ABB Robotics

Operating and Maintenance Manual
Integrated Pumps
Attachment to the IDFP product manual

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Operating and Maintenance Manual

Integrated Pumps

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Table of Contents

Table of Contents

1 Single barrel pump/double barrel pump

1.1 General information

1.1.1 Objective and purpose of these instructions

This manual is an attachment to the IDFP product manual and describes the optional integrated pump.

These instructions describe the correct operation of the following barrel pumps:

Single barrel pump	Double barrel pump
EFP30/K/ST/630	DFP30/K/ST/630
EFP30/H/ST/630	DFP30/H/ST/630
EFP50/K/ST/630	DFP50/K/ST/630
EFP50/H/ST/630	DFP50/H/ST/630
EFP200/K/ST/630	DFP200/K/ST/630
EFP200/H/ST/630	DFP200/H/ST/630
EFP200/K/VA/630	

The instructions are intended to give you sufficient information to be able to operate the barrel pump safely in production mode and to be able to perform successful troubleshooting.

These instructions only deal with the operation of the listed pump models at the control panel of the PIM.

Document reference

Technical drawing

Part list

The operator view of the IDFP on the FlexPendant is shown in the IDFP product manual.

The air motor (BA and RA), material pump (BA and RA) and follower plate (RA of the three available variants) assemblies are described in separate attachments.

1.1.2 Revisions

Version	Date	Changes
1.0	27.04.2015	First edition
2.0	11.04.2015	Revised version
2.1	07.11.2016	Changes to content
2.1 Rev. A	30.06.2017	Additions to content
2.1 Rev. B	02.01.2018	Additions to content
2.1 Rev. C	04.05.2018	"Hydraulic pump" chapter inserted

1.1.3 Target group of these instructions

The instructions are intended for operating and maintenance personnel.

Personnel	Requirements
Qualified personnel	The manager or the trained personnel carry out tasks involved with the operation of the system and inform personnel of potential dangers of improper actions. They must be familiar with the required protection devices and protective measures.
Trained personnel	Have thorough technical training and are familiar with the applicable regulations for occupational health and safety and accident prevention applicable to the system and also with the applicable laws and the accepted rules of engineering.

The following work may be carried out by specified personnel:

Activity	Qualified personnel	Trained personnel
Operation of the systems, changing barrels	X	X
Performance of maintenance and repair work, setup		X

1.1.4 List of Abbreviations

Range	Abbreviation	Meaning
General	PIM	Pump Interface Module
	BA	Operating and Maintenance Manual
	RA	Inspection instructions
Designation	EFP	Single barrel pump
	DFP	Double barrel pump
	RAM	Barrel press (pneumatic cylinder)
Size identification	30	Barrel sizes 15 l to 30 l
	50	Barrel sizes 45 l to 70 l
	200	Barrel size 200 l
Temperature control	C	Cold
	H	Hot
Material	AL	Aluminum
	ST	Steel
	VA	Stainless steel
Seal type	850/860	PUR
	615	UHMWPE
	630	PEEK

1.2 Safety

1.2.1 Intended use

The barrel pumps described here are part of the IDFP for transport of materials (adhesives and sealing materials) from barrels to the location of use.

Any other use or the use of other materials is not approved!

It must be connected to the function package and compressed air network by trained personnel subject to the directions of the IDFP product manuals. Trained personnel must also perform all maintenance and repair work.

It must be operated by qualified personnel and technicians only. Operating errors may destroy the application process, which may result in the loss of the system function.

1.2.2 Safety notices

Please observe the following information:

- Work on the installation may only be carried out by qualified personnel.
- Only trained personnel are permitted to perform maintenance and repair work. They must also have been trained to work on the assembly.
- Personal protective clothing must be worn for work. Safety goggles must also be worn when working with pressurized materials. See the IDFP product manual for the definition of suitable protective clothing.
- All other safety notes in this document and in the IDFP product manual must also be observed.
- The pump is integrated into the IDFP by the PIM. The general safety instructions in the IDFP product manual must be observed.

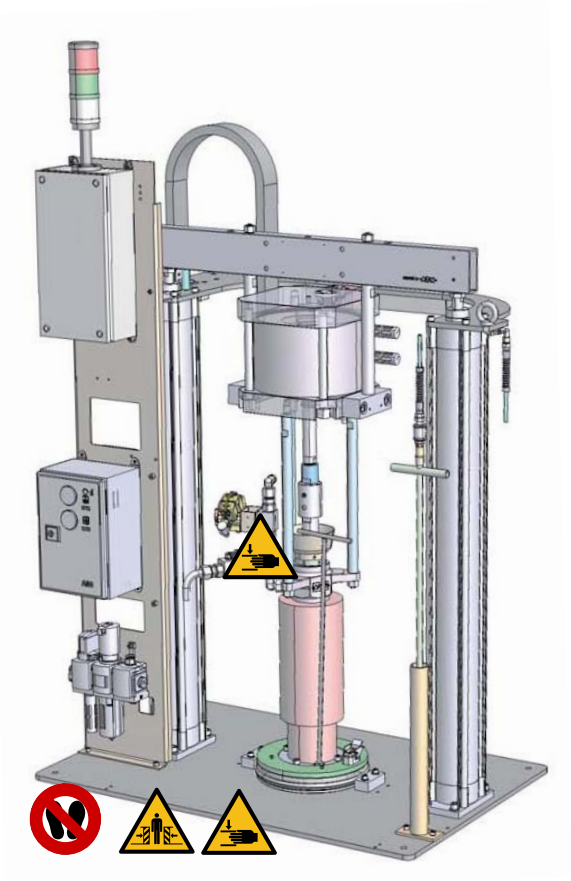

Abb. 1: Hazard points

WARNING

Risk of crushing fingers!

Fingers may be crushed by the motion of the follower plate or coupling, which may result in serious injury.

Never reach into the barrel pump, because parts there may move at any time!

1.3 Technical data

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 30.).

1.3.1 Dimensions

Dimensions (retracted) (H x W x D):	1795 x 1070 x 700 mm
Height extended	2345 mm

30 L / 50 L EFP cold	245 kg
30 L / 50 L EFP hot	250 kg
200 L EFP cold	255 kg
200 L EFP hot	260 kg

1.3.2 Connected electrical load (PIM)

Infeed voltage:	200/400/480 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 is supplied through the integrated connection to the IDC.

1.3.3 Connected pneumatic load

Input 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: $\leq$1 mg/m3

1.3.4 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.lanx-ess.com)	**X**
4	HLP 46 (hydraulic oil)	Finke (www.finke-mineraloel-werk.de)	

INFORMATION

The specified substances must not be substituted by others!

1.4 Description of the assembly

1.4.1 Overview

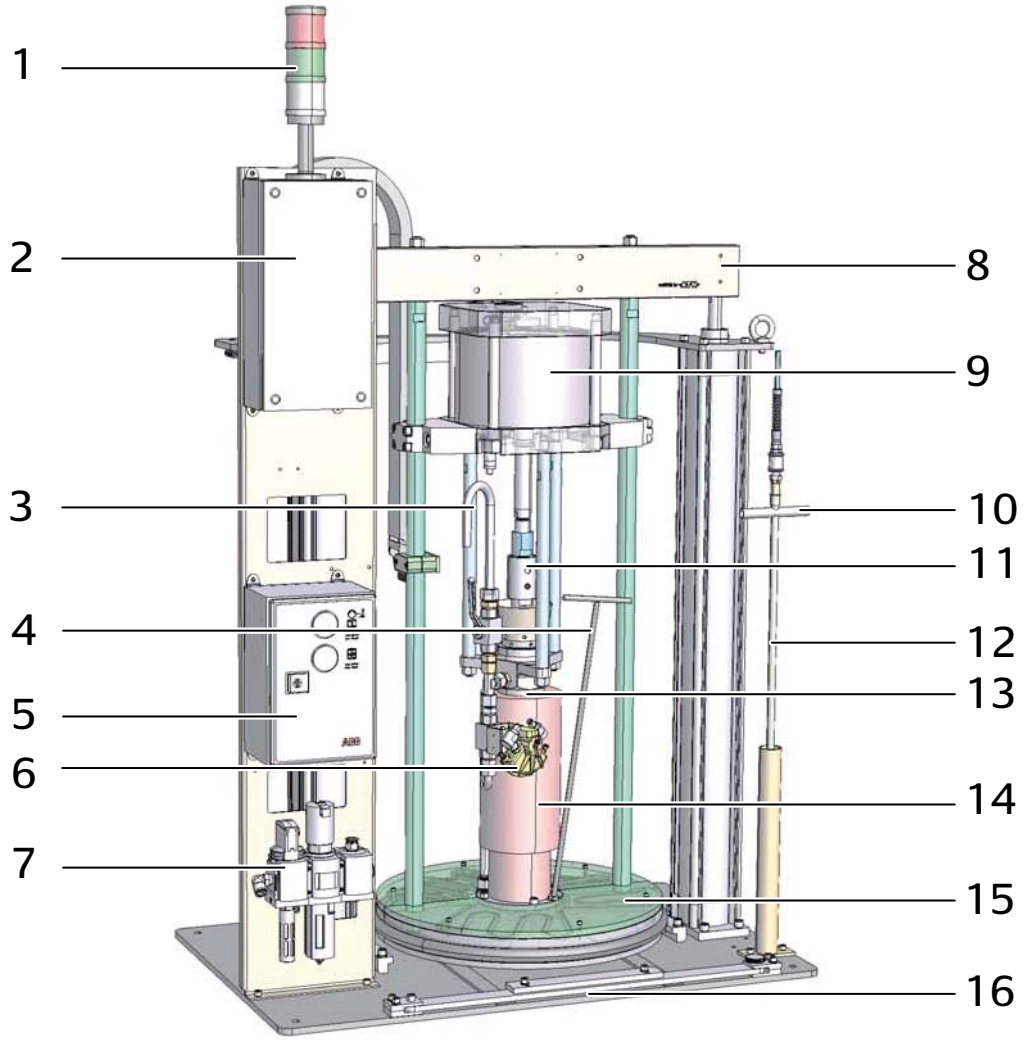

Abb. 2: Overview of the system

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
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)

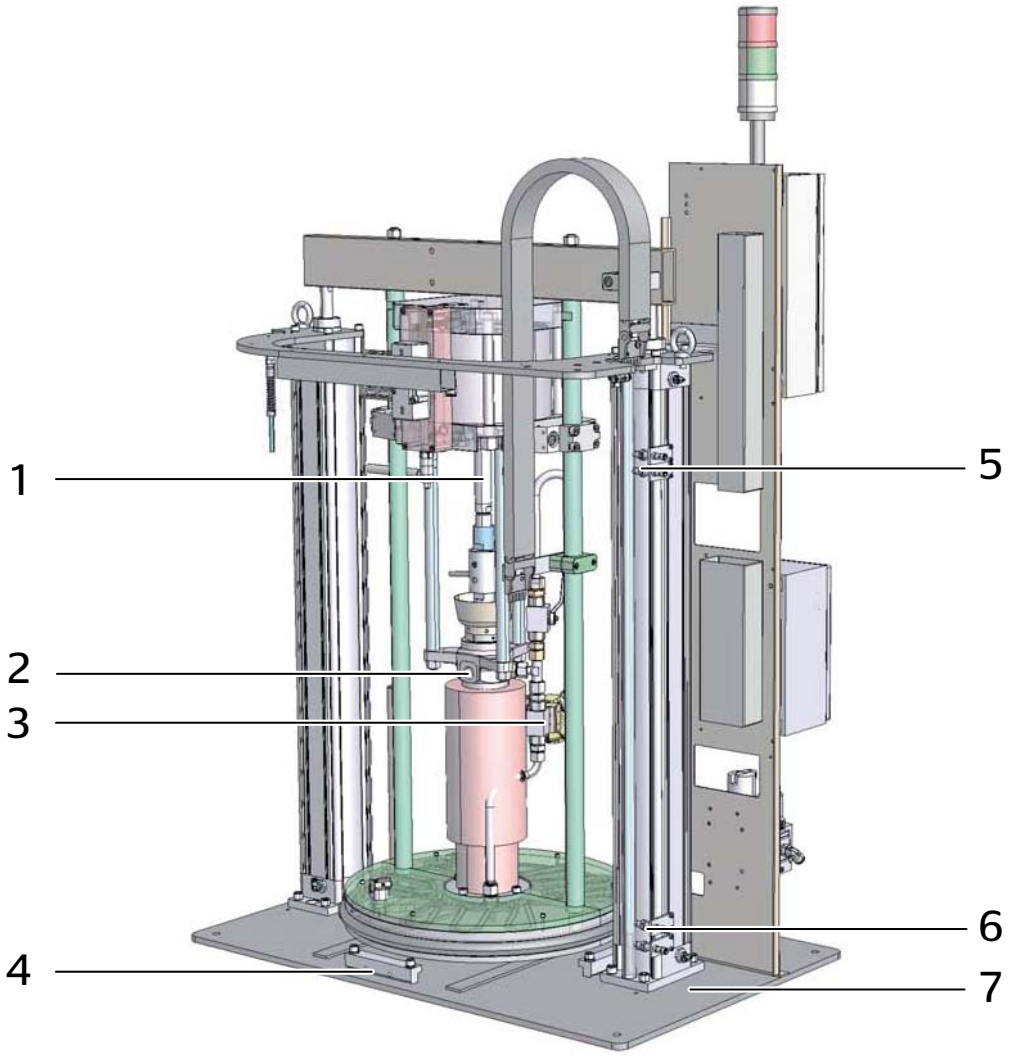

Abb. 3: View of back

1	Air motor stroke counter
2	Material hose connection
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.
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.

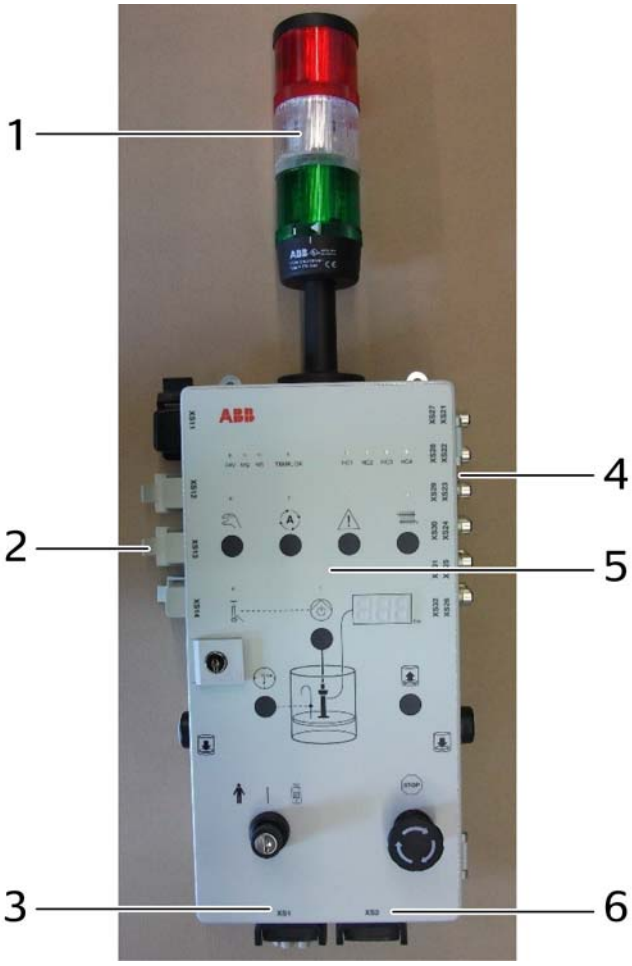

Abb. 4: PIM

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).
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.

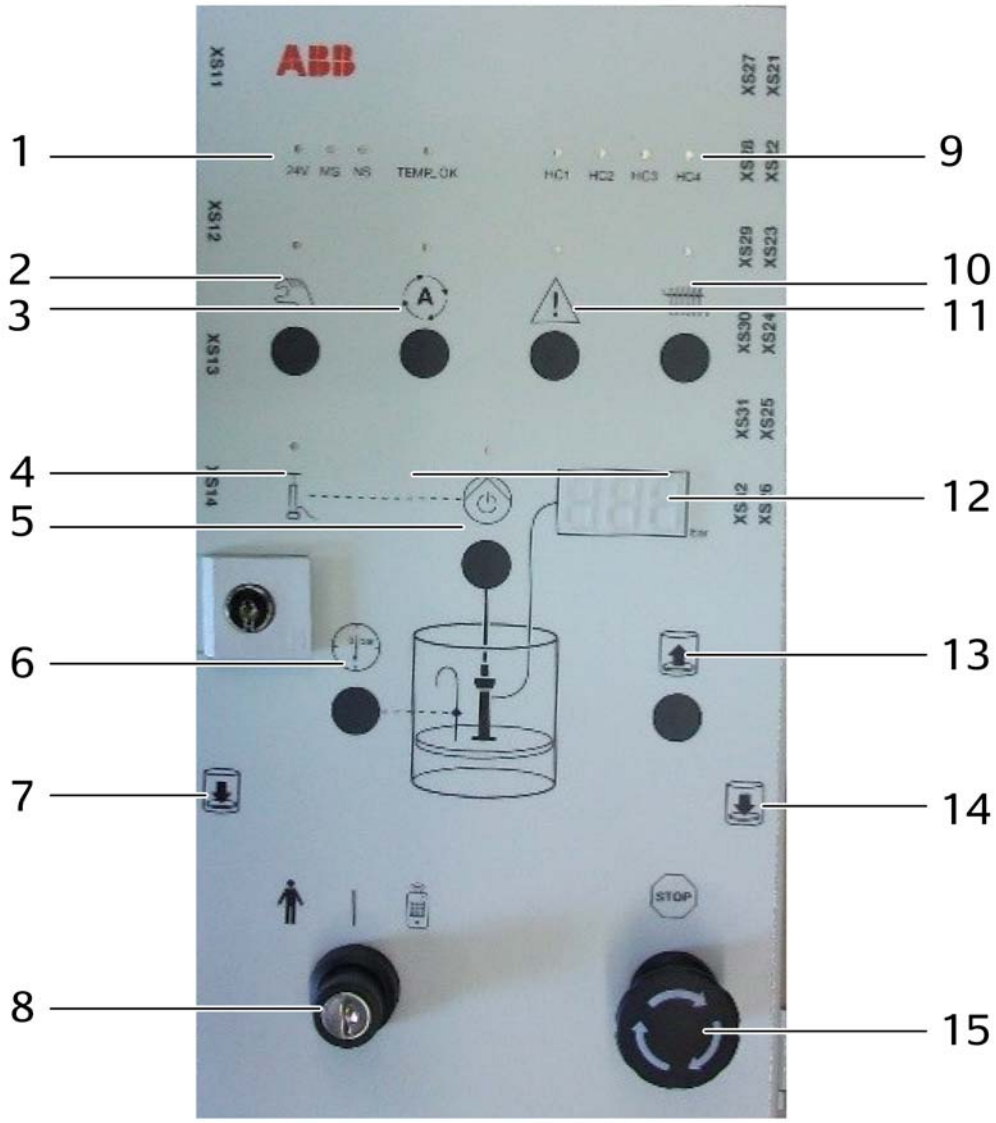

Abb. 5: PIM control panel

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
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)

1.4.2 Connections to PIM

Abb. 6: PIM terminal plate (bottom)

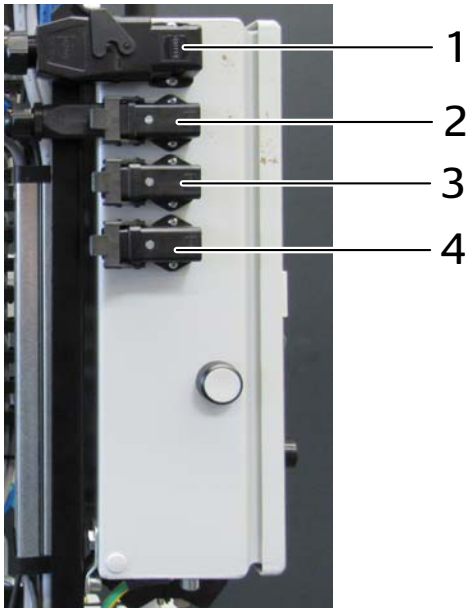

Abb. 7: PIM terminal plate (left side)

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

Abb. 8: PIM terminal plate (right side)

INFORMATION

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

1.4.3 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.

1.4.4 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

1.4.5 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.

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.

1.4.6 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.

1.4.7 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

1.4.7.1 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.

1.4.7.2 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.

1.4.7.3 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.

1.4.7.4 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.

1.5 Operation / functions

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.

1.5.1 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.

1.5.2 General operation

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

The control panel is shown in "PIM control panel" on page24.

1.5.2.1 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.

1.5.2.2 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.

1.5.2.3 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.

1.5.2.4 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.

INFORMATION

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.

1.5.2.5 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.

1.5.3 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.

1.5.4 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 IDFP product manual chapter 8.3.3 Operator view – manual mode.
- The pressure relief can also be activated by a timer. See IDFP product manual chapter 8.6.1 Operator view – configuration.

INFORMATION

The pressure relief valve only operates if the compressed air supply is OK!

1.5.5 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.

INFORMATION

The pump stop has a locking function!
The switch can be unlocked by turning it.

1.5.6 Operation of sensors

For setting the sensors see chapter 1.6.5.

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.

1.6 Maintenance of the pump

1.6.1 Notes

All maintenance and repairs must be performed by trained technicians only. They must be familiar with the operation of the barrel pump.

1.6.2 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	20,000		X				Faulty components must be replaced immediately
2.	Barrel pump	Clean oiler cup, refill with Mesamoll	50,000			X			If necessary, clean the barrel pump controller
3.	Barrel pump	Drain condensate in the filter of the maintenance unit	100,000				X		Follow the Festo operating manual
4.	Barrel pump	Replace the seals of the material pump	200,000					X	Must be done by specialists only

1.6.3 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

1.6.4 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 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!

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 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!

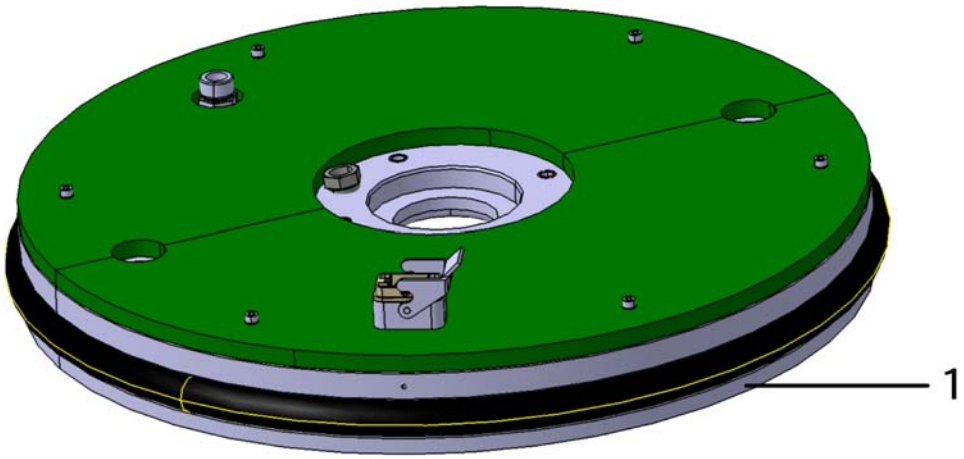

Abb. 9: Follower plate

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.

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.

1.6.5 Adjusting sensors

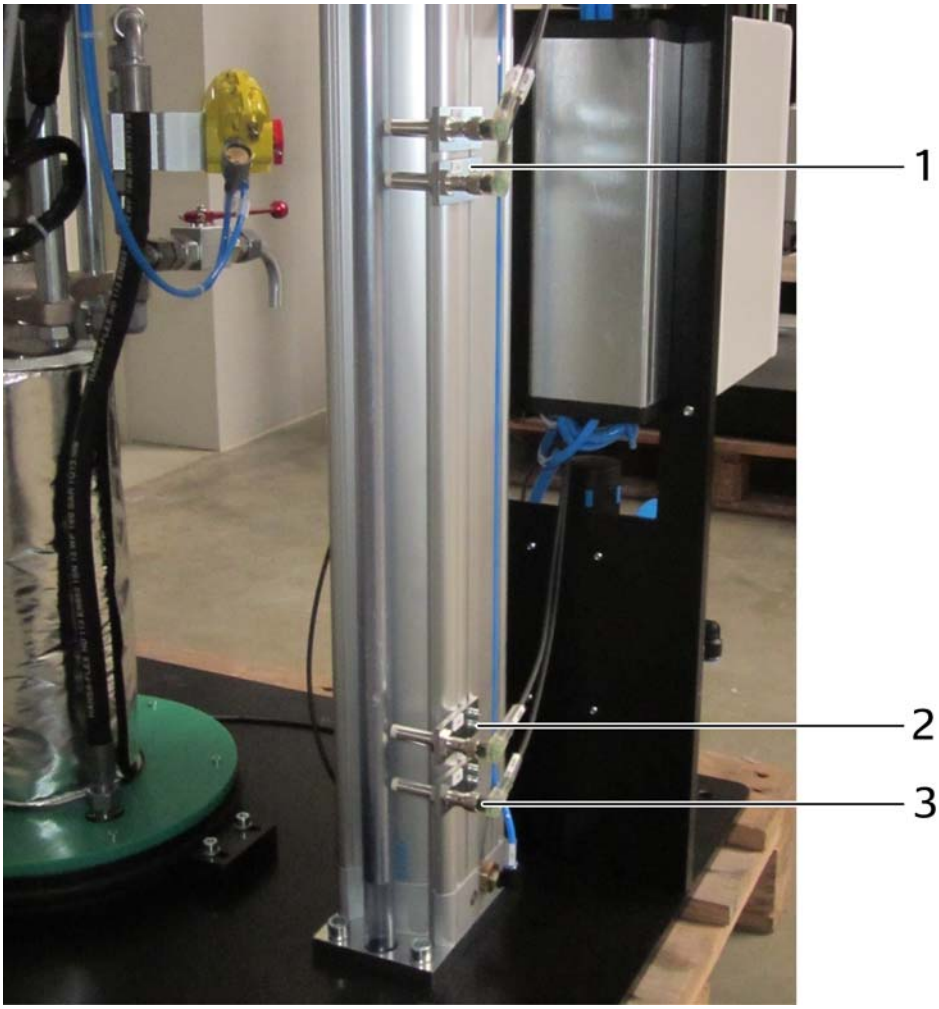

Abb. 10: Position of sensors

1	"Follower plate in barrel" sensors channel 1 and 2
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 com-

missioning.

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!

1.6.6 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.

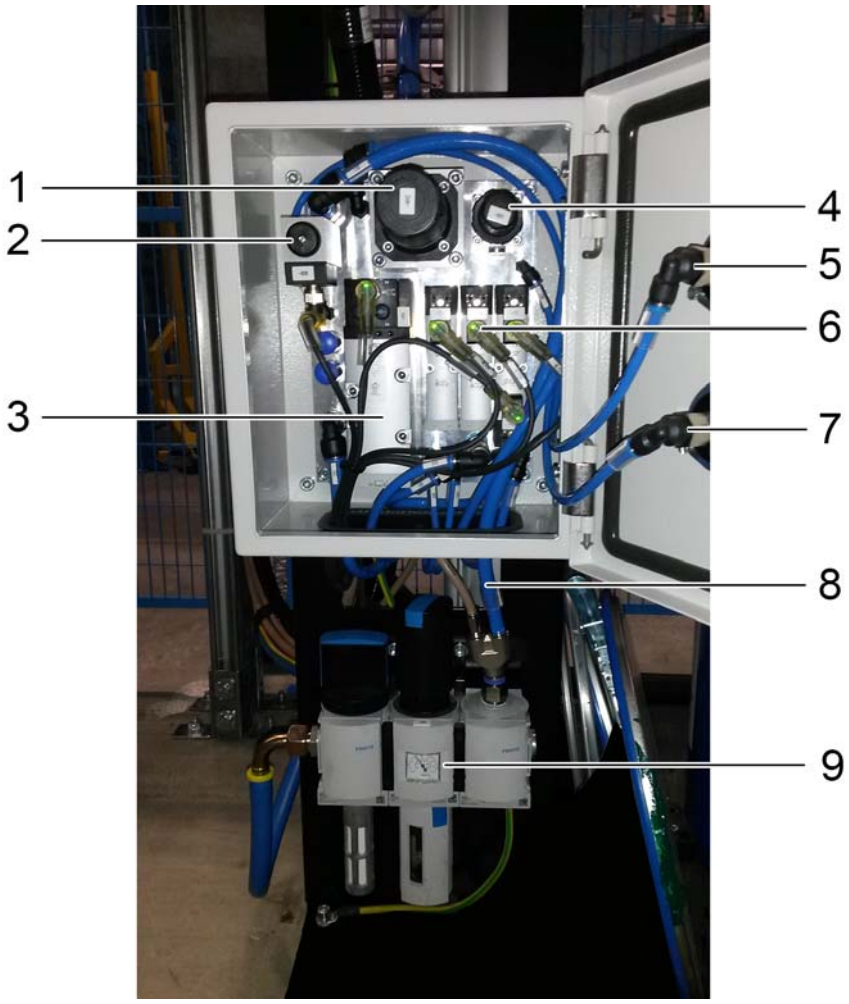

Abb. 11: Pneumatic box (external compressed air switch)

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
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.

Information

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.

Information

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
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.

1.6.7 Replacing air motor

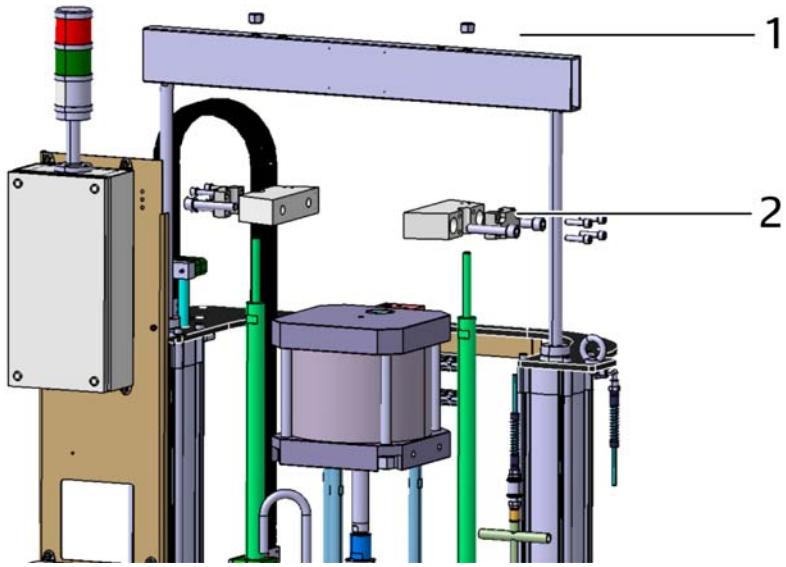

Abb. 12: Demounting air motor

1	Loosen nuts Lifting crossbar
2	With 200 l barrel pumps remove adapter + clamp

- Disconnect cables and hose from air motor.
- Release connections to the crossbar and energy chain.
- Lift crossbar up slightly.
- Disconnect coupling between air motor and material pump.
- Disconnect connecting rods between air motor and material pump.
- Remove air motor.

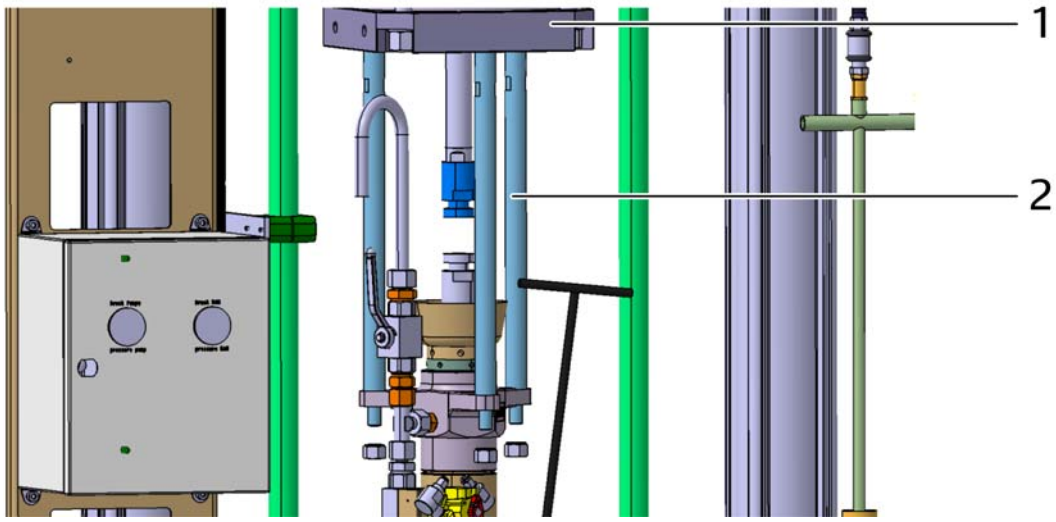

Abb. 13: Demounting air motor

1	Air motor
2	Connecting rod

- Demount connecting rods and blocks

1.6.8 Replacing follower plate

- Release energy chain retainer.
- With 200 l barrel pumps: Unscrew connecting rods from the follower plate.

1.6.9 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!

Information

Suitable safety goggles must be worn when disconnecting the material hose!

- Demount air motor as described in 1.6.7.

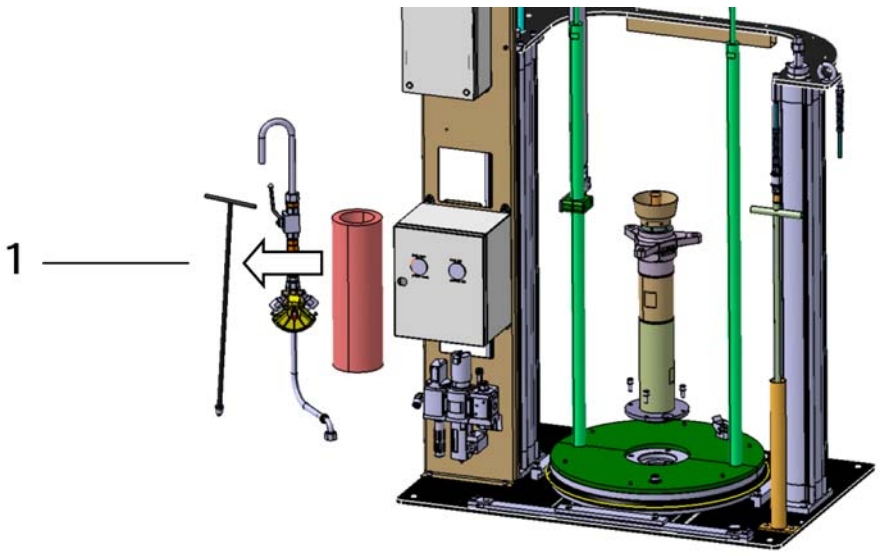

Abb. 14: Demounting material pump

1	Demount ventilation rod, optional heating sleeve and pressure relief

- Unscrew material hose from material pump.
- Disconnect coupling between air motor and material pump.
- Unscrew nuts on connecting rods between air motor and material pump.
- Remove pump.

1.7 Fault description

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

2 Hydraulic pump

2.1 General information

2.1.1 Objective and purpose of these instructions

This manual is an attachment to the IDFP product manual and describes the optional integrated hydraulic pump.

The instructions are intended to give you sufficient information to be able to operate the hydraulic pump safely in production mode and to be able to perform successful troubleshooting.

Document reference

Technical drawing

Part list

The operator view of the IDFP on the FlexPendant is shown in the IDFP product manual.

The air motor (BA and RA), material pump (BA and RA) and follower plate (RA of the three available variants) assemblies are described in separate attachments.

2.1.2 Target group of these instructions

The instructions are intended for operating and maintenance personnel.

Personnel	Requirements
Qualified personnel	The manager or the trained personnel carry out tasks involved with the operation of the system and inform personnel of potential dangers of improper actions. They must be familiar with the required protection devices and protective measures.
Trained personnel	Have thorough technical training and are familiar with the applicable regulations for occupational health and safety and accident prevention applicable to the system and also with the applicable laws and the accepted rules of engineering.

The following work may be carried out by specified personnel:

Activity	Qualified personnel	Trained personnel
Operation of the systems, changing barrels	X	X
Performance of maintenance and repair work, setup		X

2.1.3 List of Abbreviations

Range	Abbreviation	Meaning
General	PIM	Pump Interface Module
	BA	Operating and Maintenance Manual
	RA	Inspection instructions
Designation	EFP	Single barrel pump
	DFP	Double barrel pump
	RAM	Barrel press (pneumatic cylinder)
Size identification	30	Barrel sizes 15 l to 30 l
	50	Barrel sizes 45 l to 70 l
	200	Barrel size 200 l
Temperature control	C	Cold
	H	Hot
Material	AL	Aluminum
	ST	Steel
	VA	Stainless steel
Seal type	850/860	PUR
	615	UHMWPE
	630	PEEK

2.2 Safety

2.2.1 Intended use

The hydraulic pump described here is part of the IDFP for transport of materials (adhesives and sealing materials) from barrels to the location of use.

Any other use or the use of other materials is not approved!

It must be connected to the function package and compressed air network by trained personnel subject to the directions of the IDFP product manuals. Trained personnel must also perform all maintenance and repair work.

It must be operated by qualified personnel and technicians only. Operating errors may destroy the application process, which may result in the loss of the system function.

2.2.2 Safety notices

Please observe the following information:

- Work on the installation may only be carried out by qualified personnel.
- Only trained personnel are permitted to perform maintenance and repair work. They must also have been trained to work on the assembly.
- Personal protective clothing must be worn for work. Safety goggles must also be worn when working with pressurized materials. See the IDFP product manual for the definition of suitable protective clothing.
- All other safety notes in this document and in the IDFP product manual must also be observed.
- The pump is integrated into the IDFP by the PIM. The general safety instructions in the IDFP product manual must be observed.

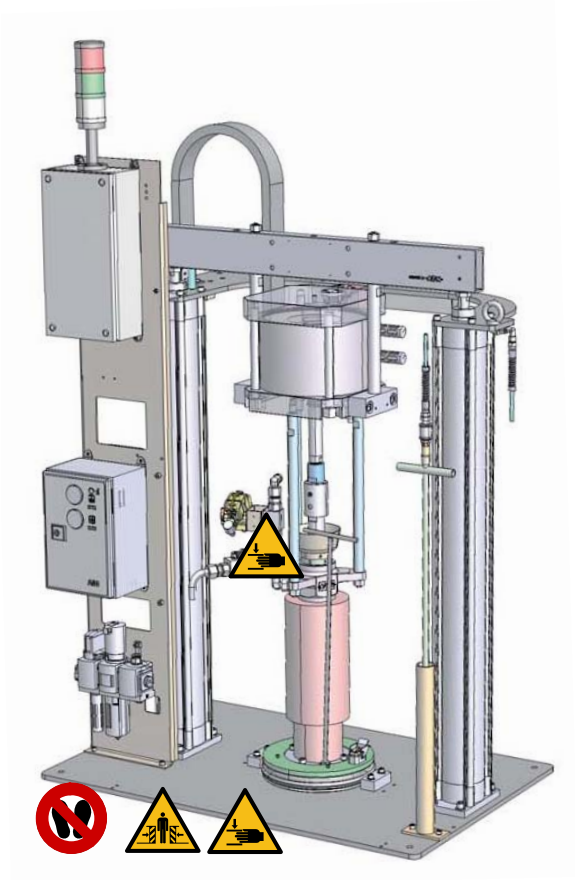

Abb. 15: Hazard points


WARNING

Risk of crushing fingers!

Fingers may be crushed by the motion of the follower plate or coupling, which may result in serious injury.

Never reach into the barrel pump, because parts there may move at any time!


WARNING

Warning of hot objects

If the hydraulic press is heated, the follower plate and lower pump may inflict burn injuries.

Never touch heated objects without protective gloves!

2.3 Technical data

2.3.1 Dimensions

Dimensions (retracted) (H x W x D):	1700 x 1025 x 800 mm
Height extended	2700 mm
Weight	450 kg

2.3.2 Compressed air supply

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

2.3.3 Hydraulic oil

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

2.4 Description of the assembly

2.4.1 Overview

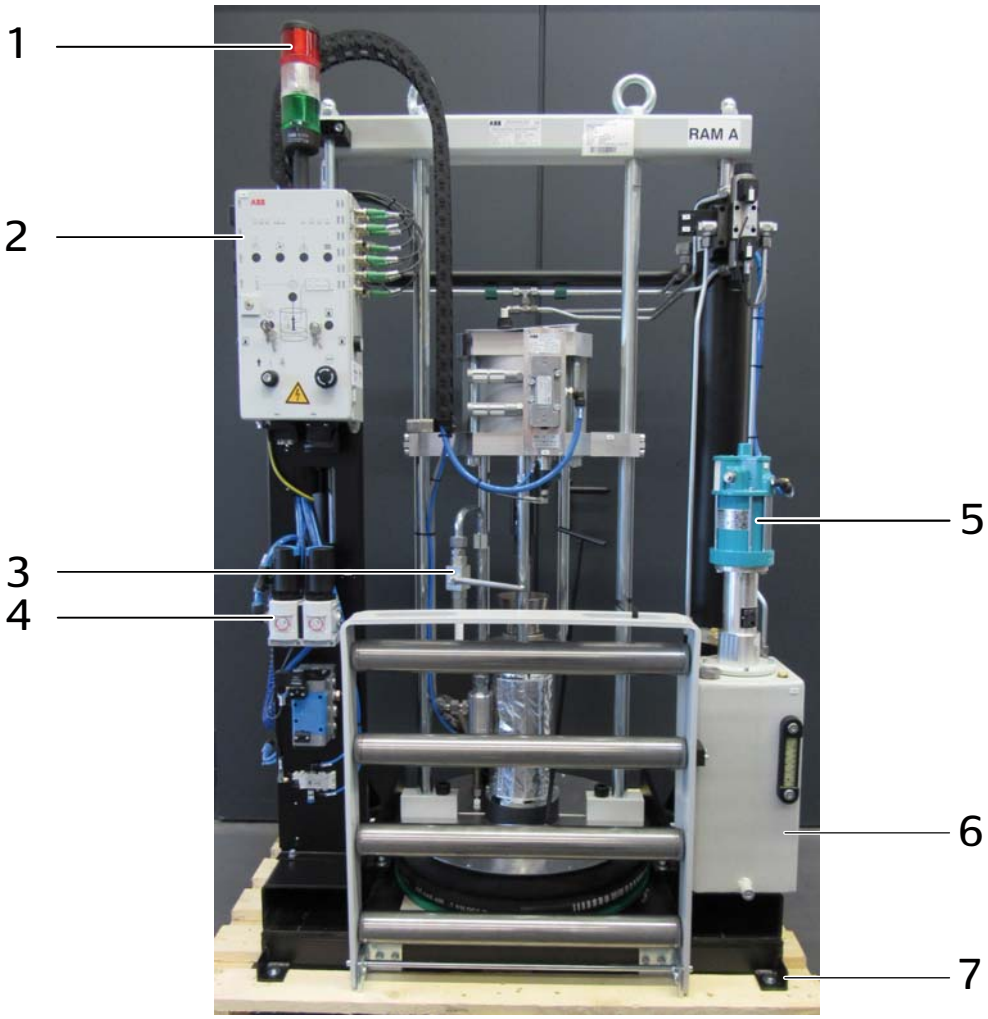

Abb. 16: Overview of the system

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

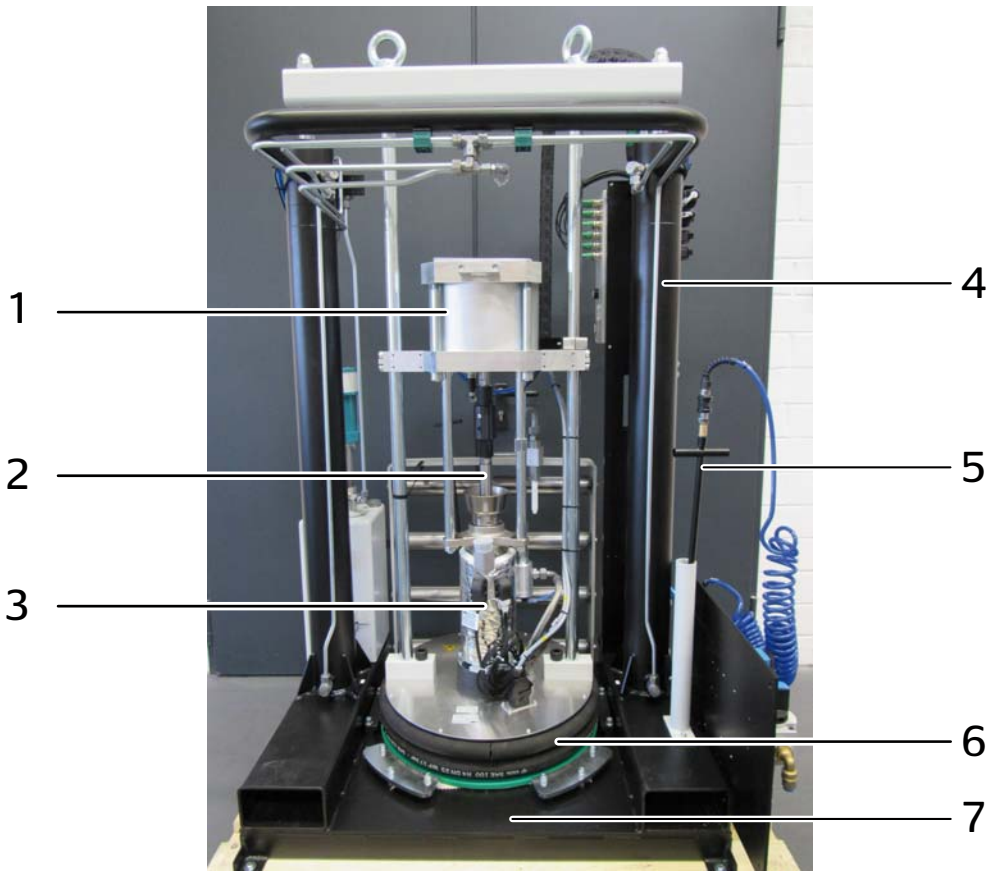

Abb. 17: View of back

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.
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.

2.4.2 Pressure regulator unit

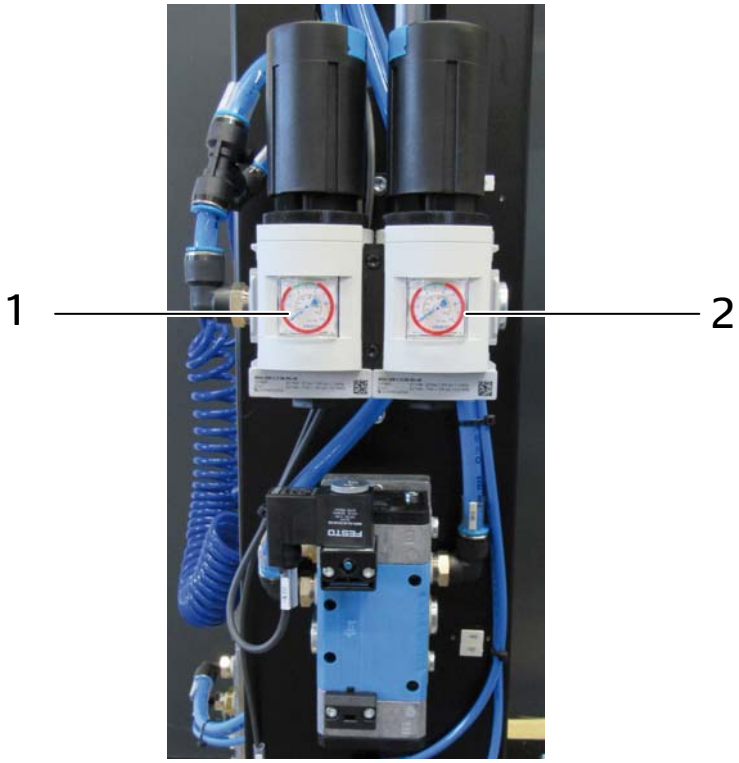

Abb. 18: Pressure regulator unit

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 of operation error

Incorrect settings may cause quality and cycle time problems.

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

INFORMATION

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

2.4.3 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.

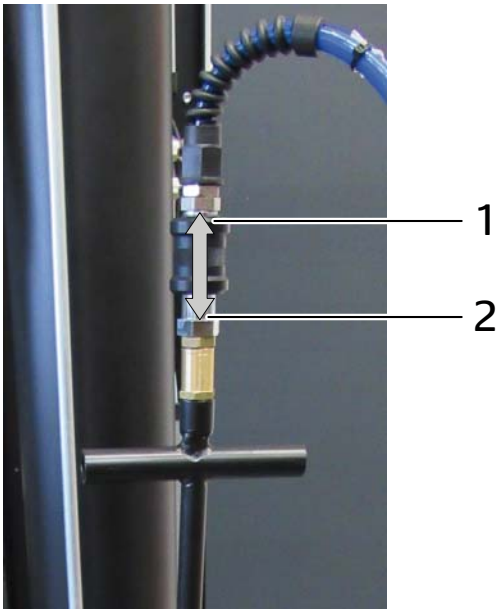

Abb. 19: Ventilation valve on the ventilation rod

1	Open ventilation valve
2	Close ventilation valve

2.4.4 Tower lights

Abb. 20: Tower lights

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.

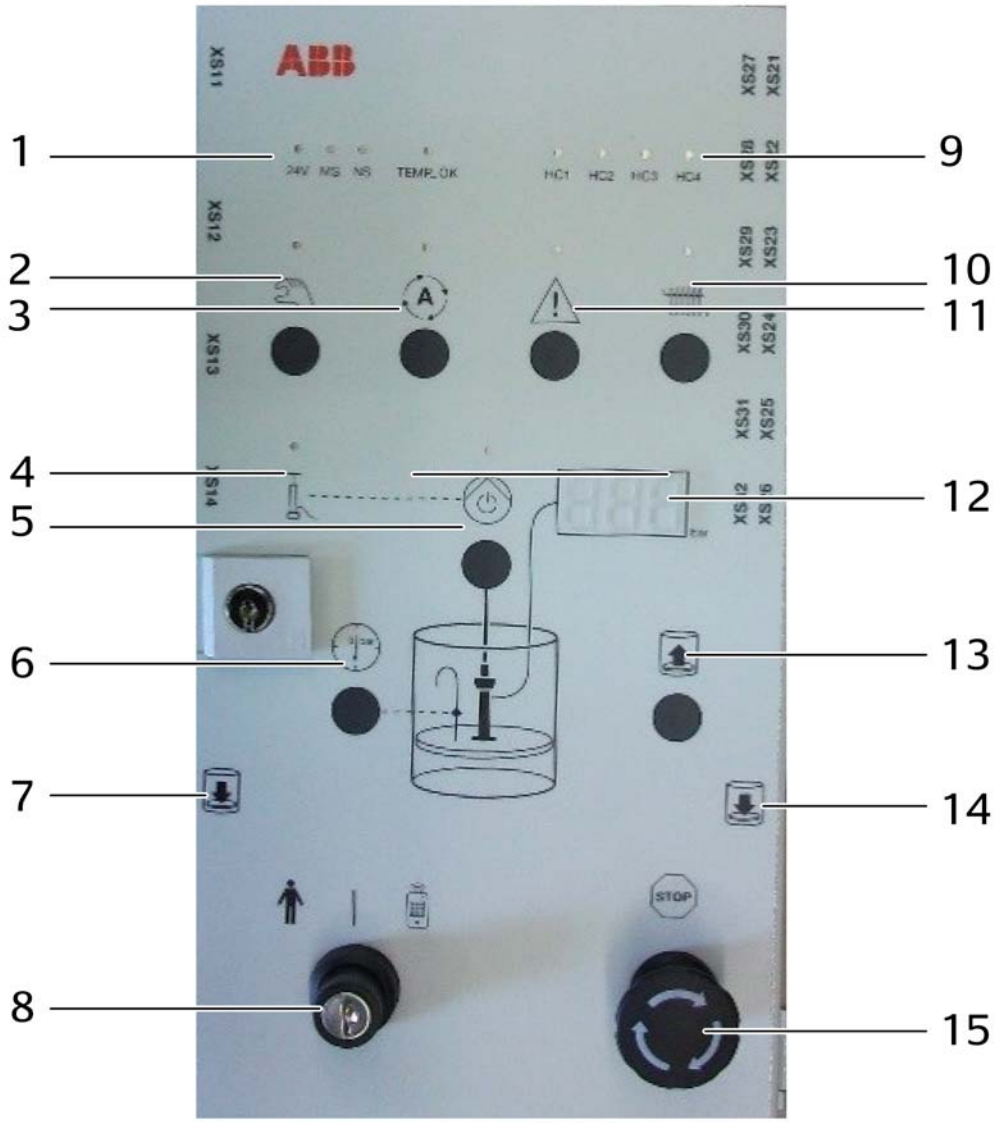

Abb. 21: PIM control panel

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
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)

2.4.5 Connections to PIM

Abb. 22: PIM terminal plate (bottom)

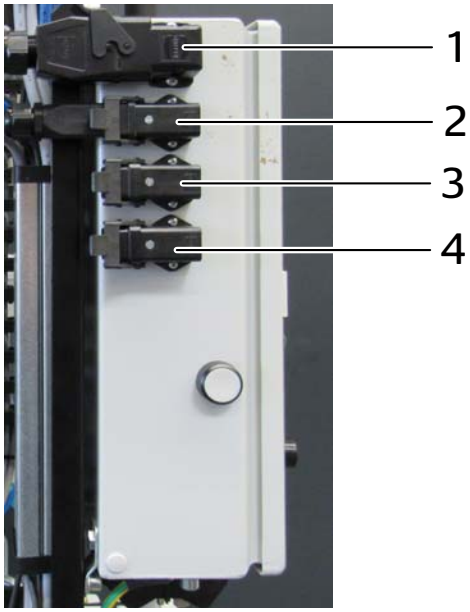

Abb. 23: PIM terminal plate (left side)

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

Abb. 24: PIM terminal plate (right side)

INFORMATION

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

2.5 Operation / functions

Operation of the hydraulic pump is restricted to changing barrels and the required maintenance tasks. For more information on the automatic controller see the higher-order Operating Instructions.

2.5.1 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 of setting in the glue barrel!

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!

ENVIRONMENTAL PROTECTION

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!

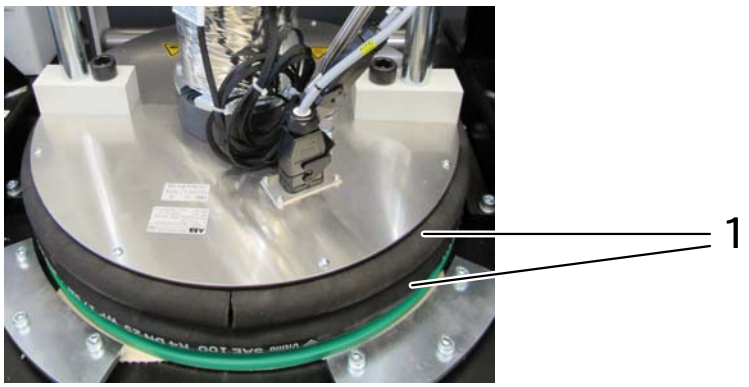

Abb. 25: Grease follower plate

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.
    Do not use grease!
14. If necessary, the barrel must now be preheated. For information see the higher-order operating manual in the "Heaters" chapter.
    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 ap-

plicable 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".

2.6 Maintenance of the pump

2.6.1 Maintenance schedule

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					1		
7.	Barrel pump	Check pneumatic and electrical connections					3		Wiring, connectors, screw connections …
8.	Barrel pump	Check that material connections are tight					3		
9.	Barrel pump	Replace seal package						1	Replace the seal package if the Mesamoll becomes discolored in spite of recent replacement

SC: shift change // D: daily // W: weekly // M: monthly // Y: annual

2.6.2 The limit switches

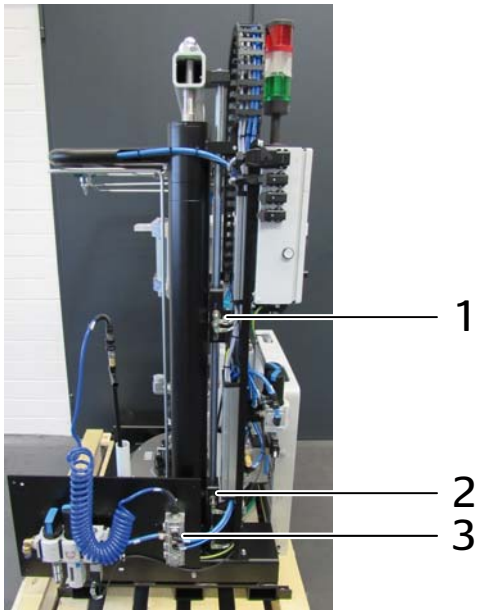

Abb. 26: Limit switch on RAM

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.

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!

2.6.3 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.

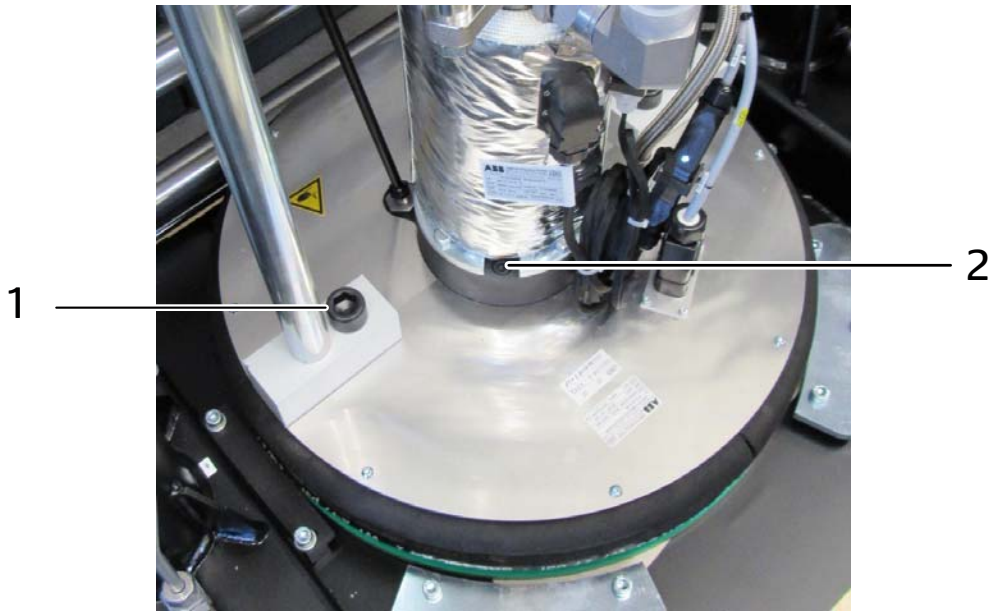

Abb. 27: Replacing the follower plate

1	Remove screws of the main support rods (2 x)
2	Remove screws of the lower pump (4 x)

6. Lift the pump unit slightly and remove the follower plate.

The follower plate is installed in reverse order.

2.6.4 Replacing lower 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.

INFORMATION

Suitable safety goggles must be worn when disconnecting the material hose!

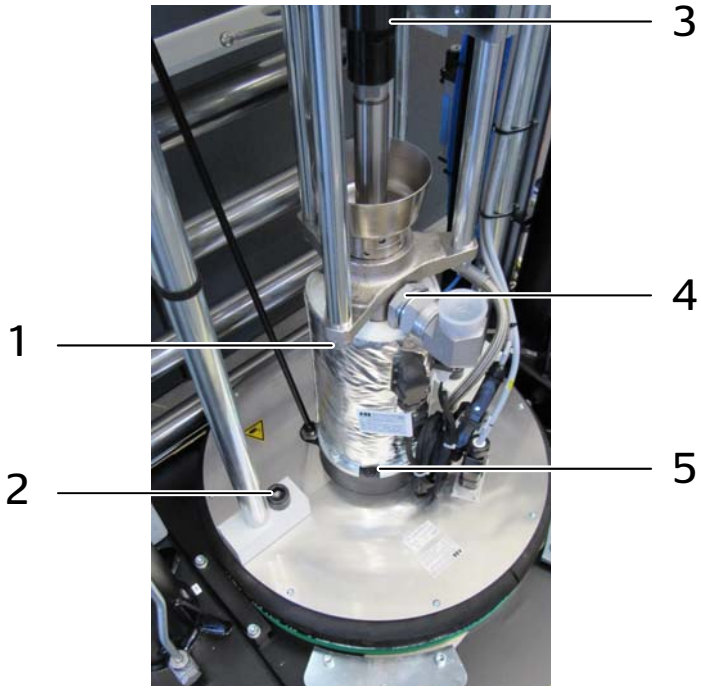

Abb. 28: Replacing the lower pump

1	Loosen nuts of the connecting rods (3 x)
2	Remove screws of the main support rods (2 x)
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.

2.6.5 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.

INFORMATION

Suitable safety goggles must be worn when disconnecting the material hose!

INFORMATION

The compressed air must be shut off at the feed line! See the associated pneumatics diagram.

INFORMATION

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

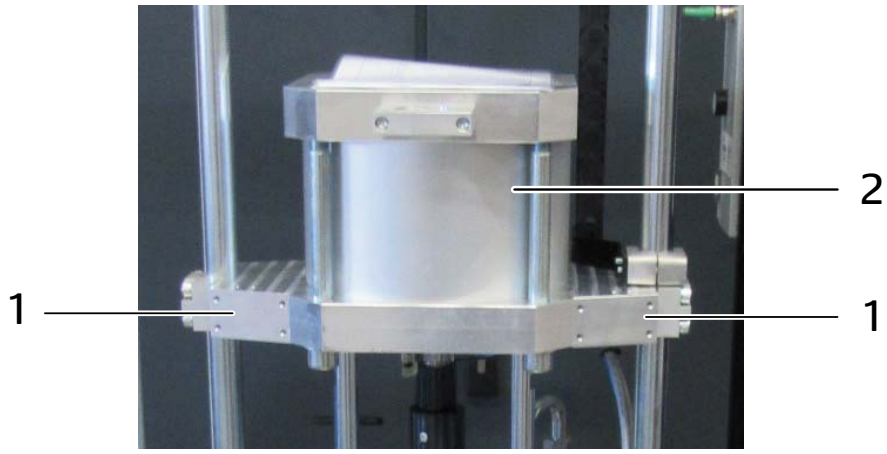

Abb. 29: Air motor with clamping unit

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.
8. Remove the 3 nuts of the connecting rods between air motor and lower pump.

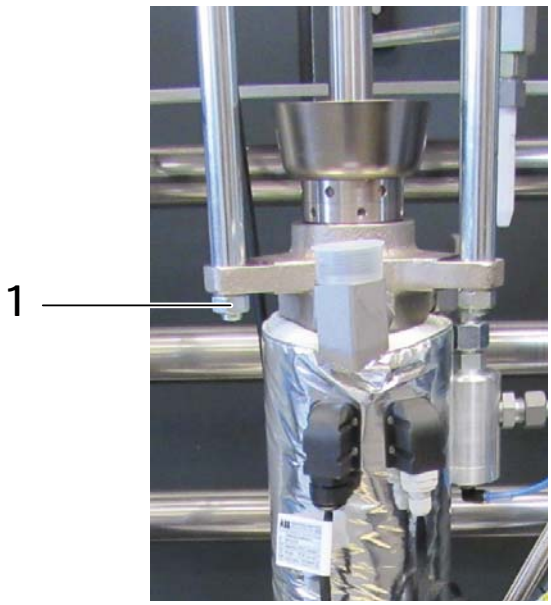

Abb. 30: Nuts of the connecting rods

1	Remove nuts of the connecting rods (3 x)

9. Pull out the air motor upwards.

The air motor is installed in reverse order.

2.6.6 Filling oiler cup

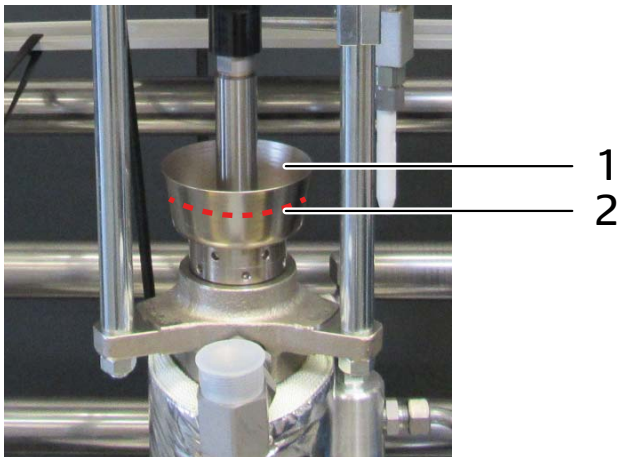

Abb. 31: Filling oiler cup

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".

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

ENVIRONMENTAL PROTECTION

Old oil must be disposed of in accordance with the applicable regulations.

2.6.7 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.

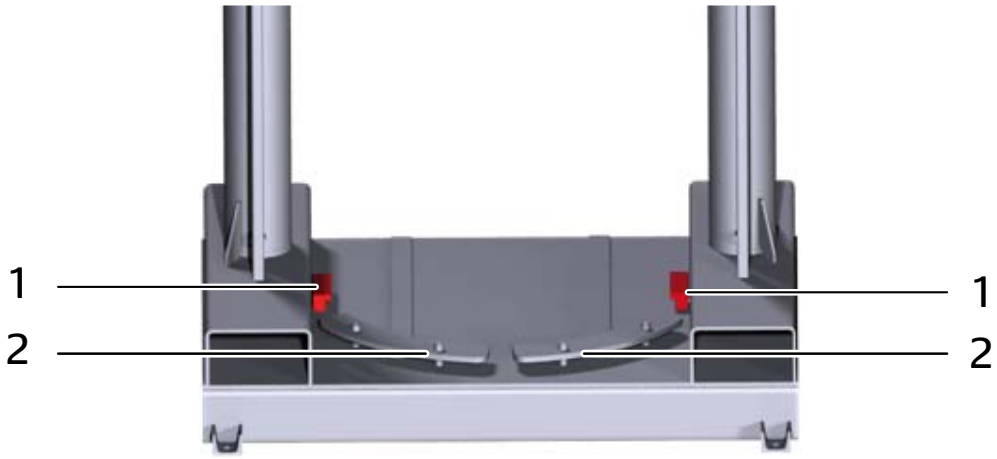

Abb. 32: Adjusting the barrel clamp

1	adjustable retainer components
2	fixed retainer components

The barrel is pushed to the RAM. The bottom collar of the barrel (Figure 24) 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 (the retainer components). This requires the adjustable retainer components to be correctly adjusted.

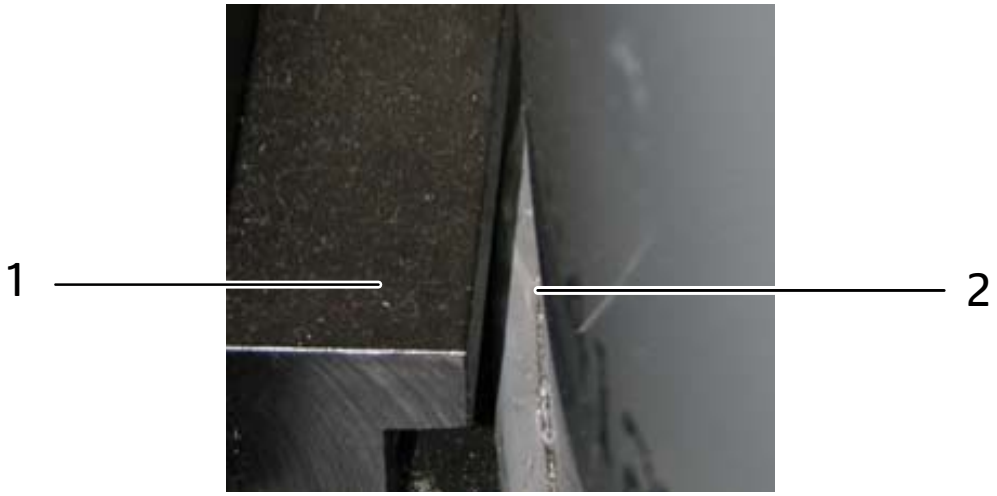

Abb. 33: Adjusting the barrel clamp - the bottom collar on the barrel

1	Retainer component

2	Collar of the barrel

The retainer components (Figure 23) are adjusted with the barrel removed. Each of the adjustable retainer components (Figure 23) has two fastening screws and two adjusting screws (Figure 25).

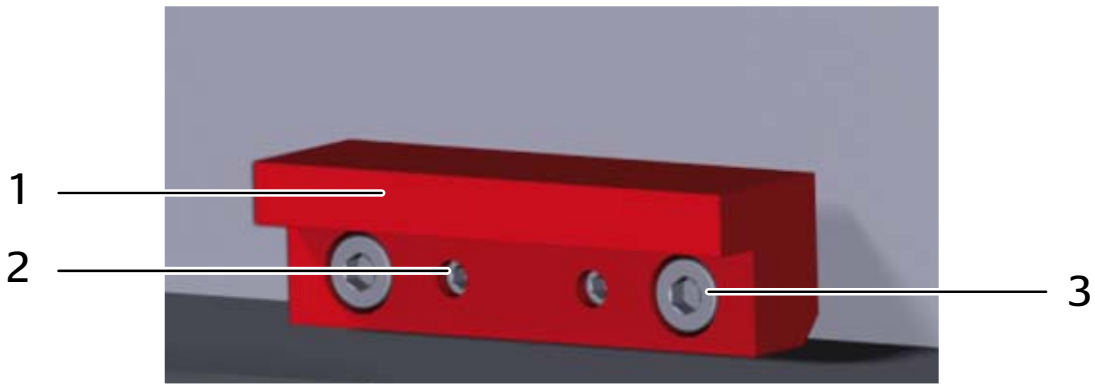

Abb. 34: Adjusting the barrel clamp - the retainer component

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.

Check the adjustment by placing a barrel in the RAM. The distance between barrel and retainer component should not exceed 2 mm.

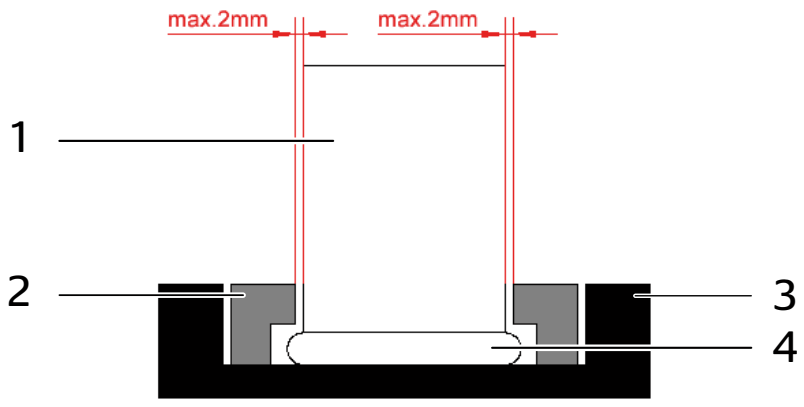

Abb. 35: Distances of the retainer components

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.

2.7 Supplementary information

2.7.1 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.

2.7.2 Storage

The system should be stored at approx. 10 °C - 30 °C room temperature. The humidity should not exceed a value of 60%. Otherwise the system must be protected against corrosion.

2.7.3 Installation

The ZRP200 IFC 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!

2.7.4 Removal

The system can be demounted by trained technicians employed by the customer. First disconnect the media supply (compressed air, electrical power supply). Then the system can be demounted.

2.7.5 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.

2.8 Definitions of terms

Operator panel: Local operator panel of a station component with a minimum of one input option (button, keyswitch) and optional display unit for the operator of the station component.

Double barrel pump: Barrel pump for pumping high or low-viscosity adhesives from two 20 to 1000 l containers. It consists of two ram presses (RAM A and B), a pneumatic unit and a controller with operator panel. During a barrel changeover the material continues to be supplied by the other RAM without interruption.

Single barrel pump: Barrel pump for pumping high or low-viscosity adhesives from one 20 to 1000 l container. It consists of one ram press (RAM) with material pump and follower plate and a controller with operator panel. Material is not supplied to the system during a barrel changeover.

Heater circuit: Electromechanical unit consisting of heater and temperature sensor using PT100 to maintain the defined temperature of a medium.

Heater: Function group of heater circuits for heating a medium.

Material supply: Assembly for supply of viscous adhesives (material) from the container (barrel) to the dosing unit.

PIM: Pump Interface Module

Polyurethane adhesive (PUR): Polyurethane adhesives are available as 1 or 2-component adhesives, which can be cured by polycondensation or polyaddition. Single-component PUR adhesives cure under humidity and/or heat.

RAM: A cyclically operating hydraulically driven pump. In this case: pneumatically or hydraulically driven one or two-column ram press for 20 l to 1000 l containers of PUR adhesives or their additives.

RAM A: Left ram press of a double barrel pump or ram press of a single barrel pump. Mostly PUR application.

RAM B: Right ram press of a double barrel pump, mostly PUR application.

Fault: Functional description of an unwanted impairment or temporary malfunction of parts or assemblies. A fault must be actively acknowledged by the operator or the controller.

Warning: Indications of a part or assembly status that may result in a fault in the near future without the intervention of an operator/maintenance technician and while continuing the current mode of

operation.

ZRP: Single barrel pump as two-column RAM press with hydraulic drive of the follower plate and pneumatic or electrical drive of the material pump. It can be used for material supply fully heated, partly heated or unheated.

ZRP 200: Single barrel pump as two-column RAM press for 200 l container.

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