ROBOTICS

Application manual

Integrated Dispensing Function Package (IDFP)

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Application manual

Integrated Dispensing Function Package (IDFP)

IRC5

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Original instructions.

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Overview of this manual

About this manual

In the interests of safe operation and to avoid personal injury and material damage:

- the application manual must be read carefully and understood,
- all safety instructions in this manual and the applicable documents must be observed and complied with,
- the application manual must always be at the application robot and constantly observed,
- all necessary work at the application robot must be carried out in compliance with all safety instructions.

The present application manual applies to all persons using IDFP - Integrated Dispensing Function Package. These are, but do not exclude others: operating personal, maintenance personal, commissioning personal and programmers. It describes construction, function and handling of the function package.

The present application manual describes the assembly, operating principle and handling of the function package for gluing and bead sealing applications using the ABB doser. It is viewed as an "assembly guide" for an incomplete machine pursuant to the Machinery Directive 2006/42/EC regarding machines and amending Directive 95/16/EC (revised version) as of May 2006.

The function package is made up of the robot, the respective application for gluing or sealing and optional material supply. This application manual describes the standard scope of delivery for a function package. All superior system functions are not included within this scope. The application manual conveys all the necessary knowledge to the user on the safe and correct handling of the application robot in its individual product life phases. It describes the functional connections of the robot to its application, the material supply, as well as the electrical and electronic control components.

The application manual contains all information required for safe use, comprehensive safety instructions and all relevant technical data. It does not replace the extensive technical and safety training of the staff entrusted with working at the application robot.

Notes on the application manual

Technical specifications and details about dimensions and weights were valid at the time this application manual went to print. Your particular application robot version may vary slightly from this information; however, this does not detract from the correctness and validity of the basic technical information supplied, and no claims can be made on this basis.

Deviations from the text and pictorial statements are possible and are dependent on the technical development, equipment and accessories of the application robot.

Terms

Appendices

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Continued

The 15 Appendices chapter lists the other applicable documents. They include circuit diagrams, assembly and operating manuals for the function package and its components.

The documents are attached as separate documents. Chapter 15 Appendices contains an overview of the appendices.

Appendix

The Appendix to this application manual lists the following information:

- A System parameters
- B Error messages updated from Excel list
- C List of interfaces updated from Excel
- D Statistical data

Usage

This manual should be used during:

- installation, from lifting the robot to its work site and securing it to the foundation, to making it ready for operation
- maintenance work
- repair work and calibration.

Intended use

The application robot is designed solely for the automated application of sealants or adhesives on workpieces. The application robot is intended solely for the purpose listed in this application manual. Any other use is considered as unintended and is not allowed.

The operator alone is liable for any damage arising from the non-intended use of the application robot. The manufacturer assumes no liability for personal injury or damage to property caused through misuse or procedural errors, improper operation or commissioning, or inadequate maintenance.

The application robot must be operated only by trained and authorized skilled personnel subject to compliance with all safety notices and instructions listed in the respective documentation. ABB Automation GmbH provides all the necessary training in the area of the robot in a comprehensive training program.

Safe and error-free use and the operating safety of the application robot can only be guaranteed subject to use in compliance with the intended use in accordance with the specifications set out in this instruction manual.

Intended use includes observation of and adherence to all the safety notices and instructions specified in this application manual, as well as all applicable regulations of regulations from DGUV(Deutsche gesetzliche Unfallversicherung, german statutory accident insurance) and the valid laws in relation to environmental protection. Intended use also includes compliance with the operating and maintenance regulations prescribed in this operating manual.

Foreseeable misuse

The following is considered as foreseeable misuse

- the use of material whose properties lie outside the permissible values,

Continues on next page

- the use of material outside the permitted temperature range, as well as
- the use of the application robot outside the defined spatial limits

Observe the *Technical data on page 61*.

Approval must be sought from ABB Automation GmbH before a material is used.

The application robot can only be operated in accordance with the intended use. It is imperative all specifications stated therein are observed. Any other use or further use is considered as impermissible misuse. The manufacturer assumes no liability for damage arising from misuse. A list containing all open materials is available on request.

Who should read this manual?

This manual is intended for:

- installation personnel
- maintenance, programming and commission personnel
- repair personnel.

Prerequisites

A maintenance/repair/installation personnel working with an ABB IDFP must:

- be trained by ABB and have the required knowledge of mechanical and electrical installation/repair/maintenance work.

Organization of chapter

The Manual is organized in the following chapters:

Chapter	Contents
Safety	Safety information that must be read through before performing any installation or service work on IDFP. Contains general safety aspects as well as more specific information about how to avoid personal injuries and damage to the product.
About the IDFP	Basic product and system information that describes what components include and what general functions have.
Installation and commissioning	Required information about lifting and installation of the IDFP.
Maintenance	Step-by-step procedures that describe how to perform maintenance of the IDFP. Based on a maintenance schedule that may be used to plan periodical maintenance.
Repair	Step-by-step procedures that describe how to perform repair activities of the IDFP. Based on available spare parts.
Calibration	General information about calibration. Procedures that do not require specific calibration equipment.
Decommissioning	Decommissioning information of IDFP and its components.
Reference information	Useful information when performing installation, maintenance or repair work. Includes lists of necessary tools, additional documents, safety standards, etc.
Spare parts	Spare parts with the reference No.
Appendix	Reference drawings of the IDFP

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References

Documentation referred to in the manual, is listed in the table below.

Document name	Document ID
Getting Started - IRC5 and RobotStudio	
IRC5 with FlexPendant	
RobotStudio	
Introduction to RAPID	
Troubleshooting for control system and robot	
Product manual of respective robot model	
RAPID Operating Manual	
RAPID Instructions, Functions and Data Types: Description and syntax of all RAPID instructions, functions and data types	
RAPID Kernel: A formal description of the RAPID programming language	
System parameters: Description of system parameters and configuration processes	
Technical reference manual - RAPID overview	
Technical reference manual - System parameters	
Product Manual IPS Structure	

Revisions

Revision	Description
1.0	First edition. 31.03.2011
2.0	New hardware concept. 23.02.2015
2.0	Added correction/comments 13.11.2015
2.1	Revision 01.05.2016
2.1	Added correction/comments 15.09.2016
2.1B	Regular update 15.12.2017
2.1C	Content revision 27.07.2018
A	Transferred to Skribenta. Doser and pumps are added.

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Revision	Description
B	Released with 6.12.1930.00. • Added safety information. • Updated error log message. • Updated weight of IDC with air conditioning unit in *Transportation on page 128*. • Updated to better reflect current versions of external software in *Software on page 248* • Minor corrections.
C	Released with 6.12.1930.00. • Updated technical data information of barrel pump in *Technical data of barrel pump on page 64*.
D	Released with 6.12.1930.00. • Corrected error messages.

Product documentation, M2004

Categories for documentation

The documentation is divided into a number of categories. This listing is based on the type of information in the documents, regardless of whether the products are standard or optional.

All documents listed can be ordered from ABB. The documents listed are valid for M2004 robotic systems.

Product manuals

All hardware, mechanical products and controllers will be delivered with a Product manual that contains:

- Safety information
- Installation and commissioning (description of mechanical installation, electrical connections)
- Maintenance (description of all required preventive maintenance procedures including intervals)
- Repair (description of all recommended repair procedures including spare parts)
- Additional procedures, if any (calibration, decommissioning)
- Reference information (article numbers for documentation referred to in Product manual, procedures, lists of tools, safety standards)
- Parts list
- Foldouts or exploded views
- Circuit diagrams (or references to circuit diagrams).

Technical reference manuals

The technical reference manuals describe the IRC5 software in general and contain relevant reference information.

- *Technical reference manual - RAPID overview*: An overview of the RAPID programming language.
- *Technical reference manual - RAPID Instructions, Functions and Data types*: Description and syntax for all RAPID instructions, functions, and data types.
- *Technical reference manual - RAPID kernel*: A formal description of the RAPID programming language.
- *Technical reference manual - System parameters*: Description of system parameters and configuration workflow.

Application manuals

Specific applications (for example software or hardware options) are described in Application Manuals. An Application Manual can describe one or several applications.

An application manual generally contains information:

- The purpose of the application (what it does and when it is useful).

Continues on next page

- What is included (for example cables, I/O boards, RAPID instructions, system parameters).
- How to use the application.
- Examples of how to use the application.

Operating manuals

The operating manuals describe hands-on handling of the products. The manuals are aimed at those having first-hand operational contact with the product, that is production cell operators, programmers, and trouble shooters.

The group of manuals includes:

- *Operating manual - Emergency safety information*
- *Safety manual for robot - Manipulator and IRC5 or OmniCore controller*
- *Operating manual - Getting started, IRC5 and RobotStudio*
- *Operating manual - IRC5 with FlexPendant*
- *Operating manual - RobotStudio*
- *Operating manual - Introduction to RAPID*
- *Operating manual - Troubleshooting IRC5*

How to read the application manual

Reading the procedures

The procedures contain all information required for the installation or service activity and can be printed out separately when needed for a certain service procedure.

Safety information

The manual includes a separate safety chapter that must be read through before proceeding with any service or installation procedures. All procedures also include specific safety information when dangerous steps are to be performed.

Read more in the chapter *Safety on page 21*.

Illustrations

The product is illustrated with general figures that does not take painting or protection type in consideration.

Likewise, certain work methods or general information that is valid for several product models, can be illustrated with illustrations that show a different product model than the one that is described in the current manual.

1 Safety

1.1 Overview

Overview

The safety information in this manual is divided in two categories:

- general safety aspects, important to attend to before performing any service work on the machine controller system. These are applicable for all service work and are found in *General safety information*.
- specific safety information, pointed out in the procedure at the moment of the danger. How to avoid and eliminate the danger is either detailed directly in the procedure, or further detailed in separate instructions, found in *Safety related instructions*.

1.2 Safety principles

The robot with application equipment is state-of-the-art technology and was designed according to the generally accepted safety-related rules and regulations. The basic safety and health requirements of the applicable laws, standards and guidelines were applied. These include the machinery directive as well as the following standards: DIN EN ISO 10218-1, DIN EN ISO 12100, DIN EN ISO 13850, DIN EN ISO13849-1. The declaration of incorporation confirms conformity with the currently valid directives and regulations of the European Union.

All safety instructions specified in the application manual and at or on the robot with application equipment must be adhered to. In addition, the generally valid regulations on accident prevention and environmental protection must be complied with. Likewise, all national and international rules and mandatory regulations on operational safety and accident prevention in the respective country of use must be adhered to. Accidents arising during the use of the robot with application equipment, which have resulted in personal injury and/or damage to the working environment, must be reported to the manufacturer directly and immediately.

The robot with application equipment must only be used in a technically perfect condition and for the areas of use and purpose described in this application manual. Any other use or use which exceeds these limits shall be considered as improper and is not permissible. The manufacturer shall not be held liable for damage and hazards to life and limb of the user or third parties, or for adverse effects on the robot with application equipment and other material assets arising from such use.

The risk is carried by the owner operator alone.

The robot with application equipment may only be operated by trained and authorized personnel in compliance with all safety instructions specified in the associated documentation. Personnel must be familiar with the warning notes and measures contained within this manual. Only if it used as intended in accordance with the information in this application manual can safe and error-free use and the operational safety of the robot with application equipment be assured.

1.3 General safety information

1.3.1 Safety operation

For safe operation and to avoid personal injury and material damage and for permanent assurance of the safety of the robot with application equipment, the following safety rules must be observed:

Application manual:

- Read through this manual carefully.
- Observe all warning information.
- Follow all instructions and safety regulations.
- Keep this manual within easy reach at the place of use at all times.

Robot with application equipment:

- Observe all safety instructions at or on the robot with application equipment.
- Always keep the information signs in an easily legible condition.
- Observe all inspection and maintenance intervals specified in the application manual.
- Keep the work cell of the robot with application equipment free from foreign bodies.
- Do not make any changes to the software of programmable control systems.

Area of work:

- Secure all stored tools, aids and work equipment against falling, rolling away, slipping or dropping.
- Regularly check all safety equipment for good accessibility and completeness, proper fastening and correct operation.
- Stop the robot with application equipment immediately when persons enter the hazard area. This also applies to emergency situations.

Spare parts and wearing parts:

- Use only spare parts and wearing parts as well as auxiliary products and service fluids that meet the technical requirements specified by the manufacturer.

1.3.2 Safety in the machine controller system

Validity and responsibility

The information does not cover how to design, install and operate a complete system, nor does it cover all peripheral equipment, which can influence the safety of the total system. To protect personnel, the complete system must be designed and installed in accordance with the safety requirements set forth in the standards and regulations of the country where the machine controller is installed.

The users of ABB industrial machine controllers are responsible for ensuring that the applicable safety laws and regulations in the country concerned are observed and that the safety devices necessary to protect people working with the machine controller system are designed and installed correctly. Personnel working with machine controllers must be familiar with the operation and handling of the industrial machine controller, described in the applicable documents, e.g. User's Guide and Product Manual.

Connection of external safety devices

Apart from the built-in safety functions, the machine controller is also supplied with an interface for the connection of external safety devices. Via this interface, an external safety function can interact with other machines and peripheral equipment. This means that control signals can act on safety signals received from the peripheral equipment as well as from the machine controller.

Limitation of liability

Any information given in this manual regarding safety, must not be construed as a warranty by ABB that the industrial machine controller will not cause injury or damage even if all safety instructions are complied with.

Related information

Type of information	Detailed in document	Section
Installation of safety device	Product manual for the machine controller	Installation and commissioning
Change operating modes	Operating manual -IRC5 with FlexPendant	Operating modes
Restricting the work space	Product manual for the machine controller	Installation and commissioning
Safety information about the machine controller	Product manual for the machine controller	Safety
Safety information about the FlexTrack	Product manual-FlexTrack	Safety

1.4 Safety risks

1.4.1 Safety risks during installation and service work

Overview

This section includes information of general safety risks to be considered when performing installation and service work on the machine controller.

General risks during installation and service

The instructions in the Application Manual - Installation and Commissioning must always be followed.

- Emergency stop buttons must be positioned in easily accessible places so that the machine controller can be stopped quickly.
- Those in charge of operations must make sure that safety instructions are available for the installation in question.
- Those who install the machine controller must have the appropriate training for the machine controller system in question and in any safety matters associated with it.

Nation/region specific regulations

To prevent injuries and damage during the installation of the machine controller system, the regulations applicable in the country concerned and the instructions of ABB Robotics must be complied with.

Non-voltage related risks

Safety zones, which have to be crossed before admittance, must be set up in front of the robot's working space. Light beams or sensitive mats are suitable devices.

- Parts in robot grippers might fall in case of energy loss.When dismantling/assembling mechanical units, watch out for falling objects.Be aware of stored heat energy in the controller.
- Never use the machine controller as a ladder, i.e. do not climb on the robot motors or other part during service work. There is a serious risk of slipping because of the high temperature of the motors or oil spills that can occur on the robot.

To be observed by the supplier of the complete system

- The supplier of the complete system must ensure that all circuits used in the safety function are interlocked in accordance with the applicable standards for that function, for example, the fencing.
- The supplier of the complete system must ensure that all circuits used in the emergency stop function are interlocked in a safe manner, in accordance with the applicable standards for the emergency stop function.

Complete machine controller

Safety risk:

Continues on next page

1.4.1 Safety risks during installation and service work
Continued

Hot components! Removed parts may result in collapse of machine controller!

> **CAUTION**
>
> Motors and gears are HOT after running the machine controller! Touching the motors and gears may result in burns!

Cabling

Safety risk:

Cable packs are sensitive to mechanical damage!

> **CAUTION**
>
> The cable packs are sensitive to mechanical damage! They must be handled with care, especially the connectors, in order to avoid damaging them!

Gearbox and motors

Safety risk:

Gears of the setter carriage may be damaged if excessive force is used!

> **CAUTION**
>
> Whenever parting/mating motors and gearbox, the gears may be damaged if excessive force is used!

1.4.2 Safety risks related to tools/workpieces

Safe design

Grippers/end effectors must be designed so that they retain workpieces in the event of a power failure or a disturbance of the controller.

CAUTION

Ensure that a gripper is prevented from dropping a workpiece, especially for the loading/unloading robot whose gripper is equipped with a tool changer.

1.4.3 Safety risk related to pneumatic systems

General

Special safety regulations apply to pneumatic systems.

Residual energy

- Residual energy may present in the system. After shutdown, particular care must be taken.
- The pressure in pneumatic systems must be released before starting to repair them.

Safe design

- Gravity may cause any parts or objects held by these systems to drop. Grippers with tool changers must have safety control system installed to prevent dropping the tool when not parked.
- Dump valves should be used in case of emergency as standard in FlexControl.
- Gripper design must prevent parts from falling off, or being ejected when robot moves.

1.4.4 Safety risks during operational disturbances

General

- The industrial robot is a flexible tool which can be used in many different industrial applications.All work must be carried out professionally and in accordance with the applicable safety regulations.Care must be taken at all times.

Qualified personnel

Corrective maintenance must only be carried out by qualified personnel who are familiar with the entire installation as well as the special risks associated with its different parts.

Extraordinary risks

If the working process is interrupted, extra care must be taken due to risks other than those associated with regular operation. Such an interruption may have to be rectified manually.

1.4.5 Risks associated with live electric parts

Voltage related risks, general

- Although troubleshooting may, on occasion, have to be carried out while the power supply is turned on, the robot must be turned off (by setting the mains switch to OFF) when repairing faults, disconnecting electric leads and disconnecting or connecting units.
- The mains supply to the robot must be connected in such a way that it can be turned off outside the robot's working space.

Voltage related risks, controller IRC5

A danger of high voltage is associated with the following parts:

- Be aware of stored electrical energy (DC link, Ultra Cap unit) in the controller.
- Units inside the controller, e.g. I/O modules, can be supplied with power from an external source.
- The mains supply/mains switch
- The transformers
- The power unit
- The control power supply (230 VAC)
- The rectifier unit (400-480 VAC and 700 VDC. Note: Capacitors!)
- The drive unit (700 VDC)
- The drive system power supply (230 VAC)T
- The service outlets (115/230 VAC)
- The customer power supply (230 VAC)
- The power supply unit for tools, or special power supply units for the machining process.
- The external voltage connected to the control cabinet remains live even when the robot is disconnected from the mains.
- Additional connections.

Voltage related risks, robot

A danger of high voltage is associated with the robot in:

- The power supply for the motors (up to 800 VDC).
- The user connections for tools or other parts of the installation (max. 230 VAC, see chapter Installation and commissioning in the application manual).

Voltage related risks, tools, material handling devices, etc.

Tools, material handling devices, etc., may be live even if the robot system is in the OFF position. Power supply cables which are in motion during the working process may be damaged.

1.4.6 Heavy weight of the module

Improper handling can cause physical injuries of the worker!

For handling the module use suitable transport and lifting equipment!

1.4.7 Pressurized material

Technical defects or incorrect handling can cause pressurized material to escape.

Splashing or spraying material can cause severe eye injuries!

Carry out regular visual inspections of the material supply lines. Relieve the working pressure before starting work. Wear your personal protective clothing.

1.5 Safety actions

1.5.1 Safety fence dimensions

General

Install a safety cell around the robot to ensure safe installation and operation. Fixed guard and movable guard must comply with ISO 13849 or IEC62061 or IEC 61508.

Dimensioning

Dimension the fence or enclosure to enable it to withstand the force created if the load being handled by the robot is dropped or released at maximum speed. Determine the maximum speed from the maximum velocities of the robot axes and from the position at which the robot is working in the work cell.

Also consider the maximum possible impact caused by a breakaway or malfunctioning rotating tool or other device fitted to the manufacturer.

For detailed information about the fence, please see the layout drawing of the Integrated Dispensing Function Package.

Note

There must be necessary distance between the tooling storage and the fencing to ensure safety.

1.5.2 Fire extinguishing

Note

Use a CARBON DIOXIDE (CO_2) extinguisher in the event of a fire in Integrated Dispensing Function Package!

1.5.3 Safety measures regarding technical condition

Check the robot with application equipment for damage and proper condition before each deployment. Check all component connections daily for secure seating. The technical condition must meet statutory requirements at all times.

In the event of personal hazard or changes in operating behaviour, take the robot with application equipment out of operation immediately. Report the incident to your supervisor or the owner operator.

Only connect the robot with application equipment to the supply lines which were provided and designed for the purpose.

Replacement and spare parts must be changed according to the systems. Changes affecting security relevant properties must not be done.

No changes, additions or conversions may be performed on the robot with application equipment without the consent of the manufacturer. This also applies to the installation and set-up of safety and protection devices or safety valves.

1.5.4 Safety measures for transport, assembly and installation

The following safety requirements must be observed during transport, assembly and installation of the robot with application equipment:

- For transport, use only adequately dimensioned lifting appliances and accessories.
- Only use the points indicated on the robot with application equipment as slinging and lifting points.

Hints on the transport of the manipulator are given in chapter 2.2 additional main components are provided with clearly visible eye bolts.

1.5.5 Safety measures during operation

Before the initial start-up, the owner operator of the robot with application equipment is obligated to be satisfied that the robot with application equipment and its safety devices are in a safe condition and operating correctly. This is also required at appropriate, regular intervals during operation of the robot with application equipment, but at least after every repair or maintenance operation.

Depending upon operational demands, the operator must make provisions for safety features, such as, for example, safety valves, heat protection covers, temperature sensors, etc.

The initial start-up of the robot with application equipment shall be carried out in principle by operating staff authorised by ABB Automation GmbH.

- Only commission the robot with application equipment if all safety devices are fitted.
- Check the correct operation of the safety devices regularly. Any defects must be rectified immediately.
- Check all media supply connections to the robot with application equipment for leak-tightness and proper condition before commissioning.
- Check that all electrical components on the robot with application equipment are in good and proper condition before start-up.
- Do not use any materials with unknown properties. Consult the manufacturer if necessary.
- Take the robot with application equipment out of operation immediately if changes are discovered during operation.

1.5.6 Special safety measures for the "Manual mode" operating modes

There is an increased hazard risk in the "Manual mode with reduced speed" and "Manual mode 100%" operating modes. For testing to be possible, the complete system must be ready for use and all systems must be pressurised. For this reason, all activities in these operating modes must be performed exclusively by appropriately trained personnel and in compliance with all locally valid safety regulations. Protective clothing must be worn and special caution is required.

The motors of the robot with application equipment can only be activated by pressing the enabling switch at the FlexPendant. This means the robot with application equipment can only move while the enabling switch is pressed.

ABB Automation GmbH recommends the use of "Manual mode with reduced speed" for work in the protected area.

In "Manual mode 100%", the robot with application equipment moves at the programmed speed. This operating mode must only be used when all personnel are outside the protected area.

The mechanisms for the safety stop in automatic mode (AS) are completely bypassed in manual mode. To execute a program in manual mode with full speed available, both the enabling switch and the start button must remain pressed, for safety reasons.

The jog mode function makes it possible to work through a program in manual mode at full speed step-by-step or perform it completely. The enabling switch is designed so that it only has to be half pressed in order to activate the motors of the robot with application equipment. If the switch is fully depressed or not pressed in at all, the robot with application equipment does not move.

Tip

You can find more information in "Operating manual - IRC5 with FlexPendant".

1.5.7 Safety measures during maintenance and repair

All maintenance work, inspection and troubleshooting must only be performed by trained and qualified specialist personnel.

Before beginning the maintenance or repair, the system must be depressurised and this status checked at the pressure gauges. The system must also be secured against the pressure supply being switched back on.

During maintenance and repair work, some protective devices will be disabled. These must be reinstalled correctly after completion of the work and then tested for correct operation.

- Attach an information sign to the activation point of the robot with application equipment, providing information that work is being performed on the robot with application equipment.
- Perform all work on the robot with application equipment only when it is at a standstill.
- Secure the robot with application equipment against being switched back on without authorisation.
- Only use spare parts, wearing parts and service fluids that have been approved by ABB Automation GmbH.
- Do not use any aggressive cleaning agents and only use lint-free cleaning cloths. Only perform cleaning work with dry, filtered compressed air up to max. 2 bar.
- Perform visual and functional inspections after all cleaning work.
- Ensure that there are no persons in the hazard area when movements of the robot with application equipment have to be observed for inspection measures, repairs or troubleshooting measures.
- Cordon off the hazard area and secure it with warning signs.
- If a second person is needed to observe certain movements, understandings reached must be unambiguous and clear commands must be agreed in order to avoid hazards.

1.5.8 Safety measures for electrical

All work on the electrics or electronics must only be performed by an authorised electrician in accordance with the applicable electro-technical rules and the provisions of the Employer's Liability Associations. Unauthorised assembly or installation work is not permitted.

- Before beginning any work on the electrical system, switch off the main fuse. Secure the system against being switched back on without authorisation.
- Have the electrical equipment checked by an electrician in accordance with the maintenance requirements in this application manual. Eliminate all defects immediately, such as loose connections or defective or damaged cables.
- Deactivate the robot with application equipment immediately in the event of faults on the electrical equipment.
- For all work on the heating circuit, this remains energised even after activating a robot emergency stop. Disconnect the power supply to the heating circuit separately before commencing any work.
- Deenergise the robot with application equipment before inspection, maintenance and repair work. Ensure this deenergised state for the duration of the work. Also display appropriate warning signs.
- Ensure that there are no sensitive electronic devices in the immediate vicinity of the robot with application equipment during operation, as electrostatic charges can occur in the working area.
- Do not use high-pressure cleaners or steam jets to clean electrical and electronic components.
- Replace defective fuses with new ones. Defective fuses must not be repaired. New fuses must match the replaced ones in terms of design and continuous load current.
- Replace defective and charred contact points immediately.

Before connecting to the local grid, check the following:

- Are all electrical connections, safety devices, fuses, etc. properly installed, connected and earthed?
- Is the power connection provided designed in accordance with the information in the electrical wiring diagram?
- Is the supply line current-free?
- Is the emergency stop switch in position "OFF"?

1.5.9 Safety measures for the pneumatics

Only specialist personnel with special knowledge and experience of pneumatics may be commissioned with work on pneumatic installations.

Unauthorized

assembly or installation work is not permitted.

- De-pressurize the robot with application equipment before maintenance, inspection and repair work. Vent the system. Pay attention to any residual energy.
- After repair and maintenance work to the components of the pneumatic system, check the system for correct operation before putting it back into operation.
- Check all lines, hoses and screw connections regularly for leaks and externally visible damage. Eliminate any leaks or damage immediately.

1.5.10 Safety measures for handling substances harmful to health

When using substances that are harmful to the health as adhesives or sealants, all work on the robot with application equipment must be performed by trained and qualified specialist personnel only.

- Observe the information on the data sheets.
- Wear the personal protective equipment specified for handling the particular substance.

The following hazards can occur:

- Risk of acid burns
- Risk of genetic modification
- Risk of poisoning
- Risk of allergic reactions

1.5.11 Safety measures for handling flammable substances

When using flammable substances as adhesives or sealants, all work on the robot with application equipment must be performed by trained and qualified specialist personnel only. The personnel must have knowledge of appropriate measures to prevent and fight fires, which are specific to the substance used.

- Observe the information on the data sheets.
- Wear the personal protective equipment specified for handling the particular medium.

1.5.12 Safety measures for handling auxiliary products and service fluids

For all lubricants and service fluids as well as cleaning agents used in connection with the operation or maintenance of the robot with application equipment, the regulations and EC safety data sheets of the respective manufacturer with regard to storage, handling, use and disposal must be observed.

Do not use any materials with unknown properties. Consult the manufacturer if necessary.

1.6 Safety related instructions

1.6.1 General safety signals

General

This table below defines the signals specifying the danger level used throughout this manual.

Symbol	Designation	Significance
	DANGER	Warns that an accident will occur if the instructions are not followed, resulting in a serious or fatal injury and/or severe damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height, and so on.
	WARNING	Warns that an accident *may* occur if the instructions are not followed, that can lead to serious injury, possibly fatal, and/or great damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height, etc.
	ELECTRICAL SHOCK	The electrocution or electrical shock symbol indicates electrical hazards which would result in severe personal injury or death.
	CAUTION	Warns that an accident may occur if the instructions are not followed that can result in injury and/or damage to the product. It also applies to warnings of risks that include burns, eye injury, skin injury, hearing damage, crushing or slipping, tripping, impact, fall from height, etc. Furthermore, it applies to warnings that include function requirements when fitting and removing equipment, where there is a risk of damaging the product or causing a breakdown.
	ELECTROSTATIC DISCHARGE (ESD)	The electrostatic discharge (ESD) symbol indicates electrostatic hazards which could result in severe damage to the product.
	NOTE	Note symbols alert you to important facts and conditions.
	TIP	Tip symbols direct you to specific instructions, where to find additional information or how to perform a certain operation in an easier way.

Continues on next page

1.6.1 General safety signals
Continued

Warning signs

This table below defines the meaning of the signs on the robot with application equipment.

Meaning	Warning signs (examples)
Warning against hazards from the robot with application equipment after removal of the cover	 xx2000000994
Warning against uncontrolled movements of the robot with application equipment with the brake released	 xx2000000995
Warning against possible risk of crushing caused by the robot with application equipment	 xx2000000996

Continues on next page

Meaning	Warning signs (examples)
Warning against possible risk of toppling of the robot with application equipment	 xx2000000997
Risk of injury due to tensioned springs	 xx2000000998
Indication of safety regulations in the application manual	 xx2000000999

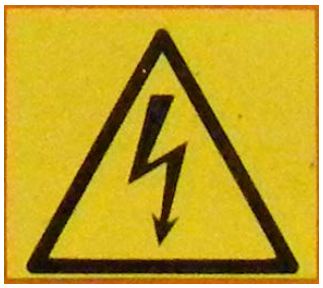
Continues on next page

1.6.1 General safety signals

Continued

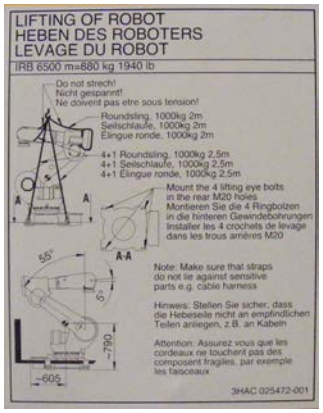
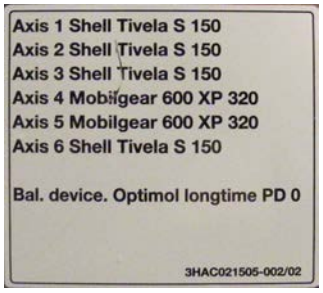
Meaning	Warning signs (examples)
Risk of burning due to hot surfaces	 xx2000001000  xx2000001009
Warning against possible hazards when handling the pump	 xx2000001010
Warning of possible crushing hazard	 xx2000001011

Continues on next page

Meaning	Warning signs (examples)
Electrical hazard	 xx2000001012

Other signs

This table below defines the meaning of the signs on the robot with application equipment.

Meaning	Warning signs (examples)
Indication of exact alignment of the robot with application equipment	 xx2000001013
Information on lifting the robot with application equipment	 xx2000001014
Information on permissible oil types	 xx2000001015

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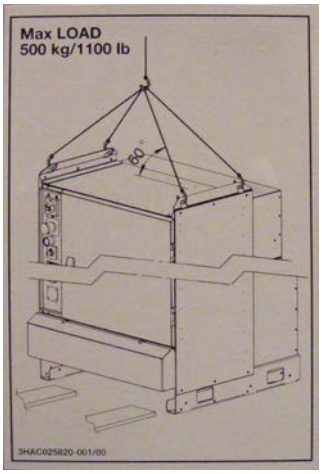
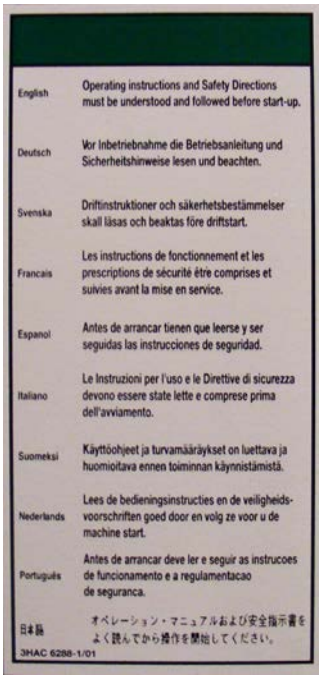
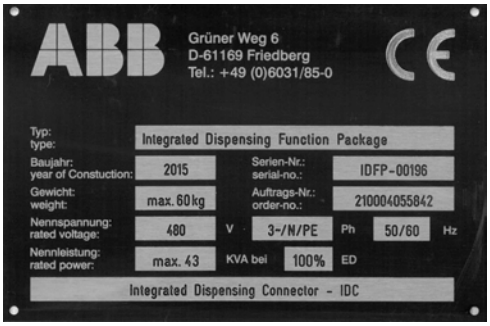
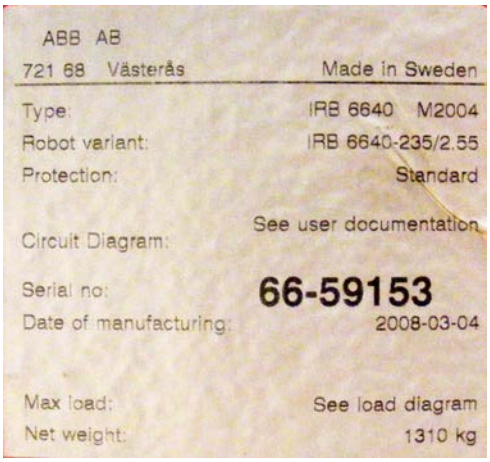
1.6.1 General safety signals
Continued

Meaning	Warning signs (examples)
Information on transporting the robot with application equipment	 xx2000001016
Information on oil types to be used	 xx2000001017
Information on operating manual	 xx2000001018

Continues on next page

Rating plates

This table below defines the meaning of the signs on the robot with application equipment.

Meaning	Rating plates
Total package Information on: • ABB contact details • Type designation • Year of manufacture • Serial number • Order number • Rated voltage • Rated power • Sub-components	 xx2000000914
Robot Information on: • Manufacturer (company, country) • Type • Variant • Protection class • Circuit diagram • Serial number • Date of production • Max. handling weight • Net weight	 xx2000001019
Dispenser Information on: • ABB contact details • Description • Serial number • Year of manufacture • Weight • Pressure	 xx2000001020

1.7 General duties of the owner operator

The owner operator is obligated to use the robot with application equipment only in a perfect and safe condition. He must ensure that, in addition to the safety instructions in this application manual, the generally applicable safety and accident-prevention regulations as well as the environmental protection requirements of the respective country of use are observed and fulfilled.

The owner operator is advised to:

- have the personnel confirm in writing that they have taken note of the contents of this application manual
- carry out officially recognised training courses or training courses offered by the manufacturer in the country of use and have participation in such courses confirmed in writing by the personnel.

1.8 Requirements for personnel

Any person who is commissioned with performing work on the robot with application equipment must be trained and instructed and must have read and understood the entire application manual before beginning the corresponding work.

For security reasons the personal should wear protective clothing. These include safety shoes, gloves, safety glasses and tight clothes.

1.9 Safety equipment and protective devices

The robot with application equipment can be equipped with a wide range of safety devices, such as door locks, light curtains, safety mats and others. Depending on the operational requirements, the owner operator may provide further safety provisions. Their description, where the safety mechanisms are fitted and how they work can be found in the operator's documentation on the system or cell.

Note

Manipulation of the safety devices and protective equipment in any way is strictly prohibited. In the event of an accident, manipulation of safety equipment will be regarded as wilful intent.

Note

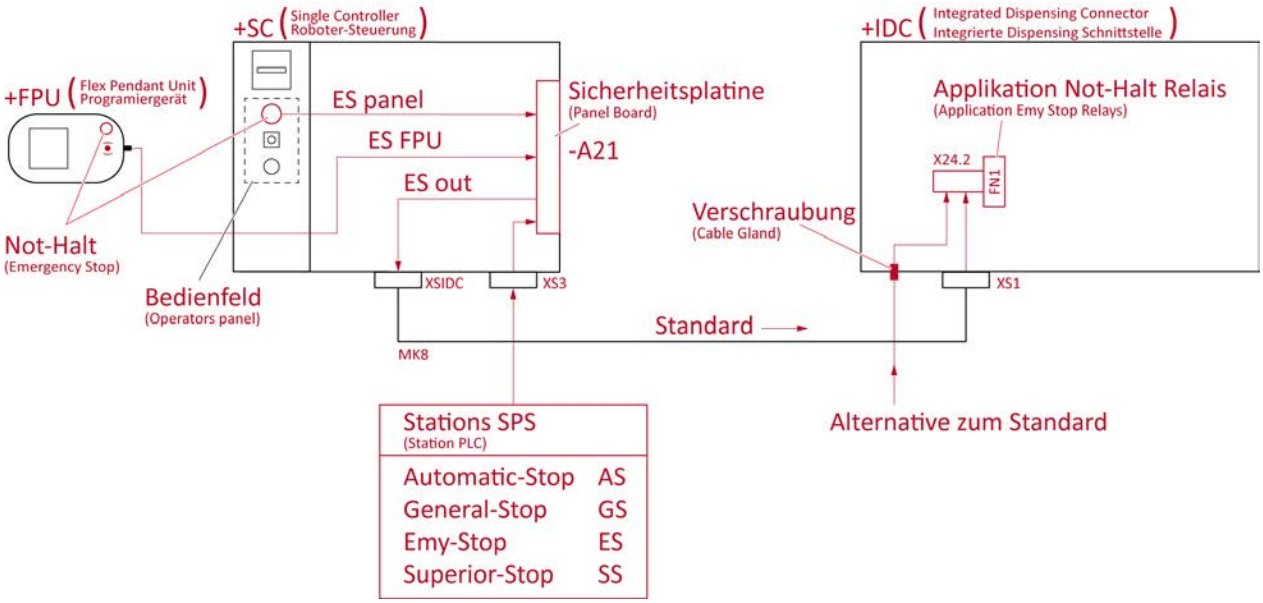
The doser only stops in the case of correct engagement in the emergency-stop chain.

Observe the connection information in *Technical description on page 77*, as well as in the wiring diagram chapter +1SC.

The wiring diagrams can be found in *Appendices on page 611*.

1.10 Safety configuration with direct electric connection

The function package is equipped with an emergency-stop connection between the robot controller and application controller.



xx2000001021

Note

If this connection is separated, other measures must be implemented to ensure that the doser and optionally integrated pump are switched off in the event of an emergency stop.

The emergency-stop signal of the station controller can be fed directly into the application controller (IDC) as an option.

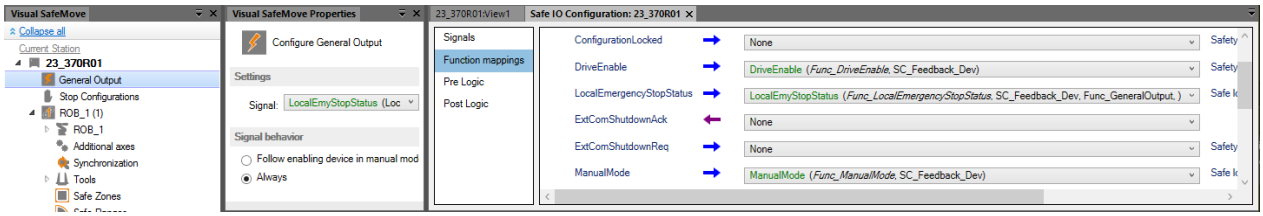
The connection options for the emergency stop are explained in *Technical data on page 61*.

1.11 Safety configuration with safety module

If the robot is delivered with ProfiSafe and/or SafeMove, the main computer is equipped with a safety module. In this case the emergency stop status output is already connected to the safety module and cannot be used to directly control the IDC safety relay.

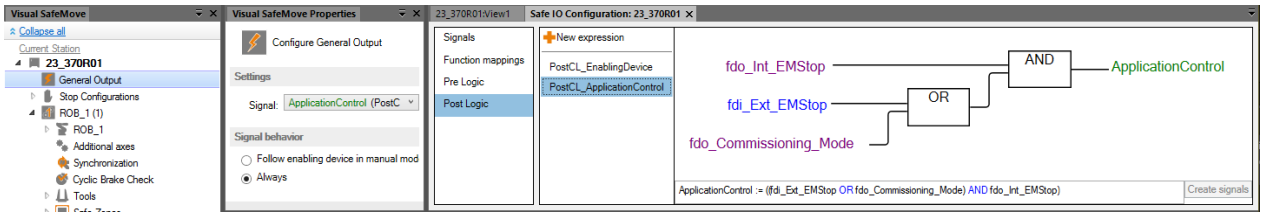
In this case the IDC safety relay is controlled via the general output of the robot safety controller. To switch on the application, the general output must be controlled via the robot safety system which is configured in Visual SafeMove in RobotStudio. As a minimum configuration, at least the internal emergency stop signal of the robot is to be used, but an extended configuration is also possible when ProfiSafe is used:

Minimum configuration with local emergeny stop



xx2000001022

Example configuration with additional external emergency stop via ProfiSafe



xx2000001023

1.12 Essential safety functions

The electrical energy supply for the drive system of the doser is disconnected in the event of an activated emergency stop by the robot using software functions and hardware contacts.

All valves at the doser are deactivated and powered off with a hardware contact. The material inlet valve at the doser is powered off with hardware contacts and therefore closed pneumatically. In addition the needle valve is closed using software functions. If the air pressure supply is interrupted, material may emerge from the nozzle.

The residual pressure in the doser is classified as harmless.

The pressure in the doser is displayed on the FlexPendant and on the pressure sensor after switch off due to an emergency stop.

The heating circuits remain active so that the system does not cool down. The electrical safety of the heating circuits is guaranteed by personal FI (fault current) monitoring.

Since IDFP S/N 00119 all inbound and outbound valves are equipped with automatic provision in basic position. Thereby it is secured that no material is leaking out of the doser even if there is a loss of compressed air.

Note

If there is no integrated material supply (optional external material supply), the customer must ensure that the material feed is safely and automatically interrupted when there is an emergency stop or over-pressure at Dispenser inlet at the function package. If an automatic shutdown is not possible in this case, appropriate warning signs must be attached at the station entrances indicating that the material feed and circulation line must be closed manually for maintenance and repair work. In this life phase the ball valves must also be protected against inadvertent opening, and a sign must be attached with the warning "Caution. Do not switch on. Work in progress".

WARNING

Risk of poisoning, chemical burns, changes to genetic make-up or allergic reactions from vapors and liquids.

Serious, possibly life-threatening, physical injuries by ingestion of hazardous substances in the human body.

- In the Setup life phase for systems without automatic shutdown, wear adequate protective clothing when you are in the vicinity of the doser.
- Find out about the risks and dangers associated with the external material supply.

Continues on next page

Tip

The safety functions of an optional integrated material supply are explained in *Appendices on page 611*.

1.13 Risk assessment

The risk assessment for the application robot was compiled on the basis of the EC Machinery Directive 2006/42/EC for an incomplete machine.

Note

Further information on risk assessment, as well as the detailed hazard assessment, are available upon request from ABB.

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2 Technical data

2.1 Technical data of function package

Note

Only data for the application technology (IDC) is specified in this chapter.

Please refer to the respective product manual for data pertaining to the robot.

Designation	Value
Connected load IDC/IDC2	IDC 2kVA (+IDC2 2kVA) (without temperature control)
with heating	max. 40 kVA
with integrated Peltier (1-4)	max. 4 kVA
Supply	3~/N/PE/200 V
	3~/N/PE/400 V
	3~/N/PE/480 V
Control voltage	24 V DC
Max. pressure	300 bar
Application processes	All usual procedures of gluing and sealing techniques
Application temperature:	Heating continuously 80 °C, short-term 100 °C Peltier: 15 - 35 °C, max. -8 /+12 to supply temperature other temperatures on request
Application precision	± 1%
Max. switching frequency of applicator	max. 20 Hz
Viscosity	For all standard sealing materials and adhesives
Material	Application technique is chosen to suit the material and approved by ABB
Compressed air supply:	filtered, dry, oil-free Compressed air quality: ISO 8573 -1:2010 (1:2:3), Particle size class 1; max 5 µm Water content: class 2; dew point < -40 °C Oil content class 3: < 1 mg/m³
Operating air pressure of doser	5.5 - 7 bar
Connection air pressure of integrated pump	5.5 - 10 bar

Continues on next page

Storage and operating conditions of the system

This table below shows the recommended transportation and storage conditions for the IDC:

Parameter	Value
Minimum ambient temperature	-10°C
Maximum ambient temperature	+70°C
Maximum ambient humidity	85% (non-condensing)
Maximum height above sea level	1,000 m

This table below shows the recommended transportation and storage conditions for the other components:

Parameter	Value
Minimum ambient temperature	+10°C
Maximum ambient temperature	+35°C
Maximum ambient humidity	65% (non-condensing)
Maximum height above sea level	1,000 m

This table below shows the allowed operating conditions for the IDC:

Parameter	Value
Minimum ambient temperature	+10°C
Maximum ambient temperature	+40°C
Maximum ambient humidity	85% (non-condensing)
Maximum height above sea level	1,000 m

This table below shows the allowed operating conditions for the other components:

Parameter	Value
Minimum ambient temperature	+15°C
Maximum ambient temperature	+35°C
Maximum ambient humidity	65% (non-condensing)
Maximum height above sea level	1,000 m

2.2 Technical data of individual components

Note

Special technical data on individual components of the application robot can be found in *Technical description on page 77* or in the relevant documents in the Appendix.

Terms technical data	Meaning
Maximum pressure	max. allowed pressure
Peak pressure	theoretically producible
Application pressure momentarily	max. programmable pressure
Nominal pressure	approved permanent pressure (for example, during circulation)
Maximum material flow	max. producible; depending on transmission
Nominal material flow	flow during application

2.3 Technical data of barrel pump

The specified data refer to a single barrel pump.

A double barrel pump consists of two single barrel pumps, but they have one single compressed air supply (See *Double barrel pump on page 175*).

Specification of air motor 250 with base pump 150

Pump capacity (air and hydraulic powered)	
Volume per double stroke	150 ccm
Max. material pressure	250 bar
Ratio	68 : 1
Max. material temperature	100°C / 212°F

Specification of air motor 320 with base pump 600

Pump capacity (air and hydraulic powered)	
Volume per double stroke	600 ccm
Max. material pressure	250 bar
Ratio	31 : 1
Max. material temperature	100°C / 212°F

Continues on next page

2.3.1 Dimensions

Type	Mass [kg]	Dimensions [mm]		
		Height	Width	Depth
30 / 50 L cold	165 kg	1,795 mm	805 mm	455 mm
30 / 50 L hot	170 kg			
200 L cold	179 kg	1,795 mm/ 2,345 mm[i]	1,070 mm	700 mm
200 L hot	184 kg			

[i] Pump raised to top position (for barrel change)

2.3.2 Connected electrical load (PIM)

Designation	Value
Infeed voltage (internal from IDC)	400/480 V / 3~/N/PE
Controller voltage	24 V
Current draw	dependent on number and type of heating elements
Fuse protection (in IDC)	32 A

The pump does not require a separate power supply.

The electrical power and 16 mm^2 grounding is supplied through the integrated connection to the IDC.

2.3.3 Connected pneumatic load

Designation	Value
Supply pressure	6-10 bar
Air quality	filtered and dried
Consumption	approx. 80 l/double stroke of one pump
Air motor ratio	1:65 filtered, dry, oil-free
Compressed air quality	ISO 8573 -1:2010 (1:2:3)
Particle size	class 1: max. 5 µm
Water content	class 2: Dew point < -40 °C
Oil content	class 3: <1 mg/m3

2.3.4 Operating and auxiliary materials

Identification	Auxiliary material	Manufacturer	
1	Multipurpose grease EP DIN51502:KP2K	WÜRTH (*www.wuerth.de*)	
2	LGEP 2.0 (heavy-duty grease)	SKF (*www.skf.com*)	
3	Mesamoll (release agent)	LANXESS (*www.lanxess.com*)	X
4	HLP 46 (hydraulic oil)	Finke (*www.finke-mineraloel-werk.de*)	

Note

The specified substances must not be substituted by others!

2.4 Technical data of hydraulic pump

2.4.1 Dimensions

Designation	Value
Dimensions (retracted) (H x W x D)	1,700 mm x 1,025 mm x 800 mm
Height extended	2,700 mm
Weight	450 kg

2.4.2 Connected pneumatic load

Designation	Value
Air pressure	6-10 bar
Air quality	filtered and dried
Volume	depends on installed pumps

2.4.3 Hydraulic oil

Designation	Value
Oil type	HLP46
Oil volume (total)	32 l
Oil volume (supply tank)	16 l
Material volume per minute	depends on installed pumps

2.5 Technical data of doser

2.5.1 General technical data

Dimensions

Dosing unit	System	Dimensions (L x W x H)	Net weight
11 ccm	Single system	200 mm x 185 mm x 540 mm	approx. 4.8 kg approx. 9 kg (with terminal box/DIB)
80 ccm	Single system	400 mm x 245 mm x 900 mm	approx. 45 kg
	Dual system	430 mm x 496 mm x 875 mm	approx. 95 kg
	2K system	260 mm x 500 mm x 955 mm	approx. 100 kg
155 ccm	Single system	425 mm x 245 mm x 980 mm	approx. 50 kg
	Dual system	425 mm x 495 mm x 975 mm	approx. 105 kg
	2K system	250 mm x 615 mm x 955 mm	approx. 110 kg
560 ccm	Single system	1,340 mm x 440 mm x 270 mm	approx. 95 kg
	Dual system	1,330 mm x 550 mm x 470 mm	approx. 190 kg
	2K system	330 mm x 550 mm x 1,330 mm	approx. 185 kg

Continues on next page

Application characteristics

Type	11 ccm	80 ccm		155 ccm		560 ccm	
Gross volume [ccm]	10.4	81		153		581	
Max. net volume [ccm]	8.8	70		138		485	
Stroke [mm] (approx.)	60	100		122		150	
Gear ratio [X:1]	15	7	9	7	9	10	12
Pressures [bar]:							
absolute max.	250	250	300	200	250	250	300
long term max. application	200	180	230	120	155	180	220
short term max. application	240	240	280	180	240	240	280
Flow [ccm/s]:							
maximal (Motor 3000 rpm)	2.9	29	22	45	35	96	80
nominal (Motor 2400 rpm)	2.3	23	18	36	28	77	64
minimal (Motor 50 rpm)	0.05	0.48	0.37	0.75	0.58	1.60	1.34
Resolution [mm^3/Motor rev.]	0.058	0.57	0.45	0.90	0.70	1.92	1.60

Power supply/rating

	11 ccm	80 ccm	155 ccm	560 ccm
Operating voltage	24 V DC	280V DC	280V DC	200V AC 3~
Rating	100 W	750 W	750 W	2500 W
Rated torque	0.32 Nm	2.4 Nm	2.4 Nm	8.1 Nm
Rated speed	3000 rpm	3000 rpm	3000 rpm	3000 min
Power transmission	Planetary gear unit Depending on product variant.			

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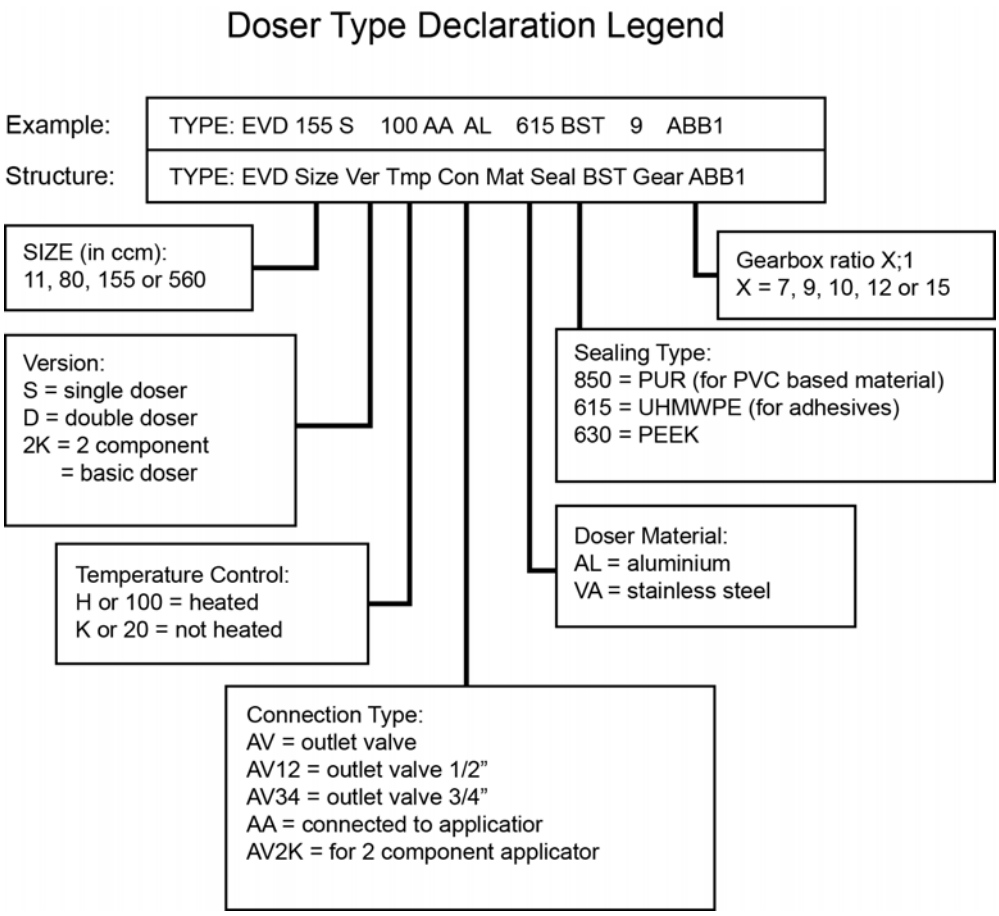
2.5.1 General technical data
Continued



xx2000002397

EVD = electronic volume doser

BST = production with provision (manufacturer code – can be ignored)

2.5.2 Operating and Auxiliary Materials

Operating and auxiliary substances	Manufacturer
Multipurpose grease LGEP 2 for high loads	SKF (www.skf.com)
Multipurpose grease LGHB 2 for high loads and high temperatures	SKF (www.skf.com)
White special Vaseline	Reiff (www.reiff-tp.de)
Paper cleaning tissues (roll) Type "Advanced 420"	Tork (www.tork.de)
Cleaning cloths WYPALL 7722	Kimberly-Clark (www.kcprofessional.com)

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3 Technical description

3.1 General

The application robot (Integrated Dispensing Function Package, IDFP for short) is designed for use in automated manufacturing in the commercial sector. Depending on the application version, it can be used for the precise and constant application of high-viscose sealants or adhesives. The application robot is made up of the robot, the respective application for gluing or sealing and the optional material supply.

The IDFP is a robot-integrated application system. Together with an ABB robot it forms a function package, in which all components are optimally coordinated. This package includes not only the mere application equipment, but the entire system of ABB robot, ABB applicator and the doser components.

Together with the optional ABB integrated material supply it is a package which covers the process from barrel to surface.

A number of various application processes can be mastered fully automated and with a robot handling system using such a function package. Market-standard high-viscose materials can be processed.

These are generally manufactured with a PVC, polyurethane or epoxy resin base.

Water-based materials, for example watery acrylates are possible with the stainless steel version of the doser.

The following table contains the abbreviations used in this section:

Abbreviation	Meaning
IDFP	Integrated Dispensing Function Package
+DIB	Dispensing Interface Box
+GK	Device-cable
+IDC	Integrated Dispensing Connector
+IDC2	Integrated Dispensing Connector 2
+K	Cartridge
+MK	Multi-cable
+PEL	Peltier
+PIM	Pump Interface Module
+RPA	RockerPanel Applicator
+SC	Single Controller
+SPA	Swivel Pointer Applicator
+FS	Filling station
PIB	Process Interface Board

Continues on next page

Limits of the operating area

According to applicable standards the application robot may only be operated within a guarding or protection device, which prevents people getting close to the application robot in automatic mode. The operator is responsible for determining the applicable standards.

The application robot can only be operated in dry rooms with suitable ventilation and at an ambient temperature between +15 °C and +40 °C.

The application robot can only be set up on a prescribed subsurface. The requirements of the subsurface are described in this application manual in *Assembly, installation and commissioning on page 133* and in the product manual of the relevant robot.

Liability for product defects

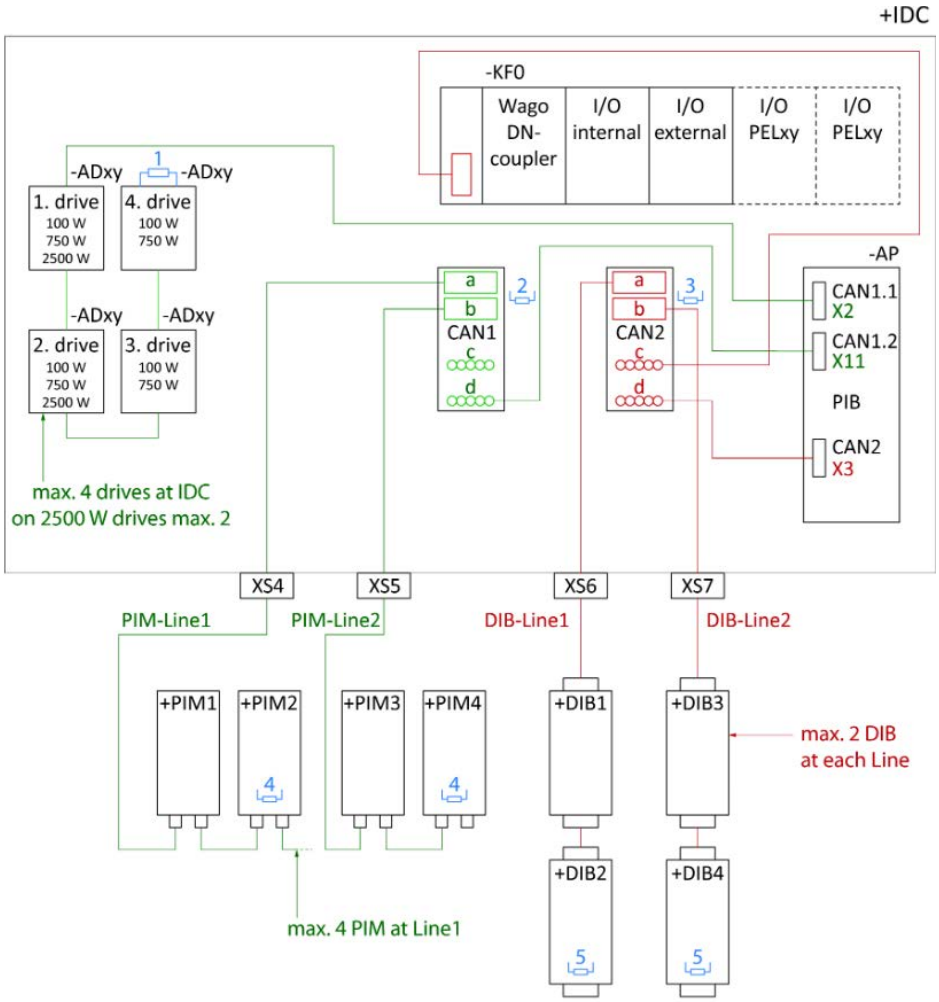
The "General Conditions for Sale and Supply" issued to the operator of the device by the manufacturer apply as a basic principle. Liability claims in relation to product defects for personal injury and damage to property are excluded, if they are attributable to one or several of the following causes:

- improper use of the application robot
- use of the application robot under limit values not agreed with ABB Automation GmbH
- improper installation, commissioning, operation, maintenance or repair of the application robot
- changes to the design and construction of the application robot without the written approval of manufacturer
- operation of the application robot with improperly installed connections and defective or improperly attached safety and protection devices
- non-compliance with the safety regulations and instructions in this application manual
- use of spare parts and wear parts, as well as cleaning agents, auxiliary and operating materials other than those recommended or prescribed by the manufacturer
- insufficient monitoring of components subject to wear
- catastrophic events caused by foreign objects or operating and maintenance instructions are available at the corresponding component in the system

3.2 Network overviews

3.2.1 Only one IDC

CAN DeviceNet for one IDC



xx2000000542

1 xx200000543 CAN terminating resistor at last drive if **no or only one** PIM cord connected.

2 xx200000544 CAN terminating resistor at point b, if **no** PIM cord connected.

3 xx200000545 CAN terminating resistor at point b, if DIB cord2 **does not** exist.

4 xx200000546 CAN termination switch at last PIM ON.

5 xx200000547 CAN termination switch at last DIB ON.

Continues on next page

3.2.1 Only one IDC
Continued

Possible variants of IDC equipment:

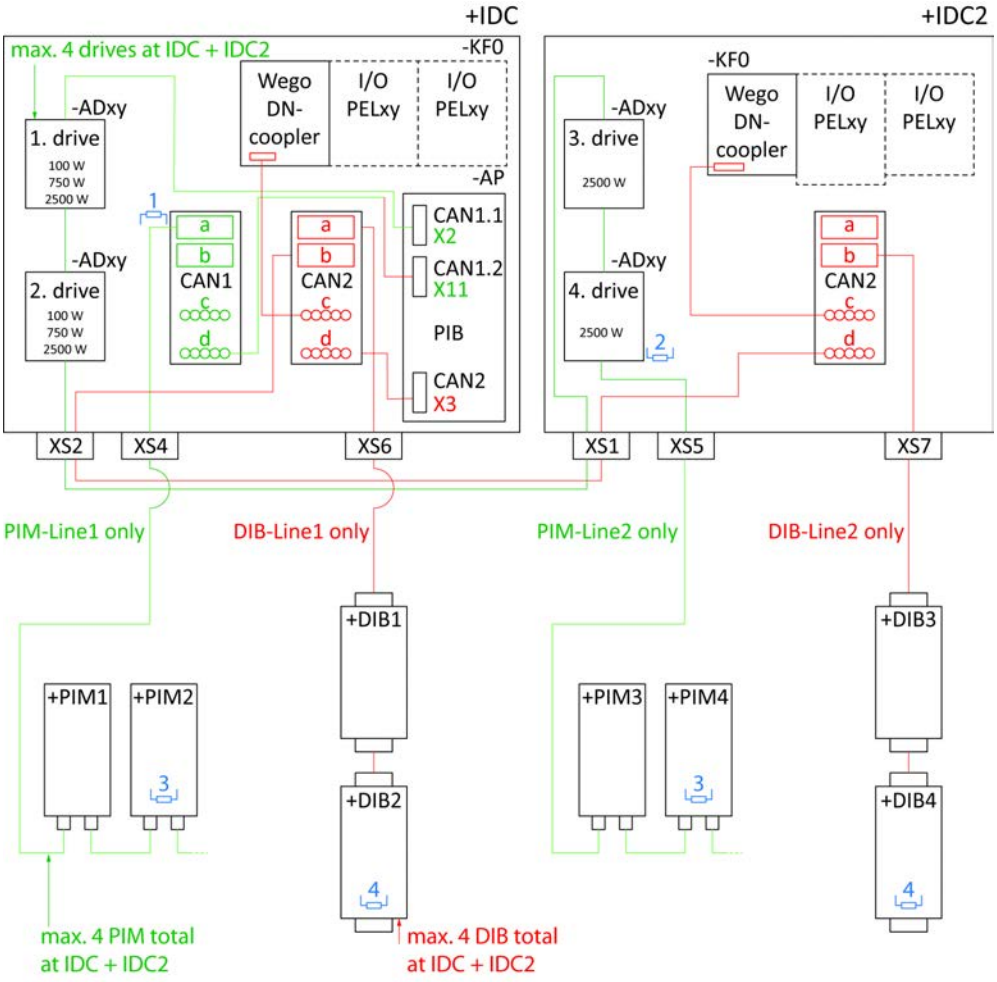
IDC			
Variant	**100 W**	**750 W**	**2500 W**
1	1-4	X	X
2	X	1-4	X
3	1-2	1-2	X
4	X	1-2	1
5	0-3	X	1
6	X	X	2

Note

A max. of four drives can be present in IDC.

3.2.2 With optional IDC2

CAN DeviceNet for two IDC



xx2000000548

1 CAN terminating resistor at point a, if no PIM cord connected.

xx2000000543

2 CAN terminating resistor at last drive, if no PIM cord2 connected.

xx2000000544

3 CAN termination switch at last PIM ON.

xx2000000545

4 CAN termination switch at last DIB ON.

xx2000000546

Continues on next page

3.2.2 With optional IDC2
Continued

The variant with IDC2 is only used if two drives with 2500 W and more are required.

	IDC			IDC2		
Variant	**100 W**	**750 W**	**2500 W**	**100 W**	**750 W**	**2500 W**
1	1-2	X	X	X	X	2
2	X	1-2	X	X	X	2
3	X	X	1-2	X	X	2

Note

A max. of four drives can be present in IDC + IDC2.

More than four may be possible upon request.

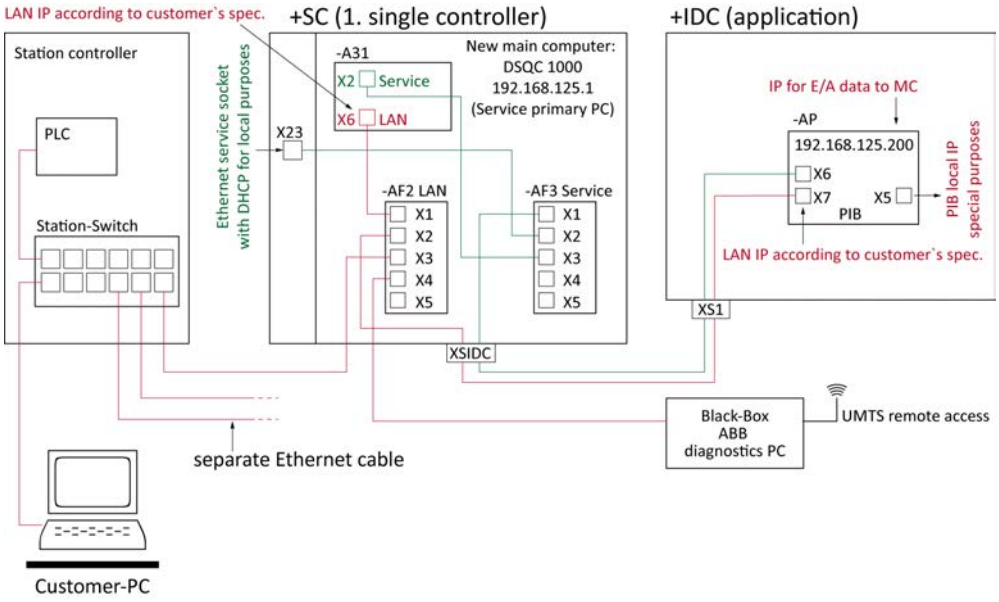
3.2.3 Can bus slave at IDC and IDC2

The application is controlled by the PIB. For this two (Can1 and Can2) Can-DeviceNet Masters are integrated there. The respective network address (Mac ID) for the slaves is allocated as follows.

Slave	Function	Mac ID
Drive	D1A	Can1: 10
	D1B	Can1: 11
	D2A	Can1: 12
	D2B/RPA	Can1: 13
	D3A	Can1: 14
	D4A	Can1: 15
PIM	P1A	Can1: 20
	P1B	Can1: 21
	P2A	Can1: 22
	P2B	Can1: 23
	P3A	Can1: 24
	P3B	Can1: 25
	P4A	Can1: 26
	P4B	Can1: 27
DIB	D1A	Can2: 10
	D1B	Can2: 11
	D2A	Can2: 12
	D2B	Can2: 13
	D3A	Can2: 14
	D4A	Can2: 15
Bus coupler IDC	IDC	Can2: 21
Bus coupler IDC2	IDC2	Can2: 22

3.2.4 Ethernet connections

Network overview part 2a with LAN switch -AF2



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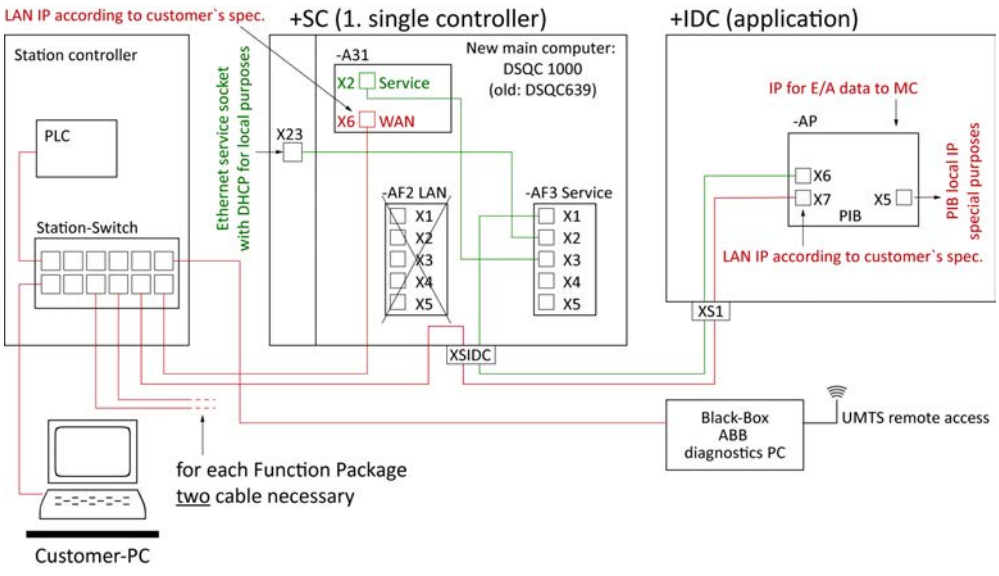
Network overview part 2b without LAN switch -AF2



xx2000000550

The customer PC is available on site and must be operational before the commissioning of the function package, i.e. it is included in the scope of delivery of the integrator of the function package.

It is connected at the station switch with fixed IP address. For a "standalone" function package, it is connected directly to the LAN-Switch (-AF2).

ABB installs the following software on this PC:

- RobotStudio for general robot programming

Continues on next page

- RobView for monitoring the application

This software is required for commissioning, maintenance and troubleshooting.

Any software provided by the customer for the visualization of the station or software for statistical purposes can also be installed on this PC.

IP addresses

In general, every function package needs two IP addresses in the station Ethernet network. Two valid addresses must be specified for commissioning, which are entered by ABB in the function package.

One Ethernet cable is sufficient to connect the station switch to **one** function package.

This LAN connection is split in the robot controller (SC) with a switch (-AF2).

- Connection to the MainComputer
- Connection to the application interface (PIB)
- A connection for the optional "Black Box", which can read data from the robot and application for temporary diagnostics purposes and makes this data available to ABB via UMTS remote access (UMTS operating license required temporarily).

Note

If two separate cables are laid to the station switch, the LAN-Switch (-AF2) in the robot controller can be dispensed with. This is possible upon request if the consequences are contractually agreed.

In this case, there must be an equipped and efficient connection to all SC and PIB in the station for a Black Box. This connection must be good as when the Black Box is connected directly at the LAN-Switch in the SC.

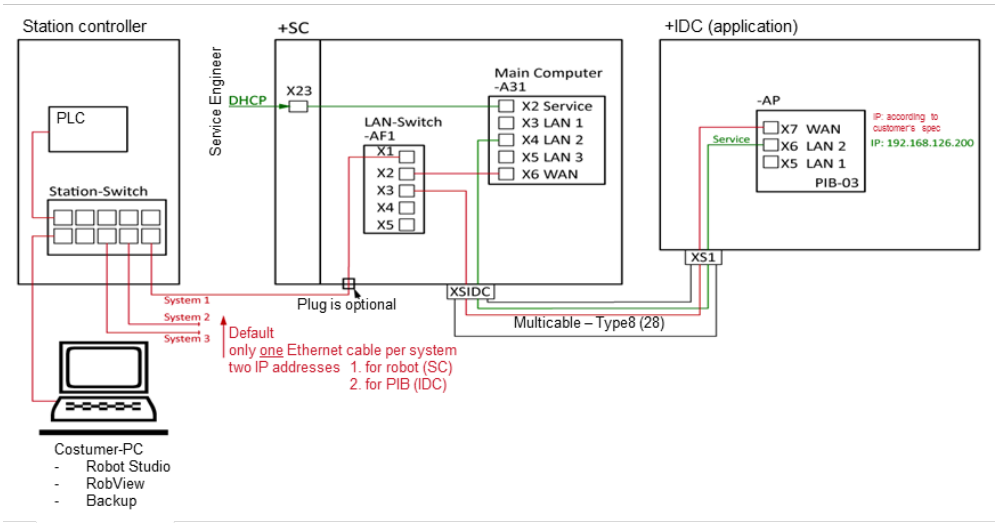
Service-Switch (-AF3)

This switch establishes the production data connection between the MainComputer and application (PIB). There is also the option locally of accessing the MainComputer externally (X23) with a DHCP connection.

This is the standard interface for ABB service personnel and cannot be removed, modified or overloaded. Only the functions for maintenance purposes agreed or described in the robot manual can be carried out. This generally does not happen during production.

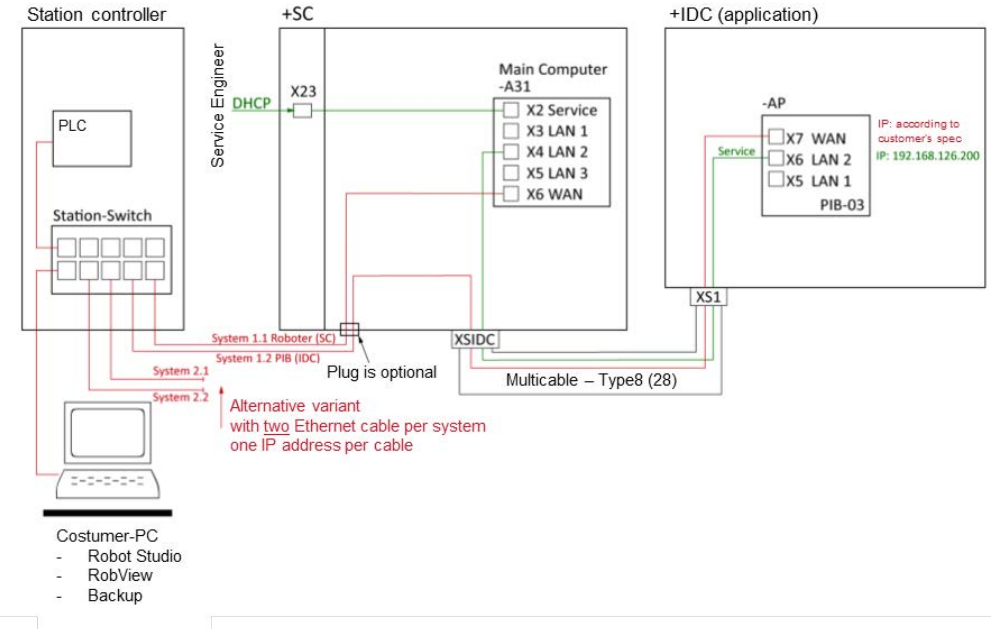
3.2.5 Ethernet variant from IDFP 00330

Network overview Part 3a Ethernet-Ab-330



xx2000000551

Network overview Part 3b Ethernet-Ab-330



xx2000000552

The customer PC is available on site and must be operational before commissioning the function package. This means that it is included in the scope of delivery of the integrator of the function package. It is connected directly to the AF1 switch (on the left beside the main computer) at X1.

ABB installs the following software on this PC:

- RobotStudio (basic version is sufficient) for general robot programming

Continues on next page

- RobView for monitoring the application

This software is required for commissioning, maintenance and troubleshooting.

Any software provided by the customer for visualization of the station or software for statistical purposes can also be installed on this PC.

IP addresses

In general, every function package needs two IP addresses in the station Ethernet network. Two valid addresses must be specified for commissioning, which are entered by ABB in the function package.

One Ethernet cable is sufficient to connect the station switch to **one** function package.

This LAN connection is split in the robot controller (SC) with a switch (-AF2).

- Connection to the MainComputer
- Connection to the application interface (PIB)
- A connection for the optional "Black Box", which can read data from the robot and application for temporary diagnostics purposes and makes this data available to ABB via UMTS remote access (UMTS operating license required temporarily).

Note

If two separate cables are laid to the station switch, the LAN-Switch (-AF2) in the robot controller can be dispensed with. This is possible upon request if the consequences are contractually agreed.

In this case, there must be an equipped and efficient connection to all SC and PIB in the station for a Black Box. This connection must be good as when the Black Box is connected directly at the LAN-Switch in the SC.

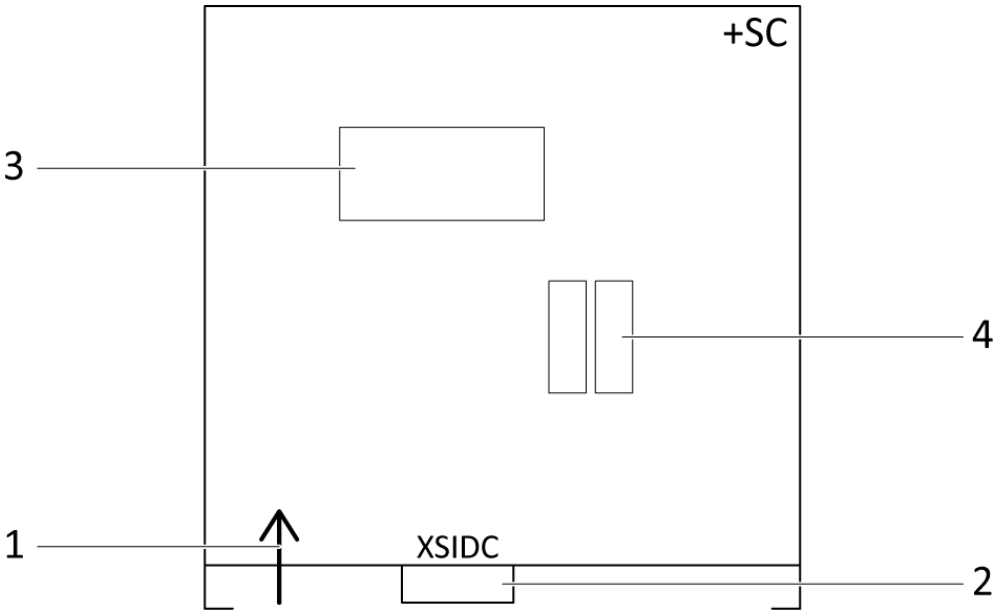
3.3 Overview of main components

The individual components of the function package are shown in detail below. Some details have been omitted in the configuration examples for reasons of clarity and simplicity (see *Configuration examples on page 116*).

Continues on next page

3.3.1 SC

Single Controller



xx2000000553

	Description
1	Supply 3~/N/PE {200, 400, 480} V plus 5 kVA transformer power supply of the drives in the IDC
2	Connection to +IDC
3	Main Computer
4	Additional "switches" for LAN and Service

A transformer (5 kVA) is also installed in the robot control cabinet (Single Controller) in order to supply the function package with 3~200 V if the feed is effected with 400 V or 480 V.

Via the additional connector XSIDC, an Ethernet connection, a safety interface and the 200 V supply for the IDC are established.

This transformer and the connector are not optional robot components, but are installed when an IDFP is put together.

3.3.2 IDC

The IDC contains the control system for the entire application equipment, which forms a completely integrated system with the direct connection to the robot controller.

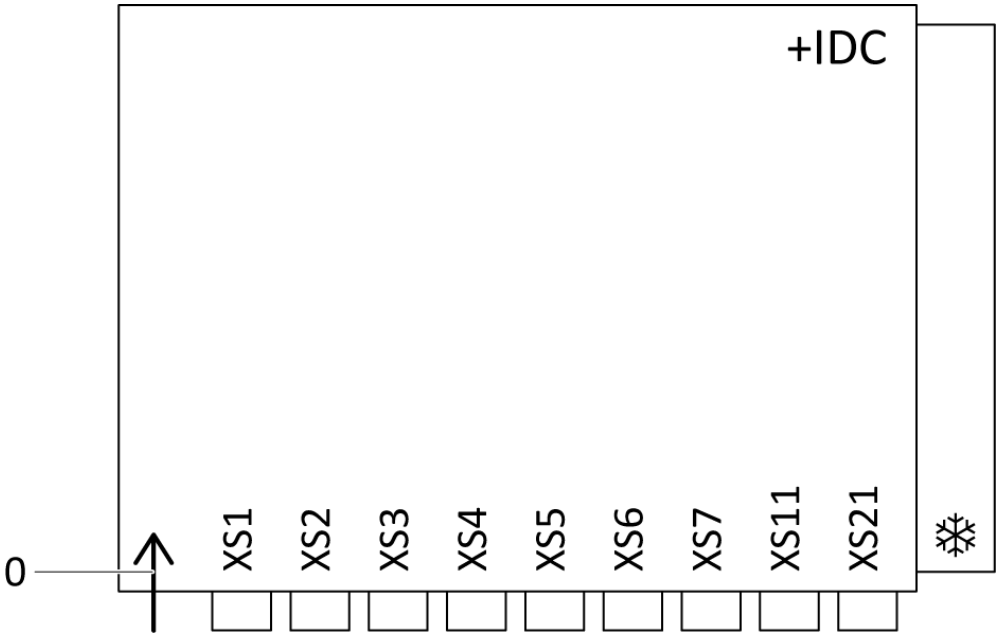
There are different variants of the IDC depending on the system configuration and ambient conditions.

If cooling is required, this is effected via the variants with a fan or an air conditioning unit (300W or 500W).

If the temperature of the material is regulated with a Peltier or heating elements, a switch for the heat output is also provided in order to switch this off independent of the entire system for repair and maintenance purposes (option IDC heated).

The standard color of the main switch on the left outer wall of the IDC is black. The version is available in yellow/red as an option, if the energy supply is effected without a superior main switch (standalone).

Integrated Dispensing Connector



xx2000000554

	Description
0	Supply 3~/N/PE {200, 400, 480} V
XS1	Connection from +SC
XS2	Connection to +IDC2
XS3	Connection of additional application components/customer-specific signals
XS4	Connection to +PIM cord 1
XS5	Connection to +PIM cord 2
XS6	Connection to +DIB cord 1
XS7	Connection to +DIB cord 2 (not available, if IDC2 is used)

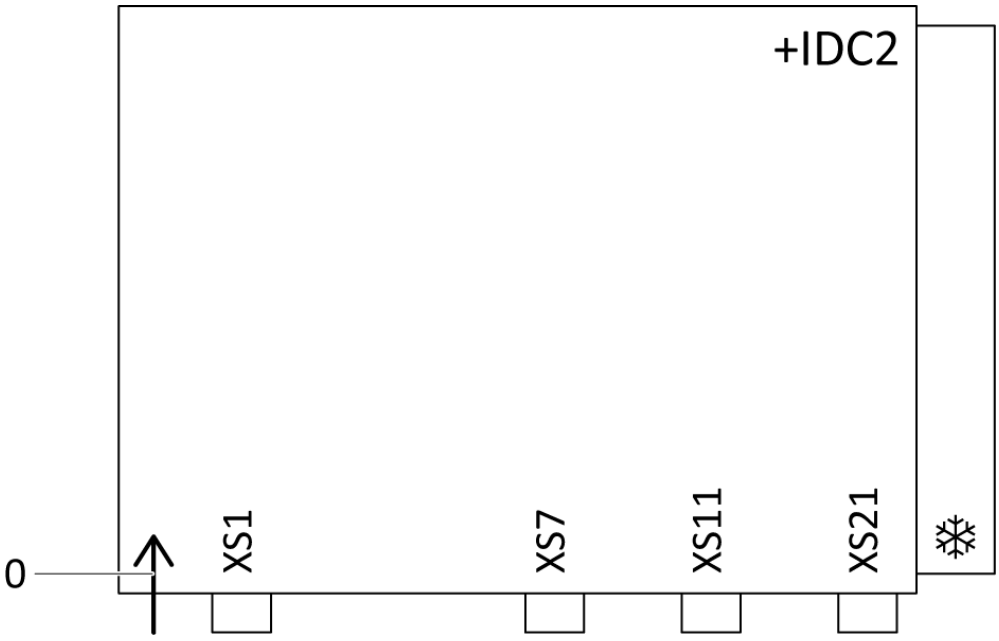
Continues on next page

	Description
XS11	Connection to +PEL XY
XS21	Connection to +PEL XY

3.3.3 IDC2

If more than four small/medium-sized dosers (size 11 ccm up to and including 155 ccm) or more than two large dosers (560 ccm) are available, they can be connected to the IDC2. The IDC2 is an additional control cabinet with the same format as the IDC and it is installed immediately beside the IDC. It is connected to the IDC with the MK 38.

Integrated Dispensing Connector 2



xx2000000555

	Description
0	Supply 3~/N/PE {200, 400, 480} V (optional, if more than 32 A is required for heat output)
XS1	Connection from +IDC
XS7	Connection to +DIB cord 2
XS11	Connection to +PEL XY
XS21	Connection to +PEL XY

Note

The XS6 connection for DIB cable 1, and XS4 and XS5 for pumps cannot be connected to +IDC2.

3.3.4 Doser and DIB

A dispenser is a higher-level unit that can consist of one or two dosers that dispense the same material.

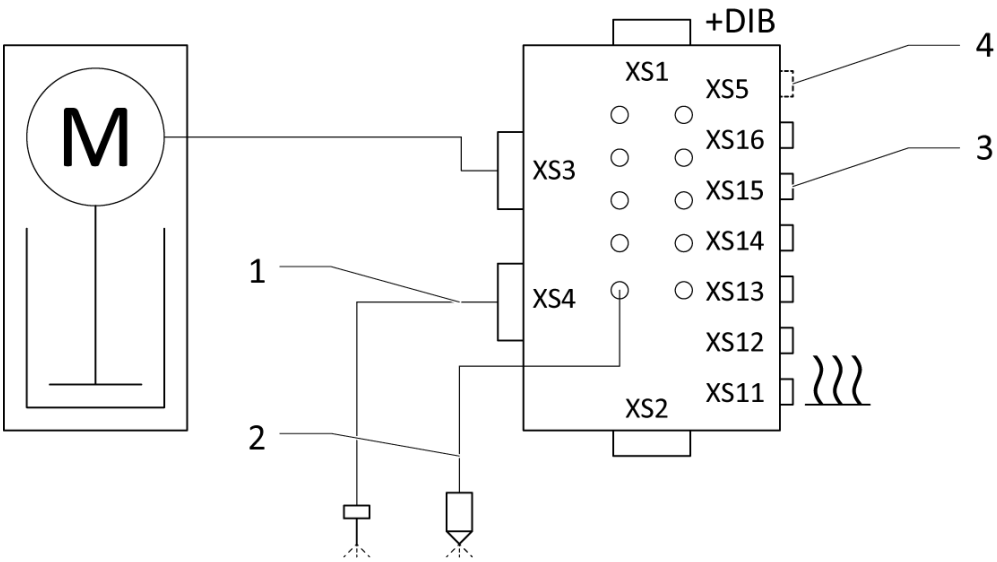
A dispenser is actuated as a single unit in the movement program via the bead data for application of material or for special functions with corresponding commands (see *Programming and parameterization on page 367*).

A doser is the mechanism (consisting of components such as motor, material chamber, transmission, valves, sensors and heating circuits, if necessary) that doses material.

The DIB (Dispensing Interface Box) is the interface of the doser to the IDC.

It forms a unit with the doser.

Dispensing Interface Box



xx2000000556

	Description
1	Applicator with sensor system (for e.g. SPA410)
2	Gluing applicator
3	Heating circuits 1-6
4	Applicator heating upon request
XS1	Connection to +IDC
XS2	Connection to +DIB (if more are available)
XS3	Motor connection

Various doser sizes and configurations are available for different applications.

Continues on next page

3.3.4 Doser and DIB
Continued

Single dosers are most suitable for applications where a known quantity of material is applied and there is sufficient time between two application cycles to refill the doser.

Single doser with heating sleeve

xx2000000557

If more material is required, then another doser size can be selected or the dual doser option can be used.

In dual mode it is also possible to apply continuous beads. Thanks to the Swap function (see *Programming and parameterization on page 367*), the switching point has no negative effects on the quality of the bead.

Dual doser

xx2000000558

Depending on system configurations, dosers can be attached at different locations.

Continues on next page

The doser can be guided by the robot, in this case the applicator is mounted directly at the doser.

Alternatively, the doser can be positioned at the upper or lower arm of the robot or move on an optional 7th axle or be stationary beside the robot. In these cases the applicator is connected to the doser outlet via a hose.

The key parameters (standard) of the doser are listed in *General technical data on page 72*.

Note

Depending on the chosen transmission the generated maximum pressure must be considered in the selection of the used hoses and seals. The hoses supplied with the IDFP are designed for operating the mentioned pressures.

Note

The maximum pressure that can be achieved depends on the volume flow rate selected.

The specified maximum flow refers to the maximum motor speed of 3,000 rpm. At this level it is no longer possible to use shoot filters.

11 ccm doser

The 11 ccm doser is mainly suitable for applying small quantities of material on smaller components.

The doser piston is driven by a motor at a power of 100 Watt.

80 ccm doser

The 80 ccm doser enables the gluing of larger components.

The doser piston is driven by a motor at a power of 750 Watt.

155 ccm doser

The 155 ccm doser is also suitable for gluing larger components or applying bead sealing materials.

The doser piston is driven by a motor at a power of 750 Watt.

560 ccm doser

The 560 ccm doser is used mainly for applying sealing, insulating and underbody protection materials. It is also suitable for applying large amounts of adhesive.

The doser piston is driven by a motor at a power of 2500 Watt.

Tip

Further information on the respective dosers can be found in the corresponding manuals in *Appendices on page 611*.

3.3.5 Applicators

There are various versions of applicators for applying material on a workpiece.

The location of the applicator is not dependent on the location of the doser. Depending on the system configuration, it can be mounted directly at the doser outlet without a hose or permanently mounted to the doser using a hose connection or can be guided by the robot.

The robot-controlled doser is an exception. Here the applicator must be attached at the doser outlet.

Gluing applicator

For gluing applications a pneumatic applicator with a nozzle is often used for applying glue beads, frequently also called a gluing applicator.

Gluing applicators are available in different lengths and diameters.

This applicator is usually mounted directly at the doser outlet or statically mounted.

It can also be heated.

Air pressure nozzle cleaning is available as an option.

Tip

Further information on the selected applicator is available in the respective manual in *Appendices on page 611*.

Gluing applicator

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Continues on next page

Swivel Pointer Applicator

SPA 415

The SPA 415 applicator is a high-pressure multi-nozzle applicator weighing approx. 3.6 kg. It has been designed especially for robot applications with high requirements in terms of precision and quality.

The applicator is equipped with a swivel joint for optimal robot flexibility and has three individually operated nozzles. The nozzles can be arranged at various angles and with different spray patterns. The robot can swivel the nozzle head independent of the power cables and hoses.

Owing to its flexibility, the SPA 415 is primarily suited for the following applications: underbody protection, NVH (noise vibration harmonizer) and bead sealing.

The applicator is designed to process most types of single-component adhesives and sealants with medium to high viscosity.

To obtain short response times, the solenoid valves, which actuate the pistons for the material valves, are mounted on the applicator. The material is circulated across the entire length of the applicator.

The nozzle length and diameter vary depending on which nozzle is required for the respective application.

The SPA 415 applicator is available in a version with an 18-pin connector, cold with up to three nozzles, and in an 8-pin version plus 14-pin connector, heated.

It is equipped with pressure and temperature sensors as options.

SPA 415 applicator

xx2000000560

Note

The SPA 415 applicator is described in the manual "415 User Manual". The manual is listed in *Appendices on page 611*.

Continues on next page

3.3.5 Applicators
Continued

SPA 475 CS (cosmetic sealing)

The SPA 475 CS applicator is a high-pressure applicator with a single nozzle and weighs approx. 3.4 kg. It has been designed especially for robot applications with high requirements in terms of precision and quality.

The applicator is equipped with a swivel joint for optimal robot flexibility. The swivel joint enables the robot to swivel the nozzle head independent of the power cables and hoses. The nozzle head can be set to different nozzle angles and spray patterns.

A nozzle changing station is also available as an option for this applicator.

Owing to its flexibility, the SPA 475 is primarily suited for the following applications: NVH (noise vibration harmonizer) and bead sealing.

The applicator is designed to process most types of single-component adhesives and sealants with medium to high viscosity.

To obtain short response times, the solenoid valves, which actuate the pistons for the material valves, are mounted in the applicator.

The optional integrated material circulation is effected across the entire length of the applicator.

The applicator is also equipped with pressure and temperature sensors as options.

The SPA 475 version cannot be heated.

SPA 475 CS applicator

xx2000000561

Note

The SPA 475 applicator is described in the manual "475 User Manual Manual". The manual is listed in *Appendices on page 611*.

Continues on next page

2K applicator

xx2100000906

A material with several components must be mixed before the application. A 2K applicator comprises a special mixing block and the mounted mixer. The application head is a static plastic mixer, which can be replaced if, for example, material hardens in the mixer pipe.

The components are first brought together in the plastic mixer. There is no mixing in the mixing block, whereby hardening is prevented.

There are mixers in different lengths and with various mixer elements, depending on the material and mixing ratio selected.

To attach the mixer pipe at the outlet block, either a union nut is used or a protective sleeve. This increases the position accuracy of the nozzle tip and reduces any possible expansion of the plastic mixer.

Other applicators

Upon request it is possible to operate other customer-specific applicators with the IDFP. These applicators can be equipped with up to three nozzles.

Continues on next page

3.3.5 Applicators
Continued

The needles are controlled with integrated signals. For the software installation, the selection in the SystemBuilder must be made depending on the number of nozzles.

Note

Further information on customer-specific applicators must be requested from the respective manufacturer.

3.3.6 Temperature control

An optional temperature control is possible using heating circuits or Peltier elements.

Heater

Various components of the function package can be heated.

If a heater is installed, existing DIBs are designed in a heated variant. Six heating circuit connections are present on each side of the box.

The doser chamber, inlet and outlet block, applicator and material hoses, etc., are heated.

Some applicators are designed with heating, the temperatures of other applicators are controlled with heating sleeves.

An optional integrated material supply can also be heated. With the PIM hot variant, up to four heating circuits can be connected to heat material hoses and pipes or the follow-up plate of the barrel pump, etc. The follow-up plate can be heated in 3 phases.

Further information on the heated material supply can be found in *Material hoses on page 104*.

Peltier

Peltier elements are available in the following variants:

- 4-stage air-cooled, single
- 4-stage air-cooled, dual
- 4-stage water-cooled, single
- 4-stage water-cooled, dual

Peltier elements are installed in the material supply between the doser and the applicator.

Material circulation must be available.

For water-cooled Peltier elements, the customer must ensure there is a corresponding process water supply in a temperature range of +10°C to +20°C. If this temperature range is not observed, the efficiency of the Peltier elements will be adversely affected.

A maximum of two Peltier elements can be integrated in one IDC, a function package with IDC and ICD2 can have up to four Peltier elements.

Two Peltier elements can be operated per dispenser.

3.3.7 Material supply and PIM

The IDFP can be supplied with material on site.

In this case ensure that all conditions necessary for the function package are observed, in particular the dynamic material supply pressure (measured at doser inlets) if all existing dosers are filled simultaneously.

Alternatively, the material supply can be integrated in the function package. There are different versions such as barrel pumps in various forms.

Single barrel pump with heating sleeve

xx2000000563

Barrel pumps can be designed as single or double barrel pumps for barrel sizes of 30 L, 50 L or 200 L. They are connected to the application control system via a PIM.

Option barrel level sensor, that calculates remaining material in barrel and a function that provides the estimated remaining application cycles until the barrel is empty.

With a barrel pump an air pressure switch is integrated at the same time. The switch must be set to 5.5 bar so that inadequate air pressure can be detected. If the air pressure falls below this value, an error is output.

The pump air pressure must be set to a level that is high enough to generate enough pressure to sufficiently fill the doser.

Note

The pump air pressure should only be so high that the inlet pressure at the doser does not exceed 240 bar (maximum doser inlet pressure 250 bar). If this pressure is too high, an error is output, the air motor is switched off and the pressure relief valve is opened.

Continues on next page

Pump Interface Module

xx2100000764

	Description
1	Top
2	Connectors left
3	Surface
4	Connectors right
XS1	Connection from +IDC
XS2	Connection to +PIM2 and other (max. four PIM)

3.3.8 Material hoses

The high-pressure hoses are used for

- the connection between pump and doser,
- the connection between doser and applicator, as well as
- the circulation of the material back to the pump or to external material supply.

The application robot is equipped as standard with non-heated material hoses.

The diameter of the hoses is dependent on the material used and the desired rate of flow.

The following diameters are available: DN13, DN16, DN25.

Note

The hoses must be fixed and cannot be accessible. They cannot be guided over sharp edges, bent or exposed to torsion loading or come into contact with chemicals.

There is also the option to have heated hoses.

Due to the maximum available power per heating circuit, the maximum total length of a heated hose line is dependent on the diameter, which is shown in the following table.

DN	Heat output [W/m]	Max. length
13	150	10 m
16	200	10 m
25	300	7 m

Note

If other heating circuits are connected simultaneously, the overall length that can be heated may be reduced. The precise distribution of the heating circuits, as well as the available power per heating circuit, can be found in the specific wiring diagram of each project.

3.3.9 Multi-cable

The main components of every application system are connected using multi-cables. With few exceptions, the multi-cable is available in 5 m, 10 m and 20 m variants. Certain combinations can be made to achieve the necessary length.

Example of multi-cable

xx2000000565

Note

The multi-cables can be combined with each other. However, the overall length of 30 m with max. two connection points cannot be exceeded.

The following combinations are allowed:

15 m = 10 m + 5 m

25 m = 20 m + 5 m

30 m = 20 m + 10 m/15 m + 15 m

The minimum bending radius for the multi-cable is 250 mm.

The following table provides an overview of the multi-cables:

Multi-cable	Function	Length variants
MK6	IDC to DIB/DIB to DIB	5 m/8 m/10 m/15 m/20 m
MK8	SC to IDC	2.5 m/5 m/10 m/20 m
MK10	IDC to PIM/PIM to PIM	5 m/10 m/20 m
MK11	DIB to SPA 410/415 heated	6.4 m/8.2 m
MK12	DIB to SPA 410/415 cold/ SPA 470- 18	6.4 m/8.2 m
MK13	DIB to SPA 470-14	6.4 m/8.2 m
MK15	IDC to PEL	5 m/10 m/20 m
MK16	Bridge DIB to DIB	245 mm/290 mm

Continues on next page

3.3.9 Multi-cable
Continued

Multi-cable	Function	Length variants
MK17	IDC to nozzle changing station	5 m/10 m/19m
MK18	special	
MK19	Extension adapter from DIB to 100 W motor or RPA applicator	6.4 m/8.2 m
MK20	Extension for MK10	5 m/10 m/20m
MK21	Extension for MK11/MK12/MK13	10 m/15 m/20 m
MK22	Victim cable for extension of MK12	0.5 m
MK25	Extension for MK15	5 m/10 m/15 m/20 m
MK26	Extension for MK6	5 m/10 m/15 m/20 m
MK27	IDC to the nozzle change station	
MK28	Extension for MK8	5 m/10 m/20m
MK29	Extension for MK19	5 m/10 m/20m
MK30	Extension for motors (G3)	0.5 m/1 m/2 m
MK36	Like MK6 but with corrugated hose to prevent kinking	5 m/8 m/10 m/15 m
MK38	IDC to IDC2	3 m/10 m/20m
MK39	Adapter from DIB-XS3 to 100 W Motor	0.5 m/1 m/2 m/6.4 m/8.2 m
MK96	LeanID IRB 6700	6.6 m
MK106	LeanID IRB 6700	4.7 m
MK112	SPA425 without heater	6.4 m/8.2 m
MK116	Like MK16 but with bridges for heater	0.5 m
MK121	To distributor of ETA applicator	5 m/10 m/15 m
MK212	SPA425 bridge cable	0.5 m

3.3.10 Device-cable

The device-cables connect the sensors and actuators to the main components of the application system.

The following table provides an overview of the device-cables:

Device-cable	Function	Length variants
GK3	Motor 750 W with PTC and H connector	0.5 m
GK4	Motor 2500 W with PTC and H connector	0.7 m
GK5	Cable DIB to central lubrication	1 m/5 m
GK6	IDC-XS3 for applicator cleaning	15 m
GK7	IDC-XS3 for central water valve	15 m
GK8	VMT Line Runner	6.4/8.2 m
GK9	Heating element without connection cable (sleeve or block)	-
GK10	Heating element with connection cable (sleeve or hose)	0.5 m/1 m
GK11	Heating circuit connection cable for devices without connection cable	1 m
GK12	Heating circuit extension for GK 10 and 11	1 m/2 m/6 m
GK13	Heating circuit connection cable follow-up plate 3~/N/PE + PT100	5 m
GK14	Heat circuit connection cable for spear heating applicator	1,5 m
GK15	DIB to oiler switch	1,5 m
GK16	Oiler switch to oiler valve	0,5 m
GK17	IDC to pistol-cleaning-device	5 m/10 m/15 m
GK21	Motor 100 W with PTC/round connector	0.2 m
GK23	Pressure sensor without display	1 m
GK25	Doser spindle lubrication	1,5 m
GK27	Temp. sensor after Peltier	2 m
GK82	Brake resistance 82 ohms	-
GK120	CAN bus terminating resistor in the IDC	-
GK121	CAN bus terminating resistor in the external plug	-

3.4 Additional application equipment

In addition to the main components, a function package may also include other components which are listed below.

Note

The additional components must be selected in the SystemBuilder during the software installation.

Continues on next page

3.4.1 Circulation

The IDFP can be optionally equipped with material circulation.

There is an additional circulation valve at the applicator or at a process accessories plate, through which the material can be transported back to the material supply. This in turn enables the regulation of the material temperature, also when there is no application.

3.4.2 Nozzle cleaning

In order to prevent the nozzle becoming contaminated with dirt, an optional valve for nozzle cleaning can be integrated. Using compressed air this removes excess material at the nozzle, thus helping to prevent dirt contamination.

3.4.3 Nozzle changing station

A nozzle changing station can be installed for certain applicators.

This enables the use of different nozzle variants for an application without having to manually make changes. A maximum of eight different nozzles can be enabled and monitored.

3.4.4 Path correction sensor

With the IDFP a path correction sensor, for example the VMT Line-Runner, can be operated. This allows high precision of the path for robot-controlled applications.

The ABB robot is generally compatible with path correction sensor. If you want use path correction sensor (e.g. VMT line runner), the robot has to be equipped with Profinet Master/Slave option.

The IDFP does not deliver any software for communication with path correction sensor and processing its data. This has to be created project specifically.

3.4.5 Lubrication options

The IDFP can be equipped with the following lubrication methods:

A Traveling axis
- Manual (see Robot documentation).
- Automatic (see Robot documentation).
- Integrated in the IDFP (see IDFP wiring diagram, DIB1 XS31).

B Doser spindle lubrication
- An electrical lubrication unit can be supplied for every dosing spindle (on DIB1-4 XS31)

C Circulating doser sealing lubrication V2.0 (seal rinse)
- An electrical circulating lubrication system and oiler for the dosing sealings (on DIB1 and 3 XS21 or XS3 at IDC) can be installed for every dispenser (single or dual).

3.4.6 Central water valve

There is also the option to install a central water valve with the optional material tempering by water-cooled Peltier elements. With this valve the water supply of several Peltier elements can be controlled centrally.

3.4.7 Air pressure switch

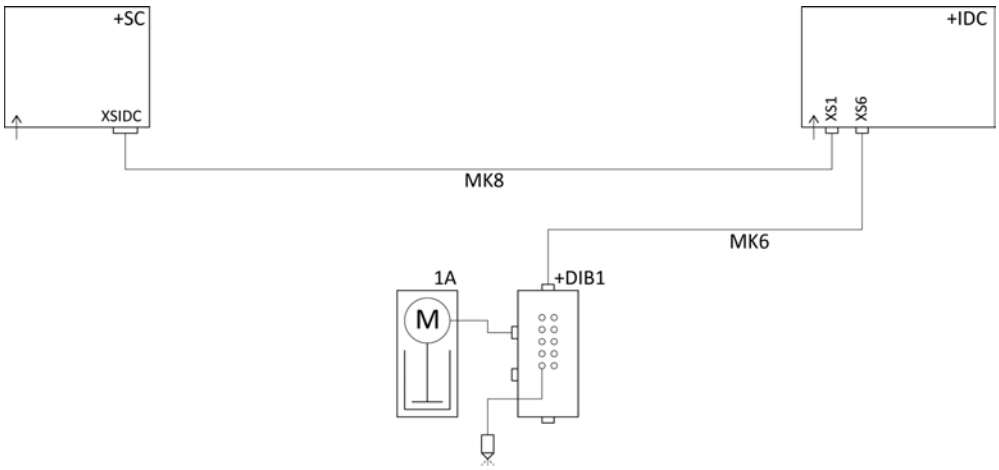
If there is an optional integrated material supply, then there is an air pressure switch which regulates and monitors the control air for the barrel pump and valves at the pump and dosers.

If there is no integrated pump, but the IDFP is supplied with material on-site, an air pressure switch can be installed on a process accessories plate at the doser. The control air can be regulated via the air pressure switch. An error is also output as soon as inadequate supply air pressure is detected.

The air pressure switch does not have to be specified separately in the software.

3.5 Configuration examples

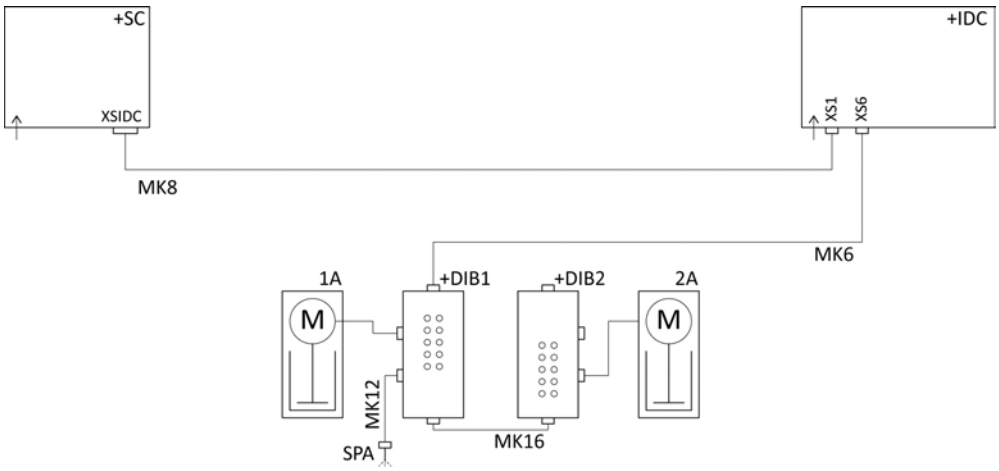
Configuration of single doser



xx2000000566

Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
One DIB cord	-
One doser	100 W/750 W/2500 W drive
Applicator	Gluing applicator

Configuration of dual doser with SPA, two materials



xx2000000567

Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
One DIB cord	-
Two dosers	100 W/750 W/2500 W drive

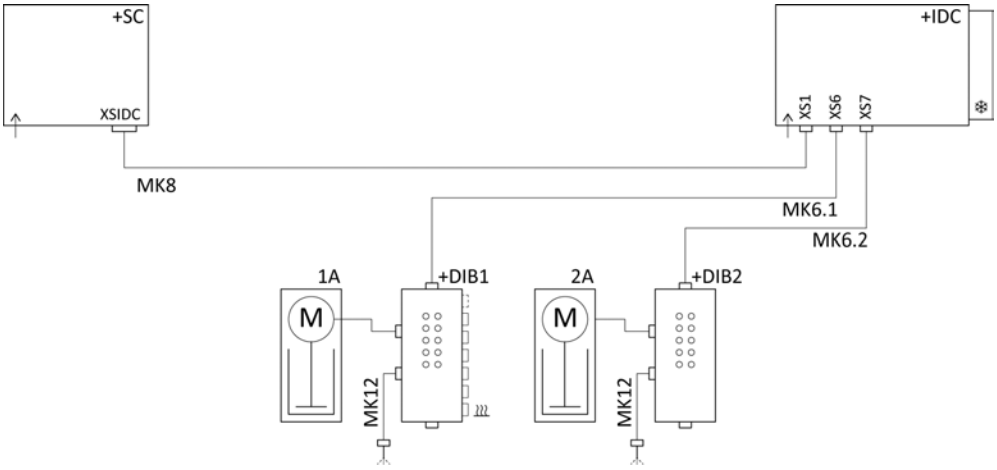
Continues on next page

Option	Variant
Applicator	See *Applicators on page 96*, SPA

Note

Only one doser with a 2500 W drive can be connected at a +IDC. It can be combined with dosers with a 100 W or 750 W drive.

Configuration with two dispensers, single doser, two materials



xx2000000568

Option	Variant
Dispenser 1	hot
Dispenser 2	cold
+IDC	with air conditioning unit 300 W/500 W
Two DIB cords	-
Two dosers	100 W/750 W/2500 W drive
Applicator	See *Applicators on page 96*, SPA

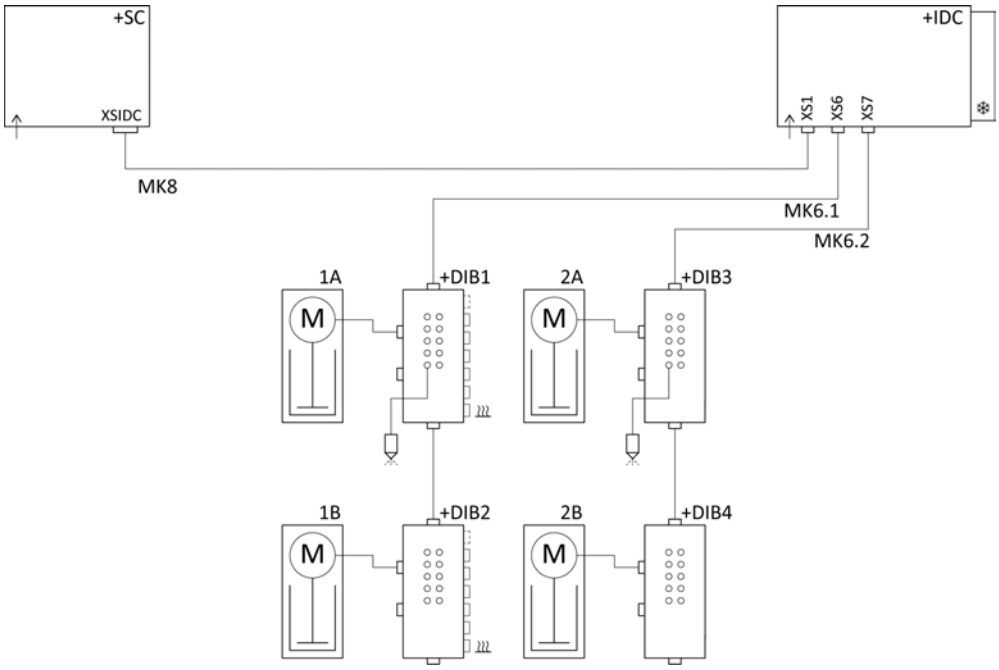
Note

Only one doser with a 2500 W drive can be connected at a +IDC. It can be combined with dosers with a 100 W or 750 W drive.

Continues on next page

3.5 Configuration examples
Continued

Configuration with two dispensers, dual doser, two materials

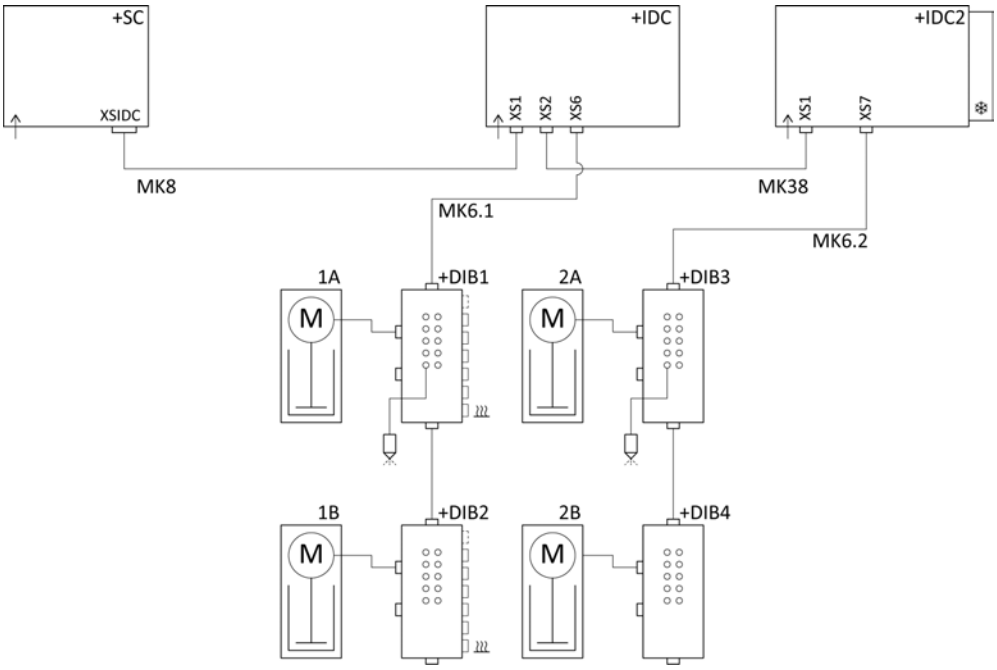


xx2000000569

Option	Variant
Dispenser 1	hot
Dispenser 2	cold
+IDC	with air conditioning unit 300 W/500 W
Two DIB cords	-
Four dosers	100 W/750 W drive
Two applicators	Gluing applicators

Continues on next page

Configuration with two dispensers, dual doser, +IDC2, two materials



xx2000000570

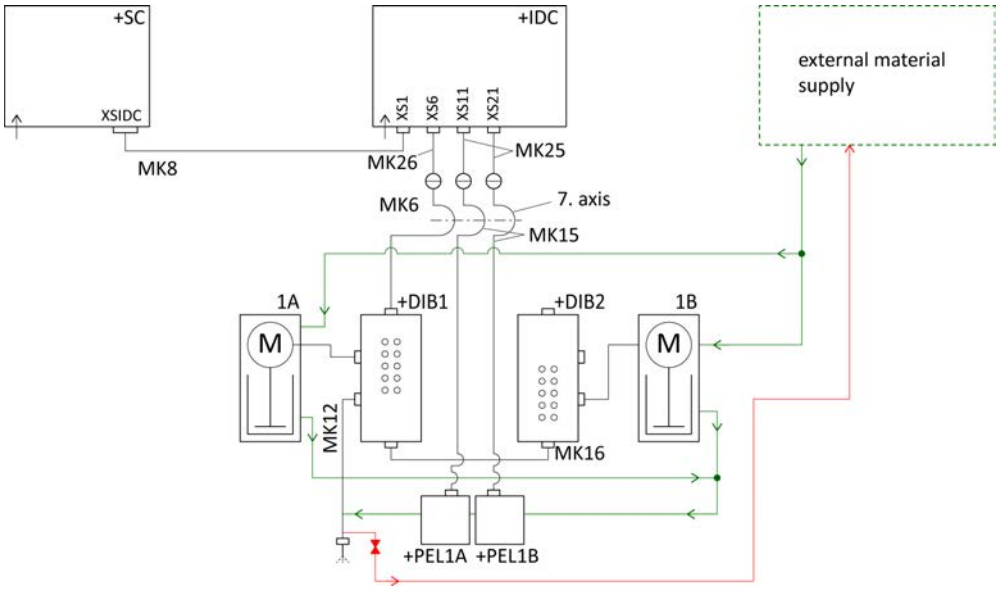
Option	Variant
Dispenser 1	hot
Dispenser 2	cold
+IDC	without air conditioning unit
+IDC 2	with air conditioning unit 300 W/500 W
Two DIB cords	-
Four dosers	100 W/750 W drive, two 2500 W drives
Two applicators	Gluing applicators

Note

Only one doser with a 2500 W drive can be connected at a +IDC. It can be combined with dosers with a 100 W or 750 W drive.

Continues on next page

Configuration with external material supply (on-site)



xx2000000571

Green line in image = Material flow

Red lines in the diagram = material circulation line

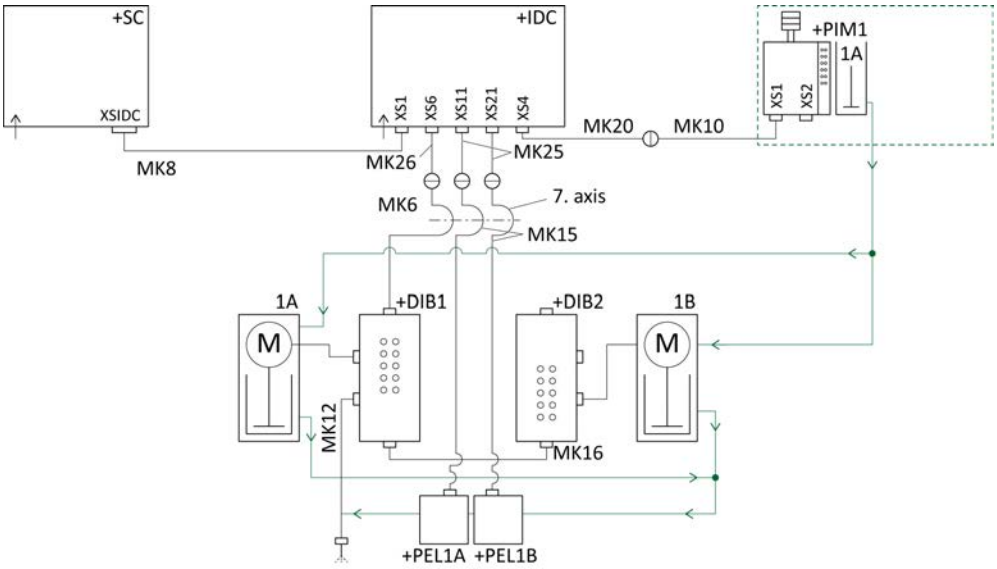
Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
One DIB cord	-
Two dosers	100 W/750 W/2500 W drive
Applicator	See *Applicators on page 96*, SPA
Peltier	4-stage water-cooled/ 3- or 4-stage air-cooled
External material supply	-
Track (7th axle, trolley)	-

Note

Only one doser with a 2500 W drive can be connected at a +IDC. It can be combined with dosers with a 100 W or 750 W drive.

Continues on next page

Configuration with integrated material supply, single barrel pump



xx2000000572

Green line in image = Material flow

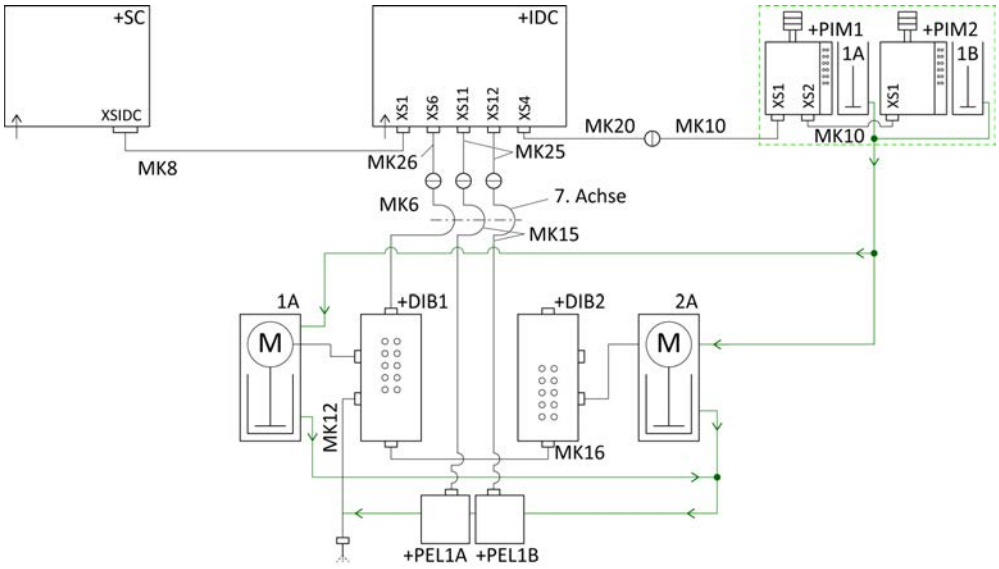
Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
One DIB cord	-
Two dosers	100 W/750 W/2500 W drive
Applicator	See *Applicators on page 96*, SPA
Peltier	4-stage water-cooled/ 3- or 4-stage air-cooled
Integrated material supply	Barrel size: 30 L/50 L/200 L
One single pump	-
Track (7th axle, trolley)	-

Note

Only one doser with a 2500 W drive can be connected at a +IDC. It can be combined with dosers with a 100 W or 750 W drive.

Continues on next page

Configuration with integrated material supply, double barrel pump



xx2000000573

Green line in image = Material flow

Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
One DIB cord	-
Two dosers	100 W/750 W/2500 W drive
Applicator	SPA
Peltier	4-stage water-cooled/ 3- or 4-stage air-cooled
Integrated material supply	Barrel size: 30 L/50 L/200 L
Dual pump	-
Track (7th axle, trolley)	-

Note

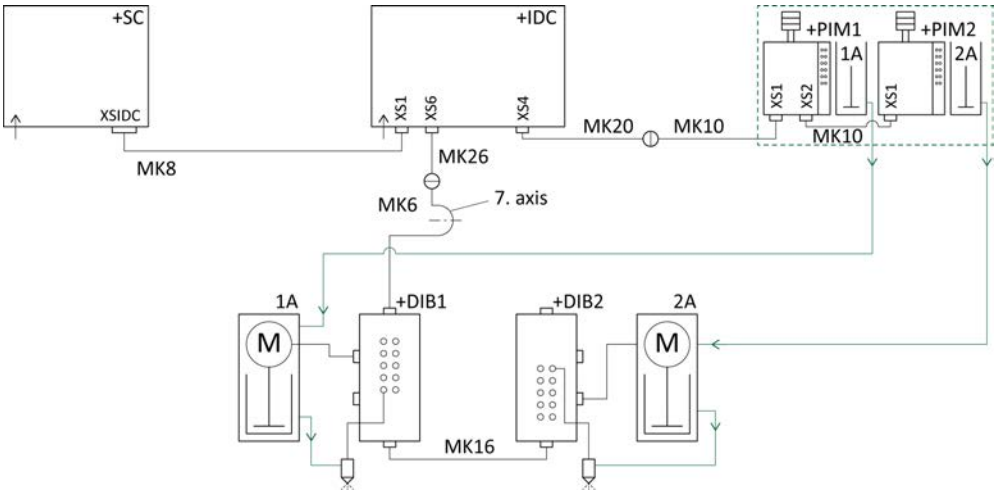
Only one doser with a 2500 W drive can be connected at a +IDC. It can be combined with dosers with a 100 W or 750 W drive.

Note

Up to four pumps can be connected one after the other. If the four pumps have to be distributed in the room, either 2x two pumps with XS5, 1x one pump and 1x three pumps with XS5 or 4x one pump can be connected.

Continues on next page

Configuration with integrated material supply, two single barrel pumps



xx2000000574

Green line in image = Material flow

Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
One DIB cord	-
Two dosers	100 W/750 W/2500 W drive
Two applicators	Gluing applicator
Integrated material supply	Barrel size: 30 L/50 L/200 L
Two single pumps	cold
Track (7th axle, trolley)	-

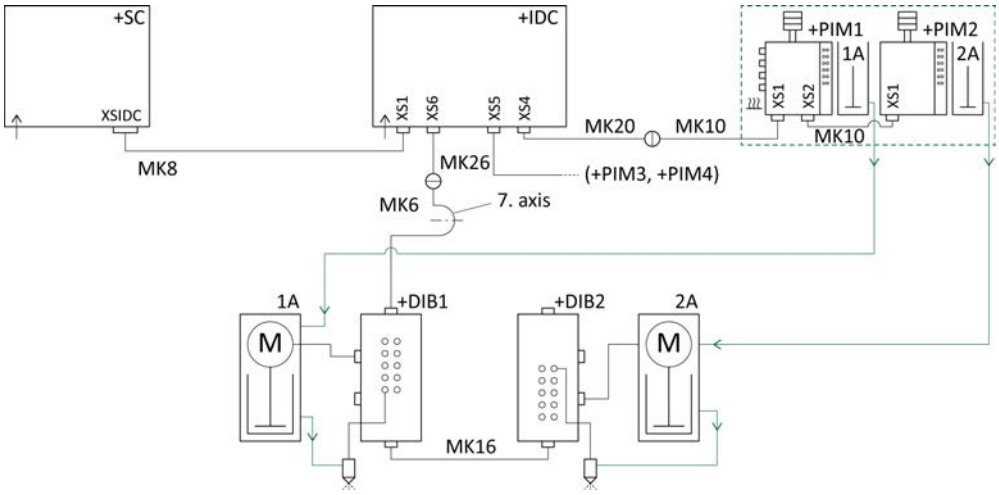
Note

Only one doser with a 2500 W drive can be connected at a +IDC. It can be combined with dosers with a 100 W or 750 W drive.

Continues on next page

3.5 Configuration examples
Continued

Configuration with integrated material supply, four single barrel pumps, two materials



xx2000000575

Green line in image = Material flow

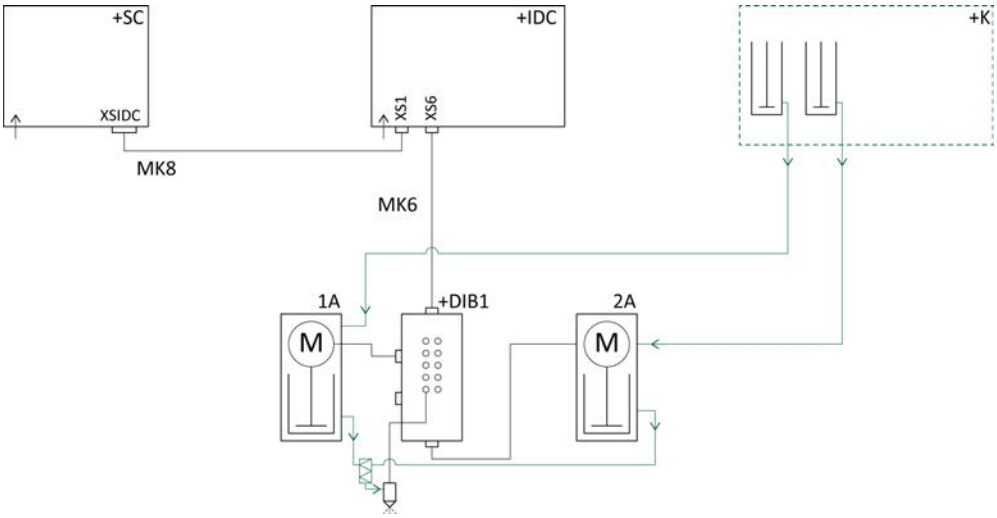
Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
One DIB cord	-
Two dosers	100 W/750 W/2500 W drive
Two applicators	Gluing applicator
Integrated material supply	Barrel size: 30 L/50 L/200 L
Two (four) single pumps	hot/cold
Track (7th axle, trolley)	-

Note

Only one doser with a 2500 W drive can be connected at a +IDC. It can be combined with dosers with a 100 W or 750 W drive.

Continues on next page

Configuration with two components and mixer, cartridge system

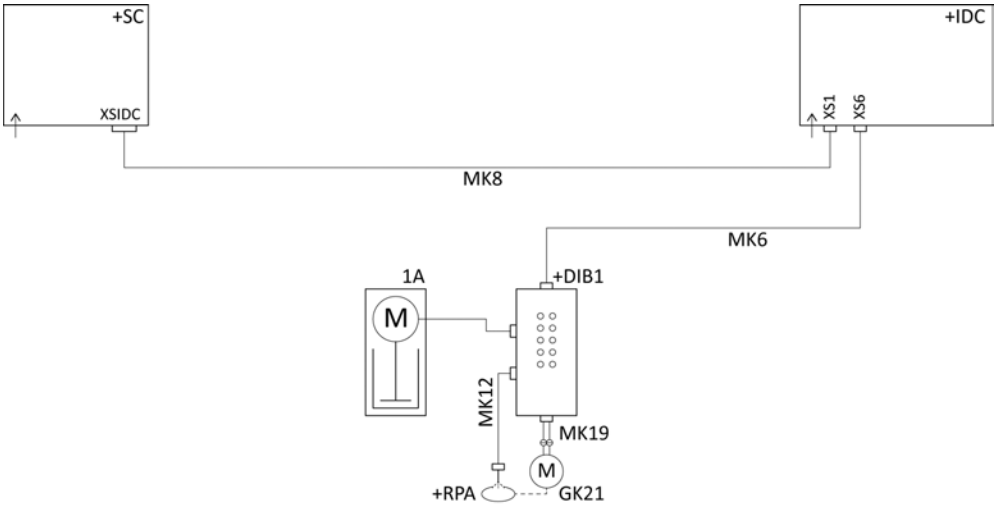


xx2000000576

Green line in image = Material flow

Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
One DIB cord	-
Two dosers	100 W/750 W drive
Applicator	2K applicator with mixer
Integrated material supply	Cartridge 2K

Configuration of 560 single doser with Rocker Panel Applicator without track



xx2000000577

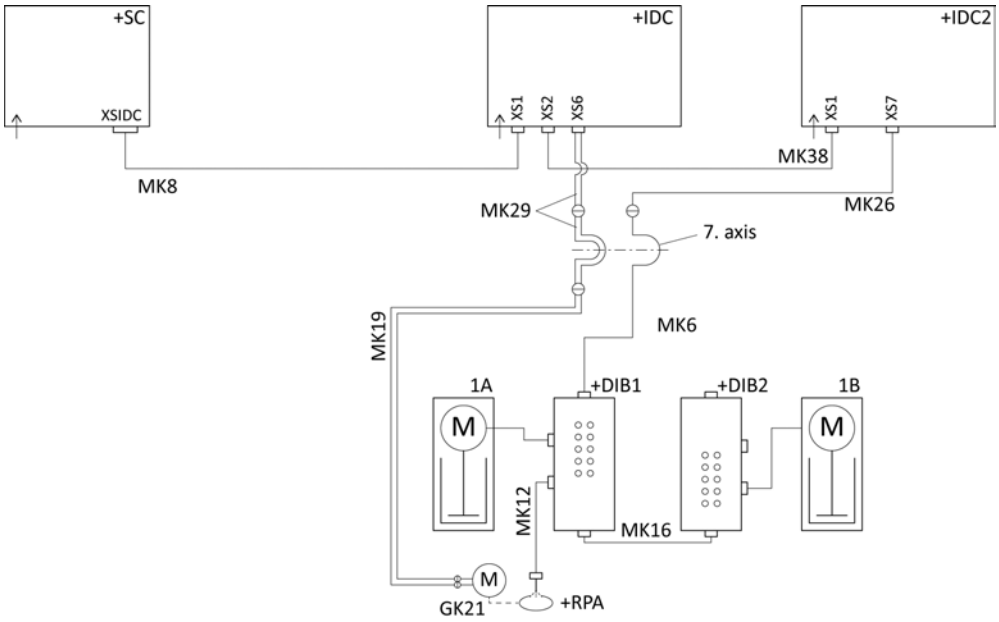
Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit

Continues on next page

3.5 Configuration examples
Continued

Option	Variant
One DIB cord	-
One doser	1x 2500 W
Applicator	RPA, drive 100 W for disk

Configuration of 560 dual doser with Rocker Panel Applicator with track



xx2000000578

Option	Variant
Dispenser 1	cold
+IDC	without air conditioning unit
+IDC2	without air conditioning unit
One DIB cord	-
Two dosers	2x 2500 W drive
Applicator	RPA, motor 100 W for disk

4 Transportation, preservation and storage

WARNING

Hazard due to untidy work, rough, slippery and uneven surfaces.

Possibility of serious, potentially life-threatening injury due to slipping, tripping and falling.

- Ensure tidy work for all transport, preservation and storage work, so that no material residues are left on the equipment parts.
- Do not leave any objects in the hazard area.
- Remove dirt deposits without leaving any residue.

WARNING

Hazard due to loss of, or reduction in, stability and steadiness.

Possibility of physical injury due to toppling or falling of the components of the robot with application equipment.

- Observe the transport instructions during transport, loading and set-up of the robot with application equipment.
- Check the specified transport position in the product manual for the robot version used.
- Use the specified transport securing devices.

Continues on next page

4.1 Transportation

WARNING

Hazard due to improper transport work.

Improperly secured parts can cause life-threatening accidents during transportation.

- When transporting the components of the robot with application equipment, ensure that adequately dimensioned hoists and slings are used.
- Secure all parts according to the regulations of the transport medium used.
- No persons may stand below suspended loads. Secure all transport routes so that no unauthorized persons can enter the hazard area.
- For more information on loads and attachment points see the applicable robot documentation and the name plates on the components.

WARNING

Risk of poisoning, acid burns, genetic modification or allergic reaction due to escaping residual quantities of medium.

If the system was already filled with a medium at an earlier time, the absorption of any residual quantities into the body can result in serious injuries to the skin, eyes or the internal organs.

For more information on loads and stop points refer to the respective robot documentation and the nameplates of the components.

CAUTION

Risk of damage to the dispenser.

If the dispenser is mounted on the hand flange, it must be disassembled for transportation in order to prevent damage.

CAUTION

Risk of environmental contamination due to leaking medium.

- Ensure that no residual quantities of medium can escape uncontrollably during transportation.
- Close all openings.
- Observe the appropriate data sheets of the manufacturer.

The IDFP is dismantled into the following individual components for transportation:

- IDC
- IDC2
- Doser
- Multi-cable

Continues on next page

- Hoses
- Optional integrated pump

Components	Transport dimensions WxDxH [cm]	Weight
IDC/IDC2	670x650x350 without air conditioning unit 800x650x350 with air conditioning unit	up to 60 kg up to 85 kg
Integrated pump	See operating instructions of the respective pump in *Appendices on page 611*	
Doser	See operating instructions of the respective pump in *Appendices on page 611*	

4.2 Application of preservative

All parts at risk of corrosion are protected by preservative.

If the system has already been filled with a medium, this must be removed without residue using suitable cleaning agents.

Suitable cleaning agents are listed in the manufacturer's documentation of the material.

CAUTION

Risk of environmental contamination due to preservatives or escaping medium.

- When handling the preservatives and the medium, check the relevant data sheets of the manufacturer.

4.3 Storage

Note

The storage duration and storage conditions are described in the respective product manual of the robot used. These conditions also apply to the whole application package.

Note

If the permissible storage duration is exceeded, all product defect claims shall be rendered null and void. ABB Automation GmbH shall not accept any responsibility for storage with medium still present and shall not be held liable for any product defect caused as a result.

For storage of the application equipment, account must be taken of whether the equipment had already been filled with medium. If this is the case, a check must be made to see whether the medium has been removed without residue or whether it can also still be stored with the equipment and, if so, under what conditions. Please observe the respective data sheets of the manufacturer.

If the medium is also stored, the hoses must be sealed air-tight and any other measures (e.g. silica gel) must be taken to prevent the medium from hardening.

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5 Assembly, installation and commissioning

WARNING

Hazard due to moving parts of the robot with application equipment.

Possibility of physical injury due to impact.

- Only stay in the hazard area for as long as absolutely necessary.
- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.
- Secure the entrance to the system against unexpected closure. Attach a maintenance sign to the access door where it can be easily seen.

  Example maintenance sign:

  Do not turn on!

  At this plant is being worked.

WARNING

Hazard due to high pressure.

Possibility of serious, potentially life-threatening injury due to the penetration of pressurized medium into the body.

- Before starting the work, perform a visual inspection of any pressurized lines and barrels.

WARNING

Hazard due to untidy work, rough, slippery and uneven surfaces.

Possibility of serious, potentially life-threatening injury due to slipping, tripping and falling.

- Ensure that you work tidily during all assembly and commissioning operations, so that no material residues are left on the equipment parts.
- Do not leave any objects in the hazard area.
- Remove dirt deposits without leaving any residue.

Continues on next page

Continued

WARNING

Hazard due to loss of, or reduction in, stability and steadiness.

Possibility of serious, potentially life-threatening injury due to the robot with application equipment toppling or falling.

- Secure the robot with application equipment immediately after set-up.
- Secure it against toppling and falling over when it is being fastened.
- Observe the manufacturer's specifications at all times.
- Please note that set-up and installation must only be performed by trained personnel and only original fasteners and spare parts approved by the robot manufacturer may be used.

WARNING

Hazard due to flammable materials.

Possibility of serious, potentially life-threatening physical injury due to naked flames.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Risk of poisoning, acid burns, genetic modification or allergic reaction due to vapours and liquids.

Serious, potentially life-threatening physical injuries due to the absorption of hazardous substances into the body.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Hazard due to operating errors.

Serious, potentially life-threatening physical injuries due to incorrect input of position data at a superordinate control system or on the robot control system.

- Only stay in the hazard area for as long as absolutely necessary.
- Work in the hazard area must only be performed by trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.

Continues on next page

Continued

WARNING

Hazard due to delayed shut-down.

Serious to potentially life-threatening physical injuries due to delayed shut-down, also during a fault or during an emergency.

- Observe the notes on shutting the system down in chapter 6.3 Special function "Shutdown" of this application manual.

WARNING

Risk of burns.

Possibility of skin injuries due to burns from hot surfaces of the dispenser.

- Note the temperature displays on the surface of the dispenser.
- Note the temperature displays on the programming device.
- Avoid body contact with hot surfaces.

Continues on next page

5.1 Assembly and connection

WARNING

Hazard due to improper use of lifting equipment.

- Note the temperature displays on the surface of the dispenser.
- Note the temperature displays on the programming device.
- Avoid body contact with hot surfaces.

Assembly of the system is carried out by employees of ABB Automation GmbH or by specialist firms authorised by ABB before the initial start-up.

Note

Corresponding training measures are provided by ABB Automation GmbH.

CAUTION

Risk of material damage through improper commissioning of application robot.

Only start up the application robot when all components and systems are fully connected and have been checked for proper functioning.

CAUTION

Risk of material damage through improper connection of systems.

Ensure that the supply lines for the supply media are connected and laid in such a way that the system components do not incur damage. Following proper connection, check all systems for tightness and proper functionality.

Note

The connection and linking of the individual system components is effected according to the plans and drawings supplied, see *Appendices on page 611*.

All cables and connections are marked accordingly.

Please contact the manufacturer if you have any technical queries:

ABB Automation GmbH

Grüner Weg 6

61169 Friedberg (Germany)

Tel.: +49 6031 85-0

Fax: +49 6031 85-113

E-mail: roboterservice@de.abb.com

Internet: www.abb.de/robotics

Continues on next page

For safe and correct assembly of the robot with application equipment at its place of work, the following conditions must be met:

- The structural design of the installation area must be prepared in accordance with the dimensions of the robot with application equipment.
- The sub-surface of the installation area must be sufficiently strong to enable safe and operationally adequate installation.
- The load capacity of the sub-surface must be designed in accordance with the specified weights of the robot with application equipment.
- The surface of the sub-surface must be sealed, horizontal and even.
- The parts to be assembled must not show any signs of damage.
- All components must not be exposed to extreme vibrations and fluctuations.
- All attachment areas must be even and free from dirt.
- All specified tightening torques must be observed (see drawing documents).
- For the performance of repair, maintenance and inspection work, the components of the robot with application equipment must be accessible at all times and must have adequate free space around them.

Continues on next page

5.1.1 Assembling the control system

Tip

Assemble the control system as described in the associated *product manual of the IRC5 controller in chapter 2 "Installation and commissioning"*.

5.1.2 Assembling the manipulator

Note

Assemble the manipulator as described in the associated *robot product manual in chapter 2 "Installation and commissioning"*.

5.2 Connecting the function package

The IDC is supplied with energy, see *Technical data on page 61*.

Depending on the configuration, the IDC is connected to the other components using a multi-cable, see *Appendices on page 611*: Single-pole representation in wiring diagram of function package.

Tip

The assembly of the individual components of the function package can be found in the respective manual in *Appendices on page 611*.

Continues on next page

5.2.1 Connecting the pneumatic system

The connection of the compressed air components to the available compressed air system is effected at the on-site service unit with a pressure reducer or at the optional integrated pump.

Note

In the case of on-site compressed air supply, this does not have to be switched off in the event of an emergency stop.

If the air pressure supply is switched off in the event of an emergency stop, it may cause uncontrolled escape of remaining material quantities in the function package. However, this is not viewed as dangerous.

Note

The connections between the individual components which have to be supplied with compressed air is effected according to the enclosed pneumatic diagram.

5.2.2 Connecting the material supply

The material supply is connected at the on-site material supply or at the optional integrated pump.

Note

For the connection of the optional integrated pump, please refer to the respective manual in *Appendices on page 611*.

The connection between the individual components can be adapted to local conditions via flexible hoses or can be established via fixed pipes.

The prescribed tightening torques must be observed for the assembly of all material guiding components.

Following the full installation of all components, the system can be filled with the corresponding material and vented. Then the material supply must be checked for tightness and proper functionality.

Before the initial commissioning, the entire pipe and hose system must be cleaned of dirt contamination which occurred during the assembly work.

CAUTION

In the case of an on-site material supply, ensure through appropriate measures that the material supply is safely interrupted when the system is accessed for maintenance or repair work.

When working on the system the remaining material pressure must be considered and appropriate protection must be worn.

CAUTION

In the event of an emergency stop or shutdown of a function package or the station, the material supply to the station must be automatically interrupted on-site.

If there is no automatic shutdown, the material supply must be interrupted by manually operated ball cocks. In this case, suitable warnings must be visibly attached at the access doors for maintenance and service personnel to make them aware of the circumstances.

Ensure that the manual ball cocks are visible and easily accessible, as well as clearly marked for this purpose.

5.2.3 Selection of operating mode

WARNING

Danger as a result of improper operation of the application robot.

- Manual mode (100%) can only be used if all personnel are outside the secured area.
- Only specially trained personnel who are aware of the corresponding risks can use this operating mode.

At the operating mode selector switch (key switch) at the controller of the robot, the following operating modes can be selected.

- Automatic mode
- Manual mode
- Manual mode (100%)

Note

A change of the operating mode must be acknowledged at the programming device after the change is made on the operating mode selector switch.

Operating mode	Description
Manual mode	• Operation effected in a production cell • An interface for the entire system is also possible
Manual mode at reduced speed	• Speed: 250 mm/s or slower • For working in the secured area • For programming • For maintenance and repairs • During commissioning of a robot system • The enabling switch must be pressed to activate the motors
Manual mode (100%)	• Operation at programmed speed • Can only be used if all personnel are outside the secured area • Can only be used by specially trained personnel who are aware of the corresponding risks • Not available for all markets • Application test at full speed • For testing programs • The enabling switch must be pressed to activate the motors

Continues on next page

5.2.3 Selection of operating mode
Continued

Bypassing safety mechanisms

Mechanisms for the safe stop in Automatic mode are fully bypassed in Manual mode.

> **Note**
>
> Further information on safety in the individual operating modes can be found in the document *"General Safety Information" for the IRC5 control system* with the document number 3HAC031045-003 in chapter 4.1.4 Safety in Manual mode and chapter 4.1.5 Safety in Automatic mode.

Enabling switch

In Manual mode the motors of the application robot are activated by the enabling switch at the FlexPendant. The application robot can only be moved when the enabling switch is pressed.

In order to implement a program in Manual mode at full speed, for safety reasons the enabling switch and the Start button must be pressed.

Using this Jog mode function, you can also work through a program step by step in Manual mode at full speed.

The enabling switch is designed so that you only have to press it in halfway to activate the motors of the application robot. The application robot does not move when the button is pressed in fully or not pressed at all.

The programming device "FlexPendant"

> **Note**
>
> Further information on the programming device "FlexPendant" can be found in the relevant operating manual "IRC5 with FlexPendant" with the document number 3HAC16590-3.

Jog mode function

Using the Jog mode function you can work through a program step by step in Manual mode or fully run the program.

Please note that a Jog mode function is not required for manual movement, regardless of the operating mode.

5.2.4 Operating mode "Manual mode"

WARNING

Danger as a result of improper operation of the application robot.

A lack of expertise or specialist knowledge may cause serious injuries. Performing setup functions when working in the cell can lead to serious injuries.

- Unauthorized individuals in the area of the application robot is not permitted in Manual mode.
- All necessary work can only be carried out by specially trained and authorized skilled personnel.

The operating mode "Manual mode" can be set, for example, for maintenance purposes by switching the operating mode selector switch and subsequent acknowledgement on the programming device.

5.2.5 Operating mode "Automatic" for operation in cell

WARNING

Danger as a result of swivelling robot arm.

- If the application robot is operated in "Automatic" mode, all individuals must be outside the protective fence.
- Before closing the protective fence of the production cell, the staff must ensure that there are no individuals remaining inside the protective fence.

In this operating mode the application robot can be operated in conjunction with other machines in a production cell via the central control system.

Note

The application of adhesive or sealant is only started when a workpiece is located in the device.

5.3 Special function "Shutdown"

The application robot is equipped with a command unit for safe shutdown.

The command to shut down the application robot takes priority over the command for starting.

Shutdown in the event of an emergency

The application robot is equipped with an EMERGENCY-STOP command unit, with which an immediate threat or impending danger can be avoided.

EMERGENCY-STOP command unit

- has clearly recognizable, visible and easily accessible controls,
- terminates the dangerous process quickly and
- triggers certain safety movements.
- If the EMERGENCY-STOP command unit is no longer operated after a stop command is triggered, this command is maintained by the blocking of the EMERGENCY-STOP command unit until it is released. It is not possible to block the device without it triggering a stop command. The device can only be released by an appropriate operation. With the release the application robot is not restarted, rather the restart is enabled.

The EMERGENCY-STOP function is available at any time and is fully operational, irrespective of the operating mode.

The EMERGENCY-STOP command units are complemented with other protective measures, but cannot replace them.

The application system is safety-connected with the robot emergency stop. In case of robot emergency stop the entire process equipment is transferred in a safe condition.

Retrofitting to other components or application processes

If the application robot has to be retrofitted to other components or application processes, ABB must be contacted before commencement of the retrofitting work:

ABB Automation GmbH

Sales & Service Robot Systems

Grüner Weg 6

61169 Friedberg

Germany

Telephone: +49 6031 85-0

Fax: +49 6031 85-297

E-mail: roboterservice@de.abb.com

5.4 Retrofitting to other material

CAUTION

Damage to the application equipment as a result of improper retrofitting.

When retrofitting to another material there is a risk that the new material comes into contact with the remainder of the old material and triggers a chemical reaction, which damages parts of the application device.

- Thoroughly clean the material system before filling a new material, if you cannot rule out a chemical reaction of the two materials.
- Observe the respective datasheets of the manufacturer for handling materials.

CAUTION

Damage to the application robot as a result of improper retrofitting.

When retrofitting to another material there is a risk that the set application parameters do not match the requirements of the new material.

- Before commissioning the application robot, adjust all application parameters to the new material.
- Observe the respective datasheets of the manufacturer for handling the material.

5.5 Installation

> **Note**
>
> The robot is equipped with the software option DispenseWare (part of the robot operating system).
>
> This option is described in the "RAPID ProcessWare/Dispense-Ware" manual. The manual is included with the documentation for the application robot.

> **Note**
>
> Some data types and functions of the DispenseWare have been modified for the Integrated Dispensing Function Package. The description in this manual is valid and replaces the definitions in the manual "RAPID ProcessWare/Dispense-Ware".

The settings and configurations of the DispenseWare, which are required for the operation of an Integrated Dispensing Function Package, are implemented and tested during prototyping and are specific to the project.

Before starting the application, ensure that:

- no safety stop is activated
- compressed air is available
- material is available
- there are no individuals in the production cell
- there are no collective faults and no error messages
- supply voltages are OK
- there are no switching-on faults

Continues on next page

5.5.1 System requirements

1. IDFP Release 5.15.x (DSQC639) or 5.61.x or later (DSQC1000 or DSQC1018)
2. RobotWare 5.15.x (DSQC639) or 5.61.x or later (DSQC1000)
3. IPS Version 4.50.19 (or later) on PIB
4. License key for robot

   The license key is supplied with the robot. It must have been created for Version 5.15 or later (Signature > 175)

Note

Necessary options:

616-1 PC Interface

617-1 FlexPendant Interface

623-1 Multitasking

641-1 DispenseWare

901-1 DispensePac Support

5.5.2 Commissioning guidelines

The commissioning guidelines are to support the commissioning. They must be followed to ensure that all items required for successful commissioning of the IDFP have been completed. The guidelines are supplied with the package on a USB stick in the IDC and in the appendix to this manual.

5.5.3 Create system in RobotStudio 5.X

1 Copy installation directory "IDFP-RW5-15"/"IDFP-RW5-60" from the IDFP file folder to the media pool:

c:\Program Files\ABB Industrial IT\Robotics IT\Mediapool\IDFP-RW5-15\ (DSQC 639)

c:\Program Files\ABB Industrial IT\Robotics IT\Mediapool\IDFP-RW5-60\ (DSQC 1000)

2 "Create system" in RobotStudio.

Proceed as described in the manual for RobotStudio, chapter 6.4 SystemBuilder.

- Start the Assistant
- Specify name and storage location
- Enter RobotWare keys

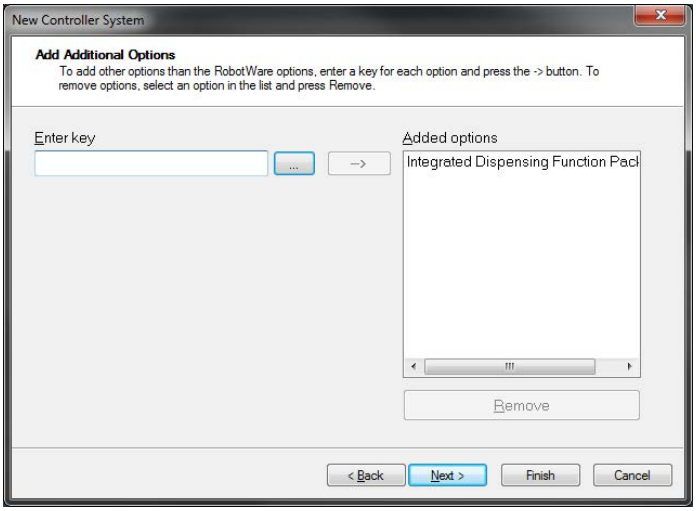
  Enter key for robot controller or take from backup
- Enter drive code

  Enter key for driver stage or take from backup
- Add additional options

  Enter key for additional option. The key is available as a file in the IDFP file folder: xxxxxx_IDFP-RW5-15.kxt or xx-xxxxx_IDFP-RW5-60.kxt.

3 Click "Next".

Enter key for additional option



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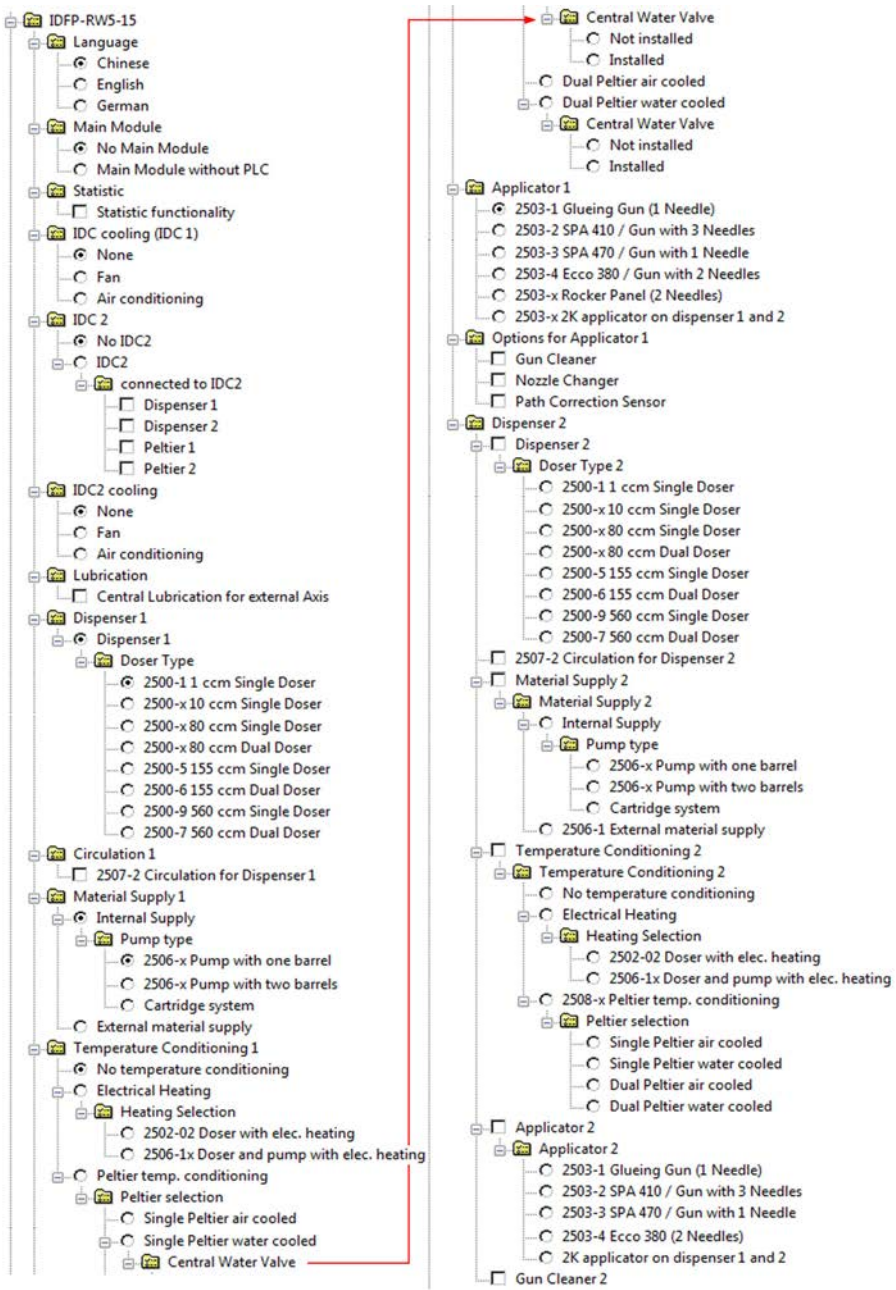
4 Configure system according to existing hardware. For this open the selection options under IDFP-RW5-15 or IDFP-RW5-60.

> **Note**
>
> The hardware is divided according to application, doser, tempering and material supply. The selection must be made based on the hardware supplied. An overview of the available options is enclosed with the assembly folder.

Selection options under IDFP-RW5-15 or IDFP-RW5-60



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5.5.3 Create system in RobotStudio 5.X
Continued

5 Click "Finish" or select additional modules and configurations by clicking "Next" (see manual for RobotStudio).

» System is created.

6 Load system to the controller (see manual for RobotStudio).

» During the installation the registration of all modules and tasks, the installation of the user interface and the error messages, as well as the configuration of the IPS, are effected.

5.5.4 Create system in RobotStudio under RobotWare 6

Note

The RobotWare 6 installation manager makes it possible to change created controls retroactively, for example to load new options.

The following options for the IDFP can NOT be loaded retroactively:

- "DispensePack"

Create system in RobotStudio

Proceed as described in the manual for RobotStudio chapter The installation manager - Create a new system.

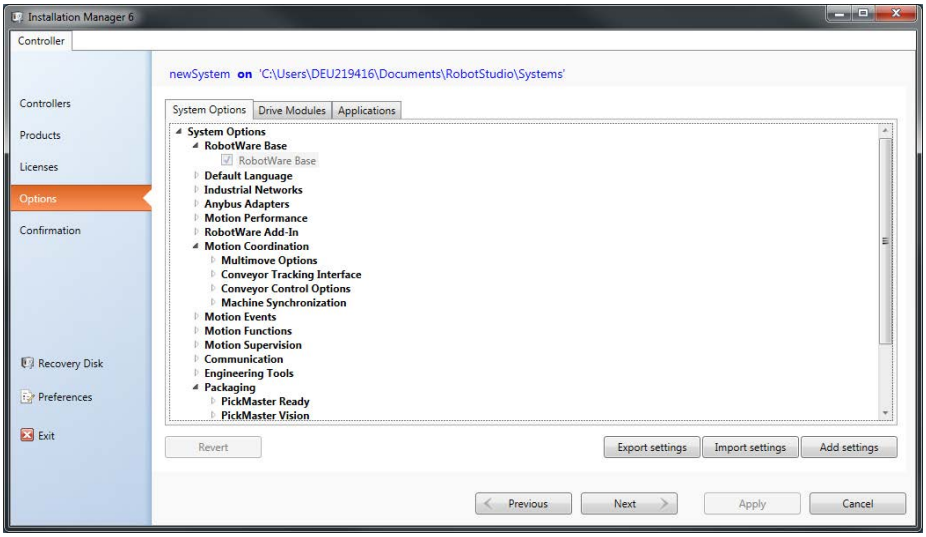
1. Open installation manager.
2. Assign names and create new system.
3. Add products. All required products and the IDFP.
4. Add required licenses.
5. Configure options.

   The options for the IDFP must be selected in accordance with the available hardware.

   The selection can be made in various ways: on one hand all settings can be selected manually, on the other hand settings can be added with a .rsf file.

   The .rsf file is supplied in the IDC on a USB stick since system IDFP-00262. Manually configured systems can also be exported. This creates a .rsf file, which can be loaded later.

   Exporting, importing and adding settings



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6. Confirm and accept.

5.5.5 Basic commissioning with Parameter Wizard

Note

The settings to be performed here are mandatory for the operation.

The Parameter Wizard is automatically run for every dispenser after booting, as soon as the compressed air supply is available. By selecting a service routine "IDFP_DXParameters", the Parameter Wizard can be called up again to make changes to parameters at a later stage.

The following input windows appear depending on the system configuration:

1 IDFP number

The IDFP number is the serial number of the system. It is the unique identification of the system and is required in the event of technical questions about a specialized system.

2 Tempering (heated material) necessary for dispenser movement

"YES" must be selected here if the material used can only be processed at a corresponding temperature (see datasheet from material manufacturer - processing temperature). The doser only performs actions if a setpoint temperature was reached and the ready delay has lapsed.

3 Purge release

With the purge release the following options can be selected:

- Allow purging at any position

  If "Allow purging at any position" is selected, then material is output from the nozzle at each current position of the applicator, if this was requested by a doser function. This happens for systems with the circulation option with the doser functions: calibrate, purge and flow check. For systems without the circulation option, material is also output from the nozzle with the functions: doser forward, empty and pressure relief.

- Only allow purging in purging position

  If "Only allow purging in purging position" is selected, the user must teach in a purging position and link this with the signals doDXPurgePos or doDXUserPos. If the purging position has been reached by the applicator, at least one of the signals must be set to "1" in order to automatically perform the purging. If no purging position was taught in (and/or not linked with one of the signals doDXPurgePos or doDXUserPos), then each time before the output of material (except in application mode) a request is sent to the TPU to check whether the output of material is allowed at the current position. If a purging position was taught in and linked to at least one of the two signals (doDXPurgePos or/and doDXUserPos), then all functions with which material must be output are automatically performed without an additional request.

4 Input gear factor for Dispenser D1

Continues on next page

The doser does not move while the gear factor is set to "0". The required gear factor must be read from the gearbox type plate (I = x).

> **Note**
>
> A dual doser with two different gear factors for each doser cannot be operated.

5 Installation position of dispenser (only for IDC2)

If an IDC 2 is available, the dispenser can be installed in IDC2. At this point it is necessary to select the IDC in which the dispenser is installed for operation of the system.

6 Rocker Panel Applicator (RPA) gear factor

If a RPA is installed, the user is prompted for the gear factor of the RPA. The gear factor of the RPA must be read on the type plate.

7 Automatic pump controller (only with internal pump)

With internal pumps an automatic pump controller offers the option of switching on the air motor only if the pump is to transport material.

For shorter filling times the air motor can be switched on before the filling request to enable the pump to build up pressure.

However, to protect the material, the air motor can also not be switched on until the request is received, which will extend the doser filling time.

Only switch on the automatic pump controller if no other systems or dispensers are being supplied with the pump.

8 Peltier fan number (only with air-cooled Peltier devices)

The number of fans of an air-cooled Peltier element must be selected here. The Peltier element can have three or four fans.

9 Define start doser (dual dispenser only)

Specify which doser is to start application on a dual dispenser system. The following options are available:

- A - application always starts with doser A (it may be necessary to refill doser A before or after starting application)
- B - application always starts with doser B (it may be necessary to refill doser B before or after starting application)
- maximum fill level - application starts with the doser with the higher fill level
- alternating - application starts alternately with doser A and B
- endless - application starts with the last active doser (recommended operation)

10 IDC fan number (only with air-cooled IDC)

Multiple fans may be installed in the IDC for efficient cooling in the IDC. The number of fans installed in the IDC must be specified at this point.

11 Automatic purge

Continues on next page

The automatic purge system can be used to prevent material from hardening and blocking valves. The automatic purge system can be used in two modes. In the first mode the doDxPurgeRequest signal is set on completion of the maximum time during which no material is fed. The signal must be processed on the project side (purge must be set to active in the program. Do this by setting the corresponding order number) and then set to 0. This procedure enables setup of more complex purge programs, for example robot motion or swiveling in purge pots. In the other mode material is removed on completion of the time and with purge release set.

12 2K mixing ratio (only with 2K)

If a 2K system is installed, the mixing ratio of the two materials can specified at this point. The proportions of each material are queried.

13 Network configuration PIB

The network configuration is queried only with integrated PIB 03 and installed IPS version IPS 4.6x. Initially the IP address is requested, then the subnet mask and the standard gateway. The IP address, subnet mask and the gateway must be in the xxx.xxx.xxx.xxx format. For example, a valid IP address would be 10.45.132.12. The standard gateway is optional. If a gateway is not specified, a blank character must be input. If an incorrect combination is input, a corresponding error message is output and a prompt for a new input is shown.

14 Click "Save"

The values are written into the system.

Note

If the Parameter Wizard is terminated with "Cancel", the values are not written into the system.

The Parameter Wizard does not start again automatically.

The Parameter Wizard can be selected later by requesting a service routine on the FlexPendant:

Menu ABB - Program Editor - Test - Call routine

For dispenser 1 the routine IDFP_D1Parameters must be performed, for dispenser 2 IDFP_D2Parameters.

Note

If the "Call routine" button is deactivated, the program pointer must initially be set to Main or to another routine.

5.5.6 Setting the material supply

A distinction is made between static and dynamic supply pressure.

The static supply pressure remains pending so long as the doser is not filled with material.

The dynamic supply pressure adjusts itself during the filling process.

It depends on the flow properties of the material and the filling speed.

A compromise must be found between filling speed and dynamic supply pressure.

The dynamic supply pressure depends on the properties of the pumps, the pipework and a pressure reducer at the outlets, if installed.

If the requirements are not correctly set (project-specific), error messages from the dosing drives may be received.

1. Overvoltage occurs if the combination of filling pressure and filling speed has been unfavorably selected. (Generation of the operation of the dosing drive; IDFP error number 115120). The dynamic supply pressure must be reduced until overvoltage errors are no longer generated.
2. Torque too high when starting the filling process. IDFP error number 115122 (Tripped by excessive static supply pressure).

5.5.7 Basic setting of controller parameter

Some functions of the Integrated Dispensing Function Package need regulators. These have to be set for each material used and are dependent on various factors.

A basic setting of the controller parameter must be performed at each initial commissioning of the system, after change of material, mechanical changes or hardware changes.

For analyzing the actual values, it is recommended to use the RobView program with the SignalAnalyser function.

The controllers must be tested and adjusted during commissioning:

- temperature controller (in temperature-controlled systems)
- pressure controller, both filling pressure controller and applicator pre-pressure controller.

The swap controller in dual systems is generally correctly adjusted.

The principles and the procedure for adjusting the controllers are explained in more detail in *Regulator settings on page 405*.

Perform service routine hose breathing compensation

The hose breathing must be determined in order to eliminate an error in the calculation of the material quantities consumed, which could cause the hose between the doser and applicator to expand ("inflate") under high pressure and the material to compress. To factor in this error in the volume measurement, the hose breathing is determined during the calibration process. See *Prepressure regulation on page 406*. The hose breathing compensation must also be carried out for systems without a hose between the doser and the applicator, in order to calculate the compressibility of the material.

This procedure may take several minutes. The call routine is called up via:

ABB - Program Editor - Test - Open routine

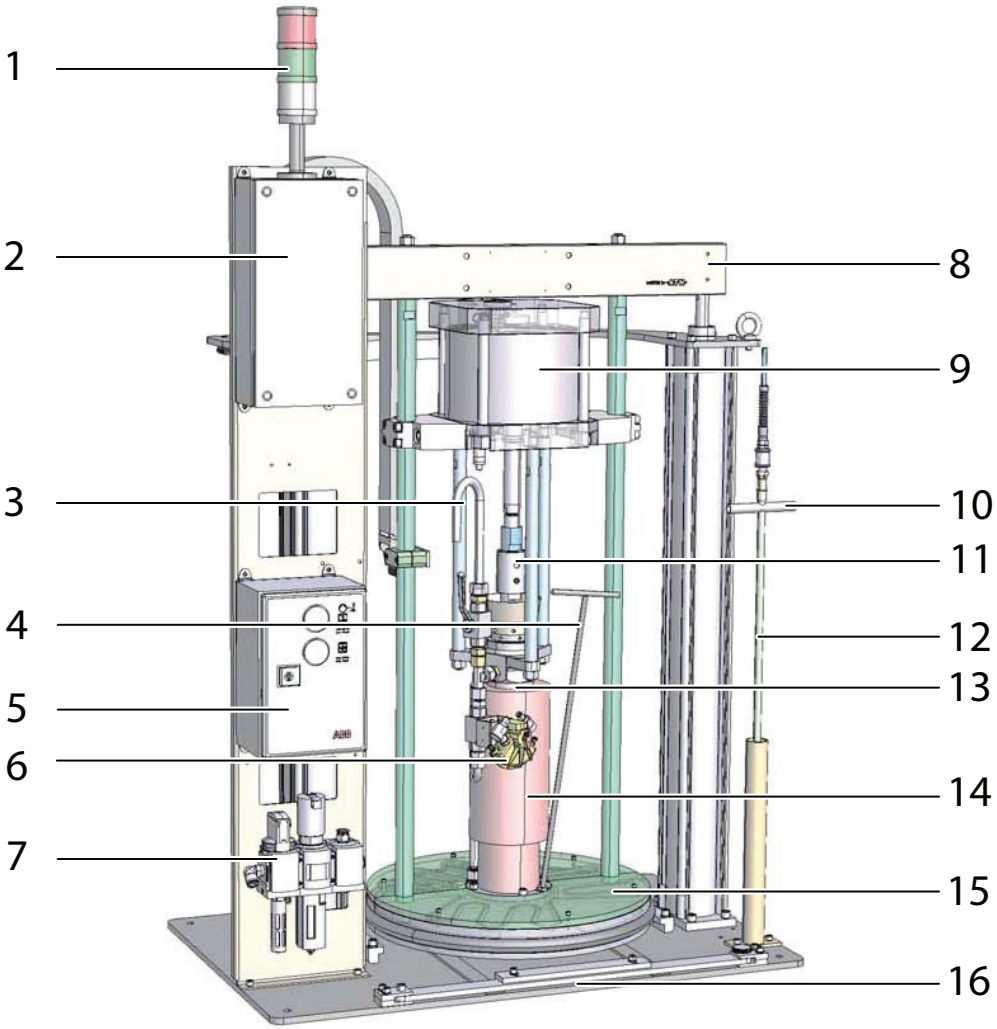
IDFP_D1HoseAccu (or IDFP_D2HoseAccu or IDFP_D3HoseAccu)

The service routine can only be executed if the dispenser is in "Ready" mode and the software task "Dispenser" is being processed (green check mark on the TPU in the task view). Otherwise, the request will not be accepted by the software task "Dispenser". The dispenser is in "Ready" mode as soon as the calibration is successful and the dispenser is performing no other action (e.g., manual function, circulation, leak check, application mode, etc.). The mode of the dispenser can be read in the process window of the IDFP user interface.

5.6 Assembly of barrel pump

5.6.1 Overview

Overview of the system



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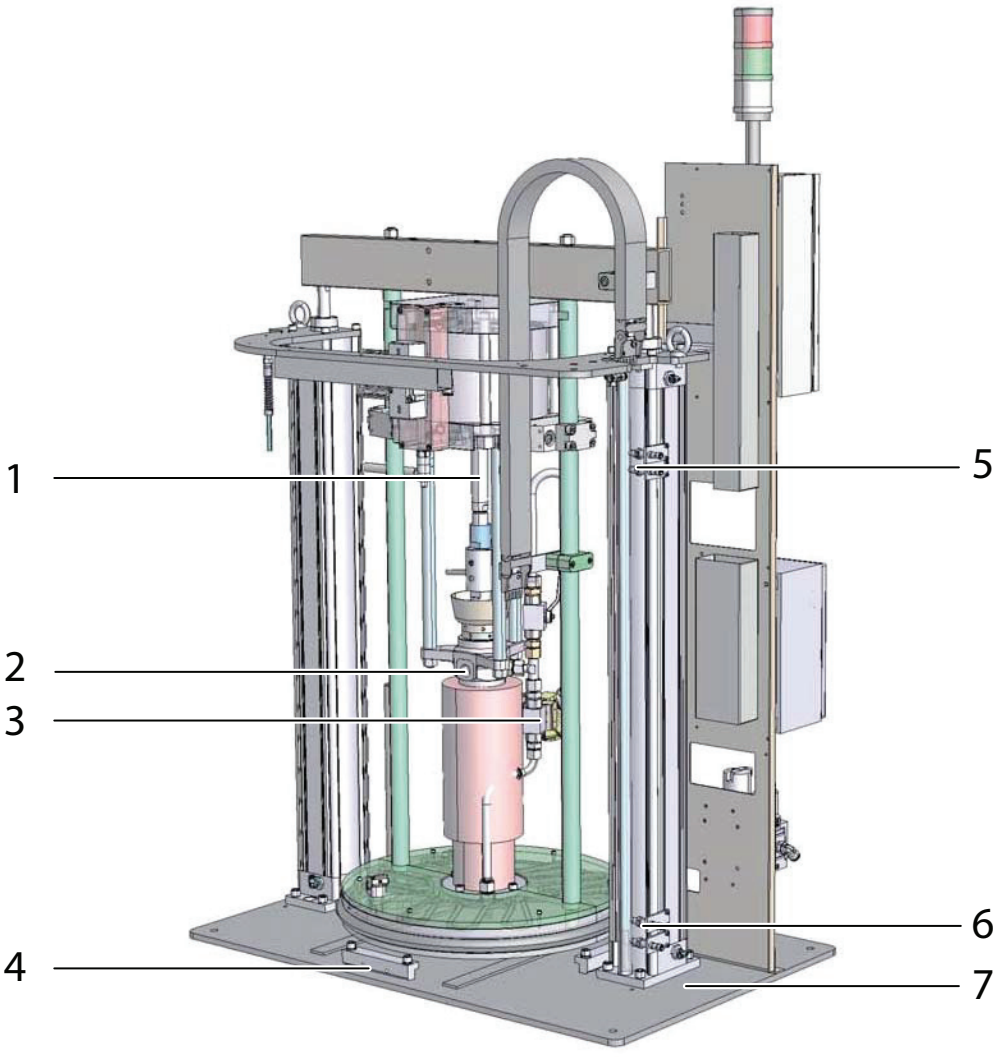
	Description
1	Tower lights
2	PIM
3	Bleed valve
4	Sealing plug
5	Pneumatic box
6	Pressure relief valve
7	Compressed air supply unit
8	RAM press

Continues on next page

5.6.1 Overview
Continued

	Description
9	Air motor
10	Air motor coupling
11	Ventilation valve
12	Ventilation rod
13	Material pump
14	Heating sleeve (optional)
15	Follower plate (optionally heated)
16	Barrel lock (with 200 l model only)

View of back



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	Description
1	Air motor stroke counter
2	Material hose connection

Continues on next page

	Description
3	Pressure relief
4	Barrel clamp
5	"Follower plate in barrel" sensors channel 1+2
6	"Barrel 80% empty" sensor
7	"Barrel empty" sensor

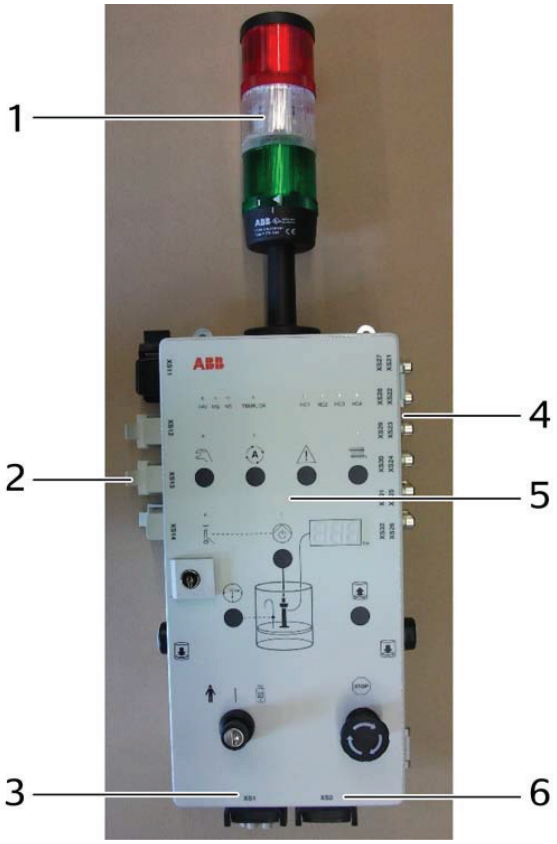
Assembly	Explanation
Air motor	The air motor drives the material pump.
Sensors	The limit switch indicates whether the follower plate is in the barrel, and whether the barrel is almost or completely empty.
Pneumatic box	The pressures for the air motor and the pneumatic cylinder are set at the lockable pneumatic box.
Compressed air supply unit	Reduces the building-supplied compressed air pressure to 6 bar. The pump can be depressurized with the main valve, and shutting down the function package shuts down the pump.
Air motor coupling	The coupling connects the air motor to the material pump. It compensates for varying axial tolerances between the two assemblies. This extends the service life of both assemblies. The coupling makes it easy to disconnect the air motor and lower pump for maintenance.
Ventilation valve	The ventilation valve is integrated in the ventilation rod. It ventilates the barrel when the follower plate is withdrawn from the barrel.
Ventilation rod	It is screwed into the ventilation opening of the follower plate when a barrel is changed. It ventilates the interior of the barrel when the follower plate is withdrawn from the barrel.
Bleed valve	The bleed valve vents the material pump after a barrel change. This prevents air from entering the material pipe system. In an emergency or when shut down for maintenance the installation must also be depressurized on the material side with this valve.
Material pump	The material pump transports the material from the material barrel to the location of use. The material is placed under pressure when it is requested.
Sealing plug	The sealing plug closes the ventilation opening of the follower plate.
Follower plate	Presses the material out of the barrel to the lower pump. The follower plate can optionally be heated.
Pressure relief valve	This valve opens a connecting line between the pressure side of the pump and the barrel. This process releases the material pressure in the outlet line.
Tower lights	The traffic light display is the status display of the pump.
RAM press	A pneumatic cylinder connected to a crossbar generates pressure on the contents of a barrel with the follower plate.
Optional heating sleeve	Electric heater with temperature sensor and insulation.

Continues on next page

5.6.1 Overview
Continued

Assembly	Explanation
PIM	Interface between pump and IDC. The pump with the optional heater can be operated from the IDC. Actuators are also actuated and data read from sensors.
Stroke counter	A pressure switch records every double stroke of the air motor.

PIM



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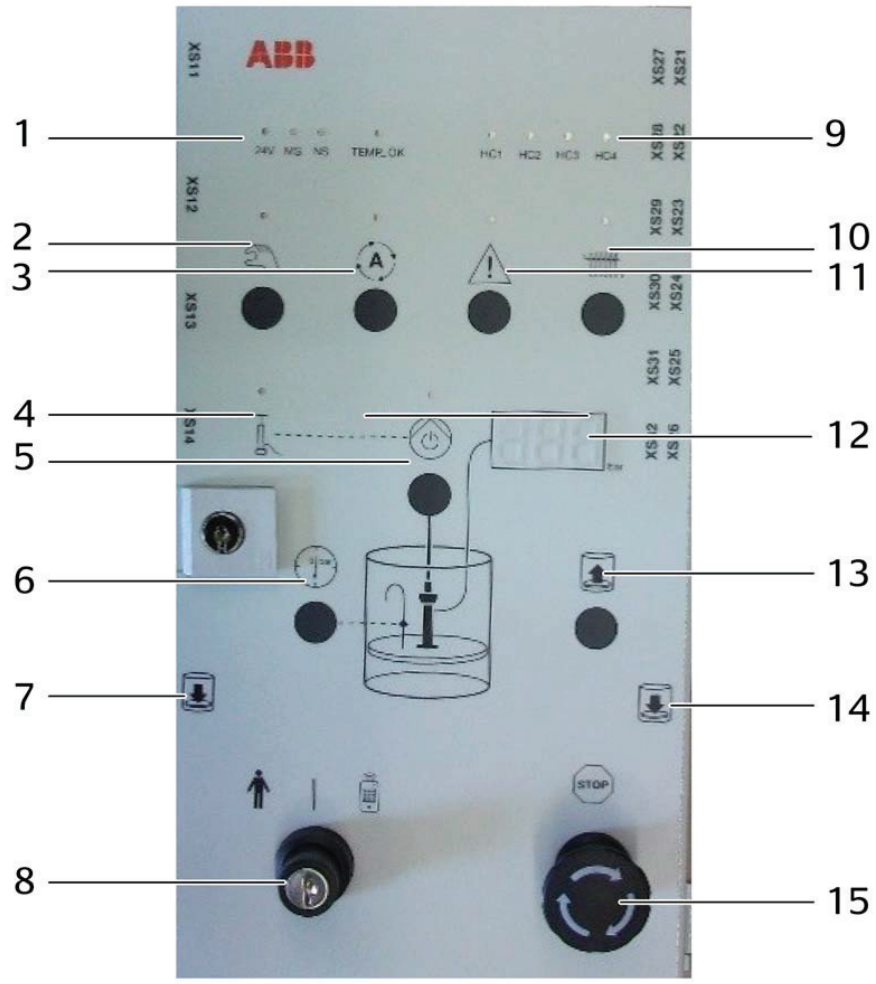
	Description
1	Tower lights
2	Heater circuit connections
3	XS1
4	M 12 terminal interface
5	Control panel
6	XS2

Assembly	Explanation
Tower lights	The tower lights display the status of barrel.
Optional heater circuit connections	Up to four heater circuits can be connected with heated pumps, such as heated follower plate, heating sleeve or heater material manifold (double barrel pump only).

Continues on next page

Assembly	Explanation
Control panel	Pump functions can be manually controlled on the control panel. It also shows the status LED and display of the material pressure, the operating mode selector switch and the pump stop button.
M12 terminal interface	Connections for different sensors and actuators, such as valve actuation, position sensors and stroke counter.
XS1	IDC connection.
XS2	Connection for additional PIM.

PIM control panel



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	Description
1	LEDs 24 V, MS, NS, TEMP_OK
2	Manual mode
3	Automatic mode
4	LED compressed air status

Continues on next page

5.6.1 Overview
Continued

	Description
5	Air motor on/off
6	Pressure relief
7	Sink follower plate A
8	Operating mode selector switch
9	LED HC1 - HC4
10	Heater on/off
11	Alarm/Reset
12	Pressure display
13	Lift follower plate
14	Sink follower plate B
15	Pump stop

Assembly	Explanation
LED 24 V	Display indicating 24 V power supply to PIM
LED MS	Module status
LED NS	Network status
LED TEMP_OK	All activated heater circuits are in the specified temperature range.
LED HC1-HC4	Heater circuit status
LED compressed air status	Display of compressed air status at the compressed air supply unit
Manual mode	Pump can be operated from the control panel. No continuous operation of air motor.
Automatic mode	Enables automatic actuation of the air motor by the IDFP software.
Alarm	LED shows error status, button acknowledges pump fault Additional test of all LEDs except for HC1-HC4
Heater on/off	Switching on heating circuits
Air motor on/off	Activates air motor
Pressure relief	Opens the pressure relief valve
Operating mode selector switch	Keyswitch for local, disabled or external operating mode.
Pump stop	Mushroom button for safe shutdown of all electrically powered pump functions
Sink follower plate	Button for two-channel control of sink follower plate If the follower plate is in the barrel, one button is enough to sink it further.
Lift follower plate	Button for lifting the follower plate
Pressure display	Three-digit display, red, shows alternately (2-second rhythm) the material pressure at the doser input and the status of the pump (pressure/--- bar <-> On / Off / Auto / Err)

5.6.2 Connections to PIM

PIM terminal plate (bottom)

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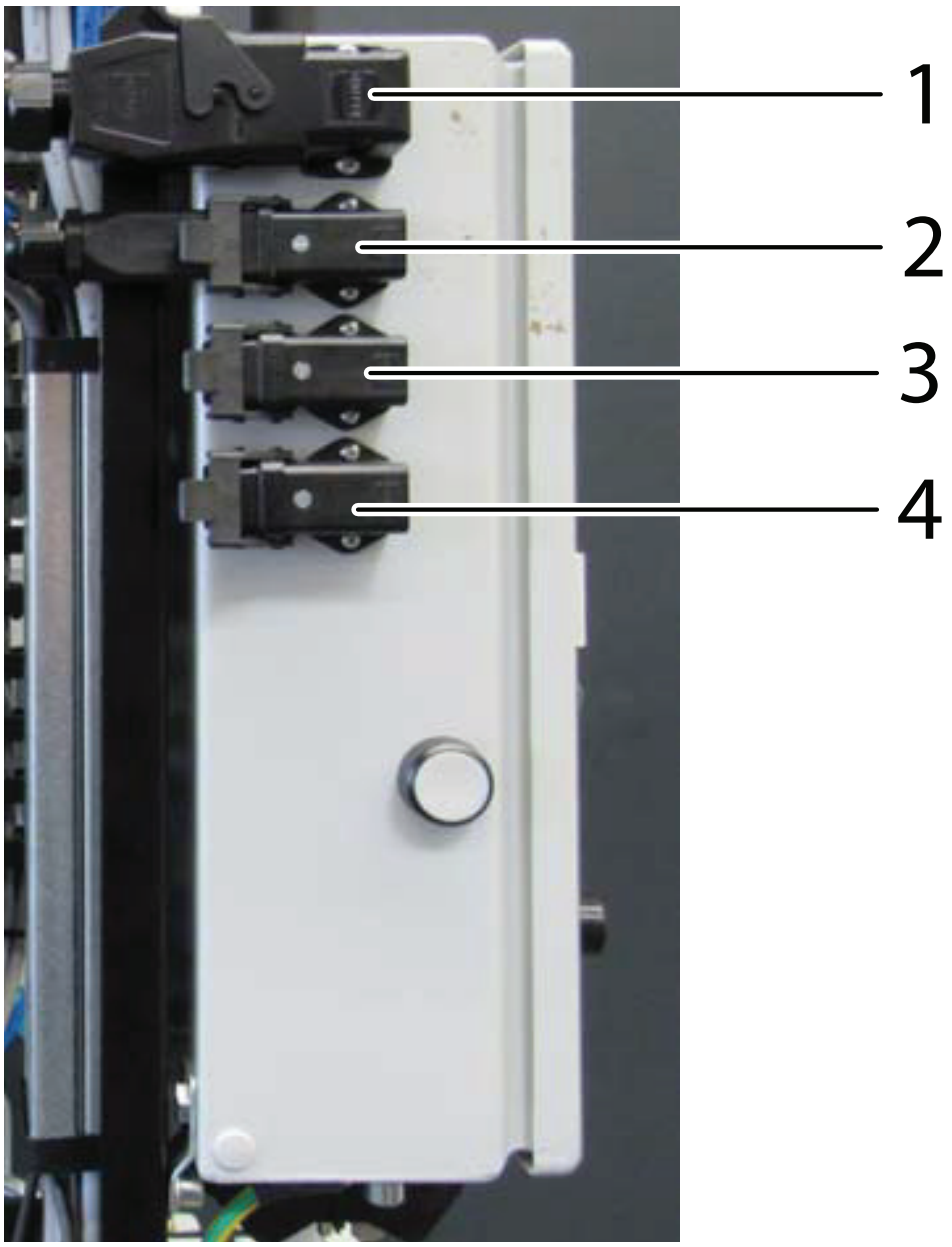
5.6.2 Connections to PIM
Continued

PIM terminal plate (left side)



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	Description
1	XD11: Connection for follower plate heater circuit
2	XD12: Connection for heater circuit
3	XD13: Connection for heater circuit
4	XD14: Connection for heater circuit

Continues on next page

PIM terminal plate (right side)

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Note

See the electrical diagram for the pin assignment, cable types and the lengths of the prefabricated cables.

5.6.3 Functional description

The barrel pump transports material (generally adhesives or their ingredients) from barrels to the location of use. The size of the barrel depends on the pump type. The follower plate is pressed on the material in the barrel so the material pump reaches it and can pump it out of the barrel.

5.6.4 Tower lights

The tower lights above the PIM show the status of the pump.

red	white	green	Meaning
Off	Off	On	Automatic mode active, pump ready
Off	Flash	Off	Fill level warning, barrel almost empty
Flash	Off	Off	Error pending, manual acknowledgment required
Off	On	On	Barrel is empty, residue drainage active
Flash	On	Off	Barrel is empty, residue drainage deactivated, error

5.6.5 LED status indicators

The status LEDs in the top line on the control panel of the PIM indicate the internal device/output status.

The device LEDs on the left side are the following:

Designation	24VIO	MS	NS	TEMP-OK
Color	Yellow	Green/Red	Green/Red	Green

The 24VIO LED lights as soon as the pump is connected to the IDC and the IDC is switched on.

The LED is independent of the emergency stop and pump stop. These states are not additionally displayed on the PIM.

The MS LED (module status) indicates whether an error is pending and has the following states:

Green	Red	Status
Off	Off	No phase connected
On	Off	All OK
Off	Flash	Flashing error code at HCx
Off	On	• HCx fuse fault (on heating output board PCB in PIM) • F100 or F200 miniature circuit breaker switched off (in IDC) • Heater output main switch on IDC switched off
Flash	Flash	Multiple status at HCx

The NS LED (network status) indicates the status of the DeviceNet connection and has the following states:

Green	Red	Status
Flash	Off	Waiting for master connection/initialization
On	Off	Master connection/data exchange
Off	Flash	Master connection/timeout during data exchange, all outputs reset.

The TEMP-OK lights if the temperatures of all active heating circuits are within the specified warning limits.

The LED is not green during the heat-up phase.

The dual-color LEDs on the right side of the control panel show the status of every heater circuit:

Designation	HC1	HC2	HC3	HC4
Color	Green/Red	Green/Red	Green/Red	Green/Red

The green LED shows that the heater circuit is operating correctly; it is off if the heating is off and on if the heating is on. If the red LED is on or flashing, an error is pending.

Continues on next page

The states of the HCx LED are the following:

Green	Red	Blinking code	Status
Off	Off		HCx switched off, all OK
On	Off		HCx switched on, all OK
Off	On		No phase connected to HCx
Off	Flash	1x	HCx fuse fault
Off	Flash	2x	HCx load error
Off	Flash	3x	HCx residual current monitoring response
Flash	Flash		External wiring fault on this channel

The status of the residual current monitoring is only signaled if the corresponding phase is shut off, i.e. the upstream FI has responded.

5.6.6 Material pressure display

The three-digit display shows alternately (2-second cycle) the material pressure at the doser input and the status of the pump (pressure/--- bar <-> On / Off / Auto / Err)

Pressure value:

- With active pump: pressure at doser input: display "0 - 400" bar
- With non-active pump: display: "- - -"

Status:

- On: pump On
- Off: pump Off and "manual" operating mode
- Auto: pump Off and "Auto" operating mode (with double barrel pump, ready for switchover)
- Err: an error is pending, which must be corrected and acknowledged.

When the alarm reset button is pressed and held the display for test purposes initially shows 288 and then after approx. 1 second 400 bar. This test shows whether all display elements are lighting correctly.

WARNING

The actual pressure at the material outlet of the pump may be higher than that displayed here.

This is due to pressure losses in the material hose between pump and doser.

5.6.7 Double barrel pump

In a double barrel pump each pump has a separate PIM with all functions.

The two pumps are electrically connected in series.

WARNING

The pump stop button on a PIM is only effective for the pump belonging to that PIM.

Other pump will not be affected.

There is an automatic switch from the active pump to the pump that was not active to that point under the following conditions:

- the active pump reserves the "Empty Initiator" (residual drainage not active)
- residual drainage finished (residual drainage active)
- non-active pump is in "Auto" and therefore ready for switchover

Continues on next page

5.6.7.1 Electric heater

Another feed hose can be electrically connected to the reserve heater circuit of pump PxA.

The heating circuits of the two pumps can be activated independently of each other.

When the almost-empty initiator is reached, the heater of the inactive pump is switched on. After the pump switch the heater of the deactivated pump is switched off.

5.6.7.2 Passive shuttle valve

The material is merged at both pumps with a shuttle valve and moved through the feed hose to the doser.

The passive shuttle valve allows the material of pump that generates the higher pressure through. When this valve is active there is no option for selecting which pump supplies material to the doser.

The valve can optionally be heated with the optional electric heater for material supply.

In this case the reserve heater circuit of the pump PxB is used to heat the shuttle valve.

5.6.7.3 Active shuttle valve

The material is merged with a pneumatically driven Or valve by both pumps and moved through the feed hose to the doser.

The valve is actuated so only the material in the active pump can be pumped. The active shuttle valve is actuated by PIMxB.

The valve can optionally be heated with the optional electric heater for material supply.

In this case the reserve heater circuit of the pump PxB is used to heat the shuttle valve.

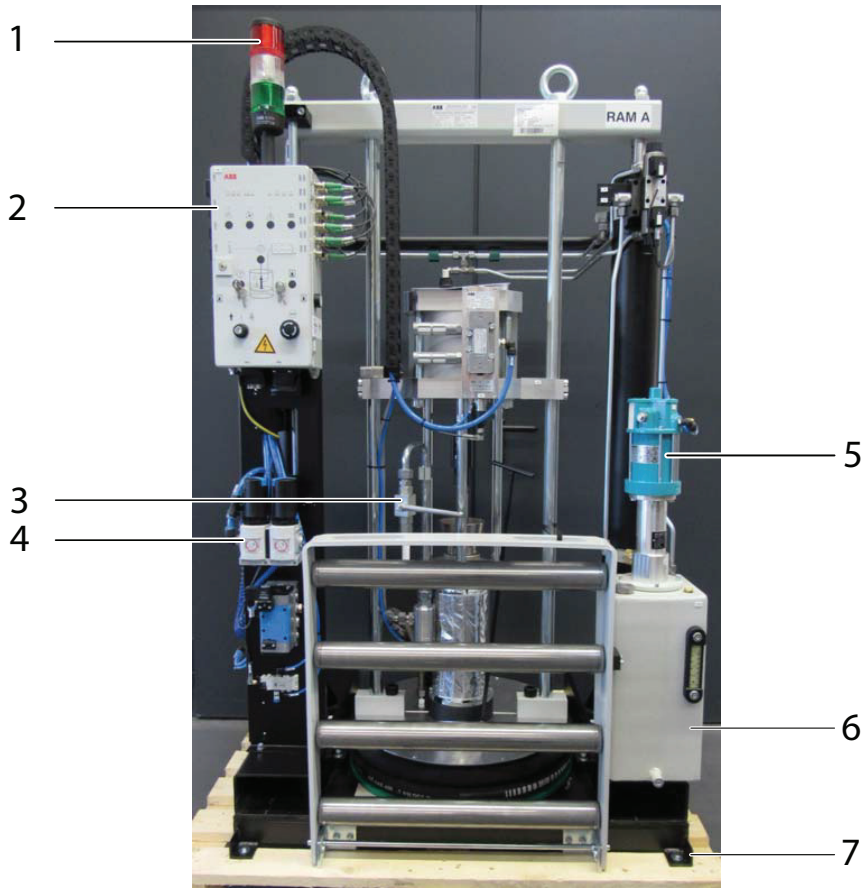
5.6.7.4 Circulation switch

If circulation is operating, an active circulation switch valve is used for the return. During circulation this valve sends the returning material back to the barrel of the active pump. The valve is actuated by PIMxA.

5.7 Assembly of hydraulic pump

5.7.1 Overview

Overview of the system

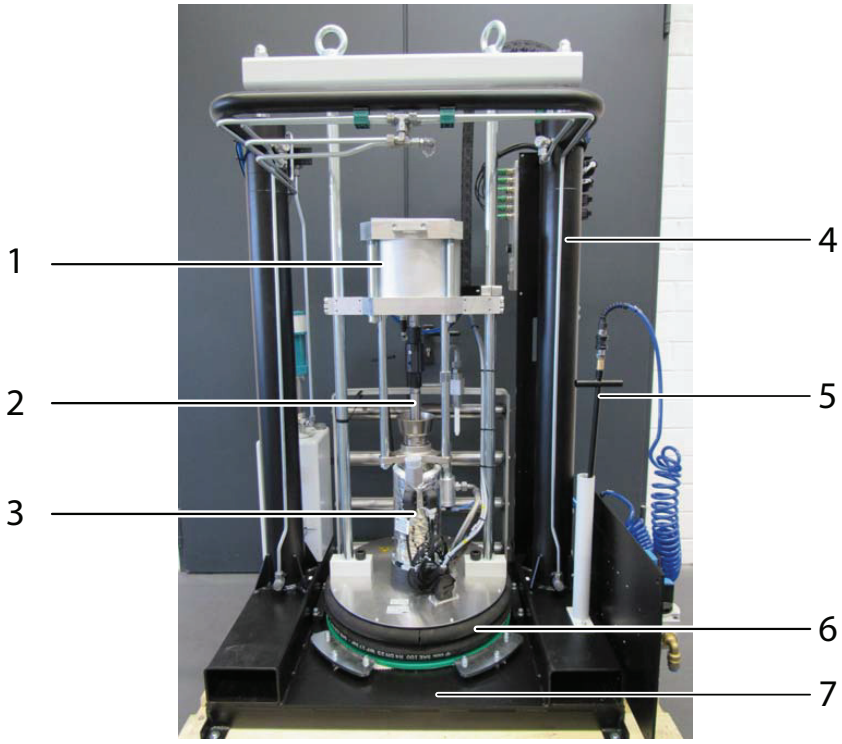


xx2000000897

	Description
1	Tower lights
2	PIM
3	Bleed valve
4	Pressure regulator unit
5	Hydraulic pump
6	Hydraulic oil tank
7	Attachment point for fixing to floor

Continues on next page

View of back



xx2000000898

	Description
1	Air motor
2	Coupling between air motor and lower pump
3	Lower pump
4	Hydraulic cylinder
5	Ventilation rod
6	Follower plate
7	Base for barrel

Assembly	Explanation
Air motor	The air motor drives the material pump.
Limit switch	The limit switch indicates whether the follower plate is in the barrel, and whether the barrel is almost or completely empty.
Pneumatic box	The pressures for the air motor and the hydraulic pump are set at the lockable pneumatic box.

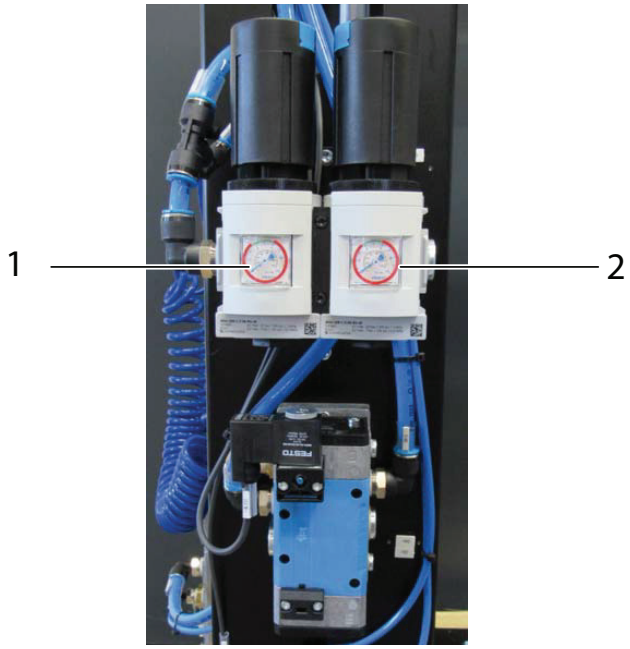
Continues on next page

5.7.1 Overview
Continued

Assembly	Explanation
Air motor coupling	The coupling connects the air motor to the material pump. It compensates for varying axial tolerances between the two assemblies. This extends the service life of both assemblies. The coupling makes it easy to disconnect the air motor and lower pump for maintenance.
Ventilation valve	The ventilation valve is integrated in the ventilation rod. It ventilates the barrel when the follower plate is withdrawn from the barrel.
Bleed valve	The bleed valve vents the material pump after a barrel change. This prevents air from entering the material pipe system. In an emergency or when shut down for maintenance the installation must also be depressurized on the material side with this valve.
Material pump	The material pump transports the material from the material barrel to the location of use. The material is placed under pressure when it is requested.
Sealing plug	The sealing plug closes the ventilation opening of the follower plate.
Follower plate	Presses the material out of the barrel to the material pump.
Tower lights	The traffic light display is the status display of the pump.
I/O interface (PIM)	Actuators are actuated and data read from sensors via this interface. The interface is connected to the PIM controller.
Operator panel (PIM)	The functions of the RAM are controlled in manual mode at the operator panels.

5.7.2 Pressure regulator unit

Pressure regulator unit



xx2000000899

	Description
1	Pressure regulator unit for air motor
2	Pressure regulator unit for hydraulic pump

Assembly	Explanation
Pressure regulator unit for air motor	Adjust the working pressure of the air motor. The material pressure can be controlled with this setting.
Pressure regulator unit for hydraulic pump	Adjust the working pressure of the air motor. The pressing force of the follower plate is controlled with this setting.

DANGER

Incorrect settings may cause quality and cycle time problems.

The settings of the pressure regulator must only be changed by qualified technicians.

Tip

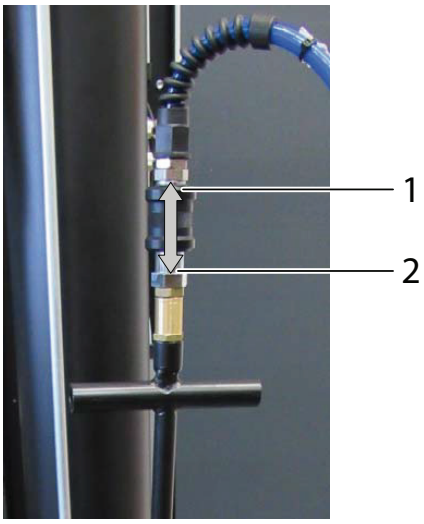
The basic setting of the pressure regulator can be found in the pneumatics diagram.

5.7.3 Ventilation valve on the ventilation rod

When the follower plate is retracted from the barrel it must be vented to prevent the formation of vacuum in the barrel.

The ventilation rod must be screwed into the follower plate and the ventilation valve must be opened.

Ventilation valve on the ventilation rod



xx2000000900

	Description
1	Open ventilation valve
2	Close ventilation valve

5.7.4 Tower lights

xx2000000902

Color	Meaning
RED	Barrel empty Flashes as soon as the barrel is empty or there is no compressed air. Otherwise the display is off.
GREEN	RAM ready Lights when the compressed air supply is on, the heaters are switched on and the heating time is finished. If the RAM is not ready, the display flashes.
WHITE	RAM active If this display is on, when the IFC requires material is supplied from this RAM. Otherwise the display is off.

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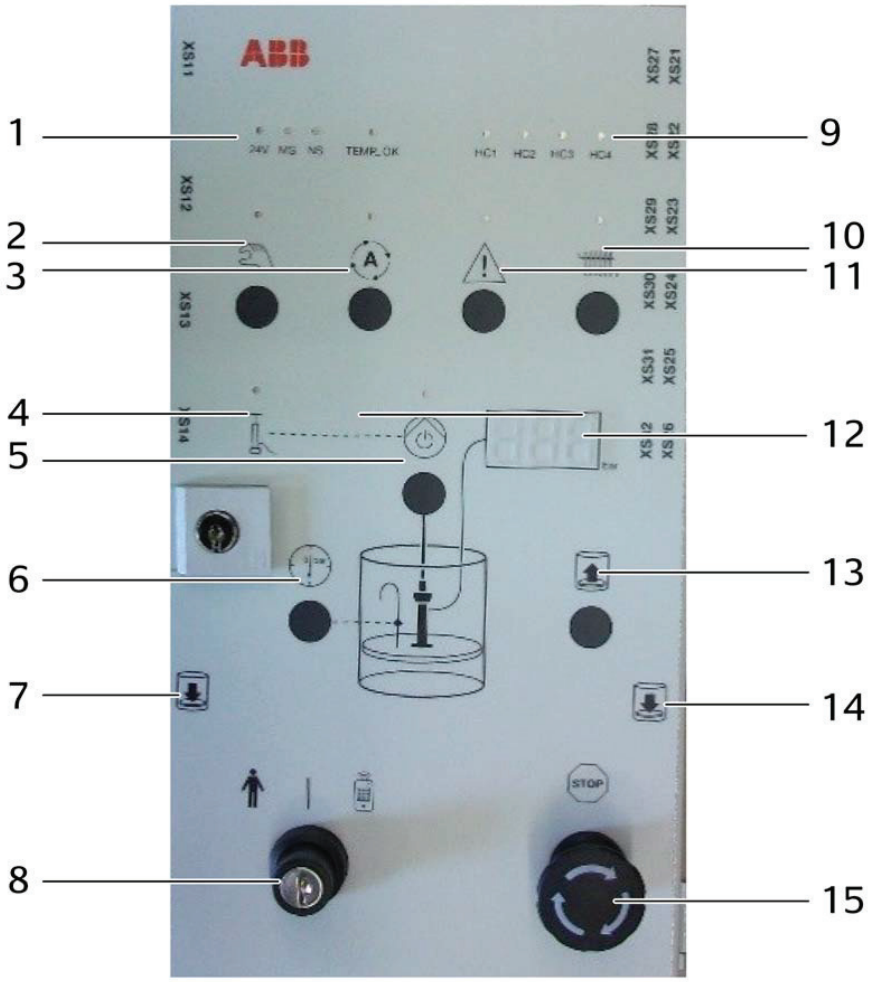
5.7.4 Tower lights
Continued

PIM control panel



xx2000000887

	Description
1	LEDs 24 V, MS, NS, TEMP_OK
2	Manual mode
3	Automatic mode
4	LED compressed air status
5	Air motor on/off
6	Pressure relief
7	Sink follower plate A
8	Operating mode selector switch
9	LED HC1 - HC4
10	Heater on/off
11	Alarm/Reset
12	Pressure display

Continues on next page

	Description
13	Lift follower plate
14	Sink follower plate B
15	Pump stop

Assembly	Explanation
LED 24 V	Display indicating 24 V power supply to PIM
LED MS	Module status
LED NS	Network status
LED TEMP_OK	All activated heater circuits are in the specified temperature range.
LED HC1-HC4	Heater circuit status
LED compressed air status	Display of compressed air status at the compressed air supply unit
Manual mode	Pump can be operated from the control panel. No continuous operation of air motor.
Automatic mode	Enables automatic actuation of the air motor by the IDFP software.
Alarm	LED shows error status, button acknowledges pump fault Additional test of all LEDs except for HC1-HC4
Heater on/off	Switching on heating circuits
Air motor on/off	Activates air motor
Pressure relief	Opens the pressure relief valve
Operating mode selector switch	Keyswitch for local, disabled or external operating mode.
Pump stop	Mushroom button for safe shutdown of all electrically powered pump functions
Sink follower plate	Button for two-channel control of sink follower plate If the follower plate is in the barrel, one button is enough to sink it further.
Lift follower plate	Button for lifting the follower plate
Pressure display	Three-digit display, red, shows alternately (2-second rhythm) the material pressure at the doser input and the status of the pump (pressure/--- bar <-> On / Off / Auto / Err)

5.7.5 Connections to PIM

PIM terminal plate (bottom)

xx2000000888

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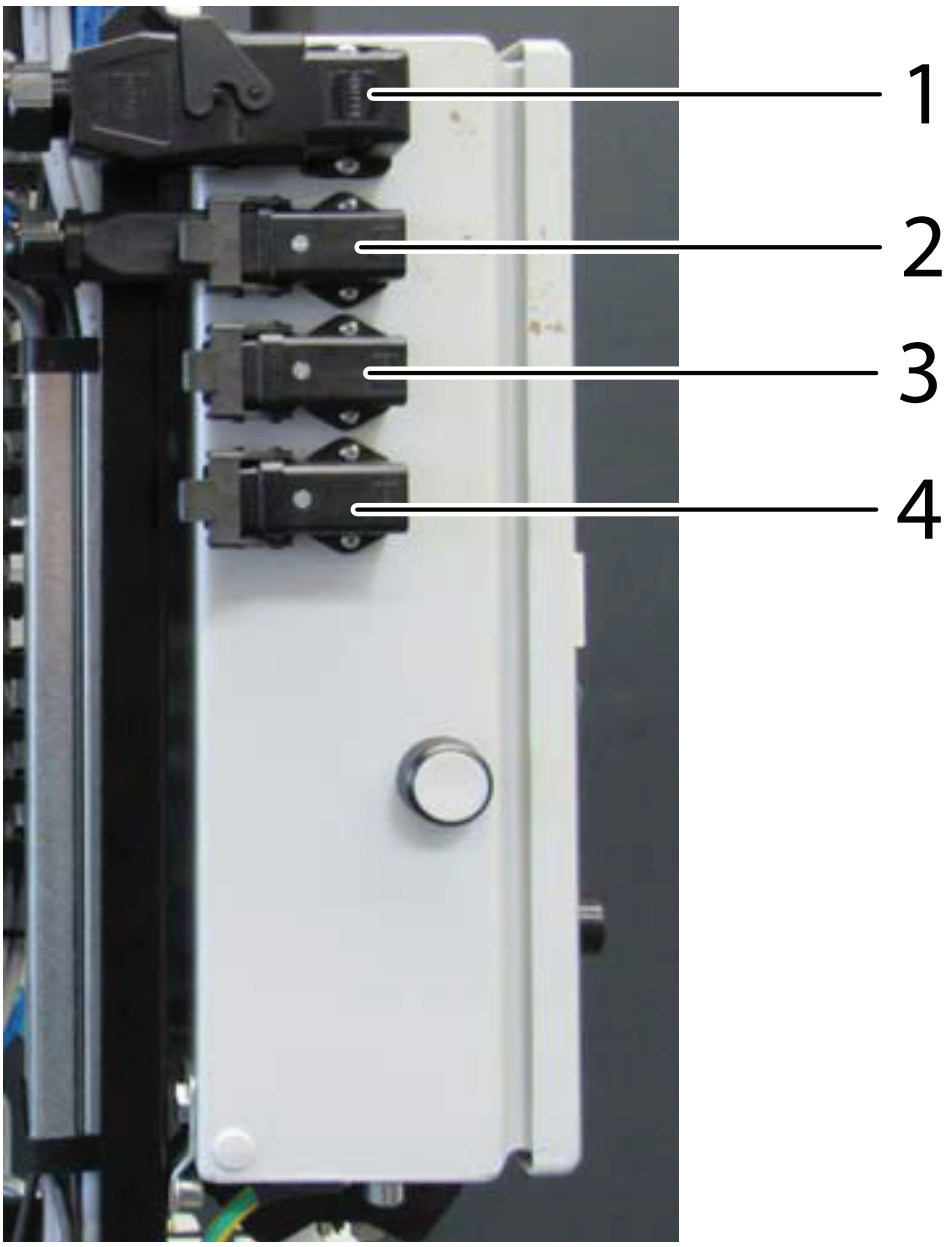
PIM terminal plate (left side)



xx2000000889

	Description
1	XD11: Connection for follower plate heater circuit
2	XD12: Connection for heater circuit
3	XD13: Connection for heater circuit
4	XD14: Connection for heater circuit

Continues on next page

5.7.5 Connections to PIM
Continued

PIM terminal plate (right side)

xx2000000890

Note

See the electrical diagram for the pin assignment, cable types and the lengths of the prefabricated cables.

5.7.6 Supplementary information

5.7.6.1 Transportation

The pump is delivered mounted on a pallet. This enables the barrel pump to be transported to the place of use with a trolley or a forklift.

5.7.6.2 Installation

The integrated pump system for IDFP is delivered as a module ready for connection. It must be permanently anchored to the floor to ensure that it remains stable. It must be connected to the mains electrical supply and the associated assemblies by an electrician.

Note that the system components must be readjusted to one another after subsequent modifications!

5.7.6.3 Removal

The system can be demounted by trained technicians employed by the customer.

1 Disconnect the media supply (material hose, air hose, power supply, etc.).
2 Demount the system.

5.7.6.4 Disposal

The disposal of the system must be in accordance with the legal regulations. Sort the station components into separate materials and send them for recycling.

5.8 Assembly of doser

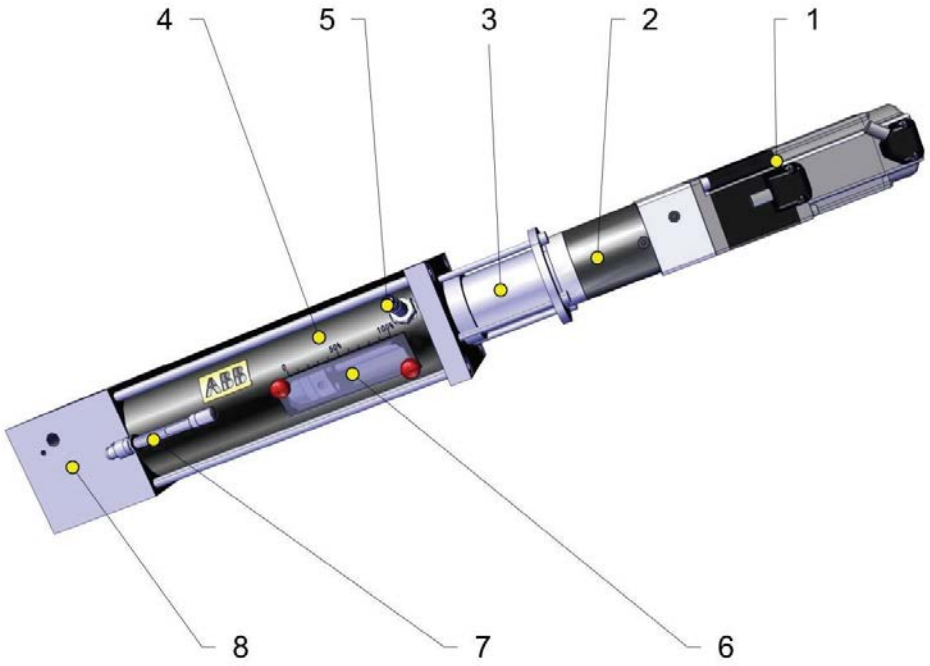
5.8.1 Overview

The following pages contain a description of the dosing unit basic assembly as well as the various dosing systems.

Overview of dosing unit 11

Basic assembly

Overview of dosing unit 11 - basic assembly



xx2000000947

	Component	Function
1	Motor	Drives the assembly (100 W servo drive).
2	Planetary gear unit	Torque transmission to drive.
3	Bearing housing	Holds the ball screw drive.
4	Protective tube	Drive unit housing.
5	Proximity switch, inductive	Proximity switch for piston rod position sensing. Used for referencing the 0-position.
6	Cover	Service opening for spindle lubrication and filling level indicator.
7	Leakage indicator	Leakage is drained off; can optionally be used for poaching/lubrication of the piston unit.
8	Material chamber (optionally with heating cartridge)	Holds the material to be applied (heating cartridge ensures constant temperature).

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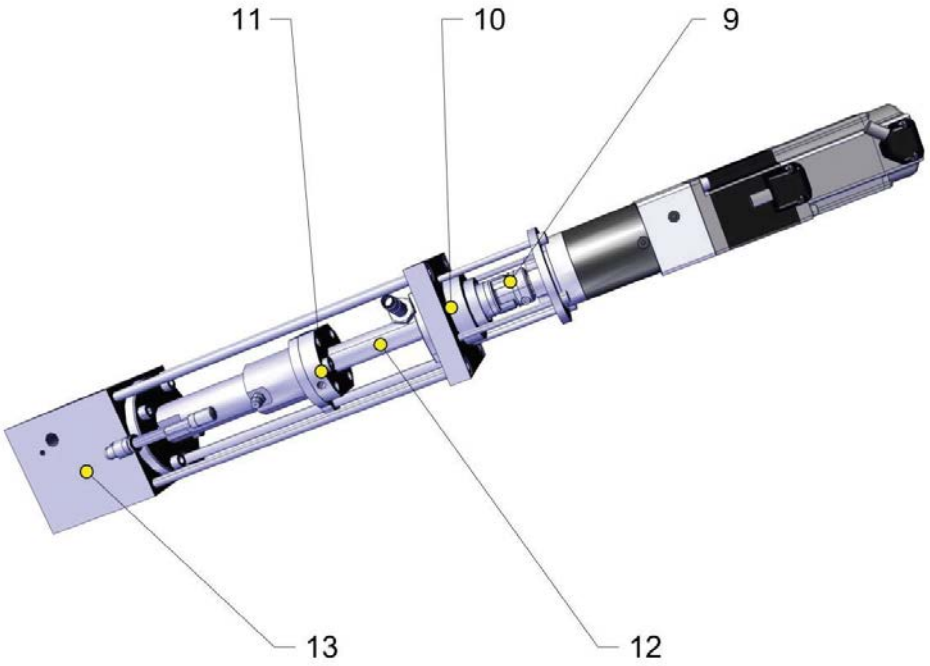
5.8.1 Overview
Continued

Overview of dosing unit 11 - basic assembly without protective tube and bearing housing



xx2000000951

	Component	Function
9	Shaft coupling	Transmits the rotary motion from the gear unit to the ball screw drive. Zero-backlash, prestressed
10	Bearing housing	Holds 2 angular contact ball bearings for spindle bearing. Two angular contact ball bearings, lifetime lubrication by manufacturer.
11	Anti-rotation lock with spindle nut	Converts the rotational movement of the spindle into a linear motion of the piston.
12	Spindle/ball screw drive	Provides power transmission.
13	Dosing chamber	Guides the piston unit and seals the pressure chamber.

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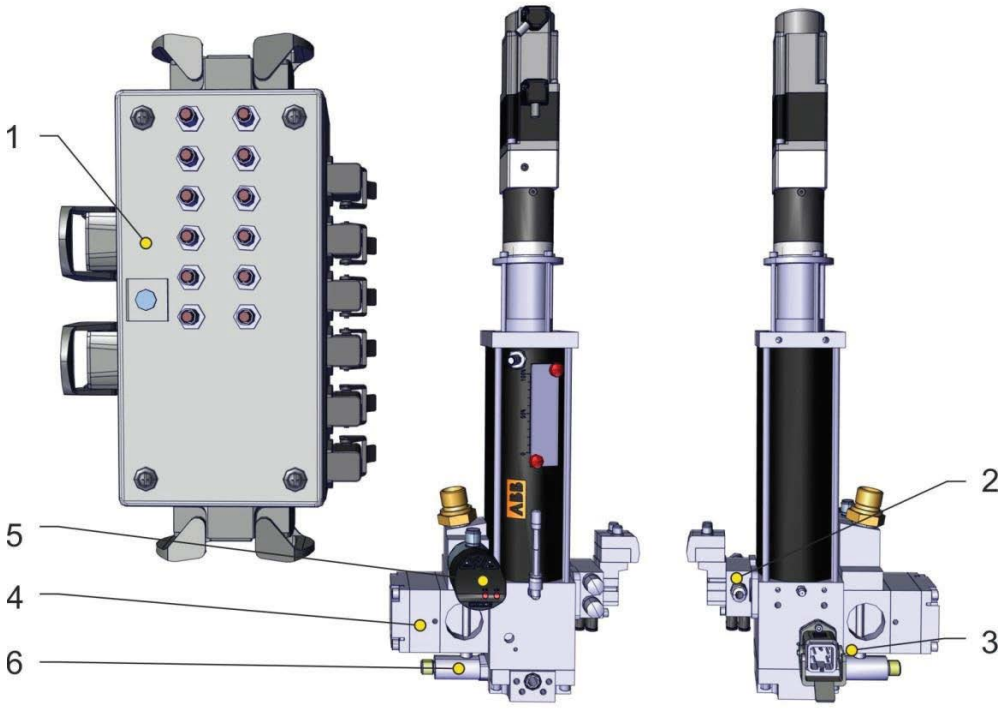
Single system

The single system is an assembly for the defined discharge of 1C material.

Overview of dosing unit 11 - single system



xx2000000955

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers. The terminal box/DIB is not fitted directly to the assembly.
2	Pilot control block	The pilot control block is used for controlling the dosing valves.
3	Heating (optional)	A heating cartridge ensures a constant temperature of the material chamber.
4	Dosing valve (material inlet valve)	The dosing valve precisely doses material for application. Controls the material flow.
5	Pressure sensor	This pressure sensor measures the pressure at the material inlet.
6	Pressure sensor	Measures the pressure at the material discharge.

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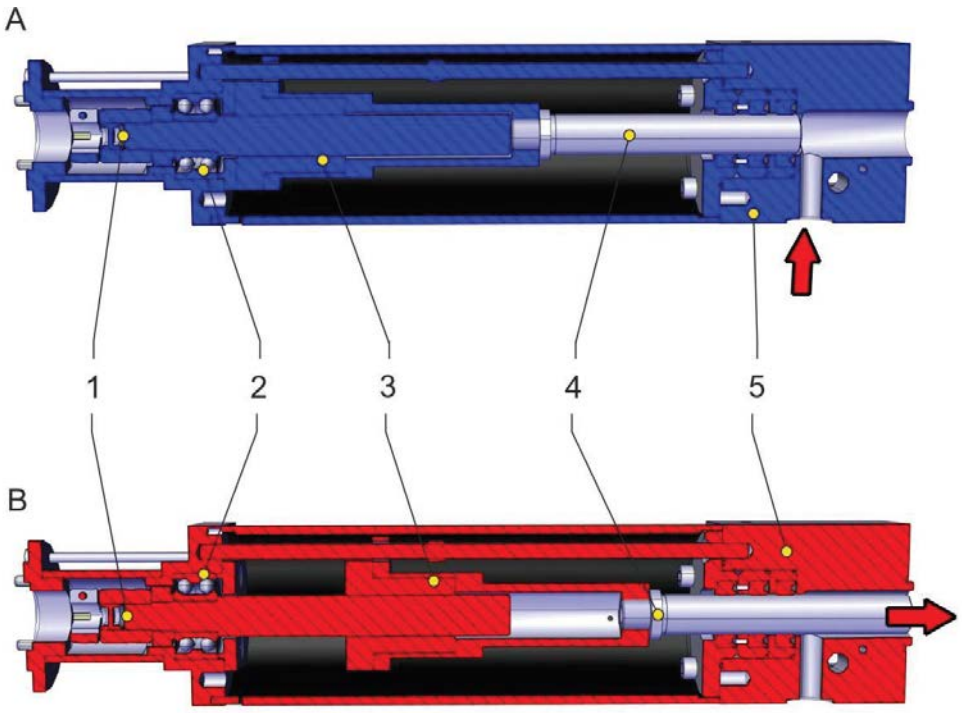
5.8.1 Overview
Continued

Schematic representation of empty and full position

Schematic representation: Empty (A) and full position (B) of the dosing unit



xx2000000965

	Component	Function
1	Coupling	
2	Spindle bearing	
3	Anti-rotation lock with spindle nut	
4	Piston	
5	Dosing chamber	

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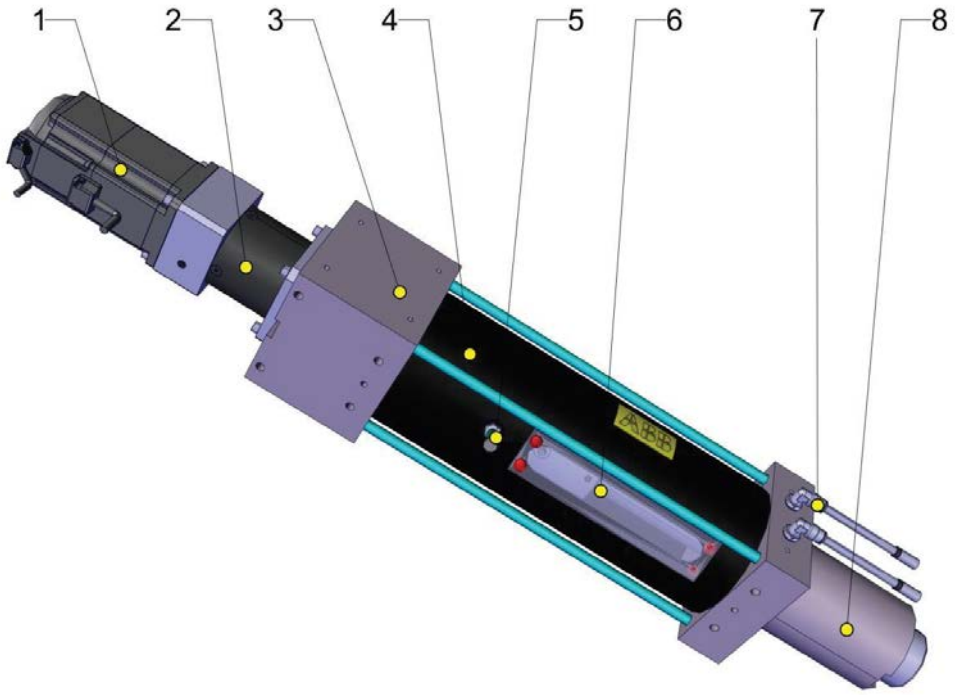
Overview of dosing unit 80

Basic assembly

Overview of dosing unit 80 - basic assembly



xx2000000948

	Component	Function
1	Motor	Assembly drive (750 W servo drive).
2	Planetary gear unit	Torque transmission to drive.
3	Bearing housing	Holds the planetary roller drive.
4	Protective tube	Drive unit housing.
5	Proximity switch, inductive	Proximity switch for piston rod position sensing. Used for referencing the 0-position.
6	Cover	Service opening for spindle lubrication and filling level indicator.
7	Leakage indicator	Leakage is drained off; can optionally be used for poaching/lubrication of the piston unit.
8	Material chamber (optionally with heating sleeve)	Holds the material to be applied (heating sleeve ensures constant temperature).

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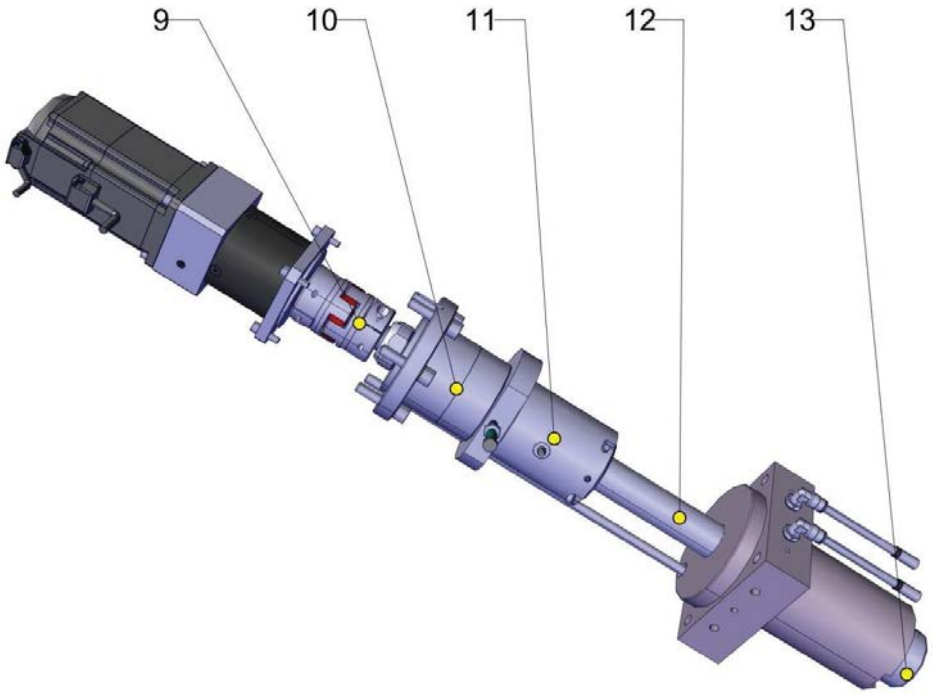
5.8.1 Overview
Continued

Overview of dosing unit 80 - basic assembly without protective tube and bearing housing



xx2000000952

	Component	Function
9	Shaft coupling	Zero-backlash, prestressed
10	Spindle bearing	Four angular ball bearings, lifetime lubrication by manufacturer.
11	Anti-rotation lock	Prevents the spindle nut from turning.
12	Piston rod	Transfers the linear movement to the piston.
13	Liner	Guides the piston unit and seals the pressure chamber.

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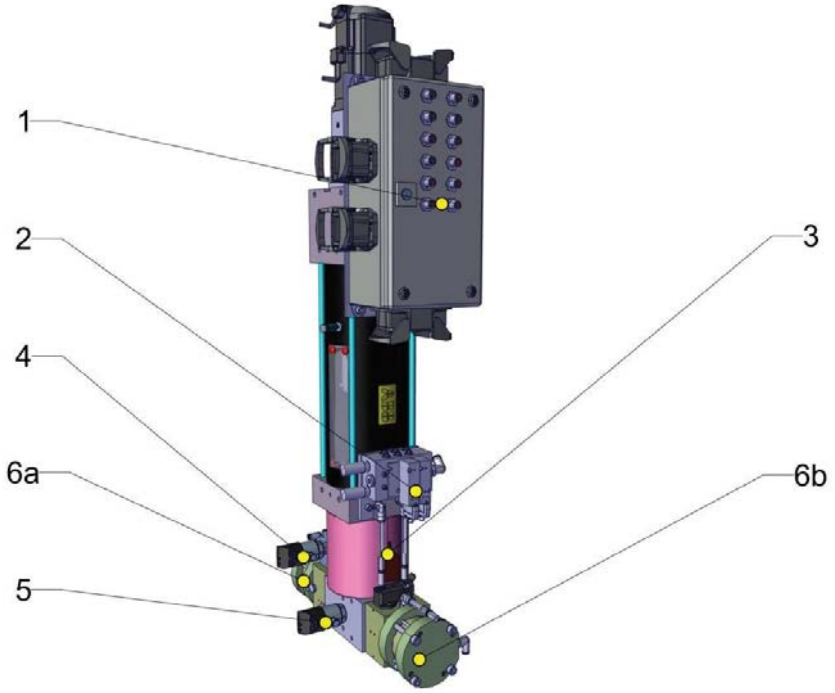
Single system

The single system is an assembly for the defined discharge of 1C material.

Overview of dosing unit 80 - single system



xx2000000956

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Pilot control block	The pilot control block is used for controlling the dosing valves.
3	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.
4	Pressure sensor	This pressure sensor measures the pressure at the material inlet.
5	Pressure sensor	This pressure sensor measures the pressure at the material outlet.
6	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Material inlet valve b: Material outlet valve

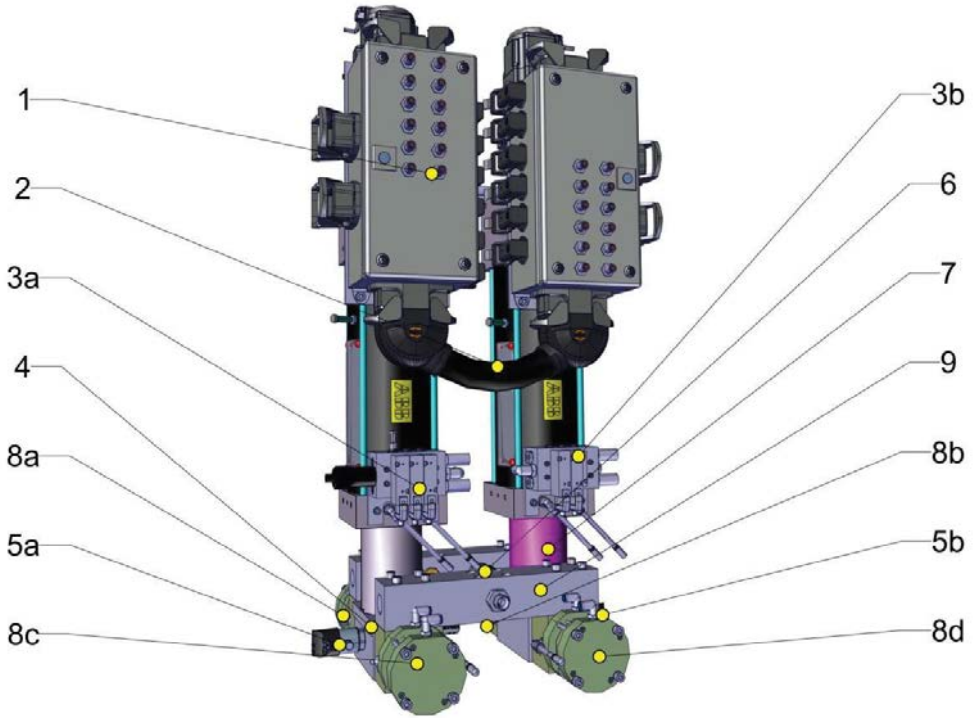
Continues on next page

5.8.1 Overview
Continued

Dual system

In the dual system, two dosing units (A and B) are combined to a single system with the aim of ensuring continuous material discharge.

Overview of dosing unit 80 - dual system



xx2000000959

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Bridge cable	The bridge cable enables data exchange between the terminal boxes of the two dosing units as well as supply of dosing unit B with power.
3	Pilot control block	The pilot control block is used for controlling the dosing valve. a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
4	Connection block	The connection block transfers the material. It has several connection options.
5	Pressure sensor	This pressure sensor measures the pressure. a: Pressure sensor for dosing unit A b: Pressure sensor for dosing unit B
6	Heating Probe	The temperature sensor monitors the material temperature.
7	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.

Continues on next page

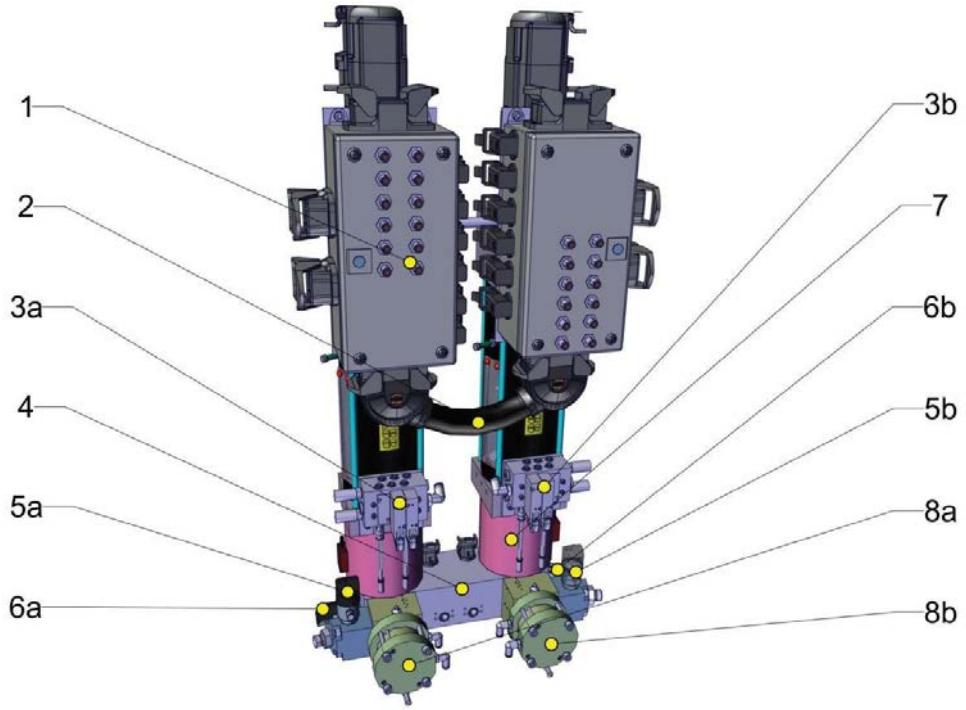
	Component	Function
8	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Material inlet valve of dosing unit A b: Material inlet valve of dosing unit B c: Material outlet valve of dosing unit A d: Material outlet valve of dosing unit B
9	Connecting plate	The connecting plate transfers the material. It connects the two dosing units with each other.

2C system

In the 2C system, two dosing units (A and B) are combined to a single system with the aim of ensuring high-precision metering and homogeneous mixing of the two components.

The material discharge of dosing units A and B takes place simultaneously.

Overview of dosing unit 80 - 2C system



xx2000000962

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Bridge cable	The bridge cable enables data exchange between the terminal boxes of the two dosing units as well as supply of dosing unit B with power.

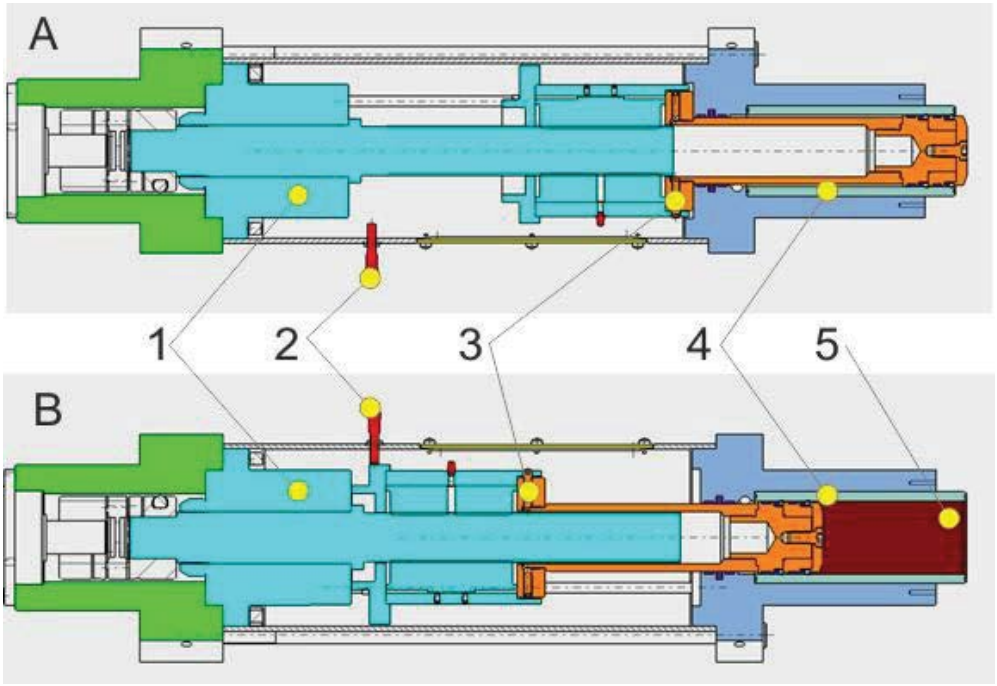
Continues on next page

5.8.1 Overview
Continued

	Component	Function
3	Pilot control block	The pilot control block is used for controlling the dosing valves. a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
4	Connection block	The connection block transfers the material. It connects the two dosing units with each other.
5	Pressure sensor	This pressure sensor measures the pressure. a: Pressure sensor for dosing unit A b: Pressure sensor for dosing unit B
6	Heating Probe	The temperature sensor monitors the material temperature. a: Temperature sensor of dosing unit A b: Temperature sensor of dosing unit B
7	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.
8	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Dosing valve of dosing unit A b: Dosing valve of dosing unit B

Scheme empty and full position

Schematic representation: Empty (A) and full position (B), Dosing unit



xx2000000966

	Component	Function
1	Spindle bearing	Spindle bearing
2	Proximity switch	Proximity switch for piston rod position sensing. Used for referencing the 0-position.

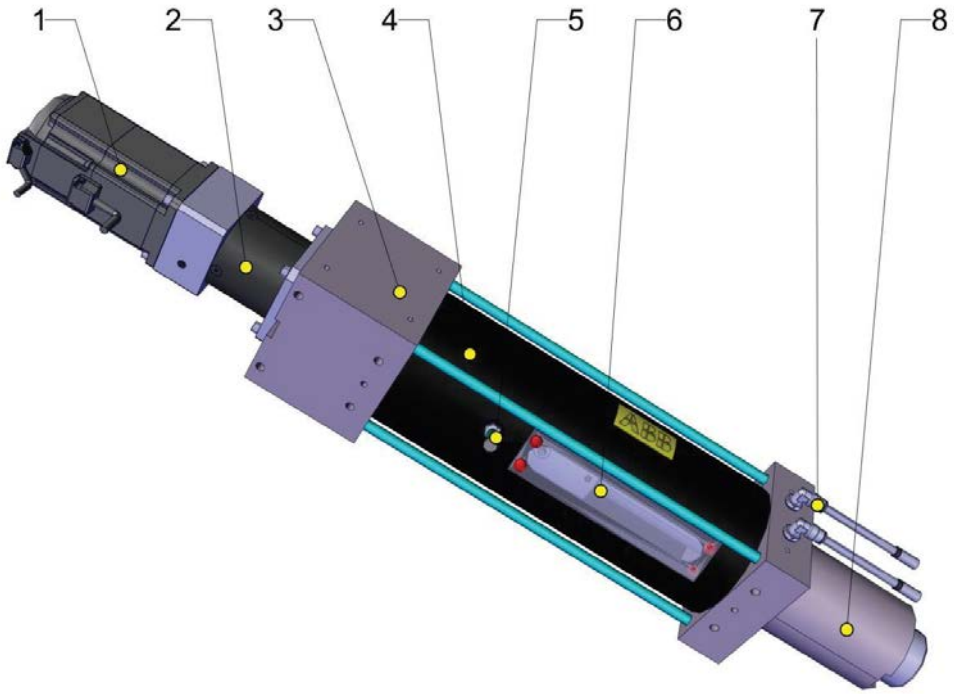
Continues on next page

	Component	Function
3	Piston unit	Generation of material pressure
4	Bushing	Guides the piston unit
5	Material chamber	Holds the material to be applied

Overview of dosing unit 155

Basic assembly

Overview of dosing unit 155 - basic assembly



xx2000000949

	Component	Function
1	Motor	Assembly drive (750 W servo drive).
2	Planetary gear unit	Torque transmission to drive.
3	Bearing housing	Holds the planetary roller drive.
4	Protective tube	Drive unit housing.
5	Proximity switch, inductive	Proximity switch for piston rod position sensing. Used for referencing the 0-position.
6	Cover	Service opening for spindle lubrication and filling level indicator.
7	Leakage indicator	Leakage is drained off; can optionally be used for poaching/lubrication of the piston unit.
8	Material chamber (optionally with heating sleeve)	Holds the material to be applied (heating sleeve ensures constant temperature).

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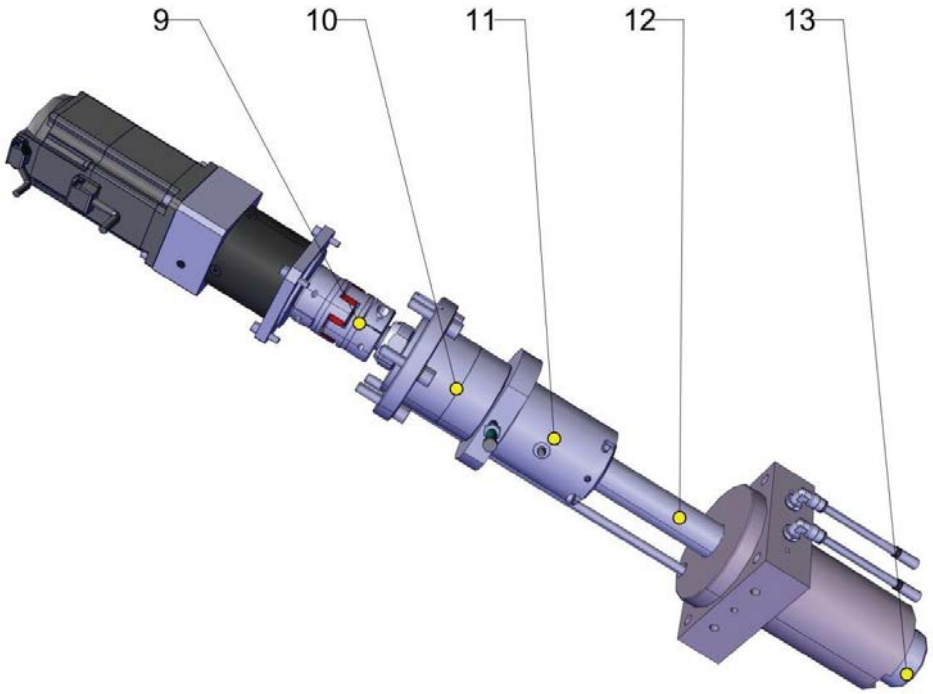
5.8.1 Overview
Continued

Overview of dosing unit 155 - basic assembly without protective tube and bearing housing



xx2000000953

	Component	Function
9	Shaft coupling	Zero-backlash, prestressed
10	Spindle bearing	Four angular ball bearings, lifetime lubrication by manufacturer.
11	Anti-rotation lock	Prevents the spindle nut from turning.
12	Piston rod	Transfers the linear movement to the piston.
13	Liner	Guides the piston unit and seals the pressure chamber.

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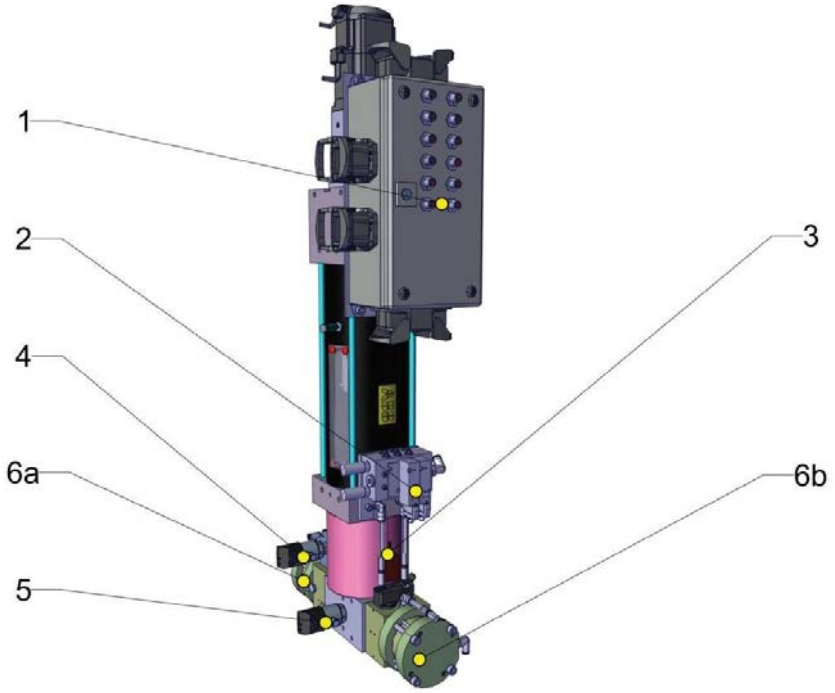
Single system

The single system is an assembly for the defined discharge of 1C material.

Overview of dosing unit 155 - single system



xx2000000957

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Pilot control block	The pilot control block is used for controlling the dosing valves.
3	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.
4	Pressure sensor	This pressure sensor measures the pressure at the material inlet.
5	Pressure sensor	This pressure sensor measures the pressure at the material outlet.
6	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Material inlet valve b: Material outlet valve

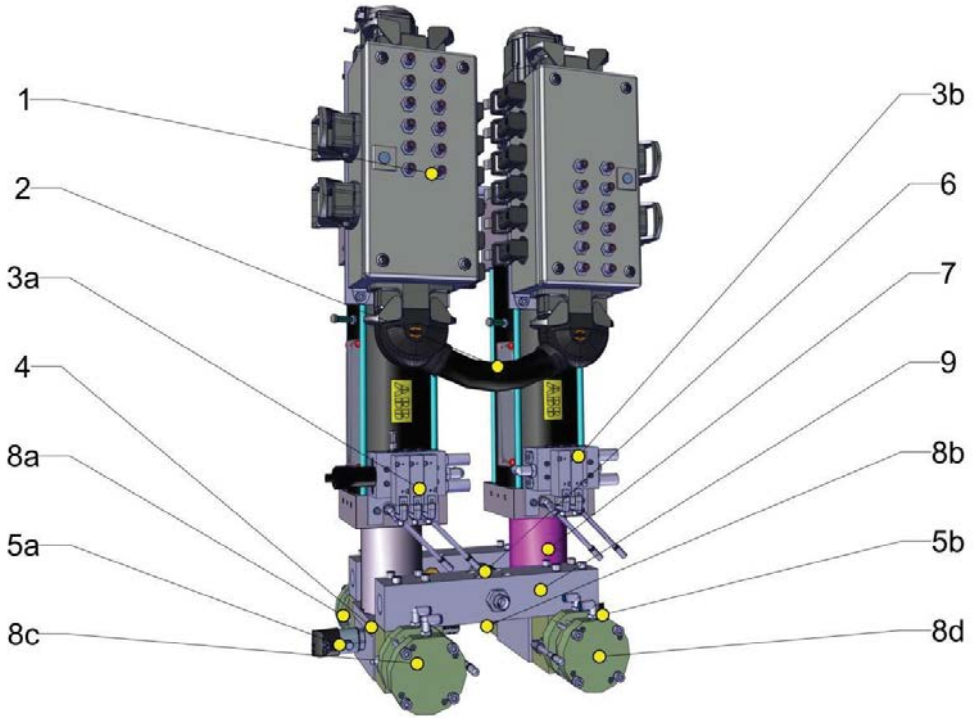
Continues on next page

5.8.1 Overview
Continued

Dual system

In the dual system, two dosing units (A and B) are combined to a single system with the aim of ensuring continuous material discharge.

Overview of dosing unit 155 - dual system



xx2000000960

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Bridge cable	The bridge cable enables data exchange between the terminal boxes of the two dosing units as well as supply of dosing unit B with power.
3	Pilot control block	The pilot control block is used for controlling the dosing valve. a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
4	Connection block	The connection block transfers the material. It has several connection options.
5	Pressure sensor	This pressure sensor measures the pressure. a: Pressure sensor for dosing unit A b: Pressure sensor for dosing unit B
6	Heating Probe	The temperature sensor monitors the material temperature.
7	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.

Continues on next page

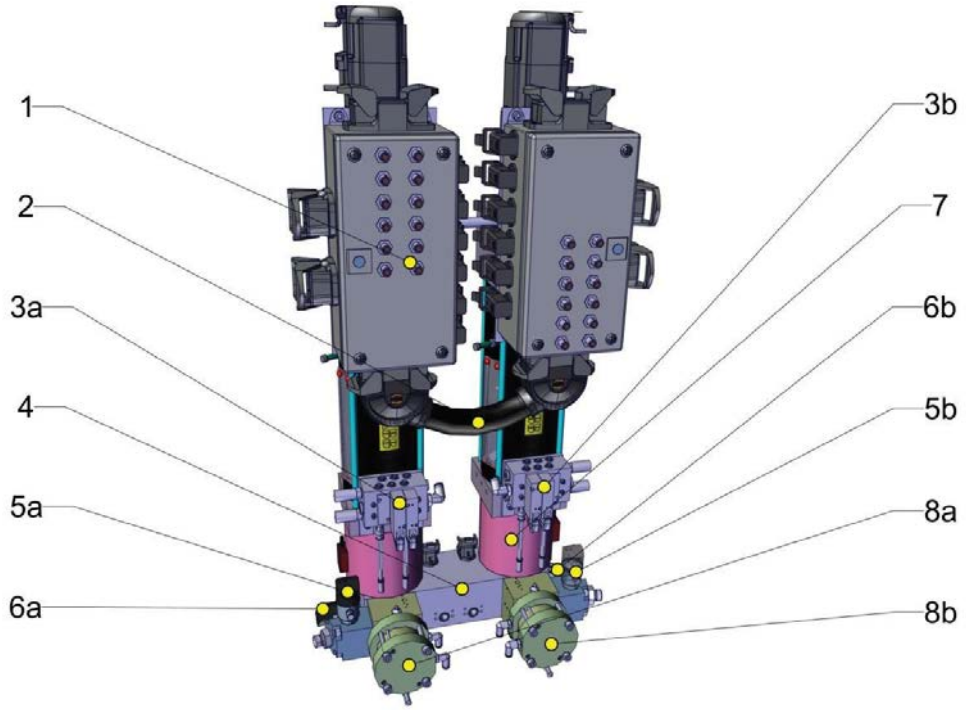
	Component	Function
8	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Material inlet valve of dosing unit A b: Material inlet valve of dosing unit B c: Material outlet valve of dosing unit A d: Material outlet valve of dosing unit B
9	Connecting plate	The connecting plate transfers the material. It connects the two dosing units with each other.

2C system

In the 2C system, two dosing units (A and B) are combined to a single system with the aim of ensuring high-precision metering and homogeneous mixing of the two components.

The material discharge of dosing units A and B takes place simultaneously.

Overview of dosing unit 155 - 2C system



xx2000000963

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Bridge cable	The bridge cable enables data exchange between the terminal boxes of the two dosing units as well as supply of dosing unit B with power.

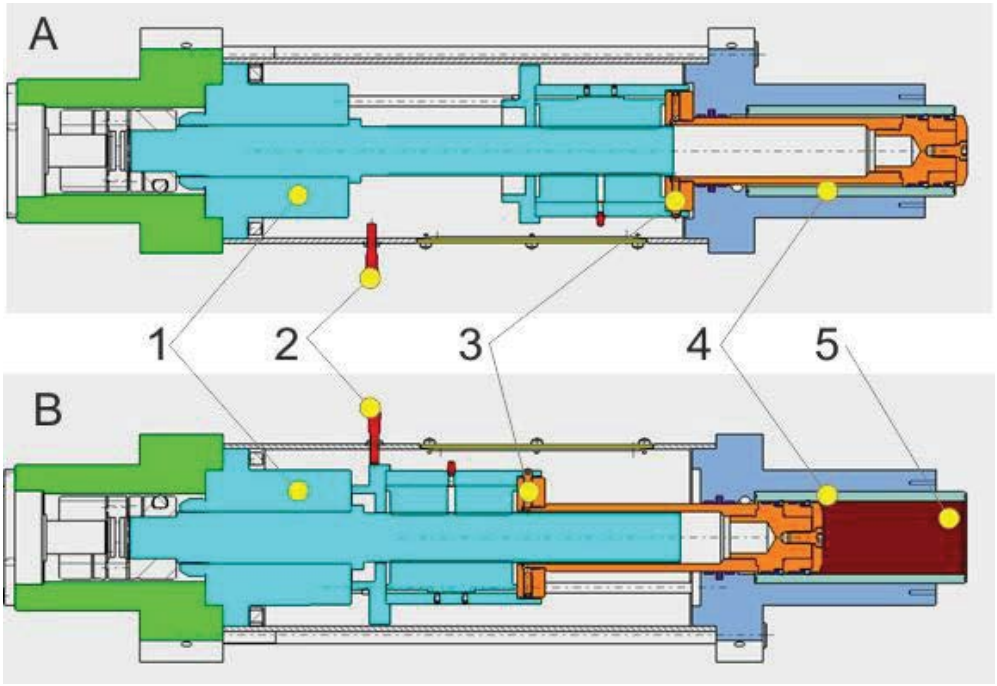
Continues on next page

5.8.1 Overview
Continued

	Component	Function
3	Pilot control block	The pilot control block is used for controlling the dosing valves. a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
4	Connection block	The connection block transfers the material. It connects the two dosing units with each other.
5	Pressure sensor	This pressure sensor measures the pressure. a: Pressure sensor for dosing unit A b: Pressure sensor for dosing unit B
6	Heating Probe	The temperature sensor monitors the material temperature. a: Temperature sensor of dosing unit A b: Temperature sensor of dosing unit B
7	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.
8	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Dosing valve of dosing unit A b: Dosing valve of dosing unit B

Scheme empty and full position

Schematic representation: Empty (A) and full position (B), Dosing unit



xx2000000967

	Component	Function
1	Spindle bearing	Spindle bearing
2	Proximity switch	Proximity switch for piston rod position sensing. Used for referencing the 0-position.

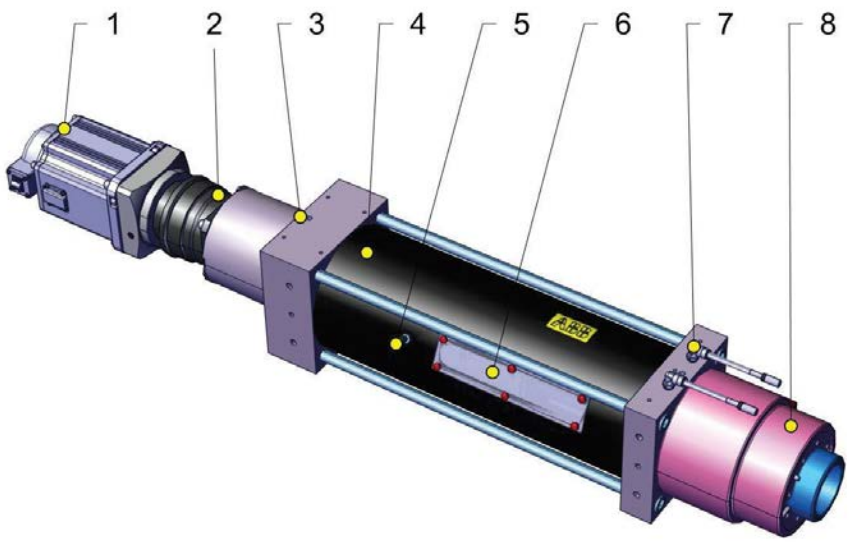
Continues on next page

	Component	Function
3	Piston unit	Generation of material pressure
4	Bushing	Guides the piston unit
5	Material chamber	Holds the material to be applied

Overview of dosing unit 560

Basic assembly

Overview of dosing unit 560 - basic assembly



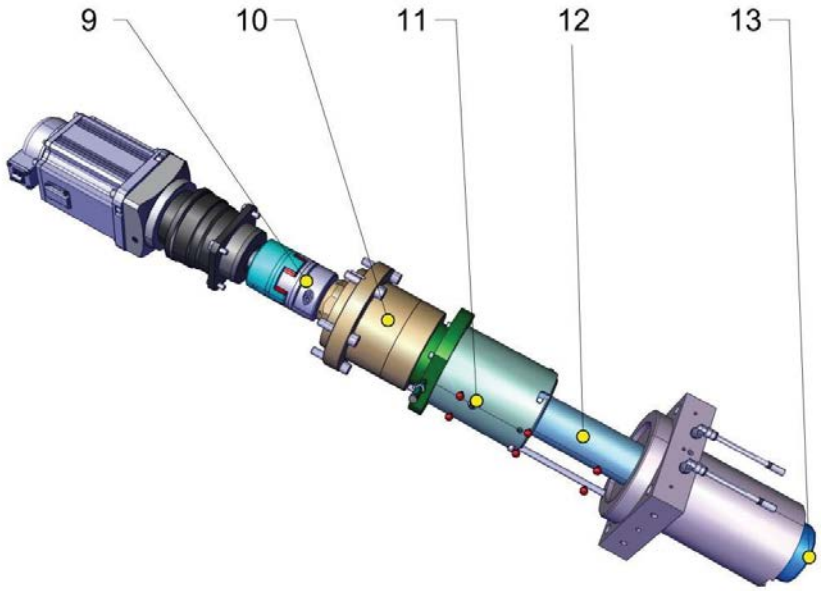
xx2000000950

	Component	Function
1	Motor	Assembly drive (750 W servo drive).
2	Planetary gearbox	Torque transmission to drive.
3	Bearing housing	Holds the planetary roller drive.
4	Protective pipe	Drive unit housing.
5	Proximity switch, inductive	Proximity switch for piston rod position sensing. Used for referencing the 0-position.
6	Cover	Service opening for spindle lubrication and filling level indicator.
7	Leakage indicator	Leakage is drained off; can optionally be used for poaching/lubrication of the piston unit.
8	Material chamber (optionally with heating sleeve)	Holds the material to be applied (heating sleeve ensures constant temperature).

Continues on next page

5.8.1 Overview
Continued

Overview of dosing unit 560 - basic assembly without protective tube and bearing housing



xx2000000954

	Component	Function
9	Shaft coupling	Zero-backlash, prestressed
10	Spindle bearing	Four angular ball bearings, lifetime lubrication by manufacturer.
11	Anti-rotation lock	Prevents the spindle nut from turning.
12	Piston rod	Transfers the linear movement to the piston.
13	Liner	Guides the piston unit and seals the pressure chamber.

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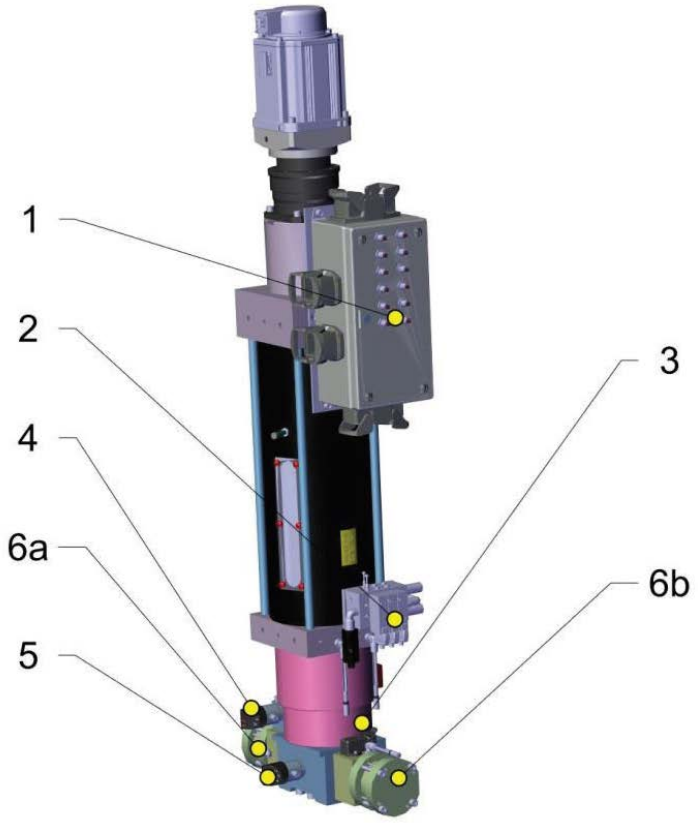
Single system

The single system is an assembly for the defined discharge of 1C material.

Overview of dosing unit 560 - single system



xx2000000958

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Pilot control block	The pilot control block is used for controlling the dosing valves.
3	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.
4	Pressure sensor	This pressure sensor measures the pressure at the material inlet.
5	Pressure sensor	This pressure sensor measures the pressure at the material outlet.
6	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Material inlet valve b: Material outlet valve

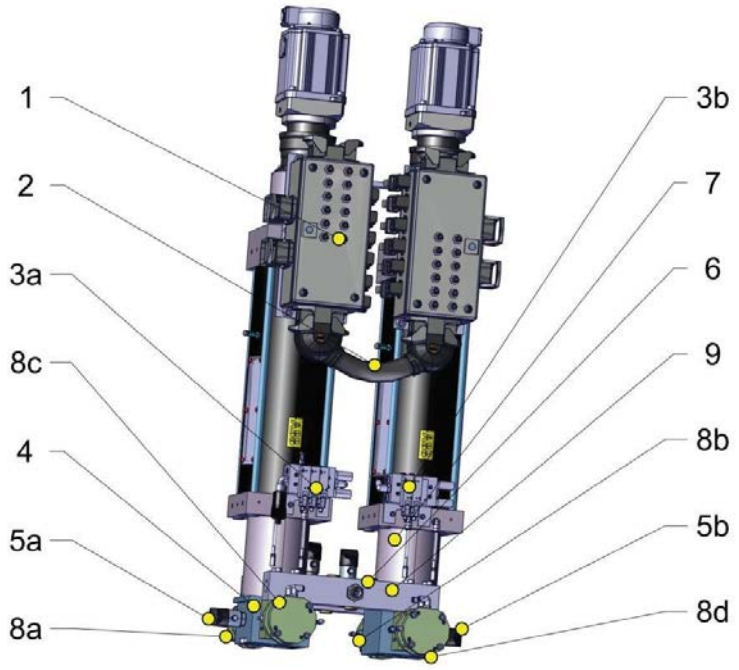
Continues on next page

5.8.1 Overview
Continued

Dual system

In the dual system, two dosing units (A and B) are combined to a single system with the aim of ensuring continuous material discharge.

Overview of dosing unit 560 - dual system



xx2000000961

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Bridge cable	The bridge cable enables data exchange between the terminal boxes of the two dosing units as well as supply of dosing unit B with power.
3	Pilot control block	The pilot control block is used for controlling the dosing valve. a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
4	Connection block	The connection block transfers the material. It has several connection options.
5	Pressure sensor	This pressure sensor measures the pressure. a: Pressure sensor for dosing unit A b: Pressure sensor for dosing unit B
6	Heating Probe	The temperature sensor monitors the material temperature.
7	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.

Continues on next page

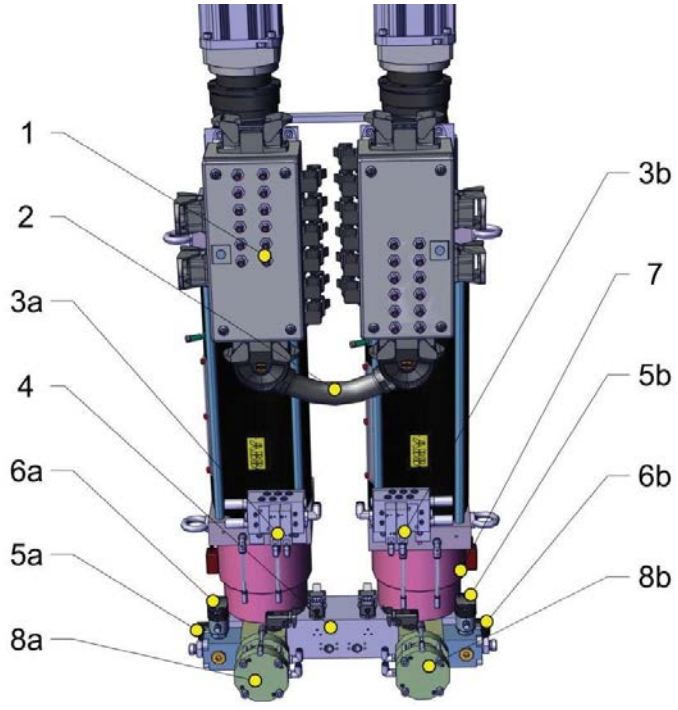
	Component	Function
8	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Material inlet valve of dosing unit A b: Material inlet valve of dosing unit B c: Material outlet valve of dosing unit A d: Material outlet valve of dosing unit B
9	Connecting plate	The connecting plate transfers the material. It connects the two dosing units with each other.

2C system

In the 2C system, two dosing units (A and B) are combined to a single system with the aim of ensuring high-precision metering and homogeneous mixing of the two components.

The material discharge of dosing units A and B takes place simultaneously.

Overview of dosing unit 560 - 2C system



xx2000000964

	Component	Function
1	Terminal box/DIB	The terminal box/DIB is the interface between the dosing unit and the higher-level controller. It has connections for communication via the bus system, for data transmission and for supplying power to the end consumers.
2	Bridge cable	The bridge cable enables data exchange between the terminal boxes of the two dosing units as well as supply of dosing unit B with power.

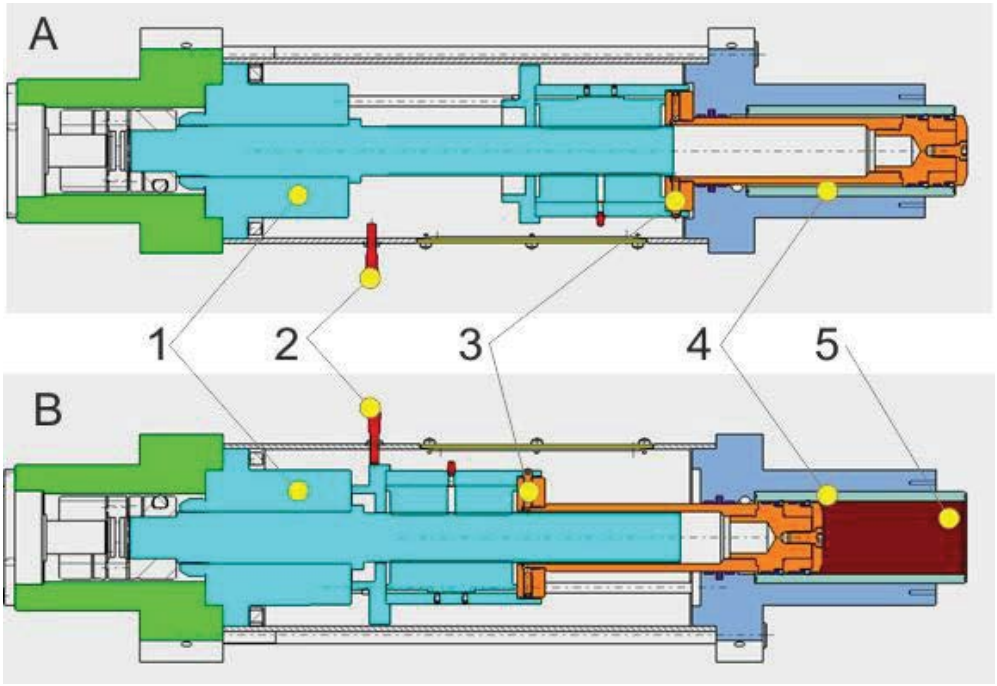
Continues on next page

5.8.1 Overview
Continued

	Component	Function
3	Pilot control block	The pilot control block is used for controlling the dosing valves. a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
4	Connection block	The connection block transfers the material. It connects the two dosing units with each other.
5	Pressure sensor	This pressure sensor measures the pressure. a: Pressure sensor for dosing unit A b: Pressure sensor for dosing unit B
6	Heating Probe	The temperature sensor monitors the material temperature. a: Temperature sensor of dosing unit A b: Temperature sensor of dosing unit B
7	Heating sleeve (optional)	The heating sleeve ensures a constant temperature of the material chamber.
8	Dosing valve	The dosing valve precisely doses material for application. Controls the material flow. a: Dosing valve of dosing unit A b: Dosing valve of dosing unit B

Scheme empty and full position

Schematic representation: Empty (A) and full position (B), Dosing unit



xx2000000968

	Component	Function
1	Spindle bearing	Spindle bearing
2	Proximity switch	Proximity switch for piston rod position sensing. Used for referencing the 0-position.

Continues on next page

	Component	Function
3	Piston unit	Generation of material pressure
4	Bushing	Guides the piston unit
5	Material chamber	Holds the material to be applied

5.8.2 Functional description

The dosing unit holds material for one application and must be refilled after every material application cycle.

During filling, the spindle moves the piston from the empty position to the full position as the material to be applied flows in.

For material discharge, the spindle's direction of rotation reverses: The spindle nut move the piston towards the Empty position, thereby pressing the material to be applied to the material outlet.

The end points and timing of the piston translation are software-dependent.

The position of the grease nipple on the scale on the protective tube, which is visible through the window in the tube, indicates the current filling level in percent.

Optionally, it is possible to continuously purge the dosing unit during operation using a central lubrication unit. This loosens material residues, which can settle in the gaps during filling and emptying.

5.8.3 Connections

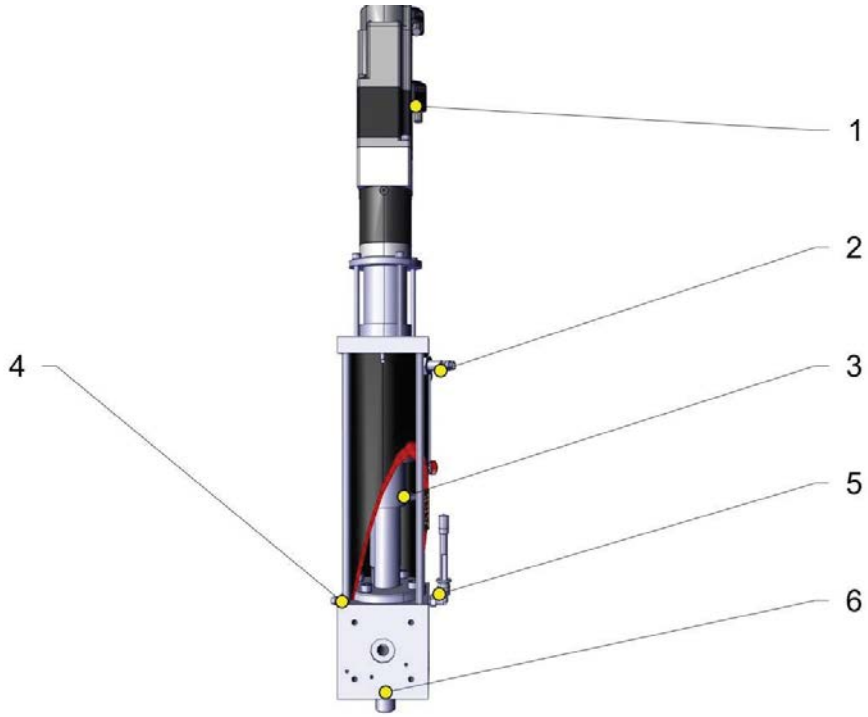
Tip

For terminal assignment, cable types and lengths of the preassembled cables, see the circuit diagram.

Connections of dosing unit 11

Basic assembly

Connections of dosing unit 11 - basic assembly



xx2000000969

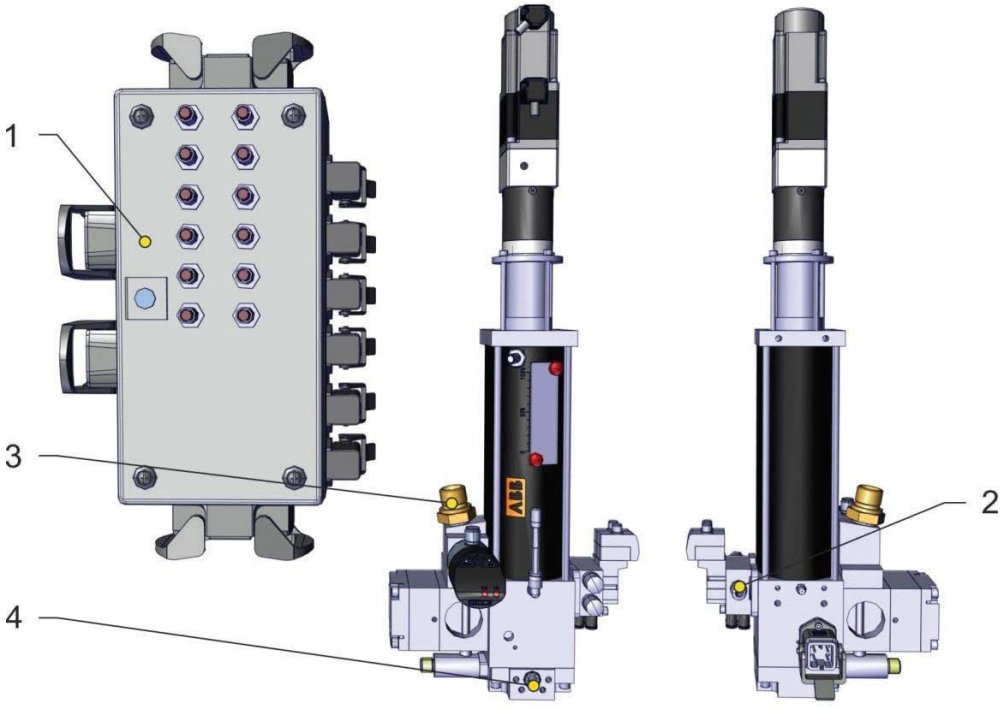
No.	Description
1	Power and data connections for motor
2	Connection for piston rod position proximity switch
3	Grease nipple for connecting a grease gun (spindle nut maintenance and repair)
4	Grease nipple for connecting a grease gun (seal carrier maintenance and repair)
5	Leakage drain connection; optional connections for the Mesamoll circuit of the central lubrication unit
6	Dosing chamber connections for material inlet and outlet valve adapters and for pressure sensor

Continues on next page

5.8.3 Connections
Continued

Single system

Connections of dosing unit 11 - single system



xx2000000973

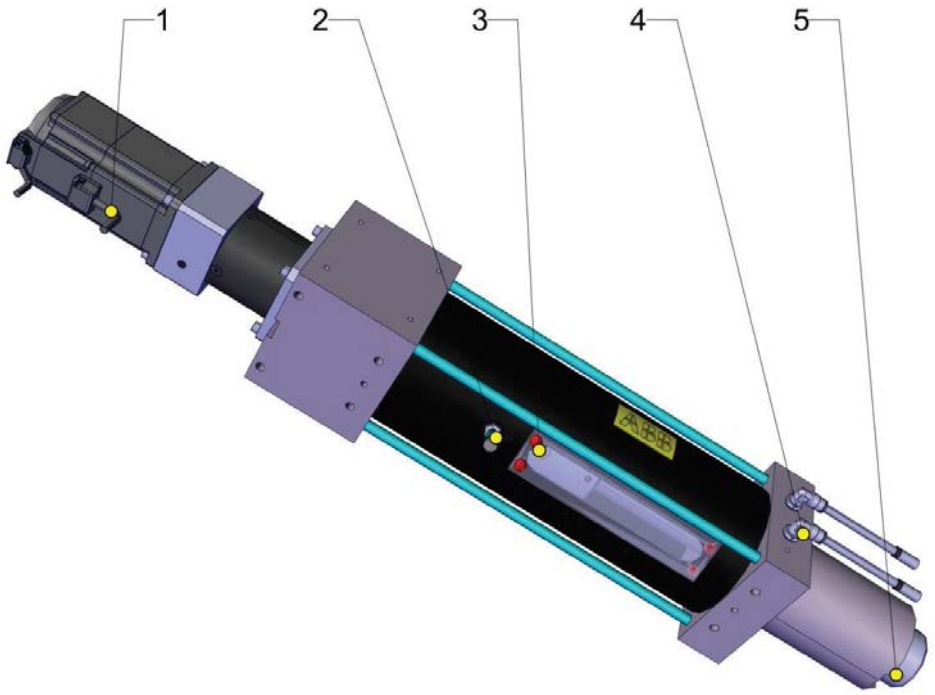
No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block
3	Material infeed
4	Material outlet

Continues on next page

Connections of dosing unit 80

Basic assembly

Connections of dosing unit 80 - basic assembly



xx2000000970

No.	Description
1	Power and data connections for motor
2	Connection for piston rod position proximity switch
3	Grease nipple for connecting a grease gun (spindle nut maintenance and repair)
4	Grease nipple for connecting a grease gun (seal carrier maintenance and repair)
5	Leakage drain connection; optional connections for the Mesamoll circuit of the central lubrication unit
6	Dosing chamber connections for material inlet and outlet valve adapters and for pressure sensor

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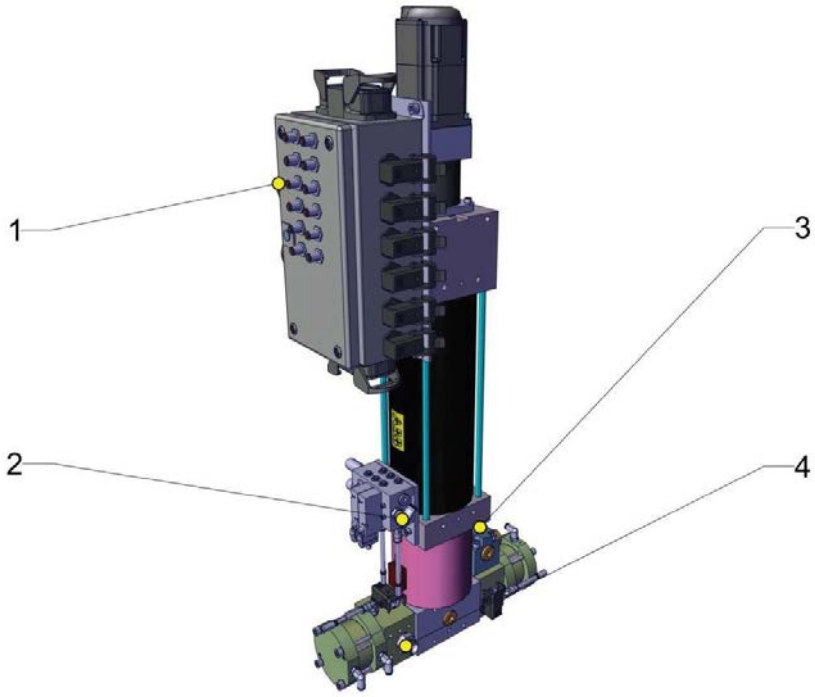
5.8.3 Connections
Continued

Single system

Connections of dosing unit 80 - single system

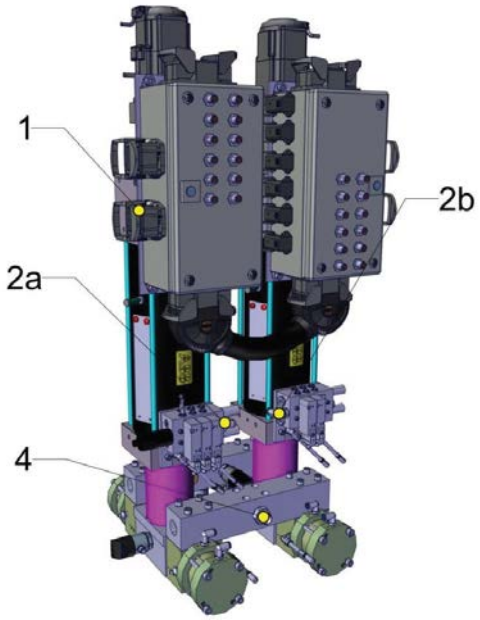


xx2000000974

No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block
3	Material infeed
4	Material outlet

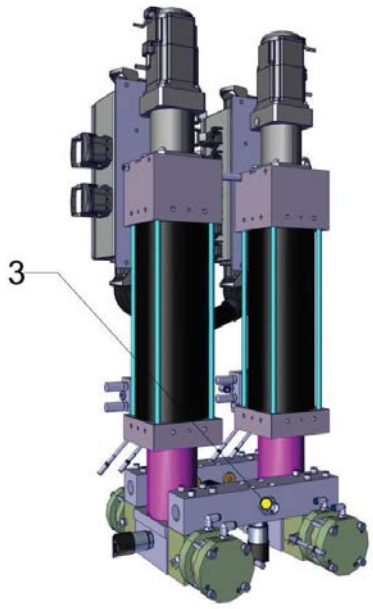
Continues on next page

Dual system



xx2000000977

Front view



xx2000000978

Rear view

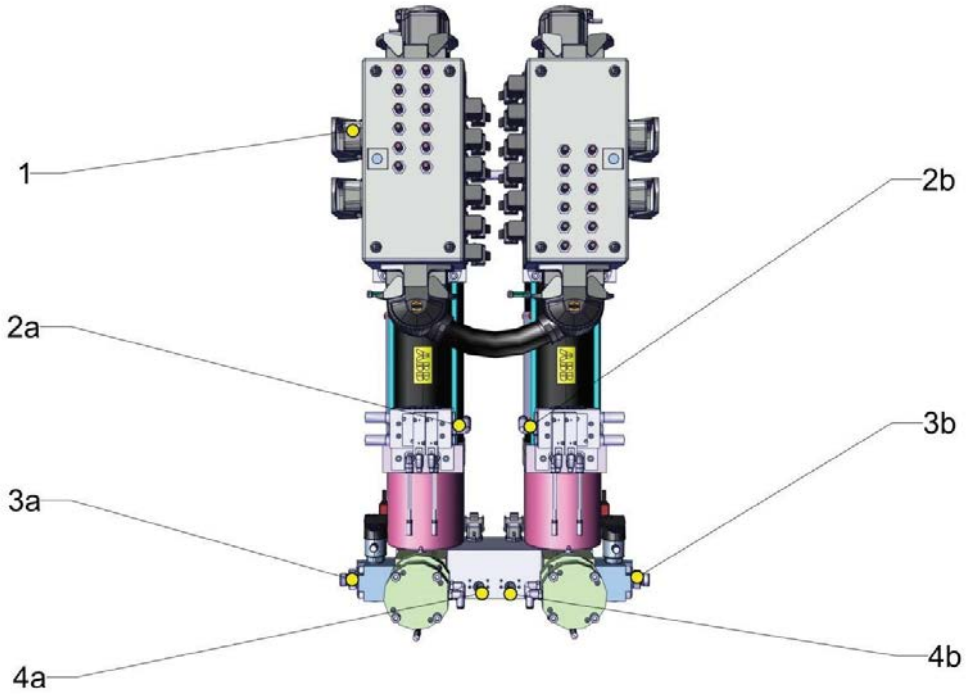
No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
3	Material infeed
4	Material outlet

Continues on next page

5.8.3 Connections
Continued

2C system

Connections of dosing unit 80 - 2C system



xx2000000983

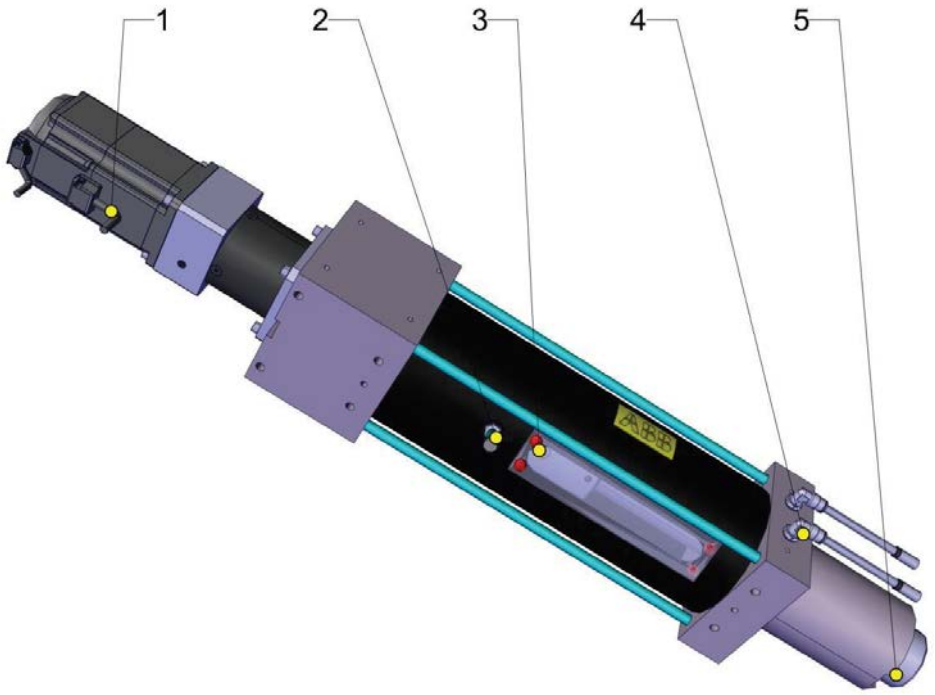
No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
3	Material infeed a: Dosing unit A (component A) b: Dosing unit B (component B)
4	Material outlet a: Dosing unit A (component A) b: Dosing unit B (component B)

Continues on next page

Connections of dosing unit 155

Basic assembly

Connections of dosing unit 155 - basic assembly



xx2000000971

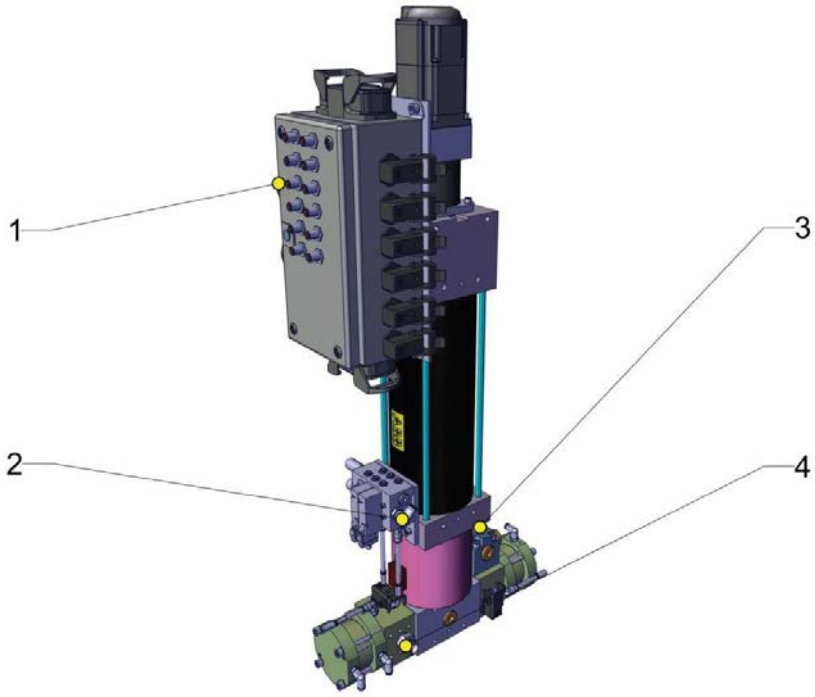
No.	Description
1	Power and data connections for motor
2	Connection for piston rod position proximity switch
3	Grease nipple for connection of a grease gun (maintenance and repair)
4	Leakage drain connection; optional connections for the Mesamoll circuit of the central lubrication unit
5	Dosing chamber connections for material inlet and outlet valve adapters and for pressure sensor

Continues on next page

5.8.3 Connections
Continued

Single system

Connections of dosing unit 155 - single system

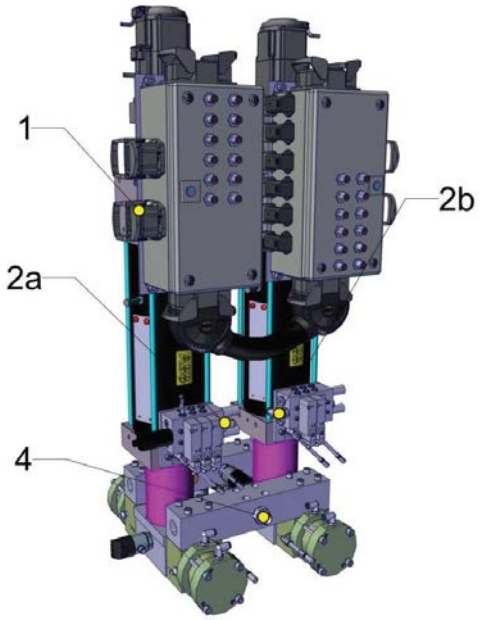


xx2000000975

No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block
3	Material infeed
4	Material outlet

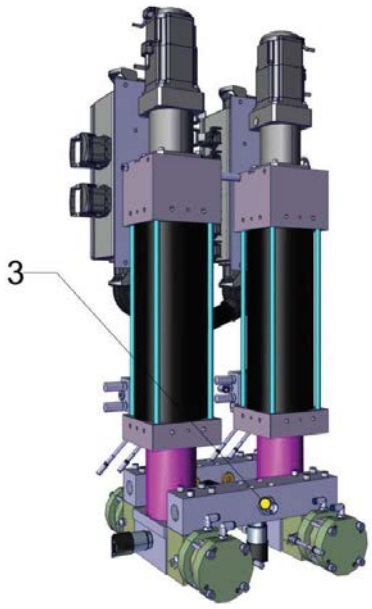
Continues on next page

Dual system



xx2000000979

Front view



xx2000000980

Rear view

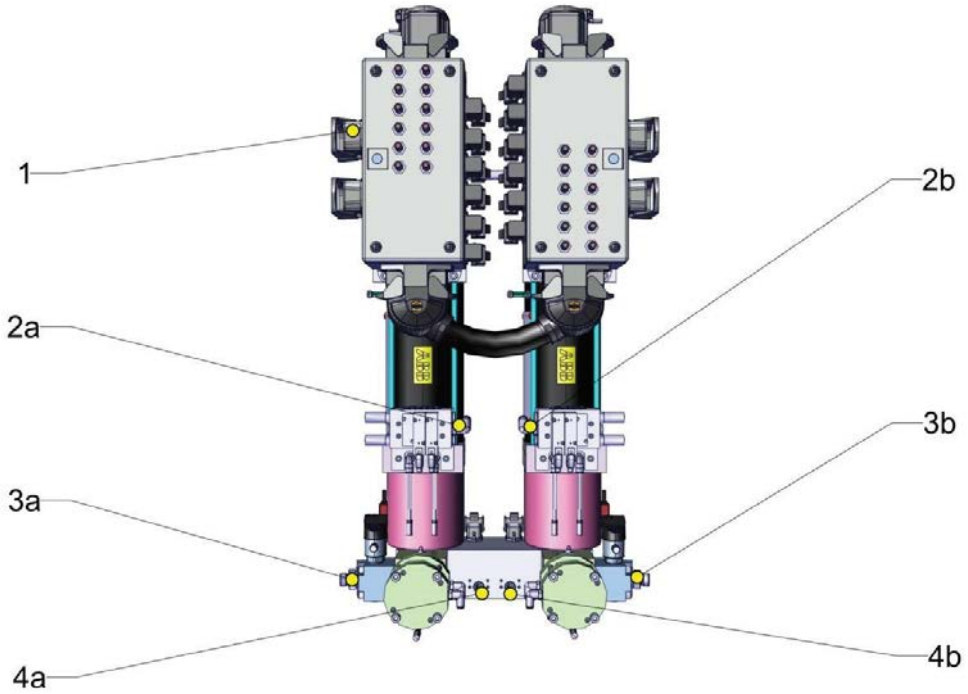
No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
3	Material infeed
4	Material outlet

Continues on next page

5.8.3 Connections
Continued

2C system

Connections of dosing unit 155 - 2C system



xx2000000984

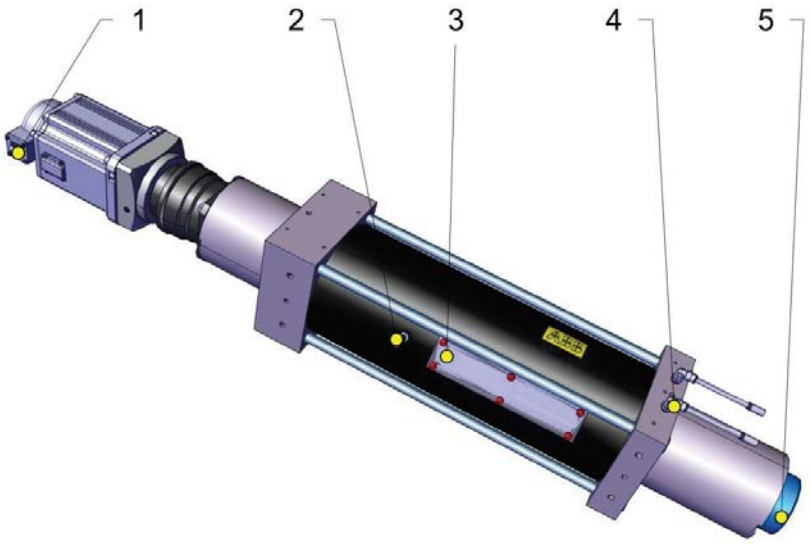
No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
3	Material infeed a: Dosing unit A (component A) b: Dosing unit B (component B)
4	Material outlet a: Dosing unit A (component A) b: Dosing unit B (component B)

Continues on next page

Connections of dosing unit 560

Basic assembly

Connections of dosing unit 560 - basic assembly



xx2000000972

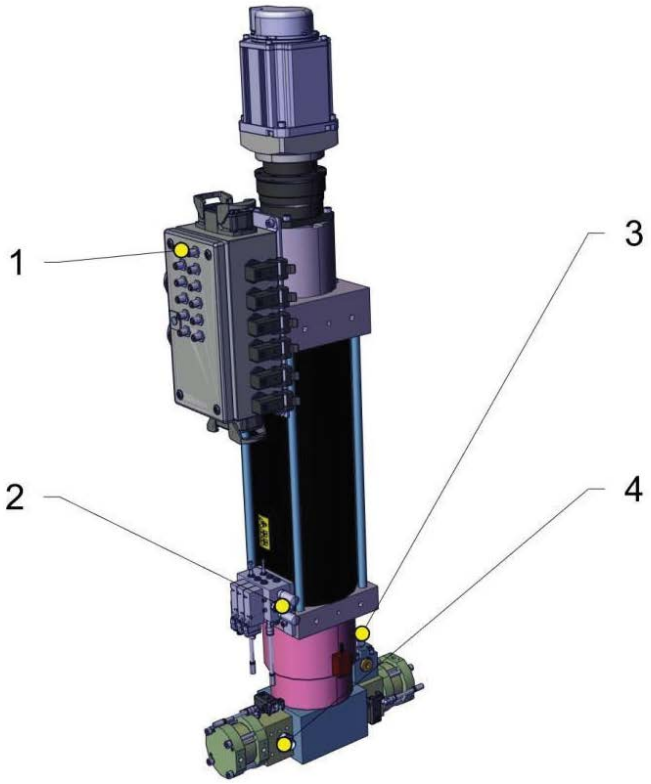
No.	Description
1	Power and data connections for motor
2	Connection for piston rod position proximity switch
3	Grease nipple for connection of a grease gun (maintenance and repair)
4	Leakage drain connection; optional connections for the Mesamoll circuit of the central lubrication unit
5	Dosing chamber connections for material inlet and outlet valve adapters and for pressure sensor

Continues on next page

5.8.3 Connections
Continued

Single system

Connections of dosing unit 560 - single system

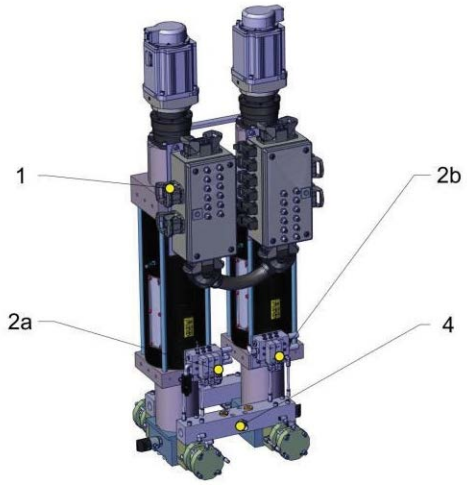


xx2000000976

No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block
3	Material infeed
4	Material outlet

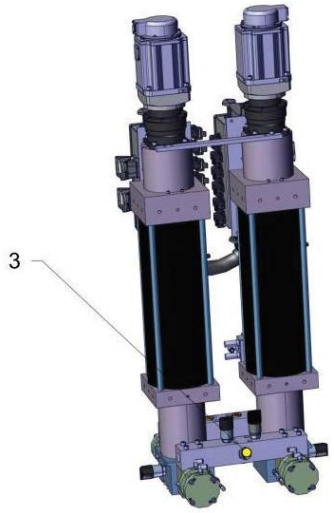
Continues on next page

Dual system



xx2000000981

Front view



xx2000000982

Rear view

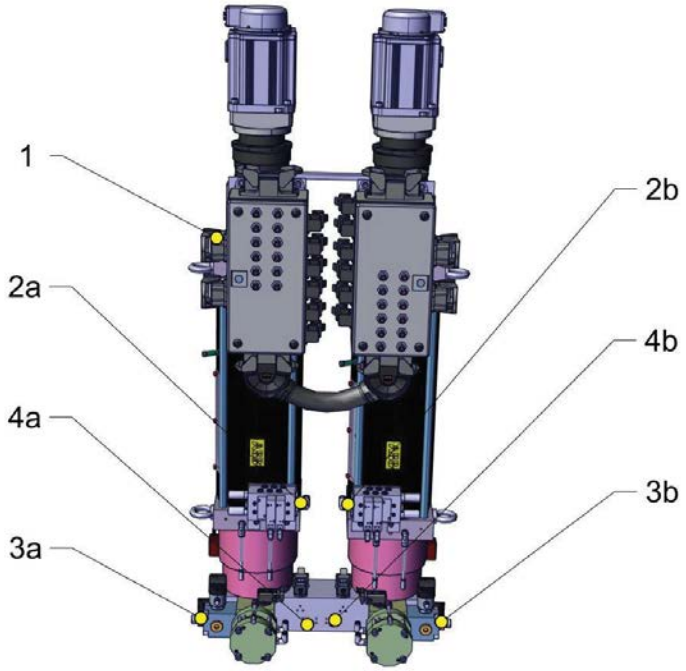
No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
3	Material infeed
4	Material outlet

Continues on next page

5.8.3 Connections
Continued

2C system

Connections of dosing unit 560 - 2C system



xx2000000985

No.	Description
1	Electrical connections for the terminal box/DIB For terminal assignments and cable types, see the circuit diagram.
2	Pneumatic connections of pilot control block a: Dosing valve pilot control block - dosing unit A b: Dosing valve pilot control block - dosing unit B
3	Material infeed a: Dosing unit A (component A) b: Dosing unit B (component B)
4	Material outlet a: Dosing unit A (component A) b: Dosing unit B (component B)

5.8.4 Interfaces to other components

The terminal box/DIB is the interface between the assembly and the higher-level controller.

5.8.5 Operator control and display elements

The dosing unit is monitored from the gluing or plant control unit. There, the filling level and spindle position can also be viewed.

5.9 Installation of doser

5.9.1 Notes

- All work described here may only be carried out on a pressure- and voltage-free system. The system must be protected against restarting.
- All work described here may only be carried out at a standstill. The system must be secured against restarting.
- The safety and accident prevention regulations given in these documentations must also be observed.
- Assembly work must be carried out by the manufacturer, by specially briefed personnel or by trained personnel.

Tip

If you have any questions, contact our customer service.

ABB Automation GmbH

Grüner Weg 6 | 61169 Friedberg | Germany

Tel.: +49 6031 85307

E-mail: roboterservice@de.abb.com

For further information, see our website

www.abb.com/robotics

WARNING

Pressurized material!

Due to improper handling pressurized material can escape. Serious eye injuries due to material splatter is possible!

Relieve the material pressure before working on the module. Wear your personal protective equipment!

WARNING

Caution: Take care when replacing the dosing unit.

The dosing unit’s mounting position and weight presents a hazard (for example of falling) when replacing. This dosing unit can be damaged or destroyed if dropped. Incorrect handling can cause injury.

Sue suitable and sufficient hoists when changing the dosing unit. Always carry out removal and installation together with a second person. All work must be carried out by trained, briefed specialists.

Note

Two people are required for the installation work.

5.9.2 Tools and accessories

The following tools and accessories are required for installation, uninstallation, maintenance and repair of the assembly:

- Set of Allen keys
- Set of open-end spanners
- Grease gun
- Sufficient number of suitable slings
- Maintenance box

5.9.3 Uninstalling the assembly

Before uninstalling the assembly, the following point must be observed:

- The dosing unit must be emptied from the higher-level control system ("Empty" function).

Tip

Observe associated documents!

For information about operating the glue feed controller, see the user manual for the general assembly.

Tip

You can find the overview illustrations in *Assembly of doser on page 195*.

To uninstall the assembly, take the following steps:

1. Disconnect the pneumatic connection of the pilot control block (supply line).
2. Disconnect the electrical connections from the terminal box/DIB.
3. Disconnect the material line.
4. Secure the dosing unit against falling with a sufficient number of suitable slings.
5. Release the dosing unit from the flanges on the plant (application tower or robot).

5.9.4 Installing the assembly

To install the assembly, take the following steps:

1 Fit the dosing unit to the flanges on the plant (application tower or robot). This can be done, for example, using a metal or adapter plate.

> **CAUTION**
>
> Sue suitable and sufficient slings when changing the dosing unit.
>
> Always carry out removal and installation together with a second person.

2 Fit the material line to the provided connection.

3 Connect the electrical connections to the terminal box/DIB.

4 Connect the pneumatic connection of the pilot control block (supply line).

> **Tip**
>
> For connection and terminal assignments, cable types and lengths of the preassembled cables, see the circuit diagram.

Before commissioning the assembly, the following point must be observed:

1 Having successfully installed the assembly, it must be purged together with the connected system.

> **Tip**
>
> Observe associated documents!
>
> For information about operating the higher-level control system, see the user manual for the general assembly.

> **Tip**
>
> You can find the overview illustrations in *Assembly of doser on page 195*.

5.10 Installation of the whole system

5.10.1 Overview about system

This figure shows an overview of the electrical installation of the IDFP system. Required components are the Single Controller (+SC1), the Integrated Dispensing Controller (+IDC) and the Doser (+DIB). The Pump (+PIM) and the Peltier (+PEL1X) are not included in every system.

Overview of IDFP System

xx2000001052

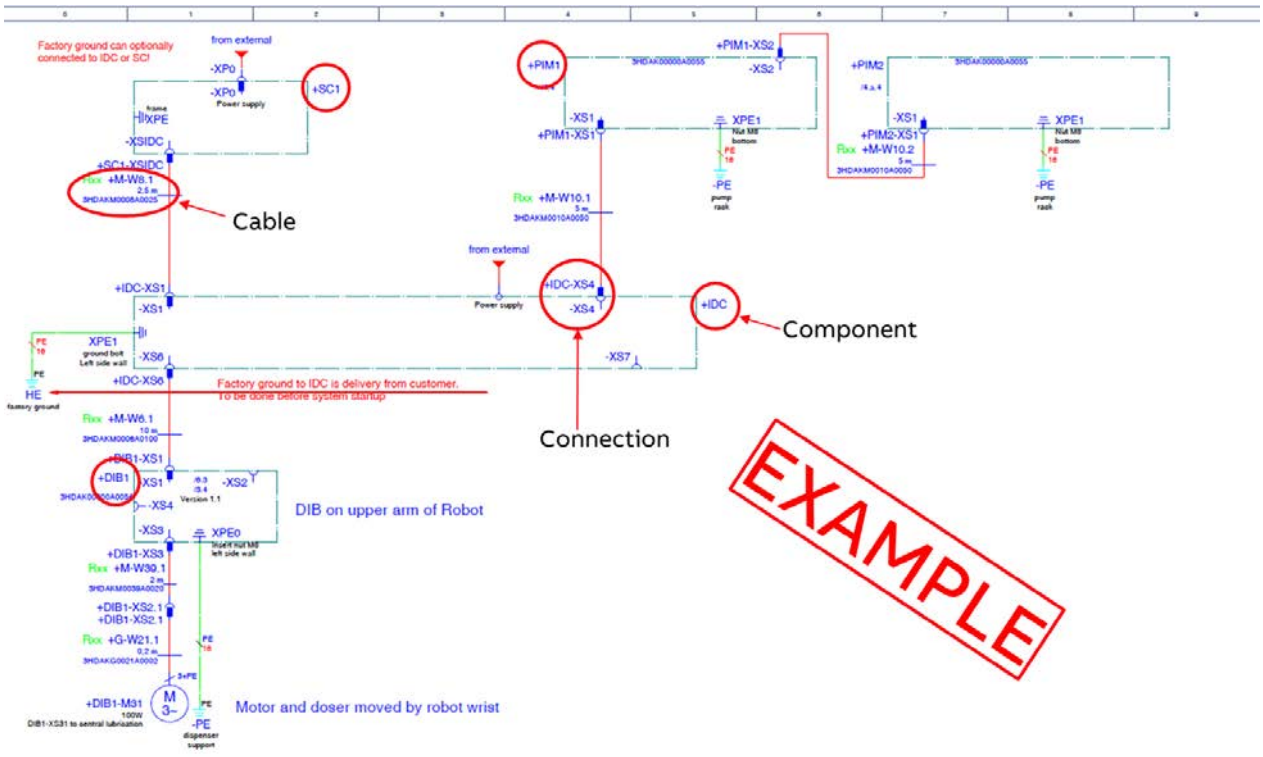
5.10.2 Overview about electrical installation

All components are connected to the IDC with different Multi cables. Table 1 shows the different connections: Which IDC Port is connected to which periphery port by which cable.

IDC Port	Cable	Periphery Port
XS1	+M-W8.1 / +M-W28.1	-XSIDC (Single Controller)
XS2	+M-W38.1	IDC2-XS1 (2nd IDC)
XS3		
XS4	+M-W10.1 / +M-W20.1	PIM1-XS1
XS5	+M-W10.2 / +M-W20.2	PIM3-XS1 (2nd or 3rd PIM)
XS6	+M-W6.1 / +M-W26.1	DIB1-XS1
XS7	+M-W6.2 / +M-W26.2	DIB3-XS1 (2nd 3rd DIB)
XS11	+M-W15.1 / +M-W25.1	PEL1A-XS1 (Peltier 1)
XS21	+M-W15.2 / +M-W25.3	PEL1B-XS1 (Peltier 2)

The personal connection plan for every system is shown at the "EPlan" file. The file is on the USB Stick you will find in the IDC. An example is shown in the following figure.

Example for personal connection plan



xx2000001053

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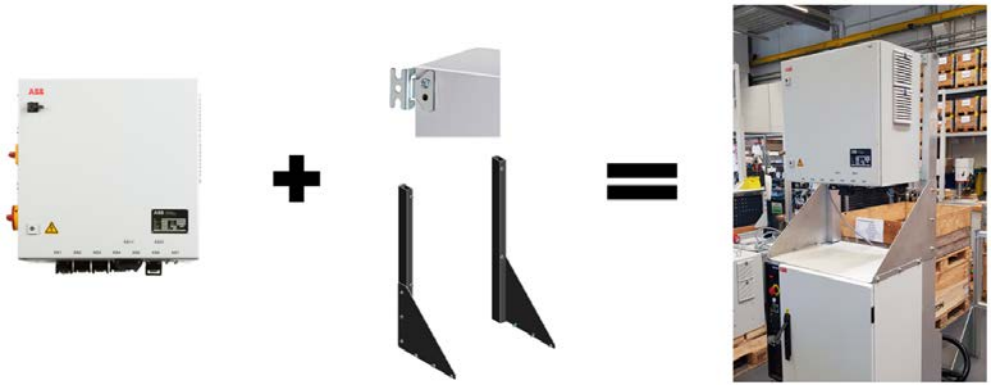
IDC frame mounting

IDC frame mounting

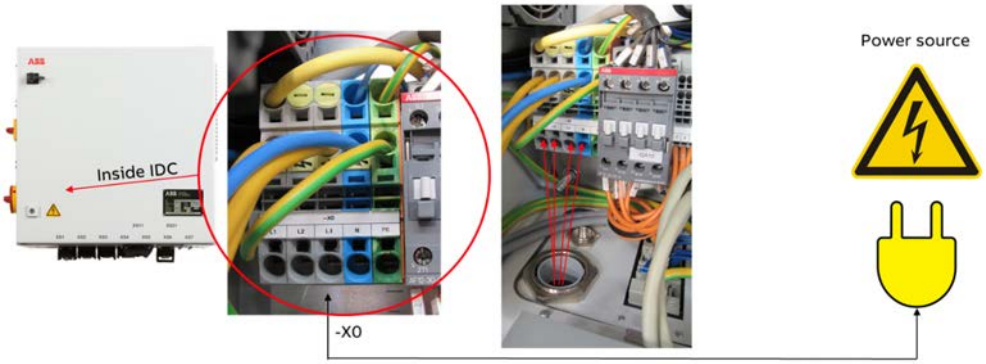


xx2000001054

For mounting on the frame use the brackets which are included in the IDC. In a first step install the brackets on the IDC and the frame on the Single Controller. In a second step mount the IDC on the frame.

IDC - Power connection

Connection IDC to power supply



xx2000001055

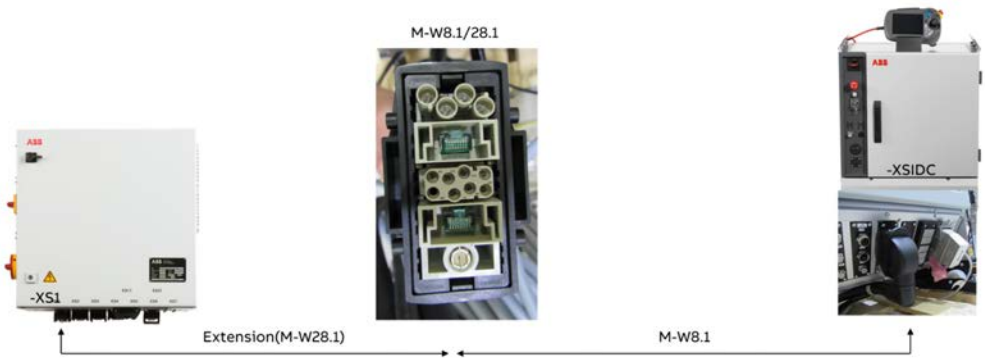
The power cable for IDC is not included. Observe cross wire section and power consumption. The power supply must be connected to X0 in the IDC.

Continues on next page

5.10.2 Overview about electrical installation
Continued

IDC - Single Controller connection

Connection IDC to SC

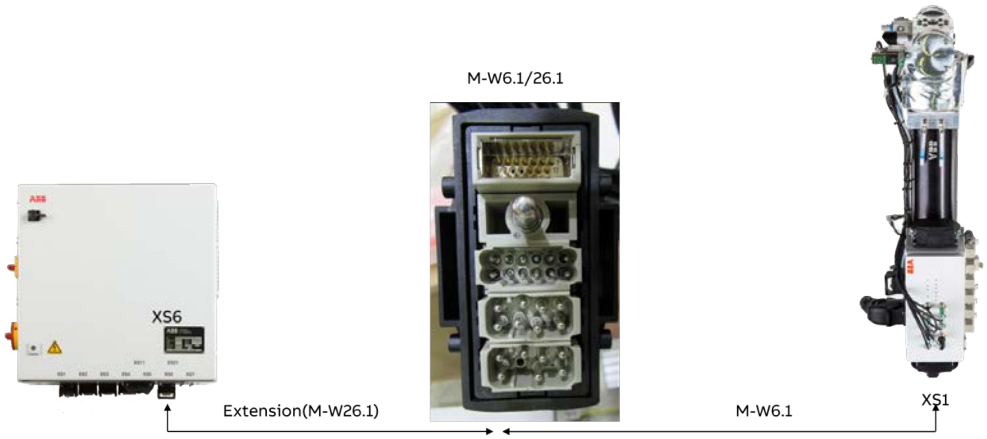


xx2000001056

M-W28.1 is not always included, only available when purchased. It is just used if M-W8.1 is too short for the connection between IDC and Single Controller. The extension always must be installed between the IDC and the standard multi cable.

IDC - Doser Interface Box connection

Connection IDC to DIB



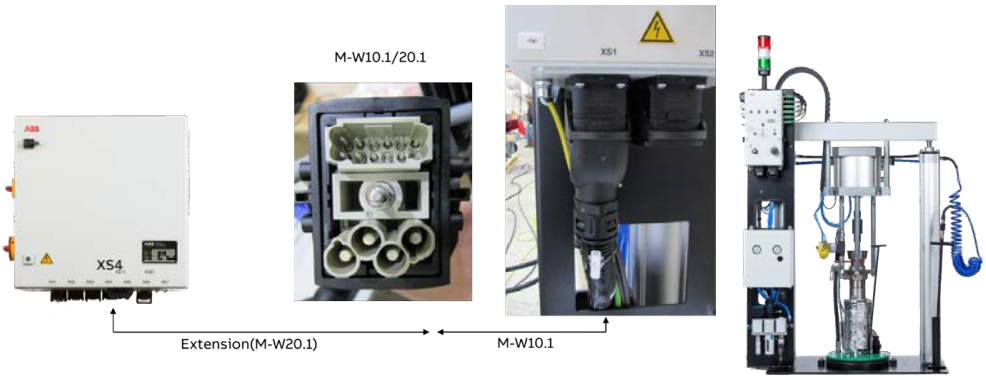
xx2000001057

M-W26.1 is not always included, only available when purchased. It is just used if M-W6.1 is too short for the connection between IDC and Doser Interface Box. The extension always must be installed between the IDC and the standard multi cable. The maximum permissible length of the multi cables between IDC and the last Doser Interface Box is 30m.

Continues on next page

IDC - Pump Interface Module connection

Connection IDC to PIM

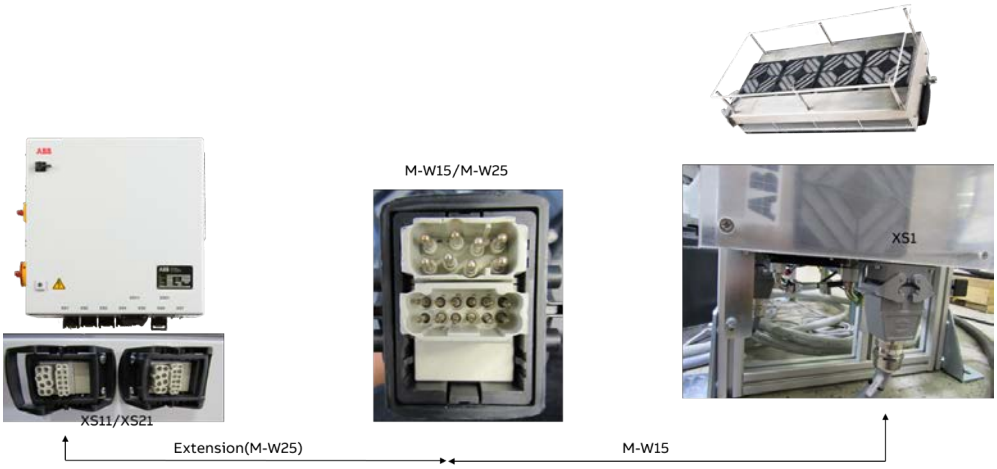


xx2000001058

M-W20.1 is not always included, only available when purchased. It is just used if M-W10.1 is too short for the connection between IDC and Pump Interface Module. The extension always must be installed between the IDC and the standard multi cable. The maximum permissible length of the multi cables between IDC and the last Pump Interface Module is 30m.

IDC - Peltier connection

Connection IDC to PEL



xx2000001059

M-W25 is not always included, only available when purchased. It is just used if M-W15 is too short for the connection between IDC and Peltier. The extension always must be installed between the IDC and the standard multi cable.

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6 Operation

WARNING

Hazard due to operating errors.

Serious to life-threatening physical injuries due to incorrect input of position data at a superordinate control system or on the robot control system.

- Only stay in the hazard area for as long as absolutely necessary.
- Work in the hazard area must only be performed by trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.

WARNING

Hazard due to flammable materials.

Possibility of serious, potentially life-threatening physical injury due to naked flames.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Risk of poisoning, acid burns, genetic modification or allergic reaction due to vapors and liquids.

Serious, potentially life-threatening physical injuries due to the absorption of hazardous substances into the body.

- Observe the appropriate data sheets of the manufacturers.

CAUTION

Risk of burns.

Possibility of skin injuries due to burns from hot surfaces of the dispenser.

- Note the temperature displays on the surface of the dispenser.
- Note the temperature displays on the programming device.
- Avoid body contact with hot surfaces.

Note

The conditions of the nozzles must be checked visually for adequate passage prior to commencement of each shift. If any abnormality (e.g., clogging) is noticed, please inform the maintenance personnel directly.

Continues on next page

6.1 Operation of IRC5

The robot is controlled by the Single Cabinet Controller.

Note

The operation of the IRC5 controller is explained in the IRC5 manual.

6.2 Operation of IDC

The main switch is located on the left outer side of the IDC. Using the main switch the voltage supply of the application equipment can be switched on or off independent of the robot controller.

xx2100000763

Note

If there is an IDC 2 in the function package, it is supplied with voltage via a multi-cable from the IDC (IDC1) and does not have its own main switch.

If a tempering option (heating or Peltier) is installed, there is an additional switch for the heating power at the same outer side of the IDC.

Note

This switch can be used for maintenance and repair purposes to safely switch off all tempering circuits.

This may be necessary if, for example, a defective heated hose or Peltier element is to be replaced.

The entire function package does not have to be switched off for this purpose.

6.3 Software

The IDFP is operated via the FlexPendant (see *User interface on page 281*).

Alternatively, the function package can also be controlled via fieldbus e.g. by a PLC. Please note that the existing signals are controlled accordingly (for signal assignment see *C List of interfaces on page 674*).

Continues on next page

6.3.1 RobotStudio

RobotStudio can be used for programming the application robot.

RobotStudio enables the creation of robot programs without having to interrupt production. With its virtual controller which is an exact copy of the original robot, realistic simulations of the real robot are possible, in which real robot programs and configurations are used which correspond exactly to the data used in production.

It is recommended to use the latest RobotStudio for systems using RobotWare 5 and RobotWare 6.

Tip

IDFP-specific RAPID commands and routines are listed in *Programming and parameterization on page 367*.

6.3.2 RobView

RobView 5 is a PC tool that supplements and completes the ABB robot systems. It can communicate with the robot over an Ethernet interface and offers a wide range of service options and useful tools for use with operation and maintenance of the robots and adjacent data units. It includes monitoring options for various robot operations.

This chapter contains brief descriptions of selected tools in RobView that are suitable for use with an IDFP. See the RobView documentation for more detailed information.

CAUTION

Please note that RobView is a powerful remote control. Changes to parameters and software by RobView may have dangerous physical effects.

All safety measures which generally apply for the operation of the application robot must be observed.

Tip

This chapter contains brief descriptions of selected tools in RobView, for more detailed information see the RobView documentation.

More information is available at *www.RobView.com*.

System structure setup

The system can be set up and viewed in the system structure setup, and individual robots can be added and removed.

Signal Analyzer

The signal analysis tool offers unique options for logging, viewing, analyzing and displaying signals in one or more robot systems. It is a very powerful tool for commissioning and service personnel, for daily analysis and more.

ShopFloor Editor

ShopFloor Editor is an efficient program editor for RAPID programs. It includes options for analyzing and editing programs graphically in 3D. Programs can be edited offline to avoid interruptions in production site.

IPS Explorer

IPS Explorer is a plug-in that offers a graphical overview of the created IPS objects and their connections with one another. It also includes the option of reading out and editing parameters of the various objects.

Admin settings

This section contains the settings that are required by the administrator when starting commissioning. This includes the user login to the robot.

Continues on next page

Time sync

The time is set to synchronize the time on the robot with the time on the PCs on which RobView is running. For example, error messages can be displayed in the SignalAnalyzer at the correct time.

6.3.3 FTP program

For FTP access (transmission of files via IP networks), a FTP program, such as FileZilla, Total Commander or similar, is required. It can also be used to save configuration files and backups to the PC.

Establishing a connection using Total Commander

1 Open file.

FTP connection

xx2000000582

2 Click on the "FTP" button.

3 Click on "New connection".

4 Enter name for the connection in "Title".

5 Under "Server name (Port)" enter the IP address of the robot (for e.g. 100.100.100.1)

User name and password correspond to the UAS Settings for the robot.

Default username and password are "Default User" and "robotics"

6 Confirm with "OK".

»The name of the connection entered appears in the previous window.

7 Click on the name of the connection and click on the "Connect" button.

»The robot data is displayed on one side of the main window, and the PC folders are displayed on the other side.

8 In this main window the files are copied to the PC folders, edited there and copied again to the robot, for e.g. application programs if a system was created with an integrated main module.

6.4 Operation / functions of barrel pump

The barrel pump is actuated by robot software of the function package via the PIM.
The pump can also be operated from the keypad on the front panel of the PIM.
For the detail view, see *on page 165*.

Continues on next page

6.4.1 Operating mode selector switch

The keyswitch for selection of the operating mode selects local/manual, disabled and remote access.

- In "local" operating mode the control panel of the PIM is enabled. The pump can be operated locally, for example to change a barrel.
- In the "disabled" operating mode the manual operation of the PIM and also automatic activation of the pump from outside are locked. This operating mode should be selected if the pump is not to be used.

  The pump can also be deselected on the FlexPendant
- The "external" operating mode enables remote access to pump functions over the bus port of the function package.

WARNING

Risk of crushing!

Persons may be injured by the motion of the pump.

External access should only be selected if the pump is visible from the operating position!

External access must only be activated with the specified signals.

Otherwise, barriers should be installed to prevent access to the danger zone.

For the detail view, see *on page 165*.

6.4.2 General operation

The following general functions can be operated at the control panel of the PIM:

The control panel is shown in *on page 165*.

Continues on next page

6.4.2.1 Manual mode button

Press this button to activate the mode for manual operation of the pump. The green LED lights.

In this mode the follower plate can be raised or lowered by pressing the applicable buttons.

In this mode the air motor only operates while the air motor button is pressed and held. If the operator switches the mode from automatic mode to manual mode, the air motor is switched off if it was previously activated.

For the detail view, see *on page 165*.

6.4.2.2 Automatic mode button

Press this button to activate the mode for automatic operation. The green LED lights.

In this mode the air motor is continuously activated as soon as the relevant button is pressed once.

The lift and sink follower plate functions and the heater on buttons are disabled.

For the detail view, see *on page 165*.

6.4.2.3 Alarm reset button

If an alarm is pending and the button is pressed, a pending pump alarm is acknowledged if there is no emergency stop or pump stop actuated. In this case the depressurizing function is triggered.

If the emergency stop or pump stop is actuated, it must be unlocked first.

The following LEDs are also activated for test purposes:

- Manual mode
- Automatic mode
- Alarm reset
- Heating circuits On
- Air motor On
- Compressed air status
- Tower light (red, green and white)

When the alarm reset button is pressed and held, the material input pressure display initially shows 288 and then after about a second 400 bar. If the button is released, all LEDs show the current status again.

For the detail view, see *on page 165*.

6.4.2.4 Heater on button

This button activates the heating circuits on a pump with optional electric heater. The associated LED lights green.

The heating circuits of the pump can be actuated. Otherwise the pump heater is deactivated and the heating circuits are not actuated.

Note

If the heater is switched on, the material pressure may be increased.

To prevent the pressure from increasing too much, the air motor should not be switched on until the end of the post-heating phase.

For the detail view, see *on page 165*.

6.4.2.5 Air motor On button

In manual mode the air motor is activated in jog mode. In automatic mode the air motor is permanently switched on.

For the detail view, see *on page 165*.

6.4.3 RAM lift/sink

1 Follower plate not yet in barrel

To sink the RAM both follower plate sink buttons must be pressed, which actuates valves Y28 and Y29.

Y28 sinks the RAM, while Y29 opens a stop air valve to release the air from the cylinders.

2 Follower plate in the barrel

To sink the RAM it is sufficient to press one of the sink buttons. The sealing plugs in the follower plate must be unscrewed to allow the air to escape from under the follower plate.

The lift follower plate button must be pressed to lift the RAM.

The ventilation pipe must also be screwed into the follower plate and air pressed under the follower plate with the slide valve.

WARNING

Risk of injury due to high air pressure

Make sure that the air pressure under the follower plate does not become too high. This is prevented

by alternately lifting and venting: Lift until the barrel is lifted off the floor then vent until the

barrel is on the floor again.

For the detail view, see *on page 165*.

6.4.4 Pressure relief

If the pressure relief button is pressed or the pressure relief is triggered by the doser, the pressure relief function is run.

The pressure relief valve forms a connection between the pump outlet and the follower plate. It releases the pressure in the feed between pump and doser.

It is a pneumatically controlled pivot valve.

- The pressure relief can be actuated at the control panel of the PIM if the operating mode is set to manual and no errors are pending and a pump stop is not actuated.
- If there was an error or pump stop, pressure is automatically released when the error or pump stop is acknowledged. From IDFP software release 6.06.0025.00 the pressure is released as soon as an error occurs, an emergency stop is active, pump stop was pressed or the power supply was switched off.
- If the doser input pressure exceeds the upper pressure limit, the pressure is automatically released.
- The pressure relief at the pump is also linked to the pressure relief of the doser. See *Manual mode on page 303*.
- The pressure relief can also be activated by a timer. See *Configuration on page 327*.

Note

The pressure relief valve only operates if the compressed air supply is OK!

For the detail view, see *on page 165*.

6.4.5 Pump stop

The locking pump stop mushroom button sets the pump to a status in which all functions are deactivated. The 24 V power feed to all outputs is also internally disconnected.

The pump stop switches off the pump immediately regardless of the status of the function package. The air motor is deactivated, manual mode is set.

Pressing the pump stop switch sets off an alarm, even if the pump is deactivated. The alarm cannot be acknowledged until the switch has been unlocked. The LEDs on the PIM are not affected.

If the switch is unlocked, the pressure is automatically released and the pressure is reduced to a safe residual pressure. From IDFP software release 6.06.0025.00 the pressure is released as soon as the pump stop has been pressed.

The alarm is not automatically acknowledged. This is done by pressing the alarm reset on the PIM.

Note

The pump stop has a locking function!

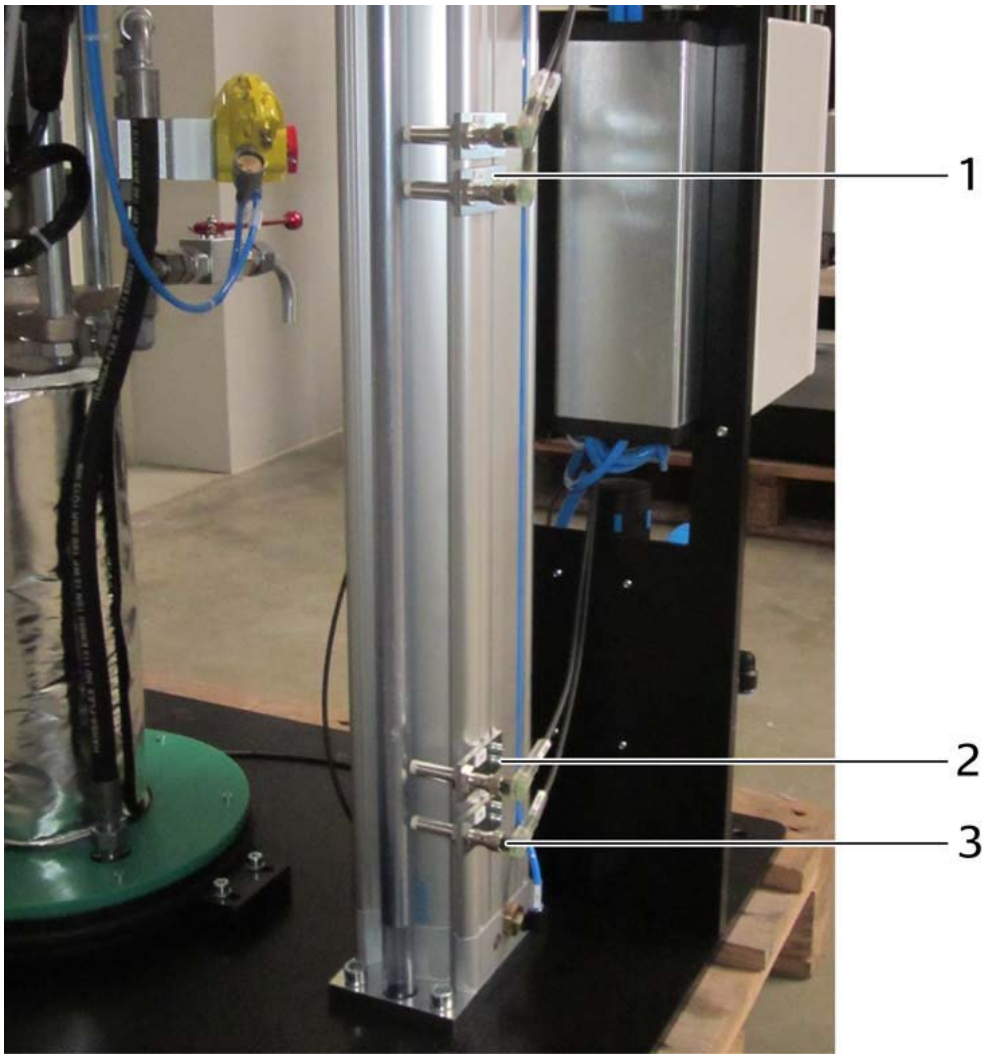
The switch can be unlocked by turning it.

For the detail view, see *on page 165*.

6.4.6 Operation of sensors

For setting the sensors see *Adjusting sensors on page 550*.

Position of sensors



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	Description
1	"Follower plate in barrel" sensors channel 1 and 2
2	"Barrel 80% empty" sensor
3	"Barrel empty" sensor

The "barrel empty" sensor switches off the air motor in automatic mode if the residual drainage is not active.

In manual mode the pump unit can be fully lowered beyond the sensor to the bottom limit stop.

The "80% empty" sensor switches in the position at which the barrel is approx. 80% empty. The signal is processed by the function package, and a warning is output.

Continues on next page

The sensors for the "Follower plate in barrel" function detect over two channels whether the follower plate is already in the barrel. Up to this point the follower plate is only lowered with two-hand operation. The automatic mode can be activated only if the two "Follower plate in barrel" sensors have switched. If the follower plate is not yet in the barrel, automatic functions will not be run. The air motor cannot be activated in this status, regardless of the operating mode.

6.5 Operation / functions of hydraulic pump

Operation of the hydraulic pump is restricted to changing barrels and the required maintenance tasks. For more information on the automatic controller, see *Process - Pump on page 318*.

Continues on next page

6.5.1 Changing barrel

This section describes the barrel change process. Only trained persons are permitted to perform this task. Please observe the following introductory notes:

WARNING

Risk of crushing!

When lowering the pump unit there is a danger of very serious injury!

Never enter the RAM!

WARNING

Danger of crushing and amputations!

Serious injury may be caused by the cutting edge when inserting the follower plate into the barrel.

Never place body parts or objects between barrel and follower plate!

WARNING

Warning of material leaking under pressure.

Spraying material may cause serious eye injuries!

Always wear suitable safety goggles!

WARNING

Warning of hot objects.

Danger of burns with installed heaters or after heating the vent valve (recommended with Quickfix adhesives)!

If possible, avoid working on hot components and if necessary use suitable protective gloves.

DANGER

Grease will cause the adhesive to cure.

Make sure that parts that come into immediate contact with the adhesive are not greased. For example, the follower plate must not be coated with grease.

When greasing the wiping rings make sure that parts that come into contact with adhesive are not contaminated with grease!

Continues on next page

6.5.1 Changing barrel
Continued

DANGER

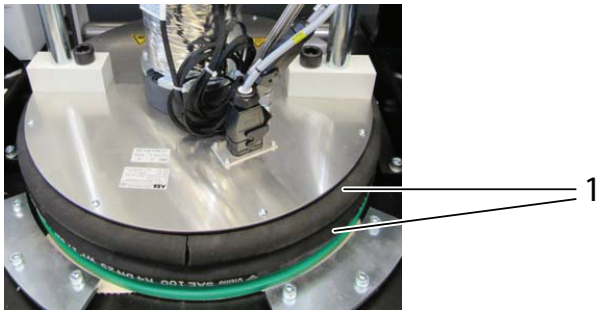
Dispose of the barrel and the residual adhesive in accordance with the applicable regulations!

Follow the instructions of the adhesive manufacturer.

When the barrel in the RAM is empty, replace it with a new barrel as follows:

1 Set the mode selector at the operator panel to "MANUAL".
2 Lower roller track (Caution! Do not allow it to fall on your feet!)
3 Remove the sealing plug from the follower plate.
4 Screw the ventilation rod into the follower plate and open the ventilation valve.
5 Press the "Lift RAM" button to move the pump unit upwards.
6 When the follower plate is completely out of the barrel, the ventilation valve must be closed and the ventilation rod removed.
7 Now remove the empty barrel from the system, seal it and dispose of it in accordance with the applicable regulations.
8 Thoroughly clean glue residue from the follower plate and coat the wiping rings with multipurpose grease. Do not damage the coating of the follower plate! Use a wood spatula or similar tool that will not damage the coating to clean the follower plate!

Grease follower plate



xx2000000903

	Description
1	Grease seals

9 Prepare the new barrel as specified by the manufacturer.
10 Place the new and acclimatized barrel onto the roller track and push it under the follower plate.
11 Fold in the roller track.
12 Sink the follower plate carefully into the barrel by pressing the "Sink RAM" button until the follower plate is in contact with the material.

Visual inspection through the ventilation opening of the follower plate.

13 Clean the sealing plug for the ventilation opening and screw into the follower plate.

Continues on next page

Do not use grease!

14 If necessary, the barrel must now be preheated. For more information, see *Process - Heating on page 321*.

Do not interrupt the heating time! Proceed with the following operations only once the heating time has finished!

15 Open the bleed valve on the lower pump.

When using Quickfix adhesives, we recommend preheating the bleed valve with a hot-air gun. Caution! Use gloves!

16 To bleed the lower pump press the "Pump On" button. The pumping process of the lower pump is started and the follower plate is pressed down on the material. Press and hold the button until "cracking noises" from the vent opening can no longer be heard.

Catch the leaking material with a suitable container and discard it in accordance with the applicable regulations! Wear safety goggles!

17 Close the bleed valve again and allow some material to set at the nozzle.

18 Set the mode selector to "Automatic".

6.5.2 General operation

The following general functions can be operated at the control panel of the PIM:
The control panel is shown in *on page 165*.

Continues on next page

6.5.2.1 Manual mode button

Press this button to activate the mode for manual operation of the pump. The green LED lights.

In this mode the follower plate can be raised or lowered by pressing the applicable buttons.

In this mode the air motor only operates while the air motor button is pressed and held. If the operator switches the mode from automatic mode to manual mode, the air motor is switched off if it was previously activated.

6.5.2.2 Automatic mode button

Press this button to activate the mode for automatic operation. The green LED lights.

In this mode the air motor is continuously activated as soon as the relevant button is pressed once.

The lift and sink follower plate functions and the heater on buttons are disabled.

6.5.2.3 Alarm reset button

If an alarm is pending and the button is pressed, a pending pump alarm is acknowledged if there is no emergency stop or pump stop actuated. In this case the depressurizing function is triggered.

If the emergency stop or pump stop is actuated, it must be unlocked first.

The following LEDs are also activated for test purposes:

- Manual mode
- Automatic mode
- Alarm reset
- Heating circuits On
- Air motor On
- Compressed air status
- Tower light (red, green and white)

When the alarm reset button is pressed and held, the material input pressure display initially shows 288 and then after about a second 400 bar. If the button is released, all LEDs show the current status again.

6.5.2.4 Heater on button

This button activates the heating circuits on a pump with optional electric heater. The associated LED lights green.

The heating circuits of the pump can be actuated. Otherwise the pump heater is deactivated and the heating circuits are not actuated.

Note

If the heater is switched on, the material pressure may be increased.

To prevent the pressure from increasing too much, the air motor should not be switched on until the end of the post-heating phase.

6.5.2.5 Air motor On button

In manual mode the air motor is activated in jog mode. In automatic mode the air motor is permanently switched on.

6.5.3 RAM lift/sink

1 Follower plate not yet in barrel

To sink the RAM both follower plate sink buttons must be pressed, which actuates valves Y28 and Y29.

Y28 sinks the RAM, while Y29 opens a stop air valve to release the air from the cylinders.

2 Follower plate in the barrel

To sink the RAM it is sufficient to press one of the sink buttons. The sealing plugs in the follower plate must be unscrewed to allow the air to escape from under the follower plate.

The lift follower plate button must be pressed to lift the RAM.

The ventilation pipe must also be screwed into the follower plate and air pressed under the follower plate with the slide valve.

WARNING

Risk of injury due to high air pressure

Make sure that the air pressure under the follower plate does not become too high. This is prevented

by alternately lifting and venting: Lift until the barrel is lifted off the floor then vent until the

barrel is on the floor again.

6.5.4 Pressure relief

If the pressure relief button is pressed or the pressure relief is triggered by the doser, the pressure relief function is run.

The pressure relief valve forms a connection between the pump outlet and the follower plate. It releases the pressure in the feed between pump and doser.

It is a pneumatically controlled pivot valve.

- The pressure relief can be actuated at the control panel of the PIM if the operating mode is set to manual and no errors are pending and a pump stop is not actuated.
- If there was an error or pump stop, pressure is automatically released when the error or pump stop is acknowledged. From IDFP software release 6.06.0025.00 the pressure is released as soon as an error occurs, an emergency stop is active, pump stop was pressed or the power supply was switched off.
- If the doser input pressure exceeds the upper pressure limit, the pressure is automatically released.
- The pressure relief at the pump is also linked to the pressure relief of the doser. See *Manual mode on page 303*.
- The pressure relief can also be activated by a timer. See *Configuration on page 327*.

Note

The pressure relief valve only operates if the compressed air supply is OK!

6.5.5 Pump stop

The locking pump stop mushroom button sets the pump to a status in which all functions are deactivated. The 24 V power feed to all outputs is also internally disconnected.

The pump stop switches off the pump immediately regardless of the status of the function package. The air motor is deactivated, manual mode is set.

Pressing the pump stop switch sets off an alarm, even if the pump is deactivated. The alarm cannot be acknowledged until the switch has been unlocked. The LEDs on the PIM are not affected.

If the switch is unlocked, the pressure is automatically released and the pressure is reduced to a safe residual pressure. From IDFP software release 6.06.0025.00 the pressure is released as soon as the pump stop has been pressed.

The alarm is not automatically acknowledged. This is done by pressing the alarm reset on the PIM.

Note

The pump stop has a locking function!

The switch can be unlocked by turning it.

6.5.6 Operation of sensors

For setting the sensors see *Adjusting sensors on page 550*.

The "barrel empty" sensor switches off the air motor in automatic mode if the residual drainage is not active.

In manual mode the pump unit can be fully lowered beyond the sensor to the bottom limit stop.

The "80% empty" sensor switches in the position at which the barrel is approx. 80% empty. The signal is processed by the function package, and a warning is output.

The sensors for the "Follower plate in barrel" function detect over two channels whether the follower plate is already in the barrel. Up to this point the follower plate is only lowered with two-hand operation. The automatic mode can be activated only if the two "Follower plate in barrel" sensors have switched. If the follower plate is not yet in the barrel, automatic functions will not be run. The air motor cannot be activated in this status, regardless of the operating mode.

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7 User interface

WARNING

Hazard due to operating errors.

Serious to life-threatening physical injuries due to incorrect input of position data at a superordinate control system or on the robot control system.

- Only stay in the hazard area for as long as absolutely necessary.
- Work in the hazard area must only be performed by trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.

WARNING

Hazard due to flammable materials.

Possibility of serious, potentially life-threatening physical injury due to naked flames.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Risk of poisoning, acid burns, genetic modification or allergic reaction due to vapors and liquids.

Serious, potentially life-threatening physical injuries due to the absorption of hazardous substances into the body.

- Observe the appropriate data sheets of the manufacturers.

CAUTION

Risk of burns.

Possibility of skin injuries due to burns from hot surfaces of the dispenser.

- Note the temperature displays on the surface of the dispenser.
- Note the temperature displays on the programming device.
- Avoid body contact with hot surfaces.

Note

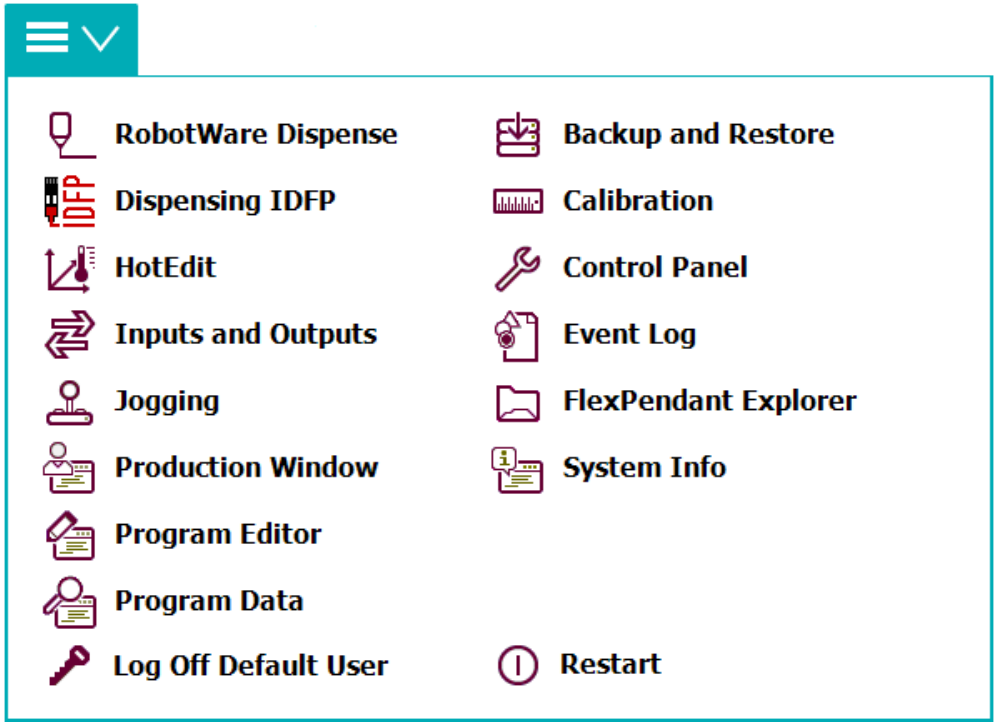
Before the start of each shift, visually check the nozzles for adequately clear passage. If undue problems are found (e.g. blockages), consult service personnel immediately.

Continues on next page

7.1 Starting the user interface

The user interface is loaded automatically after a restart of the robot. Alternatively, it is possible to start the user interface manually from the ABB menu:

ABB menu



xx2000000583

7.2 Process overview

The main process window provides an overview of the current system and production status. It is launched automatically after the user interface has started.

Note

The process overview varies depending on the configuration.

Continues on next page

7.2.1 Process overview - status bar

The status bar provides information on the current system operating mode, the error and system status, as well as the doser, pump and heating status.

Status bar

xx2000000584

By clicking on the corresponding symbol, additional information on the respective status is displayed above the status bar.

Information line above the status bar

xx2000000585

Robot operating mode

The robot operating mode is selected using the operating mode selection switch at the robot controller.

Symbol	Robot operating mode
 xx2000000586	Yellow: Manual (= 1)
 xx2000000587	Yellow: Manual 100%
 xx2000000588	Green: Automatic (= 0)

Robot error

Symbol	Robot error
 xx2000000589	Red: Malfunction (robot error)

Continues on next page

Symbol	Robot error
 xx2000000590	Green: No malfunction (robot OK)

EMERGENCY STOP/Safety

Symbol	EMERGENCY STOP/Safety
 xx2000000591	Red: EMERGENCY STOP
 xx2000000592	Yellow: Acknowledge EMERGENCY STOP via motor ON switch
 xx2000000593	Red: Safety circuit open
 xx2000000594	Green: Safety circuit closed

Compressed air

Symbol	Compressed air
 xx2000000595	Red: Air pressure not available
 xx2000000596	Green: Air pressure available

Continues on next page

7.2.1 Process overview - status bar
Continued

Motors

Symbol	Motors
 xx2000000597	Yellow: Motors switched off
 xx2000000598	Green: Motors switched on

Error acknowledgement

Symbol	Confirm error
 xx2000000599	Only appears after error has occurred. By pressing the button function package errors are reset.

Status of material supply (integrated pump option)

The current pump status is indicated by the color, the current filling level by the appearance:

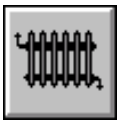
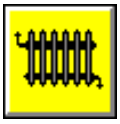
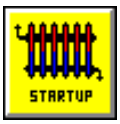
Symbol	Pump mode
 xx2000000600	Gray: Material supply deactivated
 xx2000000692	Green: Material supply OK
 xx2000000693	Yellow: The material supply in automatic mode and ready, but the air motor is off.
 xx2000000694	Blue: Manual mode
 xx2000000695	Red: Error in material supply

Continues on next page

Symbol	Pump mode
 xx2000000696	There is no barrel, or the follower plate is outside of barrel.
 xx2000000697	The barrel is OK, i.e. the filling level is between 10% and 100%.
 xx2000000698	The filling level of the barrel has dropped below 10% (almost empty).
 xx2000000699	The barrel is empty.

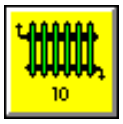
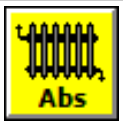
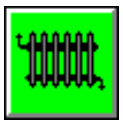
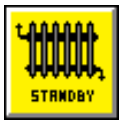
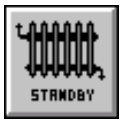
Status of tempering (heating)

A window for selecting the heating functions is opened when the button is pressed (special functions).

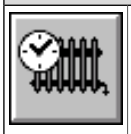
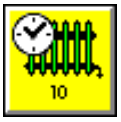
Symbol	Temperature control	Special function
 xx2000000700	Gray: Tempering deactivated	Switch on heating
 xx2000000701	Red: Tempering error or over temperature	
 xx2000000702	Yellow: Temperature warning: Temperature outside warning limits	
 xx2000000703	Yellow: Startup phase	

Continues on next page

7.2.1 Process overview - status bar
Continued

Symbol	Temperature control	Special function
 xx2000000704	Temperature reached, post heating time running	Cancel post heating
 xx2000000705	Yellow: Lowering mode	Quit lowering mode
 xx2000000706	Green: Tempering OK	
 xx2000000707	Yellow: Active standby mode (Option Peltier only). Temperature regulation without material flow, Peltier setpoint slowly reaches the temperature of the applicator. For configuration see *Configuration - Peltier on page 345*.	
 xx2000000708	Gray: Passive standby mode (Option Peltier only). The tempering is deactivated, but switches on as soon as material flows. For configuration see *Configuration - Peltier on page 345*.	

If the week timer for the tempering is activated, an additional clock appears in the symbols:

Symbol							
 xx2000000709	 xx2000000710	 xx2000000711	 xx2000000712	 xx2000000713	 xx2000000714	 xx2000000715	 xx2000000716

Status of dispenser

The status of the doser is displayed for all dispensers of the robot. If one of the dispensers is not enabled, the status display is only effected for the remaining (selected) dispensers. The status of a dispenser only reflects the status of active dosers for this dispenser.

Symbol	Doser status	Special function
 xx2000000717	Red: Dispenser error	

Continues on next page

Symbol	Doser status	Special function
 xx2000000718	Green: Dispenser OK	
 xx2000000719	Dry mode active	Deactivate dry mode for all dispensers (for activating dry mode see *Configuration - Dispenser on page 327*)

7.2.2 Process overview - Menu bar

The menu bar enables the user to navigate to the corresponding windows of the user interface.

The menu bar varies depending on the configuration.

Menu bar

xx2000000720

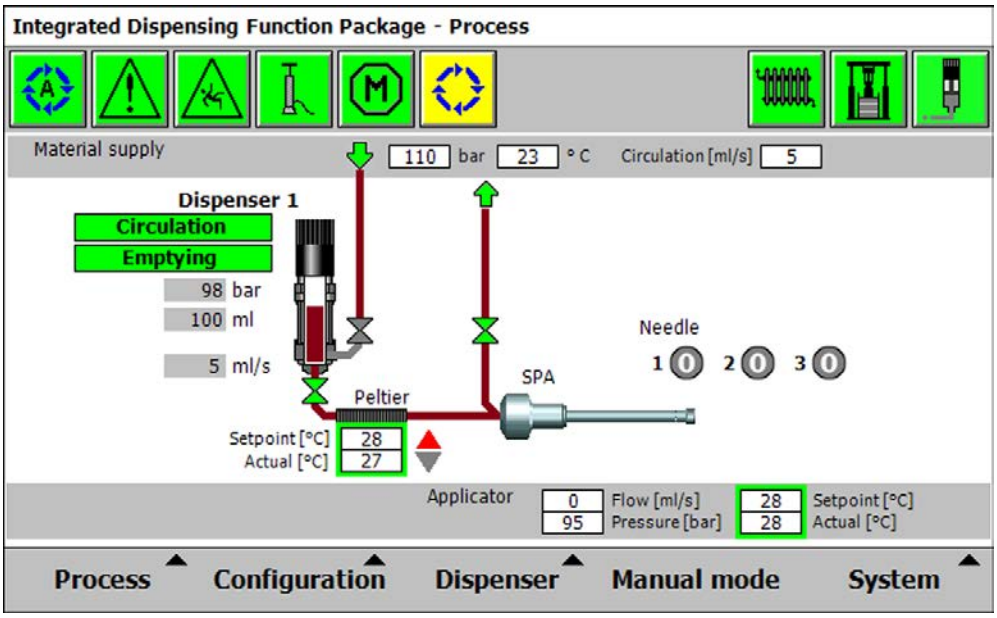
Division of the process menu:

Menu item	Submenus	Comments
Process	Pump* Heating* Protocol	These submenus display the current status of the different systems.
Configuration	Dispenser Pump* Heating*/Peltier* Application Service Error messages Statistics*	In these submenus, various system parameters can be set and adjusted.
Dispenser		Switch between the dosers. Visible only if there is more than one dispenser.
Manual mode		Switch to Manual mode (see *Manual mode on page 303*).
System		Open start view

* These submenus only appear if the system is equipped and booted correspondingly.

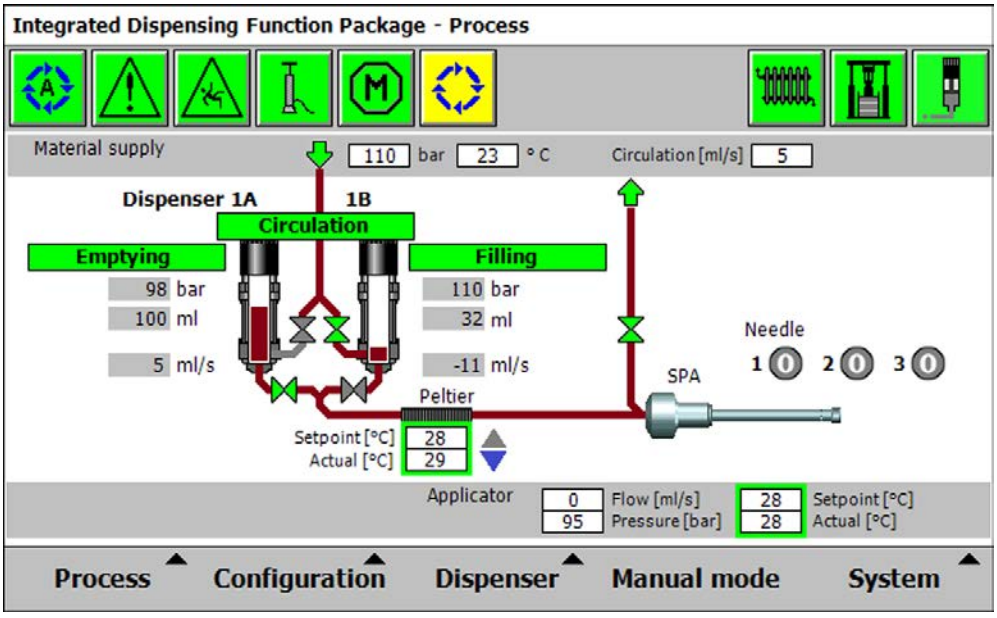
7.2.3 Process overview - Dispenser

Process overview - Single Dispenser



xx2000000721

Process overview - Dual Dispenser

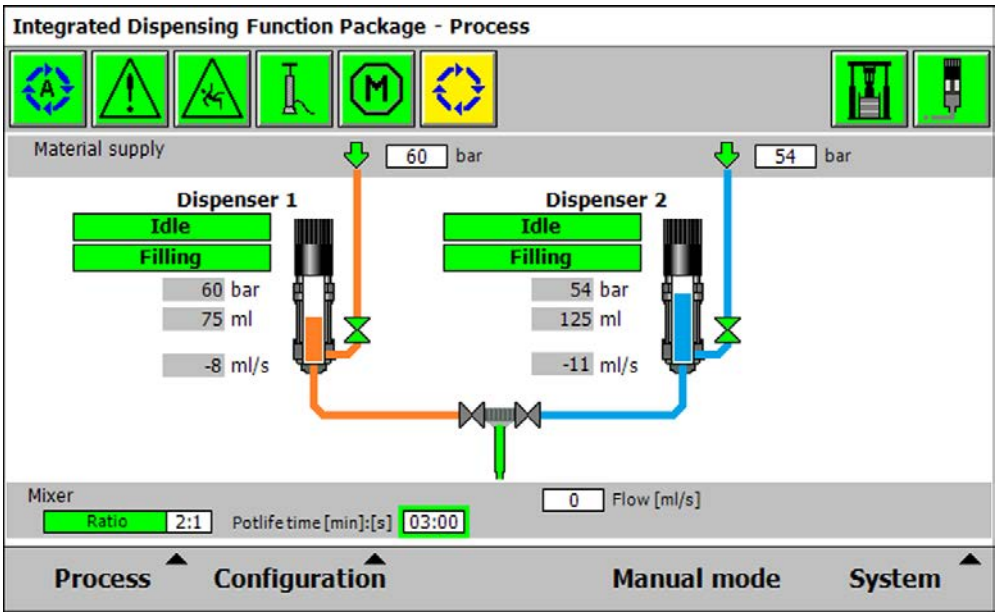


xx2000000722

Continues on next page

7.2.3 Process overview - Dispenser
Continued

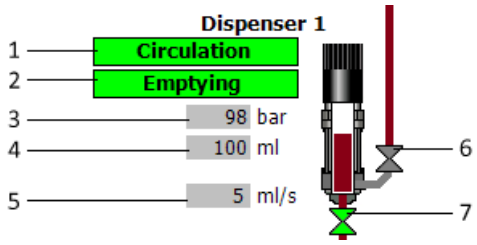
Process overview - 2K Dispenser



xx2000000723

Doser

Single Dispenser

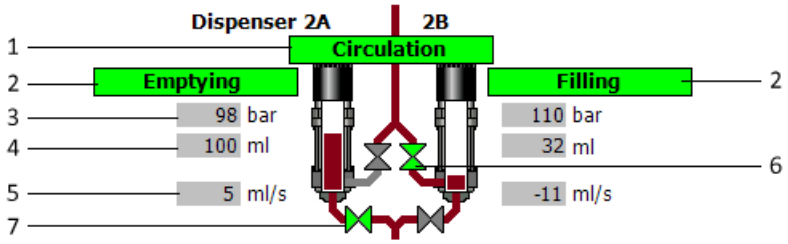


xx2000000724

	Description
1	Mode of dispenser
2	Status of doser
3	Doser pressure in bar
4	Fill volume in ml
5	Material flow in ml/s
6	Material inlet valve
7	Material outlet valve (if circulation is installed or for Dual Dispenser)

Continues on next page

Dual Dispenser



xx2000000725

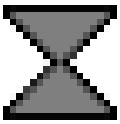
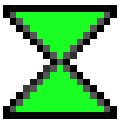
	Description
1	Mode of entire dispenser
2	Status of individual doser
3	Doser pressure in bar
4	Fill volume in ml
5	Material flow in ml/s
6	Material inlet valve
7	Material outlet valve (if circulation is installed or for Dual Dispenser)

Doser pressure: Display of the current pressure (in bar) in the doser chamber.

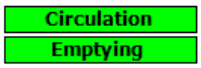
Fill volume: The current value of the fill volume of the doser is displayed (in ml).

Inlet and outlet valve of doser

The current switching status of the valve at the respective doser is displayed.

Symbol	Material inlet valve
 xx2000000726	Gray: Valve closed
 xx2000000727	Green: Valve open

7.2.4 Mode and status display

Symbol	Description
 xx2000000728	Mode (top) and status (bottom) of the selected dispenser. The mode describes the condition the entire dispenser is in. The status displays the state of an individual doser or the action that is performed by an individual doser.

Mode	Description
Undefined	After a restart, if a calibration has not yet been executed, the dispenser is in an undefined state.
Calibration	The dispenser is being calibrated.
Application	The dispenser is in application mode.
Ready	The dispenser is ready to perform actions. This state can only be attained after calibration.
Circulation	The dispenser circulates locally or globally (via material return hose).
Purge	The dispenser performs a defined number of purging cycles. This mode is also used for the flow check.
Service function (Busy)	The dispenser performs a function (emptying, filling, pressure relief, leakage monitoring, etc.).

Status	Description
Undefined	The doser is in an undefined condition following a start if a status has not yet been defined.
Idle	After the doser has completed the previous action and is between minimum and maximum, it bears the status "Idle".
Full	The fill volume has reached the set maximum level.
Empty	The fill volume quantity has reached the set minimum level.
Filling	The piston moves up, the inlet valve is open.
Emptying	The piston moves down, the outlet valve or the circulation valve is open.
Subsequent pressure regulation	Outlet and inlet valves of the doser are closed, via the pressure regulation the inactive doser takes on the current pressure of the active doser.

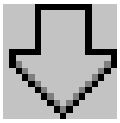
Material supply

xx2000000729

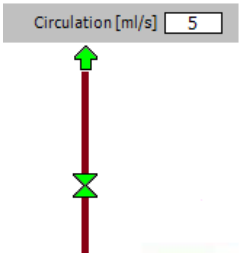
At the inlet of the doser the material supply pressure (in bar) and (with installed tempering) the temperature of the material (in degrees Celsius) are measured.

Continues on next page

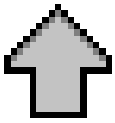
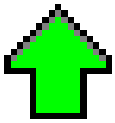
Status of material supply:

Symbol	Description
 xx2000000730	Gray: Material supply not ready
 xx2000000731	Green: Material supply ready

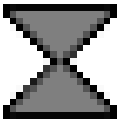
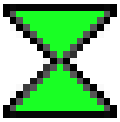
Circulation

Symbol	Description
 xx2000000733	Display of the current circulation flow (in ml/s)

Status of circulation:

Symbol	Description
 xx2000000734	Gray: Circulation deactivated
 xx2000000735	Green: Circulation active

Status of circulation valve:

Symbol	Circulation valve
 xx2000000736	Gray: Circulation valve closed
 xx2000000737	Green: Circulation valve open

Continues on next page

7.2.4 Mode and status display
Continued

Applicator

General

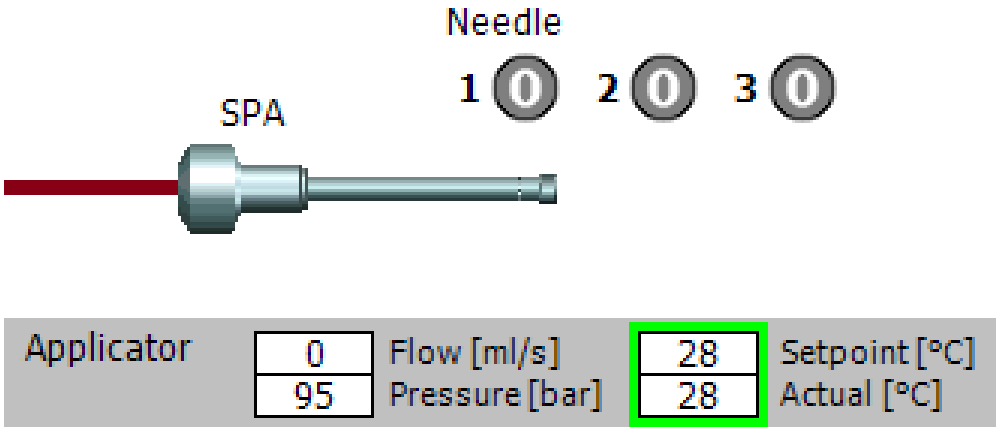
Flow: The current material flow of the applied material is displayed in ml/s.

Pressure: The current material pressure at the applicator is displayed in bar.

Temperature: The material temperature (setpoint and actual) at the applicator is displayed in degrees Celsius.

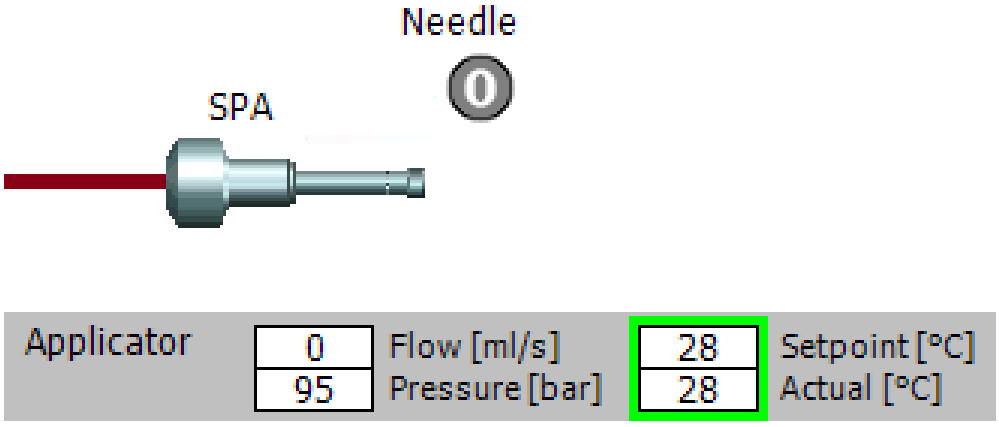
SPA

SPA XXX



xx2000000738

SPA XXX



xx2000000739

Needle: The current status of the needle valves 1 to 3 is displayed.

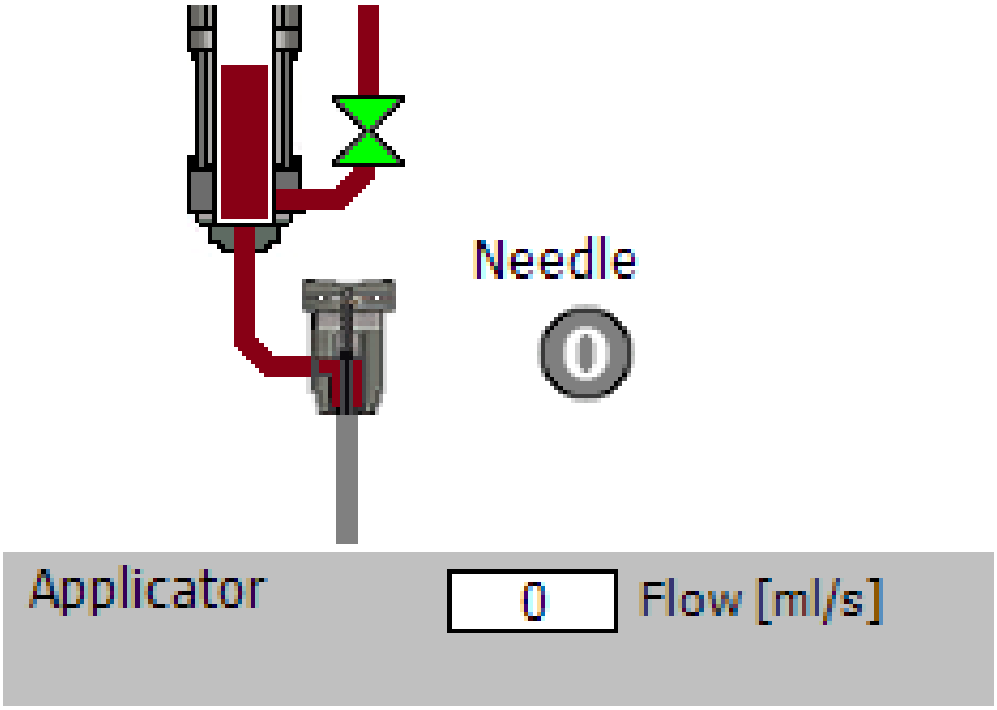
Symbol	Needle valve
 xx2000000741	Gray: Needle valve closed

Continues on next page

Symbol	Needle valve
 xx2000000742	Yellow: Needle valve open

Gluing applicator

Gluing applicator (mounted directly at doser block)



xx2000000740

Needle: The current status of the needle valves 1 to 3 is displayed.

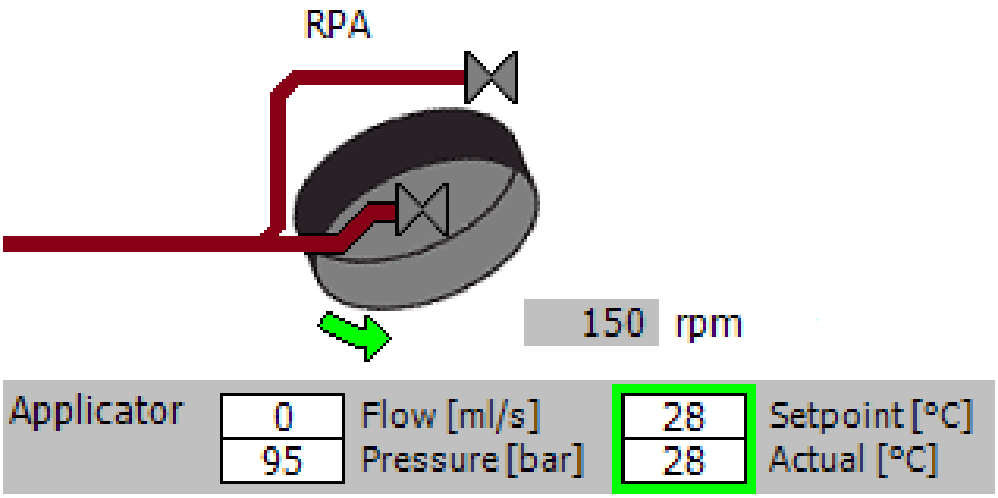
Symbol	Needle valve
 xx2000000741	Gray: Needle valve closed
 xx2000000742	Yellow: Needle valve open

Continues on next page

7.2.4 Mode and status display
Continued

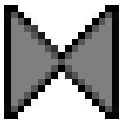
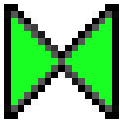
RockerPanel Applicator

RockerPanel Applicator (RPA)



xx2000000743

Needles of RPA: The current status of the needle valves 1 and 2 is displayed.

Symbol	Needle valve
 xx2000000744	Gray: Needle valve closed
 xx2000000745	Green: Needle valve open

The following is displayed additionally for the RockerPanel Applicator:

Rotation: The revolutions of the RockerPanel Applicator disk per minute, measured using an initiator located directly at the applicator disk.

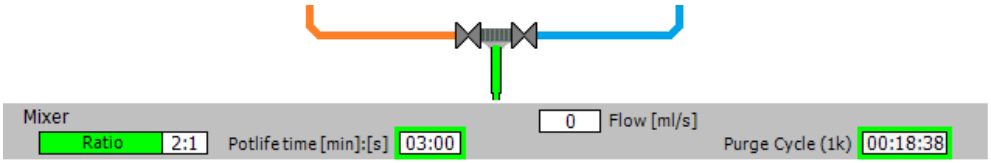
Rotation status: The arrow with the direction of rotation is displayed when the motor of the RockerPanel Applicator registers speed.

Symbol	Description
 xx2000000746	Green: Motor and applicator disk register speed.
 xx2000000747	Red: Error: The motor registers speed, but the applicator disk does not. Possible causes include a faulty drive belt, gear,etc.

Continues on next page

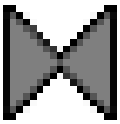
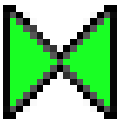
2K applicator

2K applicator (mixer)



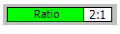
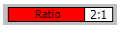
xx2000000748

2K needles: The current status of the needle valves 1 and 2 is displayed.

Symbol	Needle valve
 xx2000000744	Gray: Needle valve closed
 xx2000000745	Green: Needle valve open

The 2K application demands additional status information:

Ratio: The mixing ratio of the two components.

Symbol	Description
 xx2000000749	Green: Mixing ratio in mixer OK
 xx2000000750	Red: Mixing ratio in mixer lost

Mixer pipe: The color of the mixer pipe also provides information on the mixing ratio.

Symbol	Description
 xx2000000751	Green: Mixing ratio in mixer OK
 xx2000000752	Red: Mixing ratio in mixer lost
 xx2000000753	Color of material 1 (may vary): Mixer purged with material 1

Continues on next page

7.2.4 Mode and status display
Continued

Symbol	Description
 xx2000000754	Color of material 2 (may vary): Mixer purged with material 2

Pot life: In the case of activated pot life monitoring, the remaining time until the mixer is automatically purged, in order to prevent the mixed components hardening.

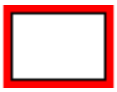
Symbol	Description
 xx2000000755	Gray: Pot life monitoring deactivated
 xx2000000756	Red: Pot life lapsed (for configuration see *Configuration - Dispenser on page 327*)
 xx2000000757	Red: Pot life warning limit reached (for configuration see *Configuration - Dispenser on page 327*)
 xx2000000758	Pot life OK

Purging cycle (1K): If the automatic purging is activated for one of the 2K dispensers (for configuration see *Configuration - Dispenser on page 327*), the time until the automatic purging is displayed here as soon as the time starts to lapse, i.e. when no application, no circulation, etc. is running. The automatic purging (1K) is performed only once after the application with the 2K dispenser, while it is repeated in cycles with a non-2K dispenser.

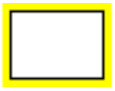
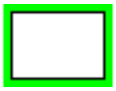
The information on the purging cycle is not shown if the time until the automatic purging is not lapsing.

Status of material tempering and Peltier element

Setpoint value:	Default temperature setpoint (for configuration see *Configuration - Heating on page 338*)
Actual value:	Actual temperature measured

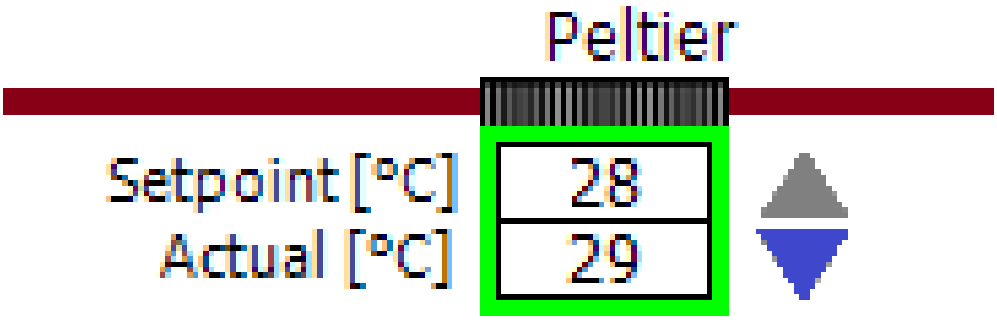
Status:	
 xx2000000759	Tempering deactivated
 xx2000000760	Temperature alarm: Temperature outside alarm limits

Continues on next page

Status:	
 xx2000000761	Temperature warning: Temperature outside warning limits
 xx2000000762	Temperature OK

Status of Peltier element

Single Peltier



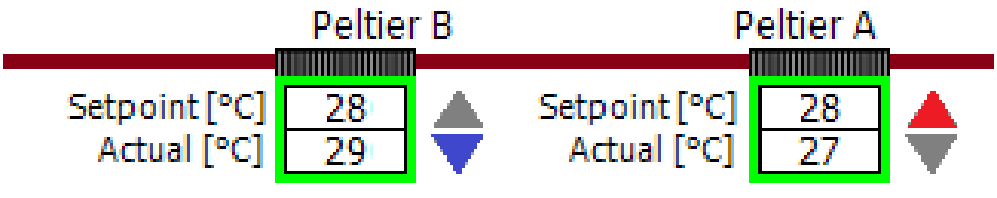
xx2000000763

Display of material temperature in Peltier element (in degrees Celsius):

Setpoint value:	Automatically calculated target temperature
Actual value:	Actual temperature measured

Tempering status:	
 xx2000000764	Peltier element heating
 xx2000000765	Peltier element cooling

Dual Peltier



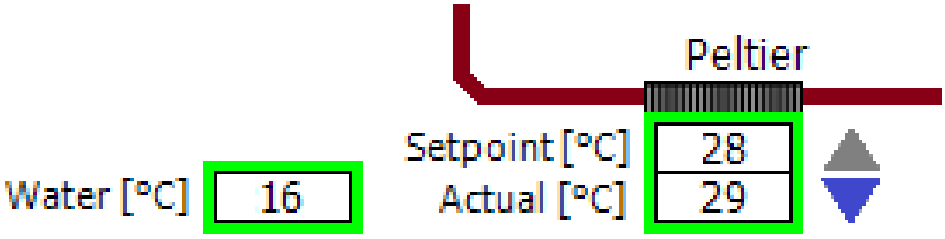
xx2000000766

Continues on next page

7.2.4 Mode and status display
Continued

Peltier B of a dual Peltier serves for the pre-tempering, Peltier A performes the actual temperature regulation and is therefore downstream from Peltier B.

Peltier with water cooling

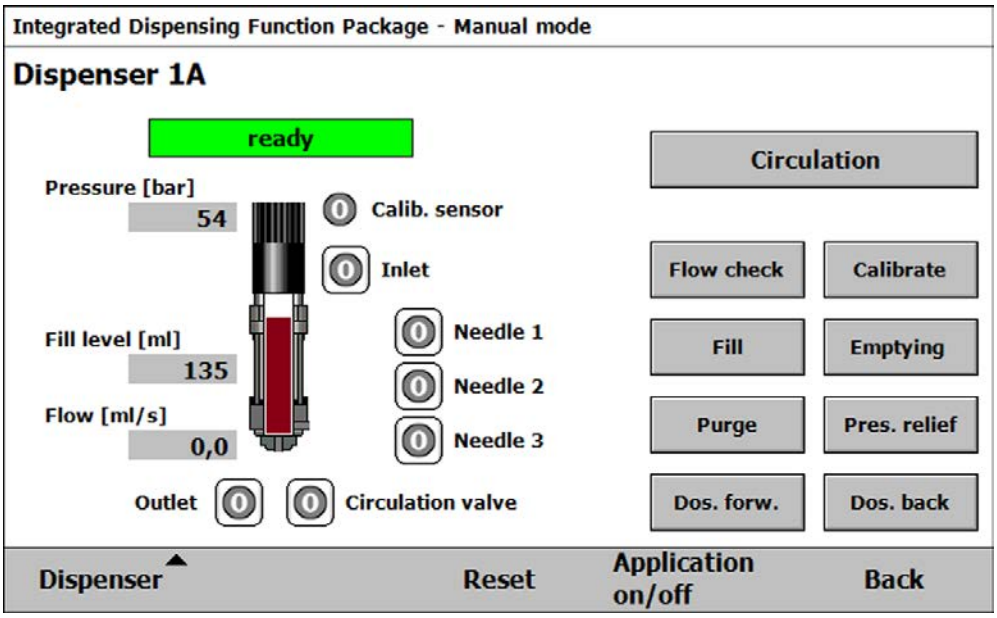


xx2000000767

Water: The temperature of the cooling water (measured in the Peltier element) is additionally displayed in degrees Celsius.

7.3 Manual mode

Manual mode

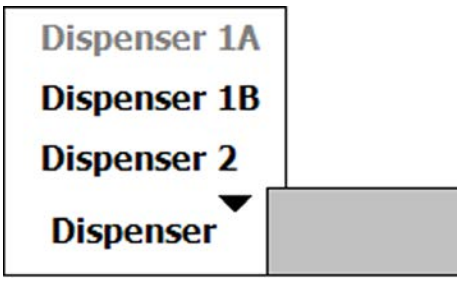


xx2000000768

In the menu window "Manual mode", functions can be performed manually.

When the manual mode window is opened, the dispenser selected in the process overview (for the dual dispenser always doser A) is displayed.

Dispenser menu



xx2000000769

The "Dispenser" menu item appears when more than one doser is installed and enables switching between all installed dispensers and its dosers.

If a dispenser performs a function, the selection of another function is blocked and the other functions are grayed out.

All manual functions are blocked in the following cases:

- The robot is in "emergency-stop".
- The doser is deselected.
- Compressed air not available.
- The dispenser is in application mode.

Continues on next page

If an application error is pending, all functions are blocked except the functions *Calibrate* and *Doser forward or back*.

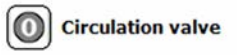
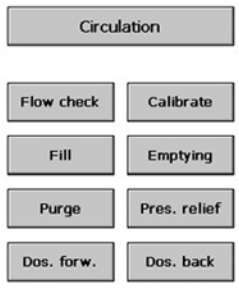
In the robot operating mode "Automatic", manual functions can be performed, but must be enabled via a confirmation dialog.

> **Note**
>
> Performing a manual function in Automatic mode of the robot is generally not recommended and may lead to malfunctions or production downtimes.

If an application error is pending, the valves can be switched and the doser calibrated, all other functions are blocked.

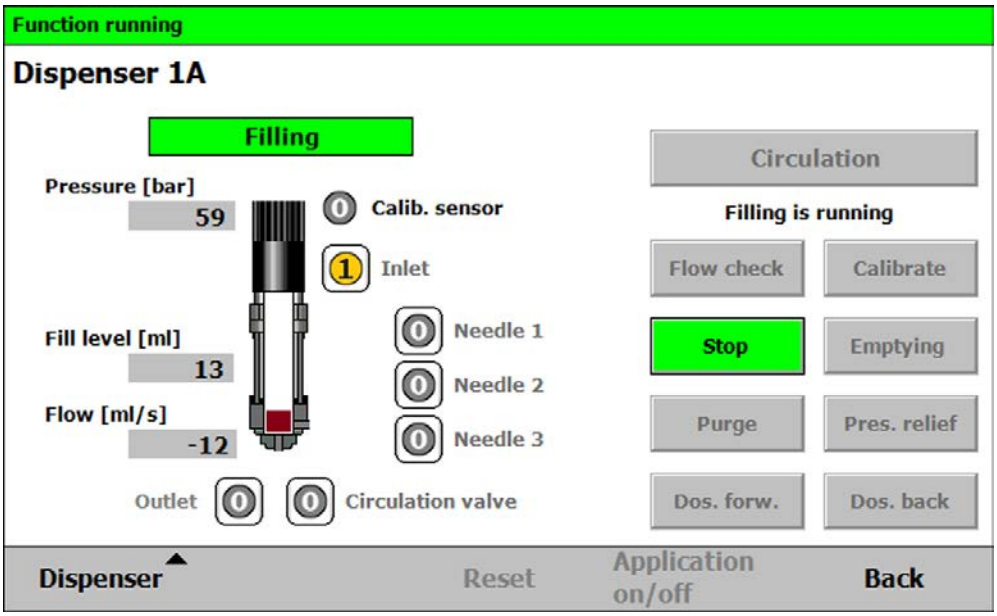
Reset: Via the menu item "Reset" the dispenser task can be reset without having to recalibrate the dispenser.

Application ON/OFF: The menu item "Application ON/OFF" activates or deactivates the application mode of the dispenser. This may be useful, for example, when teaching application programs.

Symbol	Meaning
 xx2000000770	Status of selected doser (see *Manual mode - Status of doser on page 307*)
 xx2000000771	Status of existing needle valves (1-3, depending on applicator used)
 xx2000000772	Status of circulation valve (is only displayed if circulation is present.)
 xx2000000773	Status of calibration sensor. The sensor is activated during calibration at a certain position of the doser piston.
 xx2000000774	Manual functions (see *Manual mode - Functions on page 308*)

Continues on next page

Manual mode - Stop function



xx2000000775

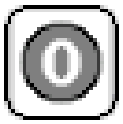
If an action was started, the text on the pressed button changes to "Stop" and it becomes the only button that can be selected. All other buttons are blocked and are automatically enabled again only when the action is completed. The action can be interrupted or canceled by clicking on the "Stop" button before its completion.

Continues on next page

7.3.1 Manual mode - Switch valves

The valves can be toggled by clicking on the symbols.

The status of the valves is displayed by the following symbols:

Symbol	Meaning
 xx2000000776	Gray: Valve closed
 xx2000000777	Yellow: Valve open

7.3.2 Manual mode - Status of doser

Doser status

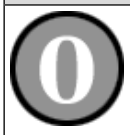
The current doser status is displayed (see *Mode and status display on page 294*).

Pressure

The current value of the pressure built up in the doser is displayed (in bar).

Calibration sensor

The status of the calibration sensor is displayed. The sensor is actuated mechanically during calibration at a certain position of the doser piston.

Symbol	Sensors
 xx2000000778	Gray: Sensor unactuated
 xx2000000779	Yellow: Sensor actuated

Fill volume

The current value of the fill volume of the doser is displayed (in ml).

The filling level in the doser symbol is also displayed as a percentage with a status bar.

Flow

The material flow in the doser (in ml/s).

7.3.3 Manual mode - Functions

Tip

All manual functions will use the default parameterized nozzle. For parameterization of the default needle, see *Manual functions default needle on page 455*.

Circulation

Note

This function is only available if the system has circulation installed.

With the manual function "Circulation", the material circulation of the system is activated or deactivated. With activated circulation, the material is conveyed back into the material supply by the dosers.

The doser performs several functions in cycles. First, it is filled. After the fill limit is reached, the corresponding outlet valve and circulation valve are opened and the doser moves forward or down, whereby material is transported back to the material supply.

If the doser has reached its empty limit, the outlet valve closes and the inlet valve opens. The doser is filled up to the fill limit. These processes are repeated regularly until the material circulation is stopped.

With active circulation the label "Stop" appears on the button and upon actuation the material circulation is switched off.

Flow check

The flow check function serves for checking the difference between the theoretically requested and actual material quantity applied.

If a doser is to undergo a flow check (accuracy check), all other dosers have to be deselected. The parameterized purging volume must be smaller than the valid net volume of a doser.

Further information is provided under "Purging" (see *Purge on page 310*).

Calibrate

With the manual function "Calibrate" the doser performs a routine during which the exact position of the doser piston is identified. This happens with help of the initiator "Calibration sensor", which is triggered at a certain position of the doser piston. The sensor is used only during the calibration process and does not provide any information on the fill level.

The calibration is necessary in order to be able to perform other actions. If the calibration cannot be properly completed, no further action is possible with this doser.

Continues on next page

After initially pressing the button, it appears in green and its label changes to "Stop". Upon the second actuation of the button, the doser stops the calibration process.

The calibration routine is automatically performed upon a restart of the robot. Otherwise, an error message is displayed.

> **Note**
>
> The "Calibrate" routine can also be performed during the application, if, for example, a serious error is pending which cannot be eliminated despite error acknowledgement and restart of the application.

Fill

With the manual function "Fill" the doser is filled up to the fill limit specified in the parameter window (see *Configuration - Dispenser on page 327*). Depending on the filling speed, the fill limit may be exceeded slightly due to delays of mechanical elements.

When the function is performed the inlet valve is opened automatically in order to enable the supply of material to the doser. Then the doser piston is moved up so that the doser is filled with material. When the fill limit is reached, the filling process stops automatically.

After initially pressing the button, it appears in green and its label changes to "Stop". Upon the second actuation of the button, the doser stops the filling process.

During the filling process (manual function and during application mode), a soft fill function is performed as an option, in order to protect the doser (see *Filling on page 411*).

Empty

With the manual function "Empty" the doser is emptied up to the empty limit specified in the parameter window (see *Configuration - Dispenser on page 327*). Depending on the emptying speed, the empty limit may be exceeded slightly due to delays of mechanical elements.

During emptying the outlet valve of the corresponding doser and if present the circulation valve are automatically opened. The material is transported from the doser back to the material supply. For systems without circulation, the material is pushed from nozzle 1 of the applicator after user validation.

The doser is not automatically refilled following this function.

After initially pressing the button, it appears in green and its label changes to "Stop". Upon the second actuation of the button, the doser stops the emptying process.

Continues on next page

Purge

With the manual function "Purge" a purging process (corresponding to the configured values) is performed. After pressing the "Purge" button, the user must select which hardware is to be purged. A needle can be selected for purging (in the event of multiple needles one needle can be selected individually or all needles) or front panels can be purged. A special form of the front panel purge, the SystemPurge, can also be selected.

During the purging process, a defined quantity of material is pushed out repeatedly from the applicator at a defined purge flow. The purge parameters must be entered at the FlexPendant (see *Configuration - Dispenser on page 327*).

During the purge the corresponding discharge valve of the doser and the selected needle is opened. The circulation valve remains closed. The material is discharged from the selected nozzle. When the purge is finished, the doser used for the purge is automatically filled to its top level. If the doser is in swap mode (dual dispenser), the purge volume may be greater than the valid net volume of a doser. In this case, switching between the dosers is part of the purge process.

Note

Pressing the "Purge" button does not automatically traverse the robot to a purge position.

Purging the needle

The number of nozzles varies depending on the applicator. Every nozzle can be purged separately or all nozzles can be purged at the same time. The objective is to remove old material or interfering particles on the nozzle from the applicator in order to achieve a good spray pattern.

Front plate purging

Front plate purging is a cleaning sequence during which the application material is purged through the doser in pulse mode. The doser piston is moved down as far as possible (as far as the mechanical stop). The inlet valve and the outlet valve (or needles for systems without circulation) are opened and closed in a defined time sequence. The aim of front plate purging is to remove the material which becomes clogged in the upper part of the doser (front plate) over time. As the doser is never completely emptied in normal mode (safety limit for mechanical stop), the material in the upper part of the doser is not replaced with fresh material in normal mode.

The front plate purging is only available for the doser sizes 80 ccm, 155 ccm and 560 ccm.

The front plate purging can be performed if required via the FlexPendant menu "Manual operation - Purging". Upon confirmation a message appears asking whether front plate purging or nozzle purging should be performed.

The front plate purging is only performed automatically for systems with circulation. After a certain number of filling cycles of the doser, front plate purging is

Continues on next page

automatically started when the doser is in circulation mode. The doser piston slowly moves down until a mechanical stop is registered.

Then the doser remains stationary. In pulse mode the outlet valve is opened and the inlet valve is pulsed.

The front plate purging must be manually activated (via the *FlexPendant Manual operation window - Purging - Front plate purging*).

Parameters

Variable name	Meaning	Default value
nDXY_FP_PulsLengthOn	Pulse length outlet valve (needle valve) opened in seconds	3
nDXY_FP_PulsLengthOff	Pulse length outlet valve (needle valve) closed in seconds	2
nDXY_FrontPlatePulses	Number of pulses per purging cycle	5
nDXY_TorqueRate	Torque in % in relation to the nominal torque for the detection of the mechanical end stop	70

Note

When purging the front panel on a 2K dispenser the mixer tube must be removed from the mixer block first to prevent damage.

SystemPurge

SystemPurge is used to vent the material feed line, for example when changing the barrel or for initial commissioning. It can also be used to change the material in the system. First, the doser (for a dual doser first A then B) is drained to the limit stop. Then the system opens all valves of the A-doser. If a B-doser is installed, all its valves remain closed. The complete material is then pushed from the material supply through the system.

The SystemPurge function runs until it is stopped manually (either via the TPU or order number 31)

Pressure relief

During the pressure relief process the residual pressure in the pump, material hoses and doser is released.

For a system without circulation the needle is opened by default. If this is not desired, the option "Pressure relief in material hose" (*Config-Doser-Pressure*) can be activated. This function should only be used if the pump is part of the function package or if it can be ensured that the external material supply is depressurized.

Doser forward

With the manual function "Doser forward" the doser is slowly moved forward or downwards. The function is used for maintenance and test purposes.

When the button is pressed once, the doser is moved forwards until its empty limit is reached and then stops automatically.

Continues on next page

For systems with circulation, the material is pushed into the circulation line. For systems without circulation, the material is pushed from nozzle 1 of the applicator after user validation.

After initially pressing the button, it appears in green and its label changes to "Stop". When the button is pressed the second time the doser stops before it has reached its empty limit.

With the initial actuation of the button, the corresponding outlet valve and if necessary the circulation valve are opened. Both valves are closed again when "Stop" is pressed.

Doser back

With the manual function "Doser back" the doser is slowly moved back or up. The function is used for maintenance and test purposes.

When the button is pressed once, the doser is moved back until its fill limit is reached and then stops automatically.

After initially pressing the button, it appears in green and its label changes to "Stop". When the button is pressed the second time the doser stops before it has reached its fill limit.

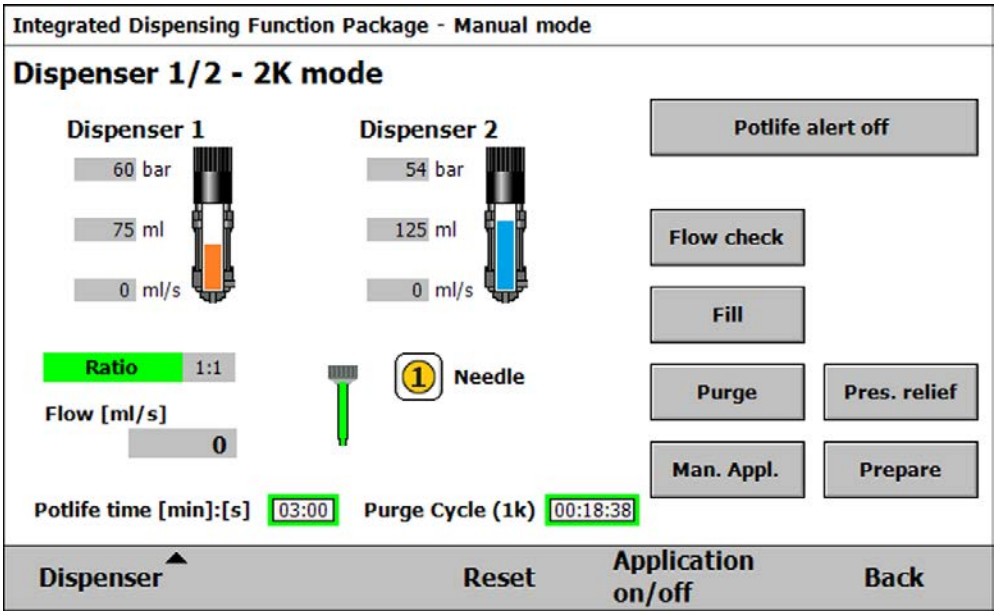
With the initial actuation of the button the corresponding inlet valve is opened. The valve is closed again when "Stop" is pressed.

7.3.4 Manual mode - 2K

Note

This window only appears for a 2K system, additional functions are available for 2K manual mode.

2K manual mode



xx2000000780

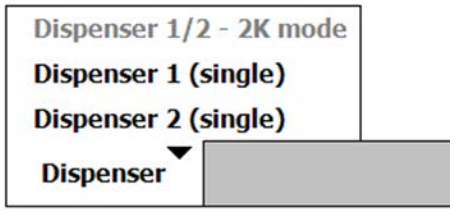
The dispenser is ready for 2K manual mode when the following conditions are satisfied:

1. Both dispensers must be calibrated and ready.
2. No application or circulation is running, no manual function are performed, etc.

Otherwise, the 2K manual mode is blocked and a corresponding message is displayed. Only the pot life monitoring can be switched off if necessary.

Via the menu "Dispenser" a switch can be made between 2K operation and the standard manual functions of the individual dispensers. The manual functions of the individual dispensers are described in *Manual mode on page 303*.

Menu Dispenser Manual mode 2K system



xx2000000781

Continues on next page

7.3.4 Manual mode - 2K
Continued

Dispenser status

The following current values of both dispensers are displayed:

	Description
Pressure	The pressure in the doser in bar
Fill level	The fill level of the doser in milliliters
Flow	The flow in the doser in milliliters per second

2K status

The 2K application demands additional status information.

	Description
Ratio	The mixing ratio of the two components and its status.
Mixer pipe	The color of the mixer pipe also provides information on the mixing ratio status.
Flow	The overall flow (both dispensers) at the applicator in milliliters per second.
Pot life	The remaining time until the mixer is automatically purged (with active pot life monitoring).
Purging cycle (1K)	Time until automatic purging after end of application (only performed once). Not displayed if the time until automatic purging is not lapsing.

Tip

A detailed description of the listed status information are provided in *Configuration - Dispenser on page 327*.

Switching needles

The current status of the needle valves of both dispensers is displayed (on the needle valve button). If one or both of the two needle valves are closed, the needle symbol appears gray. If both needle valves are open, the gray needle symbol appears yellow.

By pressing the needle valve button, both needle valves are switched.

Symbol	Needle valve
 xx2000000782	Gray: At least one of the two needle valves is closed.
 xx2000000783	Yellow: Both needle valves are open.

Continues on next page

Potlife alert off

With active pot life monitoring the button "Potlife alert off" is enabled and allows this function to be switched off. The potlife monitoring is automatically reactivated when the 2K mixing ratio is re-established, for example by the manual function "Prepare" or "Man. Appl." (see below).

Tip

Further information on the topic pot life monitoring for the 2K system are optionally provided in *Appendices on page 611*.

Flow check

The flow check function serves for checking the difference between the theoretically requested and actual material quantity applied.

After the "Flow check" button is pressed, the button appears in green and its writing changes to "Stop". Upon the second actuation of the button the doser stops the process.

Tip

Further information on the flow check for 2K systems are optionally provided in *Appendices on page 611*.

Fill

With the 2K manual function "Fill" both dispensers are filled up to the full limit specified in the parameter window (see *Configuration - Dispenser on page 327*). Depending on the filling speed, the fill limit may be exceeded slightly due to delays of mechanical elements.

When the function is performed the inlet valves are opened automatically in order to enable the supply of material to the dosers. Then the doser pistons are moved up so that the dosers are filled with material. When the fill limit is reached, the filling process stops automatically.

After initially pressing the button, it appears in green and its label changes to "Stop". Upon the second actuation of the button, the dosers stop the filling process.

During the filling process (manual function and during application mode), a soft fill function is performed as an option, in order to protect the doser (see *Filling on page 411*).

Purge

With the 2K manual function "Purge" a purging process is performed in the correct mixing ratio. During the purging process, a defined quantity of material is pushed out repeatedly from the applicator at a defined purge flow. The 2K purge parameters must be entered at the FlexPendant (see *Configuration - Dispenser on page 327*).

Continues on next page

7.3.4 Manual mode - 2K
Continued

After the purging process has started, the button appears in green and its label changes to "Stop". Upon the second actuation of the button, the doser stops the purging process.

Pressure relief

During the 2K pressure relief process, residual pressure in the optional integrated material supply and the two dispensers is released.

For a system without circulation the needle is opened as standard. If this is not desired, the option "Pressure relief in material hose" option (Configuration - Dispenser - General) can be activated. This function should only be used if the pump is part of the function package or if it can be ensured that the external material supply is depressurized.

Manual Application

With the 2K manual function "Man. Appl." the material is applied through the mixing pipe in the correct mixing ratio. The application continues until the function is stopped or one of the two dosers is empty. For the (manual) application the 2K parameter manual application flow is used (see *Configuration - Dispenser on page 327*).

After the "Man. Appl." button is pressed, the button appears in green and its label changes to "Stop". Upon the second actuation of the button, the dispenser stops the process.

Prepare

With the 2K manual function "Prepare" the mixing pipe is filled in the correct mixing ratio. The system is ready to perform a 2K application.

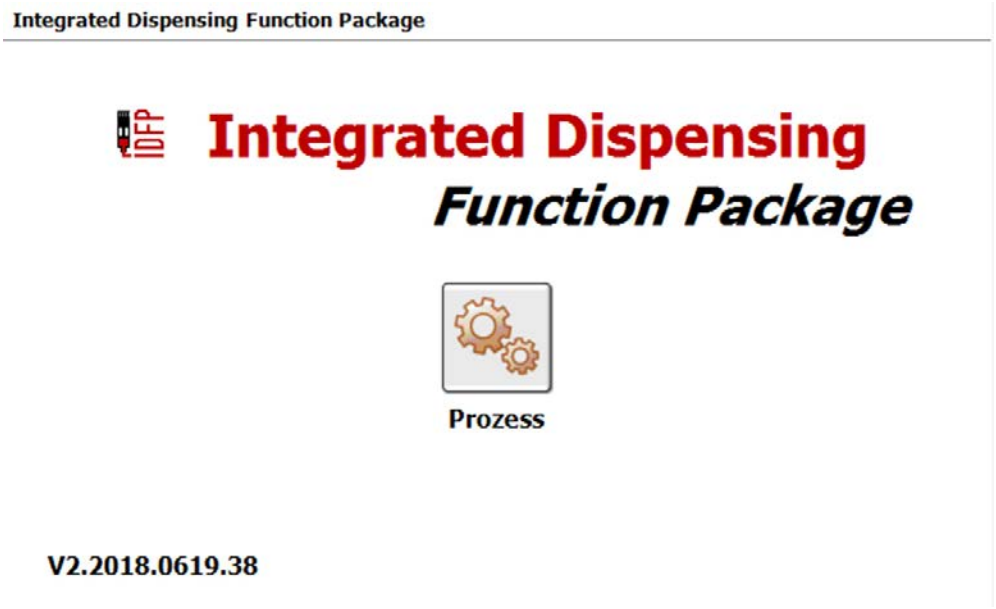
Further information on "Prepare" 2K are provided in the separate chapter 2K application.

After the "Prepare" button is pressed, the button appears in green and its label changes to "Stop". Upon the second actuation of the button, the dispenser stops the process.

7.4 Start screen

On the start screen you can see the version of the TPU application and continue to the process overview.

Start screen



xx2000000784

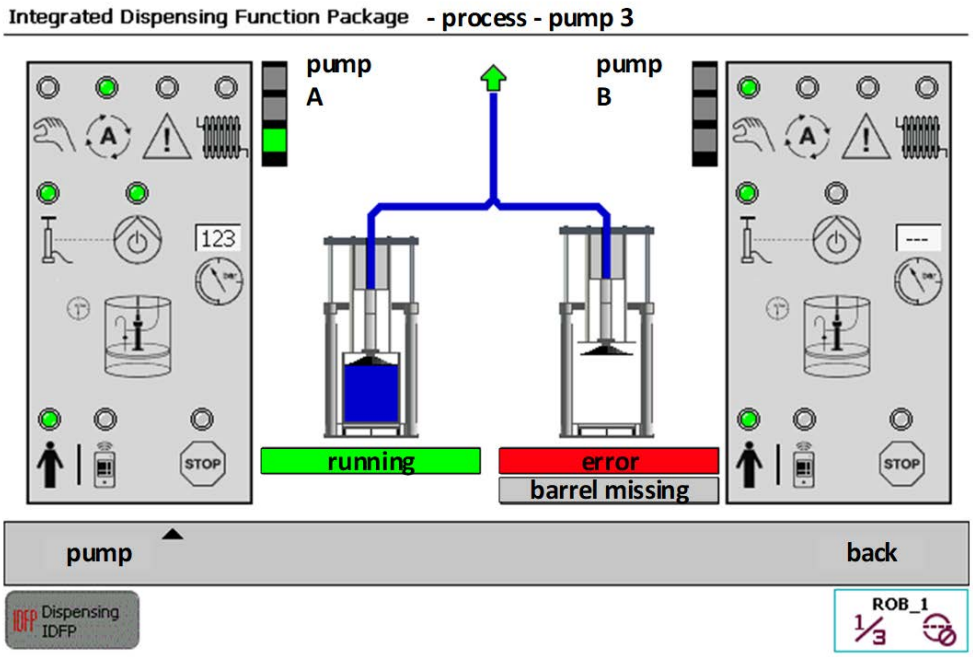
7.5 Process

7.5.1 Process - Pump

Note

This window is not available with an external material supply.

Process - Double barrel pump

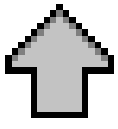
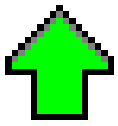


xx2000000785

The pump process view provides information on the current status of the material supply.

If more than one pump is installed, a switch can be made between the pumps via the menu item "Pump". For a dual pump (AB pump) the status display is shown in one window, both for the A and B part.

Overall status of material supply:

Symbol	Description
 xx2000000786	Gray: Material supply not ready
 xx2000000787	Green: Material supply ready

Continues on next page

Traffic light symbol	Light/Color	Description
 xx2000000788	Permanent light, bottom, green	Automatic mode and ready
 xx2000000789	Permanent light, center, white	Barrel is completely empty
	Blinking light, center, white	Warning: Barrel is almost empty
 xx2000000790	Permanent light, top, red	Is temporarily set during initialization
	Blinking light, top, red	General error

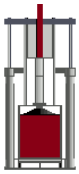
Pump status

The pump status is shown in a bar below the pump image. Possible status and meaning:

Pump status	Color	Meaning
Running	Green	The pump runs and conveys material for production.
Ready	Yellow	The pump is ready, i.e. it is in Automatic mode, but the air motor is off.
Manual mode	Blue	The pump is in Manual mode.
Error	Red	There is an error at the pump or the barrel is empty.
Deactivated	Gray	The pump is deactivated and not ready for production.

Pump/Barrel filling level

The filling level of the pump or barrel is indicated via the pump symbol.

Symbol	Description
 xx2000000791	Barrel is missing, or the follower plate is located outside the barrel.
 xx2000000792	The barrel is OK, i.e. the filling level is between 10% and 100%.

Continues on next page

7.5.1 Process - Pump
Continued

Symbol	Description
 xx2000000793	The fill level of the barrel has dropped below 10%, over 90% of the material has been consumed (almost empty).
 xx2000000839	The barrel is empty.

Another status bar for the barrel status also appears below the pump status in the following cases:

Barrel status	Color	Meaning
Barrel missing	Gray	There is no barrel, or the follower plate is located outside the barrel.
Almost empty	Yellow	The fill level of the barrel has dropped below 10%, over 90% of the material has been consumed.
Empty	Red	The barrel is empty.

Return to the process overview via the menu item "Back".

7.5.2 Process - Heating

Note

This window is only available if the option electrical heating is installed in the system.

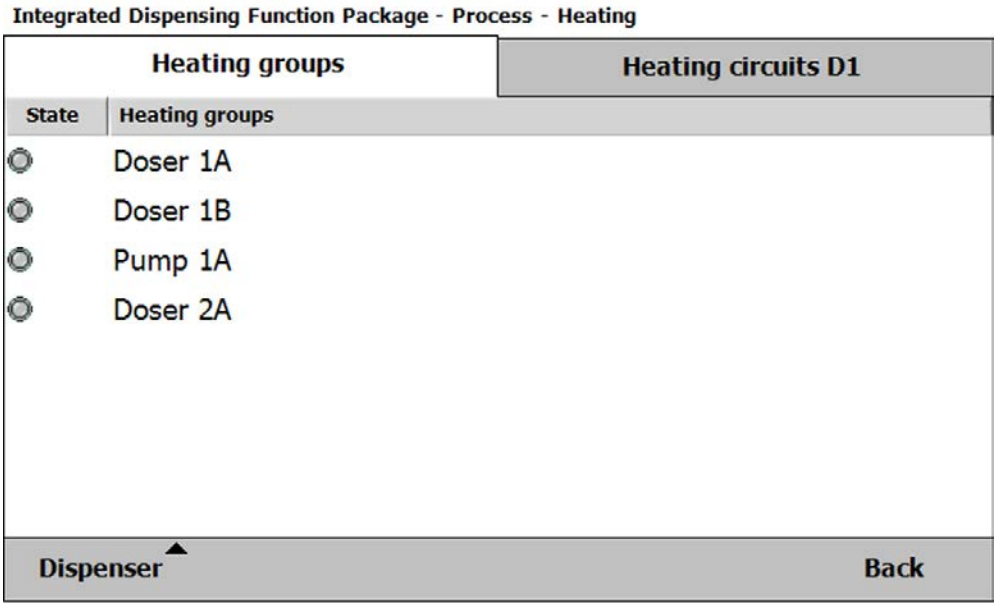
The heating process view provides information on the current status of the heater.

The window has two different tabs:

1 "Heating groups" tab: Displays all existing heating groups and their status.

2 "Heating circuits" tab: Displays all existing heating circuits, their status and their setpoint and actual temperature, as well as the temperature difference.

Process - Heating - Heating groups



xx2000000794

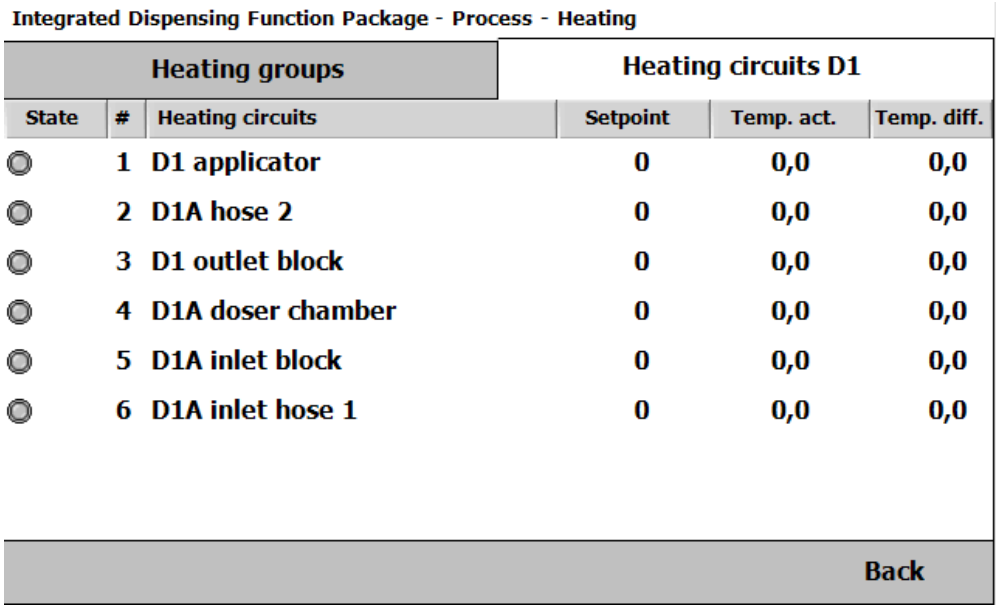
The status symbol displays the status of each individual heating group:

Symbol	Meaning
 xx2000000795	Gray: The heating group is not connected or deactivated.
 xx2000000796	Yellow: The heating group is connected, some heating circuits of the heating group are outside the warning limits.
 xx2000000840	Green: The heating group is connected, all heating circuits of the heating group have reached their setpoint value and are within the warning limits.

Continues on next page

7.5.2 Process - Heating
Continued

Process - Heating - Heating circuit



xx2000000797

The status symbol displays the status of each individual heating circuit:

Symbol	Meaning
 xx2000000795	Gray: The heating circuit is not connected or deactivated.
 xx2000000798	Red: The heating circuit is not ready or the temperature has exceeded the lower/upper alarm limit (Min/Max).
 xx2000000796	Yellow: The temperature has reached the lower or upper warning limit (Min/Max).
 xx2000000840	Green: The temperature is within the warning limit and is therefore OK.

Return to the process overview via the menu item "Back".

As soon as all heating circuits are within their limits, the digital output doTmpCondState is set to

1 The dosers obtain a ready signal from the heating and can start the application.

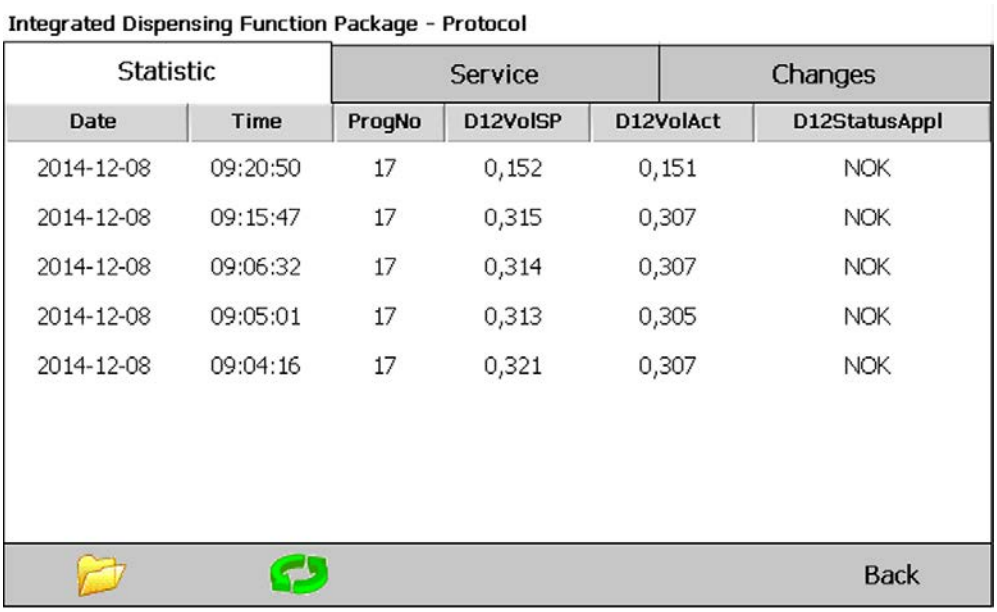
7.5.3 Process - Protocol

Up to three tabs exist in the "Protocol" window:

- Statistic (process data, only with option statistic functionality installed)
- Service (switching cycle counter for valves, volumes, as well as dispensing cycles)
- Changes (list of changes made to configurations)

Statistics window

Process - Protocol - Statistic



xx2000000799

The robot records the process data, as configured under "Configuration - Statistic", and saves this data as a csv file in the directory "Home\Statistic\User" on the robot flash disk.

When the protocol window is opened, the user interface reads the last created statistics file and the first six columns of the existing data entries are displayed in the list.

Symbol	Meaning
 xx2000000800	The directory where the statistics are saved is reread.
 xx2000000801	If required, older statistics files are manually loaded via a file-open-dialog.

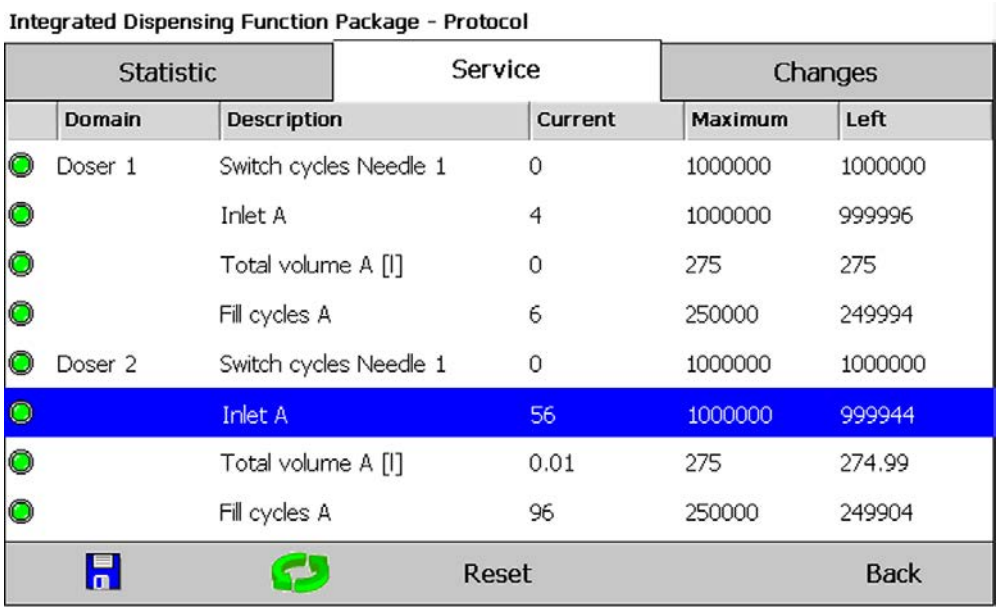
The statistics can be adapted to user specific requirements (see *Configuration - Statistic on page 360*).

Continues on next page

7.5.3 Process - Protocol
Continued

Service data

Process - Protocol - Service



xx2000000802

In the "Service" tab, the following information is displayed for the respective component:

- Current value of switching cycles, volume or filling cycles
- Maximum value of switching cycles, volumes or filling cycles
- The number of switching cycles, volume or filling cycles remaining until the maximum value is reached (Left)

Following a replacement, the counters of the corresponding component must be reset using the "Reset" function. In addition to the transmission of the modified data to the robot controller, the corresponding user modules are saved on the robot flash disk.

Symbol	Meaning
 xx2000000840	Green: If the warning limit is not yet reached, the corresponding entry is displayed with a green status LED.
 xx2000000796	Yellow: If the warning limit is reached, but the maintenance limit is not yet reached, this is displayed with a yellow status LED.
 xx2000000798	Red: If the maximum value (maintenance limit) of the switching cycles, volumes or filling cycles is exceeded, this is displayed with a red status LED.

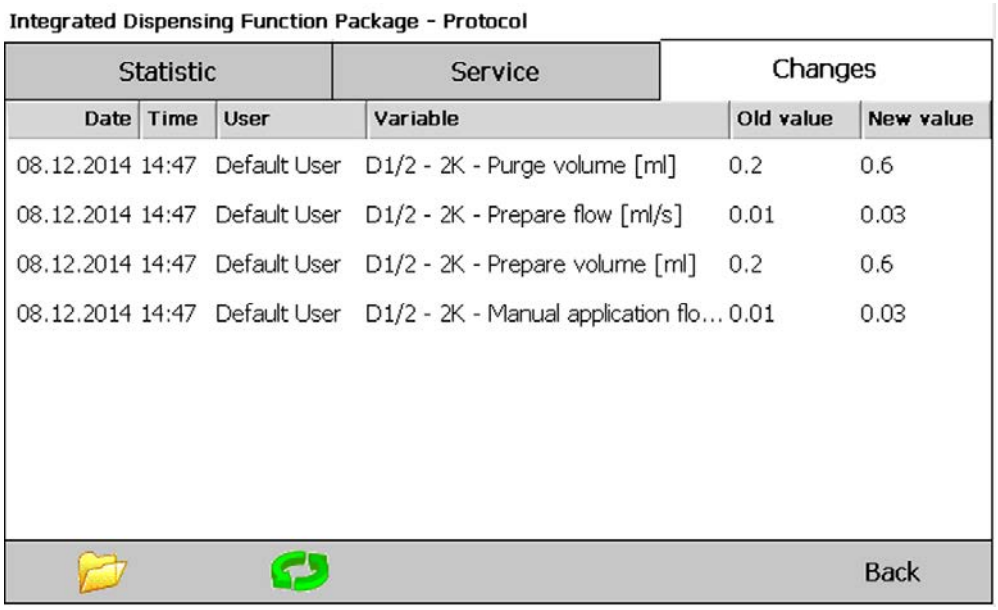
Symbol	Meaning
 xx2000000800	The switching cycle counter is updated via a manual request.

Continues on next page

Symbol	Meaning
 xx2000000803	The current status of the switching cycle counter can be saved manually as a csv file.

The maximum values (maintenance limits) and the warning limit (in percent) are configurable in "Configuration - Service" (see *Configuration - Service on page 355*).

7.5.4 Change log



xx2000000804

All changes made via the FlexPendant to the parameters are recorded. They are displayed as follows in the "Changes" tab:

- Date (date of change)
- Time (time of change)
- User (logged-in user)
- Variable (description of the modified parameter)
- Old value
- New value

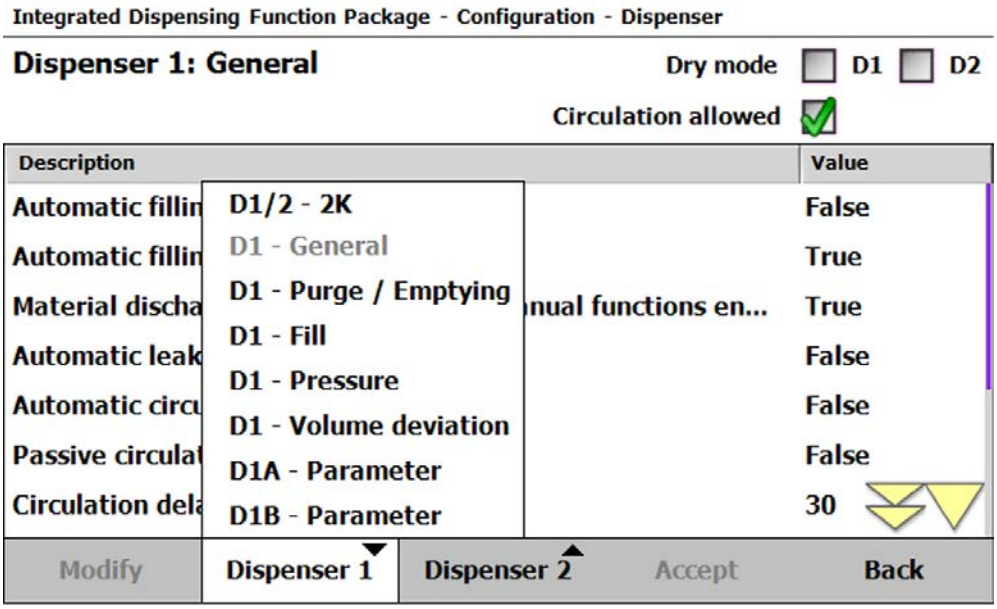
The changes are saved on the flash disk of the robot under "HOME/ChangeLog" in a csv file. A file is created for each calendar week. It is deleted automatically after 12 weeks.

Symbol	Meaning
 xx2000000800	The change log is updated via a manual request.
 xx2000000801	If required, older change logs are manually loaded via a file-open-dialog.

7.6 Configuration

7.6.1 Configuration - Dispenser

Configuration - Doser



xx2000000805

The "Configuration - Dispenser" window offers the following options:

1. Checkbox "Dry mode": Switching on/off dry mode.

   Dry mode is activated or deactivated for the entire dispenser (for a dual dispenser doser A and doser B). If dry mode is active, "dry application" is displayed, i.e. the needle is not opened.
2. Checkbox "Circulation allowed": Enable circulation (if present).
3. Menu item "Modify": Edit the selected parameter.
4. Menu item(s) "Dispenser X": A corresponding submenu is available for selection under the respective dispenser.
   - DX/Y - 2K (2K systems only)
   - DX - General
   - DX - Purge/Emptying
   - DX - Fill
   - DX - Pressure
   - DX - Volume deviation
   - DXA - Parameter
   - DXB - Parameter

     (X stands for dispenser number = 1-4; Y stands for the second dispenser in the case of a 2K system)
5. Menu item "Accept": All configuration changes must be saved with "Accept" before exiting the window. In addition to the transmission of the modified

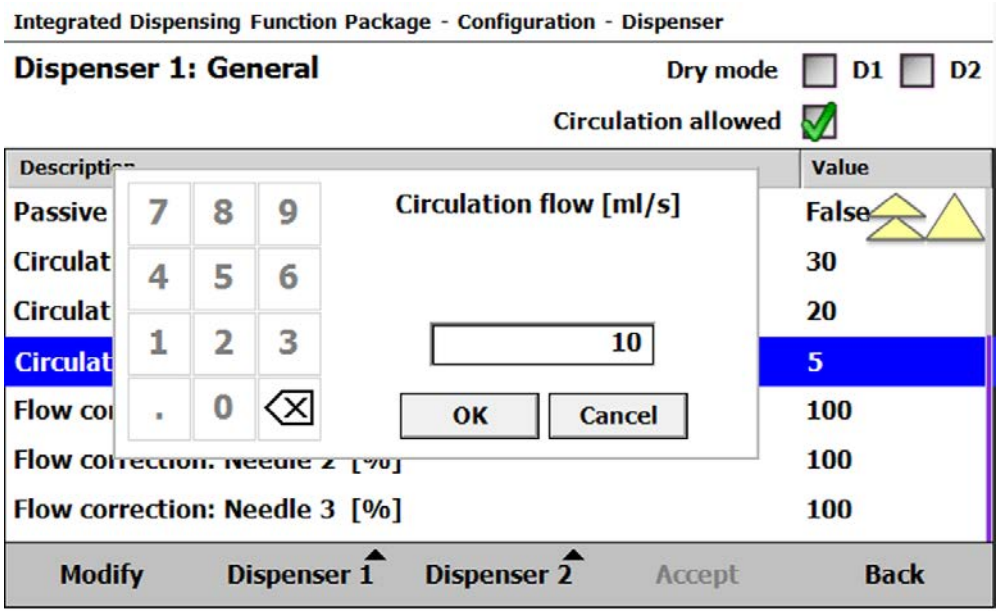
Continues on next page

data to the robot controller, the corresponding user modules are saved on the robot flash disk.

6 Menu item "Back": Return to the process overview via the menu item "Back".

Modify

Configuration - Dispenser - Modify



xx2000000806

The setting window is displayed by clicking on the menu item "Modify" or double clicking on the selected parameter. By clicking on "OK" the new value is entered in the parameter list, but not saved. Parameters with False/True values are modified by a double click. The modified parameter is displayed in blue and only saved permanently by clicking on "Accept".

Doser X/Y 2K

Note

This configuration window only exists for a 2K system.

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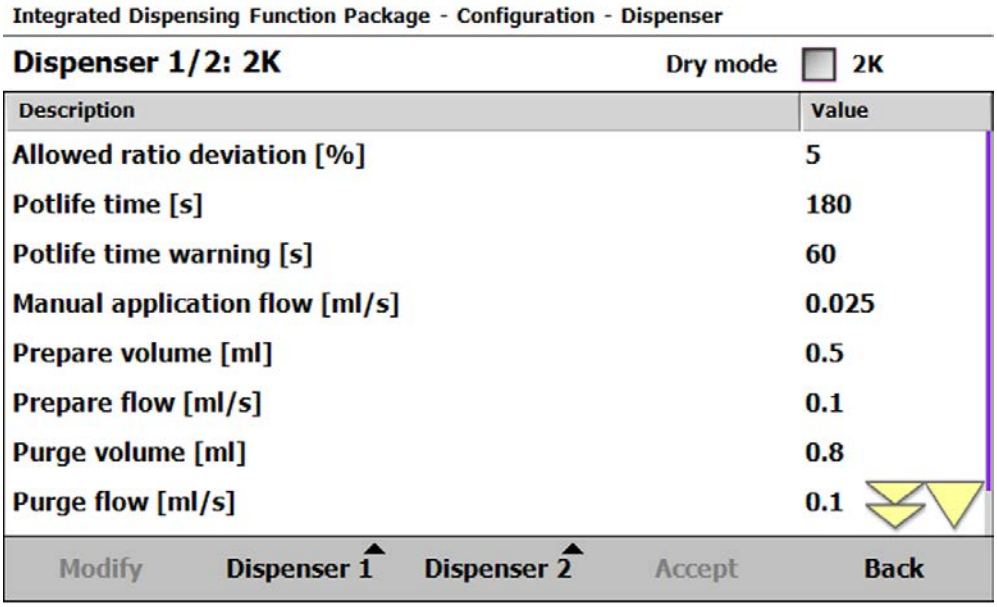
Configuration - Dispenser - Dispenser X/Y: 2K



xx2000000807

General	Description
Allowed ratio deviation [%]	By what percent can the mixing ratio vary? If the deviation is greater than the value specified here, a corresponding error message is output.
Potlife time [s]	Time in seconds in which the processing of the mixed components is possible without increasing the viscosity or after which hardening begins. The potlife time starts to lapse as soon as the mixed material is in the mixing pipe, i.e. no application running and no manual function, etc., is performed. Automatic purging can be executed when the potlife time has lapsed. This is configured via the parameter "Automatic purging after potlife elapsed" (see below). The potlife time is reset for each doser action (application, etc.). The monitoring of the current potlife time can be deactivated in the manual mode window 2K (see *Manual mode on page 303*), for example if the mixer is removed, etc.
Potlife time warning [s]	If the lapsing potlife time reaches or exceeds the configured time (in seconds), a warning is displayed, however only if "Automatic purging after potlife elapsed" (see below) is deactivated.
Manual application flow [ml/s]	Flow in milliliters per second, at which the 2K manual function "Man. Appl." (see *Manual mode on page 303*) is performed.
Prepare volume [ml]	Volume in milliliters which is required for the preparation, i.e. the filling quantity of the mixing pipe. The preparation serves for the readiness of the 2K application, the mixing pipe is filled with material in the correct mixing ratio.
Prepare flow [ml/s]	Flow in milliliters per second, at which the preparation is performed.
Purge volume [ml]	Volume in milliliters, that is output by the 2K manual function "Purge" (see *Manual mode on page 303*).
Purge flow [ml/s]	Flow in milliliters per second, at which the 2K manual function "Purge" (see *Manual mode on page 303*) is performed.

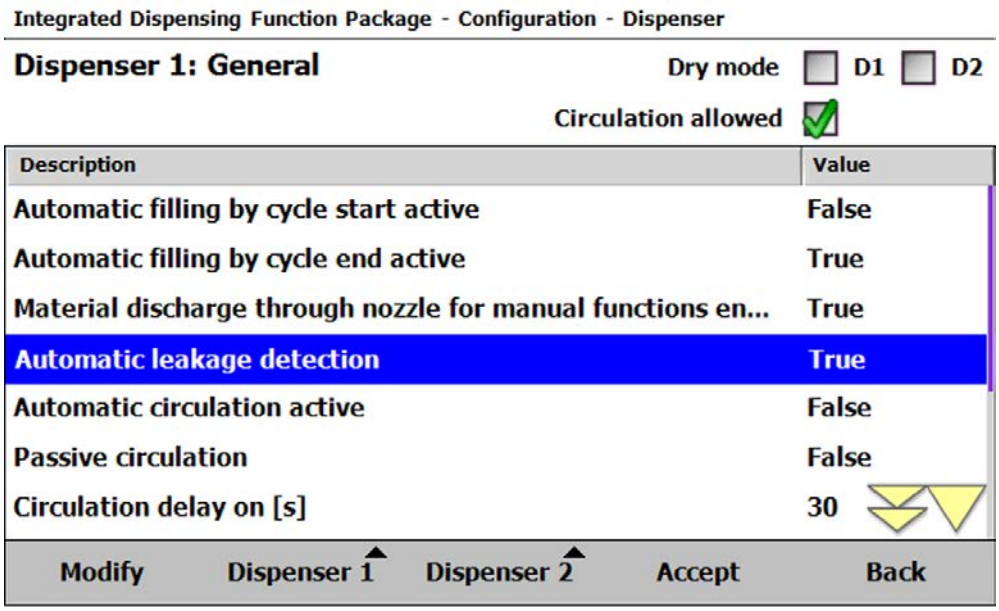
Continues on next page

7.6.1 Configuration - Dispenser
Continued

General	Description
Automatic purging potlife elapsed	Activates/Deactivates the automatic purge after lapse of pot time (see above).

Dispenser X: General

Configuration - Dispenser - Dispenser X - General



xx2000000808

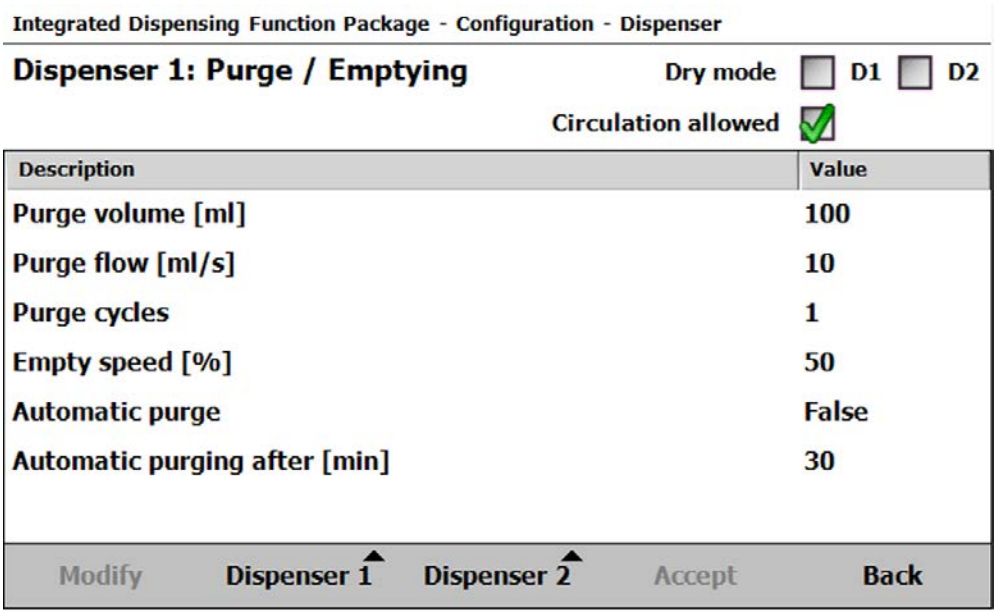
General	Description
Automatic filling by cycle start active	The doser is filled completely upon the start of a new application cycle, should it not be full.
Automatic filling by cycle active	The doser is filled completely after the end of the application cycle (only for single doser). If filling at cycle start and filling at cycle end are deactivated, in the case of a single doser a warning message is output. It must be filled in the program.
Material discharge through nozzle for manual functions enabled	If the dispenser is not stationary, but mounted at the robot flange, the automatic spray authorization can be activated. If this is not activated, an additional query is sent to the operator before manual function in order to avoid undesired discharging of material.
Automatic leakage detection	If this function is active, at certain intervals in which no other function is performed, for e.g. at breaks between application, pressure is built up and then checked to see whether the pressure remains constant. Only the section between the inlet valves at the doser up to the circulation valve is monitored (checked).
Automatic circulation active	If time-controlled circulation is activated, the circulation is automatically switched on and off after predefined times. The circulation must be activated manually if automatic circulation is deactivated.
Passive circulation	In the case of passive circulation, the doser is stationary, the inlet and outlet valves and circulation valves are opened and the pump or external material supply pushes material through the components and hoses.
Circulation delay on [s]	Time after which the material circulation is started if there is no flow setpoint value from an application program (limit value: >=0).

Continues on next page

General	Description
Maximum circulation duration [min]	If this time has lapsed with the circulation switched on, the circulation is stopped (limit value: >=0).
Circulation flow [ml/s]	This material flow is used for the material circulation (limit value: 0-20).
Flow adjustment (needle 1, 2, 3) [%]	The flow setpoint value is increased or reduced by this percentage factor.

Dispenser X: Purge/Emptying

Configuration - Dispenser - Dispenser X - Purge/Emptying



xx2000000809

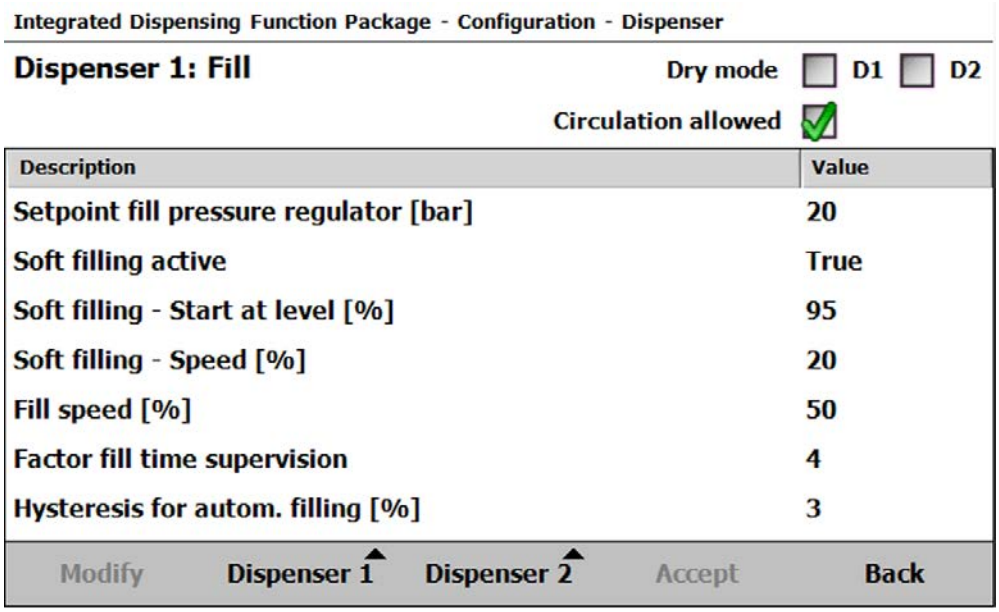
Purge	Description
Purge volume [ml]	Volume used for the current dispenser per purge cycle (limit value: <full limit-empty limit, unlimited for dual dispenser).
Purge flow [ml/s]	Purge flow used for the current dispenser (limit value: > 0 and nominal flow of doser).
Purge cycles	Number of purge cycles for current dispenser (limit value: 1 and 10).
Empty speed [%]	This percentage factor influences the emptying speed of the manual function "Empty" (see *Manual mode on page 303*).
Automatic purge	Activates automatic purging. If active, a purging process is automatically triggered after the last doser action was performed following expiry of the "Automatic purging after" (see below). The automatic purging is repeated periodically. Special case 2K: The automatic purging (1K) can only be activated for one of the dispensers within the 2K dispenser and is therefore automatically deactivated for the other dispenser. The purging process is only performed once for the 2K system (no periodic recurrence).
Automatic purging after [min]	Time until automatic purge is carried out. Is reset for each doser action (application, circulation, manual function, etc.).

Continues on next page

7.6.1 Configuration - Dispenser
Continued

Dispenser X: Fill

Configuration - Dispenser - Dispenser X - Fill



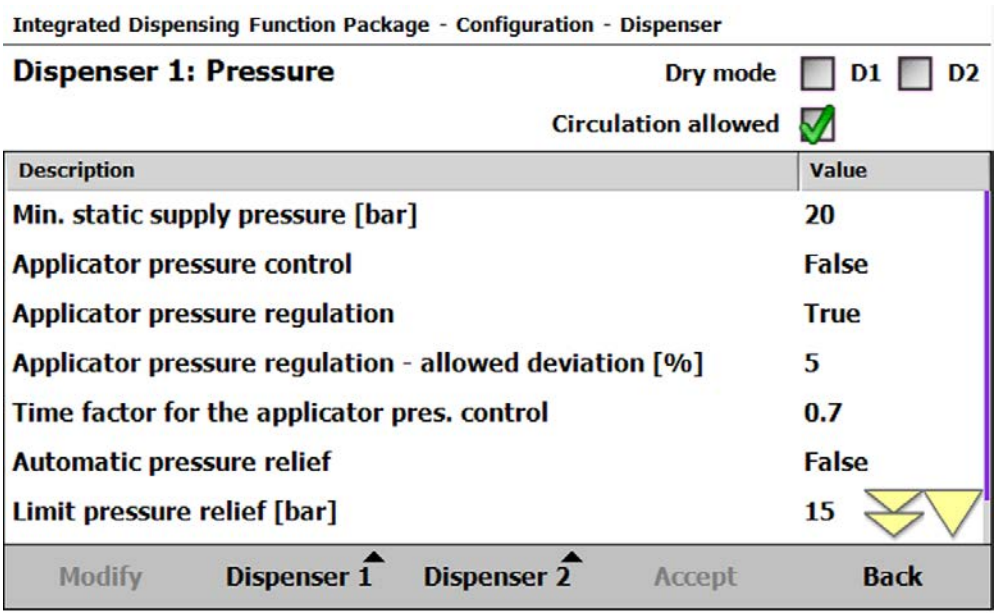
xx2000000810

Fill	Description
Setpoint fill pressure regulator [bar]	This pressure should not be exceeded during the doser filling process in order to avoid a vacuum in the doser chamber (limit value: > 5). During the filling process, pressure regulation is effective in the doser chamber so the pressure does not fall below the specified minimum filling pressure. The filling speed is adapted accordingly.
Soft filling active	If this function is active, the filling speed of the doser is reduced at the end of the filling process, thus protecting the mechanical elements of the doser.
Soft filling - Start at level [%]	The value specified here determines the fill volume from which the soft fill function is started.
Soft filling - Speed [%]	The value specified here determines the desired filling speed of the doser during the soft fill function.
Filling speed [%]	This percentage factor influences the filling speed (for example in order to protect the mechanical elements of the doser).
Factor filling time supervision	If this time is exceeded during the filling process of the doser, a warning message is output (limit value: > 0 and < 120). Value 1 corresponds to the theoretically calculated optimal filling time. As factor 1 can never be achieved, at least factor 2 must be specified. The filling time is dependent on the material. The higher the viscosity or the material, the higher the factor must be. For gluing applications, for example at least factor 4 is required. The actual max. filling time before a filling time monitoring error is output is calculated from the theoretical minimum possible filling time multiplied by the filling time supervision factor.
Hysteresis for autom. filling [%]	Filling before or after an application is only carried out if the current fill volume deviates by this deviation hysteresis with regard to the full volume.

Continues on next page

Dispenser X: Pressure

Configuration - Dispenser - Dispenser X- Pressure



xx2000000811

Pressure	Description
Min. static supply pressure [bar]	This is the minimum static supply pressure, which must be sustained at the material inlet of the doser so that normal operation is guaranteed. If the pressure drops below this value, a corresponding error message appears.
Applicator pressure control	Activate/Deactivate the applicator pressure control.
Applicator pressure regulation	Activate/Deactivate the applicator pressure regulation.
Applicator pressure regulation - Allowed deviation [%]	Allowed pressure deviation during the applicator pressure regulation given as percentage. The smaller the value selected, the more time the applicator pressure regulation requires.
Time factor of applicator pres. control	The calculated time of the motor movement for controlling the applicator pressure is multiplied by this factor. The smaller the factor, the smaller the pressure jump.
Automatic pressure relief	If the time-controlled pressure relief is activated, the pressure relief limit and the pressure relief duration (see below) must be specified and checked to see whether the pressure relief should be carried out in the material hose.
Pressure relief in hose	If this function is active, the pressure is not relieved through the nozzle, but back into the material inlet hose. (Only for system without circulation)
Limit pressure relief [bar]	Pressure value up to which the system is at least relieved or from which the system is considered as relieved.
Time to pressure relief [min]	Time after which the pressure is relieved when the system comes to a stop.

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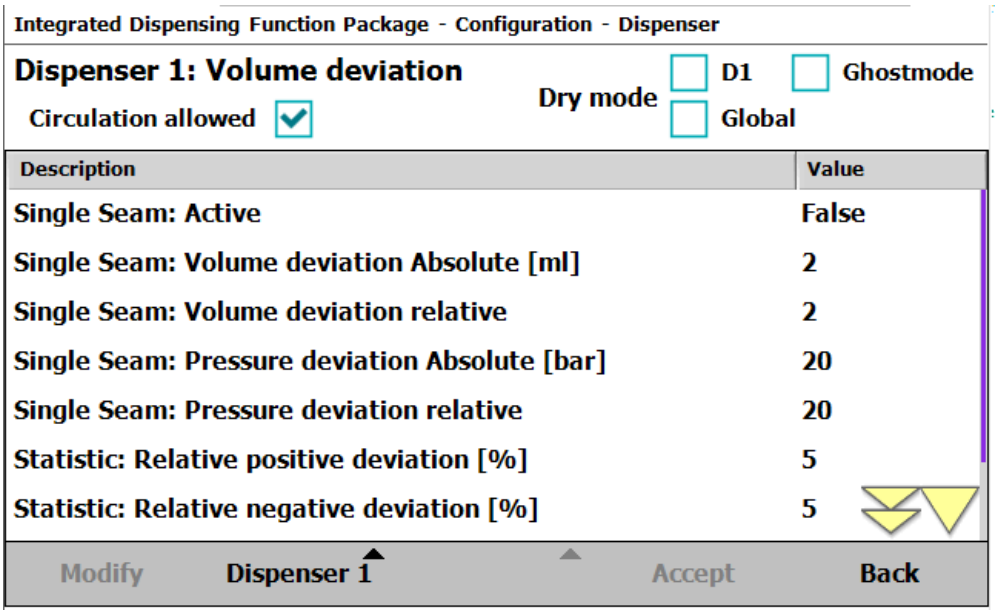
Volume deviation

Configuration - Dispenser - Dispenser X - Volume deviation



xx2000000812

Volume deviation	Description
Single bead: Active	If the value is true, single-bead recording (see *Single seam monitoring (optional) on page 468*) is activated. The entry applies globally for every dispenser.
Single bead: External referencing	If the value is true, there is no evaluation in the system. The evaluation must be external, e.g. by a PLC. (see *Evaluation on page 479*) The entry applies globally for every dispenser.
Single-bead volume deviation absolute [bar]	Allowable volume deviation in ml per bead
Single-bead volume deviation relative [%]	Allowable volume deviation relative per bead
Single bead: Pressure deviation absolute [bar]	Allowable pressure deviation in bar per bead
Single-bead pressure deviation relative [%]	Allowable pressure deviation relative per bead
Relative positive deviation [%]	Positive (+) relative (percentage) allowed volume deviation with regard to an application cycle. An error is output if this limit is exceeded (limit value: 0).
Relative negative deviation [%]	Negative (-) relative (percentage) allowed volume deviation with regard to an application cycle. An error is output if this limit is exceeded (limit value: 0).
Absolute positive deviation [ml]	Positive (+) absolute (in milliliters) allowed volume deviation with regard to an application cycle. An error is output if this limit is exceeded (limit value: > 0).

Continues on next page

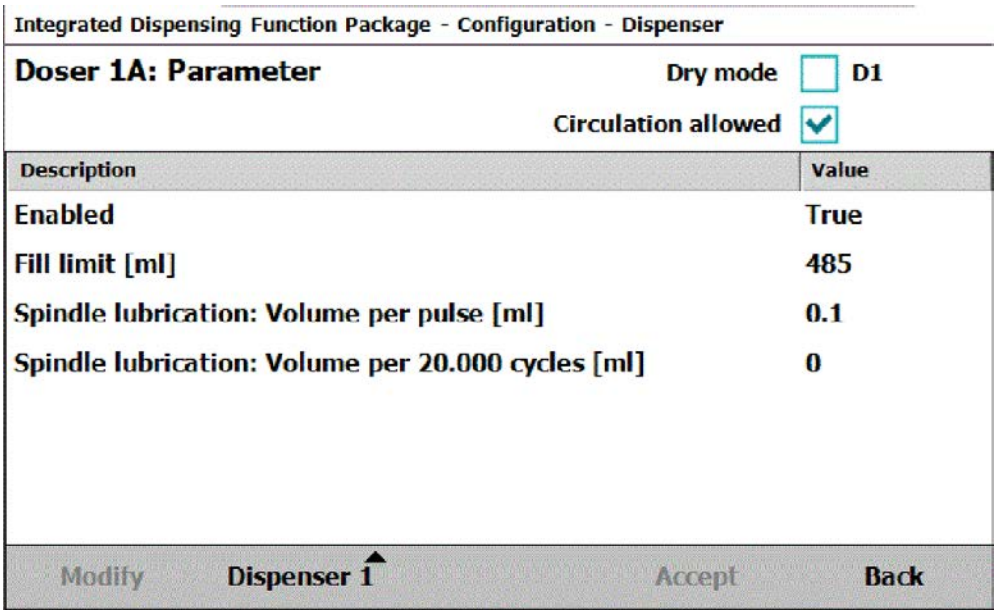
Volume deviation	Description
Absolute negative deviation [ml]	Negative (-) absolute (in milliliters) allowed volume deviation with regard to an application cycle. An error is output if this limit is exceeded (limit value: > 0).

Note

The volume monitoring for the respective area can be switched off by setting the value "999".

Doser X[A|B]: Parameter

Configuration - Dispenser - Dispenser X - Doser X[A|B]: Parameter



xx2000000813

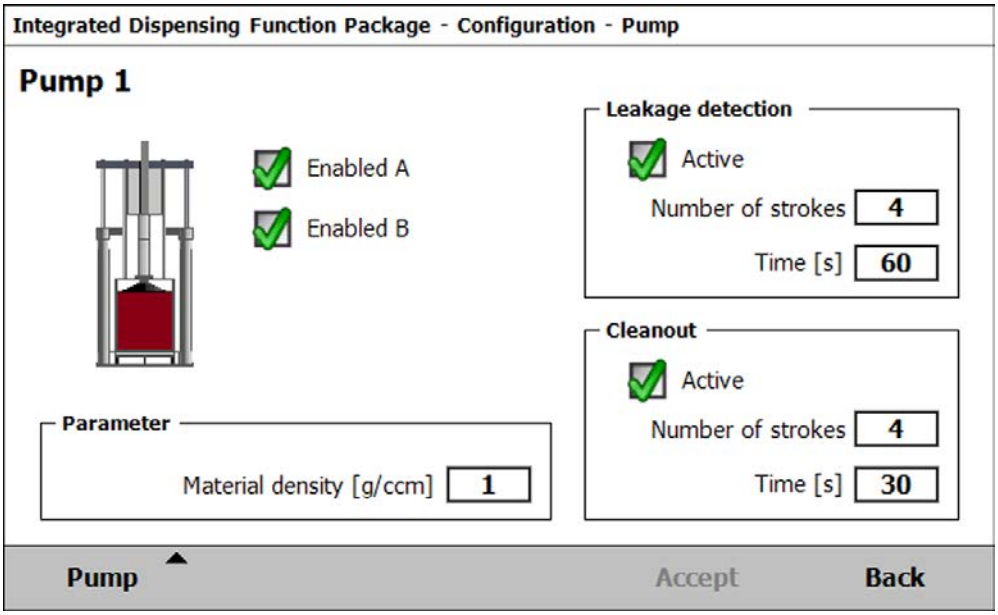
Parameters	Description
Enabled	If the value is set to true, the selected doser is activated. If the doser is deactivated, all manual functions for this doser are automatically deactivated and displayed in gray. The doser always has to be deactivated for maintenance and disassembly. If all dosers of a dispenser are deactivated, the error messages for this dispenser are no longer output. Exceptions to this rule are safety-relevant errors, such as monitoring the material input for overpressure.
Fill limit [ml]	At this volume the upwards movement of the doser (see *Manual mode - Functions on page 308*) is automatically stopped (limit value: Full limit calibration volume and > empty limit).
Spindle lubrication: Volume per pulse [ml]	On installation of "Dispenser spindle lubrication" the value set on the perma STAR CONTROL must be input. Spindle lubrication per pulse is the volume of lubricant applied per pulse.
Spindle lubrication: Volume per 20,000 cycles [ml]	The volume required for 20,000 cycles must be input here. The system then ensures regular pulses in order to apply the required volume of lubricant.

7.6.2 Configuration - Pump

Note

This window is only available with an optional integrated material supply.

Configuration - Pump



xx2000000814

If more than one pump is installed, a switch can be made between the pumps via the menu item "**Pump**".

Enabled

The pump is enabled via checkbox. If the checkbox has a green checkmark, the pump is enabled.

For a double barrel pump (AB pump) a checkbox is displayed for pump A and pump B.

Parameters

Parameters	Description
Material density [g/cm^3]	The density of the material used in grams per cubic centimeter.

Leakage detection

The stroke supervision monitors the pump strokes. If the number of strokes is exceeded within the specified period, an error is generated and the pump is stopped.

Stroke monitor	Description
Active	Activates or deactivates the Stroke monitor.
Number of strokes	Number of allowed pump strokes within the defined time.

Continues on next page

Stroke monitor	Description
Time [s]	Monitored time in seconds.

Cleanout

With the cleanout, a time frame and the maximum number of pump strokes are also defined. The cleanout is only activated when the follower plate is located at the lowermost initiator. The air motor continues to pump until the remaining quantity is pumped out under the follower plate. When it starts to reach a breakthrough point the pump is switched off.

CAUTION

The time frame and the desired number of strokes must be balanced precisely in order to avoid a destruction of the gaskets.

Cleanout	Description
Active	Activates or deactivates the cleanout. If the cleanout is active, the current pump is drained completely before a switch is made to another pump.
Number of strokes	Number of allowed pump strokes within the defined time.
Time [s]	Monitored time in seconds.

Accept: All changes to the configuration must be saved with "Accept" before exiting the window. In addition to the transmission of the modified data to the robot controller, the corresponding user modules are saved on the robot flash disk.

Back: Return to the process overview via the menu item "Back".

7.6.3 Configuration - Heating

Note

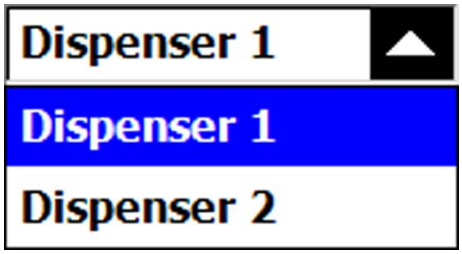
This window is only available with an option electrical heating installed.

The "Configuration - Heating" window offers the following options:

1. Checkbox "Heating": Switch heating on/off
2. Checkbox "Week timer on": Switch the week timer on/off
3. Tab "General": General parameters
4. Tab "Heating groups": Enable or disable different heating groups
5. Tab "Heating circuits": Enable or disable different heating circuits and set/adjust parameters
6. Tab "Week timer": Time-controlled start of heating

If more than one dispenser with heating is installed, a switch can be made between these dispensers using the dropdown list.

Dropdown list dispenser



xx2000000815

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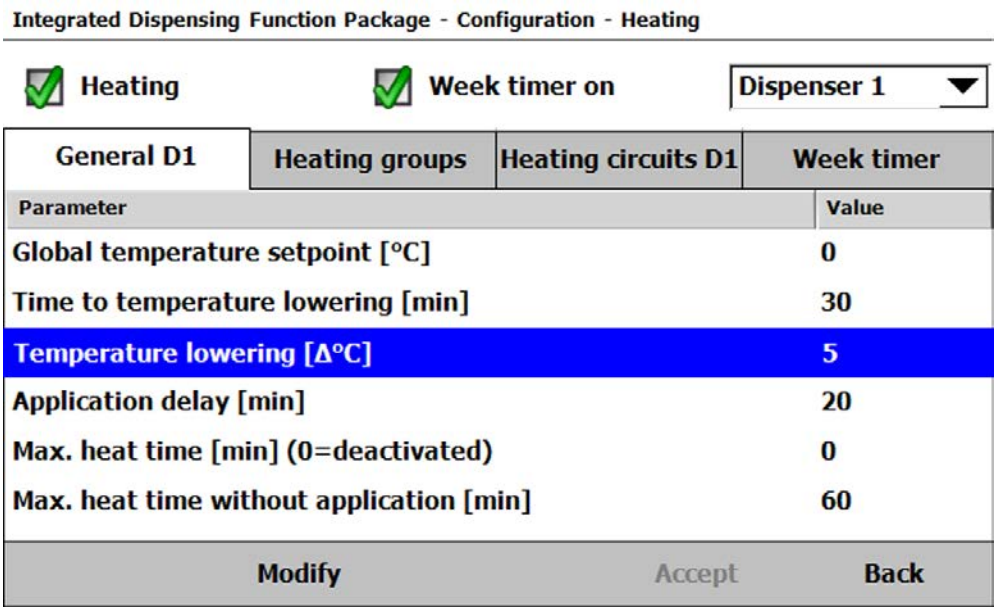
General

Configuration - Heating - General



xx2000000816

Heater	Description
Global temperature setpoint [°C]	Target temperature of applied material (limit value: 0 - 100) This is the global setpoint value for all heating circuits of the dispenser. To set different setpoint values for individual heating circuits (see *Process - Heating on page 321*), this value must be set to 0. A global setpoint can be set for every dispenser.
Time to temperature lowering [min]	If this time has lapsed, the temperature is reduced by the temperature difference of the parameter "Temperature lowering" (limit value: > 0).
Temperature lowering [Δ °C]	After expiry of the time until the temperature lowering the material temperature setpoint is reduced by this temperature difference (limit value: < material setpoint temperature and > 0).
Application delay [min]	Time which lapses after the setpoint temperature of the heating circuit is reached for the first time in order to bring the material to the corresponding temperature ("heat through").
Max. heat time [min] (0 = deactivated)	Maximum heating time (absolute). Unlimited heating with the value "0".
Max. heat time without application [min]	Time that lapses after the last application until the material tempering is switched off automatically (limit value: > 0).

Modify: Allows the modification of a parameter marked in the list.

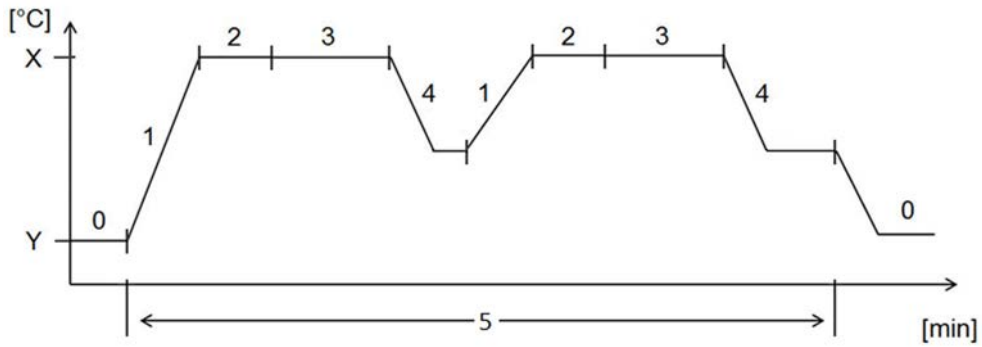
Accept: All configuration changes must be saved with "Accept" before exiting the window. In addition to the transmission of the modified data to the robot controller, the corresponding user modules are saved on the robot flash disk.

Continues on next page

7.6.3 Configuration - Heating
Continued

The following graphic illustrates the different heating phases, whereby the temperature value "Y" is the material temperature without tempering and "X" is the parameterized setpoint value.

Heating phases

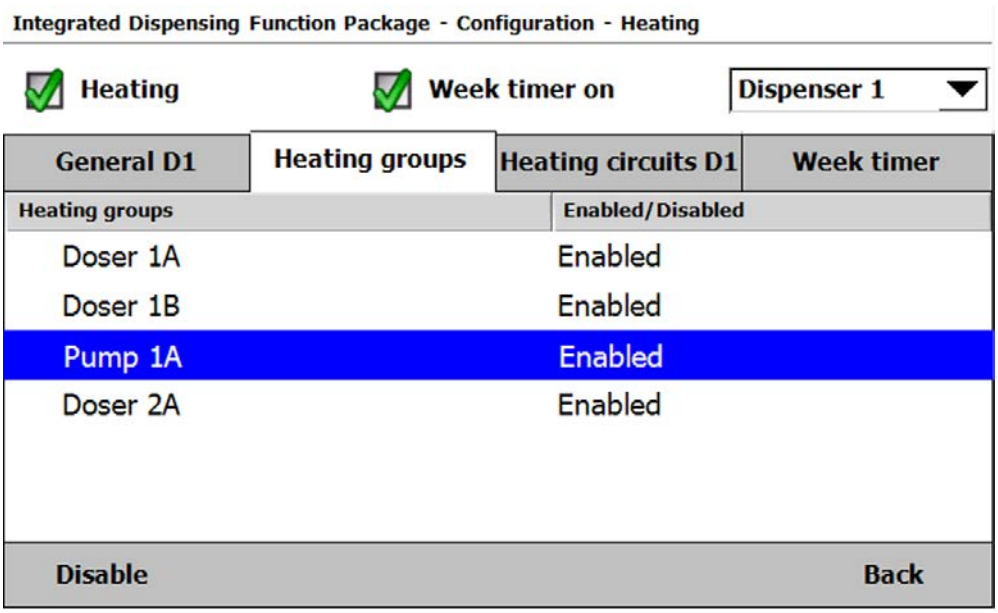


xx2000000817

Time	Description	Parameters
0	Heating switched off	
1	Startup: System is heating	Global temperature setpoint value [°C]
2	Application delay	Application delay [min]
3	Ready for application	Time to temperature lowering [min]
4	Setback mode	Temperature drop [Δ °C]
5	Total heating time	Maximum heating time [min]

Heating groups

Configuration - Heating - Heating groups



xx2000000818

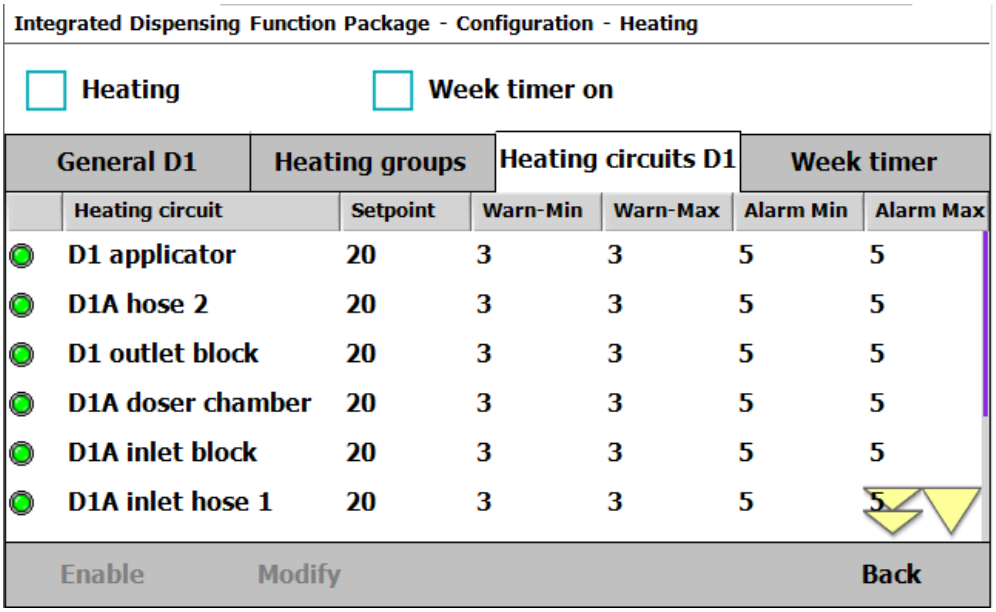
All available heating groups are shown here.

Continues on next page

The marked heating group can be enabled or disabled using "Enable" or "Disable".

Heating circuits

Configuration - Heating - Heating circuits



xx2000000819

The existing heating circuits and their key parameters are displayed here.

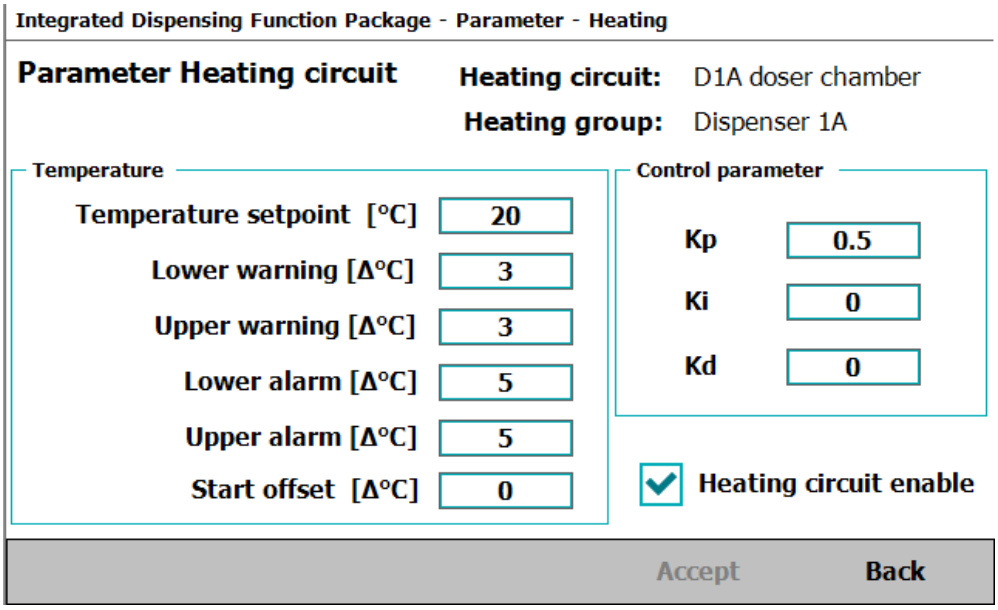
The marked heating circuit can be enabled or disabled using "Enable" or "Disable".

Symbol	Activate/Deactivate
 xx2000000840	Green: The heating circuit is enabled.
 xx2000000795	Gray: The heating circuit is disabled.

Continues on next page

Using the "Modify" button the parameter view for the marked heating circuit is opened.

Configuration - Heating - Heating circuits - Change parameters



xx2000000820

If the green checkmark in the checkbox "Heating circuit enable" is set, the heating circuit is activated.

The modified parameters are updated by clicking on "Accept". In addition to the transmission of the modified data to the robot controller, the corresponding user modules are saved on the robot flash disk.

Temperature	Description
Temperature setpoint [°C]	Target temperature of heating circuit. This can only be edited for primary heating circuits. Editing is blocked for secondary heating circuits. The setpoint temperature is automatically calculated by the robot due to the cascaded arrangement (for e.g. for Peltier element). The value of the global temperature setpoint (see tab General) must be set to 0 for the setpoint temperature to become active for individual heating circuits.
Lower warning [Δ °C]	A warning message is issued if the temperature falls below the specified temperature limit.
Upper warning [Δ °C]	A warning message is issued if the temperature exceeds the specified temperature limit.
Lower alarm [Δ °C]	An error message is issued if the temperature falls below the specified temperature limit.
Upper alarm [Δ °C]	An error message is issued if the temperature exceeds the specified temperature limit.
Start Offset [Δ °C]	During the warm-up phase an additional offset can be defined in order to accelerate the heating of the material. This is for example useful for heating sleeves, which have poor heat transfer to the doser chamber.

Example for temperature values:

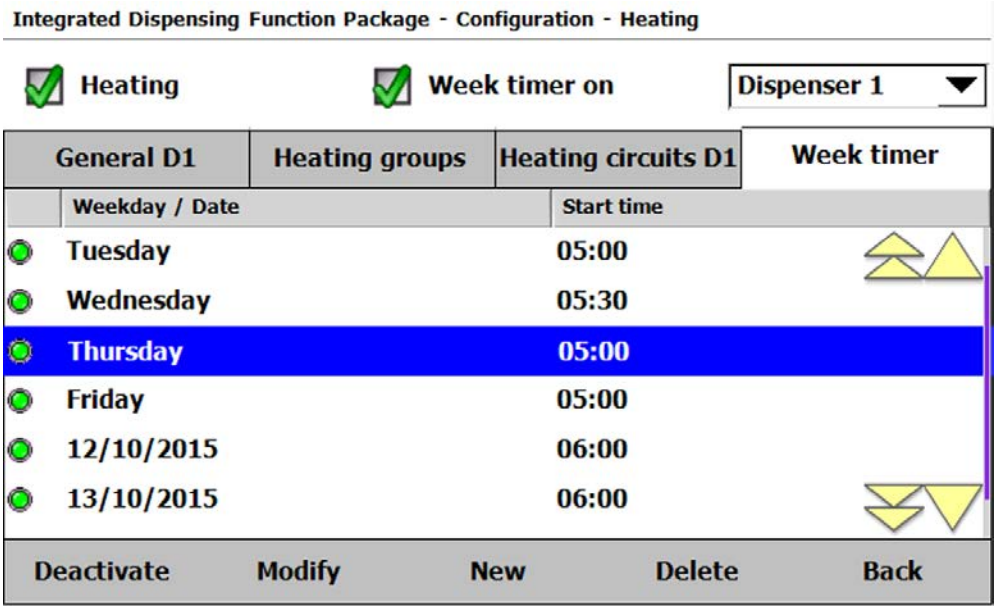
Continues on next page

For the values set in the example (see *on page 342*) a warning is triggered as soon as the temperature falls below 17 °C or above 23 °C.

An alarm is triggered if the temperature is below 15 °C or above 25 °C.

Week timer

Configuration - Heating - Week timer



xx2000000821

The week timer enables the programming of starting times for the tempering. The tempering is (with an active timer) automatically started at the specified time, in order, for example, to bring the material to an optimal temperature before production begins.

In order to activate the week timer, the green checkmark in the checkbox "Week timer on" must be set.

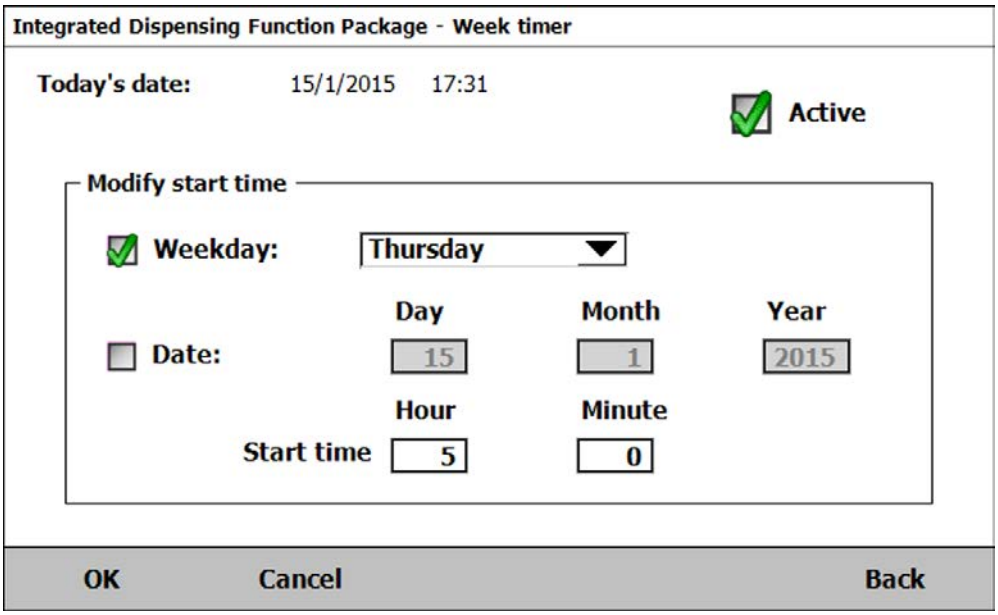
The current selected start time is activated by clicking on "Activate". The marked entry can be deleted by clicking on "Delete".

Symbol	Activate/Deactivate
 xx2000000840	Green: Start time activated.
 xx2000000795	Gray: Start time deactivated.

Continues on next page

The following window appears by clicking on "Modify" or "New":

Configuration - Heating - Clock timer - Change start time



xx2000000822

If a weekday is selected as a start time, then the start is repeated at the specified time every week until the entry is deleted or deactivated. The start is only performed once on the selected date if a date is entered.

Back: Return to the process overview via the menu item "Back".

7.6.4 Configuration - Peltier

Note

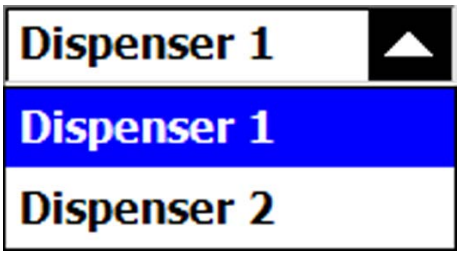
This window only exists with an optional installed Peltier.

The "Configuration - Peltier" window offers the following options:

1. Checkbox "Temperature conditioning": Enable of tempering (upon activation the Peltier is initially in *passive standby mode*, but is switched on automatically as soon as the circulation starts or an application program is started, i.e. as soon as material flows).
2. Tab "General": General parameters.
3. Tab "Control circuits": Disable or enable different control circuits for tempering and adjustment of parameters.

If more than one dispenser with Peltier is installed, a switch can be made between these dispensers using the dropdown list.

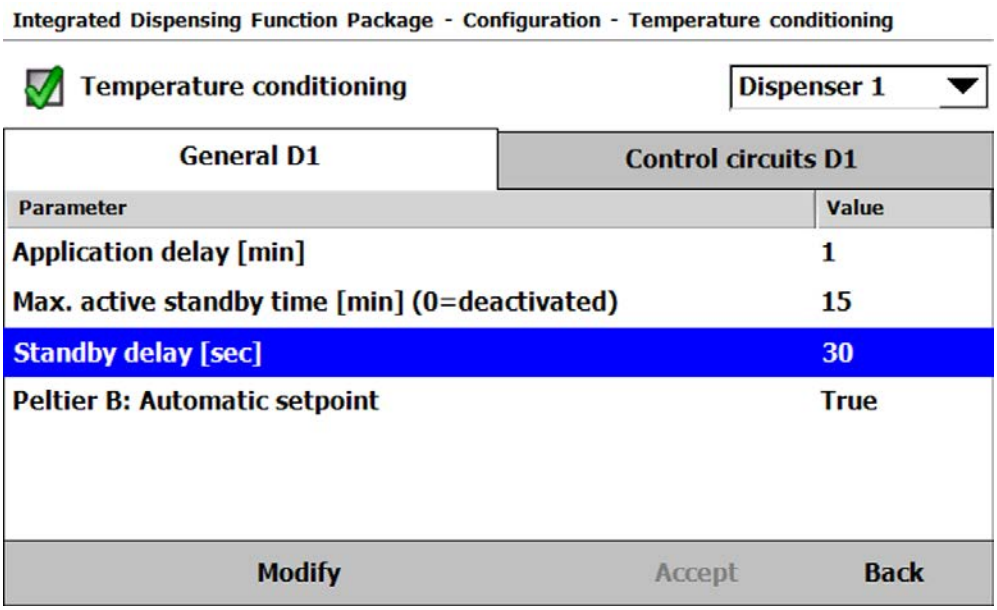
Dropdown list dispenser



xx2000000823

General

Configuration - Peltier - General



xx2000000824

Continues on next page

Tempering	Description
Application delay [min]	Time which must lapse after the start of tempering, i.e. after the setpoint temperature is reached for the first time, before the tempering obtains the status OK (green symbol in the status bar). The application delay helps to ensure that the material is brought to the necessary temperature before the initial application (heating/cooling).
Max. active standby time [min] (0=deactivated)	Time which the material tempering remains in active standby mode before it changes to passive standby mode. This function is deactivated with the value "0", i.e. the tempering remains in active standby mode (unlimited).
Standby delay [sec]	Time which lapses after the last application until the material tempering switches to active standby mode.

Note

In active standby mode (temperature regulation without material flow), the setpoint value of the Peltier element slowly approaches the setpoint temperature of the applicator.

The temperature regulation is deactivated in passive standby mode, but switches on as soon as material flows.

Note

The following option for the setpoint value of Peltier B is only available if a dual Peltier is installed.

Option	Description
Peltier B: Automatic setpoint	Upon activation an automatically calculated setpoint value is used for Peltier B. This is the average of the material inlet temperature and applicator setpoint value. If the automatic setpoint value for Peltier B is deactivated, a manual setpoint value can be set in the control circuit for Peltier B (see *on page 347*) via the parameter "Temperature setpoint [°C]" (see *on page 348*).

Note

The setpoint value of Peltier B should (generally) be between the material inlet temperature and the applicator setpoint value.

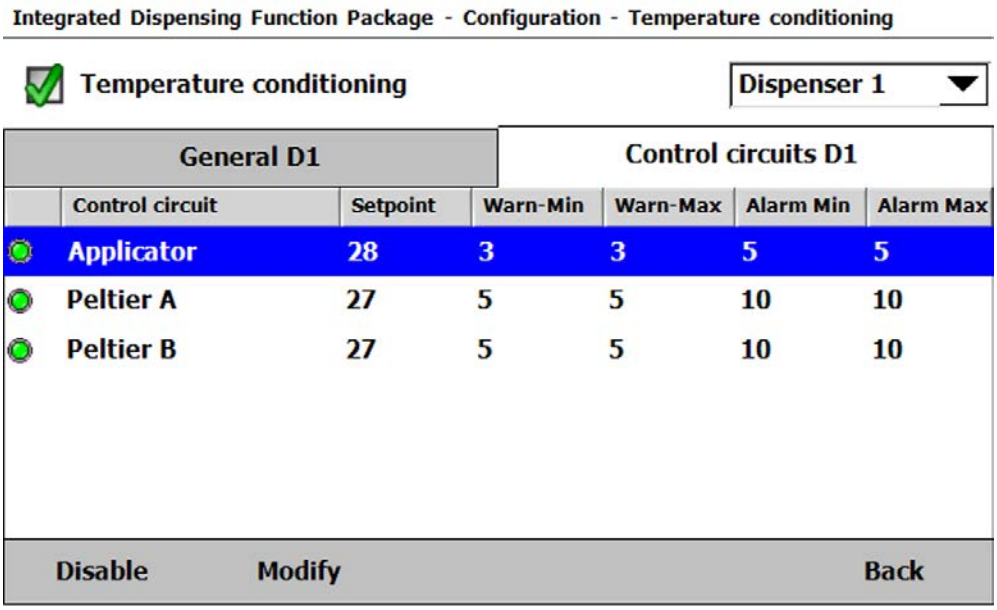
Modify: Allows the configuration of a parameter marked in the list.

Accept: All configuration changes must be saved with "Accept" before exiting the window. In addition to the transmission of the modified data to the robot controller, the corresponding user modules are saved on the robot flash disk.

Continues on next page

Control circuits

Configuration - Peltier - Control circuits



xx2000000825

Under the tab "Control circuits", the applicator temperature control circuit and the existing Peltier temperature control circuits, as well as their key parameters, are displayed.

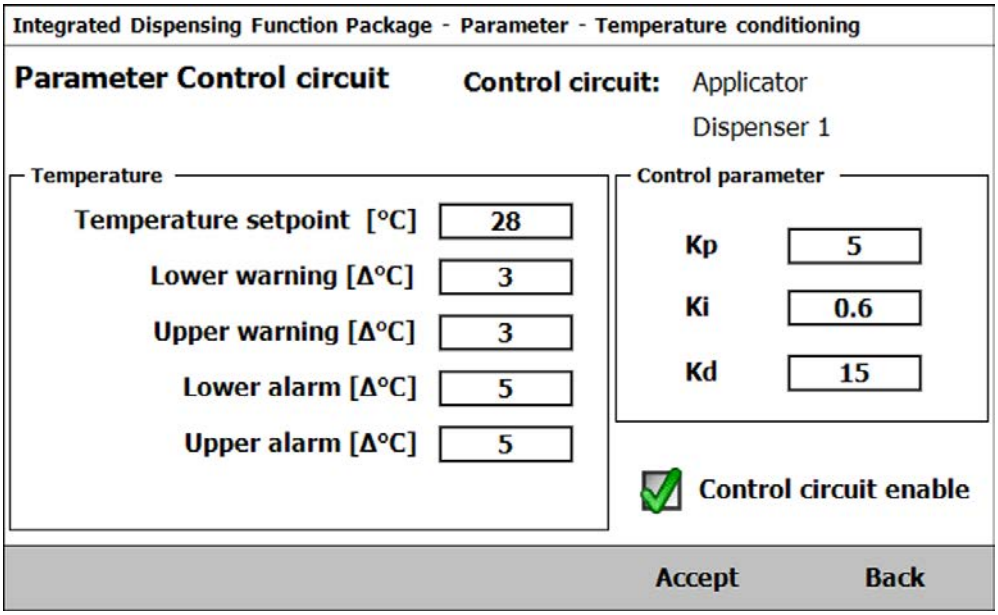
The marked control circuits can be disabled or enabled via "Disable"/"Enable".

Symbol	Activate/Deactivate
 xx2000000840	Green: The control circuit is enabled.
 xx2000000795	Gray: The control circuit is disabled.

Continues on next page

Using the "Modify" button the parameter view for the marked control circuit is opened.

Configuration - Peltier - Control circuits - Change parameters



xx2000000826

If the green checkmark in the checkbox "Control circuit enable" is set, the control circuit is activated.

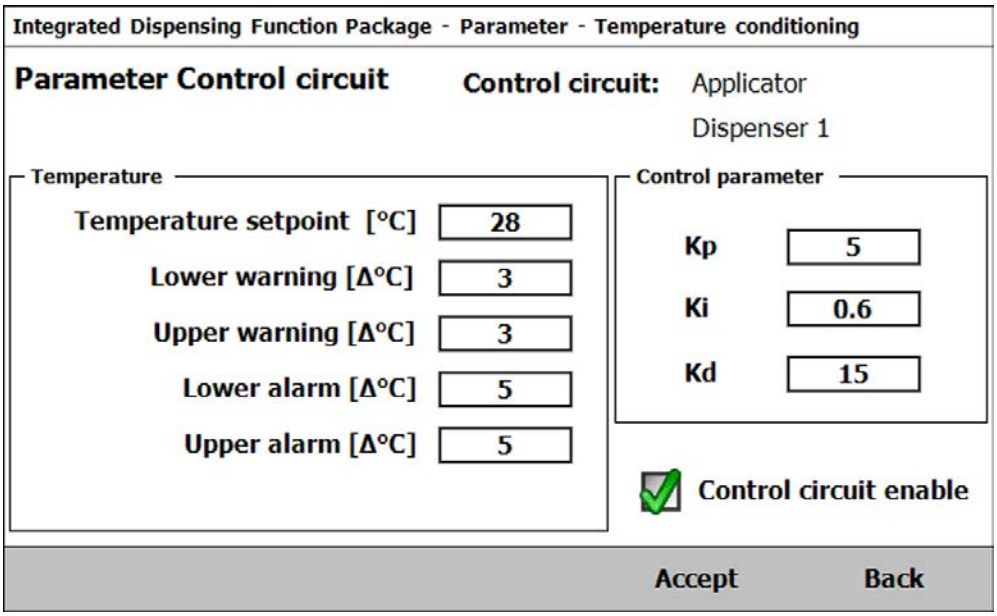
The modified parameters are updated by clicking on "Accept". In addition to the transmission of the modified data to the robot controller, the corresponding user modules are saved on the robot flash disk.

There is the option of running a dual Peltier in single operation. However, in this case only the BPeltier can be shut off. The A-Peltier further tempers the material, but the total output of the tempering is halved. For example, this can be used with a Peltier fault to bridge the period until the Peltier can be replaced. In order to deactivate an A-Peltier, the A-Peltier is connected with the cable for the B-Peltier, the B-Peltier with the cable for the A-Peltier. Now the B-Peltier can be deactivated in the configuration.

Temperature	Description
Temperature setpoint [°C]	Target temperature of control circuit. This can only be edited for applicator control circuits. Editing is blocked for Peltier control circuits. The setpoint temperature is automatically calculated by the robot due to the cascaded arrangement.
Lower warning [Δ °C]	A warning message is issued if the temperature falls below the specified temperature limit.
Upper warning [Δ °C]	A warning message is issued if the temperature exceeds the specified temperature limit.
Lower alarm [Δ °C]	An error message is issued if the temperature falls below the specified temperature limit.
Upper alarm [Δ °C]	An error message is issued if the temperature exceeds the specified temperature limit.

Continues on next page

Example for temperature values:



xx2000000826

For the values set in the example, a warning is triggered as soon as the temperature is below 25 °C or above 31 °C. An alarm is triggered if the temperature is below 23 °C or above 33 °C.

Control parameters	Description
Kp	Proportional gain of control loop.
Ki	Integral gain of control loop.
Kd	Derivative gain of control loop.

Note

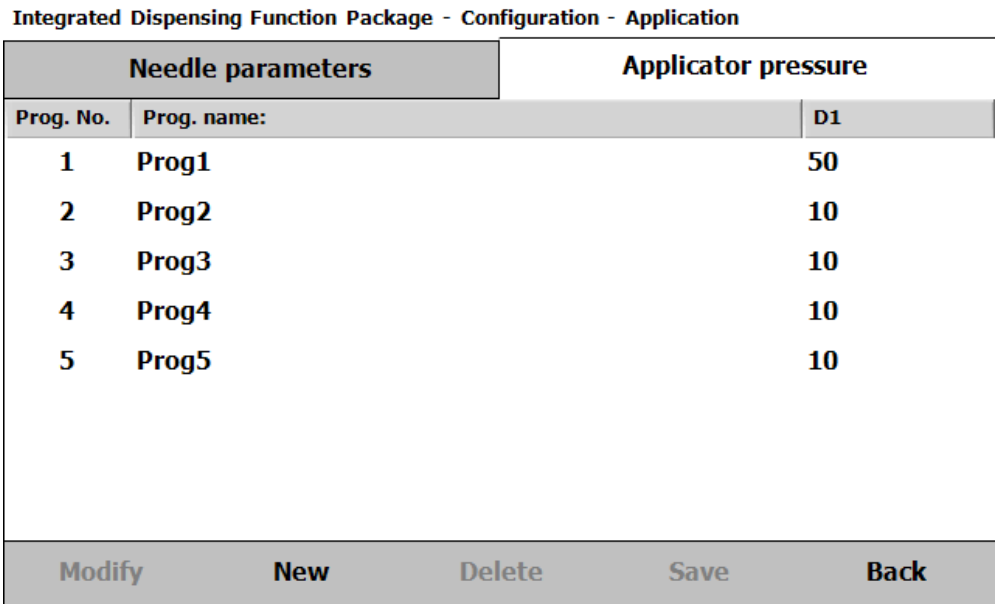
The control parameters should only be adapted by trained personnel.

Back: Return to the process overview via the menu item "Back".

7.6.5 Configuration - Application

The prepressure is set for the first bead at the start of an application program. This prepressure can be preset in Configuration - Application under the tab "Applicator pressure" for every program and every available dispenser.

Configuration - Application - Applicator pressure



xx2000000827

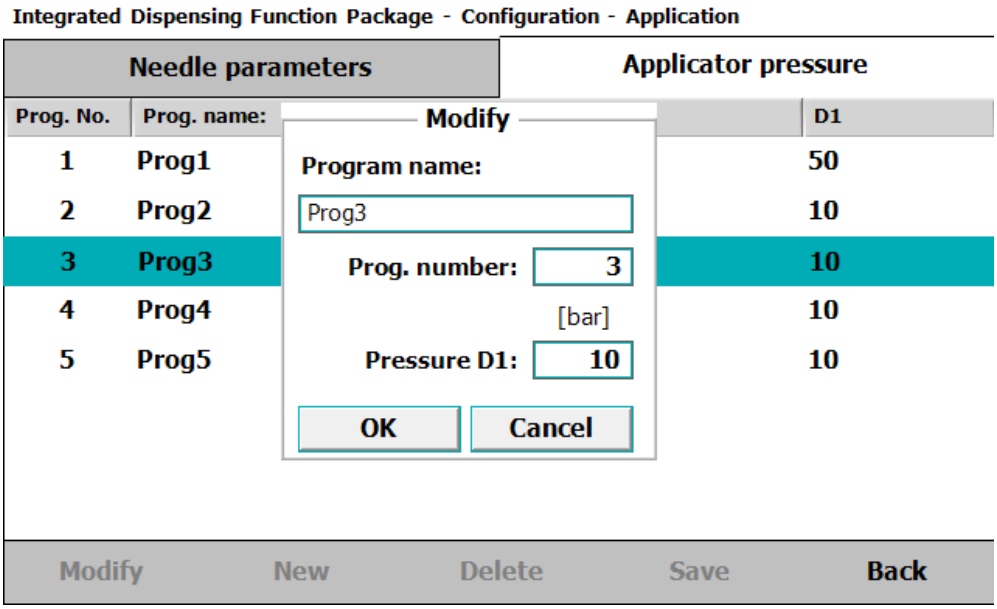
The content of the file segments.ndx is shown. It is located in the directory HOME\Index and can also be edited externally directly with a program editor and saved on the robot via a FTP program.

Note

The file segments.ndx is used if all application and service programs are saved in the folder HOME/programs and the programs are selected using a program number.

Continues on next page

Configuration - Prepressure



xx2000000828

A small window is opened via the menu items "Modify" or "New".

The program number and name, as well as the prepressures for dispensers 1 - 3, can be modified.

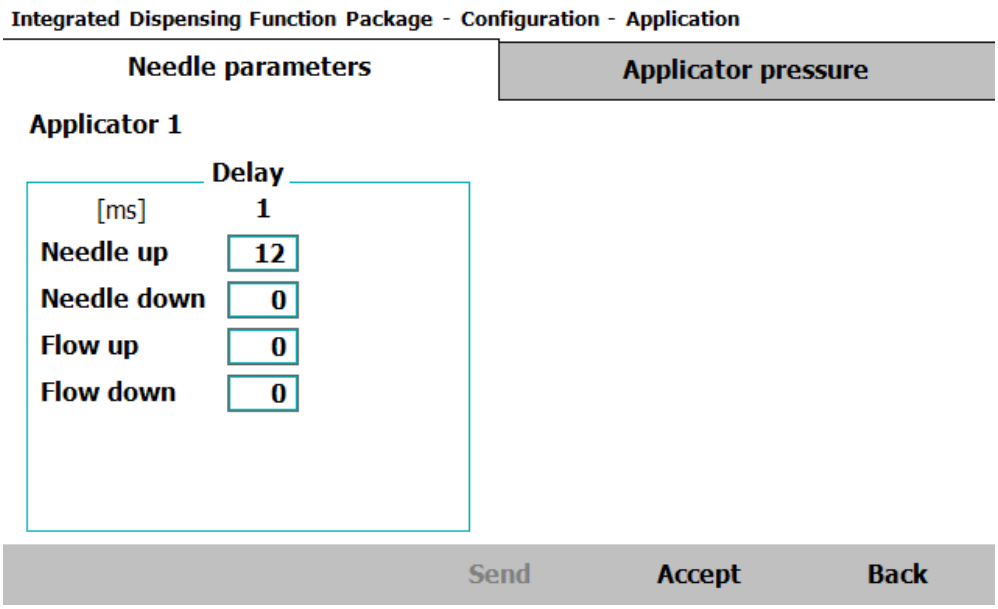
Note

If in a system with several dispensers only one of the dispensers is used in an application program, the values for the dispensers not used must be set to "0".

Continues on next page

Accept: Saves the values shown to the file segments.ndx in the directory HOME\programs\ on the robot flash disk.

Configuration - Application - Application delays



xx2000000829

The delays for the needle and flow are saved as RAPID variables in the robot controller and are transferred to the IPS at the start of the system and when switching between two needles.

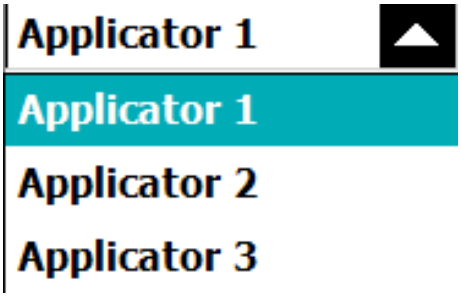
All values have the initial value "0" after a new system has been booted. The desired delays can be entered in milliseconds by clicking on the corresponding field.

Accept: The "Accept" button must be pressed to save the values to the controller. In addition to the transmission of the modified data to the robot controller, the corresponding user modules are saved on the robot flash disk.

Send: A manual transmission to the IPS (click on Send) is required to use the values for the next application program. This function is only allowed in "Ready" mode of the dispenser.

If more than one dispenser is installed, the operator can switch between the applicators using a dropdown list:

Applicator selection



xx2000000830

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Note

A change to the delays in the IPS is not allowed or has no permanent effect.

Tip

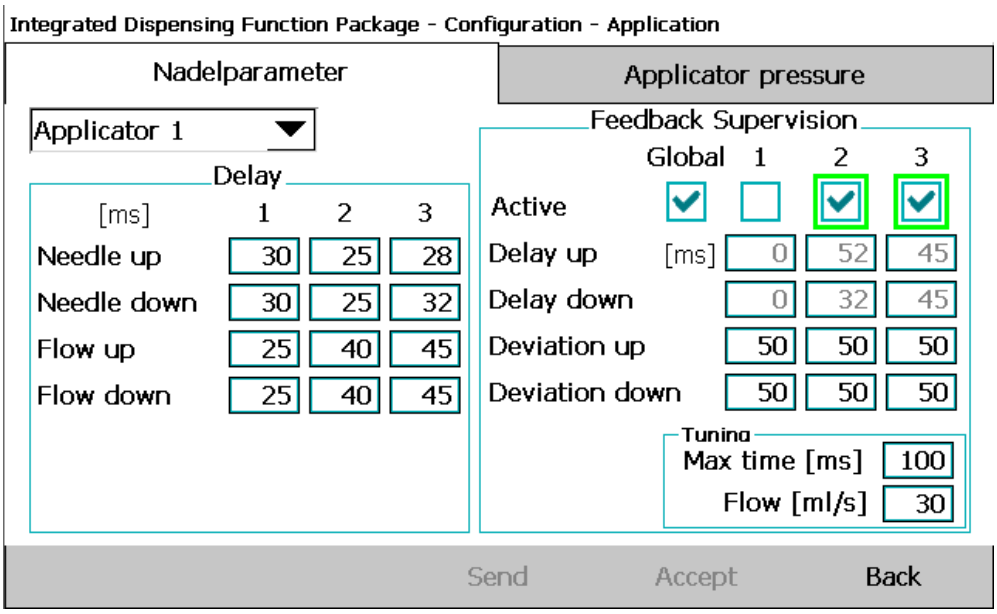
Further details on the delays for the needle and flow are provided in *Bead optimization on page 499*.

Back: Return to the process overview via the menu item "Back".

Parameterization Needle Supervision

The parameterization can be called up under the menu item IDFP - Configuration - Application:

Parameterization



xx2000000939

Explanation of the individual parameters

Parameter	Function	Min.	Max.	Unit
Delay up	determined delay switch-on	-	-	ms
Delay down	determined delay switch-off	-	-	ms
Deviation up	permitted deviation switch-on	0	50	ms
Deviation down	permitted deviation switch-off	0	50	ms
Active global	switch monitoring active global	0	1	
Active 1...3	switch monitoring active needle x	0	1	
Max. time	allowed response time for tuning	50	150	ms
Flow	material flow during tuning	0	max. flow	ml/s

Continues on next page

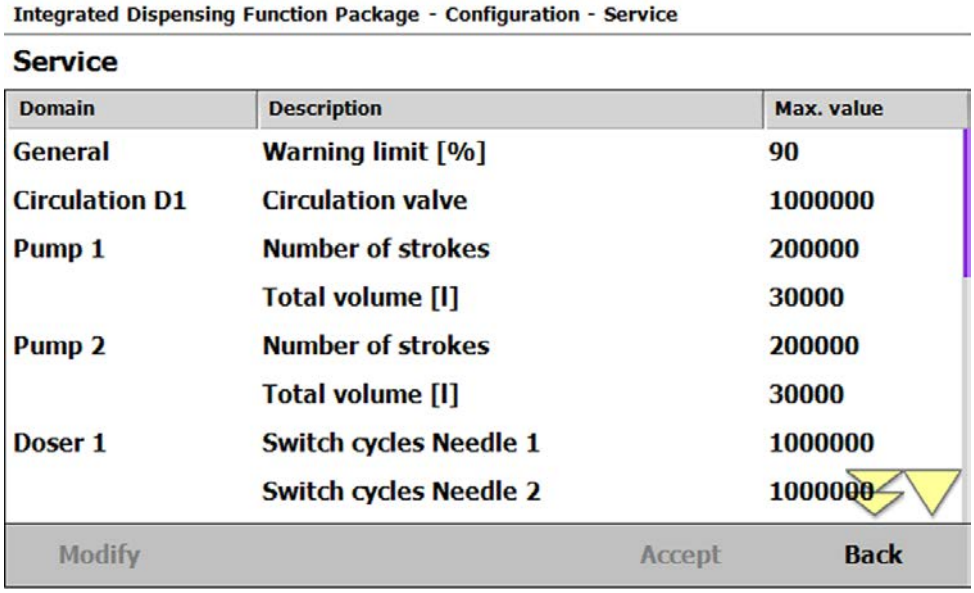
The parameters are automatically stored in the corresponding module on the robot flash disk after the tuning has been completed.

7.6.6 Configuration - Service

Note

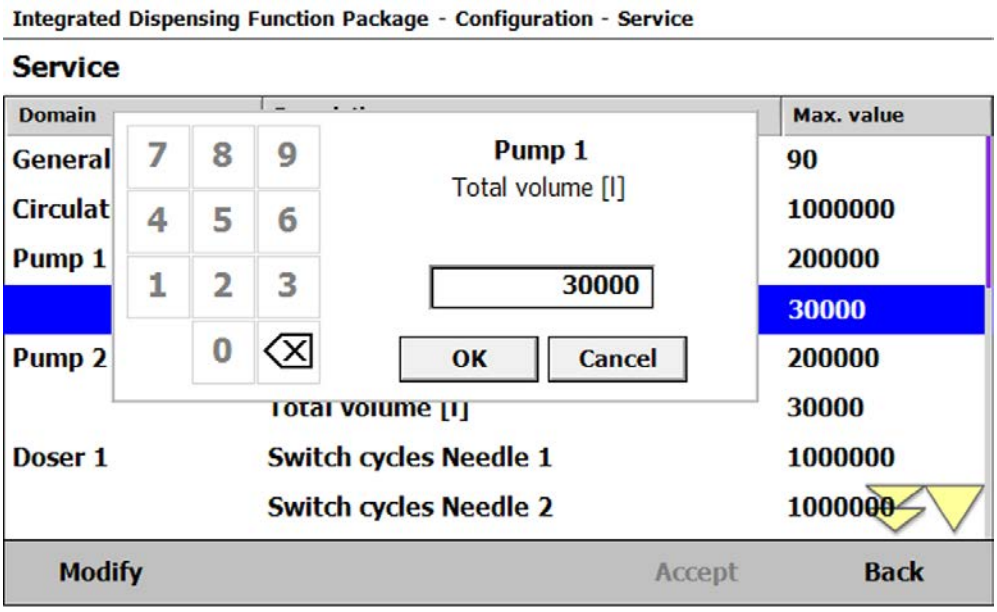
The current status of the parameters configured here can be viewed in the statistics under Service (see Service data).

Configuration - Service



xx2000000831

Configuration - Service - Change



xx2000000832

Continues on next page

The settings window is displayed by clicking on the menu item "Modify" or double clicking on a selected parameter. By clicking on "OK" the new value is entered in the parameter list, but not saved. The modified parameter is displayed in blue and only saved permanently by clicking on "Accept". In addition to the transmission of the modified data to the robot controller, the corresponding user modules are also saved on the robot flash disk.

General service limits

The respective maximum values for the specified parameters are set here.

Parameter - Warning limit [%]

A warning is issued if the specified maximum values reach the limits set here. An error is output when the maximum value is reached.

Circulation service limits

Note

This entry is only available with installed circulation.

The respective maximum values for the specified parameters are set here.

Pump service limits

Note

This entry is not available for external material supply.

The respective maximum values for the specified pump parameters are set here.

Doser service limits

The respective maximum values for the specified parameters of the doser are set here.

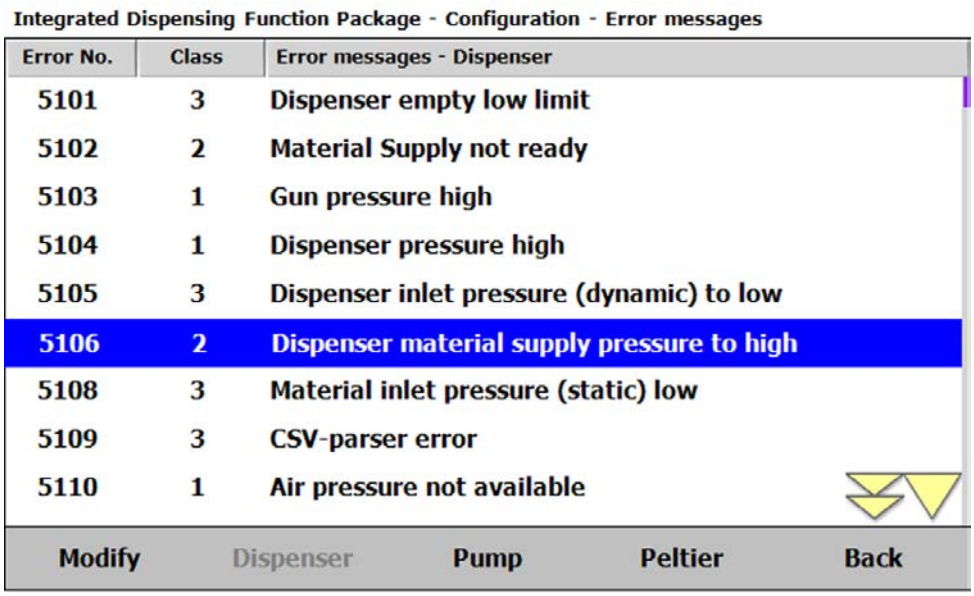
7.6.7 Configuration - Error messages

The window "Configuration - Error messages" shows a list of all error messages present in the system. It is only shown when **bHideErrConfig** is set to **FALSE**. The messages are divided into three subgroups: **Dispenser**, **Pump** and **Heating** or **Peltier**.

Note

A list of all errors is provided in the AppendixB Error messages.

Configuration - Error messages



xx2000000833

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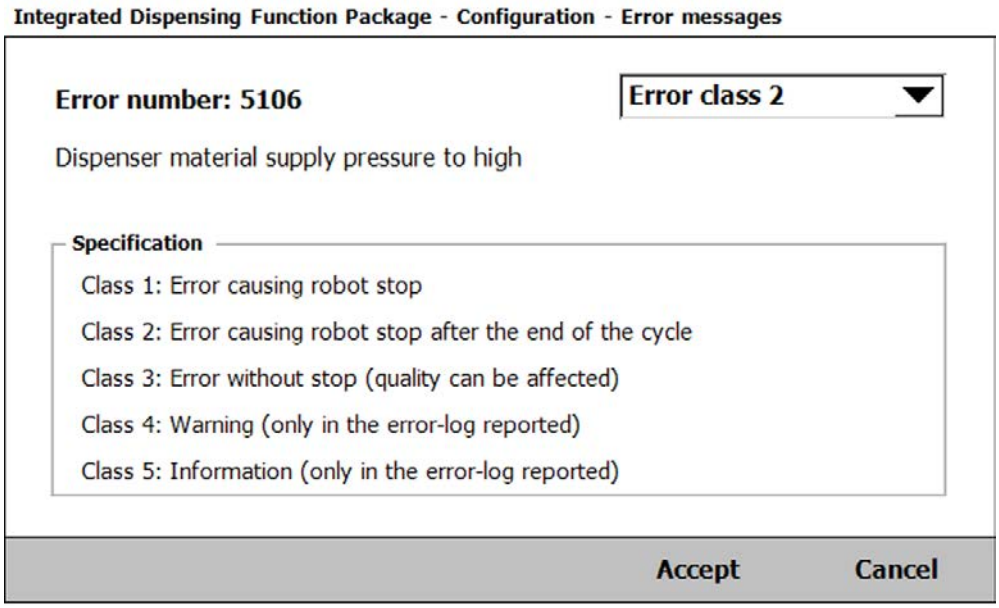
The following window with a selection of the possible error classes appears upon clicking on the menu item "Modify".

Configuration - Error messages - Modify

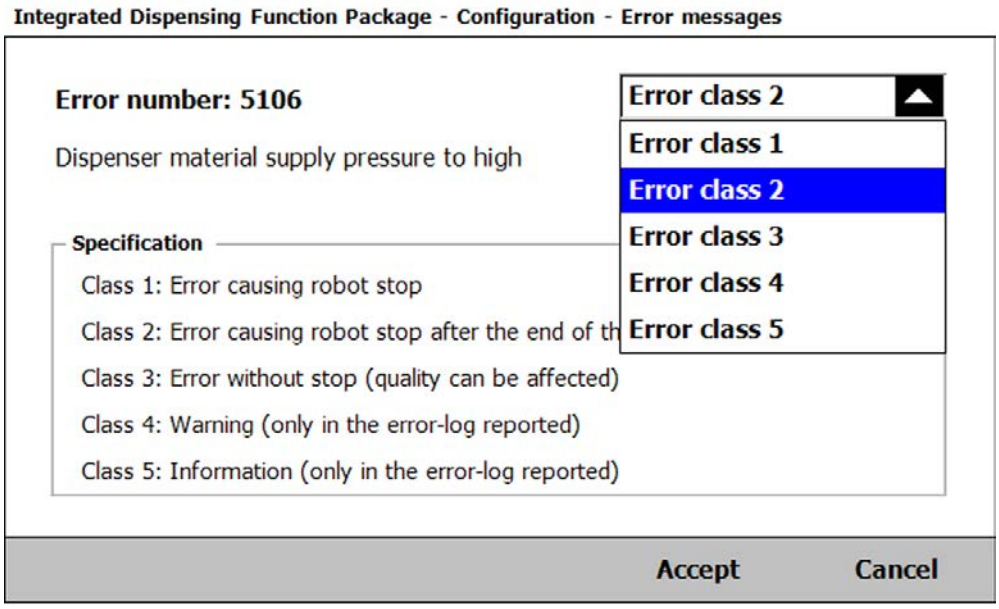


xx2000000834

The preset values can be adapted to the respective system for the specific project. How the system should behave in the event of an error must be defined in advance.

Errors can only be changed to safety class or lower. e.g. an error with safety class 3 can only be set to error level 1-3.

Configuration - Error messages - Modify



xx2000000835

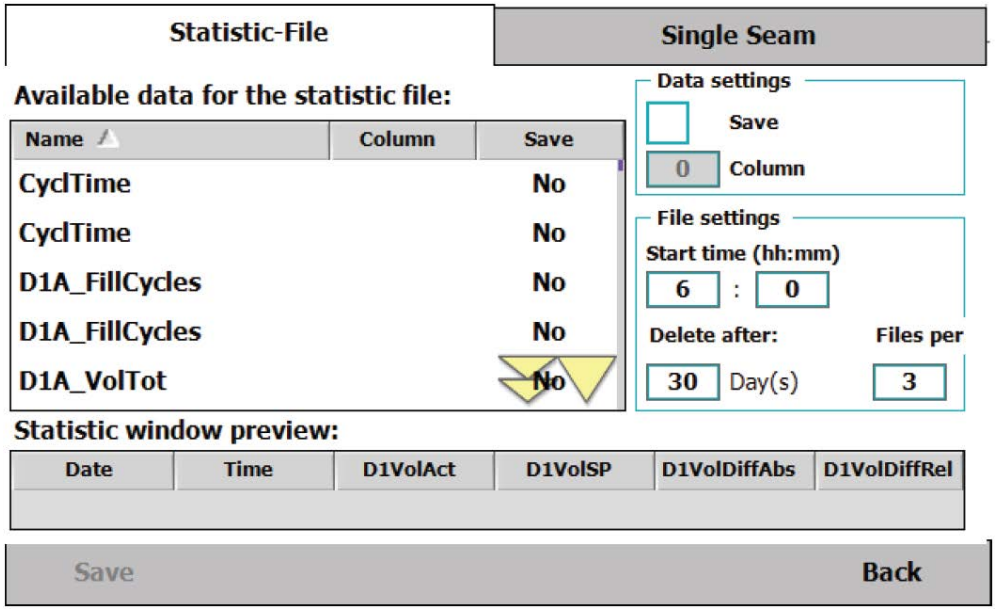
Error 5106 could be triggered for example by a blocked needle. If this occurs during the application of a component, the robot can either stop directly (error class 1) or

Continues on next page

complete the rest of the application program, but not start a new cycle (error class 2).

7.6.8 Configuration - Statistic

Configuration - Statistic

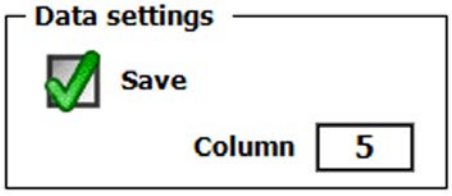


xx2000000836

With installed statistic functionality, the robot records select process data and saves this data as a csv file in the directory HOME\Statistic\User on the flash disk. The layout of this csv statistics file can be configured specific to the user in the window "Configuration - Statistic".

All values available in the system are shown in the list "Available data for the statistic file" and these values can be selected for the statistic. The configured position of the value and whether the value is currently recorded in the statistic file can also be viewed under "Column" and "Save".

Configuration - Statistic: Data settings



xx2000000837

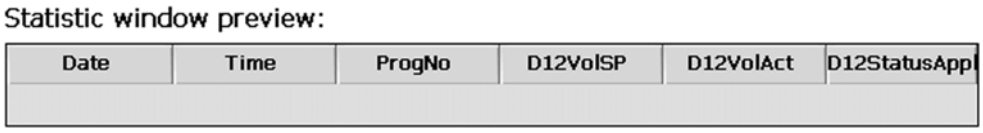
If an entry is selected in the list, editing is possible in the data settings area.

Save: Is activated when the selected entry is to be recorded by the statistics file.

Continues on next page

Column: Defines the position of the entry in the statistics file (csv file).

Configuration - Statistic: Preview

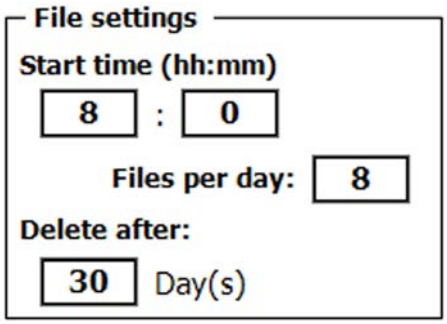


xx2000000841

Under "Statistic window preview" the first six columns configured for the statistics file are displayed. These first six columns of the created csv statistics files can be viewed in the window Process - Protocol - Statistic (see *Configuration - Statistic on page 360*) (The other recorded values are not shown here, but are still available in the csv file).

The preview is automatically updated when the configuration is changed.

Configuration - Statistics: File settings



xx2000000838

In the area "File settings" it can be determined how often a new csv file should be created and after what period the oldest file should be deleted from the memory.

Start time: Defines the time at which a new day begins for recording the statistics.

Files per day: Defines into how many individual files the statistics compiled in a day should be divided. This avoids an excessive number of files.

Delete after: Defines the number of days after which the created files should be deleted again from the flash disk.

> **Note**
>
> In order to avoid memory problems, the number of days after which the statistics files are deleted should not be too high.

Save: All changes to the statistics configuration must be saved before exiting the configuration window. In addition to the transmission of the modified data to the robot controller, the corresponding user modules are saved on the robot flash disk.

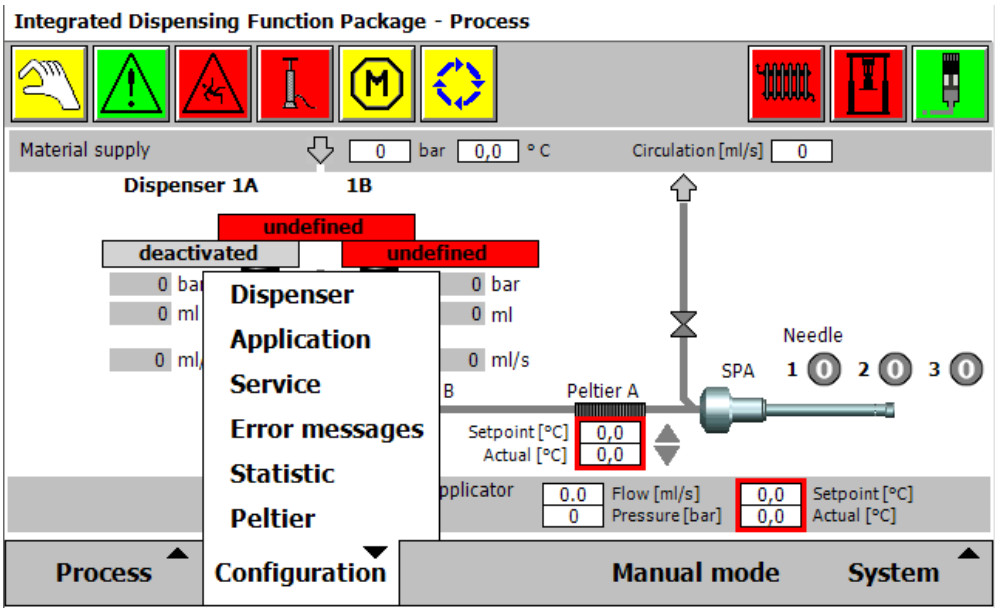
Back: Return to the process overview via the menu item "Back".

Continues on next page

7.6.8 Configuration - Statistic
Continued

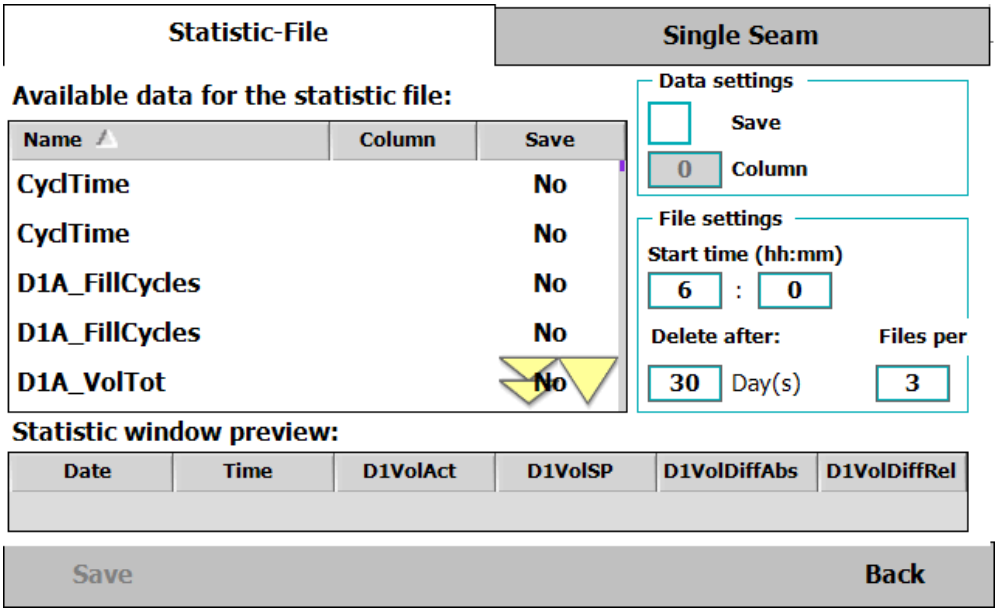
Single Seam Supervision

Single Seam Supervision is operated from the TPU "Statistics" screen in the "IDFP" window, the explanation of the individual parameters is given in the parameterization section.



xx2000000932

Single seam selection



xx2000000933

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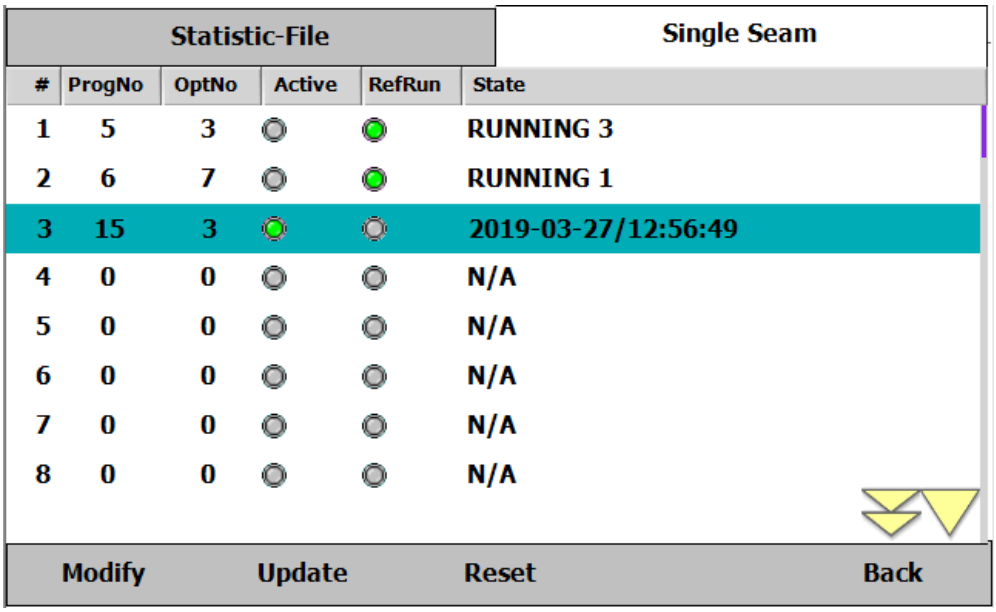
Line selection



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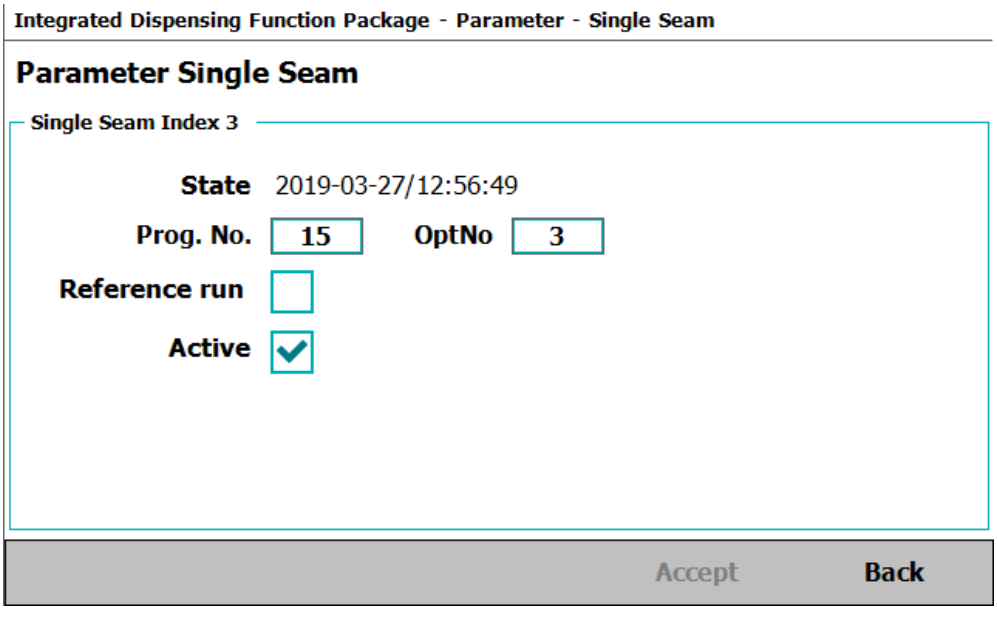
Editing the individual parameters - program / option / reference run / active

CAUTION

If the reference run is restarted with an existing reference, the status remains until the start of the first measurement!



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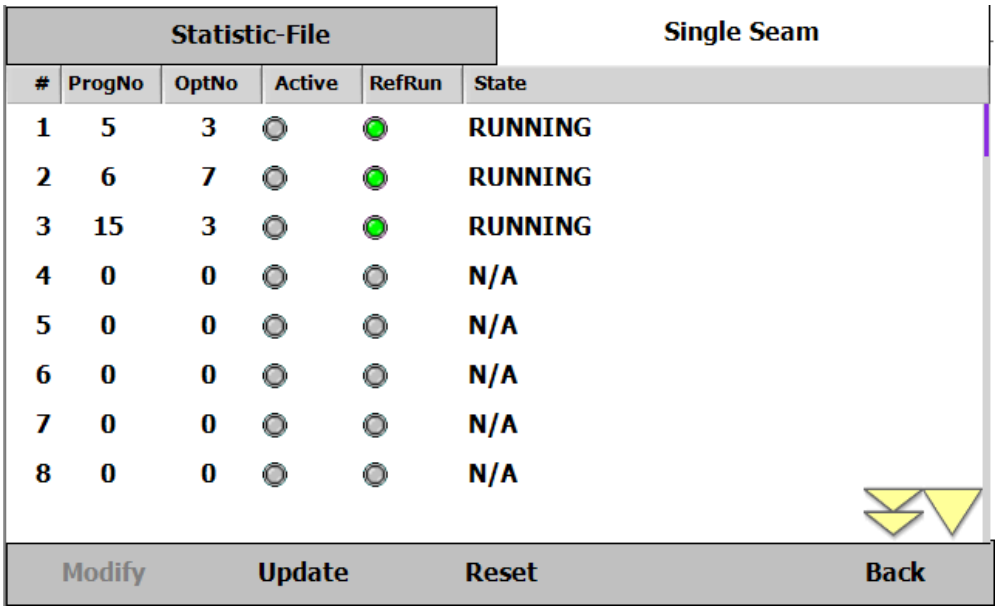
7.6.8 Configuration - Statistic
Continued

Editing of all parameters - program / option / reference run / restart



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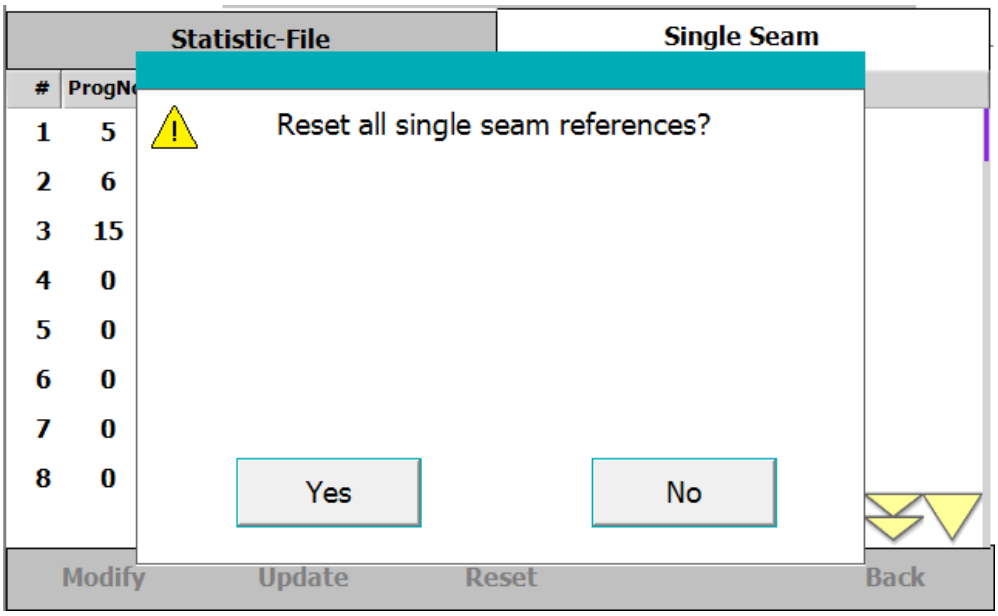
Editing all parameters - program / option / reference run / restart Confirm



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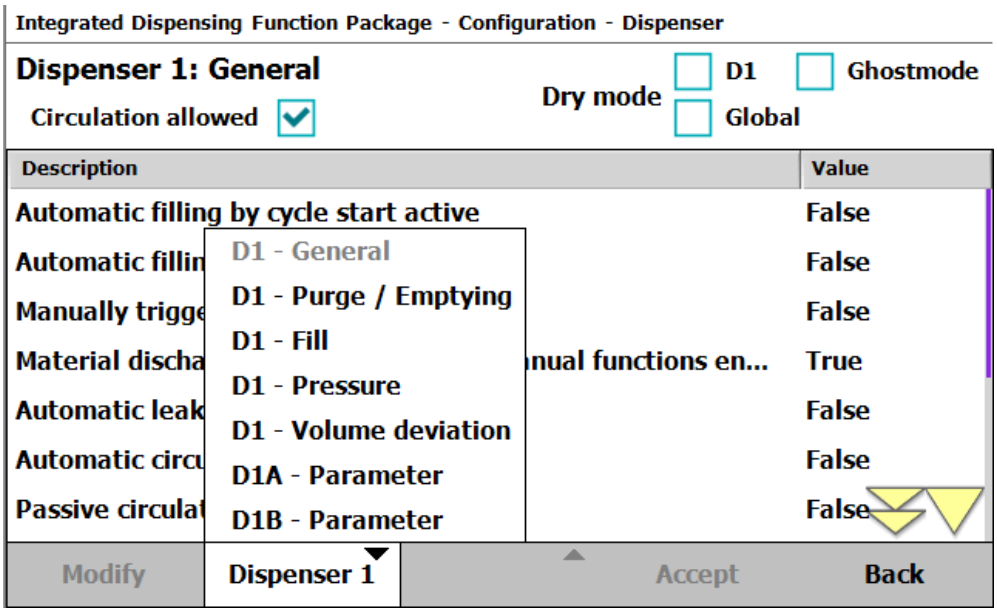
Edit the limit values and switch the function on / off in menu "Configuration - Dispenser - Volume deviation"



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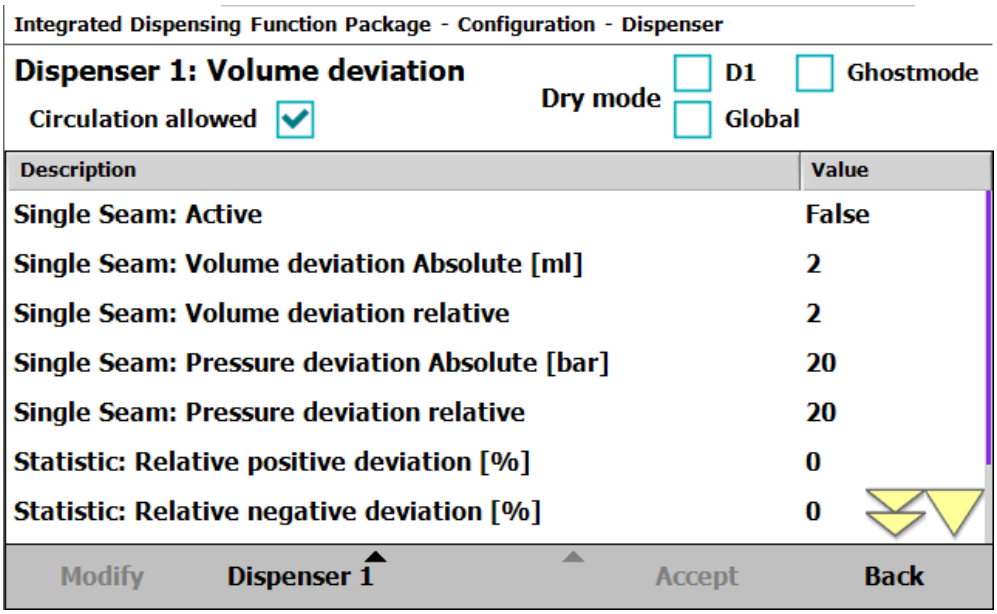

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8 Programming and parameterization

WARNING

Hazard due to moving parts of the robot with application equipment.

Possibility of serious, potentially life-threatening physical injury due to crushing of body parts.

- Only stay in the hazard area for as long as absolutely necessary.
- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.
- Secure the entrance to the system against unexpected closure. Attach a maintenance sign to the access door where it can be easily seen.

WARNING

Hazard due to high pressure.

Possibility of serious, potentially life-threatening injury due to the penetration of pressurised medium into the body.

- Before starting work, perform a visual inspection of any pressurised lines and containers.

WARNING

Hazard due to untidy work, rough, slippery and uneven surfaces.

Possibility of serious, potentially life-threatening injury due to slipping, tripping and falling.

- Ensure that you work tidily during all adjusting and programming work, so that no material residues are left on the equipment parts.
- Do not leave any objects in the hazard area.
- Remove dirt deposits without leaving any residue.

WARNING

Hazard due to moving parts of the robot with application equipment

Possibility of serious, potentially life-threatening injury due to trapping of clothing, hair, limbs.

- Observe the manufacturer's specifications and instructions at all times.
- Secure the entrance to the system against unexpected closure. Attach a maintenance sign to the access door where it can be easily seen.

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Continued

WARNING

Hazard due to flammable materials.

Possibility of serious, potentially life-threatening physical injury due to naked flames.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Risk of poisoning, acid burns, genetic modification or allergic reaction due to vapours and liquids.

Serious, potentially life-threatening physical injuries due to the absorption of hazardous substances into the body.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Hazard due to operating errors.

Serious, potentially life-threatening physical injuries due to incorrect input of position data at a superordinate control system or on the robot control system.

- Only stay in the hazard area for as long as absolutely necessary.
- Operating the application system must be performed by trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.

WARNING

Hazards due to software error.

Serious, potentially life-threatening physical injuries due to incorrect or deficient data transmission between a superordinate control system and the robot control system or other problems in the robot controller.

- Only stay in the hazard area for as long as absolutely necessary.
- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.

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WARNING

Hazard due to delayed shut-down.

Serious to potentially life-threatening physical injuries due to delayed shut down, also during a fault or during an emergency.

- Observe the notes on shutting the system down in chapter 6.3 Special function "Shutdown" of this application manual.

CAUTION

Risk of burns.

Possibility of skin injuries due to burns from hot surfaces of the dispenser.

- Note the temperature displays on the surface of the dispenser.
- Note the temperature displays on the programming device.
- Avoid body contact with hot surfaces.

Tip

The robot is equipped with the DispenseWare software option (part of the robot operating system).

This option is described in the "RAPID ProcessWare/Dispense-Ware" manual. The manual is enclosed in the documentation for the application robot.

Note

Not all DispenseWare parameters are used.

Other functions, such as the Dispense Restart function can be optionally set up specific to the project.

The settings and configurations of the DispenseWare, which are required for the operation of an Integrated Dispensing Function Package, are implemented and tested during prototyping and are specific to the project.

For example, the restart function can belong to DispenseWare.

Note

For information on DispenseWare see: Dispense Application Manual.

The desired volume flow [ml/s] or the pressure [bar] for each application section is specified by the customer.

The regulator properties are determined during the prototyping stage, appropriate to the application material and the selected processes and nozzle types. The amplification properties of the regulator are fine tuned/optimized on site.

Continues on next page

8.1 IPS

Note

The IPS (Integrated Process System) is the software that is installed and runs on the PIB and controls parts of the IDFP.

The IPS is programmed and configured automatically by the installation of the robot, manual action is not required.

8.2 IPS and DispenseWare

In comparison to the simple use of the DispenseWare options, various changes in the structure of an application program are possible with the combined use of IPS and DispenseWare in the Integrated Dispensing Function Package.

The use of the Integrated Dispensing Function Package is based on the programming of application programs with DispenseWare commands (see documentation on DispenseWare).

The key differences are described below.

Data type equipdata (DispenseWare)

The parameters for the various types of equipment are defined in the equipdata. If multiple data sets are assigned to one dispenser, e.g. in a 2K system, they can be set in the bead data as required.

The default on system installation depends on the dispenser combination. The default assignment of the equipdata to the corresponding dispensers is shown in the following table.

Dispenser combination	Equipment 1	Equipment 2	Equipment 3	Equipment 4
D1	D1	D1	D1	D1
D1/D2	D1	D2	D1	D2
D1/D2/D3	D1	D2	D3	D1
D1/D2/D3/D4	D1	D2	D3	D4
D1/D2/D34 (2K)	D1	D2	2K D34	2K D34
D12 (2K)	2K D12	2K D12	2K D12	2K D12
D12 (2K)/D3	2K D12	2K D12	D3	D3
D12 (2K)/D3/D4	2K D12	2K D12	D3	D4
D12 (2K)/D34 (2K)	2K D12	2K D12	2K D34	2K D34

If the default assignment of equipdata to dispensers is changed, the assignment must be changed corresponding to the RobotWare.

With RobotWare 6 systems the equipment is assigned to the dispensers in the file PROC.cfg, in RobotWare 5.X in the routine dp_set_int_data (DPUser.sys).

Structure of the equipdata data type with the use of DispenseWare.

The red and italic data are **not relevant** when using the combination of IDPF. Parameters in bold have been added by the IDFP and are not in the DispenseWare documentation.

```
string info;
num on_time;
num off_time;
num switch_time
num ref_speed;
num acc_max;
num decel_max;
```

Continues on next page

```
num fl1_on_time;
num fl1_off_time;
num fl1_inc_time;
num fl1_dec_time;
num fl1_delay;
num fl1_corr;
num fl2_on_time;
num fl2_off_time;
num fl2_inc_time;
num fl2_dec_time;
num fl2_delay;
num fl2_corr;
```

Tip

The meaning of the data not in bold can be found in the manual *IRC5 - Application Manuals - Gluing/Application - Dispense*.

The "switch_time" parameter defines the time of execution of a trigger function before execution of a Disp instruction. It is specified in seconds, a value of 0.02 corresponds to 20 ms. The IDFP uses this function from IDFP Version 6.07.1810.00. A check is made here for Dispenser 1 whether the currently active nozzle can be used for the application. This check takes place in DPUser. From IDFP Version 6.07.1810.00 this function can be used experimentally for switching the needles in Dispenser 1, see BeadData gun_no.

Note

The data marked in red is only saved in the IPS in the combined system (DispenseWare + IPS) and adjusted via the user interface.

The setting and adjustment of the IPS delays (flow and needle) can only be performed via the user interface (see *Configuration - Application on page 350*). The setting and adjustment of these values in the data type equipdata by DispenseWare leads to unexpected and uncontrollable behavior of the system during the application. The setting and adjustment of needle and flow delays via RobView is not possible. The data is overwritten at the start of an application by the delays saved in the user interface.

Data type beaddata (DispenseWare)

Structure of the data type beaddata with use of DispenseWare.

The data marked in red is not relevant for the combined use of IPS and DispenseWare.

```
string info;
num flow1;
num flow2;
```

Continues on next page

```
num flow1_type;
num flow2_type;
num equip_no;
num gun_no;
```

The variable equip_no specifies the current dispenser to be used.

The variable gun_no must be equal to the nozzle used on the track when using Flow Overrides.

Otherwise the Flow Overrides will not function.

The needles at the bead must also be set with the instructions SetAppData, MoveChangeApp or MoveChangeNeedle.

8.3 Programming of application movements

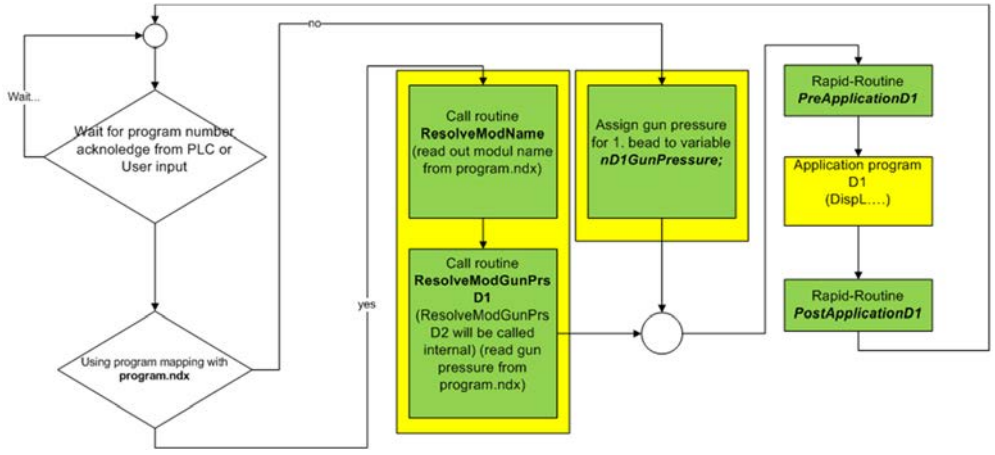
An application program for the ABB Integrated Dispensing Function Package is created largely in the same way as the creation of an application program with ABB DispenseWare e.g. Instruction "DispL" (see manual *"RAPID ProcessWare/Dispense-Ware"*).

There are a few special commands, which have been added due to the doser technology and must be considered during the creation of the application program. Detailed information is provided in a training course by ABB Automation GmbH.

8.4 Structure of an application program

A main program is used to transfer a program number to the robot. The transfer is done via a PLC, an external control system or manual operator entry. The robot needs a program number (and possibly a start signal) in order to be able to start the corresponding application program. In order to put the dispenser in application mode, the process described below must be observed when setting up a main program.

Flow chart for main program (Task: T_ROB1)



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Note

The selection of the routine PreApplicationDX and the processing of the application program and the routine PostApplicationDX are implemented for all dosers. This is effective for all dosers either in parallel or consecutively.

Continues on next page

8.4.1 Application program without standard main program

If no standard main program is selected during the creation of the robot system, the application program can be set up manually. The rules described below must be observed.

In general, the structure as described in the flow chart must be observed for the layout of the mainprogram (see *on page 375*).

The dispenser-specific RAPID commands are listed below in generalized form. The Pre-ApplicationDX command is thus applicable for all dispensers 1-4 with the X replaced by the dispenser number.

Tip

In the case of a 2K system some special features for the application mode must be observed, see *Appendices on page 611*, 2K systems.

Starting the application cycle

The RAPID routine **PreApplicationD1** automatically ends the circulation mode (if there is a circulation) and sets the Dispenser D1 to application mode. This means the dispenser is ready to apply beads to a part by using DispenseWare commands (DispL and DispC).

Following the start of the application mode the prepressure in the dispenser is automatically set for the first bead. The height of the prepressure is based on the value, which is specified in the numerical RAPID variables **nD1GunPressure** at the time the routine **PreApplicationD1** is selected. The RAPID variable must therefore include the value of the initial prepressure before the RAPID routine **PreApplicationD1** is processed.

If there are multiple dispensers available with the supplied system, these are set to application mode the same way as for Dispenser D1 with the routines **PreApplicationD2** or **PreApplicationD3** and the corresponding prepressures are specified in the variables **nD2GunPressure** and **nD3GunPressure.**

In the case of a dual doser, both dosers D1A and D1B (or D2A and D2B, D3A and D3B) are automatically set to application mode after the selection of **PreApplicationD1** (or **PreApplicationD2**, **PreApplicationD3**).

There are various options for assigning the application program and the relevant prepressure for the first bead. The following three methods are recommended:

Method 1

The program number is linked to the prepressure in an index file. Before the selection of the routine **PreApplicationD1** (or **PreApplicationD2**, **PreApplicationD3**), the index file must be searched for the program number, the assigned prepressure read out and the variables **nD1GunPressure** (or **nD2GunPressure**, **nD3GunPressure**) allocated. There is also the option to transfer the program numbers and prepressure by the menu in the user interface (see *Configuration - Application on page 350*).

Method 2

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The program number and the assigned prepressure are saved in a RAPID array. Before the selection of the routine **PreApplicationD1** (or **PreApplicationD2**, **PreApplicationD3**) the array must be searched for the program number, the assigned prepressure read and the variables **nD1GunPressure** (or **nD2GunPressure**, **nD3GunPressure**) assigned.

Method 3

The application program is dynamically loaded to the RAPID working memory after the transfer of the program number and before the selection of the routine **PreApplicationD1** (or **PreApplicationD2**, **PreApplicationD3**). In the application program there is a routine which is processed before the application program and before the implementation of the routines **PreApplicationD1** (or **PreApplicationD2**, **PreApplicationD3**) and transfers the prepressure for the first bead to the RAPID variable **nD1GunPressure** (or **nD2GunPressure**, **nD3GunPressure**).

Note

Other options can be developed accordingly.

Ending the application cycle

At the end of an application cycle the dispenser is put into standby mode. In this mode it is possible

to perform manual functions with the dispenser. An application using DispenseWare commands is not possible in this mode.

In order to end an application cycle of the corresponding dispenser, the RAPID routine **PostApplicationD1** (or **PostApplicationD2**, **PostApplicationD3**) must be performed (see *on page 375*). Then the application cycle can begin from the start.

The circulation is switched on if it is available and is activated and the switch-on delay of the circulation has lapsed.

Applicators with several dispensers

If there are several dispensers installed in a system (for e.g. D1A and D2A), they can be put into application mode and standby mode independent of each other.

Each dispenser can be controlled subject to the specifications of the following process.

1. **PreApplicationDX**
2. Application with Dispenser X
3. **PostApplicationDX**

For example, dispenser 2 can also be set to application mode whether dispenser 1 is not in application mode or is in application mode. This applies for any combination of dispensers.

Tip

Some special features for application mode must be noted for a 2K system, see *Appendices on page 611*, 2K systems.

Configuring an application

Continues on next page

8.4.1 Application program without standard main program
Continued

There is the option to configure the application via the user interface (program number and prepressures). In order to be able to use the configuration of the program number and the prepressure at the user interface (*FlexPendant - Configuration - Application*), the following conditions must be met:

- In the directory programs on the Home drive of the robot controller is the file segments.ndx. It must be created and used according to the description in *Index file segments.ndx on page 384*.
- In the directory programs on the Home drive of the robot controller the corresponding programs (application programs) are stored as a module.
- The application programs contain a main routine with the name:

  PROC main[Modulname] ()

  ENDPROC
- The module name exists in the file segments.ndx under a corresponding program number.

  (Example: In the index file segments.ndx there is an entry with the name PartA. A module with the name PartA.mod must exist in the folder !program. This contains a routine with the name PROC mainPartA()….)

The main program procedure must include the following routine selections in the correct sequence:

1. Transfer of program number.
2. Selection of the routine **ResolveModName**. This routine assigns the module name to the transferred program number, which was specified in the file segments.ndx under the transferred program number.
3. Selection of the routine **ResolveModGunPrsD1**. This routine assigns the prepressure for the first bead to the transferred program number, which was specified in the file segments.ndx under the transferred program number.
4. PreApplicationD1 (PreApplicationD2, PreApplicationD3)
5. PostApplicationD1 (PostApplicationD2, PostApplicationD3)

8.4.2 Application program with standard main program

Upon the selection of the standard main program (see *on page 375*), the procedure is effected according to Method 1 described in Starting the application cycle. The assignment of the prepressure to the RAPID variable **nD1GunPressure** (or **nD2GunPressure**, **nD3GunPressure**) is effected via the index file segments.ndx. Except for the application program, all steps (see *on page 375*) are assumed by the module MainModule.sys.

The application programs must be created in the folder Home:\programs on the flash disk (RW5.15)/SD card (RW5.61/RW6) of the robot and completed with the applicable values in the file segments.ndx in the folder Home:\programs.

The application programs are dynamically loaded from the folder Home:\programs to the working memory of the robot controller after the main program has started and the program number has been transferred. The module can be deleted again from the working memory after the completion of the application program.

Which application program is loaded and which prepressure is set for the first bead in the program depends on the data entered in the file segments.ndx in the folder Home:\programs on the robot flash disk (see *Index file segments.ndx on page 384*).

For use of the standard main program there must be a main routine in the corresponding application program, like in the following example.

```
PROC main[Modulname] ()
ENDPROC
```

Note

Changes to the application programs and the file segments.ndx cannot be made directly on the flash disk of the robot controller!

If application programs are changed online (i.e. the application program was stopped and changes were made via RobotStudio for example), then these changes are not automatically saved on the robot controller's flash disk in the folder *Home:\programs*. This must be effected manually.

Here the files must be copied from the corresponding folders to a local hard drive, modified there and then copied back again.

8.4.3 Needle change in the main program during the application cycle

If there is more than one application nozzle on the applicator of a dispenser and if a different nozzle from the current nozzle is to be used for application during an application cycle, an explicit single switch to this nozzle must be implemented. In general, after the change a nozzle number of the applicator pre-pressure is reset for the next seam.

The two actions, switching the nozzle number and the pressure regulation, are executed with the RAPID routine **MoveChangeApp** (see *MoveChangeApp on page 427*). This routine is integrated at the corresponding point in a movement program.

If a time-critical switch without pressure regulation becomes necessary, the routine **MoveChangeNeedle** (see *MoveChangeNeedle on page 430*) can also be used.

8.4.4 Filter change during the application cycle (Shootfilter)

A shootfilter is a software function that increases the requested setpoint flow change by one percentage value (depending on the physical conditions between theoretically 100% and 700%) for a defined period (specified in Hz as cut-off frequency).

The related short-term increase (or reduction) of the setpoint flow causes a brief increase (or reduction) of the motor speed of the doser. This influences the material volume at the start, end or during a requested flow change on a seam.

The shootfilter acts as a boost function to compensate for the length of the hose between dispenser and applicator, to compensate for hose breathing and to compensate for compressible materials. Shootfilters can be activated for special applications. If shootfilters are activated, they only influence the process if a requested flow volume changes.

For example, flow changes occur at the start of a seam (flow change from 0 ml/s to 10 ml/s) or at the end of a seam (flow change from 10 ml/s to 0 ml/s), during a seam in which a flow change takes place or during a seam if the robot mechanism changes speed and application is speed-dependent, i.e. the flow changes proportionally to the speed.

Shootfilters are active in the IPS. This means that flows that are higher than the specified nominal flow are possible (**dapD1.FlowNominal**). The flows in DispenseWare are limited to the nominal flow and the limit is not applied to the filters in the IPS. The potential flow with filters is restricted by the physical limits of the motor and the driver stages.

Ten filter coefficients are preconfigured in the IPS configuration. Additional filter coefficients can be added or the existing can be changed.

Preconfigured filters in the IPS:

Filter 1: Overshoot 200 %;2 Hz

Filter 2: Overshoot 200 %;6 Hz

Filter 3: Overshoot 350 %;2 Hz

Filter 4: Overshoot 350 %;6 Hz

Filter 5: Overshoot 500 %;2 Hz

Filter 6: Overshoot 500%;6Hz

Filter 7: Overshoot 750 %;1 Hz

Filter 8: Overshoot 750 %;4 Hz

Filter 9: Overshoot 750 %;8 Hz

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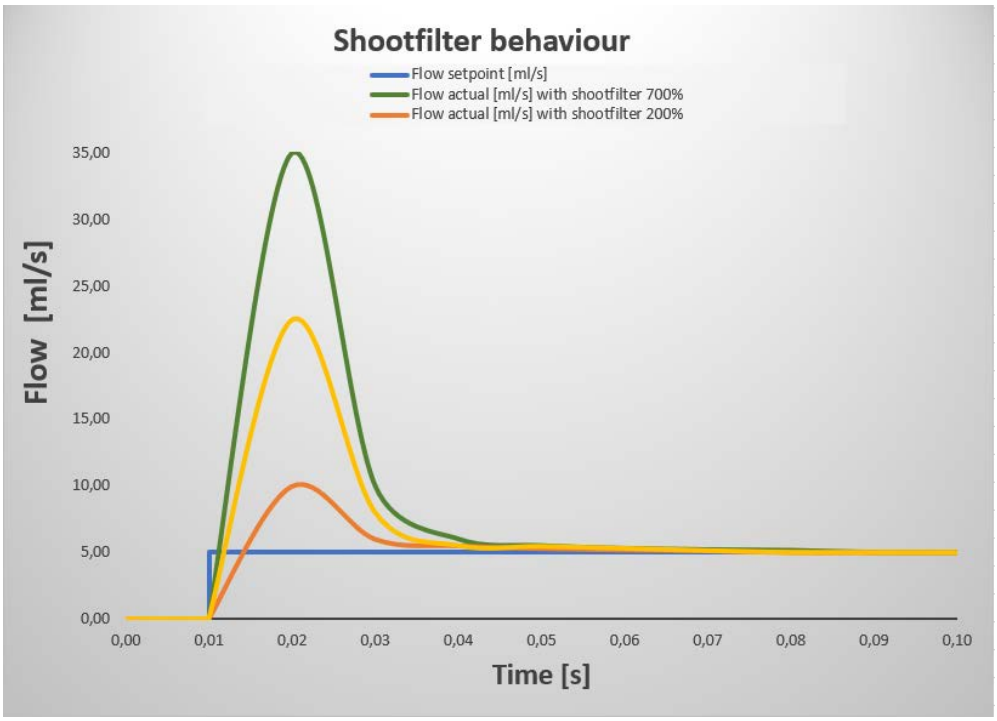
8.4.4 Filter change during the application cycle (Shootfilter)
Continued

Filter 10: Overshoot 750 %;12 Hz

Shootfilter



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A shootfilter is activated with the aid of the RAPID instruction MoveChangeApp (see *MoveChangeApp on page 427*).

8.4.5 Program number and prepressure transfer

For the transfer of the program number and the prepressure for the first bead an index file can be used, which is stored in the Home drive of the robot controller in the folder *programs*. Two RAPID routines in the main program (main routine in robot task T_ROB1) must be selected for this function.

8.4.6 Index file segments.ndx

Note

The segments.ndx file was called program.ndx before IDFP 6.07.1810.00. The segments.ndx responds as if program.ndx is used.

---------- Index (program number)

| ---------- Program name (Do NOT use program extension .xxx)

| -- Gun pressure for first bead of application program (If missing default pressure used)

|

1,Prog1,20

2,Prog2,10

The prepressure, which would be automatically set after the transfer of the program number 1 for dispenser 1, is 20 bar.

If there are two dispensers in the system, the structure of the file segments.ndx is changed.

1,Prog1,50,20

2,Prog2,40,30

In this example, 50 bar would be assigned to Dispenser 1 and 20 bar to Dispenser 2 as the prepressure.

8.4.7 RAPID routine ResolveModName

The Rapid routine **ResolveModName** is used to read the program numbers from the index file.

The routine is selected after the transfer of the program number in the main program. This routine selection is imperative in the main program if the configuration of the program number and the prepressure is to be used via the FlexPendant (see *on page 375*).

8.4.8 RAPID routine ResolveModGunPrs

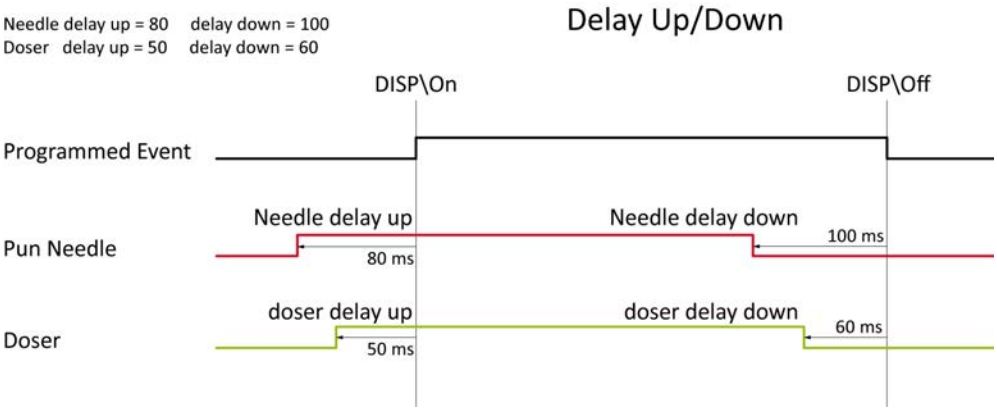
The Rapid routine **ResolveModGunPrs** is used to read the applicator pressure from the index file.

The routine is selected after the transfer of the program number in the main program. This routine selection is imperative in the main program if the configuration of the program number and the prepressure is to be used via the FlexPendant (see *on page 375*).

8.5 Set needle delay and flow delay

In order to compensate mechanical and electrical delays of the system, these must be specified in the system and processed.

Needle and flow delays



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A distinction is made between two different delays. The first results from the switching delay of the needle of the applicator. The second results from the delay between the start of the doser motor and the start of material escaping at the applicator nozzle.

To determine the needle delays (switching delays of the needle valves) and flow delays (delay time between start of doser motor and the escape of material at the nozzle), a spray test program must be created (see *Bead optimization on page 499*).

The delays can be set in the window *FlexPendant - Configuration - Application*.

Note

The procedure is described in the DispenseWare manual. These settings can only be performed in the IPS or via the FlexPendant menu *Configuration - Application - Application delays*. No changes should be made in beaddata and equipdata.

8.6 Circulation mode (circulation option)

The circulation mode of the dispenser is required to ensure that during the application intervals or interruptions the temperature of the material being processed at the applicator is kept constant. The material is circulated before or after the application (if circulation has been installed). In order to activate the circulation function, the checkbox "Circulation allowed" must be set under the *user interface FlexPendant - Configuration - Doser 1 - General*.

The circulation is automatically switched on if no functions or applications are performed with the doser and the switch-on delay for the circulation has lapsed. The timer for the switch-on delay is automatically reset again for every action of the doser.

The circulation runs until the switch-off delay of the circulation has lapsed or an application is requested (by performing the RAPID routine **PreApplicationD1**, **PreApplicationD2** or **PreApplicationD3**). To perform manual functions via the FlexPendant, the circulation must be switched off via the user interface Manual mode - Circulation. Other manual functions are blocked during circulation. If the circulation is switched off manually and not by the switch-off delay, it is not automatically switched back on again. Following the one-off manual switching on of the circulation and lapse of the switch-off delay, it is switched back on again once the switch-on delay has lapsed.

Continues on next page

8.6.1 Torque monitoring during circulation

Torque monitoring during circulation monitors the torque and limits it to prevent torque errors. This is implemented by restricting the circulation flow as required. If the torque is restored to a normal value, the circulation flow is reset to the specified value.

This function can be used to compensate for variations in the viscosity of the material, for example due to temperature changes (e.g. if the material is not yet at the specified temperature).

The torque monitoring is a standard installation after installation of the system, but it can also be disabled with the bool bDXCircTorqueSupervision (DispenserX, IDXCirc_User.sys). At the start of circulation the flow is by default increased at a ramp of 0 ml/s to the target flow at a rate of 0.2 ml/s. This rate can be adjusted with the variable nDXCircFlowIncPerSec (DispenserX, IDXCirc_User.sys).

The ramp can be changed. This is done by setting the variable nDXCircRamp to different values:

0: the circulation starts with the setpoint

1: the circulation starts with the last active circulation flow

2: every time the circulation is started the ramp is active. The single doser with circulation is an exception. In this case the circulation is set to the last active flow after filling was conducted during circulation.

A warning message is displayed if the circulation flow is between 20 % and 95 % of the target flow. If the flow is below 20 % of the target flow, an error message is output.

8.6.2 Global circulation

Global circulation circulates the material to the global material supply or the internal pump. This requires corresponding hardware (pipework).

8.6.3 Local circulation

Local circulation refers to the direct circulation from doser to doser of a dispenser. The material flows from doser A through the material hose to the applicator, from there through the circulation vale to doser B. Doser B therefore fills at the same speed with which doser B empties. If doser A is empty, the flow is reversed.

This means that the material does not need to be directed to a circulation return flow but it can be used directly in the system. This procedure can save energy in the global material supply.

WARNING

Hazard due to high pressure.

The pump pressure is measured at the inlet block of the doser. If local circulation is active, the pump is disconnected from the inlet block by the local circulation valve, and therefore the pump pressure is not displayed!

Local circulation can only be installed on dispenser with two dosers, as a result only in dispenser 1 and 2.

Special hardware is required for local circulation:

- dual doser
- material return to the pump is not installed
- an additional material supply valve installed before the inlet valve of the doser is required. Due to the lack of return material flow material is output from one of the needles (default needle 1) in the following cases:
  - application
  - calibration
  - emptying doser
  - moving doser forwards
  - circulation if maximum volume is exceeded in both dosers

For parameterization of the default needle, see *Manual functions default needle on page 455*.

Continues on next page

8.6.3.1 Maximum volume in both dosers

The volume of both dosers added together must not exceed a maximum limit. Otherwise local circulation will not be effective. After calibration of the dosers one doser automatically outputs material through the needles in order to reach this limit. If necessary, the system waits for the purge release. The maximum is defined in the variable nDXLocalCircLevelMax [ml] in the dispenser task in IDXB_User.sys.

The default value for the 560 cm3 doser is 800 ml (DXA + DXB) and 220 ml for the 155 cm3 doser.

The calculation of the maximum volume can be configured with a hysteresis. The hysteresis enables the volume to vary from the maximum volume by the defined value before material is output or material is added. The hysteresis is specified in the variable nDXLocalCircEmptyHyst [%] in the dispenser task in IDXCirc_User.sys. The default value is 7%. The doser is automatically emptied here if the volume of both dosers exceeds the maximum plus hysteresis. For example, for a 560 cm3 dual dispenser at 800 ml + 7% = 800 ml *1.07 = 856 ml.

8.6.3.2 Minimum volume in both dosers

The volume in both dosers added together must not fall below the minimum limit in order to be ready for immediate application and to avoid long filling times. If the volume falls below the minimum limit nDXLocalCircLevelMin [ml] (IDX_User.sys in the corresponding dispenser task), the inactive doser is refilled.

8.6.3.3 Application with installed, local circulation

The maximum material volume in both dosers (DXA+DXB) during application is defined with the parameter nDXFillLevelDual [%] (dispenser task, IDXCirc_User.sys). The default value is 140%.

This value is based on the average fill level of both dosers.

Example for the 560 cm3 dual dispenser with default values:

(max fill level A + max fill level B)/2*140% = 485 ml * 140% = 679 ml

The limit may be configured with a hysteresis nDXLocalCircHyst [%], default = 20%. The higher the average application flow the higher the hysteresis should be set. Otherwise there will be very many abrupt filling pulses, which may have a negative effect on the service life of the dosers.

8.6.3.4 Special features of local circulation

The material supply valve (signal doDXValveMtrlSup), required for local circulation, is closed while local circulation is active.

An additional parameter set is used for regulation of the filling of the inactive doser during circulation. Normal filling is generally much faster (up to 100 ml/s) than filling using local circulation (e.g. 10-15 ml) by the other doser. The new parameter set is in rdDXFillLocalCirc in ID1A_User.sys of the dispenser task.

The switch between the two dosers (from A to B, or B to A) operates if one of the two dosers has reached the maximum fill level of the doser or the empty limit.

8.6.3.5 Overview of the variables in use

The following parameters can be set for local circulation:

nDXLocalCircMin	Minimum volume of material in ml in both dosers for start of local circulation. If the value is lower, the dosers are filled before starting circulation.
nDXLocalCIrcMax	Maximum volume of material in ml in both dosers for start of local circulation. If the value is higher, the dosers are emptied.
nDXLocalCircEmptyHyst	Hysteresis in % for preventing output of very small volumes of material.
nDXFillLevelDual	Fill level in % that should be maintained during application.
nDXLocalCircHyst	Hysteresis for adding material during an application.

8.7 Temperature conditioning control modes

8.7.1 General information

There are different modes for controlling the temperature setpoint of the temperature conditioning.

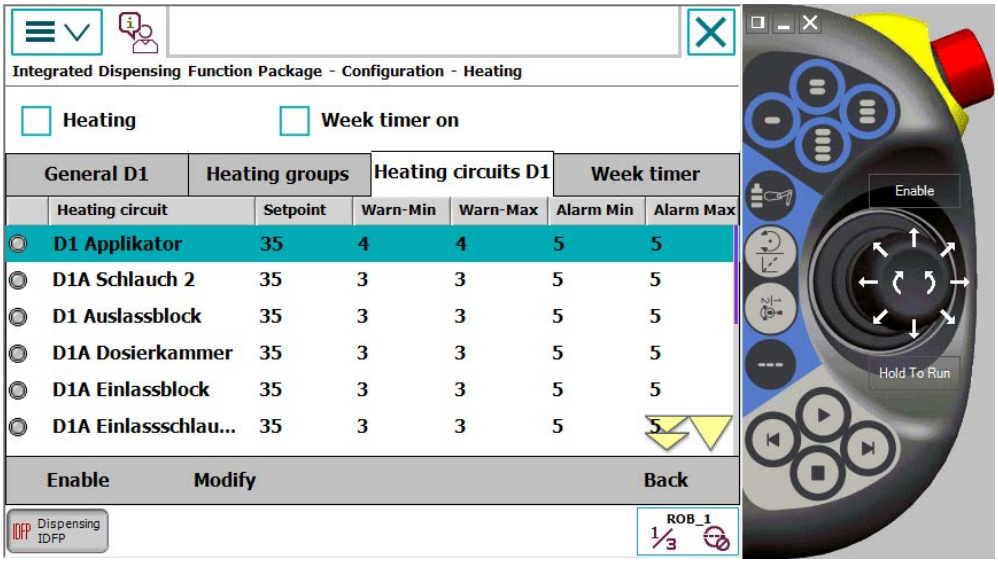
- The local and global temperature setpoint is typically used with gluing applications. Depending on the requirements of the heating circuits a global temperature setpoint may be sufficient while the local setpoint control allows a more accurate but also more complex control of the material temperature.
- The global heating circuit is typically used with sealing application and requires a temperature sensor in the applicator.

8.7.2 Local temperature setpoint

The local temperature setpoint can be used to control each heating circuit individually. It can be changed by using the following parameter:

Configuration of each setpoint individually for each heating circuit:

Configuration>Heating>Heating circuits>select circuit to modify>modify



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8.7.3 Global temperature setpoint

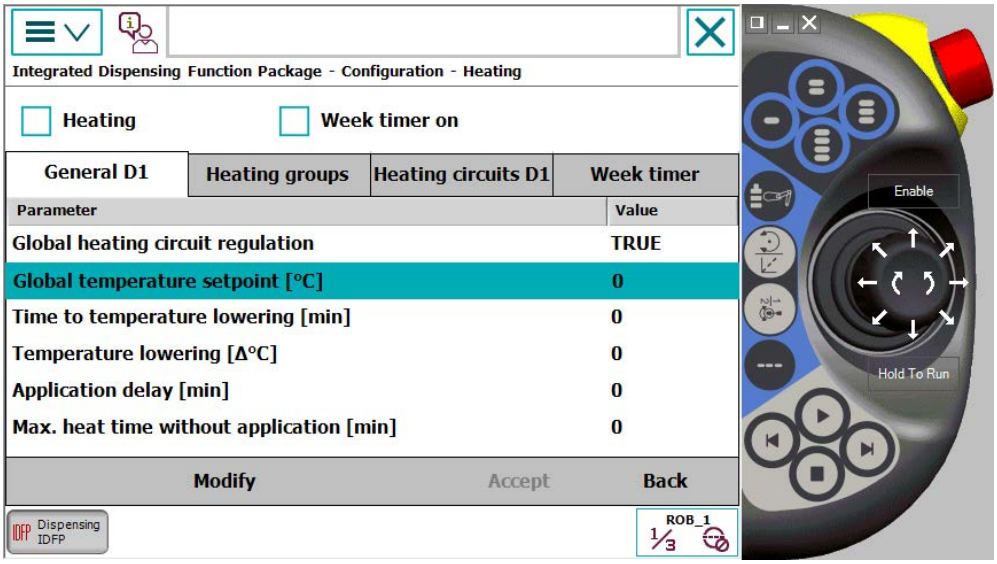
The global temperature setpoint can be used to control all heating circuits of this heating group. It is activated by setting it to a value other than zero.

WARNING

By using the global temperature setpoint the local temperature setpoints will be ignored.

Configuring the global temperature setpoint for D1:

Configuration>Heating>Global temperature setpoint



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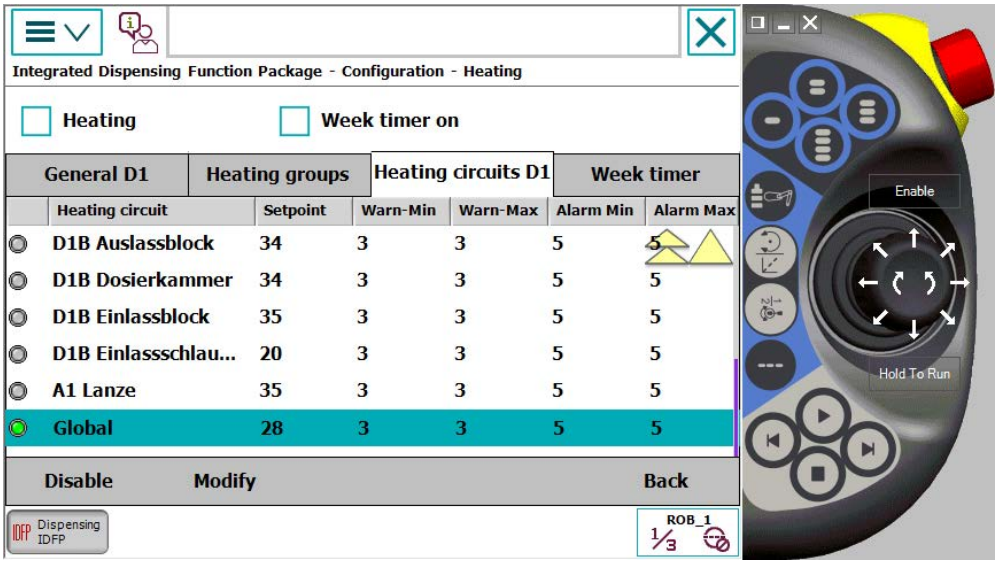
8.7.4 Global heating circuit

This circuit is used to dynamically control each circuit of the heating group. The global circuit will regulate the other circuits of the group to achieve the desired setpoint of the material at the applicator.

The global heating circuit is parameterized like every other heating circuit of a specific dispenser.

Modifying the global heating circuit



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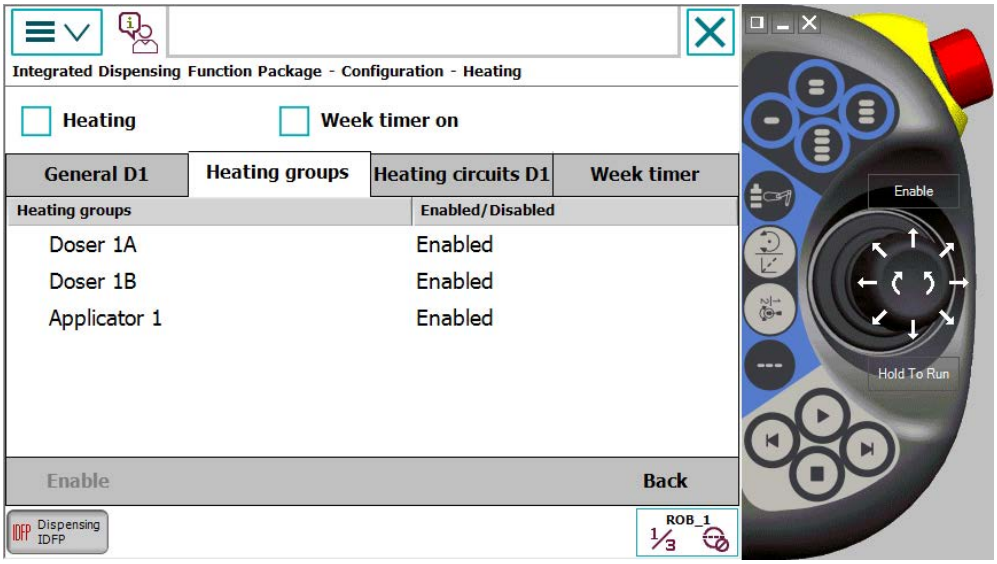
8.7.5 Lance heating

The lance heating is a special temperature circuit that allows to have the lance of an applicator heated separately. All conditions applying to heating circuits also apply for the lance heating circuit.

As it is its own circuit, it is also managed in its own heating group “Applicator” and can be enabled and disabled separately.

Overview of Heating groups with lance heating



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8.8 Application mode

8.8.1 Single operation of the dispenser

The single operation of the dispenser is automatically active when there is a single dispenser.

A dispenser is in application mode as soon as the RAPID routine **PreApplicationD1** (**PreApplicationD2** or **PreApplicationD3**) has been processed and the routine **PostApplicationD1** (**PostApplicationD2** or **PostApplicationD3**) has not yet been selected.

The following actions are requested by the operator during application mode in the application program by selecting Rapid routines:

- Applicator pressure regulation (applicator pressure control)
- Filling the dispenser with material
- Change of nozzle number (only if there are several application nozzles per applicator)
- Change of filter number (software filter for special applications)

Note

The aforementioned actions can only be started in the application program if no needle is activated at the corresponding time, i.e. only after a DispL/C-Off command and before a DispL/C-On command!

Automatic filling

In application mode of the single operation (single doser), ensure that during an application cycle no more material than the current net volume of the doser is requested. The current net volume of the doser is the difference between the current level and empty limit. To ensure that the doser is always filled to its full limit in single operation at the start of the application, automatic filling before or after the application can be activated (*FlexPendant - Configuration - Doser 1 - General - Automatic filling at start of cycle (end of cycle) active*).

For filling the doser a filling hysteresis in % is used. This means the filling process is only initiated when the current actual volume of the doser is less than the full limit and deviates by the percentage filling hysteresis. The filling hysteresis can be adjusted (FlexPendant - Configuration - Doser 1- Fill - Hysteresis for automatic filling). If this is, for example 3% at a full limit of 140 ml, the filling process is only initiated at the start or end of the application at a quantity of 140 ml - (140 ml*3 %/100%) = 135.8 ml. The hysteresis prevents the level falling below the full limit in the case of very small level changes (for e.g. by pressure regulation in the doser) and the initiation of a filling process.

If the level falls below the empty limit during the application, then the application is stopped at the current bead from a percentage shortfall of the empty limit and the doser is force filled.

Manual filling

Continues on next page

Manual refilling of the doser can only be performed during an application cycle and when the needle is closed (see *MoveForceFill on page 432*).

Applicator pressure regulation (control)

With applicator pressure regulation (control) in single operation, it is important to consider that the level of the doser my change significantly depending on the hose length, as well as the material properties and the temperatures of the material being processed. In the case of very high applicator pressure requirements, the level may change by around 20% or more.

8.8.2 Dual doser

Swap operation of the dispenser

The swap operation of the dispenser is automatically active when it is a dual dispenser and both dosers (A and B) are activated.

The swap operation enables the application of a continuous bead if certain conditions are satisfied (The dosers fill quicker than they are emptied by an application - depending on the setting of the filling pressure regulator, the setting of the material supply and the application flow).

If the application flow is permanently selected as higher than the average filling flow, both dosers are emptied completely over time.

If one of the two dosers of a dual dispenser is deactivated, the active doser works in single operation.

The following actions are requested by the operator during application mode in the application program by selecting Rapid routines:

- Applicator pressure regulation (control)
- Change of nozzle number (only if there are several application nozzles per applicator)
- Change of filter number (software filter for special applications)

Start doser (option)

With the dual operation of the dispenser, depending on the application the doser to apply first can be selected according to various criteria. The start doser can be set via the RAPID variable **nD1StartingDisp.**

nD1StartingDisp:=1	Start with dispenser A; (doser A is filled at the start of the application, if not full!)
nD1StartingDisp:=2	Start with dispenser B; (doser B is filled at the start of the application, if not full!)
nD1StartingDisp:=3	Start with doser with higher level.
nD1StartingDisp:=4	Start alternating between A and B.
nD1StartingDisp:=5 (Default)	Continuous; The last active doser starts the next application (no filling process required)

Note

The aforementioned actions can only be started in the application program if no needle is activated at the corresponding time, i.e. only after a DispL/C-Off command and before a DispL/C-On command!

8.9 Regulator settings

The setpoint values for volume flows or pressures are sent to the DIB from the robot program (DispL-Instruction) and regulated there with default regulator properties. The actual values come from sensors connected directly to the DIB.

Continues on next page

8.9.1 Prepressure regulation

Using the prepressure regulation the material pressure in the applicator can be regulated so that an optimal quality of the bead is achieved throughout. A distinction is made here between prepressure regulation and prepressure control.

With both variants when the nozzle is closed, the motor is activated so that the requested material pressure is set as quickly and accurately as possible. Depending on the selected setting and system setup, this process can take up to 5 seconds.

The time required for the prepressure regulation depends on the material properties, the length of the hose between the doser and the applicator, the temperatures of the material and the controller parameterization.

In order to set the prepressure, at least one of the two variants (prepressure regulation or control) must be activated.

The use of the prepressure control places a greater stress on the mechanical components. The approximate pressure setpoint value is set here with help of a speed jump to the maximum speed within a calculated time. The torque load of the motor is higher than with prepressure regulation.

Note

The parameters are shown here for dispenser D1 by way of an example and may also exist similarly for D2, D3 and D4.

The parameters are changed via the FlexPendant, for example under:

ABB menu - Program data - Area - Dispenser 1 - bool

The activation or deactivation of the prepressure regulation or control is effected using the following parameters:

bD1A_PrsPreCtrl	TRUE: Prepressure control D1 active FALSE: Prepressure control D1 inactive
bD1A_PrsPreReg	TRUE: Prepressure regulation D1 active FALSE: Prepressure regulation D1 inactive

At least one of the two parameters must have the value TRUE, otherwise the dispenser cannot set a prepressure.

Prepressure regulation active

With an activated prepressure regulation, the prepressure is regulated with help of a RAPID regulator if prepressure regulation is requested.

The setting of the prepressure using a regulator requires more time than a prepressure control, but is more precise.

The following parameters **must** be adapted:

rdD1GunPrs.Kp	Numerical value for the amplification factor of the proportional share of the prepressure regulator.
rdD1GunPrs.Ki	Numerical value for the amplification factor of the integral share of the prepressure regulator.
rdD1GunPrs.Kd	Numerical value for the differential coefficient of the prepressure regulator.

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The following parameters **can** be adapted:

nD1GunPrsDev	Value for the permissible percentage deviation of the prepressure in relation to the requested applicator pressure in bar. If the current pressure is within this percentage limit, the actual value of the prepressure is OK. The lower the permissible percentage deviation, the longer the pressure regulation process takes and the more precise the regulated actual value of the prepressure.
nD1PrsRegLoops	Number of cycles which the actual value of the prepressure must remain within the percentage limit **nD1GunPrsDev** so that the pressure regulation is completed without an error message (The value 10 corresponds roughly to a time of 100 ms).
nD1GunPrsLoopsMax	Maximum number of cycles during the prepressure regulation. If the time is exceeded, the system issues an error message (The value 300 corresponds roughly to a time of 3 s).

Setting/Adjusting prepressure regulator

For monitoring the pressure course during optimization, the following are recommended:

Signal Analyzer of RobView or other logger software

In order to be able to set or adjust the regulator parameters of the RAPID-based prepressure regulator, the following conditions must be met:

1. For testing, the same material has to be used, which will also be used for the actual production.
2. If temperature conditioning is available, the temperatures must be set according to the specifications of the material manufacturer, the tempering switched on and the necessary post heating time (with the electric heating option) must have lapsed.
3. To enable permanent regulation, which does not terminate early, the following variables must be set to the value specified here:

Variable	Value	Standard value
nD1PrsRegLoops	1000 (10 s)	10
nD1GunPrsLoopsMax	1000 (10 s)	500
nD1GunPrsDev	100 (100%)	5
rdD1GunPrs.Kp	Default (see *Appendix on page 617*)	Dependent on type of doser
rdD1GunPrs.Ki	0	0
rdD1GunPrs.Kd	0	0

In the hand window of the FlexPendant interface click on "Application ON/OFF" to put the dispenser into application mode.

Now the corresponding prepressures can be assigned via the numerical variable **nD1GunPrs**(T_Rob1). This can be done in a simple Rapid module. As soon as a value is assigned other than 0, the active doser sets a new prepressure. After 10 seconds (**nD1GunPrsLoopsMax**) the pressure regulation is completed and a new setpoint value can be specified.

Continues on next page

The regulator can be set with the general optimization methods, where the variable **rdD1GunPrs**(data type RegulatorData) is adapted accordingly. The data type RegulatorData includes the values Kp, Ki and Kd of a digital PID regulator.

In the hand window of the FlexPendant interface click on "Application ON/OFF" to end the application mode of the dispenser.

If the pressure regulator was set, the numerical variables **nD1RegLoops**, **nD1GunPrsLoopsMax** and **nD1GunPrsDev** must be reset to their respective default values.

Note

A regulator setting as opposed to a P regulator is initially recommended. The regulator is generally rapid and precise enough to perform the pressure regulation process.

The prepressure controller, which can also be used, also enables a very precise setting of the pressure in the applicator.

Prepressure control

If the prepressure control is active, then the positioning time, which the motor needs to set the requested pressure in the dispenser, is calculated using a control point (with the RAPID routine **HoseAccuD1** or **HoseAccuD2**, **HoseAccuD3** to be calculated in advance). The motor uses its maximum (by the software) permissible speed. With help of a short pressure shock the pressure is set without using the current actual value.

A prerequisite is a one-off performance of the RAPID routine **HoseAccuD1** (**HoseAccuD2**, **HoseAccuD3**), which carries out hose breathing compensation. This routine must be performed during commissioning. For this routine it is important that the temperature of the material matches the application temperature. This means the material must have the same conditions as in production mode. The hose breathing compensation determines the influence of the hose length and hose condition between dispenser and applicator on the material pressure in the hose.

Set prepressure control

The first step for setting the prepressure control is the performance of the service routine **HoseAccuD1** (**HoseAccuD2**, **HoseAccuD3**). This routine determines the compensation of the hose between dispenser and applicator and records a pressure-level curve. The following prerequisites must be met:

1. The material which is also used later during the application must be used.
2. If tempering is available, the temperatures must be set according to the specifications of the material manufacturer, the tempering switched on and the necessary ready delay must have lapsed.
3. The dispensers must be fully filled with material.
4. The prepressure regulator must be functional.

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The service routine can be started when these prerequisites are satisfied.

> **Note**
>
> It may take between 3 and 4 minutes per doser to determine the hose breathing compensation.

When the detection of the hose breathing compensation is completed, the prepressure controller can be activated via the user interface IDFP at the FlexPendant:

Configuration - Doser - Pressure

→ Set the selection "Prepressure control active" to the value TRUE.

Test prepressure control

In order to test the prepressure control without a prepressure regulator, it is recommended to deactivate the prepressure regulator via the user interface IDFP at the FlexPendant:

Configuration - Doser - Pressure

→ Set the selection "Prepressure regulator active" to the value FALSE.

To test the prepressure control an application program as described in Setting/Adjusting prepressure regulator should be created.

Then the overall pressure regulation consists of only one prepressure control. If the prepressure control does not reach the expected value with the pressure jump, the numerical variable **nD1MoveTimeFac** should be adapted in the value range from 0.5 to 1.5. This variable extends the rotation time of the motor by the stated factor during the generation of the pressure jump.

> **Note**
>
> Prepressure control is quick, but not very accurate. Adequate precision can only be achieved after the one-off performance of the service routine **HoseAccuD1** (**HoseAccuD2, HoseAccuD3, HoseAccuD4**) and adaptation of the movement time factor **nD1A_MoveTimeFac**. However, simple prepressure control is generally not as precise as prepressure regulation.

Parameter

> **Note**
>
> The parameters are shown here for dispenser D1 by way of an example and may also exist similarly for D2, D3 and D4.

nD1A_MoveTimeFac:

This factor is applied to the time calculated by the prepressure control (value range 0.5….1.5). This value can be adapted if it is determined that the pressure jumps are generally too big or too small. If the pressure jump is too big, the factor must be reduced. If the pressure jump is too small, it should be increased to increase the movement time during the pressure jump.

Continues on next page

Prepressure regulation and control active

If the prepressure control and regulation are active, then the control acts as a pilot control of the applicator pressure. First of all, only a time-controlled speed jump is performed with the motor in order to correct the remaining pressure difference between the setpoint and actual value of the pressure.

Prepressure regulation with prepressure control is generally faster than only prepressure regulation. The least time is required if only prepressure control is active. However, the pressure values are less precise than with regulation. Prepressure regulation is generally slower than prepressure regulation with prepressure control.

In order to set a new pressure during a shorter application interval between two beads, it is useful to only activate the prepressure control, although the high precision is set aside. The activation and deactivation of control and/or regulation of the material pressure in the applicator is described in more detail under *Filter change during the application cycle (Shootfilter) on page 381*.

8.9.2 Filling

For filling the dispenser with new material during an application cycle the routine **MoveForceFill** is used (only with single doser or if A or B is deactivated in the case of a dual doser).

The pressure in the doser chamber is constantly checked and adapted during filling as soon as the pressure in the doser chamber during the filling process becomes less than the specified minimum filling pressure. If the pressure falls below the specified minimum filling pressure, an error is output, but the filling process is continued.

The filling time is also monitored during the filling process. If the current calculated filling time is exceeded, an error is displayed and the filling process is canceled.

The filling process is also canceled in the event of an emergency stop, an error with the driver stage or a forced stop of the function. If the function is stopped by sending a function stop request (**goD1Order** = 31), no message is issued. An error message is generated for other interruptions to the filling process by a fault. The function is **not** automatically restarted following the acknowledgement of the error or emergency stop.

The time required for the filling process is dependent on various factors: material properties, temperatures, material inlet pressure, doser size and regulator parameters.

With the operation of a single doser (or a dual doser in single mode), it is possible to force the doser to refill during an application run.

Note

Refilling can only be done when all application nozzles are closed.

Refilling is done in the application program by selecting a routine in the RAPID application program.

Special function: Soft filling

The soft fill function is used for careful and precise filling at the end of the filling process. The level limit of the usable volume from which the motor starts to reduce its speed is set (usable volume = full limit - empty limit). The level limit (in %) is specified in the variables **nD1SoftFillLim**.

The motor reduces the speed from the limit **nD1SoftFillLim** to a defined minimum speed, which is to be reached at the end of the filling process. This limit is specified in the variables **nD1FillFlowMinLimFac**. It is specified as a percentage in relation to the maximum possible filling flow [ml/s].

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8.9.2 Filling
Continued

Special function: Filling ends with reduced pressure

The function is used for the controlled setting of the material pressure in the doser chamber after the filling process. A time delay between closing the filling valve and stopping the motor is set. The higher the set time delay, the lower the pressure after the filling process in the doser chamber. The filling quantity (full limit) is exceeded slightly as a result. To set the delay, a time is entered in seconds [0..0.2 s] in the numerical variable called **nDxFillValveStopDelay**.

Parameters

Note

The parameters are shown here for dispenser D1 as an example and may also exist similarly for D2, D3 and D4.

The parameters can be changed via the user interface:

Integrated Dispensing Function Package - Configuration - Doser - Filling

dapD1.FillRegPrs	Pressure setpoint value (in bar) for the filling pressure regulation.
rdD1FillPrs.Kp	Numerical value for the amplification factor of the proportional share of the fill-flow regulator.
rdD1FillPrs.Ki	Numerical value for the amplification factor of the integral share of the fill-flow regulator.
rdD1FillPrs.Kd	Numerical value for the differential coefficient of the fill-flow regulator.
bD1SoftFill	TRUE: Soft fill function active, FALSE: Soft fill function inactive.
nD1SoftFillLim	Numerical value for start limit of soft fill function (in %) in relation to the maximum filling limit (in ml).
nD1SoftFillFlowMinLimFac	Numerical value for the filling flow at the end of the filling process and with activated soft fill function (in %) in relation to the maximum filling flow (in ml).
nD1FillFlowFac	Numerical value for the filling speed override for the filling function (in %) in relation to the theoretically maximum possible filling flow (in ml/s) of the dispenser specified in **nD1A_PrsFlowFac**.
bD1AutoFill	TRUE: Automatic filling after the end of the application cycle activated (only with single doser), FALSE: Automatic filling after the end of the application cycle deactivated.
nD1FillHyst	Numerical value for the filling hysteresis. With activated automatic filling process, a filling process is only initiated when the current filling quantity falls below the volume full limit by this value (in %).
nD1A_FillCyclesTot	Specifies the total number (absolute) of all filling cycles performed by the doser.

Continues on next page

nD1FillTimeFac	Factor for the calculation of a real possible filling time [s] in relation to the theoretically minimum possible filling time [s], which is the result of the material quantity to be filled [ml] and the maximum theoretically possible filling flow [ml/s]. This factor can be adapted specific to the user. The poorer the flow characteristics of the material to be processed, the longer the filling process takes and the higher the factor which must be selected in order to avoid early cancelation of the function due to a fill time error.
nD1FillTime	Fill time of last filling process [s].
nD1A_VolumeUsed	Total volume used by doser [l].
nD1FillValveStopDelay	Run-on delay of the motor during the filling process in relation to the closing time of the fill valve [s]. With the run-on of the motor after the fill valve is closed, a high pressure can be prevented in the doser after the filling process. The higher the run-on time selected, the higher the filling level after the filling process (full limit of doser can be exceeded).

Set fill pressure regulator

The Signal Analyzer of RobView or other logger software is recommended for monitoring the flow curve during optimization.

The following prerequisites must be met for the setting of the regulator:

1. The material which is used during the application must be used.
2. If tempering is available, the temperatures must be set according to the specifications of the material manufacturer, the tempering switched on and the necessary ready delay must have lapsed.
3. The dosers should be emptied.
4. The soft fill function must be deactivated.
5. Set the numerical variable **rdD1FillPrs.Kp** to the default value.
6. Set the numerical variable **rdD1FillPrs.Ki** to 0.
7. Set the numerical variable **rdD1FillPrs.Kd** to 0.
8. Start the filling process via *FlexPendant Manual mode - Fill*.

The regulator can now be set with the general optimization methods, whereby the regulator parameters are adapted for the filling flow regulation accordingly.

Note

A regulator setting as opposed to a P regulator is initially recommended. The regulator is generally rapid and precise enough to perform the filling process.

8.9.3 Subsequent pressure regulation (dual operation - swap)

If a dispenser is operated in dual mode (automatically when both dosers D1A and D1B are activated), the application of a continuous bead is possible. A switch to the other respective doser is effected during a bead.

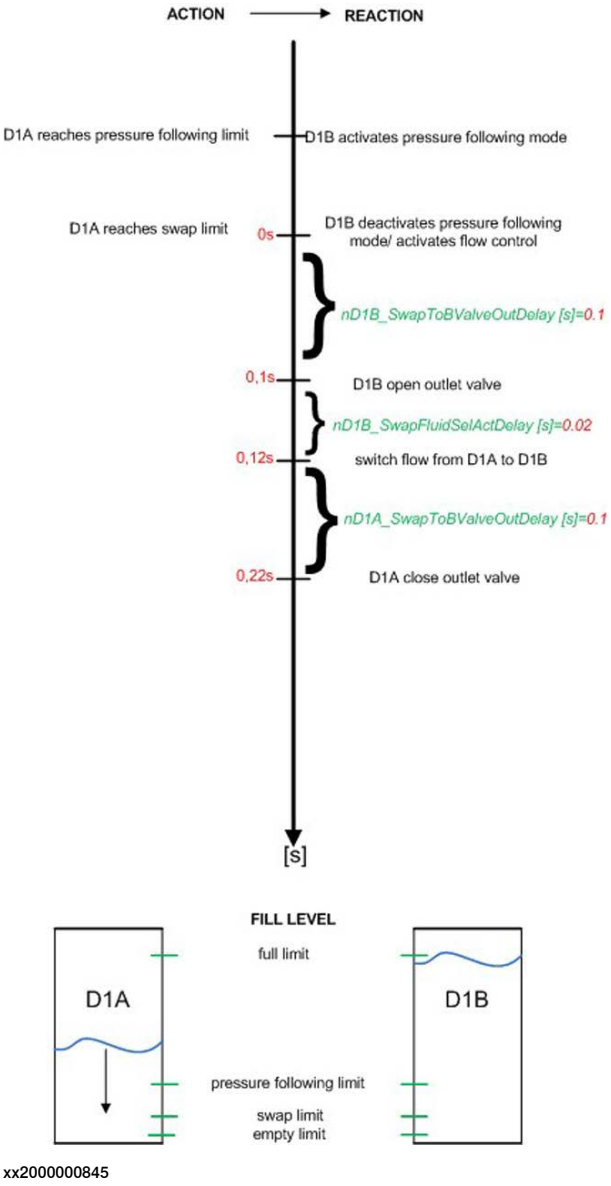
The following explains step by step how the swap is performed (using the example of switching from D1A to D1B and D1B to D1A).

1. The level of D1A reaches the limit of the pressure slave control (the limit, specified in ml, must be higher than the swap limit).
2. Activate the pressure slave control (deactivate the flow control) D1B (D1B follows pressure of D1A).
3. The level D1A reaches the swap limit (switch to D1B starts).
4. Deactivate the pressure slave control D1B (activate the flow control D1B).
5. Open the outlet valve D1B.
6. Switch flow setpoint value from D1A to D1B (Fluid Selector to 2).
7. Close outlet valve D1A.
8. Start filling process D1A/Application D1B running…
9. The level of D1B reaches the limit of the pressure slave control (the limit, specified in ml, must be higher than the swap limit).
10. Activate the pressure slave control (deactivate the flow control) D1A (D1A follows pressure of D1B).
11. The level D1B reaches the swap limit (switch to D1A starts).
12. Deactivate the pressure slave control D1A (activate the flow control D1A).
13. Open outlet valve D1A.
14. Switch flow setpoint value from D1B to D1A (Fluid Selector to 1).
15. Close outlet valve D1B.
16. Start filling process D1B/Application D1A running…
17. Continue with point 1.

Continues on next page

The following diagram shows the time sequence of all processes which are performed during the swap.

Swap operation - Time sequence of processes



xx2000000845

If the swap time (Swap D1A'D1B) at a bead is visible, this can be improved using the following setting options:

nD1B_SwapToBValveOut-Delay	Delay time between activating the flow control of D1B and the opening of the outlet valve D1B (Default value: 0.1s).
nD1B_SwapFluidSelActDelay	Delay time between opening of outlet valve and switching flow (Fluid Selector) from D1A to D1B (Default value: 0.02s).
nD1A_SwapToBValveOut-Delay	Delay time between switching flow (Fluid Selector) from D1A to D1B and closing of outlet valve D1A (Default value: 0.1s).

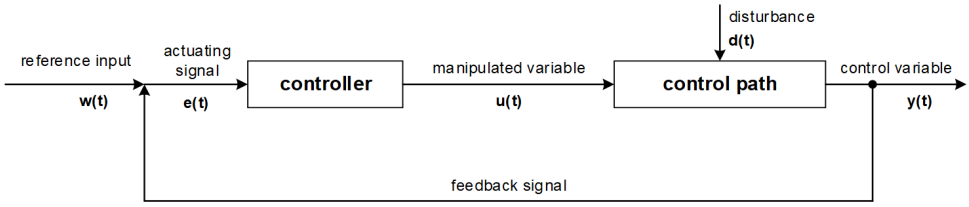
The RAPID variables **nD1A_SwapToAValveOutDelay**, **nD1A_SwapFluidSelActDelay** and **nD1B_SwapToAValveOutDelay** exist accordingly to set the swap behavior from D1B to D1A.

8.9.4 Adjustment of control parameters

The principles of control technology are in play at this point. See the relevant textbooks for more detailed information.

The standard control loop has various components (see the following picture). One command variable is preset in the control loop, the control variables are output. The controller is what can be adjusted by the user, the controlled system is what is to be controlled. In the field of dispensing this is, for example, the material that is to be heated to a specific temperature.

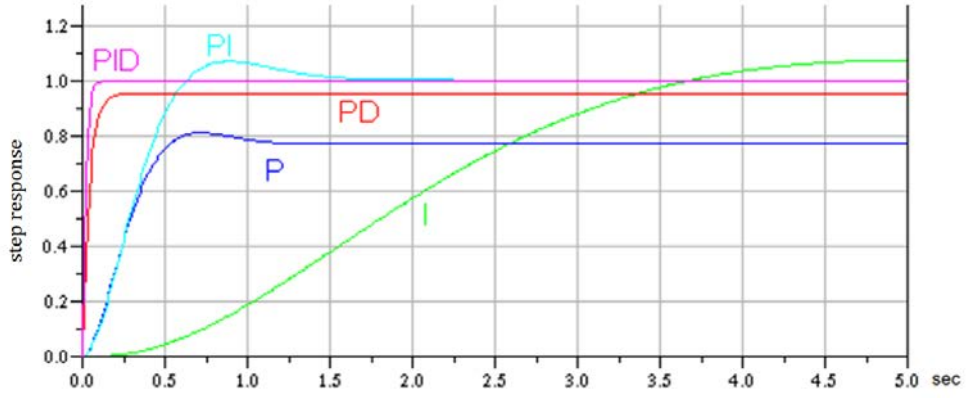
The standard control loop with all its components



xx2000000846

The following image shows the differences between different controller types.

Different controller types in comparison



xx2000000847

The green curve represents the pure I-controller. It requires a long time to adjust the control variable of the command variable. During the process the system overshoots greatly.

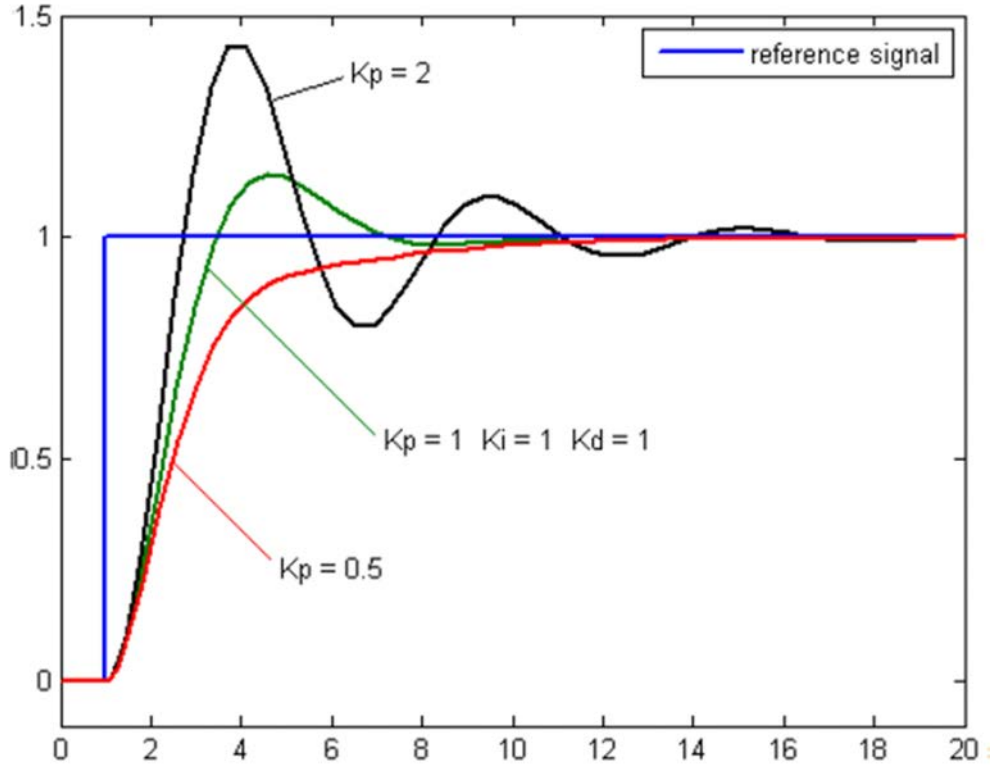
The dark blue curve represents a pure P-element. It controls faster than an I-element, but does not reach the command variable.

The PI-element is shown in light blue and can adjust the control variable to the command variable.

Continues on next page

The PID controller can control the system fastest and most precisely.

System with different Kp values



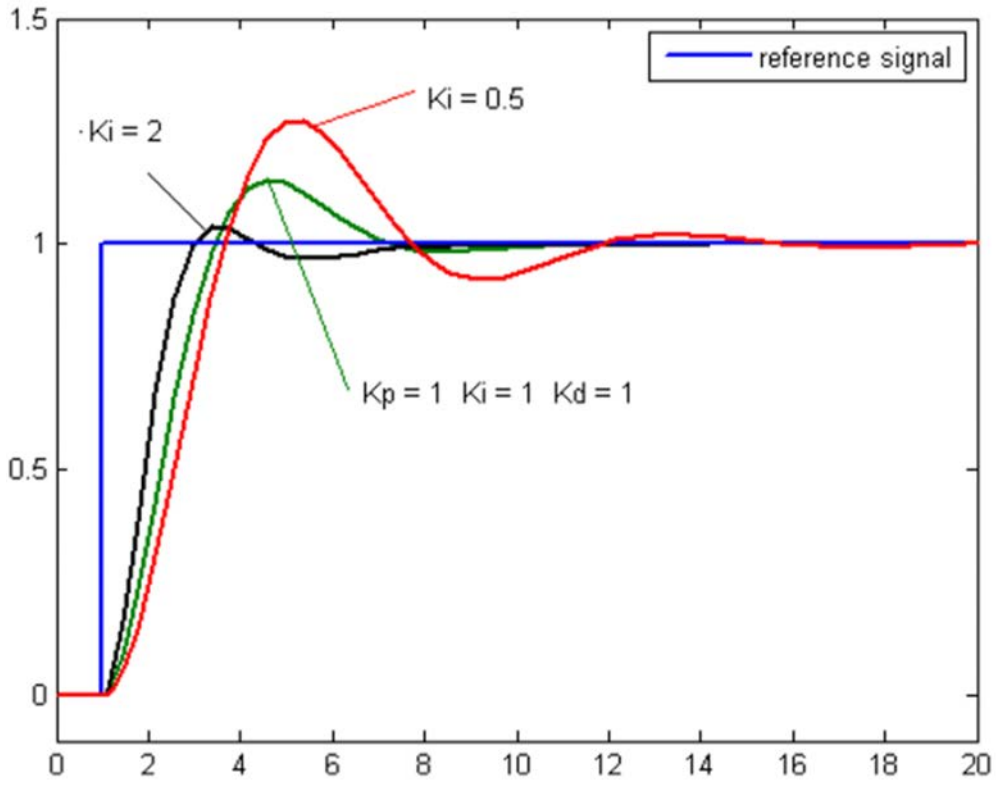
xx2000000848

The green curve in the upper image shows the system response to a jump signal for well-adjusted Pvalue, on the black curve the P-value is too high and on the red curve too low. This is shown by the transient oscillation: The greater the oscillation of the system the higher is the Kp-value set. A correctly set system should overshoot

Continues on next page

once followed by a slight undershoot, then the value should be within the range of the tolerance or have reached the target value.

System with different Ki values



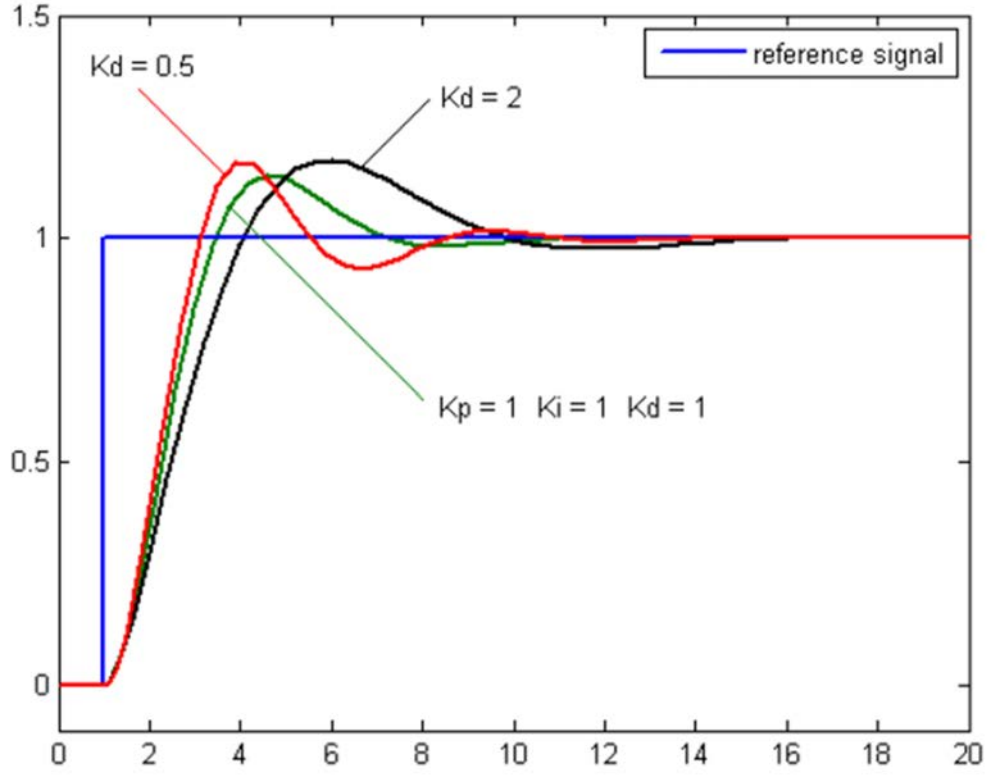
xx2000000849

The upper image shows a system with different Ki-values. The green curve shows a well adjusted Kivalue, in the black curve the I-value is too high and in the red

Continues on next page

curve too low. The I-value determines, among other items, the magnitude of the overshoot. The lower the value the greater the overshoot of the system.

System with different Kd values



xx2000000850

The green curve shows a well adjusted Kd-value, in the black curve the I-value is too high and in the red curve too low. If the Kd-value is too low the system oscillates more than with higher Kdvalues. However, if the value is too high, it takes a very long time before the control variable reaches the command variable.

The theoretical examples are now shown with practical examples of a dispensing system.

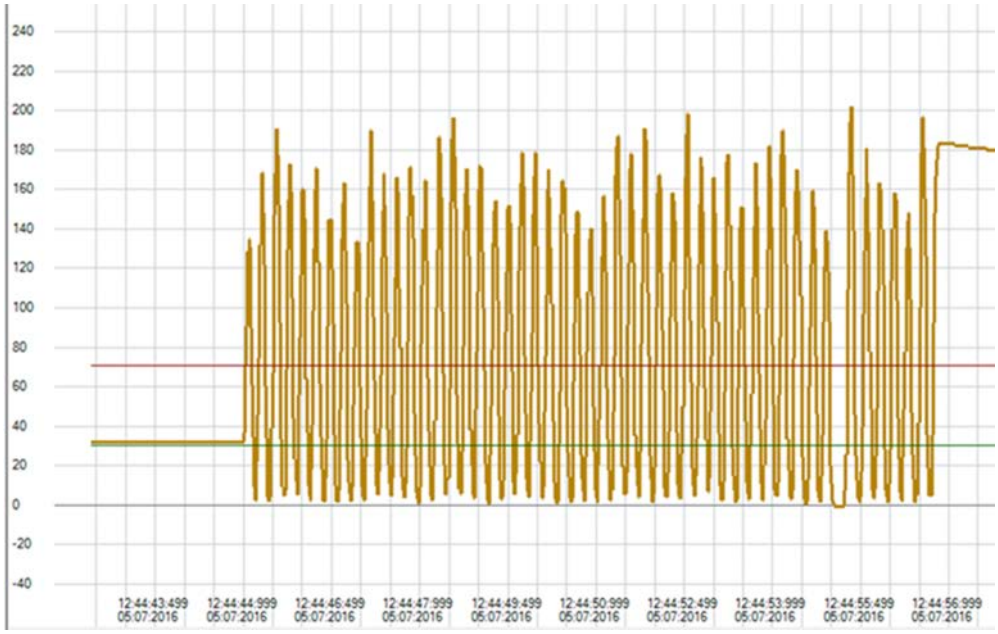
A TODO: Shows what must be done to optimize the control characteristics.

In the case of pressure regulation in general only the P-proportion of the control is set, the I- and D-proportion remains 0. The reason for this is that the driver stage

Continues on next page

of the motor already controls this. If the P-value is much too high, the driver stage reports an error (overtorque) and the pressure curve appears as follows:

Motor regulation 80 ccm doser; p: 0.5



xx2000000869

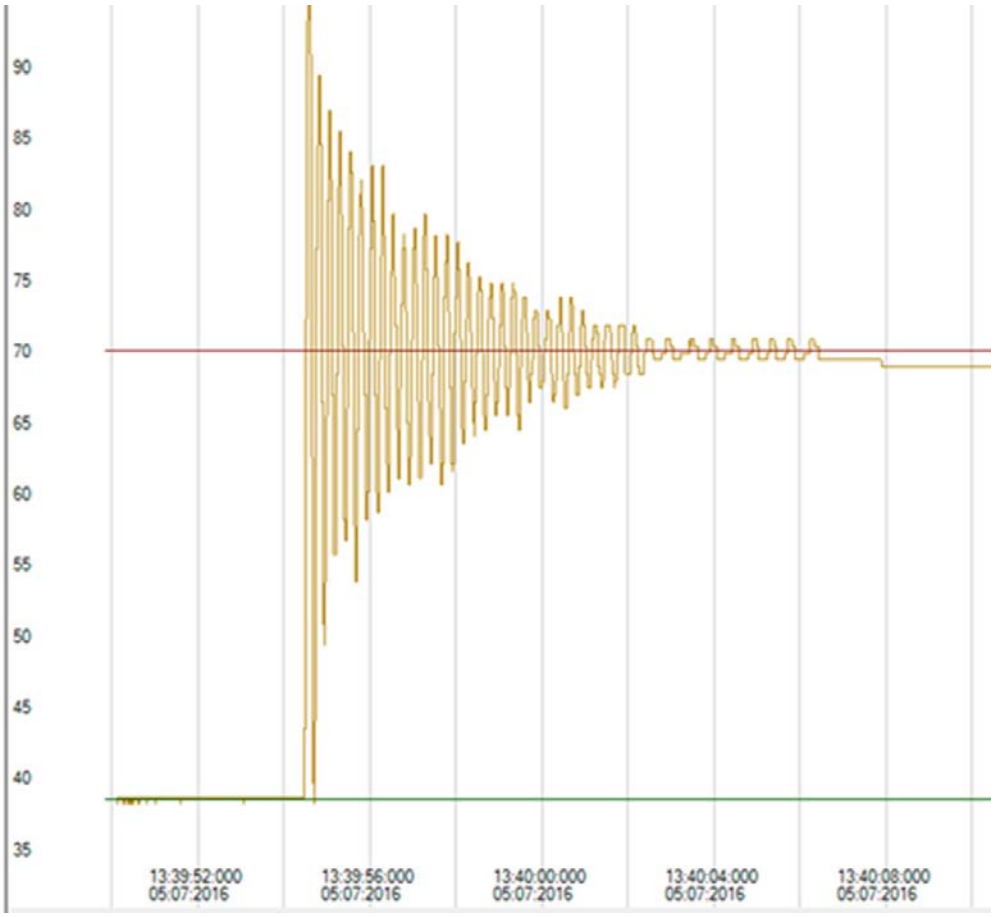
TODO: strong reduction of the P-value

The straight red line shows the setpoint value of 70 bar. At the end the system has aborted the pressure regulation with the overtorque error message.

Continues on next page

A slightly reduced P-value shows the following view (Next image). It is clear that the system is regulated after several oscillations. However, the system oscillates very strongly and this overloads the motor.

Motor regulation 80 ccm doser; p: 0.3



xx2000000870

TODO: reduction of the P-value

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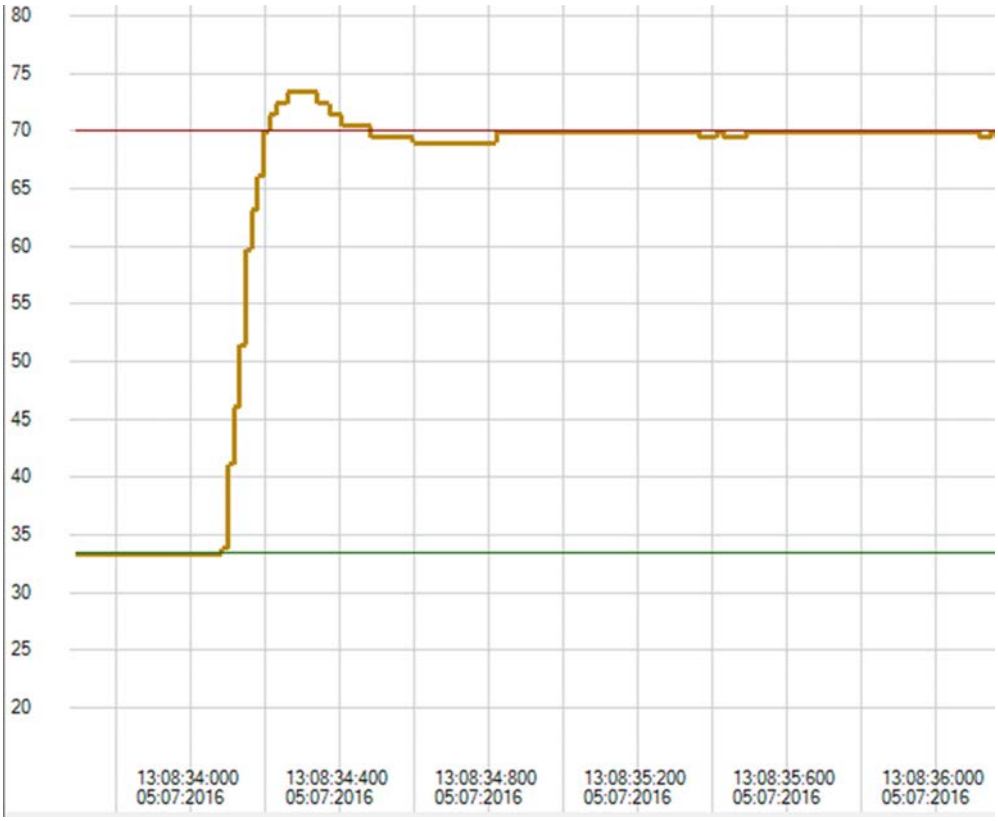
8.9.4 Adjustment of control parameters
Continued

A well-adjusted p-value appears as follows:

Motor regulation 80 ccm doser; p: 0.1

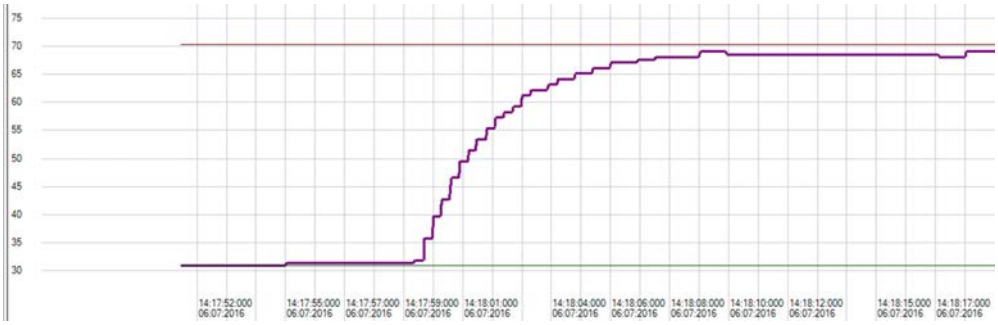


xx2000000871

The required pressure is regulated in less than one second.

TODO: everything is correctly set, no adjustments are required. However, the controller value can still be adjusted for optimization.

Motor regulation 80 ccm doser; p:0.1



xx2000000872

In this case the p-value is selected too low, the system does not reach the command value and requires a very long time (approx. 10s) to approach the value.

TODO: increase of the P-value.

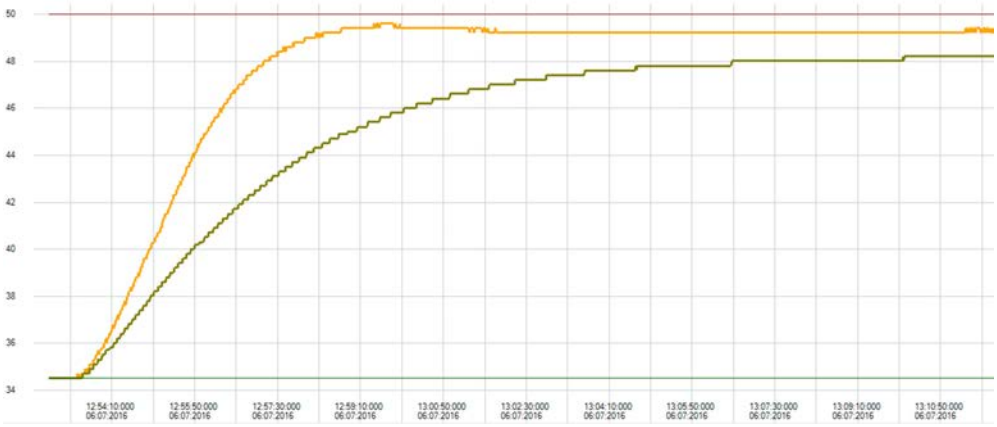
All control parameters are set for the temperature control

Continues on next page

Temperature is a very slow variable, i.e. it requires a long time to change. Accordingly the periods during which it is regulated are longer than, for example, with pressure regulation.

Temperature curves of electric heaters for various components are shown below.

Temperature control, follower plate integrated pump, yellow: p=0.5; green: p=0.1



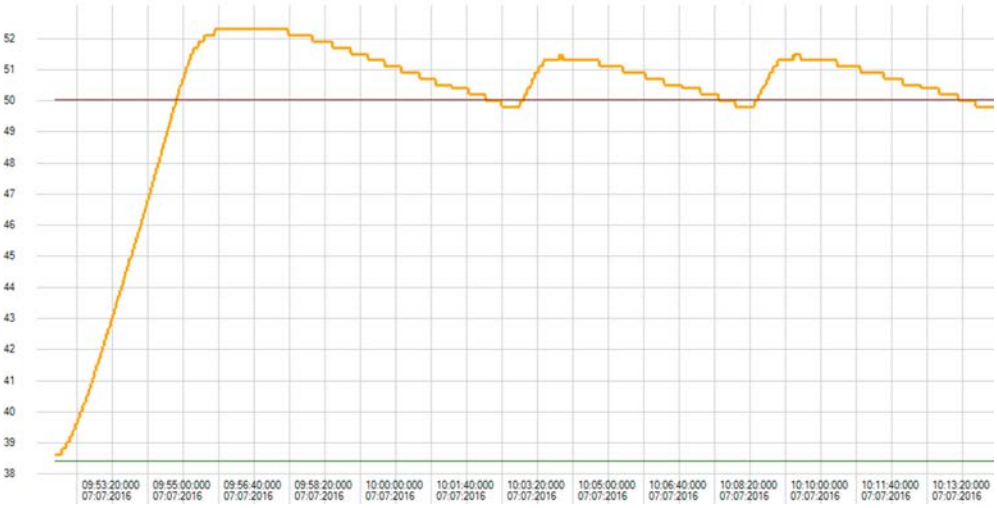
xx2000000873

Temperature curves with a pure P-feedback control are shown here. It is clear that the green temperature curve rises more slowly than the orange curve.

TODO: increase of the P-value of the feedback control

The following diagram shows the addition of an I-element of the feedback control, i.e. a PI-controller.

Temperature control, follower plate integrated pump: p = 0.7, i = 10



xx2000000874

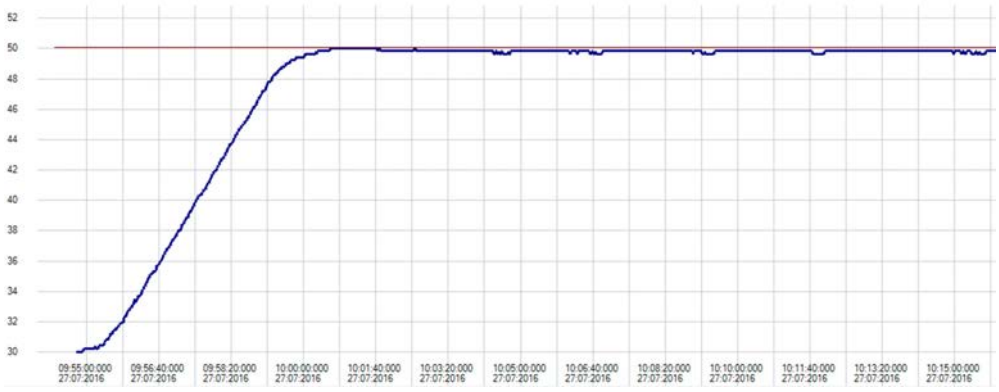
It is clear that a small undershoot of the setpoint value effects an immediate, powerful reheating. If the temperature must not fall far below the setpoint value but has a high tolerance upwards, the feedback control can be left as is. However, the overshoot can be reduced slightly by reducing the I-proportion.

A a pure PD controller is used, good values can be achieved in this example. The diagram shows the temperature curve with a PD feedback control. The temperature

Continues on next page

reaches the setpoint value fast but does not overshoot. The characteristic "braking" of the speed of the temperature change shortly before the setpoint value if reached can be seen.

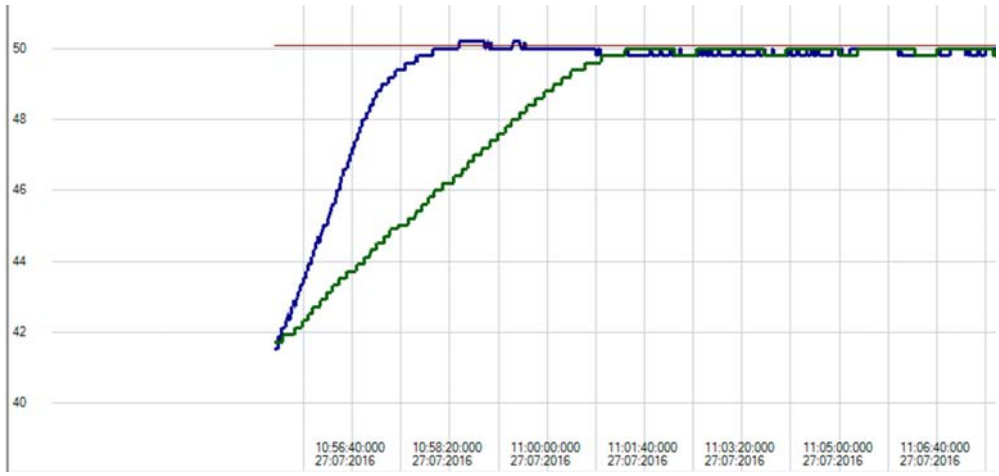
Temperature control, follower plate integrated pump, p = 2, d = 50



xx2000000875

Different D-parameters are shown in the following diagram. The green curve includes a very high D-proportion, the blue in contrast a smaller proportion. The smaller proportion increases the speed with which the heating circuit reaches the setpoint value but it also slightly overshoots.

Temperature control, follower plate integrated pump green: p = 2, d = 50; blue: p = 2, d = 5



xx2000000876

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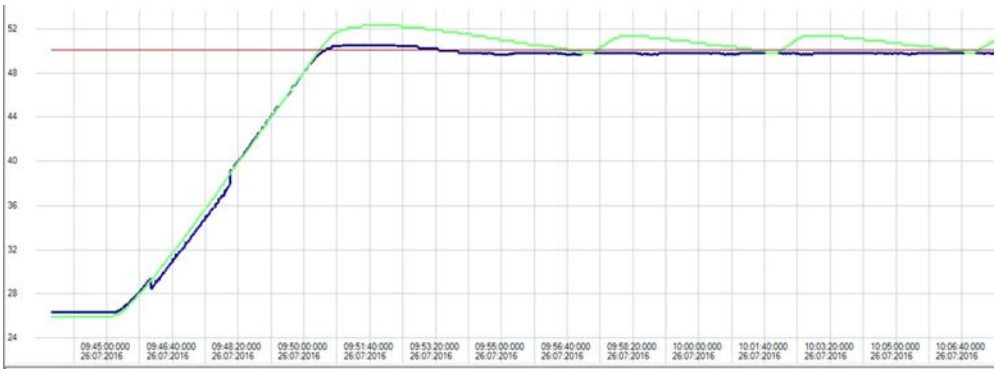
Although the PD controller already yields good results, for the sake of completeness a PID-controller is shown in the following diagram.

Temperature control, follower plate integrated pump: green: p = 2, d = 20; blue: p = 2, i = 20, d = 20



xx2000000877

The green curve represents a PID controller, the blue curve for comparison has the same P- and D-values but no I-proportion.

Setting the temperature control

The standard temperature control is a PID controller. It is designed to prevent overshoot and there should be an irregular approximation to the setpoint.

If the application or the environmental conditions require it, the controller values should be adjusted accordingly.

The adjustment is made at the user interface in:

Configuration - Heater - Heater circuits

It is recorded via the analog inputs on the robot:

Heating circuit	Signale
Applicator	aiD1A_Tmp1
Doser D1A	aiD1A_Tmp2 - aiD1A_Tmp6
Pump 1A	aiP1A_Tmp1 - aiP1A_Tmp4

8.10 RAPID instructions

IDFP-specific RAPID instructions are described below.

Continues on next page

8.10.1 MoveChangeApp

Use

The RAPID instruction **MoveChangeApp** is used in order to reset certain application parameters such as prepressure, nozzle number and/or filter number during the application cycle at a precisely defined position in the application program.

Description

MoveChangeApp can only be selected in the application program and with the nozzle closed. The instruction is used at a defined point in the application program. The requested action is activated precisely at this point. The instruction can be issued instead of a MoveL/C instruction. The difference is that a change of application parameters can be requested at the same time the point is approached. The instruction can only be used if at least one other bead follows in the current application program.

Examples

Example 1

Request for new prepressure (50 bar) at the dispenser D1A for the next bead, after at least one bead has already been applied in this application cycle.

The example relates to a single doser. With a dual doser the request of the label would be "D1" (instead of "D1A"), as in this case the prepressure is automatically dependent on the current active doser (D1A or D1B).

```
MoveChangeApp\L\Label:="D1A"\GunPressure:=50,p10,v300,z50,tool0\wobj:=
wobj0;
```

Example 2

Request for new prepressure (50 bar) at the dispenser D2A and selection of nozzle 2 (with regard to dispenser D2A) for the next bead.

```
MoveChangeApp\L\Label:="D2A"\GunPressure:=50\NeedleNo:=2,p10,v300,z50,
tool0\wobj:=wobj0;
```

Example 3

Example 3

Request for new filter during the application program for dispenser D1A (single doser). With a dual doser the label must be "D1" (instead of "D1A") so that both dispensers (D1A and D1B) perform the filter change.

```
MoveChangeApp\L\Label:="D1A"\FilterNo:=2,p10,v300,z50,tool0\wobj:=wobj0;
```

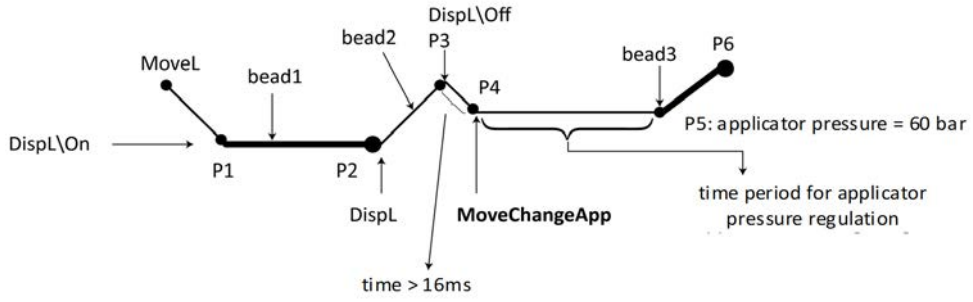
Example 4

```
DispL \On, P1, v300, bead1,z10,tool1;
DispL P2,v300,bead2,z10,tool1;
DispL \Off, P3, v300, bead2,z10,tool1;
MoveChangeApp\L\Label:="D1A"\GunPressure:=60,P4,v300,z50,tool0\wobj:=
wobj0;
DispL \On, P5, v300, bead3,z10,tool1;
```

Continues on next page

8.10.1 MoveChangeApp
Continued

```
DispL \Off, P6, v300, bead3,z10,tool1;
```



xx2000000878

Notes

The duration after the last DispL/C-Off instruction until the selection of the **MoveChangeApp** instruction should not be less than 16 ms. The duration of the prepressure regulation determines when the next DispL/C-On instruction can be applied. The duration of the prepressure regulation is dependent on several factors (see *Prepressure regulation on page 406*).

Arguments

Arguments	Description
[\L]	Data type *switch* Requirement for linear movement of robot at specified point.
[\J]	Data type *switch* Requirement for axis movement of robot at specified point.
[\Label]	Data type *string* Retrieval of doser designation for the selected action. Valid values: ["D1"/"D1A"/"D1B"/"D2"/"D2A"/"D2B"/"D3"/"D3A"/"D3B"] When it is a single doser, the specification \Label can be omitted.
[\GunPressure]	Data type *num* Numerical value for the prepressure to be set (in bar) for the following bead.
[\RegOn]	Data type *switch* Applicator pressure regulation is activated for the requested prepressure (\GunPressure) for the next bead start (DispL\ON).
[\RegOff]	Data type *switch* Applicator pressure regulation is deactivated for the requested prepressure (\GunPressure) for the next bead start (DispL\ON).
[\CtrlOn]	Data type *switch* Applicator pressure control is activated for the requested prepressure (\GunPressure) for the next bead start (DispL\ON).
[\CtrlOff]	Data type *switch* Applicator pressure control is deactivated for the requested prepressure (\GunPressure) for the next bead start (DispL\ON).

Continues on next page

Arguments	Description
[\NeedleNo]	Data type *num* Numerical value for the selection of the needle number for the following bead.
[\FilterNo]	Data type *num* Numerical value for the selection of the software filter for the following bead.
ToPoint	Data type *robtarget* Destination of robot and external axis.
Speed	Data type *speeddata* The speed data defines the speeds of the TCP (Tool Center Point), as well as reorientation speeds and speeds of the external axes.
Zone	Data type *zonedata* The zone data defines the size of the zone track in a programmed point.
Tool	Data type *tooldata* The TCP is the point of the robot mechanics which is moved to the specified destination. The tool data specifies this point of the robot mechanics.
[\WObj]	Data type *wobjdata* The work object (coordinate system), to which the robot position in the instruction refers. This argument can be omitted; in this case, the position refers to the global coordinate system. In contrast, if a stationary TCP or externally coordinated axis is used, this argument must be specified.

Limitation

The instruction can only be used once within 3 seconds. If the nozzle has to be changed more frequently within 3 seconds the instruction MoveChangeNeedle must be used. The instruction can only be performed during an application cycle (The routine PreApplicationDX was run, the routine PostApplicationDX was not yet run in the current program cycle).

Process simulate

For Process simulate an additional routine was created that can be used. MoveChangeAppL and MoveChangeAppC will run internally the instructions MoveChangeApp/L and MoveChangeApp/C. These can be used alternatively.

8.10.2 MoveChangeNeedle

Use

The RAPID instruction **MoveChangeNeedle** is used to quickly change the nozzle control to a different nozzle during the application cycle at a precisely defined position, if no other parameters such as applicator pressure or filter have to be changed.

Description

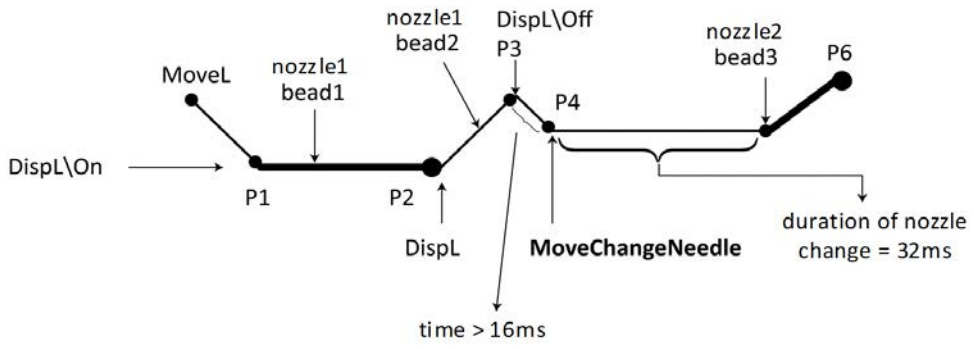
MoveChangeNeedle can only be selected in the application program and with the nozzle closed. The instruction is used at a defined point in the application program. The requested action is activated precisely at this point. The instruction can be issued instead of a MoveL/C instruction. The difference is that a change of the nozzle number can be requested at the same time the point is approached. The instruction can only be used if at least one other bead follows in the current application program.

Examples

Example 1

Request a new nozzle number at the applicator of dispenser D1 for the next bead, after at least one bead was already previously applied in this application cycle for example with nozzle 1.

```
MoveJ P1, v300,z10,tool1;
DispL \On, P2, v300, bead1,z10,tool1;
DispL P3,v300,bead2,z10,tool1;
MoveChangeNeedle\L\Label:="D1A"\NeedleNo:=2,p4,v300,z50,tool0\wobj:= wobj0;
DispL \On, P5, v300, bead3,z10,tool1;
DispL P6,v300,bead3,z10,tool1;
```



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Notes

The duration after the last DispL/C-Off instruction until the selection of the **MoveChangeNeedle** instruction should not be less than 16 ms. The time for changing the nozzle does not take more than 32 ms. This command can be selected as often as is necessary. In order to avoid unnecessary, frequent changing of the nozzle, material should only be applied to the beads with one nozzle and then to the beads with the other nozzle where possible.

Arguments

Arguments	Description
[\L]	Data type *switch* Requirement for linear movement of robot at specified point.
[\J]	Data type *switch* Requirement for axis movement of robot at specified point.
[\Label]	Data type *string* Retrieval of doser designation for the selected action. Valid values: ["D1"/"D1A"/"D1B"/"D2"/"D2A"/"D2B"/"D3"/"D3A"/"D3B"] When it is a single doser, the specification \Label can be omitted.
[\NeedleNo]	Data type *num* Numerical value for the selection of the needle number for the following bead.
ToPoint	Data type *robtarget* Destination of robot and external axis.
Speed	Data type *speeddata* The speed data defines the speeds of the TCP (Tool Center Point), as well as reorientation speeds and speeds of the external axes.
Zone	Data type *zonedata* The zone data defines the size of the zone track in a programmed point.
Tool	Data type *tooldata* The TCP is the point of the robot mechanics which is moved to the specified destination. The tool data specifies this point of the robot mechanics.
[\WObj]	Data type *wobjdata* The work object (coordinate system), to which the robot position in the instruction refers. This argument can be omitted; in this case, the position refers to the global coordinate system. In contrast, if a stationary TCP or externally coordinated axis is used, this argument must be specified.

Process simulate

For Process simulate an additional routine was created that can be used. MoveChangeNeedleL and MoveChangeNeedleC will run internally the instructions MoveChangeNeedle/L and MoveChangeNeedle/C. These can be used alternatively.

8.10.3 MoveForceFill

Use

The RAPID instruction **MoveForceFill** is used to be able to request a filling process during the application cycle when the needle is closed. In addition, a prepressure regulation is carried out at the end of the filling process if this is activated. This is necessary as the pressure in the doser chamber is undefined after a filling process. The instruction can only be used if at least one other bead follows in the current application program.

Description

MoveForceFill is used to be able to refill the doser at a precisely defined position in the application program. Then a prepressure regulation is carried out if this is activated. The instruction can only be selected in the application program and with the nozzle closed. The instruction is used at a defined point in the application program. The requested action is activated precisely at this point. The instruction can be issued instead of a MoveL/C instruction. The difference is that the filling process is started at the same time the point is approached. As the time for a filling process is dependent on various factors (see *Filling on page 411*), enough time must be calculated in between the selection of the instruction in the application program and the next DispL/C-On instruction so that the filling process and then the necessary prepressure regulation can be completed.

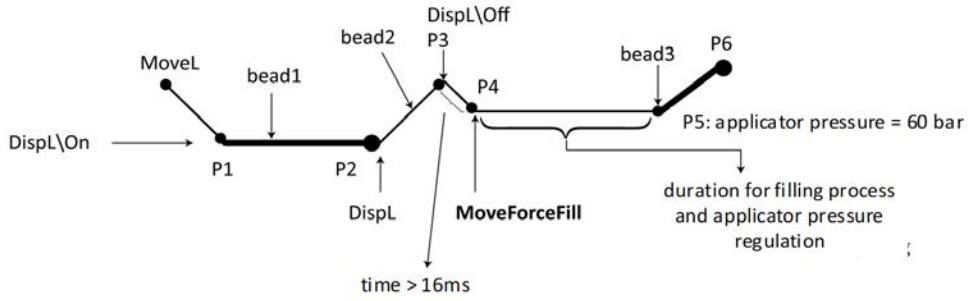
Examples

Example 1

```
MoveForceFill\L\Label:="D1A"\Max\GunPressure:=50,p10,v300,z50,tool0\wobj:=
wobj0;
```

Example 2

```
MoveForceFill\Label:="D2A"\Volume:=30\GunPressure:=50\NeedleNo:=2,p10,v300,z50,tool0\wobj:=wobj0;
```



xx2000000880

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Notes

The duration after the last DispL/C-Off instruction until the selection of the **MoveForceFill** instruction should not be less than 16 ms. The duration of the filling process and the subsequent prepressure regulation determines when the next DispL/C-On instruction can be applied. The duration of the filling process, as well as the applicator pressure regulation, are dependent on several factors (see *Prepressure regulation on page 406* and *Filling on page 411*).

Arguments

Arguments	Description
[\L]	Data type *switch* Requirement for linear movement of robot at specified point.
[\J]	Data type *switch* Requirement for axis movement of robot at specified point.
[\Label]	Data type *string* Retrieval of doser designation for the selected action. Valid values: ["D1"/"D1A"/"D1B"/"D2"/"D2A"/"D2B"/"D3"/"D3A"/"D3B"] When it is a single doser, the specification \Label can be omitted.
[\Volume]	Data type *num* Numerical value (in ml) for the refill volume. The material quantity (absolute) to be refilled during the filling process is specified. The more quantity requested, the longer the filling process takes. Instead of this parameter, the parameter "Max" (see below) can be used.
[\Max]	Data type *switch* The doser is filled up to the full volume when this parameter is used.
[\RegOn]	Data type *switch* Applicator pressure regulation is activated for the requested applicator prepressure (\GunPressure) for the start of the next seam (DispL\ON).
[\RegOff]	Data type *switch* Datentyp switch Applicator pressure regulation is deactivated for the requested applicator pre-pressure for the start of the next seam (DispL\ON).
[\CtrlOn]	Data type *switch* Applicator pressure control is activated for the request applicator pre-pressure (\GunPressure) for the start of the next seam (DispL\ON).
[\CtrlOff]	Data type *switch* Applicator pressure control is deactivated for the request applicator pre-pressure for the start of the next seam (DispL\ON).
[\GunPressure]	Data type *num* Numerical value for the prepressure to be set (in bar) for the following bead. Following the filling process a prepressure regulation must be carried out. This is automatically performed after the filling process.
ToPoint	Data type *robtarget* Destination of robot and external axis.
Speed	Data type *speeddata* The speed data defines the speeds of the TCP (Tool Center Point), as well as reorientation speeds and speeds of the external axes.

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8.10.3 MoveForceFill
Continued

Arguments	Description
Zone	Data type *zonedata* The zone data defines the size of the zone track in a programmed point.
Tool	Data type *tooldata* The TCP is the point of the robot mechanics which is moved to the specified destination. The tool data specifies this point of the robot mechanics.
[\WObj]	Data type *wobjdata* The work object (coordinate system), to which the robot position in the instruction refers. This argument can be omitted; in this case, the position refers to the global coordinate system. In contrast, if a stationary TCP or externally coordinated axis is used, this argument must be specified.

8.10.4 MoveReadyApp

Use

The RAPID instruction **MoveReadyApp** is used to check the application readiness of the dispenser before a bead. In order to be able to perform the application process, a check is carried out to see whether a pressure regulation, which was requested shortly beforehand, at the time the instruction **MoveReadyApp** was selected, has ended. A check is also carried out to see whether the refill process has ended if it was requested beforehand in the application program (only for dispensers in single mode). The instruction is not used to check the change of a needle number.

Description

MoveReadyApp is used to check at a precisely defined position in the application program whether a previously requested pressure regulation has been completed. If the pressure regulation has been completed at the point at which the check is processed, then the manipulator will continue its movement without interruption. If the pressure regulation is not yet completed, then the robot is automatically forced to stop its movement to wait until the pressure regulation is completed or to cancel the pressure regulation. Then the movement of the manipulator is continued along its track. The instruction is also used to check whether a filling process which was previously requested in the application program has been completed (only in single mode).

If a pressure regulation (pressure control) was requested, the parameter **bStopMove** should be used. This parameter is used to determine whether the manipulator stops the movement at the programmed point **MoveReadyApp** if the pressure regulation is not yet completed at this point. It automatically continues the movement when the pressure regulation is completed (**bStopMove**:=TRUE). If the parameter **bStopMove** is set to FALSE, then the pressure regulation is canceled at the programmed point **MoveReadyApp** and the application program is continued. Also in this case it may cause a brief movement stop of the manipulator, as the pressure regulation is canceled.

In the event of a request for a refill process (only in single mode), the parameter **bStopMove** is not relevant. The manipulator would stop the movement in each case if the refill process is not completed at the programmed point **MoveReadyApp**, and continue the movement when the refill process is completed.

The instruction can also be carried out before the first bead in the application program to ensure that the pressure regulation which is performed before the first bead is completed.

If in the Parameter Wizard the selection is made that heated material is required to be able to move the doser, the tempering status (doDXTmpCondState=1) is also checked. The robot movement would only be continued then as soon as the condition (doDXTmpCondState=1) is also satisfied.

Continues on next page

8.10.4 MoveReadyApp
Continued

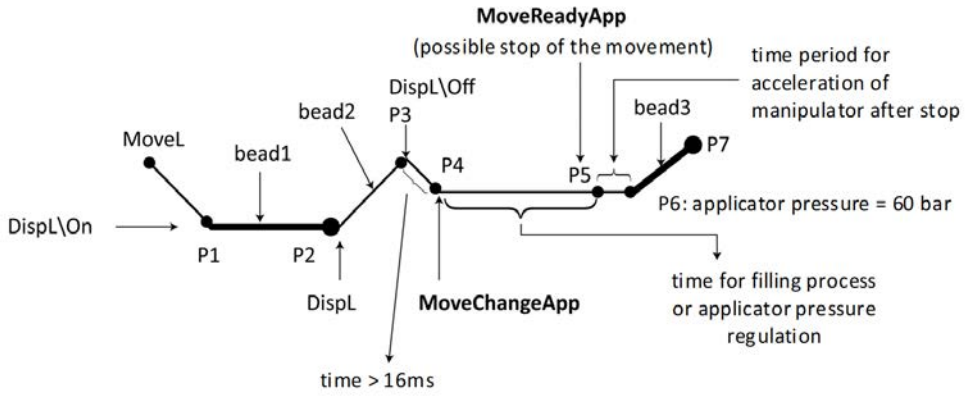
Examples

Example 1

```
MoveReadyApp\L\Label:="D1"\bStopMove:=TRUE,p10,v300,z50,tool0\wobj:=wobj0;
```

Example 2

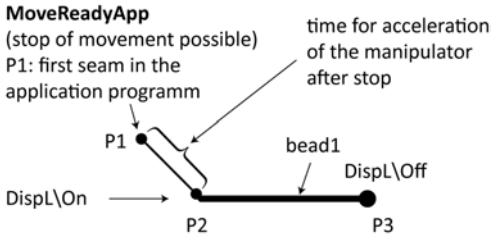
```
MoveJ P0,v500,z20,tool0\wobj:=wobj0;
DispL\On, P1,v500,bead1,z20,tool0\wobj:=wobj0;
DispL P2,v500,bead2,z20,tool0\wobj:=wobj0;
DispL\Off, P3,v500,bead1,z20,tool0\wobj:=wobj0;
MoveChangeApp\Label:="D1"\GunPressure:=60\NeedleNo:=
2,P4,v300,z50,tool0\wobj:=wobj0;
MoveReadyApp\Label:="D1"\bStopMove:=TRUE,P5 v500,z20,tool0\wobj:=wobj0;
DispL\On, P6,v500,bead3,z20,tool0\wobj:=wobj0;
DispL\Off, P7,v500,bead3,z20,tool0\wobj:=wobj0;
```



xx2000000881

Example 3

```
MoveReadyApp\Label:="D1"\bStopMove:=TRUE,P1,v300,z50,tool0\wobj:=wobj0;
DispL\On, P2,v500,bead1,z20,tool0\wobj:=wobj0;
DispL\Off, P3,v500,bead1,z20,tool0\wobj:=wobj0;
```



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Note

The duration after the last DispL/C-Off instruction until the selection of the MoveChangeApp instruction should not be less than 16 ms. The time between the instruction MoveReadyApp and the next DispL/C instruction should be selected so that sufficient acceleration of the manipulator is guaranteed after a stop so that the optimal application speed of the manipulator can be reached at the point of the next DispL/C instruction.

Arguments

Arguments	Description
[\L]	Data type *switch* Requirement for linear movement of robot at specified point.
[\J]	Data type *switch* Requirement for axis movement of robot at specified point.
[\Label]	Data type *string* Retrieval of doser designation for the selected action. Valid values: ["D1"/"D2"/"D3"] When it is a single doser, the specification \Label can be omitted.
[\StopMoving]	Data type *switch* The parameter StopMoving is only active if the previously requested action (for e.g. request for applicator pressure by MoveChangeAppL/J or MoveForceFill) is not completed at the time the trigger point is reached with the instruction MoveReadyAppL/J. StopMoving present; waits for end of the previously requested action. StopMoving not present; pressure regulation aborted. Even so the robot may be stopped because it must wait for termination of the pressure regulation. Before IDFP 5.15.8593/5.61.4593 the StopMoving parameter was represented by bStopMove.
ToPoint	Data type *robtarget* Destination of robot and external axis.
Speed	Data type *speeddata* The speed data defines the speeds of the TCP (Tool Center Point), as well as reorientation speeds and speeds of the external axes.
Zone	Data type *zonedata* The zone data defines the size of the zone track in a programmed point.
Tool	Data type *tooldata* The TCP is the point of the robot mechanics which is moved to the specified destination. The tool data specifies this point of the robot mechanics.
[\WObj]	Data type *wobjdata* The work object (coordinate system), to which the robot position in the instruction refers. This argument can be omitted; in this case, the position refers to the global coordinate system. In contrast, if a stationary TCP or externally coordinated axis is used, this argument must be specified.

Continues on next page

8.10.4 MoveReadyApp
Continued

Process simulate

For Process simulate an additional routine was created that can be used. MoveReadyAppL and MoveReadyAppC will run internally the instructions MoveReadyApp/L and MoveReadyApp/C. These can be used alternatively.

8.10.5 SetAppData

Note

This routine is not synchronized with a movement. If enough time is not observed before and after selection of the routine, unexpected behavior may result due to signal overlapping (trigger fault).

Use

The RAPID routine **SetAppData** is used to change application parameters, such as the number of software filter numbers or needle numbers, before the application.

Description

SetAppData can also be performed during the application program. The instruction is not triggered, i.e. it is not performed at a defined point in the application program. To perform a triggered event, the instruction **MoveChangeApp** (see *MoveChangeApp on page 427*) or **Move** is suitable.

SetAppData should be selected before the selection of the routine **PreApplicationD1** (**PreApplicationD2**, **PreApplicationD3**) in the user-specific RAPID routine **User_PreApplicationD1** (**User_PreApplicationD2**, **User_PreApplicationD3**). This RAPID routine is performed after the transfer of the program number and before the start of the application.

Examples

(in user-specific RAPID routine)

```
PROC User_PreApplicationD1 ()
IF nProgNo=23 THEN
SetAppData\Label:="D1A"\FilterNo:=2;
ENDIF
ENDPROC
```

This example shows how the software filter number for doser D1A is set to 2 before the application. Alternatively, an additional routine can also be added in the application program, which is then selected in the user-specific routine User_PreApplicationD1.

Notes

If "D1" is transferred as a label for the specification of a filter number, then the filter number for the doser is set to D1A and if available for the doser D1B. Therefore with a single doser, "D1A" must be specifically selected.

Upon specification of the needle number, both "D1" and "D1A" can be used as labels, as only one applicator is available for each dispenser.

Continues on next page

8.10.5 SetAppData
Continued

Arguments

Arguments	Description
[\Label]	Data type *string* Data type string Retrieval of dispenser/doser designation for the selected action. Valid values: ["D1"/"D1A"/"D1B"/"D2"/"D2A"/"D2B"/"D3"/"D3A"/"D3B"] When it is a single doser, the specification of the \Label argument can be omitted.
[\NeedleNo]	Data type *num* Numerical value for the selection of the needle number for the following bead.
[\FilterNo]	Data type *num* Numerical value for the selection of the software filter for the following bead.

8.10.6 GunPrsDX (for doser 1, X=1; for doser 2, X=2; for doser 3, X=3; for doser 4, X=4)

Note

This routine is not synchronized with a movement. If enough time is not observed before and after selection of the routine, unexpected behavior may result due to signal overlapping (trigger faults).

Description

After the routine **GunPrsDX** is selected, an applicator pressure control or regulation is started. As the routine only starts the pressure regulation or control, but does not wait for its completion, it is recommended to then check with the routine **DXReadyForApp** (and if nec. wait) whether the pressure regulation/control has been completed. Otherwise, there is the risk that a DispL\On instruction will run in the application program, without an open application nozzle as the pressure regulation requires a closed nozzle. This can lead to trigger faults.

Whether a prepressure control and/or regulation is performed depends on which parameters are selected in the user interface under *Configuration - Dispenser - DX pressure*.

Examples

```
PreApplicationD1;
MoveJ pReadyPos,v500,z20,tool0\wobj:=wobj0;
DispL \On, P1, v300, bead1,z10,tool1;
DispL P2,v300,bead2,z10,tool1;
DispL \Off, P3, v300, bead2,z10,tool1;
...!Wait time, as GunPrsD1 not triggered
GunPrsD1\pressure:=40;
D1ReadyForApp;
MoveJ p4,v500,z20,tool0\wobj:=wobj0;
DispL \On, P5, v300, bead1,z10,tool1;
DispL P6,v300,bead2,z10,tool1;
DispL \Off, P7, v300, bead2,z10,tool1;
MoveJ p4,v500,z20,tool0\wobj:=wobj0; …
PostApplicationD1;
```

Notes

If a time-sensitive applicator pressure regulation/control is required during the application mode, it is recommended to use the Rapid instruction MoveChangeApp.

Continues on next page

8.10.6 GunPrsDX (for doser 1, X=1; for doser 2, X=2; for doser 3, X=3; for doser 4, X=4)
Continued

Limitation

The Rapid routine can only be used in application mode. The needle must be closed when selecting the routine. The doser cannot perform any other function, for e.g. a filling process, during the selection.

Argument

Arguments	Description
[\Pressure]	Data type *num* Numerical value for the selection of the prepressure (in bar).

8.10.7 DXReadyForApp (for doser 1, X=1; for doser 2, X=2; for doser 3, X=3; for doser 4, X=4)

Note

This routine is not synchronized with a movement.

Use

The RAPID routine **DXReadyForApp** is used to check the application readiness of the doser before the start of a bead.

Description

The application readiness of the doser is prevented as long as the following actions are performed:

- Applicator pressure regulation or control
- Manual or automatic filling (not with dual doser; a doser can be busy with one filling process.)

The following condition must be satisfied:

- If tempering is required for application, wait for the tempering signal.

If all conditions are satisfied for completing the routine, the robot is not stopped and continues its movement.

If at least one of the conditions is not satisfied, the robot is forced to stop in this routine with a Rapid command (**StopMove\Quick**). An automatic (**StartMove**) movement is effected as soon as all conditions for the application readiness are satisfied. The routine can be selected before reaching a DispL\On instruction of a bead. A temporal safety margin of approx. 3 s must be observed, as the instruction is not triggered and there must be the option to stop and restart the robot in time before the On instruction. It is also possible to bring forward the program pointer a few seconds. A certain braking and acceleration path is also required, depending on the requested final speed of the robot. In order to perform a triggered check of the application readiness, the Rapid instruction **MoveReadyApp** can be used.

Examples

```
PreApplicationD1;
MoveJ pHomePos,v500,z20,tool0\wobj:=wobj0;
D1ReadyForApp;
!Then infeed movement
MoveJ pReadyPos,v500,z20,tool0\wobj:=wobj0; …
DispL \On, P1, v300, bead1,z10,tool1;
DispL P2,v300,bead2,z10,tool1;
DispL \Off, P3, v300, bead2,z10,tool1;
PostApplicationD1;
```

Continues on next page

8.10.7 DXReadyForApp (for doser 1, X=1; for doser 2, X=2; for doser 3, X=3; for doser 4, X=4)
Continued

Limitation

The routine D1ReadyForApp can only be used in application mode. It can only be selected when there is no current application flow or an application flow has not been requested. The current application flow must be 0. The needle must be closed.

8.11 User-specific (project-specific) adjustments

The IDFP system is designed to perform user- or project-specific adjustments. Various RAPID user routines are available for this purpose.

In addition, user-specific (project-specific) adjustments and routines can be added in all user modules (for e.g. nozzle change, etc.).

Continues on next page

8.11.1 User-specific routines in main task T_Rob1

All user-specific routines for dispenser 1 are stored in the module IDFP D1User.sys and exist similarly for every available dispenser (D1, D2, etc.).

User_PreApplicationD1

The RAPID routine **User_PreApplicationD1** is selected in the routine **PreApplicationD1**, which sets dispenser D1 to application mode. The routine can be adapted specific to the user. Here processes can be integrated which are to be performed directly before starting the application.

User_PostApplicationD1

The RAPID routine **User_PostApplicationD1** is selected in the routine **PostApplicationD1**, which changes dispenser D1 from application mode to idle mode. The routine can be adapted specific to the user. Here processes can be integrated which are to be performed directly after ending the application.

8.11.2 User-specific routines in dispenser task

All user-specific routines are stored in the respective module of the doser and exist similarly for every available doser (D1A, D1B, D2A, D2B, etc.)

User_D1A_PreForward	Implementation directly before start of manual function "Move forwards".
User_D1A_PostForward	Implementation directly after end of manual function "Move forwards".
User_D1A_PreBackward	Implementation directly before start of manual function "Move backwards".
User_D1A_PostBackward	Implementation directly after end of manual function "Move backwards".
User_D1A_PreCalib	Implementation directly before start of manual function "Calibrate".
User_D1A_PostCalib	Implementation directly after start of manual function "Calibrate".
User_D1A_PreFill	Implementation directly before start of manual function "Fill" and before filling process in single mode.
User_D1A_PostFill	Implementation directly after end of manual function "Fill" and after filling process in single mode.
User_D1A_PreEmpty	Implementation directly before start of manual function "Empty".
User_D1A_PostEmpty	Implementation directly after end of manual function "Empty".
User_D1A_PreFlowCheck	Implementation directly before start of manual "Flow check" function.
User_D1A_PostFlowCheck	Implementation directly after end of manual "Flow check" function.
User_D1A_PrePressureRelief	Implementation directly before start of manual function "Pressure relief".
User_D1A_PostPressureRelief	Implementation directly after end of manual function "Pressure relief".
User_D1A_PrePurge	Implementation directly before start of manual function "Purge".
User_D1A_PostPurge	Implementation directly after end of manual function "Purge".
User_D1A_PreHoseAccu	Implementation directly before start of service routine hose breathing compensation (IDFP_D1HoseAccu).
User_D1A_PostHoseAccu	Implementation directly after end of service routine hose breathing compensation (IDFP_D1HoseAccu).

8.11.3 User-specific routines in material supply task

All user-specific routines are stored in the material supply module and exist similarly for every available pump (P1A, P1B, P2A, P2B, etc. for integrated pump option).

The RAPID module **IM_P1Ext_User** can be adapted specific to the user, if an external material supply is to be connected to the IDFP. In this module external pump supplies for example can be switched on.

8.11.4 User-specific routines in error task

All user-specific routines are stored in the module IE_User.sys.

The user must ensure that in this routine no time-sensitive actions such as idle times are implemented. In these routines the forwarding of an error to a PLC (external control system) can be programmed by the user for example.

Following an error the following routines are selected once depending on the defined error class:

Error class	Routine	Meaning
1	MTStopUser	Stops the main tasks
2	EOCStopUser	Stops after end of cycle
3	NoStopUser	No stop
4	WarnUser	Warning
5	InfoUser	Information

The last four digits of the active error are transferred to the respective routine (num nError).

Example:

With error number 115101 the variable nError has the value 5101.

For further information on error classes see *Configuration - Error messages on page 357* and *Statistical data (optional) on page 457*.

8.11.5 User-specific routines in statistics task (statistics option)

User_PreStatisticD1

The RAPID routine **User_PreStatisticD1** is performed before writing the statistics data. Here user-specific data can be stored for statistics data acquisition (for e.g. cycle time, program numbers, option numbers, etc.).

User_PostStatisticD1

The RAPID routine **User_PostStatisticD1** is performed after writing the statistics data. Here values from the statistics can be evaluated and user-specific signals or actions deduced.

8.11.6 User-specific tasks

For external devices, for e.g. lubrication, camera systems, PLC or other devices, additional tasks can be created in the system. Take care that no system-relevant tasks or signals of the IDFP are influenced or deleted.

In addition, user-specific adjustments and routines can be added in all user modules (for e.g. nozzle change, etc.).

8.11.7 User-specific request for basic functions

The basic functions of the dispenser such as fill, empty, purge, flow check, pressure relief, move forwards, move backwards, etc., can also be requested in user-specific routines (for e.g. service runs).

Example: Request for purging in application program

Index file segments.ndx:

```
10006,yPurge
PROC yPurgeMain ()
!Move to purge position
MoveJ pPurgePos,v500,z20,tool0\wobj:=wobj0;
!Purge position reached
WaitTime \InPos,0;
!Set needle number for purging to needle 2
nG1NeedleSel:=2
!Set request for purging D1A
SetGO goD1Order,16;
!Wait on feedback that purging function completed
WaitUntil GOutput(goD1Order)=0 \MaxTime :=60;
!Move to home position
MoveJ pHomePos,v500,z20,tool0\wobj:=wobj0;
ENDPROC
```

The group signal **goDXOrder** remains set until the function has been completed. Then the group signal is reset to 0.

Function requests

Function (X=1, 2, 3, 4)	Order number (goDXOrder) (X=1, 2, 3, 4)
Fill DXA	11
Empty DXA	12
Move backwards DXA	13
Move forwards DXA	14
Calibrate DXA	15
Purge DXA	16
Flow check DXA	17
Prepare DXA and DYA (only with 2K option)	18
Manual application DXA/DYA (only with 2K option)	19
Fill DXB	21
Empty DXB	22
Move backwards DXB	23
Move forwards DXB	24

Continues on next page

Function (X=1, 2, 3, 4)	Order number (goDXOrder) (X=1, 2, 3, 4)
Calibrate DXB	25
Purge DXB	26
Flow check DXB	27
Prepare DXB and DYB (only with 2K option)	28
Manual application DXB/DYB (only with 2K option)	29
Stop current requested function	31

Mode and status of dispenser

Mode describes the overall condition of the dispenser. A mode change takes place when a function is requested, such as manual functions, circulation or application, etc.

The group output **goD1Mode** contains the dispenser mode coded in numbers.

The following modes are possible:

Number	Mode	Explanation
0	Undefined	After a restart, if a calibration has not yet been carried out, the doser is in an undefined state.
1	Ready	The doser is ready to perform an action. This state can only be attained after calibration.
2	Calibration	The doser is calibrated.
3	Application	The doser applies material.
4	Circulation	The doser circulates locally or globally (via material return hose).
5	Purge	The doser performs a defined number of purging cycles. This mode is also used for the flow check (FlowCheck).
6	Manual functions	The doser performs a function (emptying, filling, pressure relief, leakage monitoring, etc.).

Status describes the current state of the individual doser of a dispenser. A dual doser comprises doser D1A and doser D1B. Both have a separate status.

The group outputs **goD1A_State** and **goD1B_State** contain the current status of the respective doser.

The following statuses are possible:

Number	Status	Explanation
0	Undefined	The doser is in an undefined state following a start if a status has not yet been defined.
1	Ready	After the doser has performed a prior action and is between minimum and maximum, it bears the status "Idle".
2	Full	The filling quantity has reached the set maximum.
3	Empty	The filling quantity has reached the set minimum.
4	Fill	The piston moves up, the inlet valve is opened.
5	Empty	The piston moves down, the outlet valve or the circulation valve is opened.

Continues on next page

8.11.7 User-specific request for basic functions
Continued

Number	Status	Explanation
6	Set pressure	The inlet and circulation valves are closed, the motor sets an appropriate prepressure via the pressure regulation.
7	Follow	Outlet and inlet valves of the doser are closed, via the pressure regulation the inactive doser takes on the current pressure of the active doser (only with dual doser).
8	Disabled	The named doser is disabled. No function will be executed

The group outputs **goD1Mode**, **goD1A_State** and **goD1B_State** (Analog: **goD2Mode**, **goD2A_State** and **goD2B_State** and **goD3Mode**, **goD3A_State** and **goD3B_State**) can be read and displayed by external devices.

8.12 Manual functions default needle

8.12.1 General information

By default, the nozzle used for manual functions is nozzle 1.

This default selection can be changed for all manual functions, including doser calibration, movement and emptying.

Changing this parameter is recommended during commissioning, e.g. when the purge position is chosen. Furthermore, this parameter can be used for troubleshooting, e.g. if the doser does not calibrate, to verify that the used nozzle is not the problem.

8.12.2 Usage

To change the default nozzle, the variable nGxNeedleSel, where **x** corresponds to the dispenser the change shall be applied to, must be set.

For a temporary change the variable can be set by using the program data window.

For a permanent change the variable should be set in the user pre- and post-routines in the dispenser task.

Setting the variable to 1 selects needle 1, setting the variable to 2 selects needle 2, e.g.:

```
! sets the needle 2 to be used for calibration of dispenser 1.
nG1NeedleSel:=2;
```

8.13 Statistical data (optional)

Predefined values are compiled by the system for the recording of statistical data, which can be retrieved by the user. The data in the table of the record "StatDataCommon" is not compiled by the system (exclude the elements {9} Date and {10} Time), since they are user-specific values, which the user must provide himself (user data). The user must provide the values in a Rapid-Routine User_PreStatisticDX (Module IDFP_DXUser.sys). The routine runs every time the Rapid-Routine ReadMeasureDX and the Rapid-Instruction MoveReadMeasure are called, before the statistical data is written. Certain data is only provided for the use of the corresponding option.

Certain conditions have to be satisfied in order to be able to use the statistical data acquisition.

- The software option "Statistic functionality" must be installed.
- Data which is to be evaluated must be configured in the user interface under Configuration - Statistics.
- Rapid Routines must be called up in the main program of the robot for the measurement and generation of data specific to the user. (see *Structure of the statistical data acquisition on page 461*).

Continues on next page

8.13.1 Predefined statistic data evaluation

For ease of use there is a predefined set of statistical data. The statistic data evaluation is as a default deactivated after the system installation. To activate this predefined set the parameter bIDFP_Statistic (boolean value in module IDFP_D1User.sys task T_ROB1) has to be set to =TRUE. The relevant routines are run automatically when running an dispenser application cycle with the routines PreApplicationDx and PostApplicationDx. The configuration of the relevant data can be done on the IDFP TPU under Dispenser - configuration - statistic.

To add user relevant data to the statistic file please see *Writing data to the statistics file on page 459*.

8.13.2 Writing data to the statistics file

Data is written to a CSV file at a user-defined point in the main program. Depending on the selection made at the TPU, the CSV file is newly created or extended. Before the data is written to the file, the user has the option to add his own data to the data record. This happens in the User-Routine User_PreStatisticD1 (User_PreStatisticD2, User_PreStatisticD3). All data in this Routine is adapted specifically to the user.

A data set of statistical data consist of the following values:

statDataCommon{x}.AppDataName (Name of the data record, for e.g. "Program number", transfer as string.),

statDataCommon{x}.AppDataValue (Value of the data record, for e.g. "25", transfer as string.).

Which statistical data should be written to which column of the CSV file can be freely configured via the user interface.

8.13.3 Reading and evaluating data from the statistics file

Reading and evaluating data from the statistics is only possible with the current data record (data from the last measure point). Therefore, data, which is to be evaluated or processed after every measurement (Rapid Routine ReadMeasureDX), must be retrieved in the user-specific Routine User_PostStatisticD1 (User_PostStatisticD2, User_PostStatisticD3). This Routine is run during each call of the Routine ReadMeasureDX, after generating the current statistics data record.

All data is stored temporarily in a data array in Rapid, until the Rapid-Routine ResetMeasureDX has been called.

If, for example, the last application time is read and sent to external devices, the following entry must be added in the Routine User_PostStatisticD1:

Array number Application time D1 (see Table Chapter 9.x.x): 38

Rapid-Code example

```
...
SetGO goPLC_ApplTime, StrToNum(statDataD1{27}.AppDataValue);
...
```

Tip

A list of all statistical elements can be found in the Appendix.

Note

Depending on the system configuration, not all statistical elements are available.

8.13.4 Structure of the statistical data acquisition

This chapter is only relevant if the user does not want to use the predefined structure of the statistic data evaluation. This is only relevant if the user needs to evaluate data in between an application cycle instead of after the application cycle like the default configuration.

The structure of the statistical data acquisition is effected in the main program of the robot in Task T_ROB1.

The acquisition consists of various routines and instructions, which the user must add in his main program according to requirements. The Rapid-Routines and instructions allow data to be deleted, measurements to be started and retrieved, and measured data to be written to a statistics file (in CSV format). The data which can be recorded here is shown in Chapter 9.x.x1.1.

The individual routines and instructions are explained in more detail below.

(X=1 for Dispenser1, X=2 for Dispenser2, X=3 for Dispenser3, X=4 for Dispenser4, X=X for all dispensers in the system)

Routine InitMeasureDX (InitMeasureD1, InitMeasureD2)

The Routine InitMeasureDX can be called up in an initialisation routine before the program is started. It resets certain measured values. It has to be called up only once.

Routine ResetMeasureDX (ResetMeasureD1, ResetMeasureD2)

The Rapid Routine ResetMeasureDX resets all consumption data in the IPS. All temporarily stored data (string statDataD1TempMem{i,j}) is also deleted. The temporary array is used to store a maximum of 16 measurements. If this number of measurements is reached, the temporary array MUST be deleted with the retrieval of the Routine ResetMeasureDx.

Routine ReadMeasureDX (ReadMeasureD1, ReadMeasureD2)

The Routine ReadMeasureDX triggers a measurement of the data for all dispensers in the system. The Routine ReadMeasureD1 only triggers a measurement for Dispenser D1.

ReadMeasureDX is used to trigger the measurement of application parameters. The measurement includes all data (depending on available dispensers and options), which are listed in Table 9.x. The Routine is used to start measurement of statistical data of the corresponding dispenser. If the Routine *ReadMeasureDX* is called up, measurements are started for all dispensers available at the system. The measured data is filed in a temporary memory (string statDataDxTempMem and string statDataCommonTempMem).

It must be ensured that no application is running when the Routine is called up. The application nozzle must be closed at the time of the measurement. The last application must be completed at least 3 seconds beforehand, before the routine can be called up; otherwise, the forward looking Rapid program pointer could possibly cause an incorrect measurement. A measurement can only be triggered in application breaks while the dispenser is in application mode. In order to be able to guarantee a synchronised measurement with short application intervals, a

Continues on next page

synchronised Rapid instruction (MoveReadMeasure) can be used. In the case of longer application intervals, the measurement can be started by calling up the Rapid-Routine ReadMeasureDx at the earliest 3 seconds after the end of the last application.

If the Rapid-Routine ReadMeasureDX was run, an entry can be made in a statistics file with the retrieval of the Rapid-Routine WriteFileDX.

Alternatively, after running the measurement, only the application status since the retrieval of the Routine ResetMeasureDX can be queried.

Function D1AppStat (D2AppStat)

The application status combines the following data:

- Material outlet temperature Status [OK/not OK] since last retrieval of ResetMasureDX (StatDataDx{5}), only if temperature control is installed (Option Peltier or electrical heating).
- Volumes of dispensers DX Status Volume deviation [OK/not OK] since last retrieval of ResetMasureDX (StatDataDX{37}).
- Application interruption (Cancel DispL/J Instruction as a result of, for example, fault) since last retrieval of ResetMasureDX (StatDataDX{40}).

A prerequisite for calling up the function is the previous execution of the Routine ReadMeasureDX. Then the application status is available and can be queried with the function D1AppStat. If the function D1AppStat is called up immediately after the retrieval of the Rapid-Instruction MoveReadMeasure or ReadMeasureDX, it results in a wait time (of up to 100 ms) in the function D1AppStat, as the current application status must be retrieved and evaluated. In the function D1AppStat, the group output goD1AppStat is evaluated. It can be used for the external evaluation of the application status. goD1AppStat can assume the following values:

0 = No data available for evaluation

1 = Evaluated data available and the evaluation contains "OK" (OK) as a result

2 = Evaluated data available and the evaluation contains "NOT OK" (NOK) as a result. In that case the evaluated bead could be checked manually.

The function returns the status as bool; TRUE → IO, FALSE → NIO.

Example

```
…InitMeasureD1
PROC Application ()
!Resetting of the temporary measured values
ResetMeasureD1;
!Put dispenser in application mode
PreApplicationD1;
MoveJ P0,v500,z20,tool0\wobj:=wobj0;
MoveReadyApp\L\Label:="D1A",bStopMove:=TRUE,
P1,v500,bead1,z20,tool0\wobj:=wobj0;
DispL\On, P2,v500,bead1,z20,tool0\wobj:=wobj0;
DispL P3,v500,bead2,z20,tool0\wobj:=wobj0;
```

Continues on next page

```
DispL\Off, P4,v500,bead1,z20,tool0\wobj:=wobj0;
!--> Movement time with closed nozzle >=3s!!
MoveJ P5,v500,z20,tool0\wobj:=wobj0;
MoveJ P6,v500,z20,tool0\wobj:=wobj0;
MoveJ P7,v500,z20,tool0\wobj:=wobj0;
!<--
!Start/Activate measurement D1
ReadMeasureD1;
!Query the application status. If return value TRUE ' OK, if FALSE 'NOK, or there is no evaluated
data. (There was a fault during the measurement)
IF D1AppStat()=TRUE THEN
!Status OK. Next application process
Application2;
ELSE
!Status not OK, end application.
ApplicationEnd;
ENDIF
ENDPROC
PostApplicationD1
ENDPROC
```

Routine WritefileDX (WriteFileD1, WriteFileD2)

If the Routine WriteFileDX is called up, data for all dispensers in the system is written in to the CSV file. WriteFileD1 only writes data from dispenser D1 to the CSV file.

The Routine creates a statistics file in CSV format upon retrieval and one row of statistical data, as it was configured by the user. The data must be retrieved beforehand with the Routine Read-MeasureDX.

Example

```
PROC Application ()
ResetMeasureD1;
PreApplicationD1;
MoveJ P0,v500,z20,tool0\wobj:=wobj0;
MoveReadyApp\L\Label:="D1A",bStopMove:=TRUE,
P1,v500,bead1,z20,tool0\wobj:=wobj0;
DispL\On, P2,v500,bead1,z20,tool0\wobj:=wobj0;
DispL P3,v500,bead2,z20,tool0\wobj:=wobj0;
DispL\Off, P4,v500,bead1,z20,tool0\wobj:=wobj0;
!--> Movement time with closed nozzle >=3s!!
MoveJ P5,v500,z20,tool0\wobj:=wobj0;
```

Continues on next page

8.13.4 Structure of the statistical data acquisition
Continued

```
MoveJ P6,v500,z20,tool0\wobj:=wobj0;
MoveJ P7,v500,z20,tool0\wobj:=wobj0;
!<--3 seconds or fine point
ReadMeasureD1;
WriteFileD1;
PostApplicationD1
ENDPROC
```

Instruction MoveReadMeasure

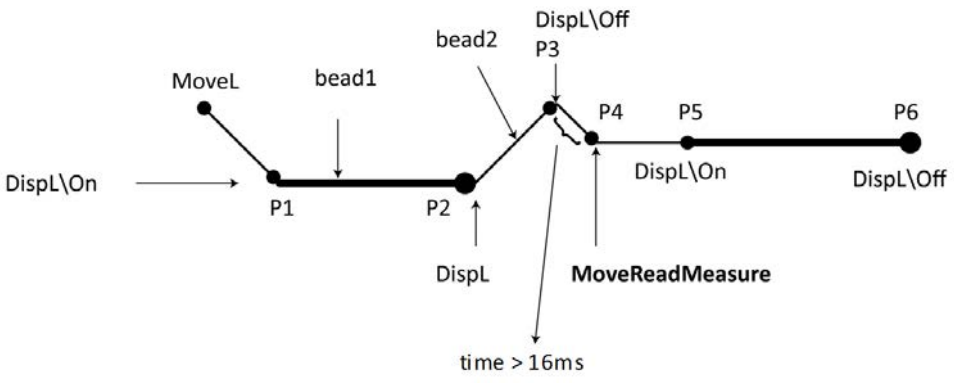
The Rapid instruction MoveReadMeasure is used for the activation of a triggered measurement at a defined track point of the robot. The activation of the measurement is connected to a robot movement. The instruction can be called up a maximum of 16 times before all temporarily stored data has to be deleted by the Routine ResetMeasure.

By performing the instruction in an application program, predefined data of certain integrated system components (dispensers, temperature control, pump, etc.), as well as user-specific data at the time of the retrieval, is measured. By calling up additional, optional transfer parameters, the measured data can be written to a statistics file (CSV format). The instruction can only be called up when the nozzle is closed. As the instruction is performed at a triggered point (predefined position), it can be performed shortly after the application nozzle is closed (16 ms). The Routine is called up in place of a MoveL or MoveJ instruction.

Examples

Example 1

```
DispL \On, P1, v300, bead1,z10,tool1;
DispL P2, v300, bead1,z10,tool1;
DispL \Off, P3, v300, bead1,z10,tool1;
MoveL P4,v300, z10,tool1;
MoveReadMeasure\L\Label:="D1A",P5,v100,fine,tSPA\WObj:=wobj0;
DispL \On, P5, v300, bead1,z10,tool1;
DispL \Off,P6, v300, bead1,z10,tool1;
```



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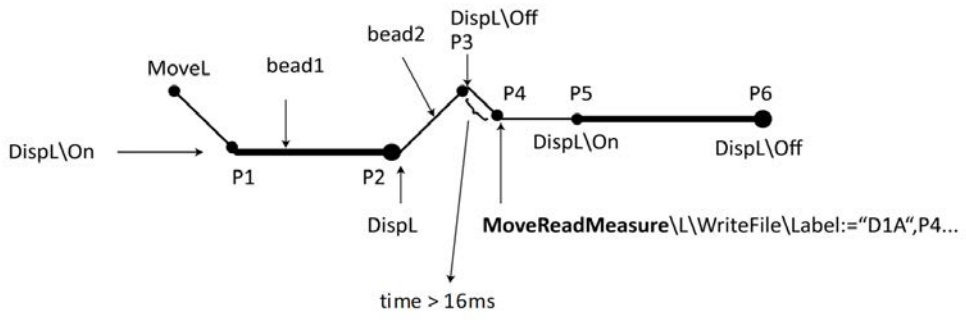
A measurement is carried out here at point P4. The measurement data is not written to the statistics file and not evaluated. If an evaluation is to be effected, then either the Rapid function D1AppStat must be evaluated or an entry made in the statistics file. (see Example 2)

Example 2

```
DispL \On, P1, v300, bead1,z10,tool1;
DispL P2, v300, bead1,z10,tool1;
DispL \Off, P3, v300, bead1,z10,tool1;
MoveL P4, v300, z10,tool1;
MoveReadMeasure\L\Label:="D1A",P5,v100,fine,tSPA\WObj:=wobj0;
IF D1AppStat()=TRUE THEN
        !Application status since last retrieval of ResetMeasure is OK.
        !Temperature is checked if available, volume deviation is checked
        !and Application interruption at the bead
        !...application is continued
        DispL \On, P5, v300, bead1,z10,tool1;
        DispL \Off, P6, v300, bead1,z10,tool1;
ELSE
        ! Application status since last retrieval of ResetMeasure is NOK.
        ! Robot does not continue to apply
        MoveL PHomePos, v300, z10,tool1;
ENDIF
```

Example 3

```
DispL \On, P1, v300, bead1,z10,tool1;
DispL P2, v300, bead1,z10,tool1;
DispL \Off, P3, v300, bead1,z10,tool1;
MoveReadMeasure\L\WriteFile\Label:="D1A",P4,v100,fine,tSPA\WObj:=wobj0;
DispL \On, P5, v300, bead1,z10,tool1;
DispL \Off,P6, v300, bead1,z10,tool1;
```



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8.13.4 Structure of the statistical data acquisition
Continued

A measurement is triggered here at point P4. Then an entry is made directly in the statistics file, as the optional parameter "\WriteFile" was called up. Also here the data for the application status could be checked directly with the function D1AppStat.

```
...
MoveL P4,v300, z10,tool1;
MoveReadMeasure\L\WriteFile\Label:="D1A",P5,v100,fine,tSPA\WObj:=wobj0;
IF D1AppStat()=TRUE THE
!Application OK
ELSE
!Application NOK
ENDIF
DispL \On, P5, v300, bead1,z10,tool1;
...
```

Notes

The duration after the last DispL/C-Off instruction until the MoveReadMeasure instruction is called up should not be less than 16 ms.

The instruction cannot be performed outside the application cycle.

If the function D1AppStat is called up immediately after the retrieval of the Rapid-Instruction MoveReadMeasure or ReadMeasureDX, it results in a wait time (of up to 100 ms) in the function D1AppStat, as the current application status must be retrieved and evaluated.

Arguments

Arguments	Description
[\L]	Data type *switch* Request for linear movement of robot at specified point.
[\J]	Data type *switch* Request for axis movement of robot at specified point.
[\label]	Data type *string* Retrieval of dispenser designation for the selected action. Valid values: ["D1"/"D1A"/"D1B"/"D2"/"D2A"/"D2B"/"D3"/"D3A"/"D3B"/"DX"] **If the Label parameter is transferred with the valid value "DX", then the measurement is performed for all dispensers in the system.**
[\WriteFile]	Data type *string* Request for write the measured data into the statistic file.
ToPoint	Data type *robtarget* Destination of robot and external axis.
Speed	Data type *speeddata* The speed data defines the speeds of the TCP, as well as reorientation speeds and speeds of the external axes.

Continues on next page

Arguments	Description
Zone	Data type *zonedata* The zone data defines the size of the zone track in a programmed point.
Tool	Data type *tooldata* The TCP (Tool Centre Point) is the point of the robot mechanics which is moved to the specified destination. The tool data specifies this point of the robot mechanics.
[\WObj]	Data type *wobjdata* The work object (coordinate system), to which the robot position in the instruction refers. This argument can be omitted; in this case, the position refers to the global coordinate system. In contrast, if a stationary TCP or externally coordinated axes are used, this argument must be specified.

A maximum of 128 seams (including pressure control processes) can be monitored in one program number/option number.

There must be at least 300 ms between two Disp\Off commands, otherwise the volume will not be correctly recorded.

The average pressure is limited to single dispensers. It can be used in dual mode if deviation limits for the pressure are sufficiently increased.

8.14 Single seam monitoring (optional)

8.14.1 Configuration of the single seam monitoring

The configuration of the single seam monitoring can be done on the IDFP TPU under configuration - statistic - tab single seam. For how to configure the single seam monitoring, see *Configuration - Statistic on page 360*.

8.14.2 Creating a new reference file

To create a new reference file for a certain program and option number the parameter reference run has to be check on the TPU checkbox. This can be done on the IDFP TPU - Configuration - Statistic --> tab Single Seam. For each combination of program and option number this parameter is available an can be marked in the checkbox.

8.14.3 Supervision mode

If a reference file was once successfully created (see *Creating a new reference file on page 469*) the supervision of this combination of program and option number will started. This will be marked automatically with the checkbox parameter active. As soon as a reference was created the marked checkbox Reference Run will be unchecked and the checkbox active will be check. Supervision will start as soon as this combination of program number and option number will be run.

8.14.4 Variables/signals in use

Variable	Meaning of variable (storage location)
nOptCode	option number of the part
nProgNo	program number
bIDFP_SingleSeam	single-seam recording active (true) or not (false), can be set dispenser-specific in the TPU with Configuration>Dispenser>Volume deviation
nDXA_PrsMeanDev	allows relative deviation for pressure, can be set dispenser-specific in the TPU with Configuration>Dispenser>Volume deviation>Pressure deviation relative
nDXA_PrsMeanAb	allows absolute deviation for pressure, can be set dispenser-specific in the TPU with Configuration>Dispenser>Volume deviation>Pressure deviation absolute
nDXVolumeDev	allows relative deviation for volume, can be set dispenser-specific in the TPU with Configuration>Dispenser>Volume deviation>Volume deviation absolute
nDXVolumeAbs	allows absolute deviation for volume, can be set dispenser-specific in the TPU with Configuration>Dispenser>Volume deviation>Volume deviation absolute
goDXSingleSeamEval 0	not ready; evaluation not yet concluded 1 no deviation, 2 deviation, 3 reference not available

8.15 Doser spindle lubrication

The spindle lubrication automatically lubricates the doser spindles in the system. Special hardware (Perma Star Control) is required for this purpose.

The configuration of the parameters for spindle lubrication requires the volume per lubrication cycle to be configured in the IDFP software and also in the lubrication unit. The same value must set in both locations. The parameter in IDFP is nDXY_LubrVolPulse in IDXY_LubrUser.sys of the corresponding dispenser task.

The required volume of lubricating material within 20,000 spindle movement can also be configured (nDXY_LubrVolSP).

The number of lubrication cycles (nDXY_LubrActCycles) and the time of last lubrication (stDXY_LastLubricated) can be read out.

The parameters can also be configured with the TPU Parameter - Dispenser - DxA/B.

8.16 Automatic pump control

The automatic pump controller reduces the load on pressure-sensitive material. When the pump controller is active, the pump is only switched to active when it is required by the system. If it is inactive, the air motor is deactivated, the pump is not pressurized.

Two modes are distinguished when the automatic pump controller is active. In the first mode the pump is switched on before, for example, a filling request is sent. This allows the material supply hose to be pressurized before filling is started. The filling time is thus reduced. In the second mode the pump is not switched on until the filling request is pending. The filling process takes longer, but the material is not pressurized for so long. The variable bP1_AirMotorAndValveFill is used to switch between the two modes. If it is set to TRUE mode two is active, if it is set to FALSE mode one is active.

The automatic pump controller can only be used if the pump is switched to the automatic mode. Otherwise the system returns an error "Material supply not ready".

If the required volume for the next application cycle is registered in the variable nDXVolumeReq, the corresponding dispenser can decide whether there is still enough material available or whether filling is required. This is divided into:

A The current volume in the dispenser is more than double the requested volume

B The current volume in the dispenser is greater than the requested volume

C The current filling volume is not sufficient for the cycle.

In case c) filling is immediate, in case b) filling is at the end of the cycle and in case a) the dispenser is ready for the next application cycle immediately

The volume value must be assigned to nDXVolumeReq before the PreApplicationDX is called.

However, these variables only make sense in the case of a single doser, because the dual doser can apply material continuously. Therefore, it is not necessary to worry about a sufficient filling volume.

8.17 Single Seam Supervision (optional)

8.17.1 General information

The "Single Seam Supervision" option requires the corresponding hardware option "Single Seam Supervision" (USB-stick) and software option "Single Seam Supervision". The following functions are included in the option:

- number of references: max. 64 (product of number of different types of "programs" and options)
- simultaneous creation of references of several programs / options
- enable / disable global monitoring
- activate / deactivate monitoring per program / option
- starting reference per programs / options
- no monitoring of the program when referencing is running (monitoring for already existing references remain activated)
- status / and error messages

8.17.2 Parameterization

Parameters – Program / Option / Reference run / Active

Parameter	Function	Value
Program	program number	0...65535
Option	option number	0...65535
Monitoring	activate monitoring	TRUE / FALSE
Reference run	start of reference generation	TRUE / FALSE
Status[i]	information	2019-04-30/10:39:01 oder RUNNING 1 … 4

[i] Information only, cannot be editing.

Overview of the possibilities

Program	Option	Monitoring	Reference formation	Reference
		Active	RefRun	RefState
2	0	TRUE / FALSE	FALSE	N/A
3	0	TRUE / FALSE	TRUE	RUNNING 1...4
8	0	TRUE / FALSE	FALSE	2019-04-30/10:39:01

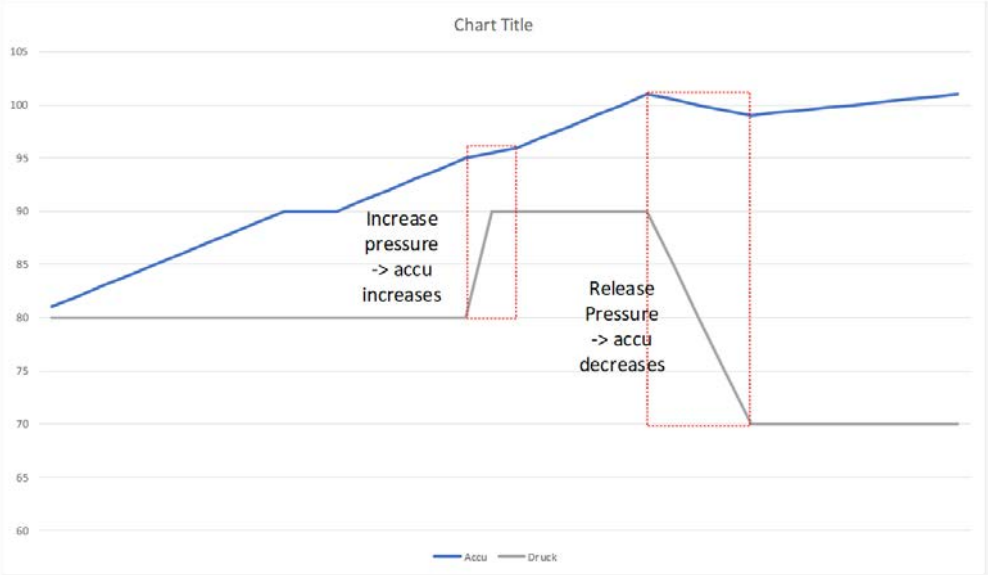
Configuration Dispenser - Application - Volume deviation

Parameter	Function	Value
Active	on / off function	TRUE / FALSE
External referencing	not used	TRUE / FALSE
Volume deviation absolute [ml]	limit value absolute +/-	0, 1...20
Volume deviation relative [%]	limit value relative +/-	1...25
Pressure deviation absolute [bar]	limit value absolute +/-	2...50
Pressure deviation relative [%]	limit value relative +/-	1...25

8.17.3 Function

8.17.3.1 General information

The single seam monitoring is not a material consumption measurement and cannot be used to determine the total consumption. It is used to monitor an applied seam with a reference formed. Negative quantities of material can also be referenced. The negative values result from an upstream pressure regulation between individual seams. When switching from a high pressure to a lower pressure, the dosing device has to move back to reduce the pressure. A negative amount of material is recorded. The amount of material in the subsequent seam is added to the "moving amount" of the pressure control. This procedure also records and evaluates changes in the pressure control.



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8.17.3.2 Procedure

If the corresponding values such as program and option number have been entered, the formation of the reference can be started by the RefRun switch. If monitoring is already active for the combination of program and option number, monitoring is switched off. After successful creation of the reference, the monitoring is automatically activated.

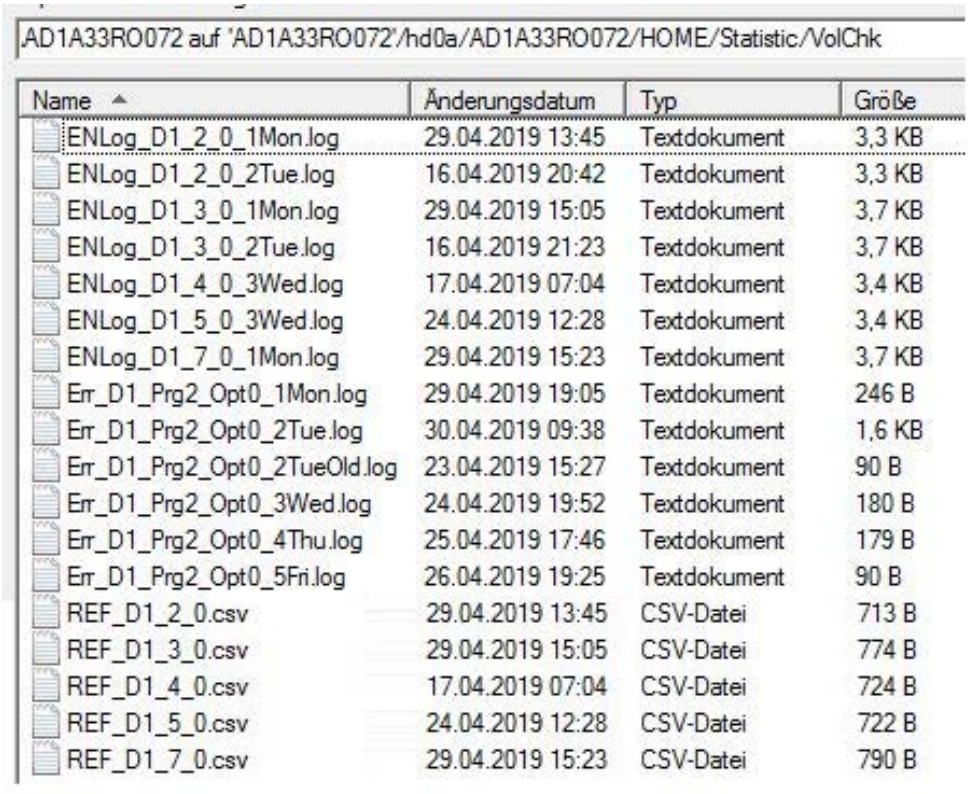
Due to the averaging of 5 runs, the formation of the reference can take a longer time depending on its availability for programs that are very rarely run - there is no time limit for the reference formation.

The intermediate results and the output of the detailed messages with active monitoring are stored on a USB-stick (plugged into the main computer in the robot controller). The references are stored on the robot flash disc. If the USB-stick is missing or defective, the robot flash disc is used as storage medium.

The storage locations are:

Function	File	Location
Intermediate results	ENLog_D1_2_0_1Mon.log	/hd0a/Robotersys-tem/home/Statistic/VolChk
Details messages	Err_D1_Prg2_Opt0_1Mon.log	/hd0a/Robotersys-tem/home/Statistic/VolChk
references	REF_D1_2_0.csv	/hd0a/Robotersys-tem/home/Statistic/VolChk

Example robot flash disc



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8.17.3.2 Procedure
Continued

Preferences for education reference

- number of reference programs run for averaging: 5
- recording volume / pressure / nozzle / number of seams
- max. number of seams incl. pressure control values per program: 128

The following monitoring operations are active during reference formation

- number of seams
- assignment seam / nozzle
- deviation of the measured values volume per seam (> 1 ml and 75%) from the mean value
- deviation of the measured values pressure per seam (> 1 bar and 75%) from the mean value

Trigger monitoring during formation reference

Output of an error message with program / option number and detail messages in a separate log file. The already created intermediate values are deleted and referencing is restarted.

Preferences for active monitoring

- reference available
- monitoring activated

The following monitoring functions are active during monitoring

- number of seams
- assignment seam / nozzle
- deviation of the measured values volume per seam (> x ml and x%) from the mean value
- deviation of the measured values pressure per seam (> x ml and x%) from the mean value

Trigger monitoring during monitoring active

Output of an error message with program / option number and detail messages in a separate log file. The output is repeated for each new program run.

8.17.3.3 Evaluation

The following states are taken into account during evaluation.

- No deviation present: goDXSingleSeamEval = 1
- Deviation from reference file present: goDXSingleSeamEval = 2
- Reference file not available for current program number and option number: goDXSingleSeamEval = 3

If reference mode is not active, corresponding error messages are output (deviation from reference file with goDXSingleSeamEval = 2; no reference file present with goDXSingleSeamEval = 3).

If reference mode is active, corresponding warnings are output with the option of importing the last application for current program number and option number as reference.

When using external processing, the evaluation of goDXSingelSeamEval and corresponding actions must be controlled by the PLC. Corresponding error messages are NOT output to the robot.

Differentiation of single-seam recording OK/NOK in main program.

After the end of the application it may be of interest to display parts reported as NOK at a pointer position to the operator.

The **SingleSeamStatus** function can be called for this purpose. The evaluated dispenser is transfered as parameter. The return value is TRUE if there is no deviation, FALSE if a deviation was detected.

Example for dispenser D1:

```
PreApplicationD1;
ApplicationD1;
PostApplicationD1;
IF SingleSeamStatus (\D1) = FALSE THEN
! move to pointer position, treatment of part renewed application, etc.
ELSE
! all OK, continue cycle
END IF
```

8.17.3.4 Limits of monitoring

A maximum of 128 seams (including pressure regulation processes) can be monitored in one program number/option number combination.

There must be at least 300 ms between two Disp\Off commands, otherwise the volume will not be correctly recorded.

8.18 Needle Supervision (optional)

8.18.1 General information

The "Needle Supervision" option requires appropriate application components (applicator with needle feedback sensors), the corresponding option in the electrical IDFP equipment (applicator cable), Doser Interface Box (DIB) and the corresponding software option "Needle Supervision". The following functions are in-cluded in the option:

- monitoring of reaction times for 3 nozzle needles
- monitoring of switch-on and switch-off times per needle
- permitted deviation per needle (open / closed)
- switching times for needle 1 to 3
- error message for each needle for timeout in open / closed mode
- switch for deactivating the monitoring for each needle
- status / and error messages

8.18.2 Operation

The parameters are set in the parameter screen in the IDFP TPU screen. The call of the tuning (testing and determination of the reaction values) is triggered by a service routine (order number 30) in the T_Rob1 task. The individual steps of the tuning are indicated by corresponding TPU messages in the log window. After successful tuning, the determined values are activated.

In order to ensure precise monitoring of the switching times of the main needles, the tuning must be carried out after each repair on the components involved (pilot valves, hoses, needle seals, needles, applicator, sensors).

8.18.3 Operation in the project

By means of the station visualization, the fixed position travel (180) can be selected and started. In the robot, the position travel yNeedleTune.mod is executed.

Alternatively, the module yNeedleTune.mod can be loaded in the operating mode setup and the routine mainyNeedleTune can be executed.

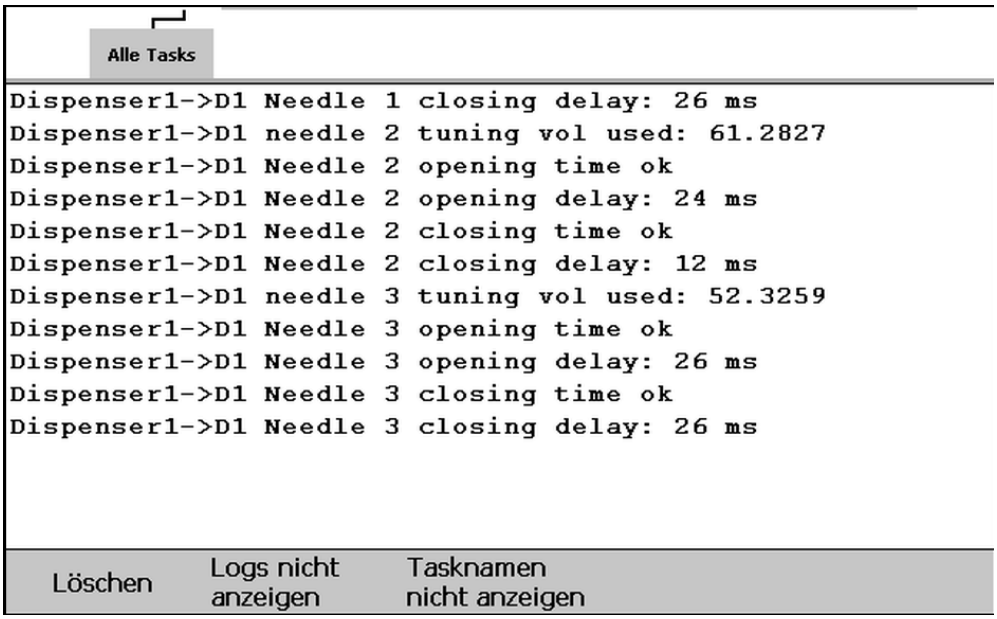
If the tuning of the feedback sensors lasts longer than 300 seconds, a monitoring time is triggered in the mainyNeedleTune routine. However, the tuning continues in the background task Dispenser1. After finishing the tuning, the T_Rob1 can be started again and the robot ends the routine mainyNeedleTune with the home run.

8.18.4 Function

Tuning is only performed for the activated needles. When the tuning is started, a function check of the sensors is triggered. The switching times of the individual needles are then determined using the binary search and the parameterized max. time. After successful completion, the determined switching times are checked again. If an error is detected during this test, the switching time is increased by 2 ms and the test is repeated until successful. Therefore, different running times of the tuning process can occur. After completion of the tuning, a corresponding message is output for each switching time test. In addition, corresponding error and TPU messages are output for all abort conditions. With Active Global switch needle monitoring function can be completely deactivated. With the other active switches, a single monitoring of a needle can be deactivated in case of malfunction.

8.18.5 Messages

Output window if the tuning has been completed successfully:



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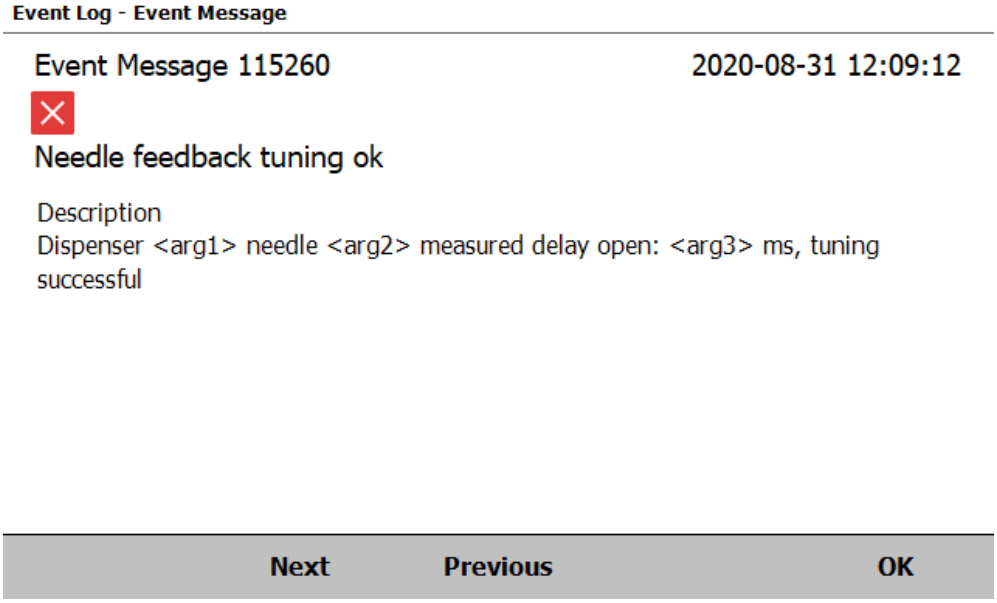

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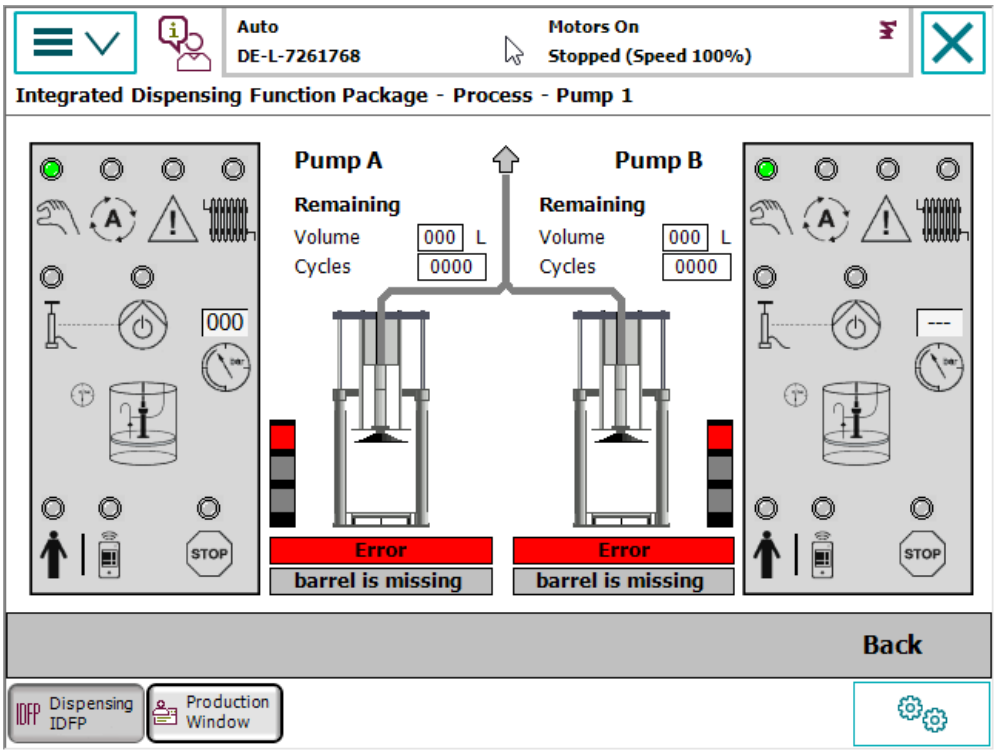
8.19 Barrel Level Meter (optional)

8.19.1 General information

The optional barrel level meter requires the corresponding hardware and software option. The following functions are provided:

- Display of the remaining material volume and the resulting remaining application cycles of integrated pumps on the TPU.
- Automatic calculation of average consumption for calculation of remaining application cycles



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8.19.2 Commissioning

Selecting a barrel diameter

The barrel size must be selected within the IDFP parameter wizard. The following sizes (barrel diameters) are predefined in the system:

- 280mm for buckets of 15-30 liters
- 284mm for buckets of 15-30 liters (with enlargement ring)
- 355mm for hobbocks of 30-50 liters
- 571mm for barrels of 200 liters

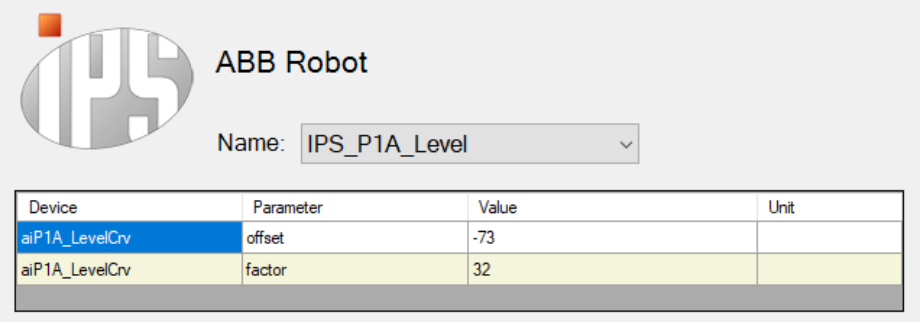
Fine adjustment of the zero point (optional)

Since the bottom of the barrel of different manufacturers can have a different height, the zero point of the sensor can be adjusted by changing the offset in the IPS level meter parameter file.

Procedure:

1. Install an empty barrel
2. Move the pump to the empty position.
3. Open the IPS parameter file (IPS_Pxx_Level.par) in the param folder of node 1 with your desired editor.

   The easiest way to do this is with the RobView Parameter Editor



xx2000000943

4. Change the offset so that the resulting remaining volume displayed on the TPU is at 0 by adding or subtracting the displayed remaining volume from the offset.

8.20 Log Viewer

8.20.1 General information

The TPU screen "Statistic" in the menu "Process - Protocol View" has been reworked to show configurable user specific data.

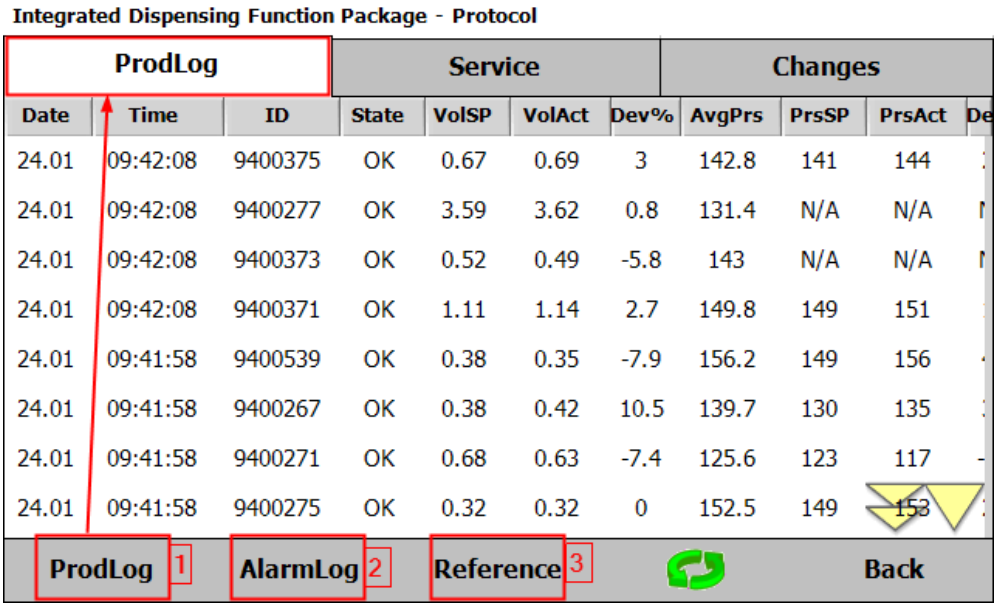
Integrated Dispensing Function Package - Protocol

ProdLog			Service				Changes			
Date	Time	ID	State	VolSP	VolAct	Dev%	AvgPrs	PrsSP	PrsAct	De
24.01	09:42:08	9400375	OK	0.67	0.69	3	142.8	141	144	
24.01	09:42:08	9400277	OK	3.59	3.62	0.8	131.4	N/A	N/A	
24.01	09:42:08	9400373	OK	0.52	0.49	-5.8	143	N/A	N/A	
24.01	09:42:08	9400371	OK	1.11	1.14	2.7	149.8	149	151	
24.01	09:41:58	9400539	OK	0.38	0.35	-7.9	156.2	149	156	
24.01	09:41:58	9400267	OK	0.38	0.42	10.5	139.7	130	135	
24.01	09:41:58	9400271	OK	0.68	0.63	-7.4	125.6	123	117	
24.01	09:41:58	9400275	OK	0.32	0.32	0	152.5	149	153	

ProdLog AlarmLog Reference Back

xx2000001113

8.20.2 Operation



xx2000001114

The screen shows a configuration of 3 items. When a button (1,2,3) is clicked the latest file in the configured folder will be loaded automatically and the header will show which of the (up to) 3 buttons is active.

The latest file is determined by alphabetical order of the file names.

Pressing the reload button will update the data with the latest file again.

Pressing the same function button again will open a file selection screen in the configured folder to load other filed than the latest.

8.20.3 Parametrization

The parametrization is done in the file **IDFP_LogViewer.xml**, which is installed in the folder **HOME:/IDFP/UserData/XML**. A maximum of 3 parameter sets of LogCfgData can be defined.

The default installation contains a configuration for the IDFP standard statistic files in item 1 which shows a folder symbol instead of a name

Explanation of the individual parameters:

Parameter	Function	Format	Allowed values
Index	Running Index	Integer	1 - 3
Text	Display text of item #	String	Any
USB	Check USB sticks	Bool	0 - 1
Path	Folder name	String	Any
Mask	File name mask	String	Any
WithHeader	File contains headers	Bool	0 - 1
LastLineFirst	Order of data	Bool	0 - 1
Separator	Data separator	Character	One character

Explanation of the parameters:

Parameter	Description
Index	Running Index
Text	Display text of item (1,2 and 3 in figure 2), should not be longer than 8 characters depending on character width
USB	The screen will first check for the configured folder on USB sticks in the main computer in order of port 1 to 4 and show the first one found. If the folder is not found on any stick or there are no sticks the folder will be opened from HOME:
Path	When empty the respective item will not show. To set HOME: as starting folder enter “HOME:”
Mask	Can contain the ‘*’ character to indicate wildcards
WithHeader	If set to 0 the columns will be numbered automatically
LastLineFirst	If set to 0 the file is shown from beginning to end, if set to 1 the order is reversed
Separator	Data separator used in file

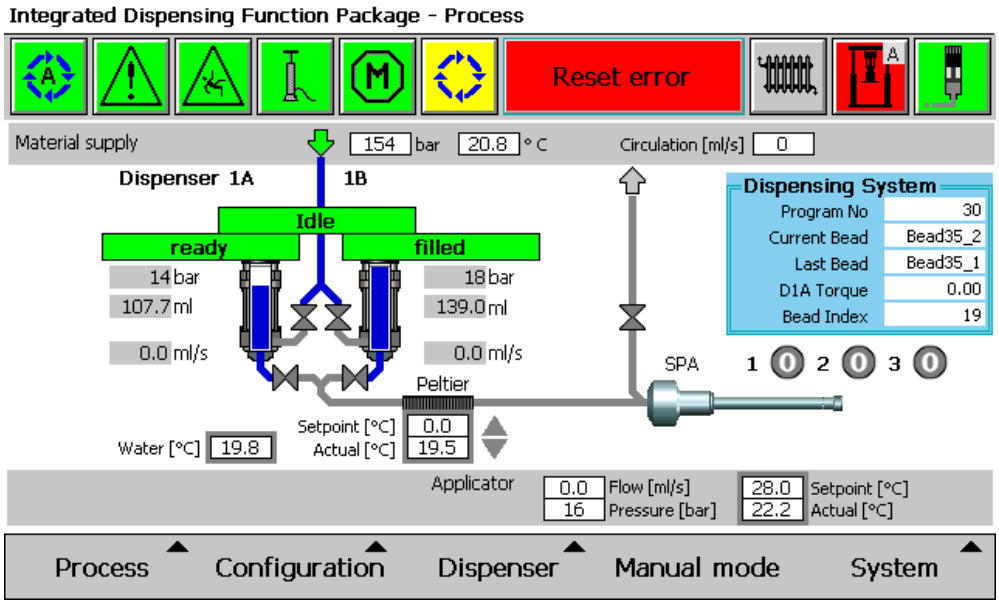
8.20.4 Errors

When the configured folder does not exist the TPU will open the file selection box in HOME.

8.21 Application Process Screen

8.21.1 General information

The application process screen can be used to display up to 10 user configurable values from RAPID or EIO on the IDFP TPU application. It is displayed in form of a blue box on the process view:



xx2000001115

8.21.2 Operation

The box can show up to 5 values in a system with SPA applicator and up to 10 values in other systems (gluing etc.). 2K systems are currently not supported.

It is automatically scaled to the number of items to be shown. Any number exceeding 10 will be ignored.

Disclaimer: any use of this functionality may result in standard values or items not being visible because they are overlapped by the box. In such a case please contact the IDFP team via dispensing-support@de.abb.com.

8.21.3 Parametrization

The parametrization is done in the file **IDFP_AppProcScreen.xml** in the folder **HOME:/IDFP/UserData/XML**.

A list of 10 empty entries can be found in the group <APS>. There is a parameter <GroupName> followed by 10 grouped items named <CustApp>.

Explanation of the individual parameters:

Parameter	Function	Format	Allowed values
GroupName	Display text of the box	String	Any
CustApp - Index	Running Index	Integer	1 - 10
CustApp – Text	Display text of item #	String	Any
CustApp – Task	Task name of RAPID value	String	Any
CustApp – Module	Module name of RAP-ID value	String	Any
CustApp – Variable	Variable name of RAPID value	String	Any
CustApp – VarType	Data type of RAPID value	String	Bool, Num, Dnum, String
CustApp – Doser	Reference to the doser	String	DX; DXY
CustApp - Signal	Name of EIO signal	String	Any

These rules apply:

- The box will be hidden when **GroupName** is empty
- An item will be hidden when the **Text** entry for that index is missing
- If you are referencing an array variable, add a Doser-Tag to the definition. Valid values for the Doser-Tag are in the format DX or DXY where X = Dispenser number (1-4) and Y = Doser (A or B).
- Signal will be ignored if Variable is set
- Errors in the configuration are shown in the white value box (see Errors)
- Signals are always rounded to 2 decimal digits; all other values are displayed unchanged
- To update the configuration it is not necessary to restart the TPU, only a restart of the IDFP screen is required

8.21.4 Errors

In case of configuration errors these messages will be displayed directly in the value field of the respective CustApp:

Error	Display
Variable and Signal empty	“unassigned”
Variable not defined in robot	“Var Error: NAME”
Signal not defined in robot	“Sig Error: NAME”

8.21.5 Example Configuration

The following Configuration displays the spindle pitch of the dispenser D1 at index 2:

```
<CustApp>
<Index>2</Index>
<Text>spindle pitch</Text>
<Task>Dispenser1</Task>
<Module>ID_DxyData</Module>
<Variable>nDx_Doser_SpindlePitch</Variable>
<VarType>num</VarType>
<Doser>D1</Doser>
<Signal></Signal>
</CustApp>
```

8.22 IDC XS3 Default signals

8.22.1 General information

The IDFP system can supply 8 digital inputs and 8 digital outputs. These will be available on the XS3 connector at the bottom of the IDC cabinet:

xx2000001116

The signals are connected to WAGO modules KF7 1-8 (output) and KF8 1-8 (input) inside the IDC.

The signals can be installed by selecting the boot option "User IO on XS3".

This option is not available when either "Filling Station" or "Nozzle changer on XS3" are installed.

8.22.2 Signal configuration

Signal	IO	Connector	IPS address
doIDC_XS3_17	Digital output	KF7:1	Can2/Mac21/Digout17
doIDC_XS3_18	Digital output	KF7:2	Can2/Mac21/Digout18
doIDC_XS3_19	Digital output	KF7:3	Can2/Mac21/Digout19
doIDC_XS3_20	Digital output	KF7:4	Can2/Mac21/Digout20
doIDC_XS3_21	Digital output	KF7:5	Can2/Mac21/Digout21
doIDC_XS3_22	Digital output	KF7:6	Can2/Mac21/Digout22
doIDC_XS3_23	Digital output	KF7:7	Can2/Mac21/Digout23
doIDC_XS3_24	Digital output	KF7:8	Can2/Mac21/Digout24
diIDC_XS3_21	Digital input	KF8:1	Can2/Mac21/Digin21
diIDC_XS3_22	Digital input	KF8:2	Can2/Mac21/Digin22
diIDC_XS3_23	Digital input	KF8:3	Can2/Mac21/Digin23
diIDC_XS3_24	Digital input	KF8:4	Can2/Mac21/Digin24
diIDC_XS3_25	Digital input	KF8:5	Can2/Mac21/Digin25
diIDC_XS3_26	Digital input	KF8:6	Can2/Mac21/Digin26
diIDC_XS3_27	Digital input	KF8:7	Can2/Mac21/Digin27
diIDC_XS3_28	Digital input	KF8:8	Can2/Mac21/Digin28

9 Bead optimization

9.1 Definition of bead quality

There are various aspects that define the quality of a dispensing bead.

Some of the most important aspects are:

- Material quantity (right volume per part/area)
- Dimensions (width and height)
- General shape and uniformity
- Position on the part

This chapter refers in particular to the shape and position of a dispensing bead.

9.2 Procedure with test beads for bead optimization

Preparation

The test beads must be applied on a stable, even surface. If it is a stationary doser, then a stable plate should be attached to the robot. If the doser is mounted at the flange of the robot, a stable bench erected in close proximity to the robot suffices.

The tests should be carried out on suitable test paper or sheet metal. It is recommended to use ABB trigger test paper (3HDAK00000A0137). It is of a sufficient size, relevant parameters are already listed for the application and can be completed for the respective tests. An analysis of the beads with precision of < 1 mm is also possible.

Alternatively, a self-created trigger test paper can also be used.

Detailed documentation of the results is required for precise analysis and subsequent understanding of the findings.

Continues on next page

9.2.1 Operating mode of robot

Test seams should be applied with 100% speed in manual mode or in automatic mode. This is necessary since the test beads must be started at the previously programmed speed. The speed of one or several axes may be above the limit speed of normal Manual mode. If the route is covered slower, then this may have a strong impact on the result of the bead quality and incorrect conclusions may be drawn from this bead.

Note

The safety instructions for Manual mode 100% and Automatic mode must be observed.

9.2.2 Number of test beads

Several test beads should be applied next to each other in every test run. If only a few beads are applied, it may be that the beads have a sufficient quality, but the quality decreases again with longer operation. This can happen for example with a change of viscosity properties as a result of a temperature change. A high number of at least 5 test beads can guarantee consistent quality.

9.2.3 Different conditions

Even if several consecutive test runs register good quality, this does not mean that this quality can always be achieved. It is recommended to perform test runs under different conditions. Such conditions include for example:

1 Several consecutive test runs.

   »Are the beads also of sufficient quality after several test runs?

2 Test run after a lengthy downtime (e.g. next morning).

   »Is the quality of the bead still good after a lengthy downtime of the robot or is purging necessary after long downtime?

3 Test runs with varying ambient conditions (temperature, humidity, etc.).

   »Do changes in ambient conditions affect the test bead? If so, how much and in which way? What are the ambient conditions at the customer's premises?

9.3 Problems and solutions

Some problems and challenges, which may occur when applying a bead, are described bellow.

Measures to solve the problems are suggested.

Continues on next page

9.3.1 General

Proceed as follows in the case of inadequate bead quality:

1 Error detection
2 Error isolation (analysis)
3 Error rectification

9.3.2 Wrong start or stop position off the beads

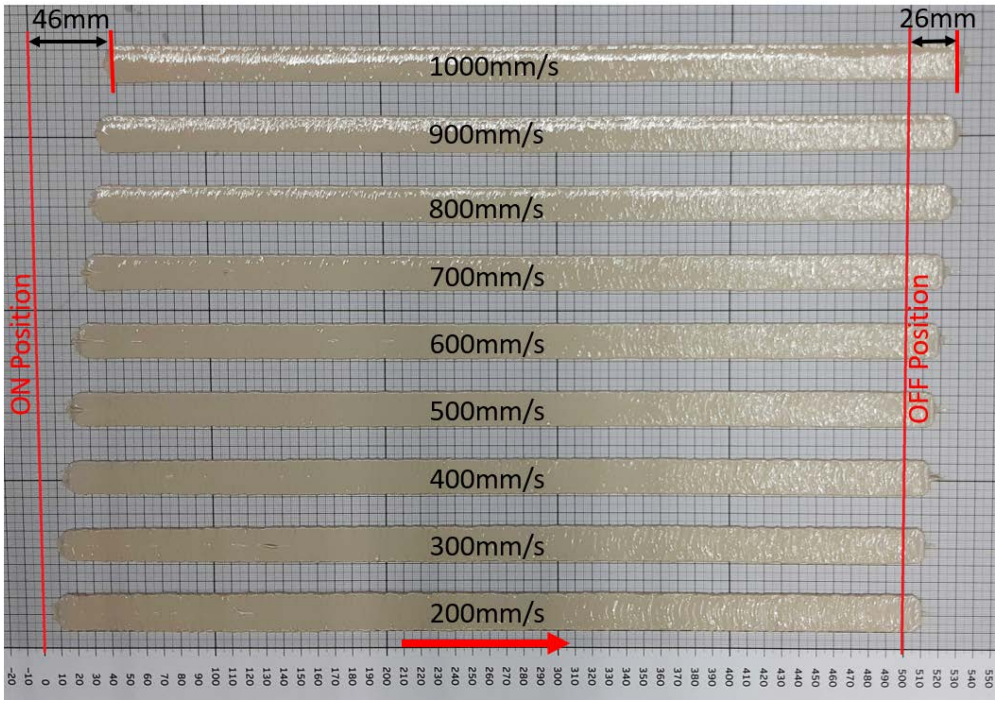
If the start and/or the stop location of all beads differ from the position where the DispL\On and/or DispL\Off robtarget is teached, the needle up and/or needle down delays may not be set correctly.

Especially after any hardware change (complete or a part of the applicator), the needle delays should be checked and adjusted if necessary.

To check the needle delays, a spray test on a test paper or piece of sheet metal can be used.

If the TCP speed in different beads of the test are changing from bead to bead, the start and end of all beads should be on the same line (at DispL\On / DispL\Off robtarget). It is not necessary to know the exact position of the robtagets, if different speeds are used.

Example with sealing beads:



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Test beads with increasing speed. NeedleUp = 0ms and NeedleDown = 0 ms.

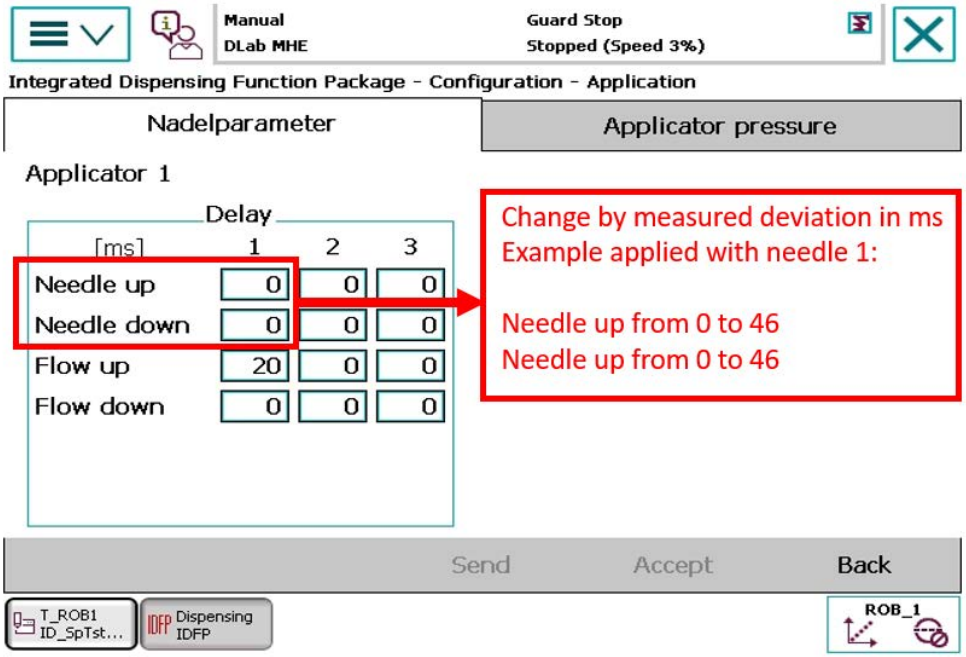
- Too late start and end of all beads. The faster the robot moves, the bigger is the difference between programmed On/Off position and the real On/Off position of the beads.

  ON: The beginning of the bead is 46mm too late at a speed of 1000mm/s.
- NeedleUp delay needs to be increased by 46ms (in this case from 0ms to 46ms)

  OFF: The end of the bead is 66mm too late at a speed of 1000mm/s.
- NeedleDown delay needs to be increased by 26ms (in this case from 0ms to 26ms)

Continues on next page

The delays can be set on the TPU IDFP Window: configuration/Application/Needle Parameter:



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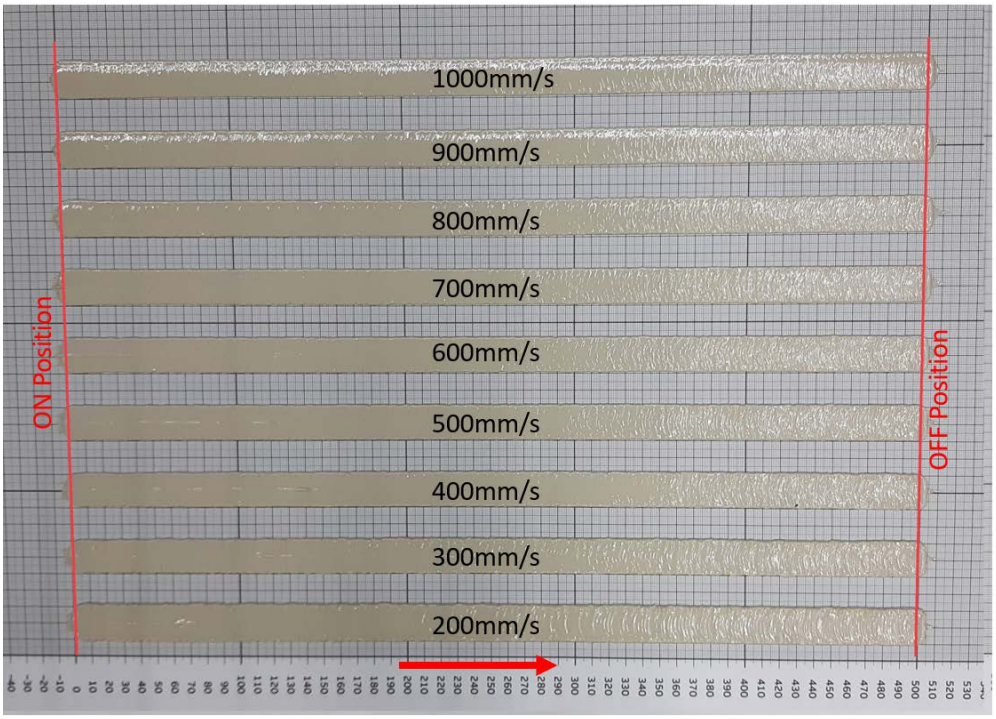
With the correct needle delays the same spray test looks like this:



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9.3.3 Hammer heads or too narrow bead beginning

Problem

Hammer head

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It is possible that there is more or less material at the beginning of the bead is applied as it should be.

In this case, so-called "hammer heads" are formed or the start of the bead is too narrow. The aim is that the beginning of the seam has the same width as the rest of the seam section.

Explanation

In order to achieve a high bead quality, the configuration of the process control system must be adjusted accordingly. Basic knowledge from the area of control engineering can help to understand the tuning of the process.

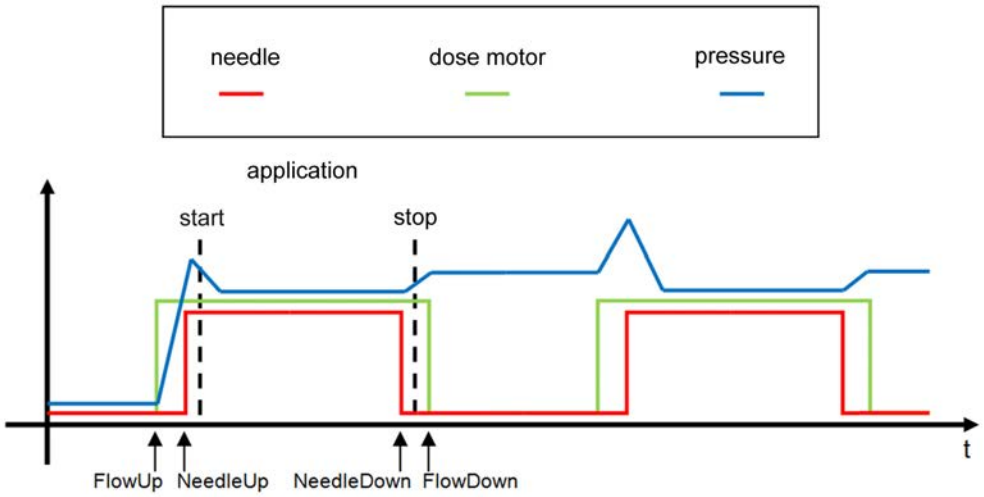
In addition to the viscosity (see *Dissimilar subsequent beads on page 511*) and ambient conditions, the inflation of the material hose and other factors must be taken into consideration.

The bead shown here (hammer head) has a major deflection at the beginning, but there is little tendency to further overshoot after the first vibration. The aim is to achieve the desired bead thickness as quickly as possible.

Continues on next page

In the following diagram the timing between doser motor, needle and pressure is shown.

Link between doser motor, needle and pressure



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The doser motor starts up (FlowUp), before the needle is opened (NeedleUp). The effect is that the pressure rises very sharply in this time interval. As soon as the needle opens (NeedleUp) and the material can leave the doser, the pressure reduces again and reaches a constant value for the rest of the bead. When the application process is completed, the needle closes again (NeedleDown). The doser motor continues to run for a short period (FlowDown), whereby the pressure increases again. After the doser motor stops, the pressure remains at a constant value and acts as prepressure for the next bead.

The following factors may be responsible for the overshooting and the formation of a hammer head at the beginning of the bead:

- Selected prepressure is too high.
- The time between pressure build-up (Flow Up) and needle opening (Needle Up) is too high.

Vice versa, low prepressure or insufficient time between start-up of the doser motor and opening of the needle may be responsible for a bead being too narrow at the beginning.

Solution

An option to prevent a hammer head or a bead being too narrow at the beginning would be an adjustment of the prepressure or the duration of the prepressure build-up.

However, this measure only affects the first bead of the part or a bead after a long interruption in the application. In these two cases there is enough time to perform active prepressure regulation.

For beads in quick succession, the prepressure is obtained by the motor running after the needle is closed (FlowDown Delay) or the motor starting before the needle is opened (FlowUp Delay).

Continues on next page

9.3.3 Hammer heads or too narrow bead beginning
Continued

The parameters Needle Up/Down and Flow Up/Down are set in the menu Configuration - Application (see *User interface on page 281*).

A description for setting and adjusting the prepressure is provided in *Regulator settings on page 405*.

9.3.4 Dissimilar subsequent beads

Problem

Applying one bead of sufficient quality does not mean that this applies for all subsequent beads. Some factors may result in several beads having different qualities.

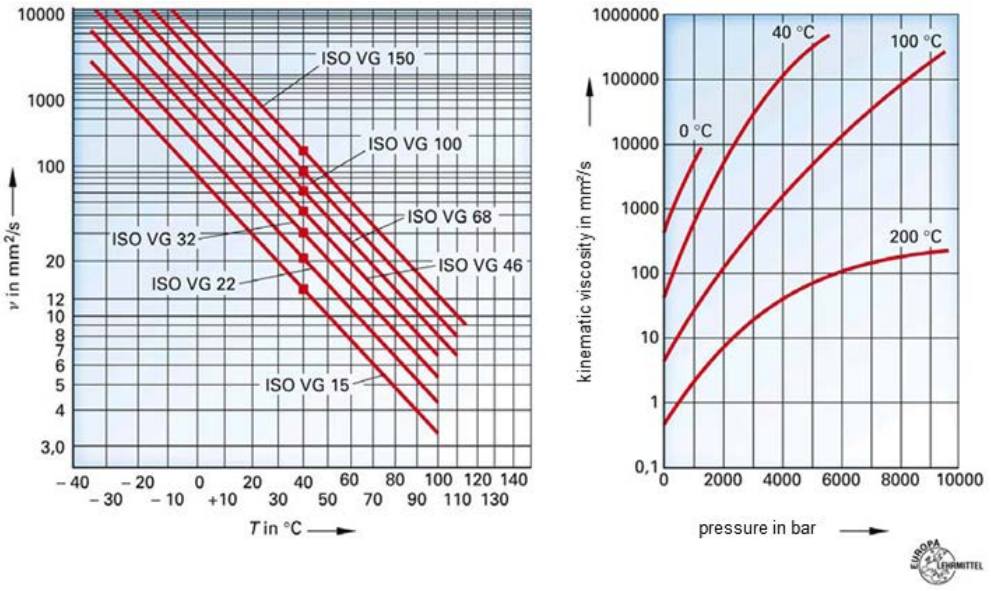
Explanation

With the first seam the pre-pressure is set by the instruction PreApplicationD1 (for dispenser 1). If seams follow in quick succession, there is insufficient time for starting active pressure regulation (see *MoveChangeApp on page 427*.

In addition, for constant bead quality a constant viscosity is required. The viscosity is mainly dependent on the material; however, it is also dependent on the temperature.

Changes to the ambient temperature or a temperature increase as a result of heat development from system parts may change the shape of a bead. The viscosity is also dependent on the pressure exerted on the material (thixotropy). The higher the pressure, the higher the kinematic viscosity.

Viscosity in relation to temperature and pressure



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Solution

During commissioning, it is necessary to take into consideration not only the ambient conditions in which the robot is being set up, but also the distances between two beads and the viscosity properties of the material to be applied.

It may be helpful to adapt the NeedleDown Delays or the time at which the doser motor starts up or stops (FlowUp or FlowDown). The interaction between these values is responsible for the prepressure of a subsequent bead (see *on page 509*).

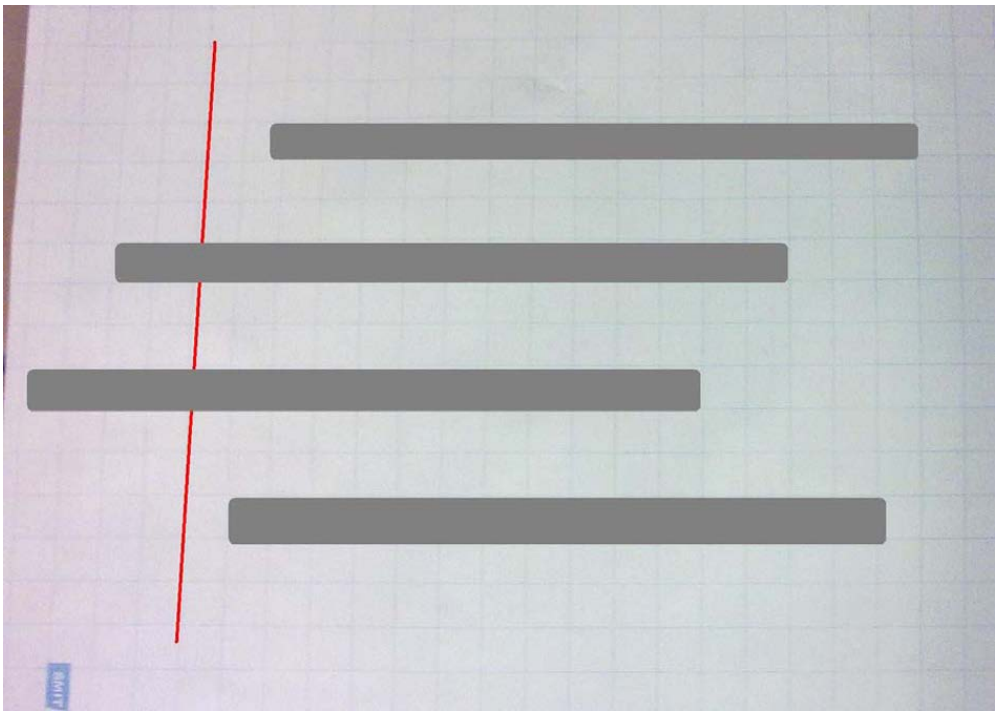
9.3.5 Irregular start points

Problem

It may happen that the bead beginnings during the test runs are not aligned in the desired position.

Error 1:

Bead beginnings outside desired start line



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The bead beginnings are not at the desired start line, but randomly distributed on either side of it.

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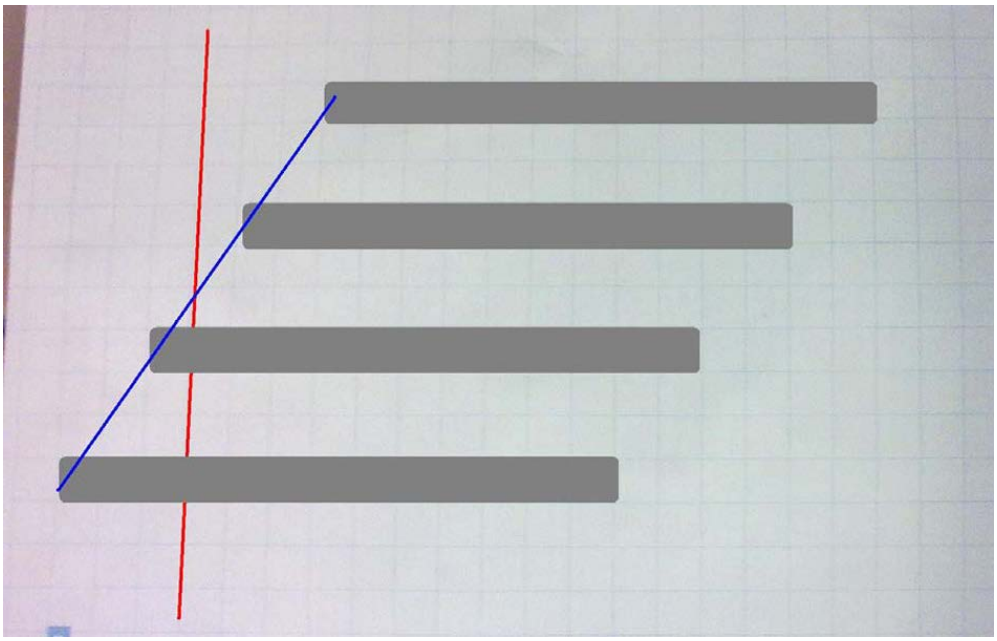
Error 2:

Bead beginnings shifted



xx2000000855

The bead beginnings are aligned in a straight line (blue), but this does not match the desired start line (red).

Explanation

In all probability the defined path points are incorrect or the work object was measured incorrectly. The Error 2 effect could be caused by incorrect setting of needle up and down delays, if the speed changes from bead to bead in the example (see *Wrong start or stop position off the beads on page 506*).

Solution

If the error is associated with the robot path, it can be eliminated with a new teaching process.

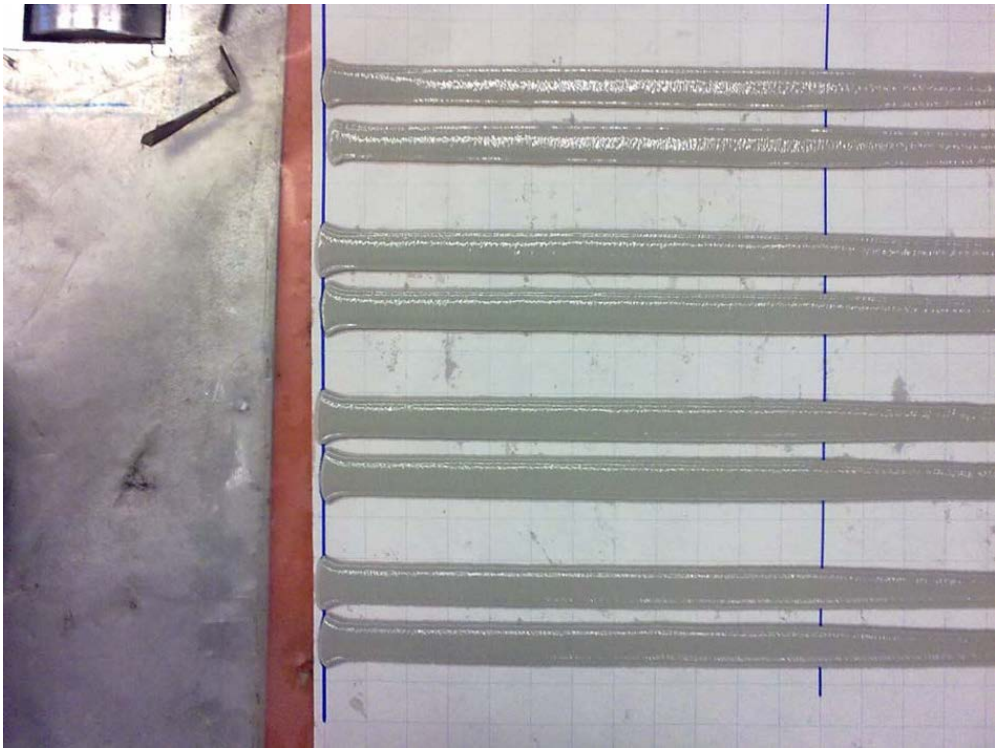
An incorrectly measured work object has to be re-measured. Tunning of needle up and needle down delay times.

Continues on next page

9.3.5 Irregular start points
Continued

The following image shows an application test with correct position of the bead beginnings, but too wide beads at the beginnings.

Bead beginnings



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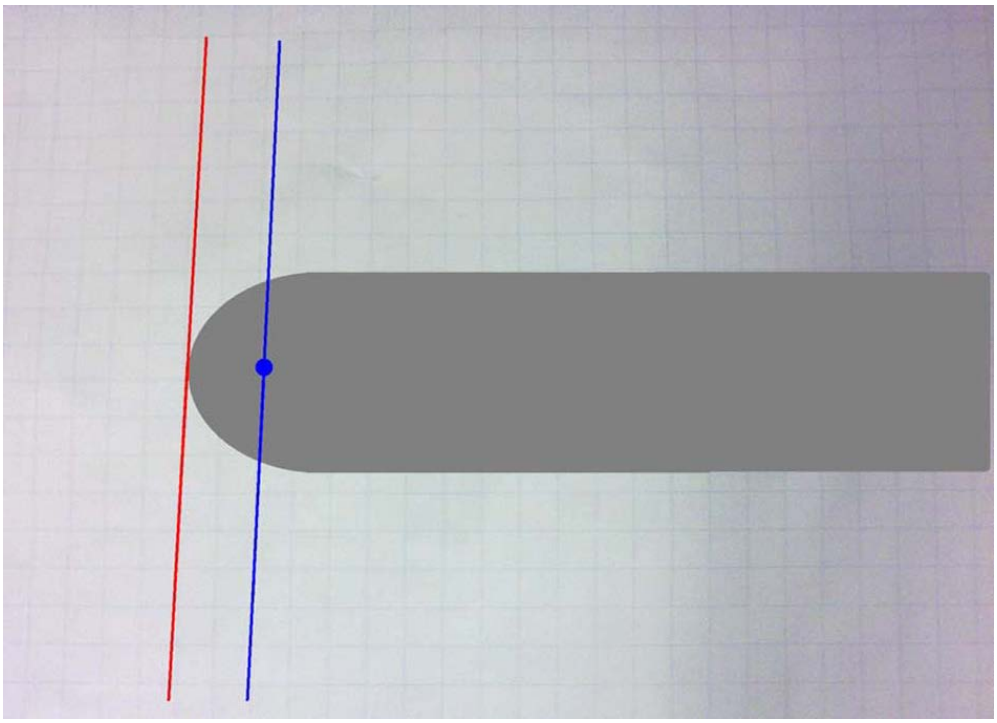
The beads shown are considered acceptable timming if the start points deviate from the plotted straight lines by maximum +/- 2 mm at a robot speed of v1000 (1000 mm/s).

Definition of start point



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The start point is defined as the point where the nozzle begins the application process (see the Definition of start point, blue point in the image). The blue line therefore defines the start line. However, in this case it must be noted that the material, depending on the viscosity, also flows to the left, i.e. over the start line (see the Definition of start point, red line in the image). The red line can thus also be defined as a start line.

Which line is defined as a start line depends on the following factors, among other things:

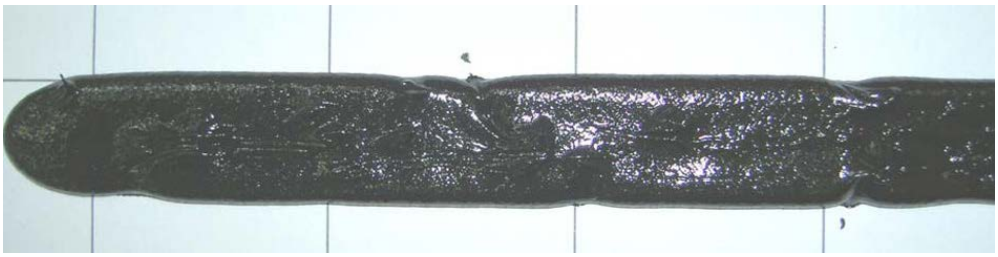
- Is a slight return flow acceptable?
- With which definition is the actual bead to be completed (not the test bead) easier to program?
- What are the customer's requests/instructions?

9.3.6 Irregularities within a bead section

Problem

Irregularities occur within a bead section.

Irregularities within a dispensing bead



xx2000000858

Explanation

Air bubbles or impurities may be present in the nozzle of the doser.

Solution

The purge routine must be performed to clean the nozzle. The application nozzle should be positioned over a collecting tray.

The purge process is activated as follows:

- Click on Manual mode in the IDFP interface.
- Select "Purge".

The purge process should be activated until a regular vertically falling stream is visible. If this is not achieved, the nozzle may need to be removed, cleaned and impurities removed by hand.

Then a test should be carried out to see whether there is any improvement to the bead.

In general, the following is recommended:

- Regular automatic purging with the aid of setting goDxOrder or another purge program
- Regular cleaning of the filter in the material supply to avoid particles to block or partly block the nozzle

When a barrel is changed make sure that sufficient material is discharged at the barrel vent valve.

The dispenser should also be purged until there are no more air bubbles in the material.

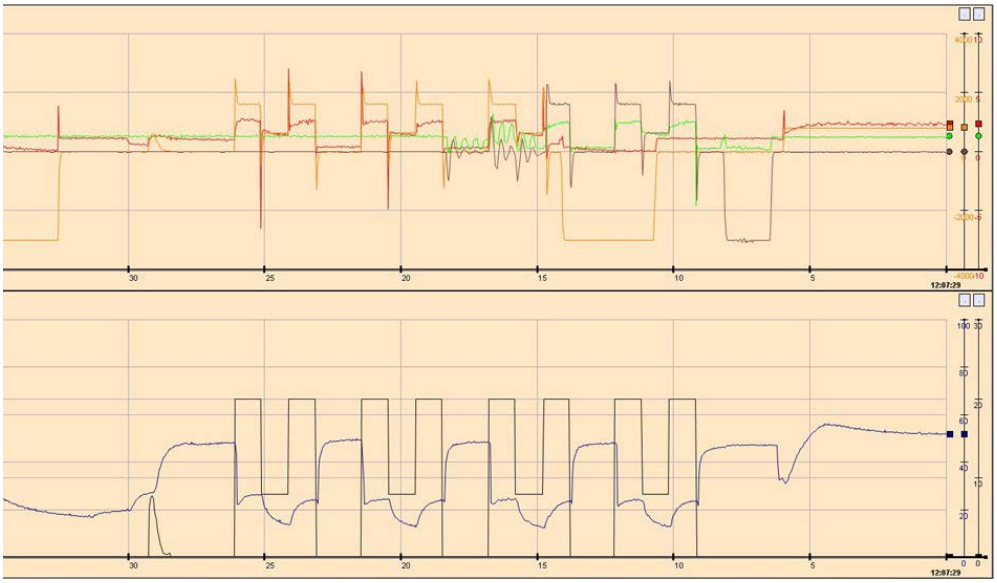
9.3.7 High torque

Problem

It happens that the motors, which are responsible for the pressure build-up for moving the material, have excessive torque peaks. The motor torque may increase to approx. three times the nominal torque for a short time.

The following diagram is an evaluation from RobView.

Torque curve



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The curves in red and orange (see the Torque curve, top in the image) describe the torque curve of the two motors. The black curve (see the Torque curve, bottom in the image) shows when and how much material should be applied. The needle is opened at the rising edge and closed at a falling edge. The blue curve (see the Torque curve, bottom in the image) shows the pressure curve.

A comparison of the curves reveals that the positive torque peaks arise shortly before the needle is opened and the negative peaks occur when closing the needle.

Explanation

In order to achieve an acceptable bead, a certain prepressure must be present before applying the material. Otherwise, no material flows initially when the needle is opened, as the pressure has to be built up and the material set in motion.

In particular, where two beads are applied in quick succession, there is the problem that prepressure must be built up within milliseconds. This is only possible with high torques and optionally the use of a shoot filter.

Solution

A check should be carried out to see whether there are critical points in the robot path. For example, beads in quick succession with gaps of less than 32ms should be avoided and efforts should be made to adjust the respective section.

Continues on next page

9.3.7 High torque
Continued

Then the settings for the doser motor must be adjusted accordingly. The same applies to the times at which the needle is opened or closed.

The setting of the shoot filter should also be optimized and checked to see whether its use is helpful and necessary. The shoot filter may be a reason for the excessive torques. Avoid the use of shoot filters where possible. Because this will cause extra stress to the system and increase the risk of getting torque peaks

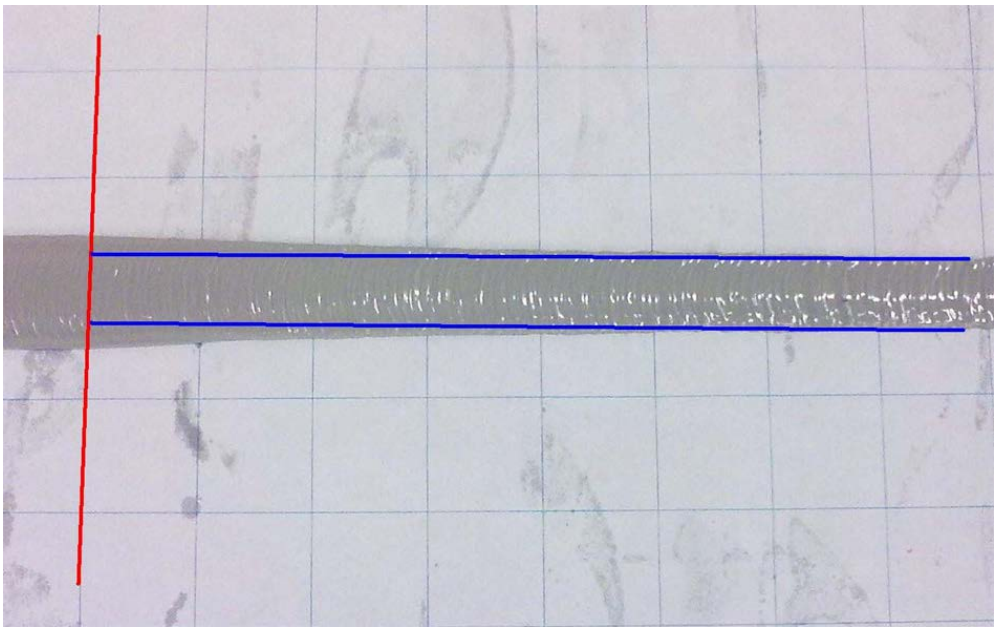
Other reasons for excessive torques include:

- Low material temperature
- Nozzle clogged
- High flow
- Mechanical problem at doser spindle, gear box or motor
- Viscosity of the material too high
- Defective needle valve
- Defective outlet valve (partly blocked peltier unit or heated hoses between doser and applicator, if installed)

9.3.8 Time until constant bead thickness

Problem

Bead section



xx2000000860

The red line marks the point at which the bead width should be modified. The blue lines indicate the width that the thinner bead should achieve. As you can see, the applied bead takes a very long time to reach the desired thickness. The transition should proceed considerably quicker.

Explanation

The speed of change of the seam width depends on several factors:

- Material
- TCP speed
- Length of hose after dispenser (if installed)
- Shootfilter (see *Filter change during the application cycle (Shootfilter) on page 381*)

Solution

Shootfilters can be used to change the seam width faster (see *Filter change during the application cycle (Shootfilter) on page 381*)

The longer the hose between dispenser and applicator (if installed) the longer it takes to implement a change of seam width.

9.3.9 Thread at bead end

Problem

A thread is drawn at the end of the bead (see the Bead end, top in the image) or it drips off (see the Bead end, bottom in the image).

Bead end

xx2000000861

Explanation

The needle takes only a few milliseconds to close. Nevertheless it is possible that in this time material is still pressed through the narrowed opening or clings on the outer side of the needle and then drips off.

Solution

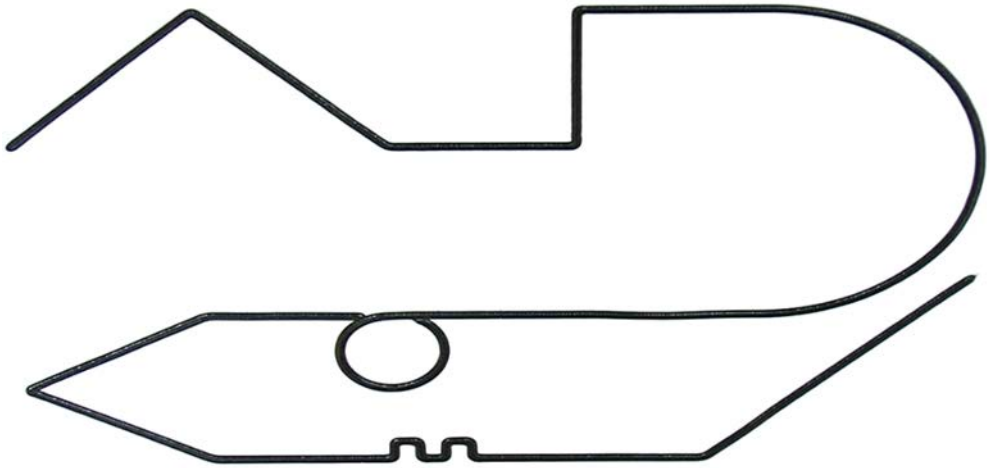
- Nozzle selection
- Material and temperature match
- Optimization of Robtargets at bead end

9.4 Schmidt curve

A so-called Schmidt curve is shown in the image below. This bead has all properties that may also occur in real application processes. These include:

- 90° corners
- Corners <90°
- Corners >90°
- Large and small curve radii
- On/Off point

Schmidt curve



xx2000000862

If this curve is started slowly (for e.g. v100) and then moved by an offset at a faster speed (for e.g. v1000), the effects that occur at a higher TCP speed can be compared directly with each other. In a system with the corresponding edge conditions (temperature, material, no hose between doser and nozzle) and well-adjusted parameters, the differences between a quick and slow bead are minimal. Possible speeds depend on the nozzle - material combination. At least a test with a lower speed, than the speed used in production is possible.

9.5 Summary - Parameters and their effect on the dispensing bead

This section lists the various parameters influencing a bead and describes what consequences changes to the parameters have.

Continues on next page

9.5.1 Needle Delays

The Needle Delays define when a needle opens or closes.

NeedleUp

Action

Reduce or increase the NeedleUp Delays (in ms).

Effect

Bead 5 with a NeedleUp Delay of 10 ms is the reference bead. The value is changed in 15 ms increments.

Needle DelayUp

xx2000000863

Reduction of the NeedleUp Delays (bead 1-4)

- The application begins later.
- The bead beginning is wider and more irregular.
- Possible formation of hammer heads.

Increase of the NeedleUp Delays (bead 6-10)

- The application begins earlier.
- The bead beginning is considerably thinner, with very high delays there is only a thread at the beginning. This is because the needle opens before the doser motor starts up which means that hardly any material comes out of the nozzle.

NeedleDown

Action

Reduction or increase of NeedleDown Delays (in ms).

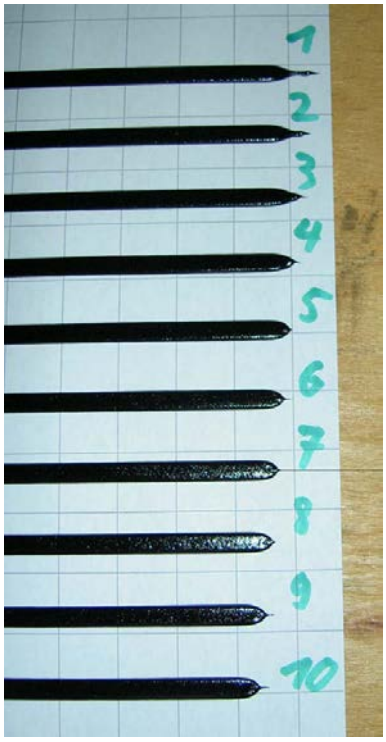
Continues on next page

9.5.1 Needle Delays
Continued

Effect

Bead 5 with a NeedleDown Delay of 30 ms is the reference bead. The value is changed in 15 ms increments.

Needle DelayDown



xx2000000864

Reduction of the NeedleDown Delays (bead 1-4)

- The application process ends later.
- The width of the bead becomes thinner towards the end, until only a thin thread is produced. This is because the doser motor is no longer running.

Increase of the NeedleDown Delays (bead 6-10)

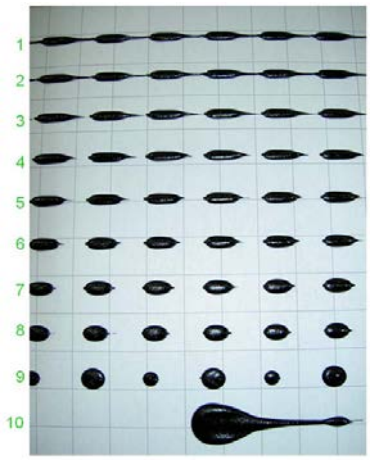
- The application ends earlier.
- The bead end looks the same as the end of the reference bead.
- It is possible that the beginning of the subsequent bead is wider and more irregular as the needle closes while pressure is still being built up.

Change of NeedleDown Delays for stepper beads

Continues on next page

Bead 5 with a NeedleDown Delay of 30 ms is the reference bead.

NeedleDown delays for stepper beads



xx2000000865

Reduction of the NeedleDown Delays (bead 1-4)

- The end of each bead section shifts backwards.
- The bead becomes thinner towards the end, until only a thin thread is produced.
- The beginning of the subsequent bead is slightly narrower.

Increase of the NeedleDown Delays (bead 6-10)

- The end of the bead shifts forwards.
- The start of the subsequent bead becomes wider.

Special case for test series 10:

At the start the duration of the needle opening is insufficient for material to emerge. However, the pressure is still built up. If the pressure is too high a large quantity of material suddenly emerges.

Combined NeedleDelay Up and NeedleDelay Down

Action

Reduce or increase of both NeedleUp and NeedleDown Delays (in ms) at the same time and by the same value.

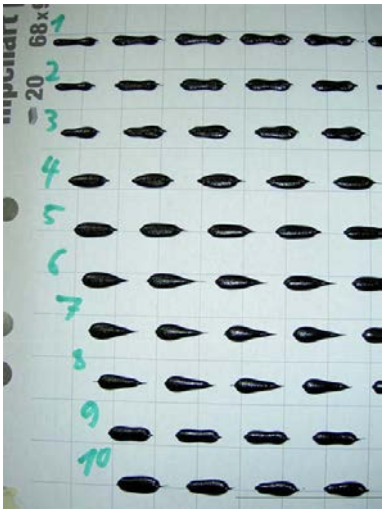
Continues on next page

9.5.1 Needle Delays
Continued

Effect

Bead 5 with a NeedleUp Delay of 10 ms and a NeedleDown Delay of 30 ms is the reference bead.

Needle DelayUp/Down - Change with stepper beads



xx2000000866

Reduction of the NeedleUp and NeedleDown Delays (bead 1-4)

- The bead sections roughly stay the same length.
- The bead sections shift forwards.
- The shape is changed. This is because the intervals in which the doser motor starts and stops are no longer matched with the Needle Delays.

Increase of the NeedleUp and NeedleDown Delays (bead 6-10)

- The bead sections roughly stay the same length.
- The bead sections shift backwards.
- The shape is changed. This is because the intervals in which the doser motor starts and stops are no longer matched with the Needle Delays.

9.5.2 Prepressure

Action

Modification of prepressure.

Effect

Bead 3 with a prepressure of 6 bar is the reference bead.

Change of prepressure

xx2000000867

Reduction of prepressure (bead 1 and 2)

- The bead beginning becomes narrower.

Increase of prepressure (bead 4-10)

- In the case of adhesive beads, the bead beginning is wider and more irregular on a longer section.
- In the case of sealing beads, hammer heads form (see *Hammer heads or too narrow bead beginning on page 508*).
- Hammer heads may be formed or the start of the seam will be wider and less regular over longer distances.

These different behaviors in the event of a modification to the prepressure can be attributed back to the different viscosities of the materials.

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10 Maintenance, repairs and cleaning

WARNING

Hazard due to moving parts of the robot with application equipment.

Possibility of serious, potentially life-threatening injury due to trapping of clothing, hair, limbs.

- Please note that movements of the robot with application equipment with the service door open are only possible while the enabling switch on the programming device is being pressed.

WARNING

Hazard due to moving parts of the robot with application equipment.

Possibility of serious, potentially life-threatening physical injury due to impact and crushing of the body.

- Only stay in the hazard area for as long as absolutely necessary.
- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.
- Secure the entrance to the system against unexpected closure. Attach a maintenance sign to the access door where it can be easily seen.
- Working in hazardous areas are only permitted in setup mode with reduced speed.

WARNING

Hazard due to operating errors.

Serious, potentially life-threatening physical injuries due to incorrect input of position data at a superordinate control system or on the robot control system.

- Only stay in the hazard area for as long as absolutely necessary.
- Work in the hazard area must only be performed by trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.

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Continued

WARNING

Hazard due to untidy work, rough, slippery and uneven surfaces.

Possibility of serious, potentially life-threatening injury due to slipping, tripping and falling.

- Ensure that you work tidily during all maintenance, inspection and repair operations.
- Do not leave any objects in the hazard area. Remove dirt deposits without leaving any residue, so that no material residues are left on the equipment parts

WARNING

Hazard due to flammable materials.

Possibility of serious, potentially life-threatening physical injury due to naked flames.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Hazard due to high pressure.

Possibility of serious, potentially life-threatening injury due to the penetration of pressurised medium into the body.

- For any work on pressurised components, only employ trained and qualified personnel who are familiar with the system.
- Before starting the work, perform a visual inspection of any pressurised lines and barrels.
- Depressurise and vent the system before beginning work. Check for any residual energy.
- After maintenance work has been completed, check the system for correct operation before restarting.
- Observe the specified maintenance schedules.

Continues on next page

WARNING

Hazard due to unexpected voltages on components, terminals and lines due to improper maintenance and inspection work.

Possibility of serious, potentially life-threatening physical injury due to electric shock, burns, falling, being caught and propelled away, and fire.

- Only stay in the hazard area for as long as absolutely necessary.
- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.
- You must observe the manufacturer's instructions at all times. All electrically conductive components must be connected with a potential equalisation rail. Mark all connections clearly.
- Before beginning the work, check that the corresponding electrical component is deenergised.

WARNING

Risk of burns.

Possibility of skin injuries due to burns from hot surfaces of the dispenser.

- Note the temperature displays on the surface of the dispenser and the temperature displays on the programming device.
- Avoid body contact with hot surfaces.

Continues on next page

10.1 Maintenance of function package

Note

Dirt and impurities in and around the cab and the robot may impair the function of the system.

In addition to the maintenance and repair tasks mentioned in the instruction manuals, the following activities must also be carried out:

- Perform a daily visual inspection for dirt contamination of system.
- Perform a daily visual and acoustic check of the equipment for leaks.
- Wipe down the applicator on the outside every day.
- Perform a weekly visual and acoustic check of the cables, as well as the air and material hoses, for fractures and other damage.

Tip

In each case also observe the information on maintenance in the respective robot product manual and in the instruction manuals of the components.

The assembly instructions for the doser, applicators and the optional integrated pump can be found in *Appendices on page 611*.

Continues on next page

10.1.1 Maintenance of the pneumatics

- Always keep pneumatic parts clean and in functioning condition.
- Check pneumatic hoses regularly for leak-tightness, secure seating of screw connections and couplings, and inspect for bends, crushing and abrasion.
- Check pneumatic valves regularly for correct operation, secure seating of plugs, crushing and abrasion of cables, and replace damaged parts as required.

Inspection

- Before beginning work, ensure that all lines are depressurised and empty.
- When replacing and laying pneumatic hoses, ensure that the hoses are not bent and cannot be crushed due to machine movements.
- Only use hose material intended for pneumatic use.

10.1.2 Maintenance of electronic components

Check:

- Always keep electronic components clean and in functioning condition.

Before putting the components into operation, they must dry out for a period of at least 24 hours in the temperature range permitted for operation and under the permissible atmospheric conditions. During storage, it must be ensured that unpackaged or no longer packaged components are reliably prevented from falling below the dew point and that condensation does not occur on or in control cabinets.

10.1.3 Maintenance intervals and tasks

In addition to the maintenance intervals specified in the manuals, the following maintenance activities and checks are required.

Daily

Component	Maintenance/Check	Measures
Entire system	Perform visual inspection of system for dirt contamination	Clean
	Perform visual and acoustic check of equipment for leaks	
	Wipe down applicator on outside/Wipe down spray nozzles	
Applicator	Wipe down applicator on outside/Clean nozzles	

Weekly

Component	Maintenance/Check	Measures
Entire system	Check important screw connections (for e.g. mounting of doser and applicator)	
	Check important plug connections (for e.g. electrical connectors, pneumatic connections) for tightness	
	Perform visual and acoustic inspection of cables, as well as air and material hoses, for fractures and other damage (for e.g. kinks and abrasion points)	
	Perform visual inspection of all pressurized components (for e.g. pump, doser, applicator, etc.) for leaks	
	Clean applicators	
	Check and record dispenser inlet pressure on the TPU Severe deviations from the default value indicate malfunctions	
	If available, replace softening agent at barrel pump, doser and applicator	
Inlet and outlet valves	Perform pneumatic leak test	Replace subassembly or seal
	Perform visual inspection of valves for defective connections	Retighten fittings
Nozzles	Clean spray nozzles	
	Check spray outlet opening *Expansion of or flushing the nozzle outlet affects the application pattern and the application pressure*	Replace nozzle if the nozzle outlet increases by 0.1 mm
Applicator	Perform pneumatic leak test	
	Perform visual inspection of applicator for defective connections	
	Check for leaks between air and material area	

Every 14 days

Component	Maintenance/Check	Measures
Doser	Check for leak Call Software IDFP Serviceroutine LeakageDetectionXs	Retighten fittings
	Check spindle for stiffness	Replace spindle
Inlet and outlet valves	Check for leaks	Retighten fittings

Continues on next page

10.1.3 Maintenance intervals and tasks
Continued

Monthly

Component	Maintenance/Check	Measures
Entire system	Check all critical components of system (for e.g. pump, material lines, doser, applicator)	Replace any critical components
	Check and document system parameters and menu parameters	
	Check and document doser pressure on display *Strong deviations from the normal value indicate faults*	
	Measure and document fill time of doser *Increased fill time indicates contaminated material filter or blockages in the material line between barrel pump and doser*	
Applicator	Check hoses and cables for excessive wear	
	If possible, perform spray test on spray bench	
	Check response times for opening and closing and watch out for abnormal behavior of applicator	
Nozzles	Replace spray nozzles depending on wear	

Every six months

Component	Maintenance/Check	Measures
Doser	Lubricate threaded spindle	See *Maintenance intervals on page 580*
Applicator	Perform visual inspection of sealing rings for leaks	Replace defective sealing ring in the event of leaks
	Perform visual inspection of wear sleeves in swivel joint housing for wear	Replace wear sleeves if worn
	Perform visual inspection of sealing rings for the nozzle needles for leaks	Replace defective sealing ring in the event of leaks
Nozzles	Replace spray nozzles depending on wear	
Controller	Trigger FI and check function	Replace if defective

Annually

Component	Maintenance/Check	Measures
Doser	Lubricate spindle with grease Increases service life *Also possible via optional automatic lubrication Perma dosers*	See *Maintenance intervals on page 580*
Applicator	Perform visual inspection for wear	Replace parts if heavily worn

10.1.4 Robot

Tip

Detailed information on the maintenance tasks and intervals can be found in the respective robot product manual.

10.1.5 Doser

Note

Observe the warning messages from the cycle number parts monitoring.

Tip

Detailed information on the maintenance tasks and intervals at the doser can be found in the respective instruction manual. The instruction manual is listed in *Appendices on page 611*.

10.1.6 Applicator

Tip

Detailed information on the maintenance tasks and intervals at the glue bead applicator can be found in the respective instruction manual. The instruction manual is listed in *Appendices on page 611*.

10.1.7 Hose package

WARNING

Hazard due to high pressure.

Possibility of serious, potentially life-threatening injury due to the penetration of pressurised medium into the body.

- For any work on pressurised components, only employ trained and qualified personnel who are familiar with the system.
- Before starting the work, perform a daily visual inspection of any pressurised lines and barrels.
- Depressurise and vent the system before beginning work. Check for any residual energy.
- Ensure that damaged hoses are replaced immediately.
- After maintenance work has been completed, check the system for correct operation before restarting.
- Observe the specified maintenance schedules.
- Wear the personal protective equipment.

Note

The usage time of hoses should not exceed 6 years (incl. 2 years storage time). For more information, see DIN 20066 2002-10 Fluid technology - Hose lines - Dimensions, requirements.

10.1.8 Heater

Subassembly	Maintenance	Time period	Comments
Doser	Trigger FI and check function.	6 months	Replace if defective.
Pump controller	Trigger FI and check function.	6 months	Replace if defective.

10.2 Repair

WARNING

Hazard due to moving parts of the robot with application equipment.

Possibility of serious, potentially life-threatening injury due to trapping of clothing, hair, limbs.

- Please note that movements of the robot with application equipment with the service door open are only possible while the enabling switch on the programming device is being pressed.
- Working in hazardous areas are only permitted in setup mode with reduced speed.

WARNING

Hazard due to operating errors.

Serious, potentially life-threatening physical injuries due to incorrect input of position data at a superordinate control system or on the robot control system.

- Only stay in the hazard area for as long as absolutely necessary. Work in the hazard area must only be performed by trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.

WARNING

Hazard due to untidy work, rough, slippery and uneven surfaces.

Possibility of serious, potentially life-threatening injury due to slipping, tripping and falling.

- Ensure that you work tidily during all maintenance, inspection and repair operations.
- Do not leave any objects in the hazard area. Remove dirt deposits without leaving any residue, so that no material residues are left on the equipment parts.

Continues on next page

WARNING

Hazard due to high pressure.

Possibility of serious, potentially life-threatening injury due to the penetration of pressurised medium into the body.

- For any work on pressurised components, only employ trained and qualified personnel who are familiar with the system.
- Before starting the work, perform a visual inspection of any pressurised lines and barrels.
- Depressurise and vent the system before beginning work. Check for any residual energy.
- After completing the repair and maintenance of components, check the system for correct operation before restarting.

WARNING

Fire hazard due to flammable materials.

Possibility of serious, potentially life-threatening physical injury due to naked flames.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Hazard due to unexpected voltages on components, terminals and lines due to improper repair works.

Possibility of serious, potentially life-threatening physical injury due to electric shock, burns, falling, being caught and propelled away, and fire.

- Only stay in the hazard area for as long as absolutely necessary.
- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.
- The manufacturer's specifications must be observed at all times.
- All electrically conductive components must be connected with a potential equalisation rail.
- Mark all connections clearly.
- Before beginning the repair works, check that the corresponding electrical component is deenergised.

Tip

Observe the spare parts lists in chapter 15 Appendices.

Continues on next page

Note

Warranty and product liability claims shall be rejected by ABB Automation GmbH if spare parts and wearing parts other than those approved by the manufacturer are used.

If you have any questions about how to order spare parts and wearing parts, please contact the manufacturer:

ABB Automation GmbH

Grüner Weg 6

61169 Friedberg (Germany)

Tel.: +49 6031 85-0

Fax: +49 6031 85-113

E-mail: roboterservice@de.abb.com

Internet: www.abb.de/robotics

Only use spare parts specified by the manufacturer. The use of other spare parts shall render any warranty claims null and void.

It cannot be guaranteed that spare parts other than those recommended by the manufacturer will have the required characteristics (tensile strength, physical parameters, surface characteristics). Therefore, there is an increased risk of damage to the system and, in particularly serious cases, also of injury to personnel.The use of spare parts that are not recommended by the manufacturer is a structural change to the system. The person making the change is therefore the system commissioner and must be made liable for the system.

10.3 Cleaning

The owner operator is responsible for performing cleaning of the robot with application equipment and its working environment at regular intervals, according to ambient conditions and the resultant level of contamination.

10.4 Service routines

The service routines are for support of commissioning and trouble-shooting the system. The service routines can be run in the manual mode of the robot. For more information on running service routines see the "Operating Manual - IRC5 with FlexPendant"

IDFP_DXParameters

When running the IDFP_DxParameters service routine, the parameter wizard is run again for the relevant dispenser. It can be used to modify existing configurations.

IDFP_DXHoseAccu

Executing IDFP_DxHoseAccu runs the hose breathing compensation for the corresponding doser. It should be run after every installation and after changes of material and with new material hoses between doser and applicator in order to take into account different characteristics of the material and the hose.

IDFP_DXLeakDetection

LeakDetection can be run if a leak is suspected. The doser builds up print in the hose between doser and applicator, with local circulation also to the material supply valve. Now the operator observes whether the print falls over a specific period. If this is the case, there is a leak and a corresponding error message is output. Leak monitoring can also be automatic. The automatic process can be set in the dispenser configuration (see *Dispenser X: General on page 330*).

10.5 Maintenance of barrel pump

Notes

All maintenance and repairs must be performed by trained technicians only. They must be familiar with the operation of the barrel pump.

Maintenance schedule

SC: shift change // D: daily // W: weekly // M: monthly // Y: annual

Pos.	System part	Work	Operation	Maintenance interval					Note
			depending on what comes first						
			Cycles	SC	D	W	M	Y	
1	Barrel pump	Visual inspection for cleanliness and obvious faults	20000		X				Faulty components must be replaced immediately
2	Barrel pump	Clean oiler cup, re-fill with Mesamoll	50000			X			If necessary, clean the barrel pump controller
3	Barrel pump	Drain condensate in the filter of the maintenance unit	100000				X		Follow the Festo operating manual
4	Barrel pump	Replace the seals of the material pump	200000					X	Must be done by specialists only

Fault table

Fault	Remedy
Follower plate does not slide into the barrel	• Grease seal • Increase RAM pressure • Install seal with smaller diameter
Follower plate seal leaks	• Vent plugs of the follower plate not open • Reduce RAM pressure • Install seal with larger diameter
Air motor stroke switching does not operate	See air motor manual
Material pump leaks pump moves up and down without sufficient pressure buildup	see operating instructions for scoop pump (lower pump)
Automatic switch (A->B / B->A) does not operate for double barrel pump.	inactive pump: • Barrel is empty • Pump not in "Auto" operating mode • Keyswitch still set to "local" operation

Continues on next page

Changing barrel

This section describes the barrel change process. Only trained persons are permitted to perform this task. Please observe the following introductory notes:

WARNING

Risk of crushing

When lowering the pump unit there is a danger of very serious injury!

Always wear suitable safety protective clothing!

Never enter the danger zone under the follower plate of the pump!

WARNING

Warning of material leaking under pressure.

Spraying material may cause serious eye injuries!

Always wear suitable safety goggles!

DANGER

Danger of setting in the material barrel!

Grease may cause the material to cure.

Make sure that parts that come into immediate contact with the adhesive are not greased. For example, the follower plate must not be coated with grease.

When greasing the wiping rings make sure that parts that come into contact with adhesive are not contaminated with grease!

DANGER

ENVIRONMENTAL PROTECTION

Dispose of the barrel and the residual adhesive in accordance with the applicable regulations!

Follow the instructions of the adhesive manufacturer.

The manager is responsible for providing the datasheets.

When the barrel pump is empty, replace the barrel with a new barrel as follows:

1. Set the keyswitch on the PIM to "manual".
2. Set the barrel pump to manual mode. If the pump was in automatic mode, this will stop the air motor.
3. Actuate the pressure relief and then open the manual pressure relief tap.
4. Remove the sealing plug from the follower plate.
5. Screw the ventilation rod into the follower plate.
6. Press the "Lift follower plate" button to move the pump unit upwards. As soon as the barrel is lifted off the floor, pump a little air under the follower

Continues on next page

plate with the ventilation valve on the ventilation rod until the barrel lowers again.

Attention: If too much air is pumped into the barrel, it will be suddenly released at the moment in which the follower plate comes out of the barrel.

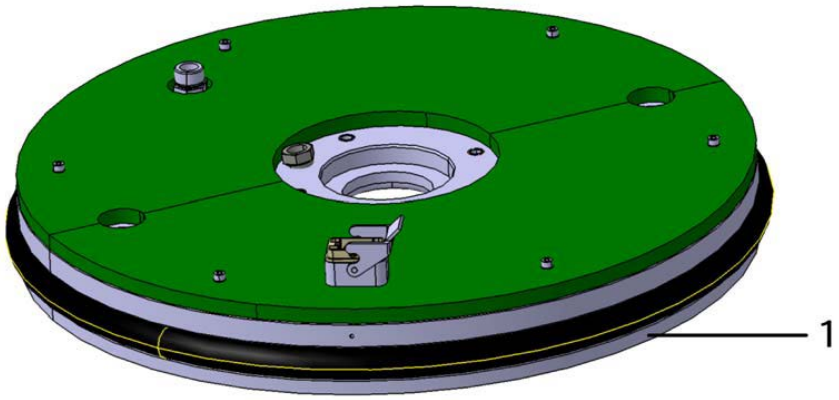
7 When the follower plate is completely out of the barrel, the ventilation valve must be closed and the ventilation rod removed.

8 Now remove the empty barrel from the system, seal it and dispose of it in accordance with the applicable regulations.

9 Thoroughly clean material residue from the follower plate and coat the seal with suitable multipurpose grease. Do not damage the coating of the follower plate!

Notice: Use a wood spatula or similar tool that will not damage the coating to clean the follower plate!

Follower plate



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	Description
1	Grease seal

Prepare the new barrel as specified by the manufacturer. See the manufacturer's datasheets and instructions for the procedure. They must be supplied by the manager.

10 Push the new, acclimatized barrel under the follower plate.

11 Sink the follower plate carefully into the barrel by pressing the "Sink follower plate" button (two-hand operation) until the follower plate is in contact with the material and material leaks from the ventilation opening of the follower plate.

12 Screw the sealing plug for the ventilation opening into the follower plate. Do not use grease!

13 If the optional pump heater is installed the barrel must now be preheated.

Do not interrupt the heating time!

14 Open the bleed valve on the material pump.

Continues on next page

15 To bleed the material pump press the "Air motor On" button. The pumping process of the material pump is started and the follower plate is pressed down on the material. Press and hold the button until "cracking noises" from the vent opening can no longer be heard.

   Catch the leaking material with a suitable container and discard it in accordance with the applicable regulations!

   Wear safety goggles!

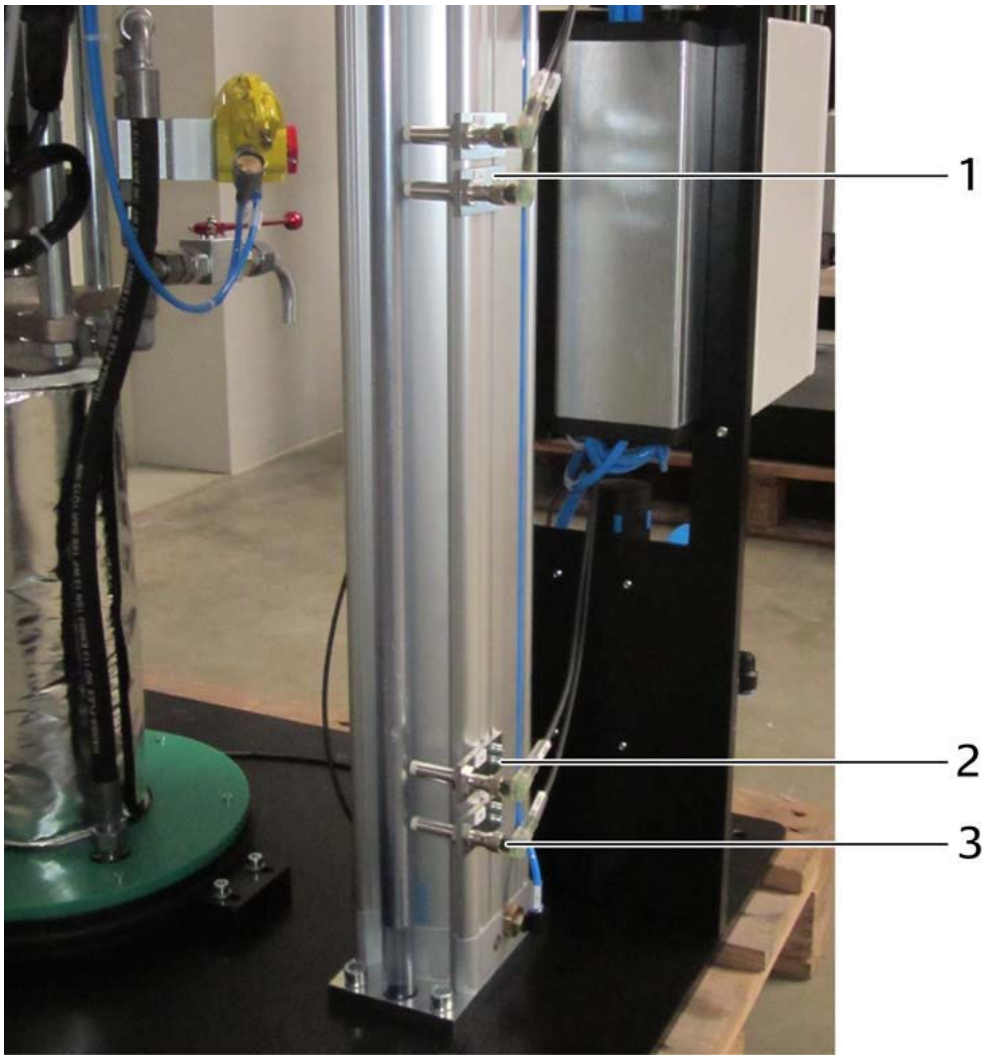
16 Close the bleed valve.

17 Set the barrel pump to automatic mode. (press "Auto" button)

18 Set keyswitch to "disabled" or "remote control" position.

Adjusting sensors

Position of sensors



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	Description
1	"Follower plate in barrel" sensors channel 1 and 2

Continues on next page

	Description
2	"Barrel 80% empty" sensor
3	"Barrel empty" sensor

CAUTION

The sensors are preset at the factory only. The fine adjustment must be made at commissioning.

The inductive sensors for position monitoring are tripped by a rod screwed to the crossbar. The max. switching distance is 7 mm.

The "follower plate in barrel" sensors must be positioned just below the top edge of the barrel. This function prevents body parts from being crushed between follower plate and barrel.

CAUTION

Make sure that they are only tripped when the follower plate is completely inside the barrel.

The positions of the "barrel 80% empty" and "barrel empty" sensors are not safety-relevant and can be adjusted as specified by the manager.

The mounts of the sensors are jammed in the grooves of the pneumatic cylinder. The switching points can be adjusted.

However, the adjustments should only be made by qualified technicians to prevent potential damage.

WARNING

Danger due to incorrectly adjusted limit switches (initiators)

This may cause crushing and very serious injuries!

Only trained technicians are permitted to adjust the limit switches!

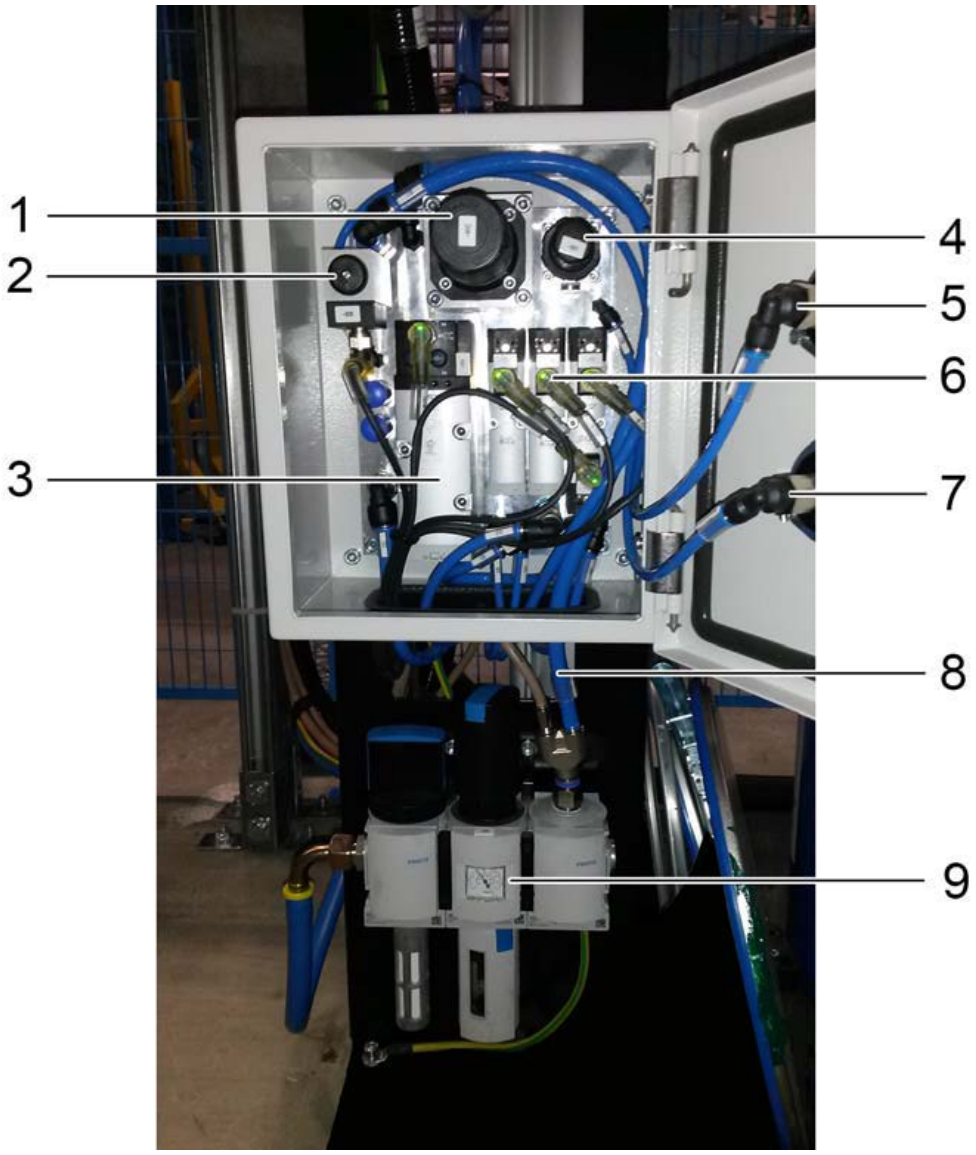
Continues on next page

Pneumatic settings

The pneumatic box must be locked at all times with a two-way key.

Only trained personnel are permitted to make adjustments inside the pneumatic box.

Pneumatic box (external compressed air switch)



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	Description
1	Z2 pressure regulator (air motor)
2	Pressure switch < 5.5 bar generates error
3	Y31 valve Y31 air motor
4	Z1 pressure regulator (lift/sink)
5	Pressure gauge pressure air motor
6	Y27-Y29 valves RAM up/down/disable

Continues on next page

	Description
7	Pressure gauge lift/sink
8	Option for feeding compressed air for doser valves
9	Z0 pressure regulator (EFP) with pressure gauge

The pressure of the complete pneumatic system is adjusted at pressure regulator Z0. The recommended pressure is 6 bar.

Note

If the static air supply pressure is only just above 5.5 bar, the dynamic air pressure may fall below 5.5 bar. In this case an alarm is generated and the air motor is shut off.

Note

If the compressed air for doser valves is not taken from behind the maintenance unit, there is no option for monitoring the compressed air at the doser.

- The pressure of the RAM press is adjusted at pressure regulator Z1:

pressure set at pressure regulator Z1	Pressure under the follower plate
1 bar	0.06 bar
2 bar	0.12 bar
3 bar	0.18 bar
4 bar	0.25 bar
5 bar	0.31 bar
6 bar	0.37 bar
7 bar	0.43 bar
8 bar	0.50 bar

- The RAM pressure should be set as low as possible to prevent leaks between the wiping ring and the barrel wall. However, it must be high enough to ensure that the force of the RAM press is great enough to press the wiping ring of the follower plate into the barrel.
- The pressure at the air motor and thus the pump pressure is adjusted at pressure regulator Z2:

pressure set at pressure regulator Z2	Material pressure at outlet of lower pump
1.0 bar	68 bar
1.5 bar	102 bar
2.0 bar	137 bar
2.5 bar	171 bar
3.0 bar	205 bar
3.5 bar	239 bar

Continues on next page

pressure set at pressure regulator Z2	Material pressure at outlet of lower pump
4.0 bar	274 bar Attention: note the compressive strength of the hoses!
4.5 bar	308 bar Attention: note the compressive strength of the hoses!

- The pressure of the barrel ventilation is set to 2 bar with the pressure restriction valve.
- The static material pressure at the doser inlet must not exceed 250 bar.

Attention: Only material hoses with a minimum operating pressure strength of 270 bar supplied or approved by ABB are permitted.

WARNING

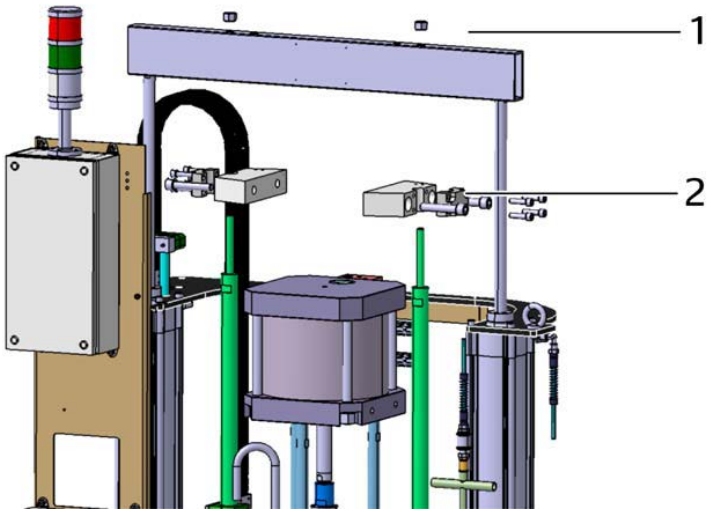
Danger due to incorrect adjustment at the pressure regulator for pump pressure

This may cause very serious injuries due to pressurized material!

Only trained technicians are permitted to adjust the pressure regulator.

Replacing air motor

Demounting air motor



xx2000000894

	Description
1	Loosen nuts Lifting crossbar
2	With 200 l barrel pumps remove adapter + clamp

Procedure:

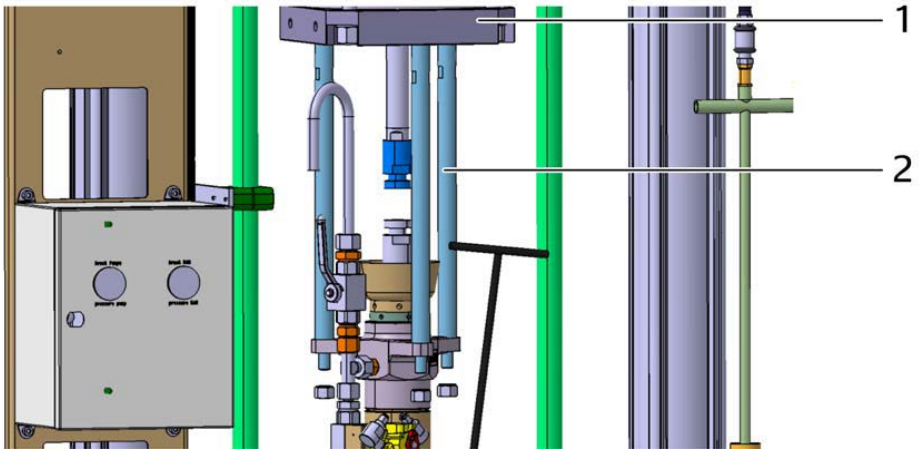
1 Disconnect cables and hose from air motor.

2 Release connections to the crossbar and energy chain.

Continues on next page

3 Lift crossbar up slightly.
4 Disconnect coupling between air motor and material pump.
5 Disconnect connecting rods between air motor and material pump.
6 Remove air motor.

Demounting air motor



xx2000000895

	Description
1	Air motor
2	Connecting rod

7 Demount connecting rods and blocks

Replacing follower plate

Procedure:

1 Release energy chain retainer.
2 With 200 l barrel pumps: Unscrew connecting rods from the follower plate.

Replacing material pump

WARNING

Danger due to pressurized material!

This may cause injury, particularly in the region of the eyes!

The material pressure must be released before disconnecting the material hose!
Always wear safety goggles!

Note

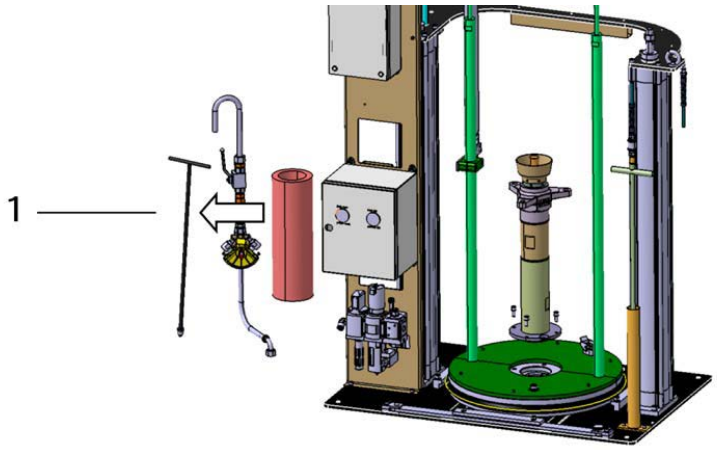
Suitable safety goggles must be worn when disconnecting the material hose!

Continues on next page

Procedure:

1 Demount air motor as described in *Replacing air motor on page 554*.

Demounting material pump



xx2000000896

	Description
1	Demount ventilation rod, optional heating sleeve and pressure relief

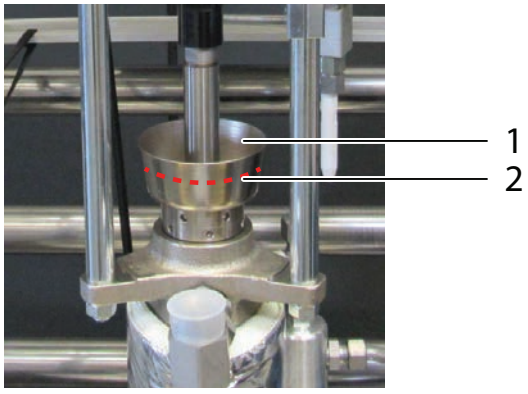
2 Unscrew material hose from material pump.

3 Disconnect coupling between air motor and material pump.

4 Unscrew nuts on connecting rods between air motor and material pump.

5 Remove pump.

Filling oiler cup



xx2000000909

	Description
1	Oiler cup
2	Fill oil approx. 2/3

The oil in the oiler cup must be replaced as required. One indication of a required change is very discolored oil.

1 Remove the oil and dispose of it.

Continues on next page

2 Clean the oiler cup and fill it approx. 2/3 with oil.
3 Use "Mesamoll" oil. For notes on the reference see the higher-order control instructions chapter "Operating and auxiliary substances".

WARNING

Spraying Mesamoll!

This may cause eye injuries!

Wear safety goggles when working with Mesamoll.

WARNING

Warning of hot objects

Risk of burns by installed heaters and heating sleeves, including adjacent assemblies!

If possible, avoid working on hot components and if necessary use suitable protective gloves.

DANGER

Old oil must be disposed of in accordance with the applicable regulations.

10.6 Maintenance of hydraulic pump

Maintenance schedule

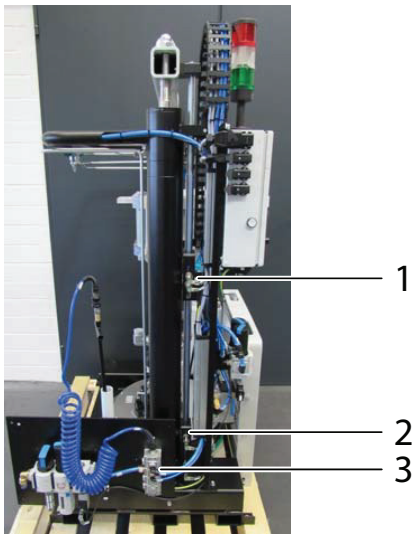
SC: shift change // D: daily // W: weekly // M: monthly // Y: annual

Pos.	System part	Work	Operation	Maintenance interval					Note
			depending on what comes first						
			Cycles	SC	D	W	M	Y	
1	Barrel pump	Perform lamp test		X	X				
2	Barrel pump	Perform visual inspection		X		X			Correct obvious faults immediately!
3	Barrel pump	Check supply in reserve barrels		X			X		
4	Barrel pump	Oil level check and oil condition check in the oil cup		X				X	Oil level must be at least 1/2 of the oil cup! If the release agent is seriously discolored, replace it!
5	Barrel pump	Actuate the bleed valve on the lower pump							for the barrel change
6	Barrel pump	Check that the oiler cup is tightly seated and tighten if necessary							
7	Barrel pump	Check pneumatic and electrical connections							Wiring, connectors, screw connections …
8	Barrel pump	Check that material connections are tight							
9	Barrel pump	Replace seal package							Replace the seal package if the Mesamoll becomes discolored in spite of recent replacement

Continues on next page

The limit switches

Limit switch on RAM



xx2000000904

	Description
1	Limit switch for the "Follower plate in barrel" function
2	Limit switch for the "Barrel 80% empty" function
3	Limit switch for the "Barrel empty" function

The "Barrel empty" limit switch switches the RAM off in the "AUTOMATIC" operating mode. The air motor and the hydraulic pump are no longer actuated at this point. In the "MANUAL" operating mode the pump unit can be fully lowered beyond the limit switch.

The "80% empty" limit switch switches in the position at which the barrel is approx. 80% empty. The signal is processed by the IFC controller, and a warning is output. If applicable, the heaters of the other RAM are switched on.

The limit switch for the "Follower plate in barrel" function detects over two channels whether the follower plate is already in the barrel. Only then can the "AUTOMATIC" operating mode be switched on. If the operating mode is activated and the follower plate is not yet in the barrel, automatic functions will not be run. In spite of the selection, the "AUTOMATIC" operating mode is not enabled.

The limit switches are fastened at the slots. The switching points can be adjusted. However, the adjustments should only be made by qualified technicians to prevent potential damage.

WARNING

Risk of crushing!

You may be crushed between the follower plate and wall attachment area, which may cause very serious injury.

Never reach between the follower plate and the wall attachment area.

Continues on next page

WARNING

Danger due to incorrectly adjusted limit switches

This may cause crushing and very serious injuries!

Only trained technicians are permitted to adjust the limit switches!

Replacing follower plate

WARNING

Warning of hot objects

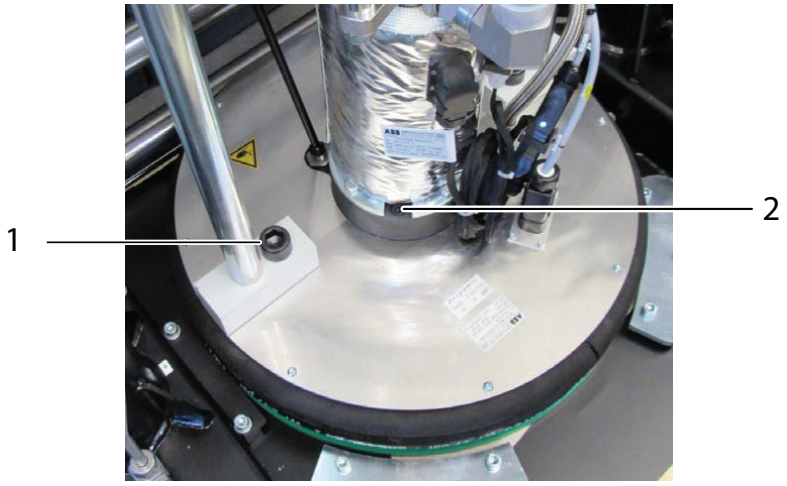
Risk of burns by installed heaters!

If possible, avoid working on hot components and if necessary use suitable protective gloves.

Replace the follower plate as follows. Note that any connectors (with heaters installed) must be disconnected from the follower plate!

1 Switch the RAM to the "MANUAL" operating mode.
2 If necessary, switch the heater on the follower plate off at the IFC and allow it to cool if required.
3 If necessary, remove the current barrel from the RAM.
4 Lower the pump unit completely.
5 Unscrew the 4 screws of the lower pump and the two screws of the two main support rods.

Replacing the follower plate



xx2000000905

	Description
1	Remove screws of the main support rods (2 x)
2	Remove screws of the lower pump (4 x)

Continues on next page

6 Lift the pump unit slightly and remove the follower plate.

The follower plate is installed in reverse order.

Replacing material pump

WARNING

Danger due to pressurized material!

This may cause injury, particularly in the region of the eyes!

The material pressure must be released before disconnecting the material hose!
Always wear safety goggles!

WARNING

Warning of hot objects

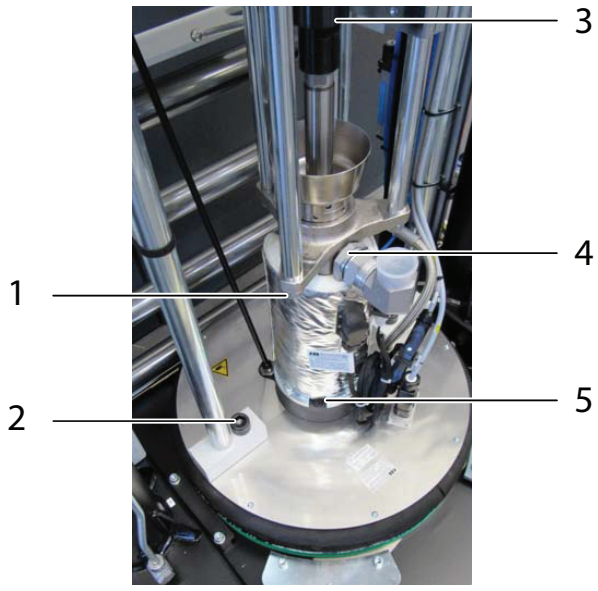
Risk of burns by installed heaters and heating sleeves on the lower pump!

If possible, avoid working on hot components and if necessary use suitable protective gloves.

Note

Suitable safety goggles must be worn when disconnecting the material hose!

Replacing the material pump



xx2000000906

	Description
1	Loosen nuts of the connecting rods (3 x)
2	Remove screws of the main support rods (2 x)

Continues on next page

	Description
3	Coupling
4	Material hose connection
5	Remove screws of the lower pump (4 x)

Replace the lower pump as follows. Note that any connectors (with heaters installed) must be disconnected from the follower plate and if necessary the heating sleeves of the lower pump must be removed! The lower pump and the adjacent assemblies may be very hot! Use protective gloves when replacing the lower pump.

Proceed as follows to replace the lower pump:

1 Switch the RAM to the "MANUAL" operating mode.
2 If necessary, switch the heater on the follower plate off at the IFC and allow it to cool if required.
3 Remove the material hose from the lower pump.
4 Disconnect the coupling between air motor and lower pump.
5 Remove the 3 nuts of the connecting rods between air motor and lower pump.
6 Remove the 4 hexagonal and the 2 hexagon socket screws that fasten the follower plate.
7 Approach the RAM.
8 Remove the lower pump.

The lower pump is installed in reverse order.

Replacing air motor

WARNING

Danger due to compressed air!

Escaping compressed air may cause injuries to the eyes and other body parts.

Shut off the compressed air before disconnecting the compressed air hose! Always wear safety goggles!

WARNING

Warning of hot objects

Risk of burns by installed heaters and heating sleeves, including adjacent assemblies!

If possible, avoid working on hot components and if necessary use suitable protective gloves.

Note

Suitable safety goggles must be worn when disconnecting the material hose!

Continues on next page

Note

The compressed air must be shut off at the feed line! See the associated pneumatics diagram.

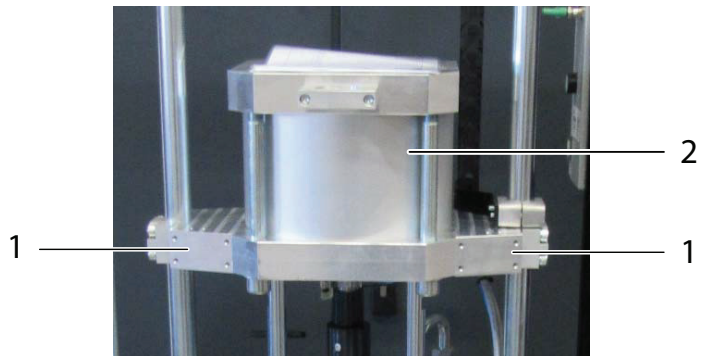
Note

Two qualified persons are required for installing and removing the air motor.

Proceed as follows to replace the air motor:

1 Switch the RAM to the "MANUAL" operating mode.
2 Shut off the compressed air at the pneumatic unit of the IFC.
3 Disconnect the compressed air line from the air motor.
4 Disconnect the coupling between air motor and lower pump.
5 Disconnect the clamping unit from the air motor

Air motor with clamping unit



xx2000000907

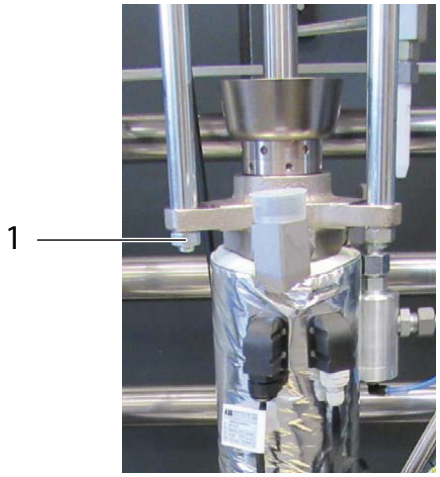
	Description
1	Clamping unit
2	Air motor

6 First unscrew the outer clamping unit. This requires removal of 4 screws each. Next unscrew the inner clamping unit from the air motor. This requires removal of 2 screws each.
7 Remove the clamping unit.

Continues on next page

8 Remove the 3 nuts of the connecting rods between air motor and lower pump.

Nuts of the connecting rods



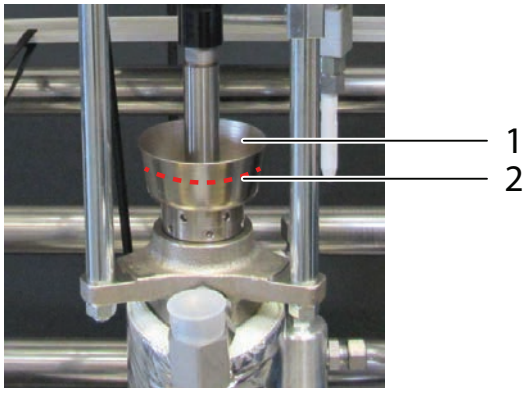
xx2000000908

	Description
1	Remove nuts of the connecting rods (3 x)

9 Pull out the air motor upwards.

The air motor is installed in reverse order.

Filling oiler cup



xx2000000909

	Description
1	Oiler cup
2	Fill oil approx. 2/3

The oil in the oiler cup must be replaced as required. One indication of a required change is very discolored oil.

1 Remove the oil and dispose of it.
2 Clean the oiler cup and fill it approx. 2/3 with oil.
3 Use "Mesamoll" oil. For notes on the reference see the higher-order control instructions chapter "Operating and auxiliary substances".

Continues on next page

WARNING

Spraying Mesamoll!

This may cause eye injuries!

Wear safety goggles when working with Mesamoll.

WARNING

Warning of hot objects

Risk of burns by installed heaters and heating sleeves, including adjacent assemblies!

If possible, avoid working on hot components and if necessary use suitable protective gloves.

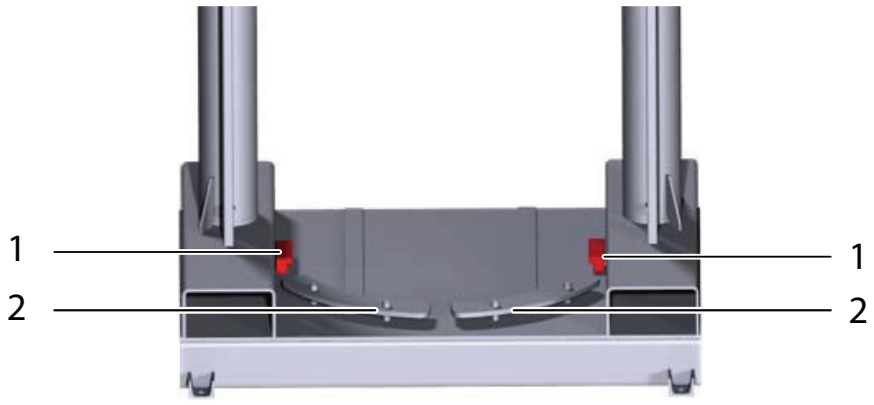
DANGER

Old oil must be disposed of in accordance with the applicable regulations.

Adjusting barrel clamp

The 200 l barrels from different manufacturers may have different tolerances in their dimensions. For this reason the barrel clamp can be adjusted at two retainer components. The following illustration shows the spacing of the individual retainer components. The red-highlighted retainer components are adjustable and are described in this chapter.

Adjusting the barrel clamp



xx2000000910

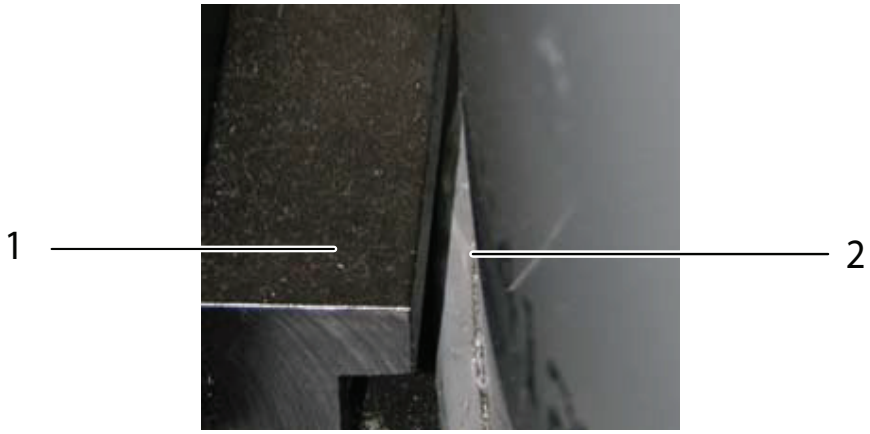
	Description
1	Adjustable retainer components
2	Fixed retainer components

The barrel is pushed to the RAM. The bottom collar of the barrel (*on page 566*) is under the retainer components. When the follower plate moves upwards out of the barrel for barrel changeover, the barrel is held down on the floor by the barrel clamp

Continues on next page

(the retainer components). This requires the adjustable retainer components to be correctly adjusted.

Adjusting the barrel clamp - the bottom collar on the barrel

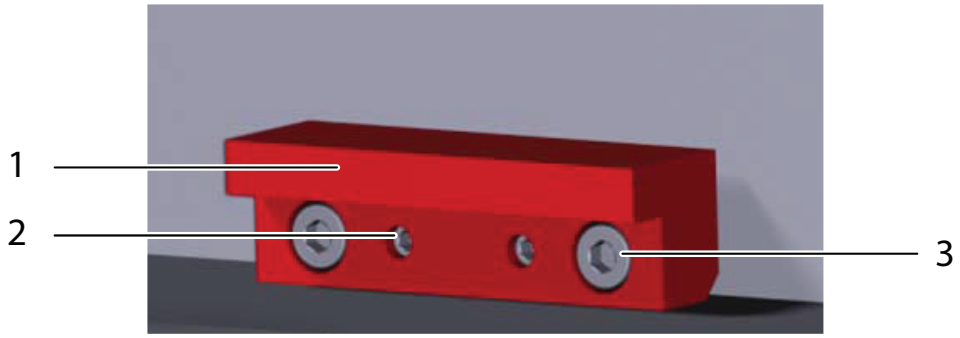


xx2000000911

	Description
1	Retainer component
2	Collar of the barrel

The retainer components (*on page 565*) are adjusted with the barrel removed. Each of the adjustable retainer components (*on page 565*) has two fastening screws and two adjusting screws (*on page 566*).

Adjusting the barrel clamp - the retainer component



xx2000000912

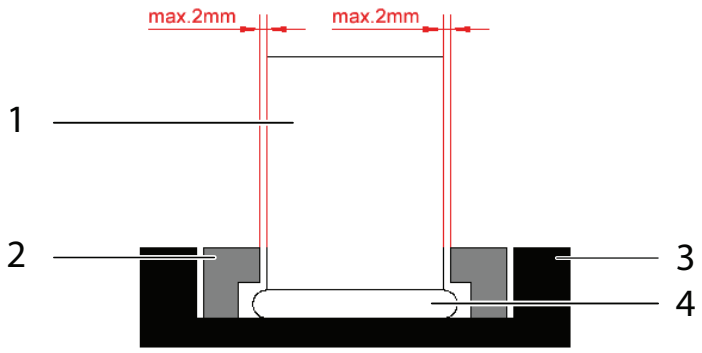
	Description
1	Retainer component
2	Adjusting screw
3	Fastening screw

To adjust the retainer components loosen the two fastening screws and adjust the distance with the adjusting screws. Then tighten the fastening screws.

Continues on next page

Check the adjustment by placing a barrel in the RAM. The distance between barrel and retainer component should not exceed 2 mm.

Distances of the retainer components



xx2000000913

	Description
1	Barrel
2	Retainer component
3	Collar of the barrel
4	RAM

We recommend the following procedure for adjustment of the barrel clamp:

1. Place a barrel on the RAM.
2. Measure the distances between barrel and retainer components and calculate the new required dimensions.
3. Remove the barrel.
4. Correct the adjustment of the retainer components.
5. Place a barrel on the RAM and check the adjustment. If the adjustment is still not correct, repeat the procedure from section 2.

10.7 Maintenance of doser

10.7.1 Notes

Maintenance personnel must be familiar and apply the general and special safety regulations and recommendations of the employers' liability insurance association.

Tip

Observe also the relevant chapters of the supplied purchased parts documentation!

The safety and accident prevention regulations given in these documentations must also be observed.

Note

Carry out maintenance and repair work as described in these documentations.

Any damage or malfunction must be remedied immediately by qualified specialist personnel. Repairs must be carried out by the manufacturer or by briefed specialists.

Tip

If you have any questions, contact our customer service.

10.7.2 Lubrication points of assembly

Lubricating the spindle nut

Note

Use only the following grease to lubricate the spindle nut:

- SKF LGEP 2
- SKF LGHB 2 (at higher temperatures)

Equivalent lubricants can be used after consultation with ABB.

You will need a grease gun that is compatible with the fitted grease nipple. You can lubricate in any position of the spindle nut. To do this, remove the cover.

- Grease volume for initial filling of the spindle nut:
  - For 11 ccm, approx. 6.5 cm^3
  - For 80 ccm, approx. 6.5 cm^3
  - For 155 ccm, approx. 40 cm^3
  - For 560 ccm, approx. 54 cm^3
- Grease volume for relubrication:
  - For 11 ccm, approx. 3 cm^3
  - For 80 ccm, approx. 3 cm^3
  - For 155 ccm, approx. 20 cm^3
  - For 560 ccm, approx. 25 cm^3

At higher spindle temperatures, the drop point of SKF LGEP 2 can be exceeded. This is the case if the spindle is dry even though it was greased according to the specified the lubrication intervals and the grease has dripped into the protective tube. In that case use SKF LGHB 2, which has a higher drop point.

After no more than one year, remove the ball screw drive and fully remove the old grease.

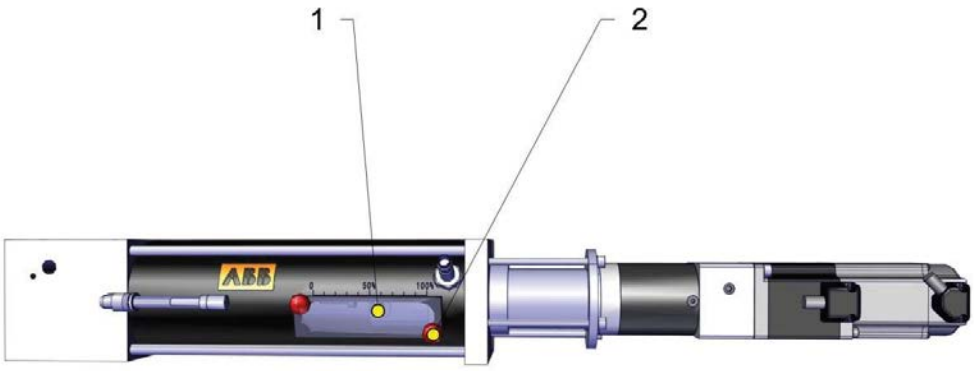
Observe the following lubrication points during maintenance of the dosing unit:

Continues on next page

10.7.2 Lubrication points of assembly
Continued

For 11 ccm:

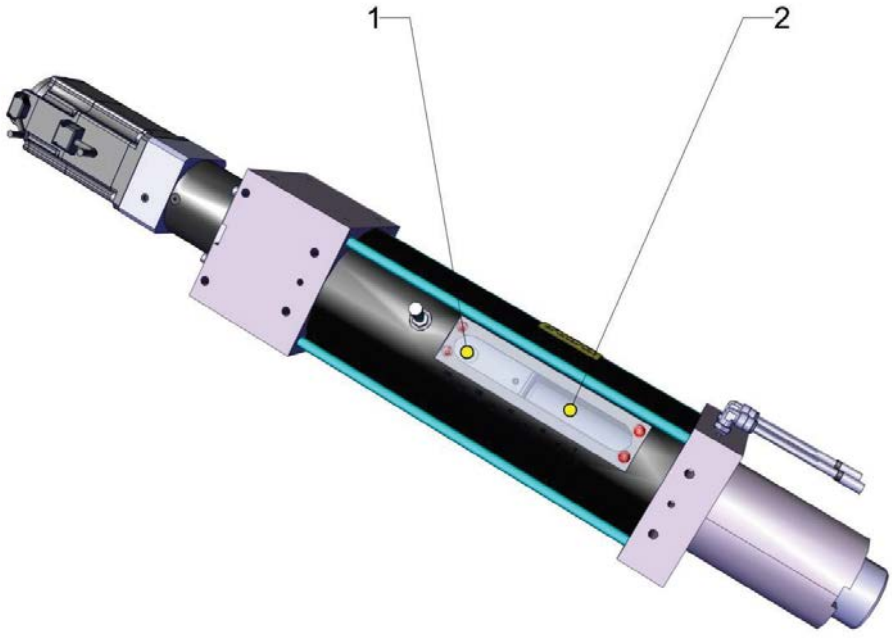
Lubrication point on dosing unit - spindle nut



xx2000000986

For 80ccm, 155 ccm, 560 ccm:

Lubrication points of the dosing unit - basic assembly



xx2000000987

No.	Description
1	Greasing the spindle nut through a grease nipple
2	Cover

Continues on next page

Note

The spindle bearings are maintenance-free and do not, therefore, require lubrication.

Note

Observe the specified lubrication intervals!

Lubricating the needle of the dosing valve

Regular lubrication of the needle increases the service life of the seals and reduces wear of the needle and the metal guides.

To lubricate the needle, the leakage indicator must first be removed.

To lubricate, use the grease nipple on the side with a suitable grease gun. Press Vaseline into the dosing valve until it emerges from the leakage opening. Wipe off the escaped Vaseline. Then refit the leakage indicator.

You will need a grease gun that is compatible with the fitted grease nipple. You can lubricate in any position of the spindle nut. To do this, remove the cover.

The needle is supplied pre-lubricated with technical Vaseline.

Note

Use Vaseline to grease the seal carrier.

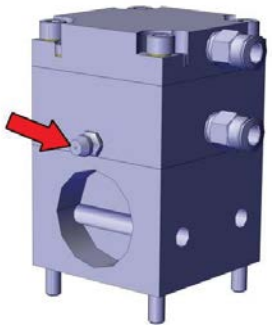
Recommended: White special-purpose Vaseline from Reiff.

You can replace this with a higher-grade bearing grease (e.g. SKF LGEP 2).

Observe the following lubrication points during maintenance of the dosing unit:

For 11 ccm:

Lubrication points of dosing valve VN6

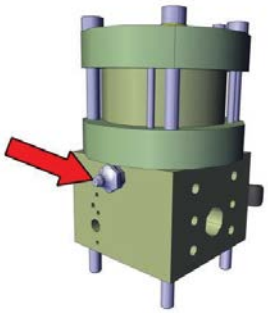


xx2000000988

Continues on next page

For 80ccm, 155 ccm, 560 ccm:

Lubrication points of dosing valve VN



xx2000000989

Note

Observe the specified lubrication intervals!

Lubricating the seal carrier for 11 ccm

Note

Use Vaseline to grease the seal carrier.

Recommended: White special-purpose Vaseline from Reiff.

You can replace this with a higher-grade bearing grease (e.g. SKF LGEP 2).

To lubricate the seal carrier, the leakage indicator must first be removed.

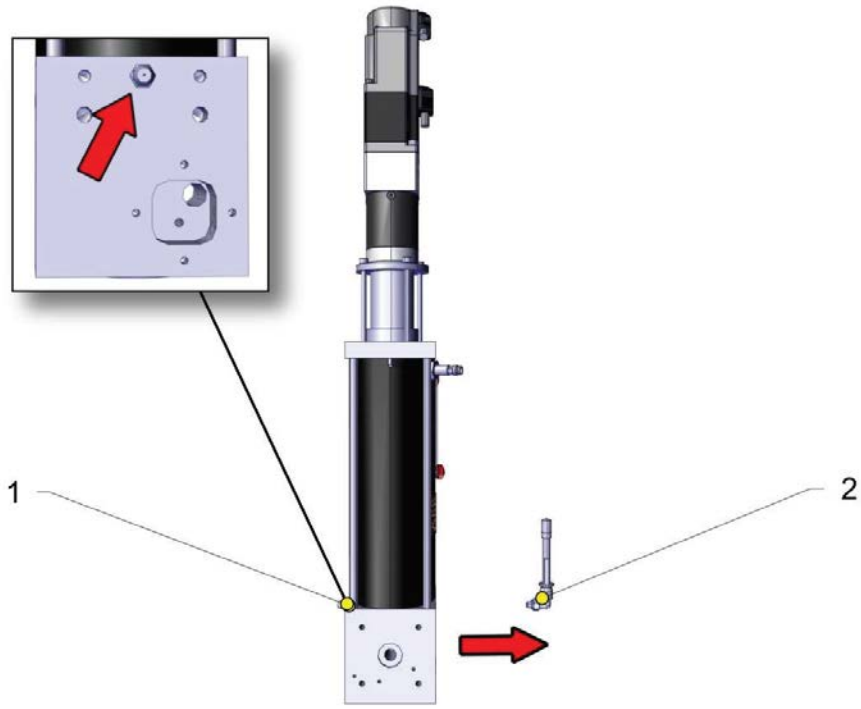
To lubricate, use the grease nipple on the side with a suitable grease gun. Press Vaseline into the seal carrier until it emerges from the leakage opening. Wipe off the escaped Vaseline.

Then refit the leakage indicator.

Continues on next page

Observe the following lubrication points during maintenance of the dosing unit:

Lubrication point on dosing unit - seal carrier



xx2000000990

No.	Description
1	Greasing the seal carrier via the grease nipple
2	Leakage indicator removed

Note

Observe the specified lubrication intervals!

10.7.3 Replacing the pressure sensor

WARNING

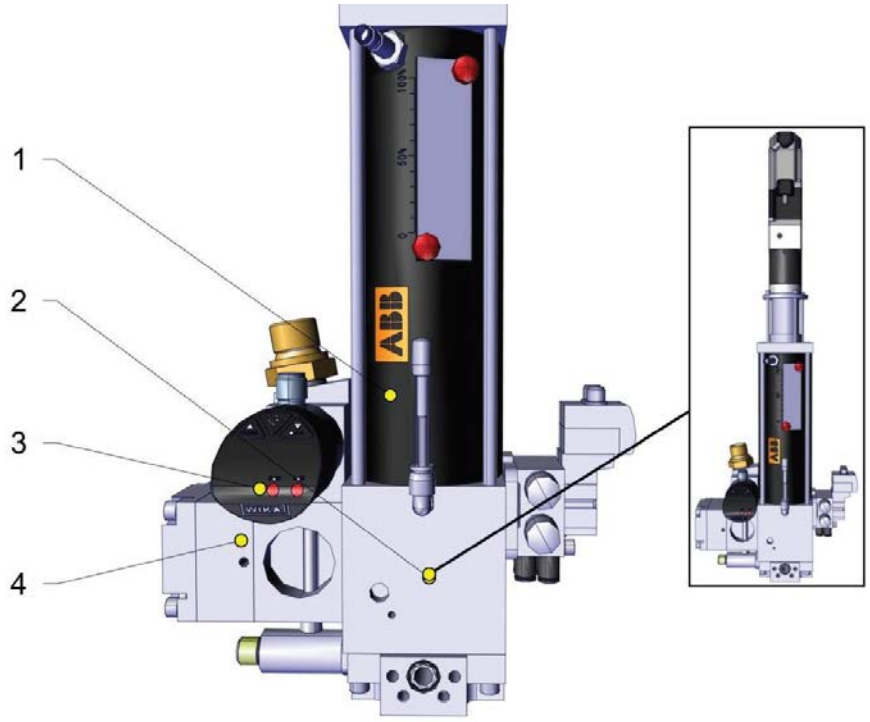
Pressurized material!

Risk of severe injuries through escaping pressurized material. Risk of severe eye injuries!

Before removing the pressure sensor relieve the material pressure! Always wear protective goggles for this work.

For information about relieving the pressure, see the user manual for the IFC 100.

EVD 11 ccm



xx2000000991

No.	Description
1	Dosing unit
2	Dosing chamber
3	Pressure sensor
4	Dosing valve

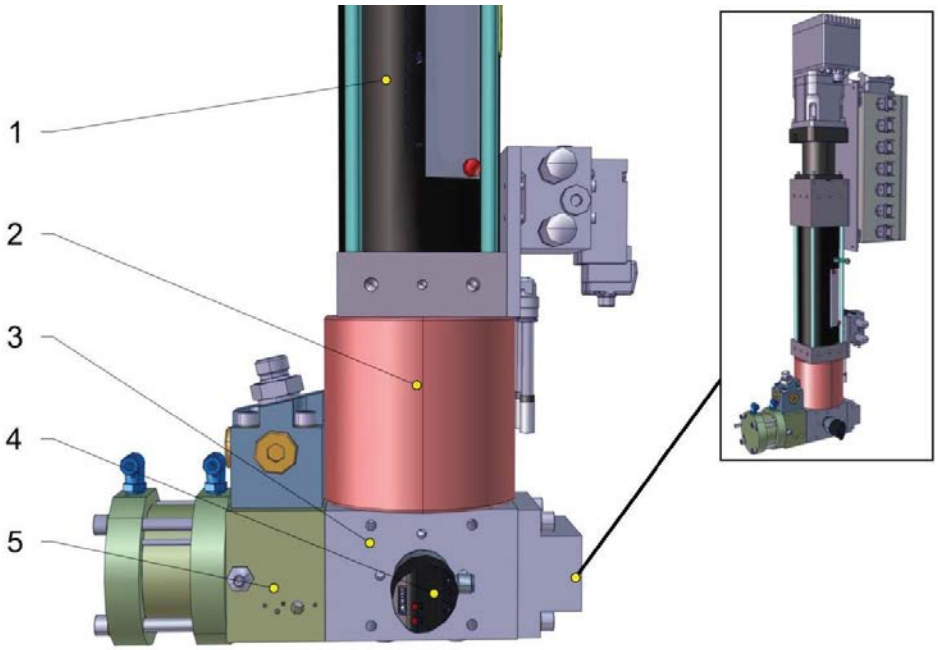
The pressure sensor is located at the connection block of the dosing system.

Disconnect the electrical connections and the pressure sensor. To remove the pressure sensor, use a 27 mm open-end spanner.

Before refitting, clean the thread in the connecting plate.

Continues on next page

EVD 80 ccm, 155 ccm, 560 ccm



xx2000000992

No.	Description
1	Dosing unit
2	Heating sleeve of the bushing
3	Terminal block
4	Pressure sensor
5	Dosing valve

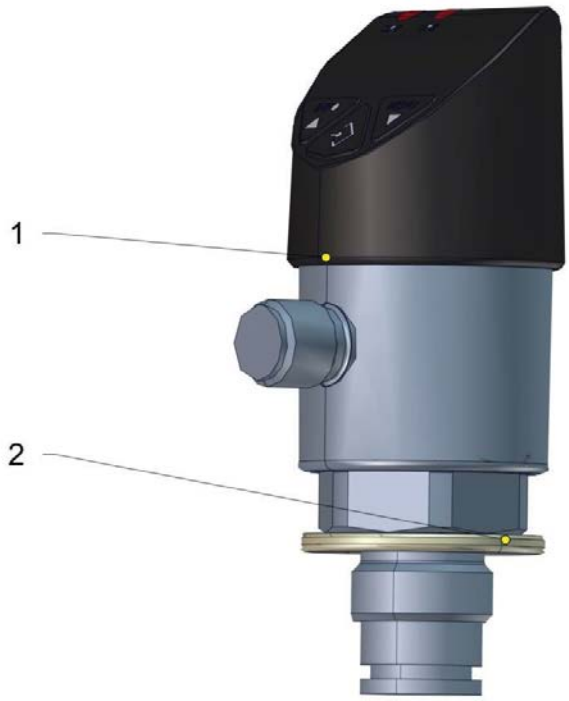
The pressure sensor is located at the connection block of the dosing system.

Disconnect the electrical connections and the pressure sensor. To remove the pressure sensor, use a 27 mm open-end spanner.

Continues on next page

10.7.3 Replacing the pressure sensor
Continued

Before refitting, clean the thread in the connecting plate. Make sure that you fit the sensor complete with the spacer.



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No.	Description
1	Pressure sensor
2	Spacer

10.7.4 Setting the piston rod position proximity switch

To do this, move the spindle nut of the drive unit into its "full" position.

Screw the proximity switch all the way to the stop onto the surface of the guide plate underneath.

Then turn the proximity switch back ½ revolution and retighten the locknut.

10.7.5 Overhaul

For maintenance and repair work on the assembly partially special skills are required mediated as part of a separate training by the manufacturer.

Note

Observe associated documents!

The revision instruction for the assembly will only be handed over after the appropriate training of the maintenance and repair personnel by the manufacturer.

Tip

Contact our ABB Service:

ABB Automation GmbH

Grüner Weg 6 | 61169 Friedberg | Germany

Phone: +49 6031 85307

E-mail: roboterservice@de.abb.com

For further information, see our website

www.abb.com/robotics

Replacing the seals for 11 ccm

With low-viscosity materials and at high pressure levels, minor leakage can occur at the piston seals. The leaked grease collects behind the piston and in the leakage indicator. This does not impair reliable operation.

If a lot of material escapes at the leakage indicators in just a short time, the piston seals are damaged or worn. In that case, replace the piston seals. In rare cases, you may also have to replace the bushing.

To do this, the dosing unit must be removed from the dosing system. To do this follow the procedure described in the revision instructions. Thoroughly clean all parts.

Finally, fit the dosing unit as described in the revision instructions.

Replacing a ball screw drive for 11 ccm

If the spindle bearing, the balls of the spindle nut or the spindle thread are defective or experience excessive wear, the dosing unit emits significantly louder running noise. In that case, the dosing unit must also be removed from the dosing system and dismantled.

To do this follow the procedure described in the overhaul instructions. We recommend that you replace the complete ball screw drive. Should you replace the bearings in the event of bearing damage, follow the instructions of manufacturer SKF.

For the final installation, observe the relevant sections in the overhaul instructions.

10.7.6 Handling of faults

Note

Removal of faults

Faults which are not removed or removed improperly can lead to faulty products, damages to the plant or personal and property damage in adjoining areas!

Faults influence directly the proper operation of the plant! Faults have to be analyzed and removed immediately!

Dosing unit does not work

Before you can use the dosing unit, it must be referenced from the plant controller, otherwise it is not operational. If it still does not work, check all lines and connections. If necessary, have briefed specialists carry out the repair.

Dosing unit stops

If the dosing unit stops, a possible cause may be a pressure drop in the material chamber.

Check the material pressure values in that case. Seals may be defective. Carry out a revision of the dosing unit with the plant in a secure (revision) state.

Another cause may be an excessive pressure caused by clogging of the application unit through excessive standby times. In this case, also check the material pressure values and the inlet valve for leak tightness.

Nonconforming application results

Insufficiently discharged material beads or entrapped air can be prevented by regularly cleaning the assembly and re-purging the entire material fed system before restarting the plant after maintenance and repair work and after longer production pauses.

10.7.7 Maintenance intervals

Maintenance intervals, general

Note

The maintenance intervals are guideline values and depend to a large extent on the applied material. High temperatures, continuous high application pressure and dry running of the seals can reduce the service life of wear parts.

The maintenance schedule cannot, therefore, provide a basis for warranty claims.

Note

The lubrication intervals are guideline values and depend to a large extent on the applied material. High temperatures, continuous high application pressure and dry running of the seals can reduce the service life of wear parts.

The lubrication schedule cannot, therefore, provide a basis for warranty claims.

Note

Note on the warranty of wear parts

The replacement intervals of the seals and gaskets depend, among other things, on pressure, temperature, material and volume flow.

The manufacturer does not assume any warranty for the service life of the seals.

Replace any worn components immediately.

SC: shift change // D: daily // W: weekly // M: monthly // Y: annual

Pos.	System part	Work	Operation	Maintenance interval					Note
			depending on what comes first						
			Cycles	SC	D	W	M	Y	
1	General	Perform general visual inspection for obvious defects.		1					Replace faulty components immediately.
2	General	Perform general visual inspection for soiling.		1					Clean soiled components immediately.
3	General	Check all electrical and pneumatic connecting elements for condition and firm seat.				1			Replace any faulty components immediately.
4	General	Check all screw couplings for firm seat.					1		Retighten any loose connections.
5	Dosing unit	Carry out a revision including replacement of seals.	100000					1	Request manufacturer service.
6	Dosing valve	Check for leaktightness.			1				Immediately eliminate any leakage.
7	Dosing valve	Overhaul.	100000					1	Replace all wear parts.

Continues on next page

Pos.	System part	Work	Opera-tion	Maintenance interval					Note
			depending on what comes first						
			Cycles	SC	D	W	M	Y	
8	Dosing unit	Grease the spindle nut.	20000				3 1		SKF LGEP 2 or SKF LGHB 2
9	Dosing valve	Lubricate the needle.	20000				3		Vaseline, two strokes from grease gun. Recommended: White special-purpose Vaseline (Reiff)
10	Dosing unit EVD 11	Grease the seal carrier.	20000				3		Recommended: White special Vaseline (Reiff)

Available for 11 ccm
Available for 80ccm, 155 ccm, 560 ccm

All figures are recommendations and may have to be adapted to the applicable requirements.

Maintenance and repair work must be performed only with the entire plant at standstill.

All maintenance and repair work within the cell to be performed only by trained, briefed specialists.

Observe the maintenance and repair instructions in the maintenance schedule for the overall plant in this technical documentation.

Note

The regular inspection of the pneumatic and electrical installation must be carried out only at plant standstill.

All work must be carried out by trained, briefed specialists.

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11 Replacement and wear parts

Note

Warranty and product liability claims shall be rejected by ABB Automation GmbH if spare parts and wearing parts other than those approved by the manufacturer are used.

If you have questions on how to order spare parts and wearing parts, please contact the manufacturer:

ABB Automation GmbH

Grüner Weg 6

61169 Friedberg (Germany)

Tel.: +49 6031 85-516

Fax: +49 6031 85-113

E-mail: roboterservice.ersatzteile@de.abb.com

Internet: www.abb.de/robotics

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11.1 Spare parts/wearing parts identification

Identification	Description
EA	Spare part category A
EB	Spare part category B
EC	Spare part category C
VA	Wearing part category A
VB	Wearing part category B
VC	Wearing part category C

Definition of spare parts

Spare parts replace the installed individual components, modules or products in the event of damage, loss or limited functionality.

Spare parts are all parts, modules or entire products that influence the production capability of the assembly facility, machine or assembly due to their function.

Definition of wearing parts

Wearing parts are all parts that are subject to foreseeable wear due to their function or that come into direct contact with the workpiece (Def. from the automotive industry).

Definition of category A

Failure of spare parts or wearing parts in category A means a 100% failure, i.e. the system or machine comes to a standstill.

Other category A spare parts or wearing parts are parts relevant to occupational health and safety (e.g. door protection switches).

Definition of category B

Spare parts and wearing parts from category B must be available within 48 hours (e.g. if a standby workstation is available).

Definition of category C

Spare parts and wearing parts from category C are parts that must be replaced in periodic, longer time intervals, or parts that only influence the function of the module, machine or system in long-term operation (e.g. sleeve for shock absorber).

Note

If necessary, we would be pleased to provide you with a list of spare parts and wearing parts, including prioritization (A, B, C parts)

11.2 Replacement and wear parts, drawings and parts lists

The drawings and parts lists with labeling of the replacement and wear parts can be found in the respective appendices (see *Appendices on page 611*).

Tip

Further information on the process equipment forms an integral part of the electronic part lists in *Appendices on page 611*.

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12 Error messages and troubleshooting

WARNING

Hazard due to moving parts of the robot with application equipment.

Possibility of physical injury due to impact.

- Only stay in the hazard area for as long as absolutely necessary.
- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.
- Secure the entrance to the system against unexpected closure. Attach a maintenance sign to the access door where it can be easily seen.

WARNING

Hazard due to moving parts of the robot with application equipment.

Severe and possibly fatal insures can be caused by clothes, hair and other body parts getting caught in the system.

- Please note that movements of the application robot are possible when the service door is open only in conjunction with pressing the approval button on the Teach Pendant Unit (TPU).

WARNING

Hazard due to operating errors.

Serious to life-threatening physical injuries due to incorrect input of position data at a superordinate control system or on the robot control system.

- Only stay in the hazard area for as long as absolutely necessary.
- Operating the application system must be performed by trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.

WARNING

Hazard due to untidy work, rough, slippery and uneven surfaces.

Possibility of serious, potentially life-threatening injury due to slipping, tripping and falling.

- Ensure that you work tidily during all assembly and commissioning operations.
- Do not leave any objects in the hazard area.
- Remove dirt deposits without leaving any residue.

Continues on next page

Continued

WARNING

Hazard due to high pressure.

Possibility of serious, potentially life-threatening injury due to the penetration of pressurised medium into the body.

- Before starting the work, perform a visual inspection of any pressurised lines and barrels.
- Observe the specified maintenance schedules.

WARNING

Risk of moving parts of the robot with application equipment.

Impacts to body parts can lead to injuries.

- Complete the maintenance and repair work only on systems that are de-energized.
- With a lock, make sure the main switch is secured from accidentally restarting when completing maintenance and repair work.

WARNING

Risk of burns.

Possibility of skin injuries due to burns from hot surfaces of the dispenser and the motors.

- Note the temperature displays at the surface of the dispenser and the motors.
- Note the temperature displays at the Teach Pendant Unit (PTU).
- Avoid body contact with hot surfaces.

Continues on next page

12.1 Troubleshooting and measures

Most faults and errors are recognized by the function package and displayed accordingly as plain text on the TPU with troubleshooting information.

In the table below, general mechanical and electrical errors are summarized.

A list of all errors associated with the IDFP including error number, description and possible consequences and measures can be found in the Appendix.

Note

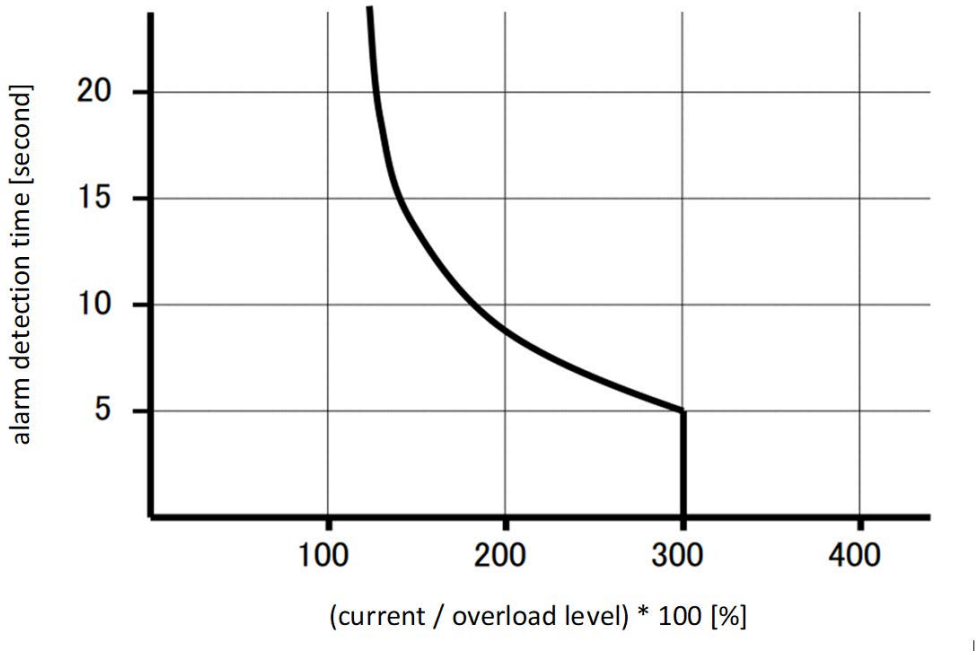
Follow the instructions on troubleshooting in the operating manual of respective components and the robot product manual.

Problem	Cause	Measure/Troubleshooting
No seams	Dry mode	Deactivate dry mode
	Needle not selected Incorrect needle selected	Before the start of the program select needle with instruction SetAppData. During application mode change needle with instruction MoveChangeNeedle or MoveChangeApp. If no needle is selected, the robot will stop before the bead.
First seam(s) not present	Application pressure regulation could not be terminated before the first seam	Increase time between applicator pressure regulation request (PreApplicationDX) and start of the first seam. If necessary, activate applicator pressure control. Insert MoveReadyApp instruction into the movement program before the first seam.
Torque error at application start (IDFP error number 115122)	Setpoint for applicator pre-pressure too high	Reduce applicator pre-pressure (nDX-Gun-Pressure)
	Incorrect pressure regulation parameters	Adjust pressure regulation parameters
	Nozzle blocked	Clean nozzle
	Incorrect material temperature	Check material temperature
	Discharge valve does not open	see "Doser/valve does not switch"
	Needle valve does not open	Clean needle valves and/or check valve stroke
	Mechanical jamming of spindle or transmission	Perform doser service
	Application delay (FlowDelayUp) too high	Reduce FlowDelay UP value
	Doser motor/brake fault	Replace motor

Continues on next page

Problem	Cause	Measure/Troubleshooting
Torque error during application (IDFP error number 115122)	Setpoint for material flow too high	Reduce application flow in bead data
	Nozzle blocked	Remove and clean nozzle
		Replace nozzle
	Shootfilter set too high	Reduce shootfilter power (instruction SetAppData)
	Incorrect torque limit values for driver stage	Set torque values to correct values in IPS
	Application delay (FlowDelay) too high	Reduce FlowDelay value
	Viscosity of the material too high	Purge, replace material, check temperature
	Needle valve blocked	Clean needle valves and/or check valve stroke
Overload error during application or circulation (IDFP error number 115118)	Torque too high for too long a time	Reduce speed or torque (reduce flow setpoint or circulation setpoint)
		Reduce period for which the speed/torque is in use Explanations in the following graph

Alarm detection overload



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The nominal torque may be increased by 300% for 5 seconds.

At a lower overload the time is extended, as shown in the graph.

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The nominal torque may be permanently increased by 110%.

Problem	Cause	Measure/Troubleshooting
Complete seam to wide/thick	Setpoint for material flow incorrect	Adjust material flow in bead data
	Override increased	Reduce override
	Inlet valve leak	Replace inlet valve
	With speed-dependent application incorrect reference speed set	Check equipdata - refspeed in Dpuser.sys module
	Worn nozzle	Replace nozzle
	Viscosity of the material too low	Purge, increase material temperature, replace material
	Leak between doser and applicator	Seal leak
Start of seam too wide/thick	Applicator pre-pressure too high	Reduce pre-pressure (nDXGunPressure)
	Needle opens too late	Check movement of needle; replace applicator if necessary
		Check and adjust needle delay times
		Check and adjust flow delay times
		Air pressure too low; adjust air pressure switch operating point
	Uneven application speed	Check spray test to see if application speed is constant
	Uneven orientation	Check and correct orientation
	Uneven application height	Check spray test to see if application height is constant
	Shootfilters activated	Motor makes a higher than expected setpoint jump. Check whether and which shootfilter is active

Continues on next page

12.1 Troubleshooting and measures
Continued

Problem	Cause	Measure/Troubleshooting
Spray pattern generally NOK	Nozzle blocked	Remove and clean nozzle
		Replace nozzle
	Nozzle worn	Replace nozzle
	TCP distance incorrect	Check TCP distance, reduce/increase as required
	Uneven robot movement	No or incorrect tool data input
		No or incorrect arm load data
		Difference in application speeds
		Incorrect or disadvantageous orientation during application
	Air bubbles in material	Purge or check for leaks
	Incorrect nozzle parameters	Parameters such as flow, TCP distance or spray angle are not suitable for this nozzle type
	Shelf life of material expired	Change material barrel and purge out the old material
	Application delays incorrectly set	Check application delays on TPU. Check application delays DispenseWare (DPUser.sys)
	Application delays not set	Check application delays on TPU. Check application delays DispenseWare (DPUser.sys)
Seam end too thick	Needle stroke by applicator too high	Adjust needle stroke with adjusting screw on applicator
	Flow off delay set too low	Adjust delay
Seam starts before intended position	Needle on delay set too high	Reduce needle on delay
	Switch on position misplaced	Check movement program
Seam starts after intended position	Needle on delay set too low	Increase needle on delay
	Switch on position misplaced	Check movement program
Seam start too thin	Selected applicator pre pressure is too low	Increase applicator pre-pressure (nDX-GunPressure)
	Selected flow on delay is too low	Increase flow on delay
	Doser has not yet finished applicator pre-pressure regulation	Insert MoveReadyApp instruction between PreApplicationDX and first Disp instruction
	Hose breathing routine not run (with pressure controller)	Run HoseAccu routine

Continues on next page

Problem	Cause	Measure/Troubleshooting
Too much material in corners of the application track	Selected Zone is too low	Increase zone size
	Max. acceleration or deceleration too high	Reduce maximum acceleration and deceleration for dispensing processes (in DPUSER module)
	Shootfilter required but not activated or incorrect shootfilter selected	Adjust shootfilter force (SetAppData instruction)
	Flow delay in DPUser.sys not set or incorrectly set	Adjust FlowDelay in equipdata DPUser.sys
Automatic circulation does not start	Automatic circulation not activated	Activate automatic circulation
	Value for closing delay for circulation set too high	Check value for closing delay circulation at TPU
	Application mode still active	Deactivate application mode
	Circulation stopped externally	Do not stop circulation
	Circulation release not issued	
Circulation stops unexpectedly	Torque error/overload/overpressure in doser	Check valves in return line
		Check shut-off delay circulation
		Reduce back pressure in circulation line
		Check discharge valve, replace if necessary
		Check circulation valve, replace if necessary
		Valve mechanically closed because air pressure too low; adjust operating point of air pressure switch
		Check temperature control, adjust temperature parameters if necessary
		Check viscosity of the material
		Check doser motor brake, replace doser motor if necessary
		Check ease of movement of doser, replace doser is necessary
Setpoint circulation flow is not reached	Viscosity too high	Check material, replace material barrel if necessary
		Reduce back pressure in circulation line
		Increase setpoint for temperature control
Empty doser	Application flow too high	Reduce material flow in bead data
	Application time too long	Insert filling process between the seams (MoveForceFill instruction)
	Material pressure at doser too low/dual doser cannot fill	Increase dynamic material pressure, adjust material filling regulator, increase filling speed
	Fill volume too low	Increase fill limit if allowable

Continues on next page

12.1 Troubleshooting and measures
Continued

Problem	Cause	Measure/Troubleshooting
Fill level above maximum level	Calibration sensor defective	Replace calibration sensor
	Calibration sensor not correctly installed	
	Material pressure in doser too high (material pressure may press doser upwards against closed brake)	Reduce material inlet pressure
	Robot controller "Motors On" actuated during filling process	
	Maximum fill level was reached by pressure regulation from high pressure to low pressure	Reduce fill limit
Material pressure too high	Discharge valve/applicator does not open	see "valve does not switch"
	Material flow too high	Reduce material flow
	Nozzle blocked	Clean nozzle
	Application delays incorrectly set (needle and flow)	Adjust retroactively acting pressure inclusions in the doser by application, adjust delays
	During circulation material pressure in circulation line too high	Reduce material pressure in circulation line
Leak	Faulty seal	Replace seal
Unusual noises	Incorrect pressure regulation parameters	Adjust pressure regulation parameters
	Doser motor fault	
Valve does not switch	Valve fault	Replace valve
	Valve blocked	Remove and clean valve
		Replace valve
	Compressed air too low	Increase compressed air supply
	Compressed air switch incorrectly set	Adjust compressed air switch
	No compressed air present	Switch on compressed air supply
Spray jet diverted	Nozzle blocked	Clean nozzle
	Nozzle damaged	Replace nozzle
	Nozzle shape unsuitable for the current material	Replace nozzle
	Electrostatic charge at applicator	Check grounding
Compressed air blows out	Air hose fault	Replace air hose
Material leak on housing	Defect seal	Perform doser maintenance

Continues on next page

Problem	Cause	Measure/Troubleshooting
Temperature above alarm limit	Temperature regulation parameters incorrectly set	Adjust temperature regulation parameters
	Alarm limits set too low	Adjust alarm limits
Setpoint temperature is not reached (heater circuits)	Temperature regulation parameters incorrectly set	Adjust temperature regulation parameters
	Ambient temperature higher than setpoint temperature	Check whether ambient temperature must be adjusted
	Ambient temperature too low	Check whether ambient temperature must be adjusted
Setpoint temperature is not reached (Peltiers)	Temperature regulation parameters incorrectly set	Adjust temperature regulation parameters
	Ambient temperature too low/ too high	Adjust temperature regulation parameters
		Check whether ambient temperature must be adjusted
		Integrate additional or more powerful (water-cooled) Peltier in system
	Not enough material flow	Turn on circulation
		Increase circulation flow
Pump pistons do not move	Pump pressure too low	Increase pump pressure
	Switching valves fault	Replace switching valve
	Air motor fault	Replace air motor
Pump piston is moving but there is no material pressure	Follower plate is not in contact with material	Increase RAM pressure
		1 Remove stopper 2 Move follower plate down manually 3 Replace stopper
Pump in error status	Pump stop actuated	Cancel pump stop status and acknowledge error
	Emergency stop actuated	Cancel emergency stop status and acknowledge error
Material inlet pressure too low	Pressure buildup by external material supply too low	Increase external material supply pump pressure
	Leak in external material supply	Replace relevant components
Pump status display does not show the expected status	Displays defective	Run lamp test (press and hold Err reset).
		All indicator lamps of the pump display and all LEDs on the PIM (except for heater circuit LEDs) should light, the 7-segment display should show first 287, then 399 and then 287 again.

12.2 Error classes

Every error of the function package has an adjustable error class. If an error occurs, depending on the error class, it is either displayed on the TPU or only saved in the robot's error log. If an error is present, a button for acknowledging the error appears in the status bar of the Dispensing user interface.

Continues on next page

12.2.1 Overview of error classes

Error class	Effect
1	Error causes robot to come to an immediate stop
2	Error causes robot to stop at end of cycle (application program)
3	Error without stop (quality may be influenced)
4	Warning (is only displayed in error log)
5	Information (is only displayed in error log)

12.2.2 Overview of error number ranges

Number range	Functional area
115100 - 115299	Dispenser functions
115300 - 115399	Temperature conditioning (heating and Peltier)
115400 - 115449	Material supply

Tip

An overview of all error numbers including an error description can be found in the Appendix.

12.2.3 Setting the error classes

One setting is made directly on the user interface (see *Configuration - Error messages on page 357*).

An array with all error classes is stored in the "Error" task in the "IE_User.sys" module.

Every error number has a separate define minimum safety level. The error class of the error number cannot be set higher than this level. This ensures that safety-relevant functions are maintained.

The safety level is not necessarily the default error class the system is delivered with.

12.3 Acknowledgement of an error

If an error is present, it can be acknowledged in different ways:

- Button on user interface
- Button at the station display (link to signal diErrReset required)
- Press function button 1 (I) on TPU (standard setting after booting)

12.4 User actions in the event of an error

When an error occurs user-specific actions can be performed which must be programmed as routines in the error task (see *Programming and parameterization on page 367*).

12.5 Fault description of integrated pump

Frequently asked questions about the functions of the integrated pump:

- Follower plate cannot be lowered
  - Buttons not pressed simultaneously
  - No compressed air/incorrect adjusted
  - Valve fault
  - Purge air valve fault
  - Mechanical blockage
  - Venting not possible
- Automatic mode cannot be activated.
  - Alarm pending
  - Disabled or external operating mode
  - Material supply task stopped
  - Pump stop not unlocked
- Pressure display shows nothing
  - Display fault
  - No compressed air (pressure cannot build up)
  - Pressure sensor not connected
  - Pressure sensor incorrectly adjusted
  - Communication with IDC interrupted
- Error cannot be acknowledged
  - Material supply task stopped
  - Error still pending
  - Emergency stop not acknowledged
  - Pump stop not unlocked
- Manual mode is unexpectedly activated
  - Robot emergency stop active
- Pump is not heating
  - Maintenance switch not on
  - Fuse blown
  - Heater deactivated

13 Decommissioning, disassembly, disposal

13.1 Decommissioning and disassembly

WARNING

Hazard due to moving parts of the robot with application equipment.

Possibility of serious, potentially life-threatening injury due to uncontrolled movements of the robot with application equipment or through falling of already loosened parts.

- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Secure already loosened parts properly against undesired falling.

WARNING

Hazard due to loss of, or reduction in, stability and steadiness.

Possibility of serious, potentially life-threatening injury due to the robot with application equipment toppling or falling.

- Secure the robot with application equipment against toppling and falling during disassembly.
- Observe the manufacturer's specifications at all times.

WARNING

Hazard due to untidy work, rough, slippery and uneven surfaces.

Possibility of serious, potentially life-threatening injury due to slipping, tripping and falling.

- Ensure tidy work during all decommissioning, disassembly and disposal work.
- Do not leave any objects in the hazard area. Remove dirt deposits without leaving any residue, so that no material residues are left on the equipment parts.

WARNING

Hazard due to high pressure.

Possibility of serious, potentially life-threatening injury due to the penetration of pressurised medium into the body.

- Drain the processed medium before commencing any work for decommissioning, disassembly and disposal.
- Only perform work on the system when it is depressurised.

Continues on next page

WARNING

Hazard due to flammable materials.

Possibility of serious, potentially life-threatening physical injury due to naked flames.

- Observe the appropriate data sheets of the manufacturers.

WARNING

Risk of poisoning, acid burns, genetic modification or allergic reaction due to leaking residual quantities of medium.

If there are residual quantities of processed medium remaining in the application device, these may be absorbed into the body and serious injury to the skin, eyes or internal organs may be caused as a result.

- Clean all components that have come into contact with the processed medium, taking into account the corresponding data sheets of the manufacturer.
- Wear suitable personal protective equipment when working with hazardous substances.

WARNING

Hazard due to unexpected voltages on components, terminals and lines due to improper disassembly.

Possibility of serious, potentially life-threatening physical injury due to electric shock, burns, falling, being caught and propelled away, and fire.

- Only stay in the hazard area for as long as absolutely necessary.
- For any work in the hazard area, only employ trained and qualified personnel who are familiar with the system.
- Please note that only one person may be in the hazard area when work is being performed there.
- The manufacturer's specifications must be observed at all times.
- Before disassembly, check that the corresponding electrical component is deenergised.

Continues on next page

CAUTION

Risk of environmental contamination due to the escape of medium or preservatives.

- Ensure that no residual quantities of the medium or preservative can escape uncontrollably during work for decommissioning, disassembly and disposal. Remove residual quantities of medium without leaving any residue, using appropriate cleaning agents.
- Observe the corresponding data sheets of the manufacturer.
- Ensure that lubricants and service fluids, cleaning agents as well as their barrels are not disposed of as regular household refuse or seep into the soil. Observe the information on the corresponding data sheets.

Note

Before beginning decommissioning work, ABB Automation GmbH recommends that you perform a complete data backup in case of the need for later recovery of the system.

If later reuse of the robot with application equipment or individual components of it is planned, some preparations must be made. Depending on the processed medium, it must be ensured that the residual quantities remaining in the system do not harden and that all openings remain sealed. If, due to the properties of the processed medium, no residual quantities may remain in the system, these must be removed without leaving any residue, in compliance with the manufacturer's data sheets.

As a result of decommissioning work on the robot with application equipment, it can be the case that safety devices for activation of an emergency stop, such as the emergency stop switch on the programming device or on the Single Cabinet Controller, are no longer operable. If this is the case, these no longer active safety devices must be disassembled immediately or covered in such a way that they are no longer visible.

13.2 Disposal

CAUTION

Risk of environmental contamination.

- Ensure that lubricants and service fluids, cleaning agents as well as their barrels are not disposed of as regular household refuse or seep into the soil.
- Observe the information on the corresponding data sheets.

Disposal of all replaced parts, materials and substances must be performed in accordance with the valid international, national and local laws, regulations, safety and environmental protection provisions.

In accordance with the local environmental protection provisions, the following products must be disposed of by the operator at his own cost:

- Packaging components of the recipient
- No longer used lubricants, cleaning agents, transport media, electrical parts, etc.

Continues on next page

13.2.1 Waste containing residual media

CAUTION

Risk of environmental contamination.

Residual media represents a high level of potential hazard for the environment.

- Collect and store this waste in suitable barrels. Label the barrels accordingly.
- Note that the disposal of this waste must be performed by a specialist company in accordance with the applicable legal requirements.
- For all work with residual media, observe the corresponding data sheets of the manufacturer.

13.2.2 Scrapping

When scrapping the system components, the laws and regulations applicable at the present time must be observed. At the time of recycling and disposal, consideration must be given to the substance recyclability, dismantlability and sortability of materials and assemblies and to possible environmental hazards and health hazards. Material groups, such as plastics and metals of different types, must be sorted before being sent to the recycling or disposal process.

13.2.3 Disposal of electrotechnical and electronic components

The disposal and recycling of electrotechnical and electronic components must be carried out in accordance with the respective laws or state regulations.

Special instructions in the supplier documentation must be observed.

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14 Appendices

Further documents, such as wiring diagrams, assembly and operating instructions of the function package and its components, are not included in this manual. They are included as separate documents.

This chapter contains an overview of the appendices.

Note

Other appendices which are not listed may be present.

Continues on next page

14.1 Relevant documents

The following documents belong to the product manual of the application robot and are supplied together with this application manual:

Contents	Documentation
Declaration of Incorporation	Declaration of Incorporation
Pneumatic diagram	Pneumatic diagram for doser[i]
Electric diagram	based on selected configuration[i]
Replacement and wear parts lists	based on selected configuration[i]
Assembly instructions	based on selected configuration[i]
Drawings/Parts lists	based on selected configuration[i]
RobView	RobView5 Operating Manual

[i] Delivered as project specific documentation

14.2 Documents for selected options

14.2.1 Doser

The documentation of a doser includes operating and maintenance instructions, a revision index, doser drawing, as well as a parts list.

Doser

Contents	Documentation
11 ccm doser	i
80 ccm doser	*i*
155 ccm doser	*i*
560 ccm doser	*i*

i Delivered as project specific documentation

Doser valves

Contents	Documentation
Valve VN8 - cold	*i*
Valve VN8 - VA - cold	*i*
Valve VN8 - hot	*i*
Valve VN8 - VA- hot	*i*

14.2.2 Applicators

Contents	Documentation
Applicator VN6	i
Applicator VN8	*i*
Applicator VN8 long	*i*
SPA 415	*i*
SPA 475	*i*
2K applicator	*i*

i Delivered as project specific documentation

14.2.3 Integrated pump

The documentation of an integrated pump includes operating and maintenance instructions, a revision index, parts list and a drawing of the barrel pump, the scoop piston pump, air motor and the follow-up plate.

Contents	Documentation
Single barrel pump 30L - cold	i
Single barrel pump 30L - hot	*i*
Single barrel pump 50L - cold	*i*
Single barrel pump 50L - hot	*i*
Single barrel pump 200L - cold	*i*
Single barrel pump 200L - hot	*i*
Double barrel pump 30L - cold	*i*
Double barrel pump 30L - hot	*i*
Double barrel pump 200L - cold	*i*

i Delivered as project specific documentation

14.2.4 Temperature control

Contents	Documentation
Peltier, air-cooled	i
Peltier, water-cooled	*i*

i Delivered as project specific documentation

15 Appendix

15.1 A System parameters

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15.1 A System parameters

Variable	Data type	Description	Module	Default value	Unit	Limit value
nD1GunPressure	num	Applicator pressure setpoint value D1 (upon retrieval of PreApplicationD1)	IDFP_D1Base.sys	0	bar	5...200
nD1SoftFillLim	num	Fill volume limit in percent (soft fill function) in relation to the full volume (dstD1A.VolLimMax)	ID1A_User	95	%	50...95
nD1FillFlowMinLimFac	num	Filling speed as percent at end of filling process (soft fill function) in relation to the nominal filling flow (dapD1.FlowNominal)	ID1A_User	20	%	1...90
nD1FillTimeFlowFac	num	Filling speed as percent in relation to nominal filling flow (dapD1.FlowNominal)	ID1A_User	100	%	5...100
nD1FillTimeFac	num	Filling time factor The theoretically minimum possible filling time in relation to the nominal filling flow is multiplied by this factor (dapD1.FlowNominal). An error message is issued following the lapse of the filling time during the filling process.	ID1A_User	3	%	1...10
nD1FillHyst	num	Filling hysteresis In the case of an automatic filling process at the start or end of the application cycle, the dispenser is only filled if the full volume has reduced by the filling hysteresis (in %).	ID1A_User	2	%	0...20
nD1GunPrsDev	num	Pressure deviation as percent, which is allowed for the applicator pressure regulation. The smaller the value, the more time required to regulate the applicator pressure.	ID1A_User	5	%	1...10
nD1VolOverride1	num	Material flow [ml/s] corrector factor dispenser 1 in relation to setpoint flow, needle 1	ID1A_User	100	%	50...150
nD1VolOverride2	num	Material flow [ml/s] corrector factor dispenser 1 in relation to setpoint flow, needle 2	ID1A_User	100	%	50...150
nD1VolOverride3	num	Material flow [ml/s] corrector factor dispenser 1 in relation to setpoint flow, needle 3	ID1A_User	100	%	50...150
nD1ValveLimRel	num	Switching cycle warning limit of valves, in relation to the absolute, maximum switching cycle number	ID1A_User	90	%	50...150
nD1MoveTimeFac	num	Applicator pressure control movement time factor The calculated movement time of the motor for controlling the applicator pressure is multiplied by this factor. (corrector factor)	ID1A_User	0,7		0,5...1,5
rdD1FillPrs.Kp	num	Filling pressure regulation proportional value	ID1A_User	GA		0,001...1000
rdD1FillPrs.Ki	num	Filling pressure regulation integral value	ID1A_User	GA		0,001...1000
rdD1FillPrs.Kd	num	Filling pressure regulation differential value	ID1A_User	GA		0,001...1000
rdD1GunPrs.Kp	num	Applicator pressure regulation proportional value	ID1A_User	GA		0,001...1000
rdD1GunPrs.Ki	num	Applicator pressure regulation integral value	ID1A_User	GA		0,001...1000
rdD1GunPrs.Kd	num	Applicator pressure regulation differential value	ID1A_User	GA		0,001...1000
nD1A_VolumeUsed	num	Total volume used by doser D1A	ID1A_User		l	0...
nD1DriveVoltMin	num	Minimum required doser voltage	ID1A_User	15/220	V	15/220
nD1DriveVoltMax	num	Max. permissible doser voltage (filling)	ID1A_User	28/390	V	20...410
nD1DriveVoltHyst	num	Hysteresis for stopping and restarting the filling process after overvoltage of nD1A_DriveVoltMax	ID1A_User	Feb 50		5...100
nG1NeedleAct	num	Needle selection for purge function	ID1A_User	1		1...5
nD1A_FillCyclesTot	num	Number of filling cycles total	ID1A_User	0		...20000000
nD1SpeedMax	num	Maximum motor speed IDrive D1A	ID1A_User	3000	rpm	0...3000
nD1PrsRegLoops	num	Number of cycles (1 cycle ~ 10 ms), which the requested flow must be within tolerance limits, in order to successfully terminate the applicator pressure regulation	ID1A_User	10		1...1000

Continues on next page

Variable	Data type	Description	Module	Default value	Unit	Limit value
nD1GunPrsLoopsMax	num	Maximum number of cycles (1 cycle ~ 10 ms), for the applicator pressure regulation until time-out	ID1A_User	500		10...1000
nD1FillFlowFac	num	Filling flow override in % in relation to max. filling speed	ID1A_User	100		1...100
nD1FillTimeFac	num	Factor for real filling time in relation to theoretically calculated possible filling time	ID1A_User	4		1...20
nD1FillHyst	num	Percentage deviation from full volume, from which automatic filling processes are started	ID1A_User	3	%	0...20
nD1FillValveStopDelay	num	Time delay when stopping motor during filling process after closing inlet valve	ID1A_User	0	s	0...0,2
nD1ValveLimRel	num	Relative warning limit of switching cycle counter of all valves in relation to respective switching cycle limit	ID1A_User	90	%	10...100
nD1GearFac	num	Current gear factor	ID1A_User	0		0...30
nD1FlowCheckGunPrs	num	Prepressure for flow check function	ID1A_User	60	bar	5...200
nD1PrsReliefLim	num	Pressure relief limit	ID1A_User	5	bar	5...50
nD1PrsReliefTime	num	Pressure relief duration	ID1A_User	5	s	5...120
nD1StartingDisp	num	Start doser next application (only dual doser)	ID1B_User	5		1...5
nD1A_SwapPrsRegEnaDelay	num	Delay time: Deactivation pressure slave controller when switching to B	ID1B_User	0	s	0...0,5
nD1B_SwapPrsRegEnaDelay	num	Delay time between deactivation pressure slave controller when switching to A	ID1B_User	0	s	0...0,5
nD1A_SwapFluidSelActDelay	num	Delay time between opening outlet valve B and switching flow from A to B	ID1B_User	0,02	s	0...0,5
nD1B_SwapFluidSelActDelay	num	Delay time between opening outlet valve A and switching flow from B to A	ID1B_User	0,02	s	0...0,5
nD1B_SwapToAValveOutDelay	num	Delay time between switching flow from A to B and closing outlet valve A	ID1B_User	0,1	s	0...0,5
nD1A_SwapToBValveOutDelay	num	Delay time between switching flow from B to A and closing outlet valve B	ID1B_User	0,1	s	0...0,5
nG1Needle1FlowUp	num	FlowUp delay applicator 1 needle 1	IDFP_D1User	0	ms	0...80
nG1Needle1FlowDown	num	FlowDown delay applicator 1 needle 1	IDFP_D1User	0	ms	0...80
nG1Needle2FlowUp	num	FlowUp delay applicator 1 needle 2	IDFP_D1User	0	ms	0...80
nG1Needle2FlowDown	num	FlowDown delay applicator 1 needle 2	IDFP_D1User	0	ms	0...80
nG1Needle3FlowUp	num	FlowUp delay applicator 1 needle 3	IDFP_D1User	0	ms	0...80
nG1Needle3FlowDown	num	FlowDown delay applicator 1 needle 3	IDFP_D1User	0	ms	0...80
nG2Needle1FlowUp	num	FlowUp delay applicator 2 needle 1	IDFP_D2User	0	ms	0...80
nG2Needle1FlowDown	num	FlowDown delay applicator 2 needle 1	IDFP_D2User	0	ms	0...80
nG2Needle2FlowUp	num	FlowUp delay applicator 2 needle 2	IDFP_D2User	0	ms	0...80
nG2Needle2FlowDown	num	FlowDown delay applicator 2 needle 2	IDFP_D2User	0	ms	0...80
nG2Needle3FlowUp	num	FlowUp delay applicator 2 needle 3	IDFP_D2User	0	ms	0...80
nG2Needle3FlowDown	num	FlowDown delay applicator 2 needle 3	IDFP_D2User	0	ms	0...80
StatData{}	Statistic Data	Array for all statistical data	IS_Main			
nIDFP_ErrChronicle{}	num	Error array in chronological sequence	IE_Data			
bD1SoftFill	bool	Activate soft fill function	ID1A_User	TRUE		TRUE/FALSE

Continues on next page

15.1 A System parameters

Variable	Data type	Description	Module	Default value	Unit	Limit value
bD1AutoFillStart	bool	Automatic filling of doser at cycle start activated	ID1A_User	FALSE		TRUE/FALSE
bD1AutoFillEnd	bool	Automatic filling of doser at cycle end activated	ID1A_User	TRUE		TRUE/FALSE
bD1AutoAppEn	bool	Activate automatic spray release (only for stationary systems)	ID1A_User	FALSE		TRUE/FALSE
bD1CircPassive	bool	Activate passive circulation (only for systems with circulation)	ID1A_User	FALSE		TRUE/FALSE
bD1PrsReliefAuto	bool	Activate automatic pressure relief	ID1A_User	FALSE		TRUE/FALSE
bD1LeakageDetect	bool	Activate automatic leakage monitoring	ID1A_User	FALSE		TRUE/FALSE
bD1PrsPreCtrl	bool	Applicator pressure regulation activated	ID1A_User	TRUE		TRUE/FALSE
bD1PrsPreReg	bool	Applicator pressure control activated	ID1A_User	TRUE		TRUE/FALSE
bD1CircOnAuto	bool	Automatic circulation activated	ID1A_User	FALSE		TRUE/FALSE
bD1LeakageDetectAuto	bool	Automatic leakage monitoring	ID1A_User	FALSE		TRUE/FALSE
bD1PrsReliefInHose	bool	Automatic pressure relief in feed line	ID1A_User	FALSE		TRUE/FALSE
dapDXA	Dispenser Application Data	General application data DXA	IDFP_D1Data			

Continues on next page

15.2 B Error messages

115101, Dispenser empty low limit

Description

Routine: *arg*Dispenser *arg* empty limit reached.

Consequences

Last bead might be incomplete.

Probable causes

Flow request to high.

Recommended actions

Check/raise empty limit.

Default error class: 1 Safety class: 4

115102, Material Supply not ready

Description

Routine: *arg*Material supply for *arg* is not ready.Actual pressure: *arg* bar.

Consequences

Doser action could not be started.

Probable causes

Material supply switched off

Recommended actions

Switch on material supply

Default error class: 2 Safety class: 3

115103, Applicator prepressure value is invalid

Description

Routine: *arg*The calculated value of the prepressure for the material flow *arg*ml/s is out of limit (0-300bar) of the viscosity curve . Or beaddata includes wrong value for prepressure

Consequences

applicator prepressure will not be set

Probable causes

Viscosity curve for this flow value not calibratedViscosity curve value for the pressure was calculated smaller 0A wrong prepressure value is included in beaddata

Recommended actions

Calibrate viscosity curve for smaller flowChange prepressure value in beaddataIncrease flow setpoint

Default error class: 1 Safety class: 2

115104, Dispenser pressure high

Description

Routine: *arg*Dispenser *arg* exceeded high pressure.Actual pressure is *arg* bar.

Consequences

Warning! Pressure inside dispenser is to high.

Continues on next page

Probable causes

Needle does not openoutlet valve dose not openvalve circ does not openapplicator defectmaterial viscosity too high

Recommended actions

Depressurize dispenser carefully (open needle, open circ valve if installed).Replace applicator

Default error class: 1 Safety class: 1

115105, Dispenser inlet pressure (dynamic) to low

Description

Routine: *arg*Material pressure inside dispenser *arg* is too low. The parameterized limit of *arg*bar was fallen below for *arg*s

Consequences

Actual fill speed is reduced as long as the fill pressure is low. If underpressure (<=0bar) there could be air inside system

Probable causes

Material supply can not fulfill requested fill speed.

Recommended actions

Increase material supply pressure. Reduce fill speed.Adapt fill pressure regulator paramters.

Default error class: 3 Safety class: 4

115106, Dispenser material supply pressure to high

Description

Routine: *arg*Dispenser *arg* exceeded high supply pressure. Either pressure switch tripped or pressure value is above limitActual supply pressure is *arg* bar Allowed supply pressure limit is max *arg* bar

Probable causes

Pump air pressure to highPressure switch has triggeredInlet pressure sensor digital input not inverted

Recommended actions

Reduce pump air pressurecheck pressure switchinvert digital pressure sensor input

Default error class: 1 Safety class: 1

115107, Unexpected task stop

Description

Task *arg* has stopped unexpectedly.

Consequences

The system is in an undefined state.

Probable causes

Internal communication error.

Recommended actions

Reset program pointer to main in task and start task.Restart robot.

Default error class: 2 Safety class: 2

Continues on next page

115108, Material inlet pressure (static) low

Description

Routine: *arg*Inlet material pressure for dispenser *arg* exceeded low limitActual pressure is *arg* bar. Requested pressure is *arg* bar.

Consequences

Fill cycle will be slower than required

Recommended actions

Increase material pressure or clean filter.

Default error class: 2 Safety class: 3

115109, CSV-parser error

Description

Could not open the file: *arg* for reading.

Recommended actions

Make sure the file exists, and is accessible.

Default error class: 3 Safety class: 5

115110, Air pressure not available

Description

Routine: *arg*Air pressure at dispenser *arg* pressure switch (input signal: *arg*) is low.Process disabled.

Consequences

Application cannot start.

Probable causes

Air pressure must be higher than 5.5 bar.

Recommended actions

Check air pressure supply.Check sensor for input signal *arg*

Default error class: 1 Safety class: 2

115111, Dispenser not in application mode

Description

Routine: *arg*A flow for applicator *arg* was orderd with a Disp-instruction. Dispenser is not in application mode

Consequences

Disp instruction could not be run

Probable causes

Call routine PreApplicationDX for named dispenser

Recommended actions

Call routine PreApplicationDX for named dispenserset dispenser application mode (TPU window manual mode)

Default error class: 1 Safety class: 5

Continues on next page

115112, failure on spindle lubrication

Description

Routine: *arg* Acknowledge via Set-Button on spindle lubrication doser *arg*

Consequences

the spindle doser *arg* is not lubricated sufficient

Probable causes

fat cartridge is emptyfat tubes are cloggedlubrication power unit defective

Recommended actions

replace fat cartridgecheck lubrication power unitCheck fat tubes for clogges

Default error class: 3 Safety class: 5

115113, No start condition

Description

Routine: *arg*The function can't execute.At least one start condition is missing.

Default error class: 3 Safety class: 5

115114, Dispenser change failure

Description

Routine: *arg*Fill levels of both Dispenser are below change limit.

Consequences

Doser could not be filled.

Default error class: 3 Safety class: 3

115115, Timeout: applicator pressure regulation

Description

Routine: *arg*Inlet pressure control dispenser *arg* time exceeded.Actual pressure is *arg* bar.

Consequences

Requested pressure of *arg* bar could not be set.

Default error class: 3 Safety class: 3

115116, Applicator inlet pressure control impossible

Description

Routine: *arg*Dispenser fill level is below minimum pressure limit

Consequences

Inlet pressure could not be controlled correctlyNext bead may have poor quality

Probable causes

Dispenser or valve leakage

Default error class: 3 Safety class: 3

115117, Applicator inlet pressure control impossible

Description

Routine: *arg*

Continues on next page

Default error class: 3 Safety class: 3

115118, Dispenser iDrive failure - Overload

Description

Routine: *arg*iDrive *arg* Overload Error - Current over time period exceeded high limit

Consequences

Drive will be deactivated. Motor stops turning

Probable causes

flow setpoint or period of time of flow too high or too longcirculation with too high pressure over a too long period of timeapplicator or needle defect

Recommended actions

reduce flow setpointreduce time of applicationreduce time of circulationactivate torque supervision for circulationreplace applicator or needle

Default error class: 1 Safety class: 3

115119, Dispenser iDrive failure - Resolver

Description

Routine: *arg*iDrive Resolver Error - Resolver signal is missing or faulty

Consequences

Drive will be deactivated. Motor stops turning

Probable causes

Multicable MK6/MK16/MK26 or IDC internal cable defective Drive defectiveDIB defective

Recommended actions

change Multicable MK6/MK16/MK26 or IDC internal cable change Drivechange DIB

Default error class: 1 Safety class: 3

115120, Dispenser iDrive failure - Overvoltage

Description

Routine: *arg*iDrive Overvoltage Error

Consequences

Drive will be deactivated. Motor stops turning

Probable causes

dynamic fill pressure in combination with fill speed of motor to highpower supply voltage for drive to highRID defective (only 750W)G30 defektive (only 100W)

Recommended actions

Reduce inlet pressurereduce fill speedcheck drive power supplycheck fill pressure regulatorreplace RID (only 750W)replace G30 (only 100W)

Default error class: 1 Safety class: 3

115121, Dispenser iDrive failure - Voltage down

Description

Routine: *arg*iDrive dispenser *arg* power supply is missingcurrent voltage is *arg* V

Continues on next page

Consequences

Drive will be deactivated. Motor stops turning

Probable causes

KM10 not switched on200V power supply (single controller) not ok (750/2500W)G30 defective (100W)Drive defective

Recommended actions

Check iDrive power supply.Replace drivereplace G30 (100W)

Default error class: 1 Safety class: 3

115122, Dispenser iDrive failure - Torque

Description

Routine: *arg*iDrive *arg* torque is high

Probable causes

Outlet valve does not switch.circulation valve or needle does not switch.Flow request is to high

Default error class: 1 Safety class: 3

115123, Dispenser iDrive failure

Description

Routine: *arg*iDrive regeneration alarm

Consequences

Voltage on drive too high over a period of time

Probable causes

dynamic fill pressure is too high over a period of time

Recommended actions

Decrease material inlet pressure

Default error class: 1 Safety class: 3

115124, Dispenser iDrive failure - Overspeed

Description

Routine: *arg*iDrive overspeed alarm

Consequences

Drive will be deactivated. Motor stops turning

Probable causes

motor turns faster than drive speed setpointdrive defective

Recommended actions

Reduce fill pressureReplace drive

Default error class: 1 Safety class: 3

115125, Dispenser iDrive failure

Description

Routine: *arg*iDrive supply voltage switched off for all dosers of the system

Consequences

iDrive voltage of all drives is decreasing

Continues on next page

Probable causes

Relais for power supply for the doser drives was switched off (doDXPowerOn=0)

Recommended actions

Check power supplyCheck error stateCheck relais for power supply

Default error class: 1 Safety class: 3

115126, Dosing system (IDFP) is running out of specified range

Description

the error class of an drive error of the dispenser, which should immediately stop the system was changed from error class 1 to error class *arg*

Consequences

The system is running in spite of iDrive errors. Doser or drive of the dispenser could be damaged

Probable causes

Too high material pressure for short or long term

Recommended actions

Investigate and eliminate the reason of the drive error. The system should only be run for a short term in this range

Default error class: 3 Safety class: 4

115127, Emergency stop with circulation active

Description

Routine: *arg*the circulation of dispenser *arg* has been stopped due to emergency stop. Circulation must be restarted!

Consequences

material cools off, loss in bead quality

Probable causes

emergency stop

Recommended actions

restart circulation

Default error class: 3 Safety class: 5

115128, iDrive is in error status

Description

Routine: *arg*The iDrive *arg* is in error stateThe time for recovery is unknown

Consequences

The iDrive could not assimilate the setpointAn unknown time for regeneration must elapse

Probable causes

Because of an iDrive error the action was interrupted

Recommended actions

The action will continue when the drive is accepting the new setpoint. Possibly the action has to be restarted manually

Default error class: 3 Safety class: 3

Continues on next page

115129, Outlet valve malfunction

Description

Routine: *arg*Outlet valve of dispenser *arg* is not working properly.

Recommended actions

Check outlet valve, cable and air pressure supply.Change outlet valve

Default error class: 3 Safety class: 3

115130, Dispenser purge request

Description

Routine: *arg*Timer for automatic purging dispenser *arg* elapsed. Purge request is active. Signal do*arg*PurgeRequest=1

Consequences

timer will be started again if signal do*arg*PurgeRequest was set to 0

Probable causes

Request automatic purging is active

Recommended actions

create purge sequence. Start purging. Set signal do*arg*PurgeRequest to 0

Default error class: 4 Safety class: 5

115131, Calibration failure timeout

Description

Routine: *arg*Calibration of dispenser *arg* not executed.Calibration timeout

Probable causes

overpressure faultiDrive torque too highapplicator defectcirculation valve defect

Recommended actions

Increase material inlet pressure. Check inlet valve.Replace needle or applicatorreplace circulation valve

Default error class: 1 Safety class: 1

115132, Calibration failure sensor never ON

Description

Routine: *arg*Calibration of dispenser *arg* not executed.Calibration sensor not triggered.

Consequences

Calibration step was canceled after *arg* s.

Recommended actions

Check calibration sensor

Default error class: 1 Safety class: 1

115133, Calibration failure sensor always ON

Description

Routine: *arg*Calibration of dispenser *arg* not executedCalibration sensor has a permanent high signal

Consequences

Calibration step was canceled after *arg* s

Continues on next page

Recommended actions

Check calibration sensor

Default error class: 1 Safety class: 1

115134, Missing fill valve signal

Description

Routine: *arg*Missing fill valve feedback signal from dispenser *arg*

Default error class: 3 Safety class: 3

115135, Missing outlet valve signal

Description

Routine: *arg*Missing outlet valve feedback signal from dispenser *arg*

Default error class: 3 Safety class: 3

115136, Missing circulation valve signal

Description

Routine: *arg*Missing circulation valve feedback signal from dispenser *arg*

Default error class: 3 Safety class: 3

115137, Missing needle valve signal

Description

Routine: *arg*Missing needle valve feedback signal from dispenser *arg*

Default error class: 3 Safety class: 3

115138, Inlet pressure sensor is defective

Description

Routine: *arg*Check dispenser *arg* inlet pressure sensor signal

Default error class: 3 Safety class: 3

115139, Outlet pressure sensor is defective

Description

Routine: *arg*Check dispenser *arg* outlet pressure sensor signal

Default error class: 3 Safety class: 3

115140, applicator pressure sensor is defective

Description

Routine: *arg*Check gun *arg* material pressure sensor signal.

Default error class: 3 Safety class: 3

115141, Local circulation - total quantity of material of both doser to high

Description

Routine: *arg*local circulation dispenser *arg* requested. Total quantity of material of both doser is higher than possible quantity of material for local circulation

Continues on next page

Consequences

Material will be purged through nozzle, to enable local circulation

Probable causes

Both doser were filled manually over total quantity of material for local circulation

Recommended actions

One doser will be emptied through nozzle. Then local circulation will be started.

Default error class: 4 Safety class: 5

115142, Defect on spindle lubrication

Description

Routine: *arg* Acknowledge via Set-Button on spindle lubrication doser *arg*

Consequences

spindle on dispenser *arg* is not lubricated anymore

Probable causes

cable break DIB XS31lubrication power unit defective

Recommended actions

replace cable DIB XS31replace lubrication power unit

Default error class: 3 Safety class: 5

115143, Pressure relief failure

Description

Routine: *arg*Actual pressure inside dispenser *arg* is *arg* bar.

Consequences

Pressure in dispenser could not completely be reliefed

Recommended actions

Manually relief pressure. Shut down material supply, open all fill-, outlet- and dump valves.

Default error class: 3 Safety class: 3

115144, Fill time exceeded

Description

Routine: *arg*Filling process of dispenser *arg* has exceeded allowed fill time of *arg* s.

Consequences

Requested fill volume could not be reached.Material volume can be insufficient for the next application cycle.

Recommended actions

Increase material inlet pressureCheck if filling valve has opened mechanically

Default error class: 2 Safety class: 3

115145, Gear factor for this dispenser not available

Description

Routine: *arg*gear factor for doser *arg*, which was prompted in the parameter wizard is not available for this doser size

Continues on next page

Consequences

system can not be run

Probable causes

wrong gear factor was put in the parameter wizard

Recommended actions

Put in the right gear factor in the parameter wizard

Default error class: 3 Safety class: 3

115146, automatic filling turned off

Description

automatic filling of the doser at beginning and end of application cycle is turned off

Consequences

the doser might not have enough material for the entire next application cycle

Recommended actions

activate filling either at the end or at the beginning of application cycle.

Default error class: 3 Safety class: 4

115147, Single seam aquistion - Error during reference run

Description

Dispenser *arg*: Number of beads in program *arg* option *arg* differs from first application: *arg*

Consequences

Temporary data has been deleted and the reference run needs to be activated again

Default error class: 3 Safety class: 4

115148, Single seam aquistion - Error during reference run

Description

Dispenser *arg*: Needle in bead *arg* in program *arg* option *arg* differs from first application: *arg*

Consequences

Temporary data has been deleted and the reference run needs to be activated again

Default error class: 3 Safety class: 4

115149, Single seam aquisition - Reference created

Description

Dispenser *arg*: Reference for program *arg* option *arg* was successfully created

Default error class: 3 Safety class: 4

115150, Single seam aquistion - Evaluation failed

Description

Dispenser *arg*: Reference for program *arg* option *arg* could not be created because the data evaluation has failed (see log)

Default error class: 3 Safety class: 4

Continues on next page

115151, Weekly time switch start is failed

Description

Routine: *arg*Condition hasn't been met.

Default error class: 3 Safety class: 3

115152, Local circulation valve number of switching cycle exceeded

Description

Routine: *arg*Maximum switching cycles dispenser *arg* for circulation valve exceeded

Recommended actions

Check circulation valve.Change circulation valve.

Default error class: 3 Safety class: 3

115153, Temperature failure iDrive

Description

Routine: *arg*iDrive *arg* temperature above max limit.Actual temperature of iDrive *arg* is *arg* °C

Consequences

Wait until drive is cooled down

Probable causes

iDrive defectivemach. Defect of the doseriDrive is overloadedTemp. In IDC too high(fan / AC defect)thermally conductive paste between iDrive and IDC not correct

Recommended actions

Check dispenser mechanics, bearings, spindle, greasing etc.Check for material blockage in outlet valve.Check ventilation of IDC cabinet

Default error class: 3 Safety class: 3

115154, Applicated volume exceeded

Description

Routine: *arg*Total applicated volume differs too much from target quantity.

Probable causes

Application cycle stopped. DxHoseAccu has not beend executed.

Recommended actions

Check dispenser *arg*

Default error class: 3 Safety class: 3

115155, Dispenser cycles exceeded

Description

Routine: *arg*Number of dispenser cycles *arg* exceeded errorlimit

Recommended actions

Check dispenser *arg* and reset service information.

Default error class: 3 Safety class: 3

Continues on next page

115156, Calibration sensor ON during filling

Description

Routine: *arg*Dispenser *arg* stop on the calibration sensor

Recommended actions

Check dispenser *arg*

Default error class: 3 Safety class: 3

115157, Total volume of Dispenser has exceeded

Description

Routine: *arg*Total volume of dispenser *arg* exceeded

Recommended actions

Check dispenser *arg* and reset service information.

Default error class: 3 Safety class: 4

115158, Material inlet pressure below lower warning limit

Description

Routine: *arg*Material inlet pressure of dispenser *arg* dropped below low warning limit.Actual pressure is *arg* bar.

Recommended actions

Increase material inlet pressure

Default error class: 3 Safety class: 4

115159, Communication lost to device on devicenet

Description

the communication to *arg* (*arg*) has been lost

Consequences

signals on *arg* cannot be read/writtenthe system is not ready for production

Probable causes

loose connectionfaulty cabeling

Recommended actions

check connection from PIB to *arg*restart system

Default error class: 3 Safety class: 5

115160, Wrong nozzle is activated

Description

Routine: *arg*While using Disp-instruction *arg* of dispenser *arg* a wrong nozzle number was used. Only nozzle 1-3 are valid nozzles.

Consequences

Possibly no material will be applicated

Probable causes

Switching to application nozzle failed

Continues on next page

Recommended actions

Put in correct nozzle number manually by setting the signal goGXNeedleSel to correct numberStart program

Default error class: 1 Safety class: 2

115161, Needle takes too long to open

Description

Dispenser *arg* Needle *arg* takes longer than *arg* ms to open

Consequences

Possibly no material will be applicated

Default error class: 4 Safety class: 4

115162, Needle takes too long to close

Description

Dispenser *arg* Needle *arg* takes longer than *arg* ms to close

Default error class: 4 Safety class: 4

115163, Dispenser inlet pressure (dynamic) to low - filling stopped

Description

Routine: *arg*Dispenser *arg* exceeded low pressure.Actual pressure is *arg* bar

Consequences

Filling cycle will be stopped due to repeating low fill pressure

Probable causes

Material supply can not fulfill requested fill speed.

Recommended actions

Increase material supply pressure.Reduce fill speed.Adapt fill pressure regulator paramters.

Default error class: 4 Safety class: 4

115164, Number of switching cycles exceeded

Description

the number of switching cycles for valve *arg* at dispenser *arg* is exceededmaximum switching cycles: *arg*current number of switching cycles: *arg*

Consequences

the valve might not close or open correctly or does not switch at all

Recommended actions

check valve, service the valve and chage it if necessary

Default error class: 3 Safety class: 5

115165, Number of switching cycles exceeds warning level

Description

the number of switching cycles for valve *arg* at dispenser *arg* will soon exceed the service levelmaximum switching cycles till service: *arg*current number of switching cycles: *arg*

Continues on next page

Recommended actions

Prepare for service of the valve

Default error class: 4 Safety class: 4

115166, Service warning

Description

Routine: *arg*Total volume of dispenser *arg*has reached the service warning limit

Recommended actions

Prepare checking dispenser *arg*

Default error class: 4 Safety class: 4

115167, Dual material interlock wait time exceeded

Description

arg: the maximum wait time of *arg* seconds has been exceeded

Consequences

The function could not be started

Probable causes

The other dispenser is currently active

Recommended actions

Stop the function on the other dispenser

Default error class: 3 Safety class: 5

115168, Applicator inlet pressure control canceled

Description

Routine: *arg*Gun inlet pressure control stopped, because of an application request[Bead-Name übergeben]

Default error class: 3 Safety class: 4

115169, Timeout: parameter change failure

Description

Routine: *arg*

Default error class: 3 Safety class: 3

115170, Temperature iDrive high warning

Description

Routine: *arg*The temperature of iDrive *arg* has reached the high limit.

Default error class: 3 Safety class: 4

115171, Applicated volume exceeded target quantity

Description

Routine: *arg*Total applicated volume *arg* exceeded target quantity

Recommended actions

Check dispenser *arg*.

Continues on next page

Default error class: 3 Safety class: 3

115172, Service Warning: dispenser cycles

Description

Routine: *arg*Number of dispenser cycles *arg* exceeded high warn

Recommended actions

Check dispenser *arg*.

Default error class: 3 Safety class: 4

115173, Material inlet pressure high warning

Description

Routine: *arg*Material inlet pressure exceeded high warn.The current pressur is *arg* bar.

Recommended actions

Reduce inlet pressure.

Default error class: 3 Safety class: 3

115174, Filling limit exceeded

Description

Routine: *arg*Requested fill volume above the maximum filling level.

Consequences

Fill volume is limited to the maximum filling level.

Default error class: 3 Safety class: 3

115175, Dispenser empty time exceeded

Description

Routine: *arg*Dispenser *arg* empty process is stoppedEmpty process time of *arg*s is exceeded

Recommended actions

Exchange iDrive moduleCheck transmission factorCheck transmission parameter

Default error class: 3 Safety class: 3

115176, Requested material flow above high limit

Description

Routine: *arg*In bead *arg* a material flow has been requested which is above the allowed flow of *arg* ml/s.

Consequences

Requested flow can not be used.Flow reduced to *arg*ml/s.

Recommended actions

Reduce flow in the programm to the maximum flow

Default error class: 4 Safety class: 4

115177, Missing doser motor PTC feedback

Description

Routine: *arg*PTC error of at least one motor or no feedback

Continues on next page

Consequences

iDrive power supply is not possible.

Probable causes

PTC of doser motor gives no feedback

Recommended actions

Check PTC connection of all drives.

Default error class: 1 Safety class: 1

115178, RID board could not be switched on

Description

Routine: *arg*No response from RID board dispenser *arg*

Consequences

iDrive power supply is not switched on. Dispenser could not be moved

Probable causes

Relais for power supply QA10 does not supply power.RID board does not give any feedback

Recommended actions

Check relais for power suppy QA10.Check RID board and feedback signal

Default error class: 1 Safety class: 1

115179, The power supply for the iDrive is too low

Description

The power supply of the iDrive dispenser *arg* is too low though switched on main contactor QA10 (and RID board, if available). The actual voltage is *arg* V.

Consequences

Running the iDrive is not possible.

Probable causes

RID board has failure. The power supply between main contactor and iDrive is disconnected.

Recommended actions

Please check power supply, relais QA10 and RID board.

Default error class: 2 Safety class: 2

115180, Dispenser level is over maximum fill limit

Description

The material level of the doser *arg* is higher than maximum limit. Actual material level is *arg* ml

Consequences

The doser can not be filled any more. Pressure regulation is not possible in that case

Probable causes

The pressure inside the doser could not be lowered

Recommended actions

Please empty the doser to the max limit

Default error class: 1 Safety class: 2

Continues on next page

115181, Material Supply not ready

Description

Routine: *arg*The material supply for *arg* is not ready for production

Recommended actions

Check material supply.Switch pump ON.Check air supply.

Default error class: 3 Safety class: 3

115182, Dispenser is disabled

Description

Routine: *arg* Dispenser *arg* is disabled. No actions possible.

Recommended actions

Dispenser must be enabled to perform any actions.

Default error class: 3 Safety class: 5

115183, Error is waiting for acknowledge

Description

arg Dispenser *arg* is waiting for error acknowledge of error.

Consequences

iDrive is deactivated. Requested flow could not be set.

Recommended actions

Please acknowledge error.

Default error class: 3 Safety class: 3

115184, Dispenser not in application mode

Description

Routine: *arg* Dispenser is not in application mode (PreApplication).

Recommended actions

Before starting application dispenser must be enabled fo application (PreApplication).

Default error class: 3 Safety class: 3

115185, Dispenser is waiting for enable of temperature conditioning system

Description

Routine: *arg* Dispenser *arg* is waiting for temperature conditioning system enabling.

Recommended actions

Wait until temperature conditioning is switched on and enables application.

Default error class: 3 Safety class: 4

115186, Errornumber was not found

Description

Routine: *arg* Called errornumber 11*arg* was not found.

Probable causes

Errornumber could not be called.

Continues on next page

Default error class: 3 Safety class: 4

115187, Fill action was stopped by calibration sensor

Description

Routine: *arg* Fill action of Dispenser *arg* was stopped by calibration sensor.

Consequences

It is possible that the dispenser will reach the upper mechanical stop.

Probable causes

Calibration is possibly incorrect.

Recommended actions

Calibrate Dispenser *arg*.

Default error class: 2 Safety class: 3

115188, Dispenser is not ready for production

Description

Routine: *arg* Dispenser *arg* is not ready after filling and/ or applicator pressure regulation

Consequences

Dispenser is not ready to applicate.

Probable causes

Filling or applicator pressure regulation takes to long time

Recommended actions

Retry to call gun pressure regulation or filling.

Default error class: 1 Safety class: 1

115189, Prepressure regulation and control are disabled

Description

Routine: *arg* Prepressure regulation and control of doser *arg* are deactivated.

Consequences

applicator pressure will not be adjusted

Probable causes

Gun pressure regulation and control are deactivated.

Recommended actions

Activate gun pressure control and/ or regulation.

Default error class: 3 Safety class: 4

115190, Start of the application programm not possible

Description

Routine: *arg*Application or circulation mode of *arg* was not stopped or application error is active

Consequences

Wait for ending mode or acknowlegde application error

Probable causes

Fill cycle not ended yet or application error is active

Continues on next page

Recommended actions

Acknowledge application error

Default error class: 2 Safety class: 3

115191, Temperature iDrive over warning limit

Description

Routine: *arg*Temperature iDrive *arg* is very high. Actual temperature is *arg* °C

Consequences

No doser action possible any more.

Probable causes

iDrive defectivemach. Defect of the doseriDrive is overloadedTemp. In IDC too high(fan / AC defect)thermally conductive paste between iDrive and IDC not correct

Recommended actions

Check dispenser mechanics, bearings, spindle, greasing etc.Check for material blockage in outlet valve.Check ventilation of IDC cabinet

Default error class: 4 Safety class: 4

115192, Voltage on iDrive too high

Description

Routine: *arg*Voltage of iDrive *arg* is too high. Actual voltage is *arg* V

Consequences

Filling is paused for a short time

Probable causes

Material inlet pressure while filling is too high (for a short time).

Recommended actions

decrease material inlet pressure.

Default error class: 3 Safety class: 3

115193, Single seam aquisition - Error during reference run

Description

Dispenser: *arg*While reference run for program *arg* was running pressure could not be measured

Consequences

Reference file has not been createdReference run will be repeated automatically until pressure has a valid value

Probable causes

The length of the Bead could be to short.In this case IPS is not able to provide valid pressure data

Recommended actions

Reference has not been createdSystem will try to get an valid value next timeSet parameter bIgnoreMeanPrs =TRUEIn this case only invalid pressure values will be ignored and reference will be created

Default error class: 1 Safety class: 5

Continues on next page

115194, Switch nozzle failed

Description

Routine: *arg* Nozzle dispenser *arg* could not be switched

Consequences

Application with requested nozzle not possible

Recommended actions

Restart program

Default error class: 3 Safety class: 3

115195, Supply of the value is not supported

Description

Routine: *arg* The supplied value is not supported from the system. The argument *arg* was not found.

Consequences

Change parameter with the help of the Rapid-instruction could not be set.

Probable causes

Supplied value does not exist.

Recommended actions

Check supplied value in rapid instructions (MoveChangeApp;SetAppData; MoveForceFill;MoveReadyApp…)

Default error class: 3 Safety class: 5

115196, Requested needle override exceeds limits

Description

arg : The override request of *arg* for needle *arg* exceeds the system limits (*arg* - *arg*)

Consequences

The override was limited

Recommended actions

Change override parameter for needle *arg*

Default error class: 3 Safety class: 5

115197, Leakage detection was stopped

Description

Routine: *arg* Leakage detection *arg* was stopped due to request of doser function

Default error class: 5 Safety class: 5

115198, Leakage was detected

Description

Routine: *arg* Leakage detected doser *arg*. Actual deviation is *arg* %. Allowed deviation is *arg* %.

Consequences

System has a leak between doser *arg* and applicator. Applicated volume could differ from requested value.

Continues on next page

Probable causes

Leakage on doser / hoses/ gun / circulation valve/ inlet valve

Recommended actions

Check the parts for leakage.

Default error class: 3 Safety class: 3

115199, Error class 2 - stop end of cycle - active

Description

An error of class 2 (11*arg*) - stop end of cycle - was generated while last application cycle.

Consequences

Maintask was stopped end of cycle.

Probable causes

Error class 2 active

Recommended actions

Check event log for errors of class 2 for more information - fix error and acknowledge.

Default error class: 3 Safety class: 3

115200, Cartridge minimal fill level reached

Description

Routine: *arg* Fill level of cartridge has reached minimum warning level.

Recommended actions

Prepare for cartridge change.

Default error class: 4 Safety class: 4

115201, Cartridge empty

Description

Routine: *arg* Fill level of cartridge has reached empty limit.

Recommended actions

Change cartridge.

Default error class: 3 Safety class: 3

115202, Front plate purging was canceled

Description

Routine: *arg* Front plate purging *arg* was canceled because of application order.

Consequences

On next start of circulation front plate purging of *arg* will be started again

Probable causes

Application order. Circulation cycle before application order was too short.

Recommended actions

Increase circulation time.

Default error class: 4 Safety class: 4

Continues on next page

115203, Minimal fill level of both dosers is reached

Description

Routine: *arg* Minimal fill level is reached for both dosers *arg* in dual mode.

Consequences

The fill level of doser A and B have reached minimum fill level at the same time. Flow request was rejected. If running circulation will be stopped.

Probable causes

Flow request is to high over a period of time or filling speed is too low.

Recommended actions

Increase filling speed; increase material supply pressure; decrease flow request over period of time.

Default error class: 1 Safety class: 2

115204, No feedback PTC iDrive

Description

Routine : *arg* No feedback of at least one PTC of connected iDrives

Consequences

No doser functions possible any more.

Probable causes

PTC defect; RID-Board defect; motor overheated

Recommended actions

Check RID; PTC; Motor

Default error class: 1 Safety class: 1

115205, 2K function synchronization error

Description

Routine: *arg* 2K function cannot be started. Doser *arg* not ready.

Consequences

2K function cannot be executed.

Probable causes

Doser *arg* is not ready to execute the ordered 2K function.

Recommended actions

Check doser which is not ready. Establish standby mode.

Default error class: 1 Safety class: 2

115206, Error while serving material

Description

Routine: *arg* Serving material of two components was not successful. Doser *arg* could not be started or stopped synchronously

Consequences

Serving material must be repeated. Mix ratio of the material is not correct

Probable causes

Doser *arg* has an error

Continues on next page

Recommended actions

check doser *arg* for errors

Default error class: 1 Safety class: 2

115207, 2K function synchronization error

Description

Routine: *arg* 2K function cannot be stopped. Doser *arg* not ready.

Consequences

2K function cannot be stopped. Mix ratio not correct

Probable causes

Doser *arg* has an error

Recommended actions

check doser *arg* for errors

Default error class: 3 Safety class: 3

115208, 2K Error while preparing after filling

Description

Routine: *arg* 2K automatic preparing can not be started. Dispenser *arg* is not ready after filling cycle

Consequences

Application not possible because prepare has not been done

Probable causes

Fill cycle *arg* was not successful or could not be started

Recommended actions

Prepare requirde for application. Please prepare manually

Default error class: 3 Safety class: 3

115209, 2K error. Prepare not possible. Fill level to low

Description

Routine: *arg* 2K automatic preparing can not be started. Dispenser *arg* fill level to low

Consequences

Prepare was not successfully. Application is not possible.

Probable causes

Dispenser *arg* fill level to low to prepare. Mix ratio may not be correct

Recommended actions

Fill dispenser manually or try again

Default error class: 2 Safety class: 2

115210, 2K mix ratio deviation

Description

mix ratio while 2K application/ function of *arg* is out of limitation for mix ratio. Before starting next application cycle material will be prepared automatically

Consequences

Mix ratio on last seam may not be correct

Continues on next page

Probable causes

Deviation material flow dispenser 1 and dispenser 2 (2K)

Recommended actions

Please check seams on last applicated workpiece

Default error class: 3 Safety class: 3

115211, 2K potlife alarm

Description

Routine: *arg*Potlife Dispenser *arg* for the 2K material is timed out

Consequences

The 2K material can be jammed inside the mixer. Application may not be possible any more

Probable causes

The 2K material stays to long inside the mixer without movingAn active error prohibits preparing material

Recommended actions

Prepare immediately. If this is not possible change mixer.

Default error class: 3 Safety class: 3

115212, 2K Potlife Warning

Description

Routine: *arg*Potlife Dispenser *arg* for the 2K material will be timed out soon

Consequences

The 2K material could be jammed inside the mixer. Application after potlife time out may not be possible

Probable causes

The 2K material stays to long inside the mixer without moving

Recommended actions

Prepare, purge or applicate in 2K mode before potlife will be time out or remove mixer when no application is following soon

Default error class: 3 Safety class: 3

115213, 2K function due to low fill level not possible

Description

The 2K function could not be started. A fill time error of doser *arg* avoids the function

Consequences

The mixed material could jam the mixer

Probable causes

Filling was not possible. Check inlet pressure and cartridge fill level

Recommended actions

Increase inlet pressure. Restart 2K functionCheck material supply

Default error class: 3 Safety class: 3

115214, Fuse IDC cabinet - KF1

Description

Fuse on WAGO module KF1 tripped. (Signal: diFuseIDC_Internal)

Continues on next page

Consequences

Internal IDC signals could not be switched.

Probable causes

Short circuit on internal outputs or faulty WAGO modules KF1-KF4.

Recommended actions

Exchange fuse or check modules.

Default error class: 1 Safety class: 1

115215, Fuse IDC cabinet - KF5

Description

Fuse on WAGO module KF5 tripped. (Signal: diFuseIDC_External)

Consequences

External signals outside of IDC could not be switched, e.g. on DIB or PIM.

Probable causes

Short circuit on external outputs or faulty WAGO modules KF5-KF8.

Recommended actions

Exchange fuse or check modules.

Default error class: 1 Safety class: 1

115216, Fuse IDC air conditioning

Description

Fuse of air conditioning unit of IDC tripped. (Signal: diFuseIDC_AC)

Consequences

Risk of over heating within IDC.

Probable causes

AC unit defect

Recommended actions

Check or change unit.

Default error class: 2 Safety class: 2

115217, External emergency stop for application system

Description

Routine: *arg*An emergency stop for the application system was triggered. IDC is in emergency stop state.

Consequences

No doser functions possible.

Recommended actions

Reset emergency stop.

Default error class: 1 Safety class: 1

115218, 2K mix ratio not ok. Not ready for 2K application

Description

Routine: *arg*2K mix ratio inside the mixer dispenser *arg* not ok

Continues on next page

Consequences

2K application with correct mix ratio not possible

Probable causes

Potlife timed out. Prepare function was not activated

Recommended actions

Before starting application cycle Prepare function must be create right mix ratio

Default error class: 3 Safety class: 3

115219, Over temperature motor iDrive

Description

Routine : *arg* PTC of motor iDrive *arg* notifies over temperature of the motor

Consequences

No doser functions possible any more.

Probable causes

motor overheated

Recommended actions

Check motor and/or replace it

Default error class: 1 Safety class: 1

115220, Robot movement was stopped - application error

Description

appication movement was stopped. Application erro is active Dispenser *arg*

Consequences

Restart with active error could start the robot movement without material.

Probable causes

application error is active. Motors of Dispenser could be deactivated.

Recommended actions

fix and acknowlegde application error. With acknowledge of the error motors will be activated

Default error class: 3 Safety class: 3

115221, Incorrect entry in SysDump.ndx

Description

incorrect entry in SysDump.ndx. The entry &arg2 in row *arg* is not allowed

Consequences

The automatic backup/sysdump function could not be executed.

Probable causes

Entry for hour is bigger than 23 or smaller than 0. Entry for minute is bigger than 59 or smaller than 0

Recommended actions

Correct error in SysDump.ndx or remove file (Home:\SysDump.ndx)

Default error class: 3 Safety class: 3

Continues on next page

115222, Automatic application request timeout

Description

Order *arg* was canceled. Automatic application request for doser *arg* is denied. The defined time *arg*s to reach purge position was timed out

Consequences

automatic application can not be proceed. Nozzle can be jammed

Recommended actions

Move robot to purge position and retry

Default error class: 3 Safety class: 4

115223, Automatic backup failed

Description

requested automatic backup could not be created. Circulation of dispenser could not be stopped

Consequences

backup will not be created

Default error class: 3 Safety class: 4

115224, error acknowledge was activated from external

Description

error acknowledge was activated from external source

Consequences

error state will be acknowledged

Default error class: 5 Safety class: 5

115225, Doser not in application mode

Description

Routine: *arg*Measurement was started outside of application mode of *arg*. This is not allowed

Consequences

The Measurement of the statistical data could not be started. Data will be incomplete when writing to file

Probable causes

Routine ReadMeasure was called outside application mode

Recommended actions

The Measruement (call of routine ReadMeasure or MoveReadMeasure) is only allowed in application mode of

Default error class: 3 Safety class: 3

115226, Amount of measurepoints of statistical data exceeded

Description

Routine: *arg*The amount (16) of possible measurepoints (Statistics) of dispenser *arg* was exceeded. Amount of measurepoints must be reduced

Consequences

Collection of statistical data is faulty if not corrected

Continues on next page

Probable causes

More than 16 times calling routine "ReadMeasureDX" or "MoveReadMeasure" without deleting by calling routine "ResetMeasure"

Recommended actions

Decrease amount ao calling routine "ReadMeasureDX" or "MoveReadMeasure" to 16. Afterwards call of routine "ResetMeasure" is mandatory

Default error class: 3 Safety class: 3

115227, Disc speed devitation on RockerPanel applicator

Description

Routine: *arg*A speed deviation off the disc at the RockerPanel applicator *arg* was detected.Setpoint: *arg*Actual: *arg*

Consequences

Loose of quality of the seams is possible

Probable causes

belt of the applicator disc is sliding or initiator is damaged or defiled

Recommended actions

Check RockerPanel applicator on mechanical and electrical defects. Check speed initiator on disc

Default error class: 3 Safety class: 3

115228, RockerPanel applicator disc is not rotating

Description

Routine: *arg*Rotation of disc at the RockerPanel applicator *arg* was not detected

Consequences

Loose of quality of the seams is possible

Probable causes

belt of the applicator disc is damaged or initiator is damaged or defiled

Recommended actions

Check RockerPanel applicator on mechanical and electrical defects. Check speed initiator on disc

Default error class: 2 Safety class: 2

115229, RockerPanel applicator not started

Description

Routine: *arg*RockerPanel applicator *arg* disc rotation could not be started

Consequences

Application not possible

Probable causes

motor damage

Recommended actions

Check motor and/or replace it

Default error class: 2 Safety class: 2

Continues on next page

115230, RockerPanel applicator not stopped

Description

Routine: *arg*RockerPanel applicator *arg* disc rotation could not be stopped

Consequences

Not possible to stop disc rotation

Probable causes

motor damage

Recommended actions

Check motor and/or replace it

Default error class: 2 Safety class: 2

115231, Alarm climate control

Description

The alarm for the climate control was activated

Consequences

climate control does not work properly. There is a risk of overheating the IDC

Probable causes

Please check alarm at the climate control

Recommended actions

Error at climate control must be solved forthwith or must be rapaired

Default error class: 3 Safety class: 3

115232, Statistic data could not be deleted

Description

Routine: *arg*Statistic data for doser *arg* could not be deleted. Write process is running. Signal do*arg*SatReady=0.

Consequences

Task Statistik could have stopped. Statistic data could be faulty

Probable causes

Deleting of statistic data (ResetMeasure) was run while writing statistical data.

Recommended actions

If task Statistik was stopped task must be restarted manually. Check signal do*arg*StatReady=1

Default error class: 3 Safety class: 4

115233, Failed to write statistical data

Description

Routine: *arg*Die Statistikdaten für Dosierer *arg* konnten nicht geschrieben werden. Statistical data for dispenser *arg* could not be written

Consequences

statistical data in statistic file may be faulty

Continues on next page

Probable causes

The acknowledge to write the statistical data takes longer than 5 seconds. Maybe to many data should be written

Recommended actions

configure less statistical data

Default error class: 4 Safety class: 4

115234, Communication error ICI bus

Description

Signal *arg* not accessable. Communcation lost between maincomputer and PIB

Consequences

Application not possible. Connection lost between MC and PIB

Probable causes

service connection between maincomputer and PIB disconnected for a short-time or longer time

Recommended actions

please check ethernet connection between maincomputer and PIB. Switch off robot cotroller and IDC to prevent overheating of temperature conditioning

Default error class: 1 Safety class: 1

115235, Service routine IDFP_DXHoseAccu has not been executed

Description

The service routine IDFP_DXHoseAccu for *arg* was not executed without error

Consequences

volume supervision and applicator pressure control may not be operational

Probable causes

The user has not executed the service routine (after new installation or restore)

Recommended actions

Please run the serviceroutine as described in the manual. Please take care on ambient conditions

Default error class: 3 Safety class: 3

115236, PTC wire break/short circuit motor iDrive

Description

Routine : *arg* PTC of motor iDrive *arg* notifies wire break or short circuit

Consequences

No doser functions possible any more.

Probable causes

motor not connected electrically. PTC defect

Recommended actions

check motor connection. Check PTC.

Default error class: 1 Safety class: 1

Continues on next page

115237, Error appeared while running IDFP application function

Description

When running the application function *arg* an error appeared. At least one nozzle was open while running the function

Consequences

All parameters of the application function will be ignored. The function will be run as Move instruction

Probable causes

At least one nozzle was open while running the application function

Recommended actions

Application function *arg* must only be run while all nozzles are closed

Default error class: 3 Safety class: 3

115238, Application program trigger error

Description

While (before) the seam *arg* with nozzle *arg* Dispenser *arg* an error was triggered

Consequences

named bead *arg* or bead nearby could be missing or quality could be bad

Probable causes

Invalid trigg timesToo high application delays

Recommended actions

Check application delays in IPSCheck application delays in DispenseWareCheck time-length of the seam, seam breaks and zones

Default error class: 3 Safety class: 4

115239, Application request while pressure regulation/filling

Description

Application of the seam *arg* (or a seam located in front of it) with nozzle *arg* Dispenser *arg* was incomplete

Consequences

named bead *arg* or bead nearby could be missing or quality could be bad

Probable causes

applicator pressure regulation or fill cycle was not complete when seam was requested

Recommended actions

Insert MoveReadyApp-Instruction after pressure regulation or fill cylce in front of first beadincrease time for start-up movementdecrease robot speedcheck applicator pressure regulationcheck fill cycle

Default error class: 3 Safety class: 4

115240, Circulation flow setpoint could not be reached

Description

Routine: *arg*requested circulation flow dispenser *arg* of *arg* ml/s could not be reachedActual circulation flow is *arg* ml/sActual torque limit is *arg* Nm

Consequences

Torque of doser motor is highTemperature setpoint at the applicator may not be reachedActual temperature at the applicator could deviate from the setpoint

Continues on next page

Probable causes

Material pressure in circulation tube is too highMaterial viscosity is too highMaterial temperature is to high

Recommended actions

decrease circulation setpointdecrease material pressure in circulation tube

Default error class: 4 Safety class: 4

115241, Circulation flow setpoint could not be reached

Description

Routine: *arg*requested circulation flow dispenser *arg* of *arg* ml/s could not be reachedactual circulation flow is too lowActual circulation flow is *arg* ml/sActual torque limit is *arg* Nm

Consequences

Torque of doser motor is highTemperature of the drive could be too highTemperature setpoint at the applicator may not be reachedActual temperature at the applicator could deviate from the setpoint

Probable causes

Material pressure in circulation tube is too highMaterial viscosity is too highMaterial temperature is to high

Recommended actions

decrease circulation setpointdecrease material pressure in circulation tube

Default error class: 3 Safety class: 4

115242, Wait for readiness of 2k dispenser

Description

Routine: *arg*System waits until 2k dispenser *arg* is in idle mode (max time 240s). Actually there is a function running or an error is active

Probable causes

Call of the routine D12_State in task T_ROB1 shows that $arg is not idle (bDXIdle=FALSE)

Recommended actions

System waits for readiness of dispenser. Please check, if doser is idle. Doser must be calibrated and must not run any other function

Default error class: 4 Safety class: 4

115243, Dispenser iDrive failure - overcurrent

Description

Routine: &arg1A too high current flows to the motor

Consequences

Drive will be deactivated. Motor stops turning

Probable causes

Drive defective/ motor defectivemulticable type MK6/MK16/MK26 defectiveIDC internal cable defectiveDIB defective

Recommended actions

replace drive / replace motorreplace cable / replace DIB

Default error class: 1 Safety class: 3

Continues on next page

115244, Dispenser iDrive failure - counter overflow

Consequences

Drive will be deactivated. Motor stops turning

Probable causes

wrong operating mode of the drive

Recommended actions

replace drive

Default error class: 1 Safety class: 3

115245, Dispenser iDrive - internal error

Recommended actions

replace drive

Default error class: 1 Safety class: 3

115246, Single seam aquisition - reference does not exist

Description

Routine: *arg*Application cycle program *arg*, option *arg* has ended. Temporary data for dispenser *arg* could not be evaluated.

Consequences

The applicated element will be flagged as "not ok"

Probable causes

Reference data has not be created or reference was deleted

Recommended actions

seams of element have to be checkedReference data has to be created. Reference data can only be created in reference mode

Default error class: 4 Safety class: 4

115247, Single seam aquisition - deviation in temporary data

Description

Temporary data *arg* of program *arg* option *arg*, seam *arg* , *arg*, deviates from reference data

Consequences

The applicated element will be flagged as "not ok"

Probable causes

seam faultyapplication program has been changedAn doser error was active while applicating

Recommended actions

seams of element have to be checkedReference data has to be created. Reference data can only be created in reference mode

Default error class: 3 Safety class: 3

115248, Single seam aquisition - no evaluated data available

Description

Routine: *arg*No single seam data was evaluated for dispenser *arg*. Signal go*arg*SingleSeamEval has value 0.

Continues on next page

Consequences

The result of the single seam evaluation is classified as not ok

Probable causes

The routine PostApplication*arg* must be run before the routine SingIleSeamStatus*arg*main computer could be overloaded

Recommended actions

check order of routine call PostApplication*arg* and SingleSeamStatus*arg*main computer should be checked for overload

Default error class: 3 Safety class: 5

115249, Loading IPS configuration - timeout

Description

Routine: *arg*IPS configuration could not be loaded fast enough

Consequences

The system can not be used

Probable causes

IDC not switched onPlease check PIB power supplyPIB is possibly defective

Recommended actions

Coldstart robot controllerswitch on IDCCheck power supply PIBExchange PIB

Default error class: 3 Safety class: 5

115250, Filling station robot not in position

Description

A fill request was ordered for dispenser *arg* but the robot did not moved to filling station position

Consequences

Doser cannot be filled

Probable causes

Doser not in filling station

Recommended actions

Move doser to filling position and refill

Default error class: 3 Safety class: 5

115251, Filling station clamp was not closed

Description

The clamp for filling station for dispenser *arg* did not close within the given wait time of *arg* s

Consequences

Doser cannot be filled

Probable causes

Doser not in filling station

Recommended actions

Move doser to fill station position and refill

Default error class: 3 Safety class: 5

Continues on next page

115252, Filling station clamp was not opened

Description

The clamp for filling station for dispenser *arg* did not open within the given wait time of *arg* s

Consequences

robot can not move dispenser out of the filling station

Probable causes

Clamp not adjusted correctlyClamp is defective

Recommended actions

adjust clamp correctlymaintenance the filling station clamp

Default error class: 3 Safety class: 5

115253, RPA drive error

Description

the drive of RPA has an error. For a more detailed description see event log of the robot

Consequences

RPA interrupted application

Probable causes

RPA is brokenmaterial stuck on RPA

Recommended actions

maintain RPAclean the RPA

Default error class: 1 Safety class: 2

115254, Single seam aquisition - deviation pressure at least one seam

Description

Temporary data *arg* of segment *arg*, BeadID *arg* , pressure, deviates from reference data

Consequences

The applicated element will be flagged as "not ok"

Probable causes

seam faultyapplication program has been changedAn doser error was active while applicating

Recommended actions

seams of element have to be checkedViscosity of material could have been changedRestart nozzle calibrationCreate new single seam reference

Default error class: 3 Safety class: 5

115255, Single seam aquisition - deviation volume at least one seam

Description

Temporary data *arg* of segment *arg*, BeadID *arg*, volume, deviates from reference data

Consequences

The applicated element will be flagged as "not ok"

Probable causes

seam faultyapplication program has been changedAn doser error was active while applicating

Continues on next page

Recommended actions

seams of element have to be checkedViscosity of material could have been changedCreate new single seam reference

Default error class: 3 Safety class: 5

115256, Needle feedback tuning error

Description

Dispenser *arg* needle *arg* creates error at *arg* ms (open), tuning skipped

Default error class: 3 Safety class: 5

115257, Needle feedback tuning error

Description

Dispenser *arg* needle *arg* creates error at *arg* ms (close), tuning skipped

Default error class: 3 Safety class: 5

115258, Needle feedback tuning error

Description

Dispenser *arg* needle *arg* feedback sensor does not react on open, tuning skipped

Default error class: 3 Safety class: 5

115259, Needle feedback tuning error

Description

Dispenser *arg* needle *arg* feedback sensor does not react on close, tuning skipped

Default error class: 3 Safety class: 5

115260, Needle feedback tuning ok

Description

Dispenser *arg* needle *arg* measured delay open: *arg* ms, tuning successful

Default error class: 3 Safety class: 5

115261, Needle feedback tuning ok

Description

Dispenser *arg* needle *arg* measured delay close: *arg* ms, tuning successful

Default error class: 3 Safety class: 5

115262, Needle feedback tuning info

Description

Dispenser *arg* needle *arg* feedback supervision not active, tuning skipped

Default error class: 3 Safety class: 5

115263, Needle feedback tuning error

Description

Dispenser *arg* application error, tuning canceled

Default error class: 3 Safety class: 5

Continues on next page

115264, Filling station fill request timeout

Description

A fill request was ordered for dispenser *arg* but the robot did not moved to filling station position after *arg* s

Consequences

Fill request will be ignoreddoser is not filled

Probable causes

robot did not move to filling station position in time

Recommended actions

resend fill requestfill with manual doser function

Default error class: 3 Safety class: 5

115265, Dynamic viscosity change was too high

Description

The change of the viscosity factor was too high related to last value

Consequences

Dynamic nozzle curve will not be adjusted with that factor

Probable causes

Viscosity changed too fastTemperature has been changedpressure drop due tu old clodged material in the system

Recommended actions

Material has to be checkedAdjustable limits for viscosity changed could be changedCheck system on clodged material

Default error class: 3 Safety class: 4

115266, Nozzle calibration dynamic curve pressure too high

Description

The new viscosity factor adjusted the nozzle curve to a pressure higher than *arg*

Consequences

Higher flows could lead to overpressure or overload faults

Probable causes

material viscosity has been increasedtemperature is too lownozzle is clogded with materialnozzle diameter to small

Recommended actions

Use only material flows which needs less than *arg* barincrease temperaturechange materialpurge and clean nozzle and system

Default error class: 3 Safety class: 4

115267, Doser circulating lubrication feedback is missing

Description

the doser circulating lubrication of doser *arg* sends no feedback

Consequences

Doser will not be lubricated

Continues on next page

Probable causes

mechanical switch on lubrication unit is not switched oncirculating lubrication has a defect

Recommended actions

check mechanical switch on lubrication unitcheck circulating lubrication on defects

Default error class: 3 Safety class: 5

115268, Doser circulating lubrication maintenance warning

Description

The circulating lubrication of doser *arg* has reached the maintenance warning limit

Consequences

Doser sealings will soon not be lubricated good enough

Probable causes

Runtime of the circulating lubrication has reached the warning limit

Recommended actions

Prepare for maintenance of the circulating lubrication

Default error class: 4 Safety class: 5

115269, Doser circulating lubrication maintenance limit exceeded

Description

The circulating lubrication of doser *arg* has reached the maintenance limit

Consequences

Doser sealings will not be lubricated good enough

Probable causes

Runtime of the circulating lubrication has reached the maintenance limit

Recommended actions

maintenance the circulating lubricationreset service counter

Default error class: 3 Safety class: 5

115270, Barrel level sensor pump not connected

Description

Signal *arg* has no value

Consequences

Barrel level cannot be detected

Probable causes

Sensor not connectedcable broken

Default error class: 3 Safety class: 5

115271, EIO Signal not defined

Description

Module *arg*: EIO signal *arg* not defined (routine *arg*)

Consequences

Signal access not possible

Continues on next page

Probable causes

Signal is not defined in EIOIPS connection broken

Recommended actions

check signalscheck IPS connection

Default error class: 3 Safety class: 5

115272, IPS function call failed

Description

Module *arg*: IPS function *arg* in routine *arg* returned an error

Consequences

Values were not sent/activated

Probable causes

Timeout while sendingFile or device does not exist

Default error class: 3 Safety class: 5

115273, Serviceroutine IDFP_DXNozzleCalib was not executed or failed

Description

Nozzle calibration doser *arg* was not executed or verified. Data not present or failed

Consequences

Prepressure adaption may have failed

Probable causes

nozzle calibration not executedminimal viscosity exceededmaximal viscosity exceeded

Recommended actions

run nozzle calibrationcheck parameter minimal visositycheck parameter maximal viscosity

Default error class: 3 Safety class: 5

115274, Total hose volume has exceeded

Description

Routine: *arg*Total hose volume of dispenser inlet hose *arg* exceeded

Recommended actions

Check inlet hoses *arg* and reset service information.

Default error class: 3 Safety class: 5

115275, IDFP Log - Semaphore timeout

Description

Timeout while adding a message to the IDFP log. Message: *arg*

Default error class: 3 Safety class: 5

115276, IDFP Log - Semaphore timeout

Description

Timeout while trying to flush the log to the file.

Default error class: 3 Safety class: 5

Continues on next page

115277, IDFP Log - File open error

Description

Error while trying to open File *arg*.Message: *arg*

Default error class: 3 Safety class: 5

115278, IDFP Log - General error

Description

Error (*arg*) while trying to log to file *arg*. Message: *arg*

Default error class: 3 Safety class: 5

115279, Single seam aquisition - data evaluation is running

Description

Data evaluation dispenser *arg* of single seam is running. Data in routine *arg* must not be deleted before

Consequences

A time lag is created due to evaluating datadata evaluation could be faulty

Probable causes

While data evaluation in task statistic routine *arg* is called

Recommended actions

Between starting evaluation (doDxEvalData=1) and delete data *arg* a time delay up to 1s is needed

Default error class: 4 Safety class: 5

115280, Single seam aquistion - Error during reference run

Description

Dispenser *arg*: Negative pressure value(s) in program *arg* option *arg*

Consequences

Application will be excluded from referencing

Probable causes

Pressure sensor defectiveSensor cable faulty

Default error class: 3 Safety class: 5

115281, Data initialze failed

Description

A data value dispenser $arg 1 is out of allowed range

Consequences

Supervision task ERROR could not be started

Probable causes

Task Dispenser was not started correctly

Recommended actions

restart system

Default error class: 3 Safety class: 5

Continues on next page

115282, Missing license

Description

License for IDFP function *arg* missing.

Consequences

Function is not available.

Probable causes

License file not stored in robot or no license existing.

Recommended actions

Deactivate function or request a license from your ABB contact.

Default error class: 3 Safety class: 5

115283, Invalid license

Description

License for IDFP function *arg* is invalid.

Consequences

Function is not available.

Probable causes

Wrong license file stored in robot.

Recommended actions

Deactivate function or request a license from your ABB contact.

Default error class: 3 Safety class: 5

115284, License trial period warning

Description

License for IDFP function *arg* in trial state.

Consequences

Remaining days: *arg*!

Probable causes

License file not stored in robot.

Recommended actions

Deactivate function or request a license from your ABB contact.

Default error class: 4 Safety class: 5

115285, Singe seam aquisition - seam stop detected

Description

While application of a seam dispenser *arg* a seam stop was detected on program *arg* on seam *arg*

Consequences

the seam could be faulty

Probable causes

Application stopRobot stopEmergency stop

Recommended actions

The application can be continuedThe seam must be checked

Continues on next page

Default error class: 3 Safety class: 5

115286, IPR error

Description

arg is no known attribute of the record *arg*.

Consequences

arg skipped.

Probable causes

Wrong definition in IDFP DEF module.

Recommended actions

Contact ABB for further support.

Default error class: 3 Safety class: 5

115287, Single seam aquisition - prepressure deviation

Description

Before application of a seam dispenser *arg* while running program *arg* before seam *arg* a prepressure deviation was detected.

Consequences

the seam could be faulty

Probable causes

Prepressure regulation takes too long timePrepressure limits are to low

Recommended actions

Increase prepressure deviation limitsOptimize prepressure regulation parameters

Default error class: 3 Safety class: 5

115301, Fan current of Peltier has fallen below critical limit

Description

Actual current of *arg* fan is *arg* mA. The limit is *arg* mA.

Consequences

Peltier can be overheated.The material can be hardened

Probable causes

Peltier cooling is not sufficiently guaranteed

Recommended actions

Deactivate peltierMaintain peltier fansExchange peltier fans

Default error class: 2 Safety class: 2

115302, Fan current of Peltier too high

Description

Actual current of *arg* fan is *arg* mA. The limit is *arg* mA.

Recommended actions

Check fan, 24V fuse, digital output of fan and wiring.Change fan

Default error class: 2 Safety class: 2

Continues on next page

115303, Fan current of Peltier too low

Description

Actual current of *arg* fan is *arg* mA. The limit is *arg* mA.

Consequences

peltier element could be overheated

Recommended actions

Check fan, 24V fuse, digital output of fan and wiring.Change fan

Default error class: 2 Safety class: 2

115304, Heat circuit temperature above absolute max limit

Description

Temperature of circuit *arg* is too high.Actual temperature of circuit *arg* is *arg* °C.

Recommended actions

Disconnect heating circuit to avoid material blockages.Check temperature sensor and wiring.Check parameters and setpoints.

Default error class: 2 Safety class: 2

115305, Temperature of peltier block too high

Description

Over temperature emergency switch activated for peltier *arg*.Actual temperature is *arg* °C.

Consequences

the heating or cooling power will be bisected because peltier has over 80°C. As a result the applicator temperature setpoint could not be reached

Recommended actions

Check peltier temperature switch and wiring.Check parameters and setpoints.

Default error class: 2 Safety class: 2

115306, Unexpected current in heating circuit

Description

Heating circuit *arg* has raised a current alarm.

Consequences

The heating circuit *arg* could not be heated.

Probable causes

Heating circuit *arg* is defective. An unexpected current has been detected.

Recommended actions

Deactivate circuit if error remainsCheck circuit.Check wiring.

Default error class: 2 Safety class: 3

115307, Peltier temperature above absolut max limit

Description

Temperature of peltier *arg* is too high.Actual temperature of circuit *arg* is *arg* °C.

Continues on next page

Recommended actions

deactivate peltier to avoid material blockages.Check temperature sensor and wiring.Check parameters and setpoints.

Default error class: 2 Safety class: 2

115308, Temperature sensor not connected

Description

Temperature sensor of circuit *arg* is not connected.

Recommended actions

Change sensor or evaluation unit.Check power supply of sensor.

Default error class: 3 Safety class: 3

115309, Temperature sensor short circuit

Description

Temperature sensor of circuit *arg* has a short circuit

Recommended actions

Change sensor or evaluation unit.Check power supply of sensor.

Default error class: 3 Safety class: 3

115310, SSR cooling switching fault

Description

Solid state relay for cooling of *arg* does not switch to *arg*.

Recommended actions

Check digital ouput to SSR and 24V supply.Change Solid state relay.

Default error class: 2 Safety class: 2

115311, SSR heating switching fault

Description

Solid state relay for heating of *arg* does not switch to *arg*.

Recommended actions

Check digital ouput to SSR and 24V supply.Change Solid state relay.

Default error class: 2 Safety class: 2

115312, Heating time without application exceeded

Description

Heating is switched off.

Recommended actions

Time value can be increased in heating parameters.

Default error class: 3 Safety class: 5

115313, Heating time exceeded

Description

Heating is switched off.

Continues on next page

Recommended actions

Time value can be increased in heating parameters.

Default error class: 3 Safety class: 5

115314, Drawdown time exceeded

Description

Temperature is lowered.

Recommended actions

Time value can be increased in heating parameters.

Default error class: 3 Safety class: 5

115315, IDC cabinet safety error - RCCB

Description

Residual-current circuit breaker (RCCB) F1 was triggered.

Probable causes

Heating circuit defective.

Recommended actions

Check heating circuit.If necessary disconnect circuit to continue operating other heating circuits.

Default error class: 2 Safety class: 3

115316, Material temperature below lower alarm limit

Description

Temperature of circuit number *arg* is low.Actual Temperature is *arg* °C.

Default error class: 3 Safety class: 3

115317, Material temperature above upper alarm limit

Description

Temperature of circuit number *arg* is high.Actual Temperature is *arg* °C.

Default error class: 3 Safety class: 3

115318, Material temperature below lower warning limit

Description

Temperature of circuit number *arg* is low.Actual temperature is *arg* °C.

Default error class: 4 Safety class: 4

115319, Material temperature above upper warning limit

Description

Temperature of circuit number *arg* is high.Actual temperature is *arg* °C.

Default error class: 4 Safety class: 4

115320, Week timer started heating Default error class: 5 Safety class: 5

Continues on next page

115321, IDC cabinet fuse error - Dispenser Heating

Description

One of the fuses *arg* for Dispenser *arg* is switched off.

Consequences

Circuits are not working.

Probable causes

Short circuit in heating circuit or cable.

Recommended actions

Check heating circuit.Turn on fuse.

Default error class: 3 Safety class: 3

115322, IDC cabinet fuse error - Dispenser Heating

Description

The fuses *arg* is switched off.

Consequences

Circuits are not working.

Probable causes

Short circuit in heating circuit or cable.

Recommended actions

Check heating circuit.Turn on fuse.

Default error class: 3 Safety class: 5

115323, Heating regulation is not possible

Description

Signal *arg* not accessible.

Consequences

Regulation will be deactivated.

Probable causes

No temperature sensor installed in applicator.

Default error class: 3 Safety class: 5

115324, IDC cabinet fuse error - pump heating

Description

Fuse *arg* for pump *arg* is switched off

Consequences

Circuits of pump and material hoses are not working.

Probable causes

Short circuit in heating circuit or cable.

Recommended actions

Check heating circuit.Turn on fuse.

Default error class: 3 Safety class: 3

Continues on next page

115325, Fuse 24V temperature control

Description

Fuse 24V in IDC for peltier unit *arg* failed.

Recommended actions

Turn on main fuse.Check temperature element.Change Solid state relay.

Default error class: 3 Safety class: 3

115326, Fuse 24V peltier fan

Description

Fan fuse in IDC for peltier unit *arg* failed.

Recommended actions

Turn on fan fuse.Change fan.

Default error class: 3 Safety class: 3

115327, Failure or deactivated 24V power supply for temperature control

Description

The 24V power supply for peltier unit *arg* is down.

Recommended actions

Check power supply in IDC.Check 400V supply to 24V power supplyCheck wiring, solid state relais and fuse.

Default error class: 3 Safety class: 3

115328, Water temperature exceeds warning limits

Description

Water inlet temperature for peltier unit *arg* exceeds warning limits.

Consequences

Peltier unit cannot work properlyPeltier will be switched off until water temperature is inside limits

Probable causes

water temperature too warm. Water temperature too cold. Water inlet valve closed. No water flow

Recommended actions

Check water inlet valve physically. Check water flow. Check water inlet temperature

Default error class: 4 Safety class: 4

115329, Water temperature exceeds alarm limits

Description

The actual temperature at the water inlet of Peltier *arg* is *arg*°C. This value is outside of the alarm limits. The setpoint is *arg*°C.

Consequences

Peltier unit cannot work properly

Probable causes

water temperature too warm. Water temperature too cold. Water inlet valve closed. No water flow

Continues on next page

Recommended actions

Check water inlet valve physically. Check water flow. Check water inlet temperature

Default error class: 2 Safety class: 3

115330, IDFP installation error

Description

The IDFP software was not or incompletely installed.

Consequences

IDFP is not functional.

Probable causes

Missing or invalid selection in the Installation Manager.

Recommended actions

Check the selection in the Installation Manager and reinstall the system.

Default error class: 3 Safety class: 5

115402, Pump stop active

Description

Pump stop for *arg* on pump panel was activated.

Consequences

All functions on *arg* will be deactivated. Inputs are still readable.

Default error class: 3 Safety class: 3

115403, Missing air supply for pump

Description

The air supply sensor for pump *arg* recognizes low air supply.

Consequences

Pump cannot be used.

Recommended actions

Check air supply.

Default error class: 3 Safety class: 3

115404, Barrel endurance is expired

Description

Barrel endurance is expired

Consequences

Quality of application could be compromised.

Recommended actions

Change barrel.

Default error class: 3 Safety class: 4

115405, Stroke detection of pump

Description

Air motor of *arg* has been stopped because of too many pump strokes per time.

Continues on next page

Consequences

Large amount of material might have leaked out.Air could have gathered in material barrel.

Probable causes

Leaking connections or hoses.Air below following plate.

Recommended actions

Check all hoses and tube fitting of ram.Ensure no air gathered under following plate. Increase air pressure for followinf plate.

Default error class: 3 Safety class: 3

115406, all pumps for dispenser are deactivated

Description

all available pumps for *arg* are deactivated

Consequences

materialsupply for dispenser is not available

Probable causes

all pumps are deactivated

Recommended actions

activate at least one pump

Default error class: 3 Safety class: 5

115407, Run empty mode finished

Description

Barrel of *arg* is empty.

Consequences

Airmotor was switched off.Barrel is completely emptyed.

Probable causes

The following plate reached the bottom of the barrel.

Recommended actions

Exchange the material barrel.

Default error class: 4 Safety class: 4

115408, High presure in material input

Description

Pressure sensor on dispenser inlet *arg* recognizes high pressure. Signal (diDxMtrlPrsHigh) of inlet pressure sensor has been triggered

Consequences

Airmotor was switched off.Pressure relief was activated.

Probable causes

Pressure too high.Defect of the sensor or cable broken.Pressure sensor setup not correct for new sensor (check circuit diagram).

Recommended actions

Decrease air supply for air motor.Exchange or check sensor and cable.

Default error class: 1 Safety class: 1

Continues on next page

115410, Warning level material barrel

Description

Warning fill level *arg* was reached.

Default error class: 4 Safety class: 4

115411, Material barrel empty

Description

The barrel of ram *arg* is empty.

Probable causes

The following plate reached the bottom of the barrel.

Recommended actions

Exchange the material barrel.Automatic switch to second barrel if available.

Default error class: 3 Safety class: 3

115413, Air-motor will not be switched on.

Description

Following plate is not within the barrel of pump *arg*.

Probable causes

Following plate is not within the barrel or the fill level sensor is defect.

Recommended actions

Manually position following plate in barrel and check fill level sensors.

Default error class: 3 Safety class: 3

115415, Sensor for warn level detection defect

Description

Sensor for empty level has been reached before the sensor for the warning level. Pump *arg*

Probable causes

Sensors could have been switched or cable is broken

Recommended actions

Check or exchange sensor or cable.

Default error class: 3 Safety class: 3

115416, Sensor for warn level detection broken

Description

Lower sensor for ram plate has been reached before the upper sensor. Pump *arg*

Probable causes

Sensors could have been switched or cable is broken

Recommended actions

Check or exchange sensor or cable.

Default error class: 3 Safety class: 3

Continues on next page

115417, Service warning internal pump - pump volume

Description

routine: *arg*Pump *arg* needs maintenance soon

Probable causes

Service counter pump volume has reached warning limit

Recommended actions

Prepare for maintenace of pump

Default error class: 4 Safety class: 5

115418, Service warning internal pump - pump stroke counter

Description

routine: *arg*Pump *arg* needs maintenance soon

Probable causes

Service counter pump stroke counter has reached warning limit

Recommended actions

Prepare for maintenace of pump

Default error class: 3 Safety class: 5

115419, Impossible to switch pumps

Description

Material of *arg* can not be pumped

Recommended actions

Check if the pump *arg* is in the automatic modeand has no errors.

Default error class: 3 Safety class: 3

115420, Temperature PIM high warning

Description

Temperature in PIM of *arg* is high.

Default error class: 4 Safety class: 4

115421, Temperature PIM high alarm

Description

Temperature in PIM of *arg* is high.

Default error class: 3 Safety class: 3

115422, Pump volume reached service limit

Description

routine: *arg*Pump *arg* needs maintenance

Probable causes

Service counter pump volume has reached service limit

Recommended actions

Pump maintenance

Continues on next page

Default error class: 3 Safety class: 4

115423, Pump stroke counter has reached service limit

Description

routine: *arg*Pump *arg* needs maintenance

Probable causes

Service counter pump stroke counter has reached service limit

Recommended actions

Pump maintenance

Default error class: 3 Safety class: 4

15.3 C List of interfaces

Continues on next page

Digital In

Digital In

The signals of the virtual IO unit "IDFP" serve for the operation and status report of the function package and vary depending on the selected setup.
General=Always available
(x)=Can only be set externally under certain conditions. Is also set by the system
The following abbreviations were used in the table:

Control	1
Only Status	2
Error	3
Warning	4
Safety	5

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
1	diDXY_HeaterStateZ	2	DI	p		x		0	heating circuit Z DXY not active		integrated electrical heating
								1	heating circuit Z DXY active		
2	diGXNeedle3FB	2	DI	p		x		0	needle feedback GX needle 3 closed		needle feedback sensor
								1	needle feedback GX needle 3 opened		
3	diGXNeedle2FB	2	DI	p		x		0	needle feedback GX needle 2 closed		needle feedback sensor
								1	needle feedback GX needle 2 opened		
4	diGXNeedle1FB	2	DI	p		x		0	needle feedback GX needle 1 closed		needle feedback sensor
								1	needle feedback GX needle 1 opened		
5	diDXY_Camera	2	DI	p		x	(x)	0	path correction sensor triffer signal is not active		path correction sensor
								1	patch correction sensor is active		
6	diDXY_SpindleLubrError	3	DI	p		x		0	spindle lubrication DXY has no error		spindle Lubrication
								1	spindle lubrication DXY has an error		
7	diDXY_LubrError	3	DI	p		x		0	lubrication DXY has no error		integrated lubrication
								1	lubrication DXY has an error		
8	diDXY_CalSens	2	DI	p		x		0	calibration sensor DXY is not active		dispenser
								1	calibration sensor DXY is active		
9	diDXAirState	2	DI	p		x		0	Air supply for dispenser system is switched off	Status air supply dispenser system	dispenser
								1	Air supply for dispenser system is switched on		
10	diDXMtrlPrsHigh	5	DI	p		x		0	overpressure material inlet DX		dispenser
								1	material pressure inlet is ok		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
11	diFuseIDC_Internal	3	DI	p		x		0	internal fuse IDC off		general
								1	internal fuse IDC ok		
12	diRID1On	3	DI	p		x		0	RID1 switched off		drives <2500W
								1	RID1 switched on		
13	diRID2On	3	DI	p		x		0	RID2 switched off		drives <2500W
								1	RID2 switched on		
14	diFuseF300	3	DI	p		x		0	fuse F300 is turned off		DIB
								1	fuse F300 is turned on		
15	diAirCondAlarm	3	DI	p		x		0	air conditioning IDC ok		air conditioning IDC
								1	air condition alarm		
16	diRCCB_TmpCond	3	DI	p		x		0	FI circuit breaker temperature conditioning is off		integrated temperature conditioning
								1	FI circuit breaker temperature conditioning is ok		
17	diFuseF100	3	DI	p		x		0	fuse F100 is turned off		DIB
								1	fuse F100 is turned on		
18	diFuseF200	3	DI	p		x		0	fuse F200 is turned off		DIB
								1	fuse F200 is turned on		
19	diFuseF11_F13	3	DI	p		x		0	fuse F11-F13 is turned off		electrical heating
								1	fuse F11-F13 is turned on		
20	diFuseF21_F23	3	DI	p		x		0	fuse F21-F23 is turned off		integrated pump
								1	fuse F21-F23 is turned on		
21	diFuseF31_F33	3	DI	p		x		0	fuse F31-F33 is turned off		DIB
								1	fuse F31-F33 is turned on		
22	diFuseF41_F43	3	DI	p		x		0	fuse F41-F43 is turned off		DIB
								1	fuse F41-F43 is turned on		
23	diFuseIDC_AC	3	DI	p		x		0	Fuse IDC air conditioning is turned off		air conditioning IDC
								1	Fuse IDC air conditioning is turned on		
24	diFuseIDC_External	3	DI	p		x		0	external fuse IDC tripped		general
								1	external fuse is ok		
25	diNozzleChangerZ	1	DI	p	1	x	x	0	nozzle changer place Z is unlocked/ unlock	Z = 1..8	nozzle changer
								1	nozzle changer place Z is locked/ lock		
26	diPelXY_Power	3	DI	p		x		0	power supply peltier switched off		integrated Peltier
								1	power supply peltier switched on		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
27	diPelXY_SignalFuse	3	DI	p		x		0	24 V fuse peltier has tripped		integrated Peltier
								1	24V fuse peltier ok		
28	diPelXY_HeatOn	2	DI	p		x		0	solid state relais peltier for heating switched off		integrated Peltier
								1	solid state relais peltier for heating switched on		
29	diPelXY_CoolOn	2	DI	p		x		0	solid state relais peltier for cooling switched off		integrated Peltier
								1	solid state relais peltier for cooling switched on		
30	diPelXY_TmpHighAlarm	3	DI	p		x		0	peltier temperature is ok		integrated Peltier
								1	peltier temperature is too high		
31	diPelXY_PowerFuse	3	DI	p		x		0	peltier fuse power supply has tripped		integrated Peltier
								1	peltier fuse power supply is ok		
32	diExtEmyStop	1	DI	v			x	0	-		general
								1	external emergency stop active		
33	diErrReset	1	DI	v	0->1	x	x	0	-	Acknowledge of errors of the function package application	general
								1	acknowledge error		
34	diTmpCondOnPLC	1	DI	v	0->1	x	x	0	-		integrated temperature conditioning
								1	Temperature conditioning/ electrical heating will be switched on by external source		
35	diTmpCondOffPLC	1	DI	v	0->1	x	x	0	-		integrated temperature conditioning
								1	Temperature conditioning/ electrical heating will be switched off by external source		
36	diPXPrsRelief	1	DI	v	1	x	x	0	-	pressure relief internal pump X	integrated pump
								1	Pump X gets pressurereliefed		
37	diPX_Ext_Auto	1	DI	p	1	x	x	0	-	Pump x will be switched to external mode	integrated pump
								1	Pump x will be switched to automatic from external source		
38	diPXY_HeaterStateZ	2	DI	p		x		0	heating circuit Z PXY not active		integrated electrical heating
								1	heating circuit Z PXY active		
39	diPXY_KS_ext	4	DI	p		x		0	key switch PXY not in external mode		integrated pump
								1	key switch PXY in external mode		
40	diPXY_KS_local	4	DI	p		x		0	key switch PXY not in local mode		integrated pump
								1	key switch PXY in local mode		
41	diPXY_Stop	3	DI	p		x		0	pump stop is active		integrated pump
								1	pump stop is not active		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
42	diPXY_Empty	3	DI	p		x		0	material level barrel of pump PXY is not empty		integrated pump
								1	material level barrel if pump PXY is emtpy		
43	diPXY_MinWarn	4	DI	p		x		0	material level barrel of pump PXY is not under warning level		integrated pump
								1	material level barrel if pump PXY is under warning level		
44	diPXY_InDrum2	3	DI	p		x		0	following plate PXY is not inside barrel (initiiator 1)		integrated pump
								1	following plate PXY is inside the barrel (initiator 2)		
45	diPXY_InDrum1	3	DI	p		x		0	following plate PXY is not inside barrel (initiiator 2)		integrated pump
								1	following plate PXY is inside the barrel (initiator 2)		
46	diPXY_Stroke	3	DI	p		x		0	initiator pump stroke counter is not Initiator is not 1		integrated pump
								1	initiator pump stroke counter is not initiator is 1		

Continues on next page

Digital Output

Digital Output

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
1	doGXRPA_Air	1	DO	p		x	x	0	Rockerpanel applicator GX air nozzle switch/ switched off		rocker panel applicator
								1	Rockerpanel applicator GX air nozzle switch/ switched on		
2	doDXY_ValveFill	1	DO	p		x	x	0	fill valve DXY close / closed		dispenser
								1	fill valve DXY open / opened		
3	doDXY_ValveOut	1	DO	p	1	x	x	0	material outlet valve DXY close(d)	physically not installed if applicator not mounted directly on the dispenser	general
								1	material outlet valve DXY open(ed)		
4	doRID1On	1	DO	p		x	(x)	0	switch off RID board 1		drives <2500W
								1	switch on RID Board 1		
5	doRID2On	1	DO	v		x	(x)	0	switch off RID board 2		drives <2500W
								1	switch on RID Board 2		
6	doDxPowerOn	3	DO	p	1	x	(x)	0	power contactor for Idrive DX switched/ switch off		general
								1	power contactor for Idrive DX switched/ switch on		
7	doTmpCondPowerOn1	3	DO	p	1	x	x	0	power contactor for electrical heating DX switched/ switch off		integrated electrical heating
								1	power contactor for electrical heating DX switched/ switch on		
8	doPelXY_Power	3	DO	p	1	x	(x)	0	power contactor peltier XY switched/ switch off		integrated peltier
								1	power contactor peltier XY switched/ switch on		
9	doIDC_FanOn	1	DO	p	1	x	(x)	0	Fan for IDC switch/ switched off		fan IDC
								1	Fan for IDC switch/ switched on		
10	doIDC2_FanOn	1	DO	p	1	x	(x)	0	Fan for IDC2 switch/ switched off		fan IDC2
								1	Fan for IDC2 switch/ switched on		
11	doNozzleChangerZ		DO	p	1	x	x	0	nozzlechanger Z locked/lock		nozzle changer
								1	nozzlechanger Z ready/free		
12	doGunCleanOn	1	DO	p	1	x	x	0	gun clean valve switched / switch off		gun cleaner
								1	gun clean valve switched / switch on		
13	doCentralCoolWater	1	DO	p		x	x	0	water inlet valve peltier switched / switch off	only if water cooled peltier is installed	integrated peltier
								1	water inlet valve peltier switched / switch on		

Continues on next page

15.3 C List of interfaces

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
14	doDXY_BrakeOpen	1	DO	p		x	(x)	0	brake motor DXY close/ is closed		general
								1	brake motor DXY open/ is open		
15	doGXRPA_BrakeOpen	1	DO	p		x	(x)	0	brake of motor rocker panel applicator close/ is closed		rocker panel applicator
								1	brake of motor rocker panel applicator open/ is opened		
16	doPelXY_Cooling	1	DO	p		x	x	0	peltier fan/ water inlet valve switch /switched off		integrated peltier
								1	peltier fan/ water inlet valve switch /switched on		
17	doPelXY_HeatOn	1	DO	p		x	(x)	0	Solid State Relais Peltier XY heating switch / switched off	is not allowed to switch on at the same time with signal doPelXY_CoolOn (danger of short circuit)	integrated peltier
								1	Solid State Relais Peltier XY heating switch / switched on		
18	doPelXY_CoolOn	1	DO	p		x	(x)	0	Solid State Relais Peltier XY cooling switch / switched off	is not allowed to switch on at the same time with signal doPelXY_HeatOn (danger of short circuit)	integrated peltier
								1	Solid State Relais Peltier XY cooling switch / switched on		
19	sdoIDFP_EmyStop	4	DO	v		x		0	emergency stop is not acitve		general
								1	emergency stop is active		
20	sdoIDFP_RunChainOK	3	DO	v		x		0	runchain robot controller is not closed		general
								1	runchain robot controller is closed		
21	sdoIDFP_AutoOn	2	DO	v		x		0	automatic mode is not active		general
								1	automatic mode is active		
22	sdoIDFP_MotorOn	2	DO	v		x		0	robot motors switched off		general
								1	robot motors switched on		
23	sdoIDFP_CycleOn	2	DO	v		x		0	program cycle is stopped		general
								1	program cycle is running		
24	doStopMainEOC	4	DO	v	1	x	x	0	Error class 2 is not active	Error class 2: Stop at the end of the application cycle (routine PostApplication). Signal could be set to 1 to stop the robot movement at the end of the application cycle.	general
								1	Error class 2 is active. Robot Movement will be stopped at the end of the application cycle		
25	doStopMain	3	DO	v	1	x	x	0	Error class 1 is not active	Error class 1: stop of robot movement. Signal could be set to one to stop robot movement immediately.	general
								1	Error class 1 is active. Robot Movement will be stopped immediately		
26	doTmpCondOn	2	DO	v		x		0	temperature control /heating is switched off	For switching on/off temperature control use signal diTmp-Cond[On/Off]PLC (0->1)	integrated temperature conditioning
								1	temperature control/heating is switched on		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
27	doBackupRunning	2	DO	v		x		0	no robot backup ongoing		general
								1	robot backup ongoing		
28	doDXPurgePos	2	DO	v		x	x	0	purge position for DX not enabled		dispenser
								1	purge position for DX enabled		
29	doDXUserPos	2	DO	v		x	x	0	purge position for DX not enabled (2nd user defined purge position)		dispenser
								1	purge position for DX enabled(2nd user defined purge position)		
30	doDXCircStart	1	DO	v		x	x	0	stop material circulation for DX	Dispenser must be idle to start circulation	material circulation
								1	start material circulation for DX		
31	doDXCircOn	2	DO	v		x		0	material circulation is switched off (feedback)		material circulation
								1	material circulation is switched on (feedback)		
32	doDXAppError	3	DO	v		x		0	DX no application error active		dispenser
								1	DX application error active		
33	doDXTmpCondOn	2	DO	v		x		0	feedback temperature control DX is not active		integrated temperature conditioning
								1	feedback temperature control DX is active		
34	doIDXReset	1	DO	v		x	x	0	-		general
								1	restart (initialize of task Dispenser X		
35	doDXStatReady	1	DO	v	0	x	x	0	user must signal set to 0 for handshake if main program is waiting for doDxStatReady = 1	DX must be in idle mode	statistic
								1	statistical data DX is ready for evaluation		
36	doDXParamWizard	1	DO	v	1		x	0	-		general
								1	start param wizard DX		
37	doDXY_IDriveError	3	DO	v		x		0	no error on Idrive DXY active		general
								1	error on Idrive DXY active		
38	doDXY_MtrlPrsHigh	3	DO	v		x		0	no material over pressure inside doser DXY		general
								1	material over pressure inside doser DXY		
39	doDXPrsRelief	2	DO	v		x		0	pressure relief DX not requested	signal to material supply. Request to switch of material supply	general
								1	pressure relief DX is requested		
40	doDXAutoAppReq	2	DO	v		x		0	system DX not requested purging through nozzle	could be guaranteed if setting doDXPurge-Pos=1 or doDxUser-Pos=1 (opt. worldzone could be connected to these signals).	general
								1	system DX requested purging through nozzle		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
41	doDXXRatio2K_OK	3	DO	v		x		0	2K mix ratio not ok (mixer)		2k
								1	2K mix ration ok (mixer)		
42	doPXMtrlSupReady	3	DO	p		x	x	0	material supply for DX is not ready		general
								1	material supply for DX is ready		
43	doPXY_AirMotor	1	DO	p	1	x	x	0	air motor pump PXY switched off/is off		integrated pump
								1	air motor pump PXY switched on/is on		
44	doPXY_PrsRelief	2	DO	p		x		0	pressure relief pump PXY not active		integrated pump
								1	pressure relief pump PXY is active		
45	doPX_RemoteOn	1	DO	p	1		x	1	request pump on from remote	will be done when key switch is set to remote	integrated pump
46	doPX_RemoteOff	1	DO	p	1		x	1	request pump off from remote	will be done when key switch is set to remote	integrated pump
47	doPX_RemotePrsRelief	1	DO	p	1		x	1	request pump pressure relief from remote	will be done when key switch is set to remote	integrated pump
48	doGXRPA_IDriveMotorOn	1	DO	p		x	(x)	0	motor Idrive rocker panel applicator switch/ switched off		rocker panel applicator
								1	motor Idrive rocker panel applicator switch/ switched on		
49	doDXY_IDriveMotorOn	1	DO	p	1	x	(x)	0	Idrive for motor DXY switched off/swtich off		general
								1	Idrive for motor DXY switched on/ switch on		
50	doPXY_LampTopWhite	2	DO	p		x		0	white signal light pump switched off		integrated pump
								1	white signal light pump switched on		
51	doPXY_LampTopGreen	2	DO	p		x		0	green signal light pump switched off		integrated pump
								1	green signal light pump switched on		
52	doPXY_LED_Man	2	DO	p		x		0	LED manual control PXY activated switched off		integrated pump
								1	LED manual control PXY activated switched on		
53	doPXY_LED_PumpAlarm	2	DO	p		x		0	LED pump alarm PXY activated switched off		integrated pump
								1	LED pump alarm PXY activated switched on		
54	doPXY_LED_AirOK	2	DO	p		x		0	LED air supply PXY activated switched off		integrated pump
								1	LED air supply PXY activated switched on		
55	doPXY_LED_Heat	2	DO	p		x		0	LED pump heating PXY activated switched off		integrated pump
								1	LED pump heating PXY activated switched on		
56	doPXY_LED_Auto	2	DO	p		x		0	LED automatic/ remote control PXY activated switched off		integrated pump
								1	LED automatic/ remote control PXY activated switched on		

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ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
57	doPXY_LED_AirMotor	2	DO	p		x		0	LED air motor PXY activated switched off		integrated pump
								1	LED air motor PXY activated switched on		
58	doPXY_TmpState	2	DO	p		x		0	LED state heating PXY is running off		integrated pump
								1	LED state heating PXY is running on		
59	doPXY_TmpZ	2	DO	p		x		0	heat circuit Z pump XY switched off		integrated pump
								1	heat circuit Z pump XY switched on		
60	doPXY_LampTopRed	2	DO	p		x		0	red signal light pump switched off		integrated pump
								1	red signal light pump switched on		
61	doPXY_ControlAir	1	DO	p		x	x	0	control air PXY switch/ switched off		integrated pump
								1	control air PXY switch/ switched on		
62	doPXY_Down	1	DO	p		x	(x)	0	Pump PXY lowering following plate not active/ deactivate		integrated pump
								1	Pump PXY lowering following plate active/ activate		
63	doPXY_Up	1	DO	p		x	x	0	Pump PXY lift following plate not active/ deactivate		integrated pump
								1	Pump PXY lift following plate active/ activate		

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15.3 C List of interfaces

Analog In

Analog In

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
1	aiGXMtrlTmp	2	AI	p		x			actual value applicator temperature °C		dispenser
2	aiGX_TmpLance	2	AI	p		x			actual lance temperature applicator °C		lance temperature sensor
3	aiDXY_TmpZ	2	AI	p		x			actual temperatur DXY heating circuit 1 °C		integrated electrical heating
4	aiDXMtrlTmp	2	AI	p		x			actual material temperature material inlet DXY		integrated peltier
5	aiGXMtrlPrs	2	AI	p		x			actual material pressure applicator GX		dispenser
6	aiDXMtrlSupPrs	2	AI	p		x			actual material supply pressure		dispenser
7	aiDXY_MtrlPrsOut	2	AI	p		x			actual material pressure doser outlet DXY		dispenser
8	aiPelXY_FanCurr	2	AI	p		x			peltier fan current in mA	only air cooled peltier	integrated peltier
9	aiIDC_FanCurr	2	AI	p		x			IDC fan current mA		fan IDC
10	aiPelXY_Tmp	2	AI	p		x			actual material temperature peltier XY		integrated peltier
11	aiPelXY_Water	2	AI	p		x			actual water temperature peltier XY	only water cooled peltier	integrated peltier
12	aiIDC2_FanCurr	2	AI	p		x			IDC2 fan current in mA		fan IDC2
13	aiGXTmpSP	2	AI	v		x	x		Applicator X temperature setpoint		integrated temperature conditioning
14	aiDXY_DriveVolt	2	AI	p		x			supply voltage Idrive DXY		dispenser
15	aiDXY_Torque	2	AI	p		x			Torque Idrive motor DXY		dispenser
16	aiDXY_DriveTmp	2	AI	p		x			Idrive Temperature DXY		dispenser
17	aiGXFluid	2	AI	p		x			actual material flow Dispenser X		dispenser

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Analog Out

Analog Out

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
1	aoGXFluid	2	AO	p		x	(x)		analogue material flow setpoint DX	Controlling the material flow setpoint is connected with opening the needle (needle 1-3 or circulation valve needle 4 via signal goGXNeedle-Sel)same point of time excluding delay times. Under different circumstances is controlling not possible. In case of a dual dispenser system it depends on signal state goGxFluidSel which doser (A or B is controlled). goGXFluidSel=1 --> doser A. goGXFluidSel=2 --> doser B. If signalstate goGXNeedle-Sel=0 controlling the doser is not possible.	dispenser
2	aoDXY_Level	2	AO	p		x			Doser DXY material fill level	B-Version only dual dispenser	dispenser
3	aoGXRPA_SP	2	AO	p		x	(x)		rotational speed setpoint (rpm) rockerpanel applicator GX		rocker panel applicator
4	aoPXY_MtrlPrs	2	AO	p		x			actual material supply pressure PXY		integrated pump

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Group Output

Group Output

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
1	goDXOrder	1	GO	v		x	x	0	Dispenser has no order acutally / feedback that order was done. Dispenser could be in application mode!		dispenser
								2	request super purge/super purge is running		
								3	request frontplate purging DXA/ DXB / frontplate purging is running		
								4	request to send actual application delays (actual values from TPU - configuartion - application delays) to IPS. / Ordered send of application delays is running		
								5	request IPS backup / IPS backup running		
								6	request IPS restore / IPS restore running		
								7	request pressure relief DXA,DXB,PXA,PXB / pressure relief running		
								8	request hose accu compensation / hose accu compensation is running		
								9	request leackage detection / leakage detection is running		
								11	request fill DXA / fill DXA is running		
								12	request empty doser DXA / empty doser DXA is running		
								13	request move backward DXA/ move backward DXA is running		dispenser
								14	request move foreward DXA/ move foreward DXA is running		
								15	request calibration DXA / calibration DXA is running		
								16	request purging DXA / purging DXA is running [Before sending the request for purging num nGXNeedleSel (or from external goGxNeedleSelExt) must be have the value for which nozzle will be purged (e.g. 1. nGXNeedleSel= 2.SetGO goDXOrder,16) the example shows how to purge only nozzle 2.]		
								17	request flow check DXA / flow check DXA running		
								18	Request prepare 2K DXA and DYA / prepare 2K DXA and DYA is running		
								19	Request 2K applying manual DXA and DYA / applying manual 2K DXA and DYA is running		
								21	request fill DXB / fill DXB is running		
								22	request empty doser DXB / empty doser DXB is running		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
								23	request move backward DXB/ move backward DXB is running		dispenser
								24	request move forward DXB/ move forward DXB is running		
								25	request calibration DXB / calibration DXB is running		
								26	request purging DXB / purging DXB is running	Before sending the request for purging num nGXNeedleSel (or from external goGxNeedleSelExt) must be have the value for which nozzle will be purged (e.g. 1. nGXNeedleSel:=2. SetGO goDXOrder, 26) the example shows how to purge only nozzle 2.	
								27	request flow check DXB / flow check DXB running		
								31	request to interrupt the actual running function / interrupt the function is running		
2	goDXOrderAck	2	GO	v		x			feedback from a request of goDXOrder. Same number as goDXOrder. Order was accepted		dispenser
3	goDXY_State	2	GO	v		x		0	Status of doser DXY undefined (not calibrated)	Status doser DXY	dispenser
								1	status of doser DXY "no action"		
								2	status of doser DXY "full"		
								3	status of doser DXY "empty"		
								4	status of doser DXY "filling"		
								5	status of doser DXY "emptying"		
								6	status of doser DXY "applicator pressure"		
								7	status of doser DXY "following pressure from DXZ" (only dual)		
4	goDXMode	2	GO	v		x		0	Undefined (not calibrated)		dispenser
								1	ready		
								2	calibration		
								3	application		
								4	circulation		
								5	purging		
								6	function running (manual function or function activated from external)		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
5	goDXAppStat	2	GO	v		x		0	no data evaluation available	application result status. (Must be generated by the routines InitReadMeasureDX, ResetMeasureDX, ReadMeasureDX (see documentation statistics)	statistic
								1	application result is ok (volume deviation / temperature / application interrupt)		
								2	application result is not ok (volume deviation / temperature / application interrupt)		
6	goGXNeedleSelExt	1	GO	v		x	x	0	no nozzle selected from external (Default nozzle 1 will be used for purging). By starting the manual purge from the TPU nozzle number could be selected		dispenser
								1	nozzle 1 from external selected		
								2	nozzle 2from external selected		
								3	nozzle 3from external selected		
								4	nozzle 1,2 and 3 from external selected (purge all)		
7	goDXSingleSeamEval	2	GO	v		x	(x)	0	NO status for single seam available	This has to be evaluated if using single seam data acquisition	statistic and Supervision
								1	Single seam evaluation result is ok		
								2	Single seam evaluation result is deviation between reference file and temp file		
								3	Single seam evaluation result is no reference file available		
8	goDXTmpCondState	2	GO	v		x		0	overheated or hardware fault		integrated electrical heating
								1	Status OK - no error or warning		
								2	Temperature out of warning range		
								3	temperature control off		
								4	preheating is running		
								5	Temperature ok, post heating time is running		
								6	over temperature		
								7	StandBy (temperature control switched on but not active --> flow=0)		
								0	weektimer deactivated		
								10	weektimer activated		
9	goDXTmpCondCount	2	GO	v		x		0-256	application delay / post heating time [s] DX		integrated electrical heating
10	goGXMtrlTmpState	2	GO	v		x		0	Alarm - temperature out of range		
								1	Temp ok		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
								2	Warning		
								3	temperature control switched off		
11	goPelXY_State	2	GO	v		x		0	Alarm - temperature out of range		integrated peltier
								1	Temp ok		
								2	Warning		
								3	temperature control switched off		
12	goDXXOrder2K	1	GO	v		x	x	0	no 2K function requested		2k
								3	request frontplate purging (both 2K dispenser) / frontplate purging 2K is running		
								7	request pressure relief (both 2K dispenser+internal pump) / pressure relief 2K is running		
								11	request fill (both 2K dispenser) / filling 2K is running		
								16	request 2K purging / purging 2K is running		
								17	request 2K flowcheck / flowcheck 2K is running		
								18	request prepare 2K/ preparing 2K is running		
								19	request 2K manuel application / manual application is running (as long as order number will be reset to 0!)		
								31	request interrupt actual running 2k function / Interrupt of function is running		
13	goDXXPotlifeState	2	GO	v		x	x	0	2K potlife timed out		2k
								1	2K potlife is running		
								2	2K potlife is running - potlife warning active		
								3	2K stop potlife potlife alarm		
14	goDXXMixerState	2	GO	p		x		0	2K mixing ratio is not ok		2k
								1	mixer is purged with 2k material component 1 (D1) completely		
								2	mixer is purged with 2k material component 2 (D2) completely		
								3	2K mixing ratio ok. Ready for 2k application		
15	goPXY_State	2	GO	p		x		0	no barrel		integrated pump
								1	pump in auto, air motor on		
								2	pump in auto, air motor off		
								3	pump in manual		
								4	pump deactivated		

Continues on next page

ongoing number	signal name	category	signal type	signal type (physical (p)/virtuel (v))	controlling	R (read)	W (write)	Signal state	Signal value meaning	internal function	Requirement/category (general=available in every case and setup)
16	goGXFluidSel	2	GO	p		x		0	no doser is selected to applicate material. Application not possible.		dispenser
								1	doser A from DX is selected to applicate material		
								2	doser B from DX is selected to applicate material		
17	goGXNeedleSel	2	GO	p		x	(x)	0	GX no nozzle selected for application (application not possible)	for assign the nozzle number for the purging order use signal goGXNeedleSelExt from external or nGXNeedleSel from internal (robot main program)	dispenser
								1	GX nozzle 1 is selected		
								2	GX nozzle 2 is selected [2 needle applicator needed]		
								3	GX nozzle 3 is selected [3 needle applicator needed]		
								4	circulation valve is selected (circulation mode)[material circulation needed		
								5	simulated nozzle for applicator pressure regulation		
18	goDXY_Filter	2	GO	p		x	(x)	0-15	actual shootfilter selected for DXY		dispenser

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15.4 D Statistic data

Continues on next page

15.4 D Statistic data

ARRAY StatisticData StatDataCommon

ARRAY StatisticData StatDataCommon

Number in array	User data	Abbreviation (TPU - Configuration - Statistics)	Definition	Unit
1	Cust1: Program number	ProgNo	User-specific data	
2	Cust2: Part No. (e.g. body)	PartNo	User-specific data	
3	Cust3: Option number	OptNo	User-specific data	
4	Cust4: Type number	TypNo	User-specific data	
5	Cust5: Other PLC data	PLCData1	User-specific data	
6	Cust6: Other PLC data	PLCData2	User-specific data	
7	Cust7: Other data	ExtData1	User-specific data	
8	Cust8: Cycle time	CyclTime	User-specific data	
9	Date	Date:	Date	Day.Month.Year
10	Time	Time	Time	HH:MM:SS
11	Robot name	RobName	Name of robot	
12	Serial number	SerialNo	Robot serial number	
13	Station name	StationName	Name of station	
14	Status of external devices	StatusExtDev	Status of external devices during application	

Continues on next page

ARRAY StatisticData StatDataD1

ARRAY StatisticData StatDataD1

Number in array	System data	Abbreviation (TPU - Configuration - Statistics)	Definition	Unit
1	Material outlet temperature Max. D1	G1TmpMax	Maximum measured outlet temperature	°C
2	Material outlet temperature Min. D1	G1TmpMin	Minimum measured outlet temperature	°C
3	Material outlet temperature setpoint value D1	G1TmpSP	Material setpoint temperature	°C
4	Material outlet temperature average D1	G1TmpAv	Average outlet temperature in relation to last application cycle	°C
5	Material outlet temperature status (OK/NOK) D1	G1TmpStatus	Status outlet temperature of last application cycle	°C
8	Peltier1 temperature (with two Peltier àMaster) D1	D1PelATmpAv	Actual temperature Peltier 1 average during last cycle	°C
9		D1PelATmpMin	Actual temperature Peltier 1 minimum during last cycle	°C
10		D1Pel1ATmpMax	Actual temperature Peltier 1 maximum during last cycle	°C
11	Peltier 1B temperature D1	D1PelBTmpAv	Actual temperature Peltier 1B average during last cycle	°C
12		D1PelBTmpMin	Actual temperature Peltier 1B minimum during last cycle	°C
13		D1PelBTmpMax	Actual temperature Peltier 1B maximum during last cycle	°C
18	Material inlet temperature D1	D1MtrlTmp	Average during the application	°C
19	Material inlet pressure at start of application D1	D1MtrlPrs		bar
23	Status of application D1	D1StatusAppl	Status of application during the cycle	OK/NOK
24	Needle On-Time D1 Needle 1	D1NeedleOnTimeN1	Time needle switched on during last cycle	s
25	Needle On-Time D1 Needle 2	D1NeedleOnTimeN2	Time needle switched on during last cycle	s
26	Needle On-Time D1 Needle 3	D1NeedleOnTimeN3	Time needle switched on during last cycle	s
27	Application time D1	D1ApplTime	Application time of last cycle	s
28	Filling time (Single Dispenser) D1	D1FillTime	Total filling time before/after application (Single Dispenser only)	s
29	Doser filling cycles D1A	D1A_FillCycles	Filling cycles total	
30	Doser material used D1A	D1A_VolTot	Total material used	Liter
31	Doser filling cycles D1B	D1B_FillCycles	Filling cycles total	
32	Doser material used D1B	D1B_VolTot	Total material used	Liter
33	Volume doser D1	D1VolAct	Actual value of last application cycle	ml
34		D1VolSP	Setpoint value of last application cycle	ml
35		D1VolDiffAbs	Absolute difference of last application cycle	ml
36		D1VolDiffRel	Relative difference of last application cycle	%
37		D1VolStatus	Status OK/NOK of last application cycle	OK/NOK
38	Volume of pump P1	P1VolAbs	Actual absolute volume total	Liter
39		P1StrAbs	Actual absolute number of strokes total	
40	Application interruption of bead (since last measurement) D1	D1AppAbort	Cancelation of DispX instruction	YES/NO
41	Measuring point D1 consecutive number	D1MeasurePoint	Measuring point (triggered by Routine ReadMeasure)	

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15.4 D Statistic data

ARRAY StatisticData StatDataD2

ARRAY StatisticData StatDataD2

Number in array	System data	Abbreviation (TPU - Configuration - Statistics)	Definition	Unit
1	Material outlet temperature Max. D2	G2TmpMax	Maximum measured outlet temperature	°C
2	Material outlet temperature Min. D2	G2TmpMin	Minimum measured outlet temperature	°C
3	Material outlet temperature setpoint value D2	G2TmpSP	Material setpoint temperature	°C
4	Material outlet temperature average D2	G2TmpAv	Average outlet temperature in relation to last application cycle	°C
5	Material outlet temperature status (OK/NOK) D2	G2TmpStatus	Status outlet temperature of last application cycle	°C
8	Peltier1 temperature (with two Peltier àMaster) D2	D2PelATmpAv	Actual average of last application cycle	°C
9		D2PelATmpMin	Minimum value of last application cycle	°C
10		D2Pel1ATmpMax	Maximum value of last application cycle	°C
11	Peltier 2 temperature D2	D2PelBTmpAv	Actual average of last application cycle	°C
12		D2PelBTmpMin	Minimum value of last application cycle	°C
13		D2PelBTmpMax	Maximum value of last application cycle	°C
18	Material inlet temperature D2	D2MtrlTmp	Average during the application	°C
19	Material inlet pressure at start of application D2	D2MtrlPrs		bar
23	Status of application D2	D2StatusAppl	Status of application during the cycle	OK/NOK
24	Needle On-Time D2 Needle 1	D2NeedleOnTimeN1	Time needle switched on during last cycle	s
25	Needle On-Time D2 Needle 2	D2NeedleOnTimeN2	Time needle switched on during last cycle	s
26	Needle On-Time D2 Needle 3	D2NeedleOnTimeN3	Time needle switched on during last cycle	s
27	Application time D2	D2ApplTime	Application time of last cycle	s
28	Filling time (Single Dispenser) D2	D2FillTime	Total filling time before/after application (Single Dispenser only)	s
29	Doser filling cycles D2A	D2A_FillCycles	Filling cycles total	
30	Doser material used D2A	D2A_VolTot	Total material used	Liter
31	Doser filling cycles D2B	D2B_FillCycles	Filling cycles total	
32	Doser material used D2B	D2B_VolTot	Total material used	Liter
33	Volume doser D2	D2VolAct	Actual value of last application cycle	ml
34		D2VolSP	Setpoint value of last application cycle	ml
35		D2VolDiffAbs	Absolute difference of last application cycle	ml
36		D2VolDiffRel	Relative difference of last application cycle	%
37		D2VolStatus	Status OK/NOK of last application cycle	OK/NOK
38	Volume of pump P2	P2VolAbs	Actual absolute volume total	Liter
39		P2StrAbs	Actual absolute number of strokes total	
40	Application interruption of bead (since last measurement) D2	D2AppAbort	Cancelation of DispX instruction	YES/NO
41	Measuring point D2 consecutive number	D2MeasurePoint	Measuring point (triggered by Routine ReadMeasure)	

Continues on next page

ARRAY StatisticData StatDataD3

ARRAY StatisticData StatDataD3

Number in array	System data	Abbreviation (TPU - Configuration - Statistics)	Definition	Unit
1	Material outlet temperature Max. D3	G3TmpMax	Maximum measured outlet temperature	°C
2	Material outlet temperature Min. D3	G3TmpMin	Minimum measured outlet temperature	°C
3	Material outlet temperature setpoint value D3	G3TmpSP	Material setpoint temperature	°C
4	Material outlet temperature average D3	G3TmpAv	Average outlet temperature in relation to last application cycle	°C
5	Material outlet temperature status (OK/NOK) D3	G3TmpStatus	Status outlet temperature of last application cycle	°C
8	Peltier1 temperature (with two Peltier àMaster) D3	D3PelATmpAv	Actual average of last application cycle	°C
9		D3PelATmpMin	Minimum value of last application cycle	°C
10		D3Pel1ATmpMax	Maximum value of last application cycle	°C
11	Peltier 1B temperature D3	D3PelBTmpAv	Actual average of last application cycle	°C
12		D3PelBTmpMin	Minimum value of last application cycle	°C
13		D3PelBTmpMax	Maximum value of last application cycle	°C
18	Material inlet temperature D3	D3MtrlTmp	Average during the application	°C
19	Material inlet pressure at start of application D3	D3MtrlPrs		bar
23	Status of application D3	D3StatusAppl	Status of application during the cycle	OK/NOK
24	Needle On-Time D3 Needle 1	D3NeedleOnTimeN1	Time needle switched on during last cycle	s
25	Needle On-Time D3 Needle 2	D3NeedleOnTimeN2	Time needle switched on during last cycle	s
26	Needle On-Time D3 Needle 3	D3NeedleOnTimeN3	Time needle switched on during last cycle	s
27	Application time D3	D3ApplTime	Application time of last cycle	s
28	Filling time (Single Dispenser) D3	D3FillTime	Total filling time before/after application (Single Dispenser only)	s
29	Doser filling cycles D3A	D3A_FillCycles	Filling cycles total	
30	Doser material used D3A	D3A_VolTot	Total material used	Liter
31	Doser filling cycles D3B	D3B_FillCycles	Filling cycles total	
32	Doser material used D3B	D3B_VolTot	Total material used	Liter
33	Volume doser D3	D3VolAct	Actual value of last application cycle	ml
34		D3VolSP	Setpoint value of last application cycle	ml
35		D3VolDiffAbs	Absolute difference of last application cycle	ml
36		D3VolDiffRel	Relative difference of last application cycle	%
37		D3VolStatus	Status OK/NOK of last application cycle	OK/NOK
38	Volume of pump P3	P3VolAbs	Actual absolute volume total	Liter
39		P3StrAbs	Actual absolute number of strokes total	
40	Application interruption of bead (since last measurement) D3	D3AppAbort	Cancelation of DispX instruction	YES/NO
41	Measuring point D3 consecutive number	D3MeasurePoint	Measuring point (triggered by Routine ReadMeasure)	

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15.4 D Statistic data

ARRAY StatisticData StatDataD4

ARRAY StatisticData StatDataD4

Number in array	System data	Abbreviation (TPU - Configuration - Statistics)	Definition	Unit
1	Material outlet temperature Max. D4	G4TmpMax	Maximum measured outlet temperature	°C
2	Material outlet temperature Min. D4	G4TmpMin	Minimum measured outlet temperature	°C
3	Material outlet temperature setpoint value D4	G4TmpSP	Material setpoint temperature	°C
4	Material outlet temperature average D4	G4TmpAv	Average outlet temperature in relation to last application cycle	°C
5	Material outlet temperature status (OK/NOK) D4	G4TmpStatus	Status outlet temperature of last application cycle	°C
8	Peltier1 temperature (with two Peltier àMaster) D4	D4PelATmpAv	Actual average of last application cycle	°C
9		D4PelATmpMin	Minimum value of last application cycle	°C
10		D4Pel1ATmpMax	Maximum value of last application cycle	°C
11	Peltier 2 temperature D4	D4PelBTmpAv	Actual average of last application cycle	°C
12		D4PelBTmpMin	Minimum value of last application cycle	°C
13		D4PelBTmpMax	Maximum value of last application cycle	°C
18	Material inlet temperature D4	D4MtrlTmp	Average during the application	°C
19	Material inlet pressure at start of application D4	D4MtrlPrs		bar
23	Status of application D4	D4StatusAppl	Status of application during the cycle	OK/NOK
24	Needle On-Time D4 Needle 1	D4NeedleOnTimeN1	Time needle switched on during last cycle	s
25	Needle On-Time D4 Needle 2	D4NeedleOnTimeN2	Time needle switched on during last cycle	s
26	Needle On-Time D4 Needle 3	D4NeedleOnTimeN3	Time needle switched on during last cycle	s
27	Application time D4	D4ApplTime	Application time of last cycle	s
28	Filling time (Single Dispenser) D4	D4FillTime	Total filling time before/after application (Single Dispenser only)	s
29	Doser filling cycles D4A	D4A_FillCycles	Filling cycles total	
30	Doser material used D4A	D4A_VolTot	Total material used	Liter
31	Doser filling cycles D4B	D4B_FillCycles	Filling cycles total	
32	Doser material used D4B	D4B_VolTot	Total material used	Liter
33	Volume doser D4	D4VolAct	Actual value of last application cycle	ml
34		D4VolSP	Setpoint value of last application cycle	ml
35		D4VolDiffAbs	Absolute difference of last application cycle	ml
36		D4VolDiffRel	Relative difference of last application cycle	%
37		D4VolStatus	Status OK/NOK of last application cycle	OK/NOK
38	Volume of pump P4	P4VolAbs	Actual absolute volume total	Liter
39		P4StrAbs	Actual absolute number of strokes total	
40	Application interruption of bead (since last measurement) D4	D4AppAbort	Cancelation of DispX instruction	YES/NO
41	Measuring point D4 consecutive number	D4MeasurePoint	Measuring point (triggered by Routine ReadMeasure)	

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ARRAY StatisticData StatDataD12

ARRAY StatisticData StatDataD12

Number in array	System data	Abbreviation (TPU - Configuration - Statistics)	Definition	Unit
1	2K volume actual value	D12VolAct		ml
2	2K volume setpoint value	D12VolSP		ml
3	2K volume difference absolute	D12VolDiffAbs		ml
4	2K volume difference relative	D12VolDiffRel		%
5	Status of application	D12StatusAppl		OK/NOK

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