

Technical description

Tool parking system TPS400

M8309-1 Project NRV P6700

Tool changers | Swivels | Swivel tool changers | **Tool parking** | Hose packages | Valve units | Tool systems



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Robot Systems Products AB
Isolatorvägen 4
SE-721 37 Västerås
Sweden

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1 INTRODUCTION

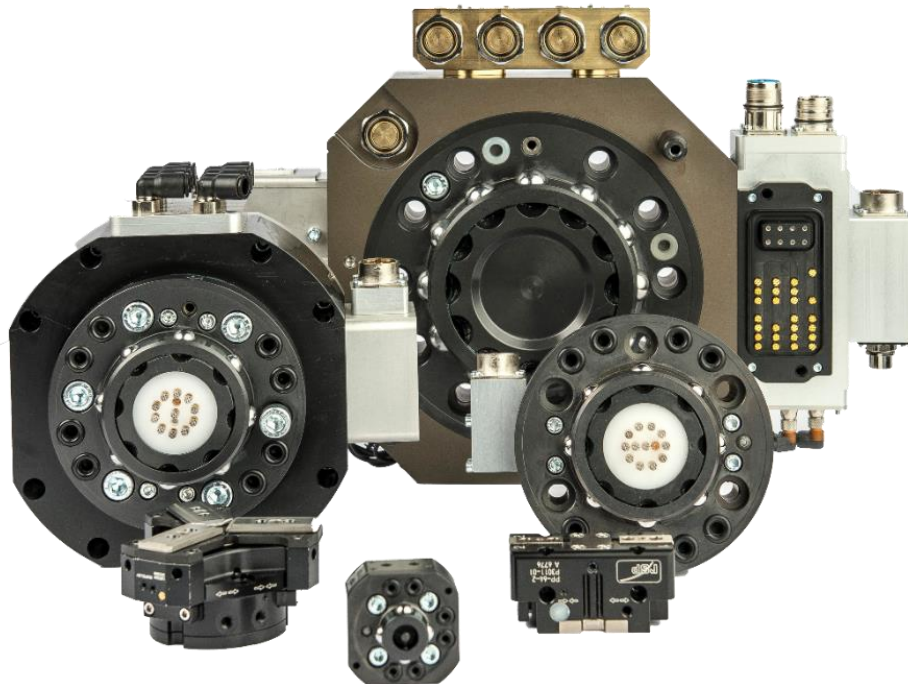
Robot System Products is a front-rank provider of peripheral products for high performance robot applications. We provide complete tool systems solutions for your robot installations, aiming to improve your productivity with the most reliable and cost-effective tooling on the market. Continuously we explore emerging technologies, working with leading edge design.

Robot System Products has a wide range of standard robot peripheral products:

- Tool changers
- Swivels
- Swivel tool changers
- CiRo
- Grippers
- Hose Packages
- Valve units
- Tool systems
- Tool parking systems

Robot System Products' tool changers are constructed to maximize the flexibility and reliability of your robot fleet. Through our patented locking device TrueConnect™ robustness and high safety are combined with low weight and compactness. With our swivels compressed air, water, electrical and data signals as well as weld and servo power are transferred to your tools with robot motion capabilities fully maintained. Our Swivel tool changers unite the TrueConnect™ mechanism with our swivel technology, combining the best out of the two technologies. With RSPs unique CiRo-technology cables and hoses can be freely selected with high robot flexibility maintained, and the space requirements reduced. RSP's integrated Tool systems are delivered as complete plug-and-play solutions designed for quick and simple installation.

Robot System Products' product lines are available for all major robot brands and come with complete documentation. 3D-models for simulation are available for download at:
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1.1 Safety

1.1.1 General

The integrator installing the tool parking system must follow the safety demands stated in standards and provisions applicable in the country where the tool parking system is installed.

The user of the Robot System Products tool parking system is responsible that law and directives applicable in respective countries, with regards to safety, are adhered to. The user is also responsible to guarantee that all safety devices are installed correctly.



WARNING!

Never carry out service work on a robot that has not been taken out of operation. See safety information for the robot.



WARNING!

Only perform work on grippers or tools attached to the tool parking system if the air pressure is safely switched off.



WARNING!

Be aware that tool stand hangers, tool plates and tool stands are heavy and may cause personal injury and equipment damage if dropped.



WARNING! The electrical control of the moveable dust cover must be interlocked by the normal safety system of the robot cell

1.1.2 Explanation of warnings

The warnings in this document are specific to the products in this manual. It is expected that the user also pay attention to certain notifications from the robot manufacturer and/or the manufacturers of other components used in the installation.



WARNING!

The warning sign will make you aware that a situation could result in potential serious injury or damage to equipment.



NOTE!

The note sign will alert you about something important to consider.

2 TECHNICAL SPECIFICATIONS

This document describes RSP tool parking systems and its components. The tool parking systems are designed both for material handling and spot-welding.

RSP TPS400 is modular and easy to install, has a robust design and includes options – which also can be ordered for retrofitting. RSP offers a variety of tool parking system components which can easily be combined and tailored for storage solutions that fits individual robot system requirements, support manufacturing standardisation, and save time for the line builder.



2.1 Tool parking system overview

Single hangers for material handling

Product number	Column height	Extension	Weight	Pneumatic diagram	Circuit diagram
P8515-125-13	1.25 m	130 mm	84 kg	Pne0186-112 (section 2.2.2)	E0186-112 (section 2.2.1)
P8515-125-18	1.25 m	180 mm	85 kg		
P8515-150-13	1.5 m	130 mm	93 kg		
P8515-150-18	1.5 m	180 mm	94 kg		

Single hangers for weld gun and material handling

Product number	Column height	Extension	Weight	Pneumatic diagram	Circuit diagram
P8515-125-00	1.25 m	-	75 kg	Pne0186-112 (section 2.2.2))	E0186-112 (section 2.2.1)
P8515-125-08	1.25 m	80 mm	83 kg		
P8515-150-00	1.5 m	-	84 kg		
P8515-150-08	1.5 m	80 mm	92 kg		

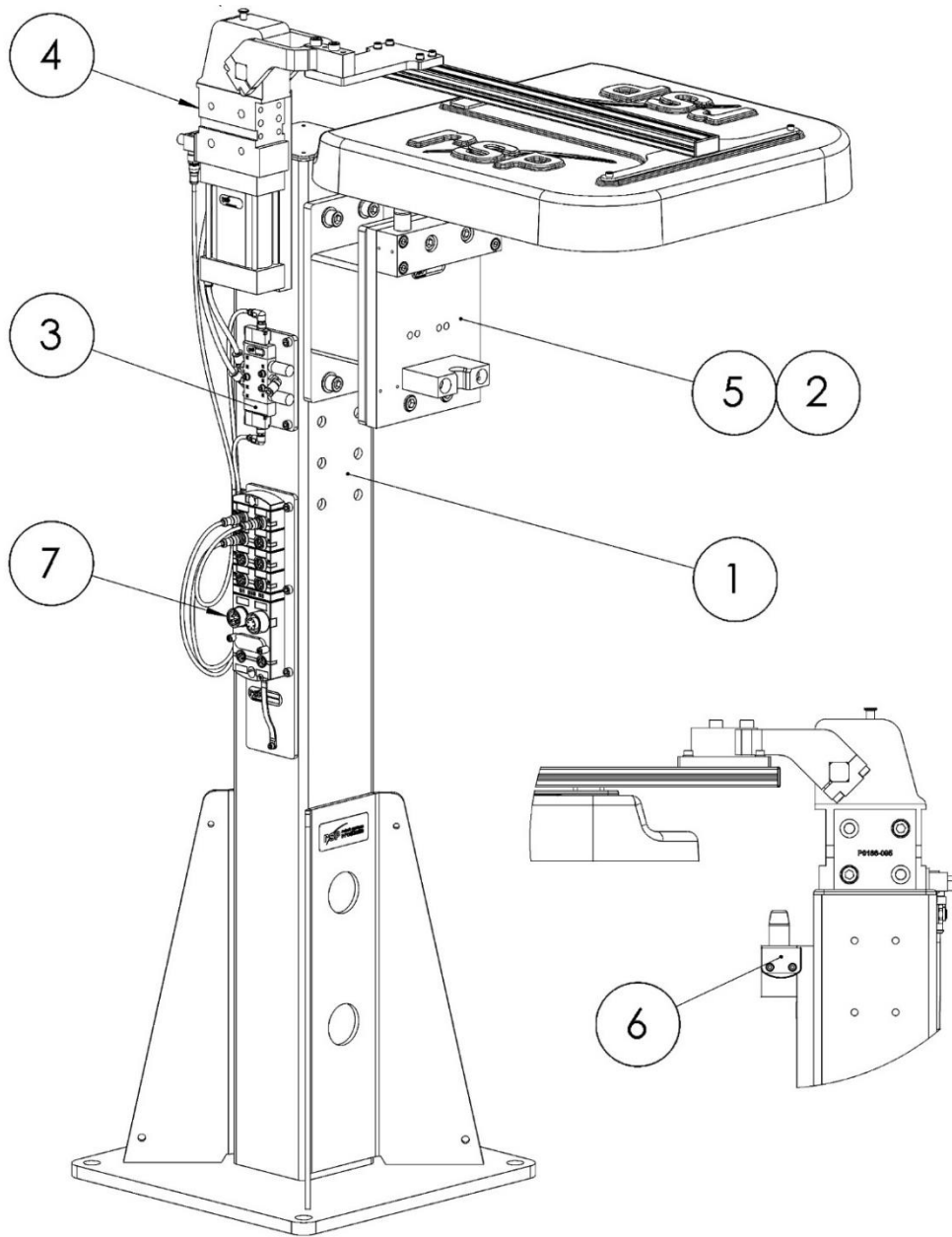


NOTE! P8515-xxx is prepared for use together with the safety signal module P7501-XXX and is equipped with passive tool in stand sensor on the tool parking side, with active sensor to be mounted on the tool side.



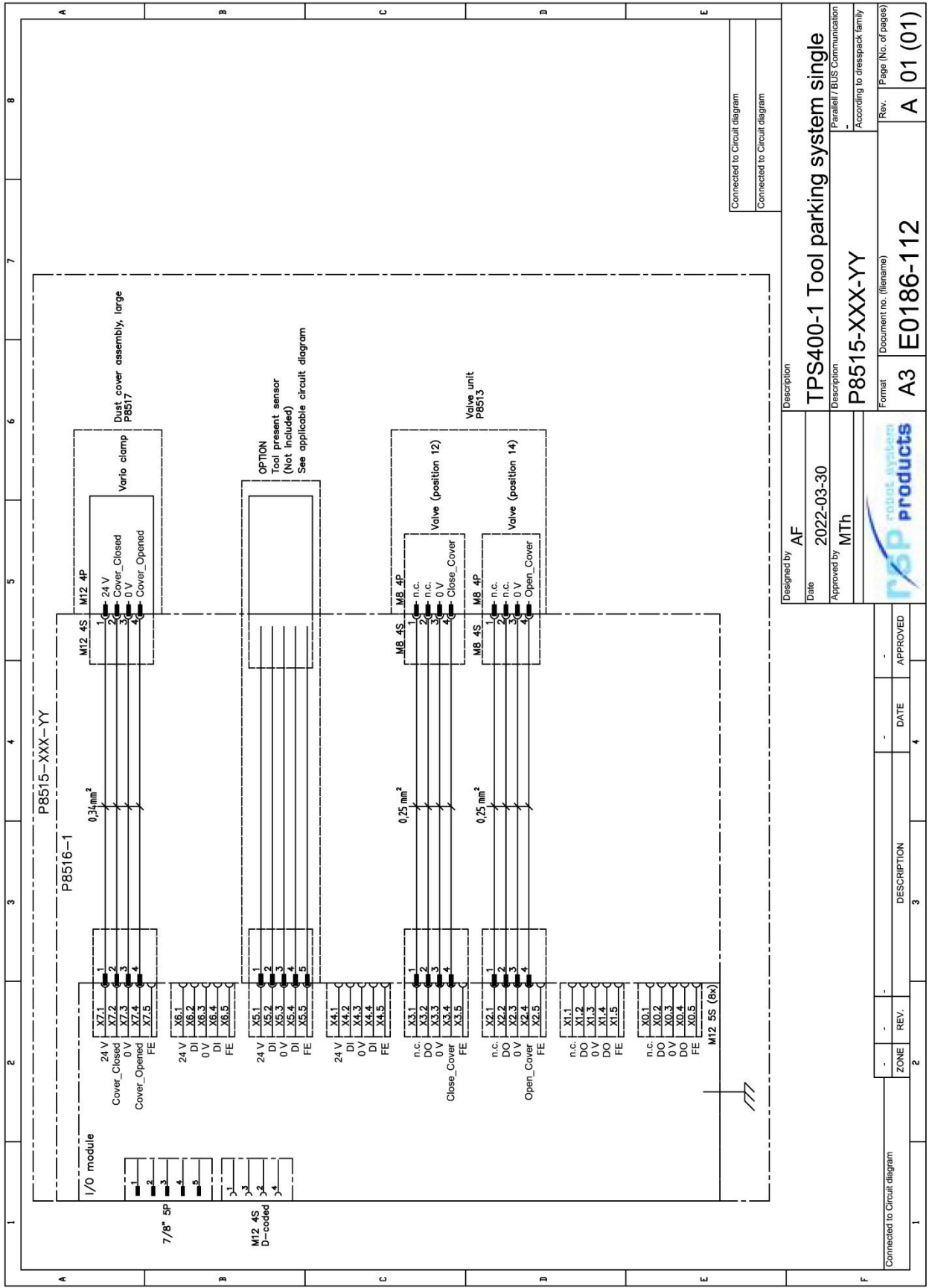
NOTE! 3D-models of the tool parking systems are available in STEP and Parasolid-format.

2.2 Tool parking system single, TPS400-1. Article no: P8515-XXX-YY



POS	ITEM No	DESCRIPTION	QTY.
1	P8380-XXX	Tool stand column complete	1
2	P8518-YY	Tool hanger extension kit	1
3	P8513	Valve unit to dust cover	1
4	P8517-1	Dust cover assembly, large	1
5	P8302	Tool stand hanger .	1
6	P8369	Tool in stand sensor assembly, passive	1
7	P8516-1	I/O connection module. Profinet	1

2.2.1 Circuit diagram E0186-112 for P8515

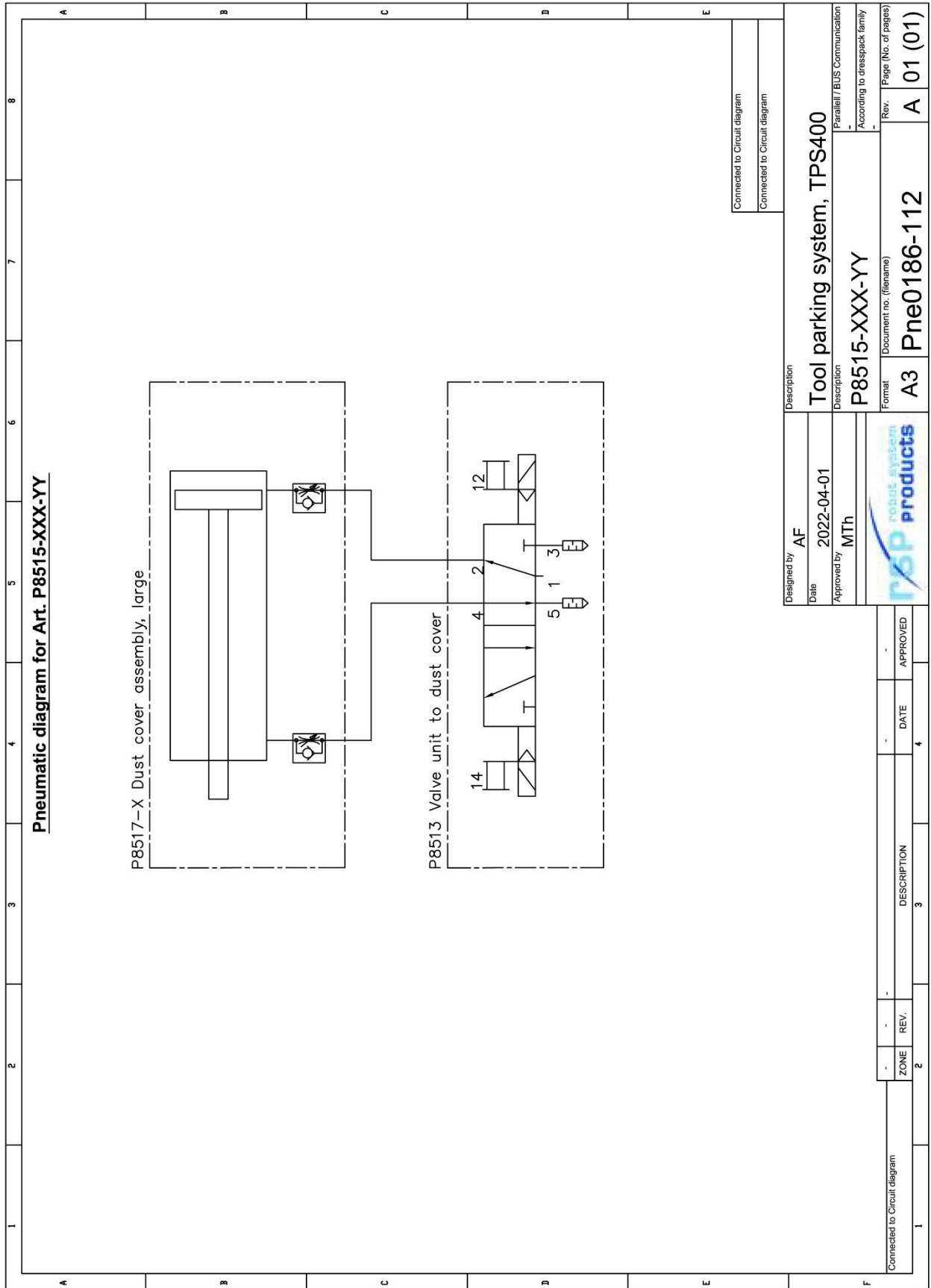


Connected to Circuit diagram
Connected to Circuit diagram

Designed by AF		Description TPS400-1 Tool parking system single	
Date 2022-03-30		Parallel/ BUS Communication P8515-XXX-YY	
Approved by MTh		According to dresspack family	
		Rev. (Page No. of pages) A 01 (01)	
Document no. (filename) A3 E0186-112		Format A3	
ZONE	REV.	DESCRIPTION	DATE
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Approved		APPROVED	

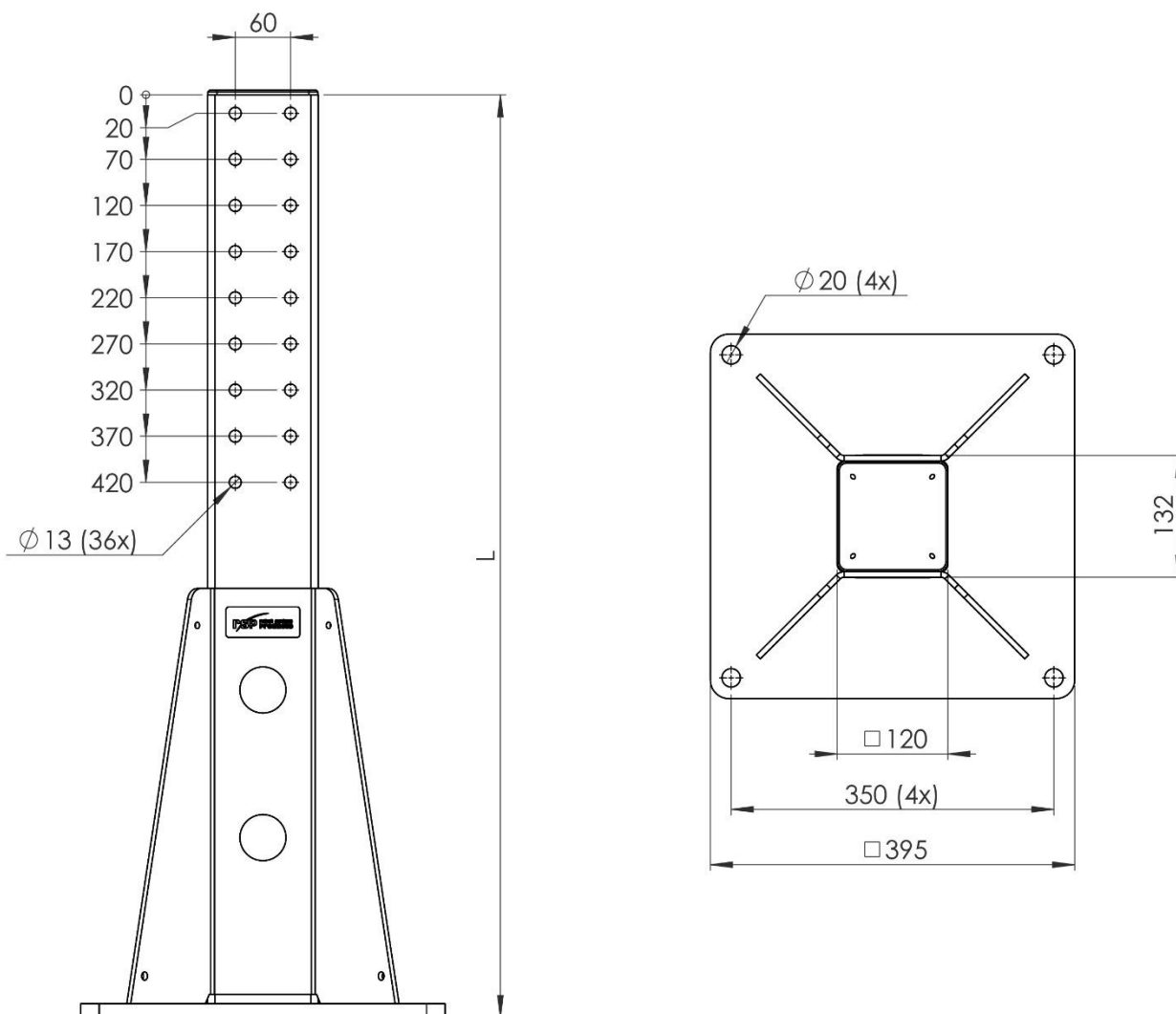
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2.2.2 Pneumatic diagram Pne0186-112 for P8515



2.3 Tool parking system components

2.3.1 Tool stand columns. Article no: P8380-XXX



The tool stand column P8380-XXX gives together with the tool stand hanger P8302 and tool plate P8303A a robust tool parking system for easy tool changing. The tool stand column comes in different heights and is prepared for mounting of a single hanger or double hanger, dustcover, connection modules and valve units.

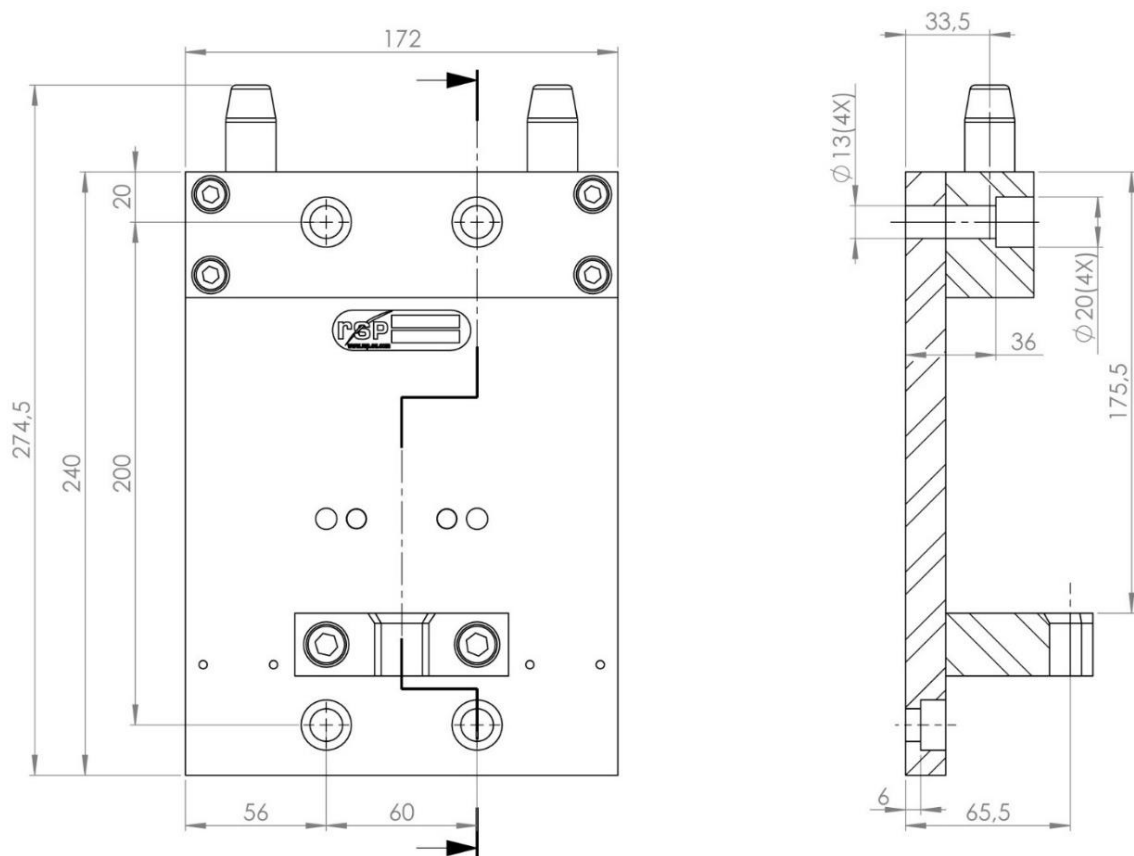
Technical data

Article number	Height (L)	Weight
P8380-125	1250 mm	56 kg
P8380-150	1500 mm	65 kg



NOTE! The tool stand column must be rigidly mounted on a levelled and stable pavement using all four holes.

2.3.2 Tool stand hanger. Article no: P8302

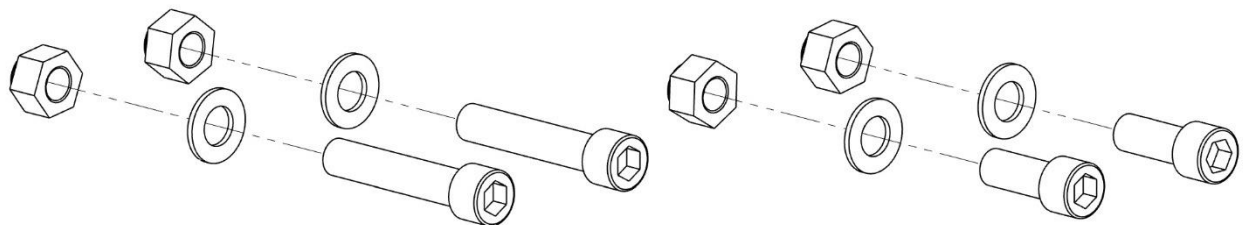


The tool stand hanger P8302, mounted on the tool stand column P8380-XXX, gives together with tool plate P8303A a robust tool parking system for easy tool changing. To be mounted using mounting kit for tool stand hanger P8370, or extension kit P8518-YY.

Technical data

Weight	8.3 kg
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2.3.3 Mounting kit. Article: P8370

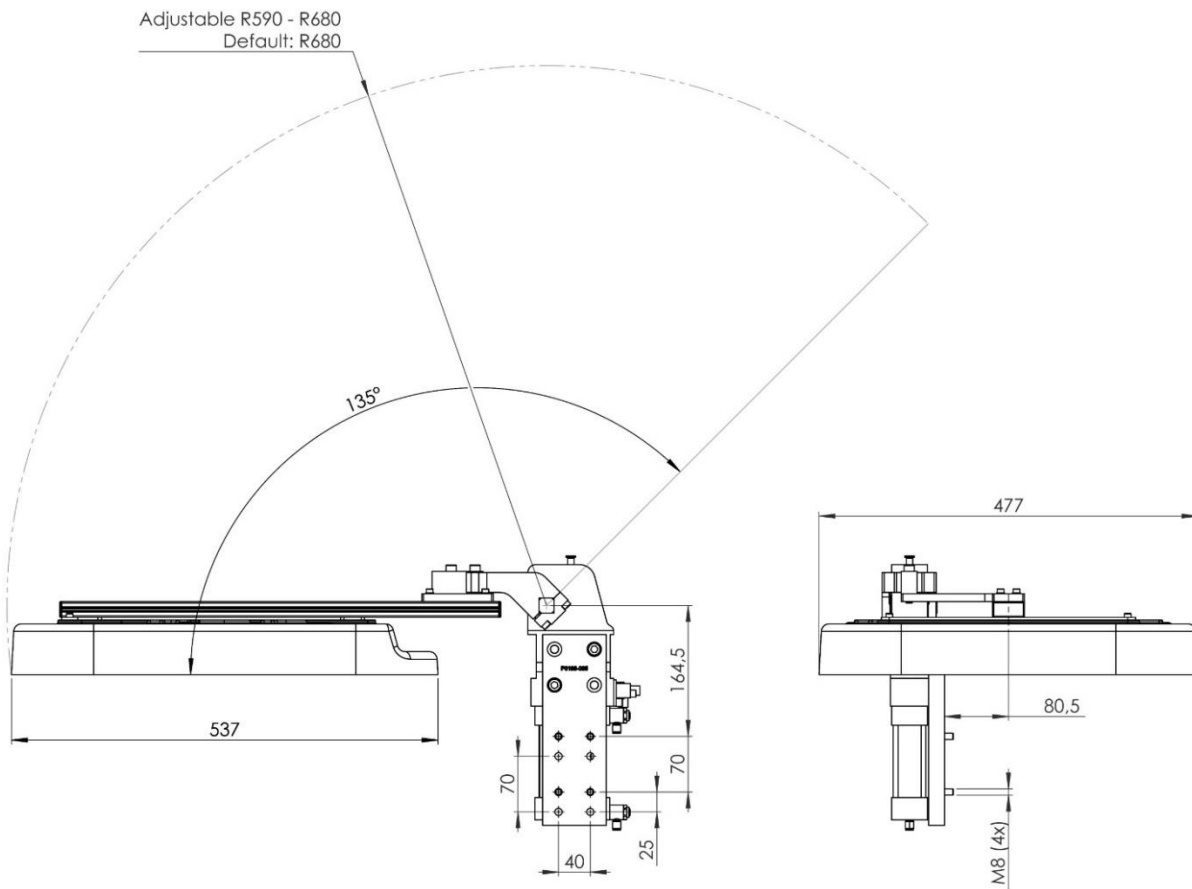


The mounting kit P8370, which consists of two M12 x 60 and two M12 x 30 screws with corresponding nuts and washers, is used for mounting of tool stand hanger, P8302, directly on a tool stand column.

Technical data

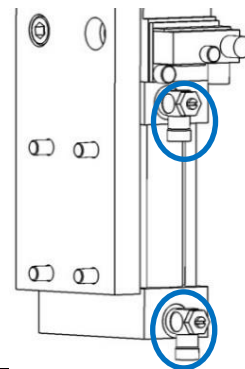
Weight	0.3 kg
---------------	--------

2.3.4 Dust cover with pneumatic tilting clamp. Article no: P8517-1



The dust covers with pneumatic tilting clamp, P8517-1, shall be mounted on the tool stand column P8380. The dust covers are used for effectively protecting the tool and tool attachment, including modules, when parked on the tool stand. The tilting angle is adjustable within the range of 10°–135°, the default tilting angle being fully open, 135°.

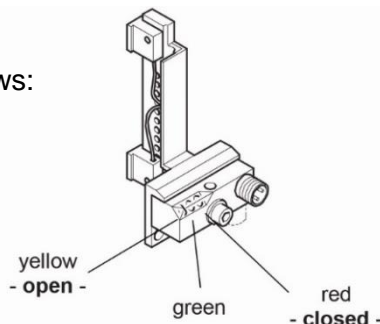
Flow control valves, I1315, are installed on both ports to reduce the tilting clamps opening and closing speed, adjust the proper system/line speed to ensure a smooth dust cover operation (sections 4.3 or 4.4.3).



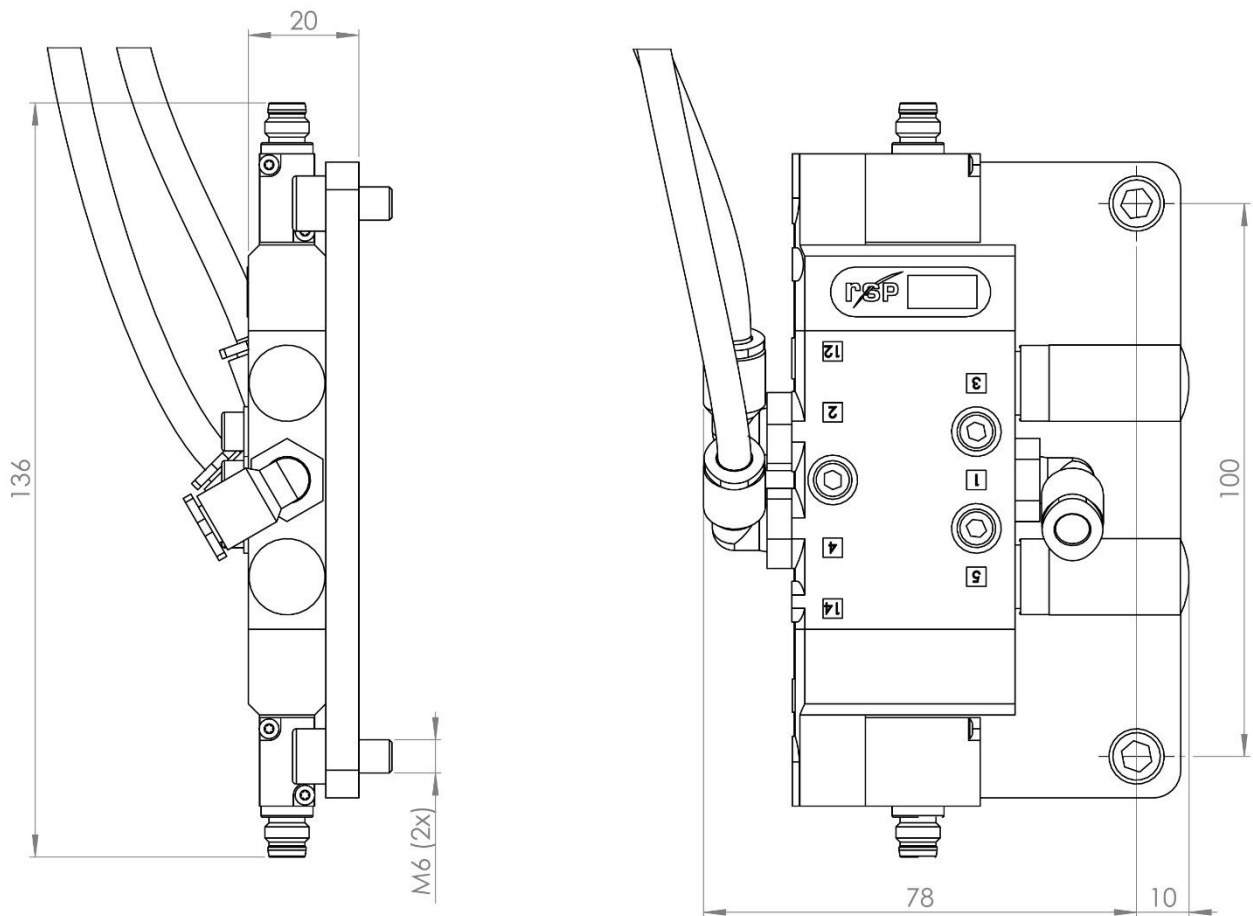
Weight		7.8 kg
Electrical signals	Circuit diagram	E0186-110 (section 2.3.6)
	Pneumatic diagram	Pne0186-110 (section 2.3.8)
	M12 4-pole, male	0V, 24V, Cover_Closed, Cover Opened

The function of the integrated LEDs is as follows:

- Green System current
- Red Cover_Closed
- Yellow Cover Opened



2.3.5 Valve unit for dust cover. Article no: P8513

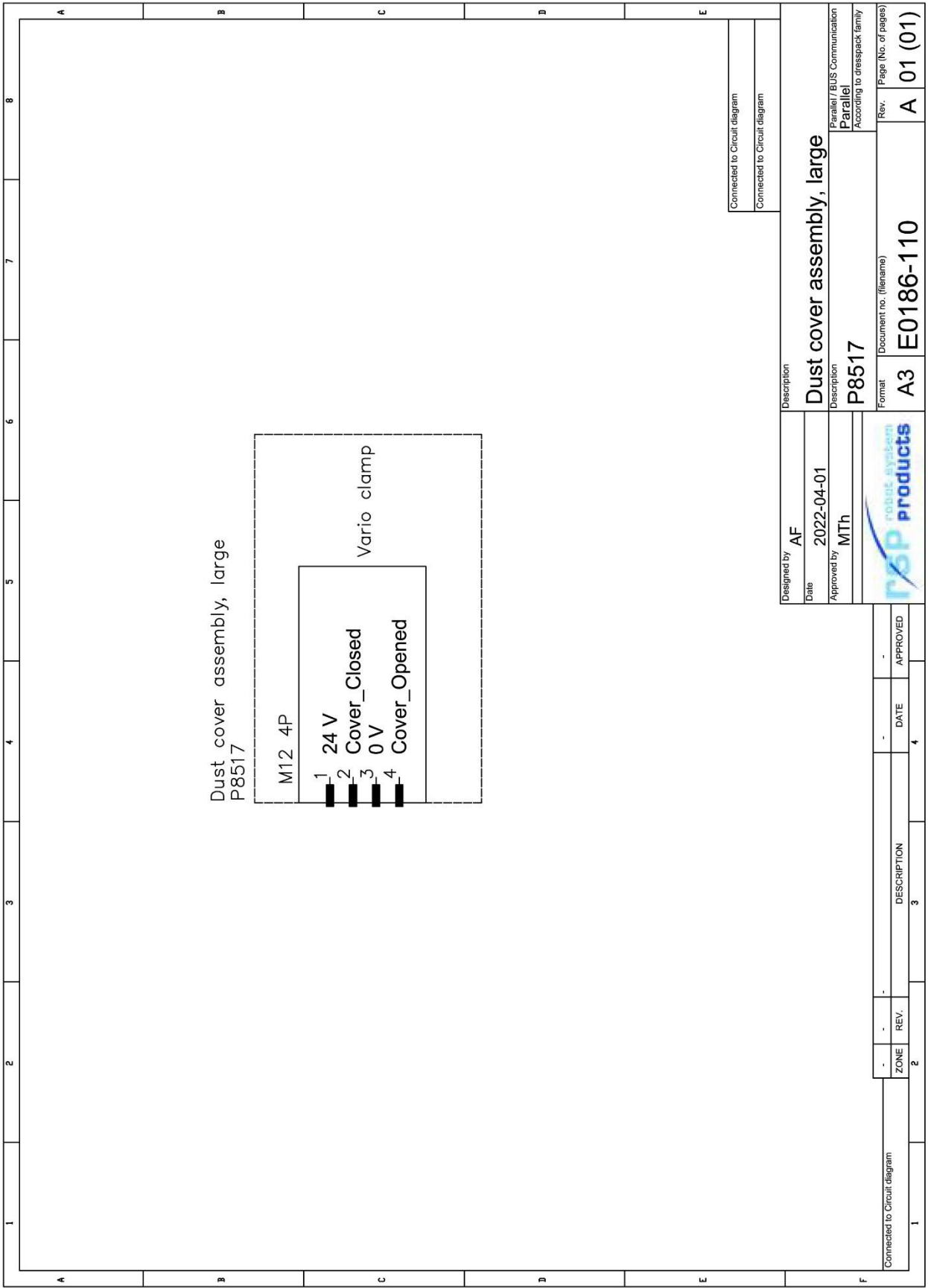


A bi-stabile 5/2-valve to be mounted on the tool stand column P8380-XXX and used together with dust cover with pneumatic tilting clamp, P8517-1.

Technical data

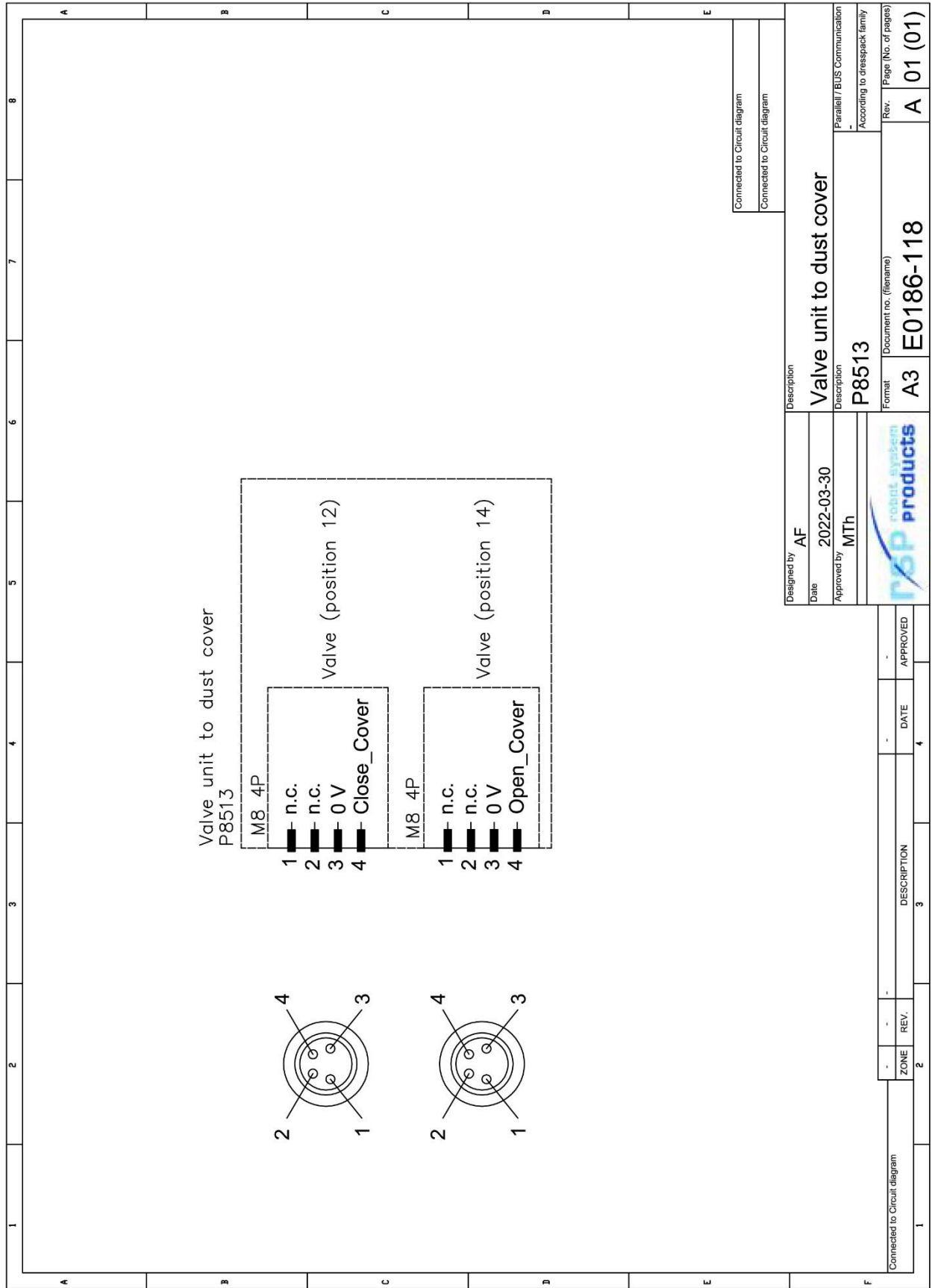
Weight		0.5 kg
Electrical signals	Circuit diagram	E0186-118 (section 2.3.7)
	Pneumatic diagram	Pne0186-118 (section 2.3.9)
	M8 4-pole, male	0V, OpenCover
	M8 4-pole, male	0V, CloseCover

2.3.6 Circuit diagram E0186-110



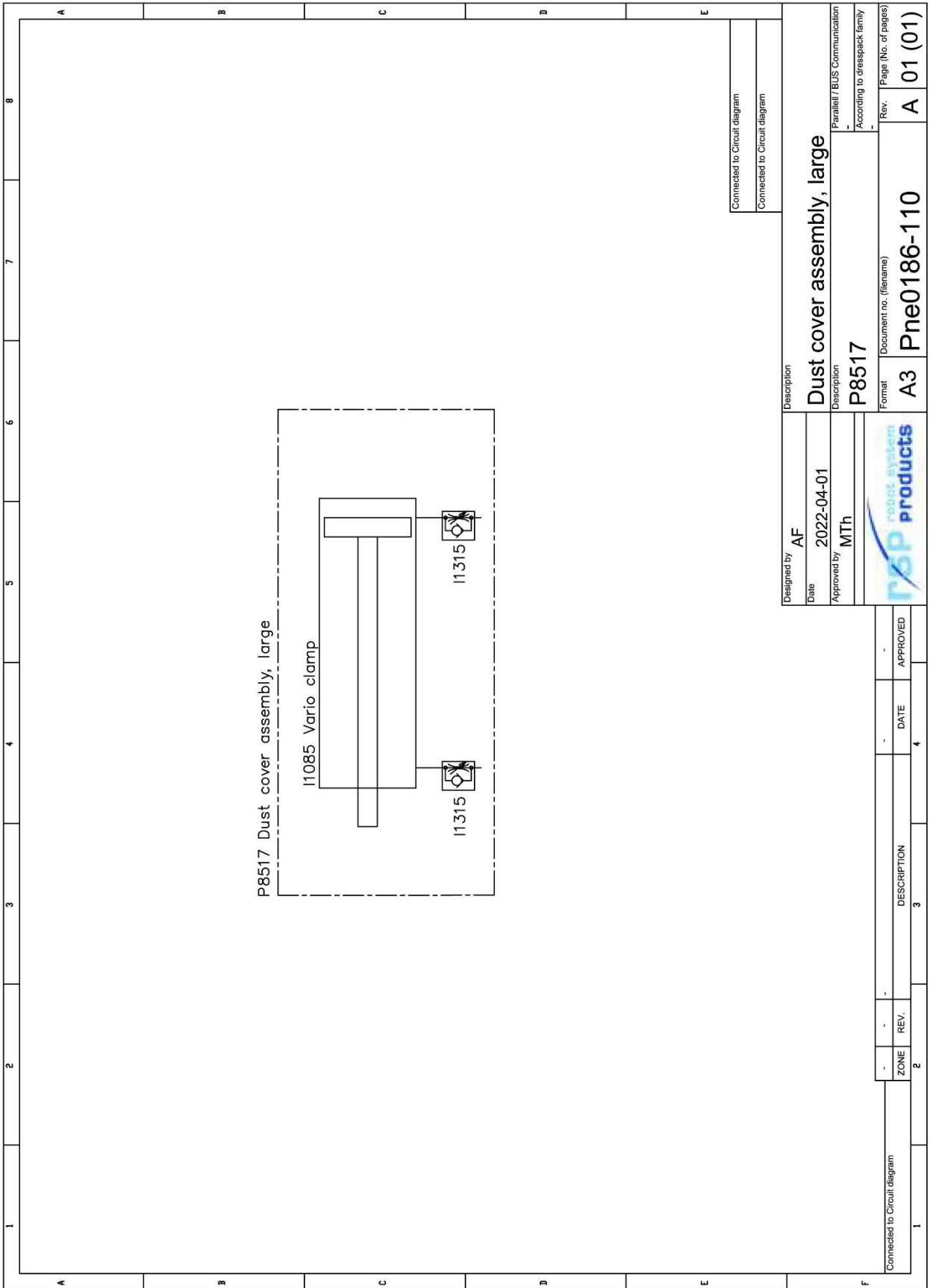
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2.3.7 Circuit diagram E0186-118



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2.3.8 Pneumatic diagram Pne0186-110



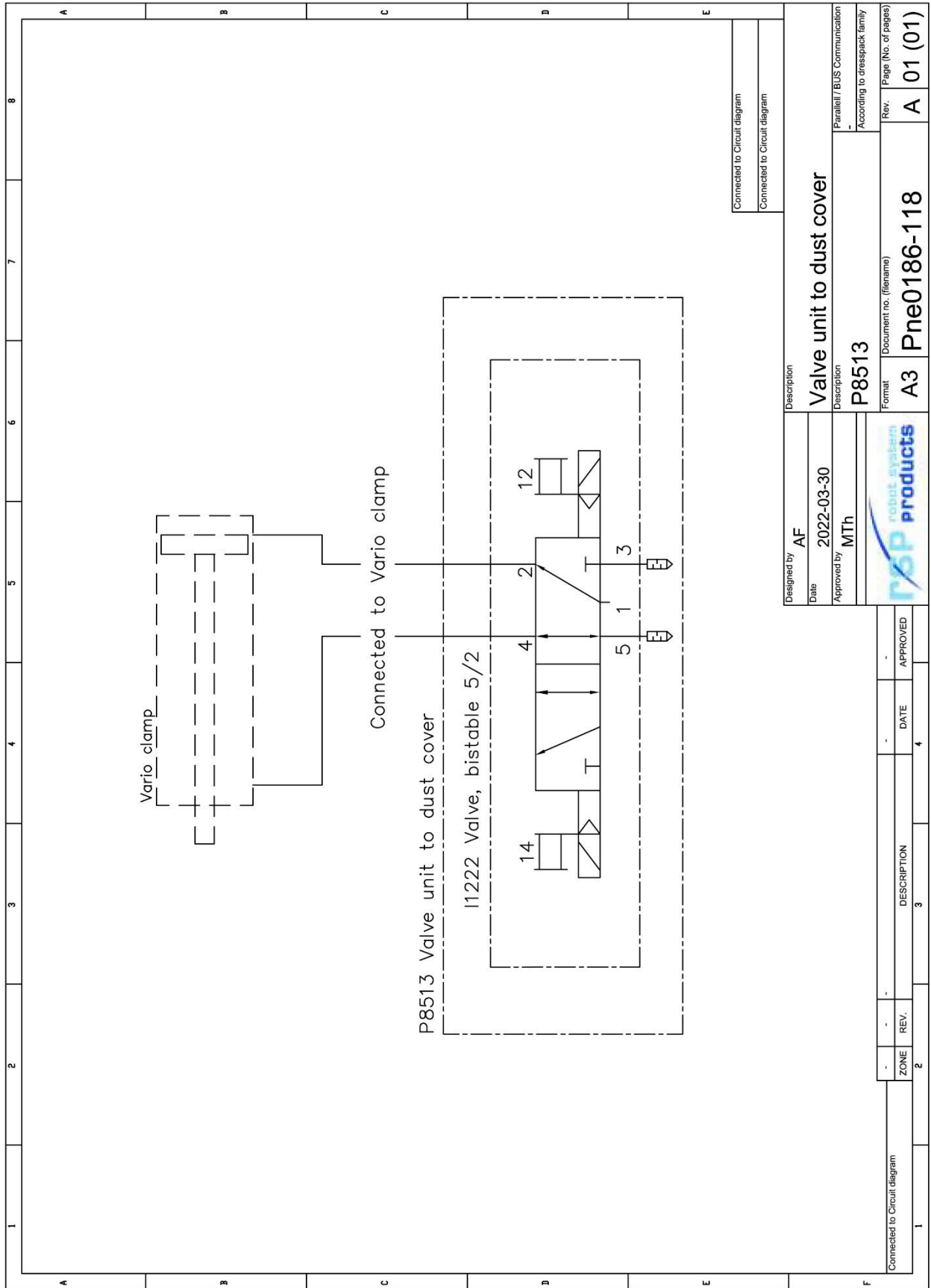
Connected to Circuit diagram		Description		Designed by		AF	
Connected to Circuit diagram		Dust cover assembly, large		Date		2022-04-01	
		P8517		Approved by		MTh	
		A3		Format		A3	
		Pne0186-110		Document no. (filename)		Pne0186-110	
		A 01 (01)		Rev.		A 01 (01)	
		-		Parallel / BUS Communication		-	
		-		According to dresspack family		-	
		-		Page (No. of pages)		-	



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2.3.9 Pneumatic diagram Pne0186-118



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2.4 Load diagrams for tool parking system

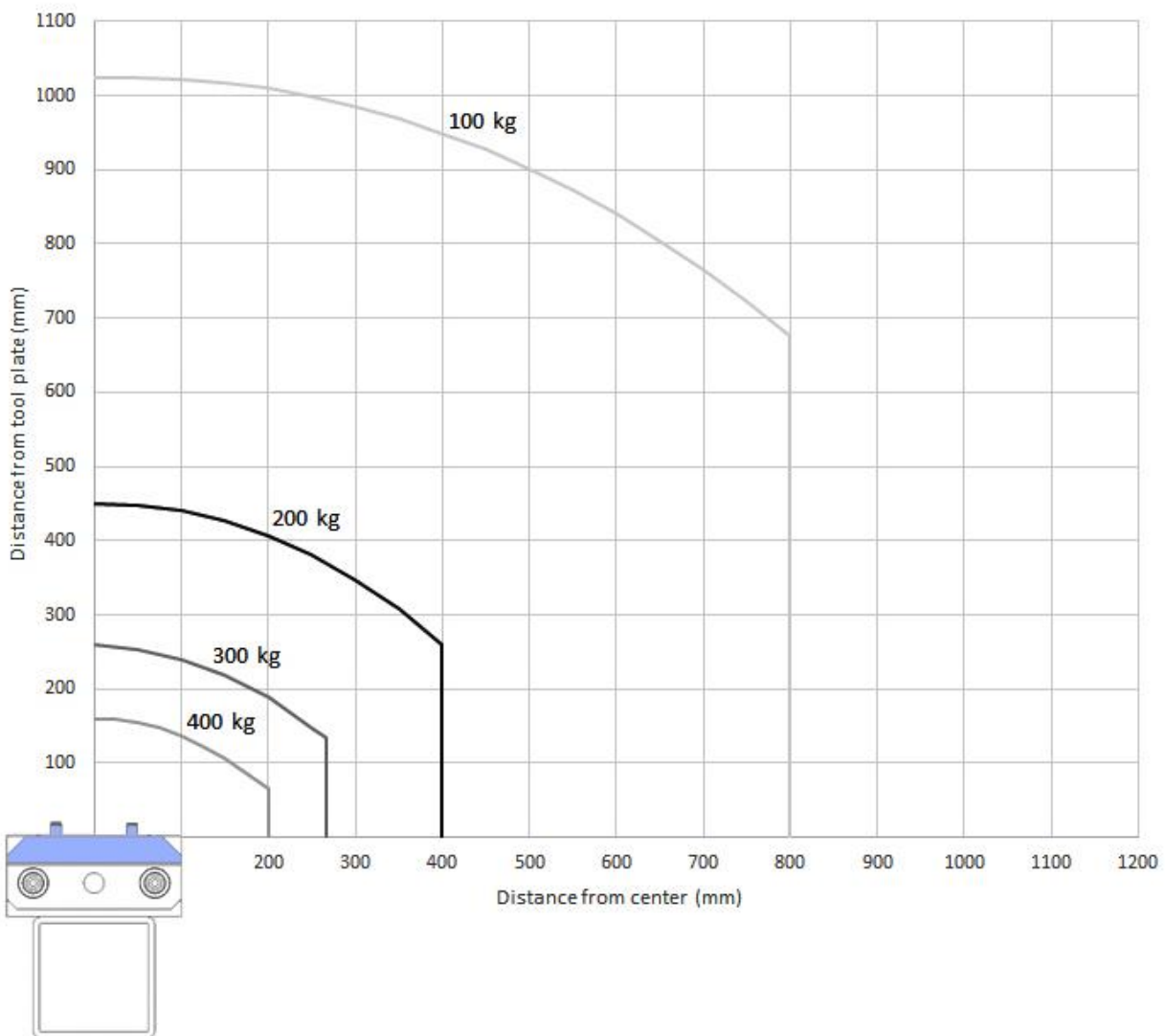
The diagram shows the load corresponding to a maximum displacement of 0.5 mm of the docking position for drop off/pick up.



NOTE! The displacement of the docking position for drop off/pick up depends on the distance from the tool plate to the centre of gravity of the tool attachment and tool. To minimize the wear of the tool changer we recommend a docking position tolerance of maximum 1 mm.

2.4.1 Load diagram, tool stand column, 1.25 meter

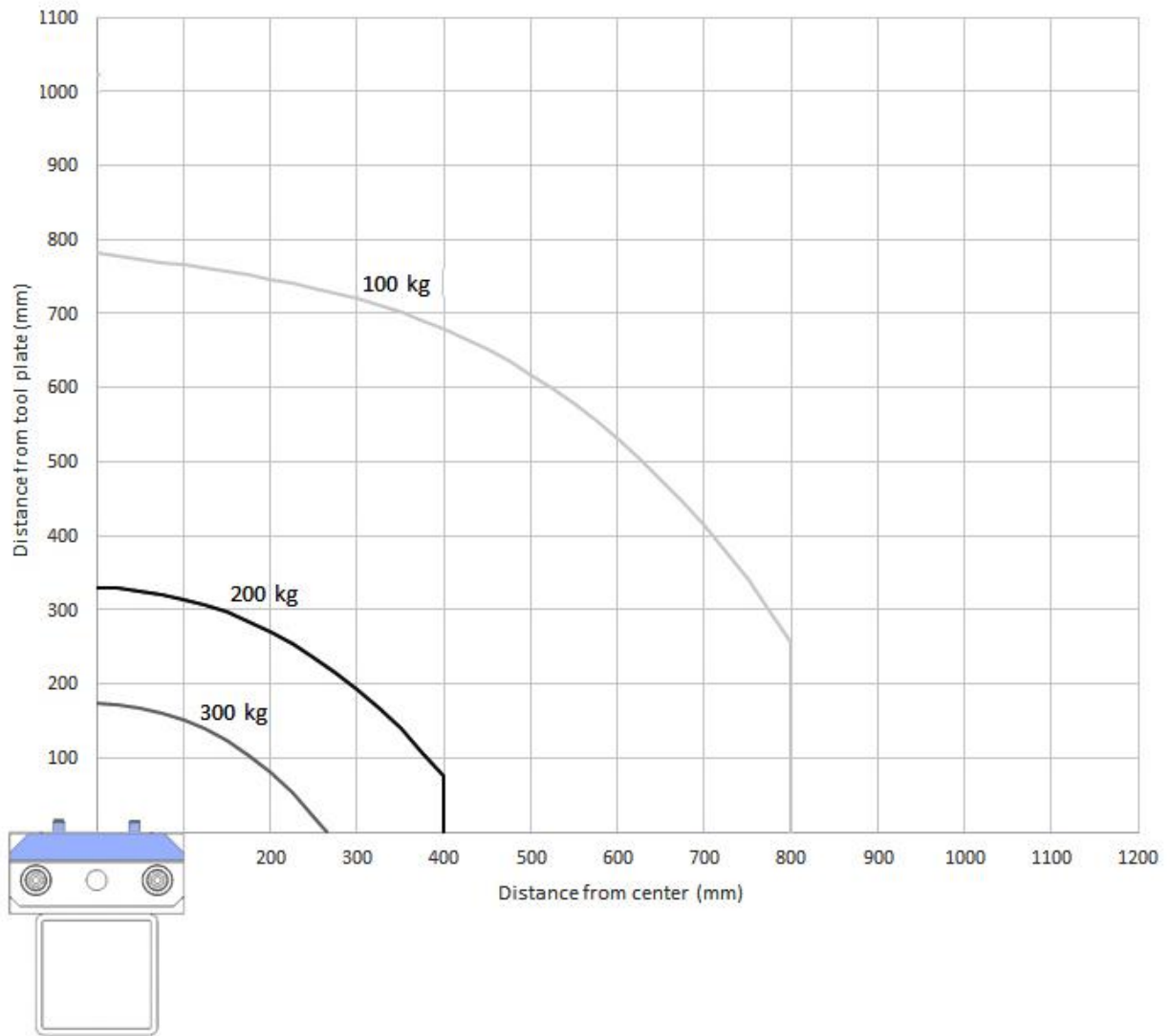
Load diagram for tool parking system with a 1.25-meter high tool stand column P8380-125.



NOTE! In the diagram the tool stand column is shown from above with the tool stand hanger attached and the tool plate side shown in blue!

2.4.2 Load diagram, tool stand column, 1.5 meter

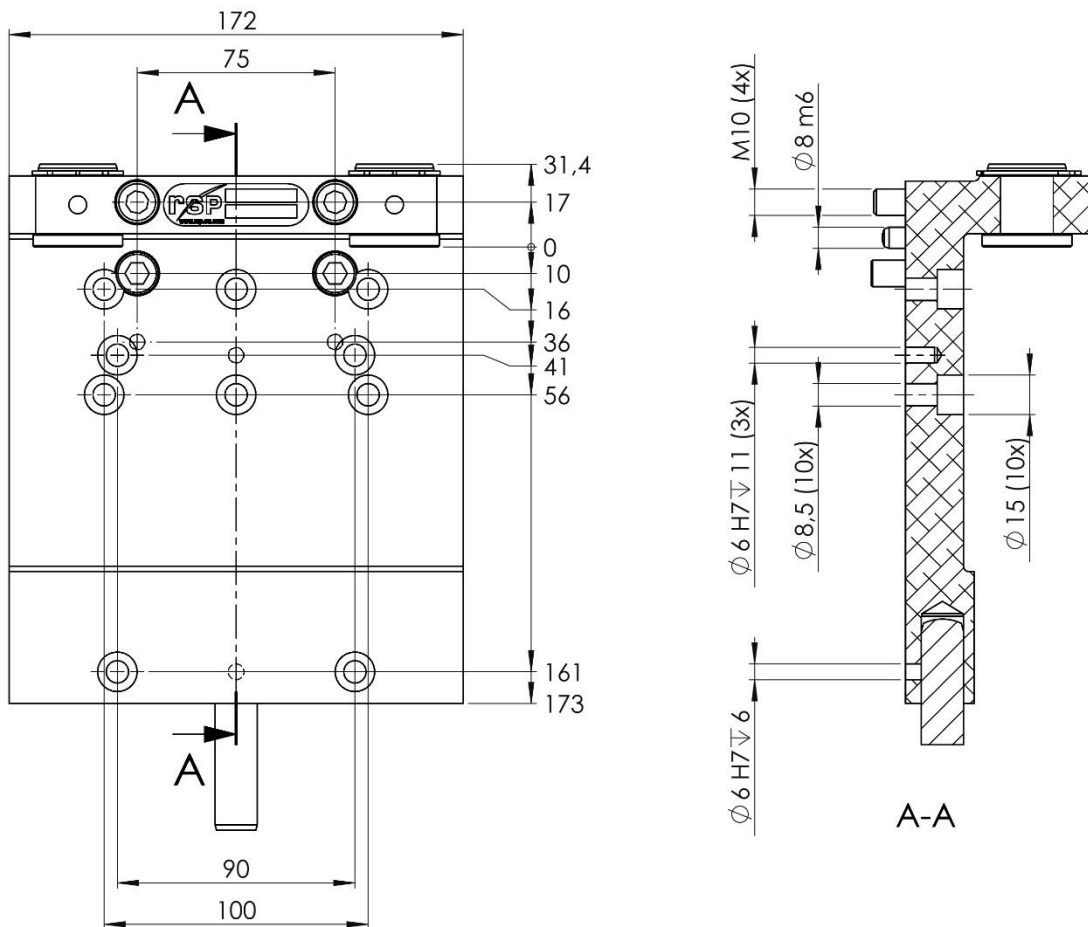
Load diagram for tool parking system with a 1.5-meter high tool stand column P8380-150.



NOTE! In the diagram the tool stand column is shown from above with the tool stand hanger attached and the tool plate side shown in blue!

3 OPTIONS

3.1 Tool plate. Article no: P8303A



The tool plate P8303A, mounted on the tool attachment or tool, gives together with tool stand hanger P8302 and tool stand column P8380 a robust tool parking system for easy tool changing.

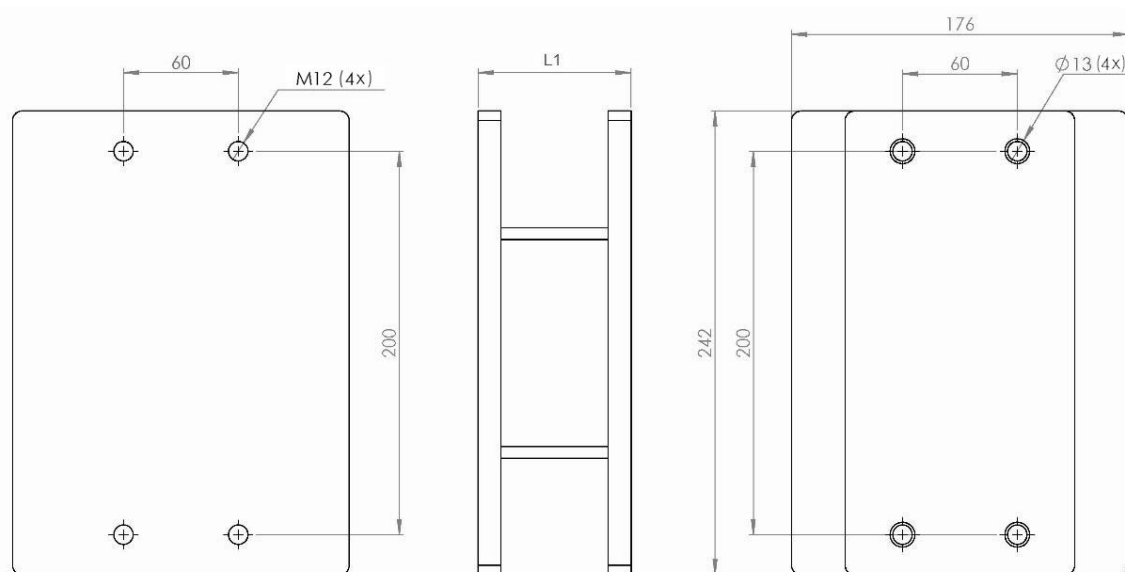


NOTE! When used in combination with the safety signal modules P7501-xxx the tool plate P8303A, with the active tool-in-stand sensor (I1171) mounted, can be used together with the passive tool-in-stand sensor P8369 to get tool in stand signals for the safety logic.

Technical data

Weight	2.6 kg
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3.2 Tool hanger extension kit. Article no: P8518-YY



To be mounted between the tool stand column, P8380-XXX, and the tool stand hanger, P8302.

Technical data

Article number	Width (L1)	Weight
P8518-08	80 mm	7.7 kg
P8518-13	130 mm	8.5 kg
P8518-18	180 mm	9.4 kg

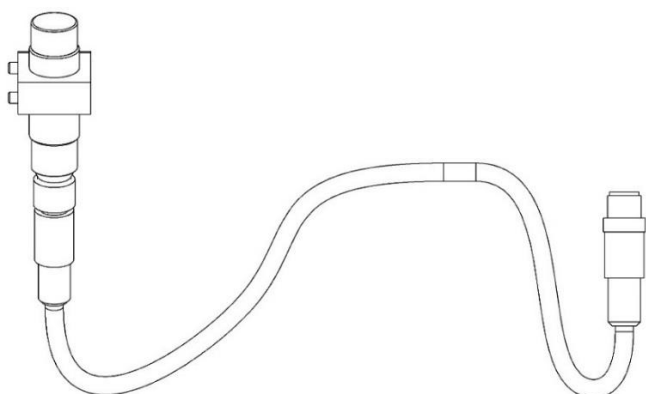


NOTE! All screws, with corresponding nuts and washers, for mounting of the tool stand hanger and tool hanger extension on a tool stand column are included in P8518-YY.



NOTE! The widest tool hanger extension, P8518-18, shall not be used in combination with tool attachment TA720.

3.3 Tool present sensor, inductive. Article no: P8312



To be mounted on the tool stand hanger, a 0.8 meter cable is included. Transmits a double channel signal to detect presence of tool in the tool parking system.

Technical data

Weight		0.2 kg
Electrical signals	Circuit diagram M12 4-pole male	E0186-040 (section 3.3.1) 24V, 0V, Tool present 1, Tool present 2
Safety classification (ISO13849-1)		Category 2, PL d

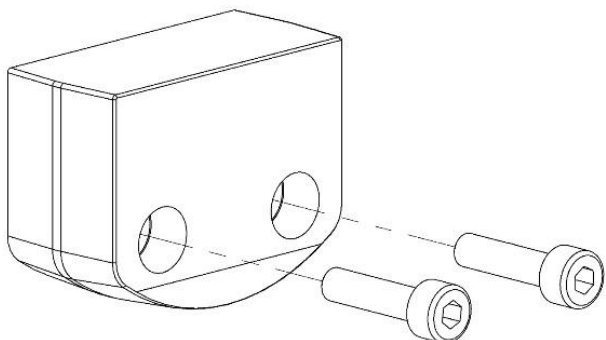
3.4 Tool in stand sensor, passive side. Article: P8369

The tool-in-stand sensor P8369 is mounted on the tool stand hanger and used together with an active tool in stand sensor (I1171) mounted on the tool plate for checking that the tool/tool attachment is present in the parking position before the tool changer is permitted to open.



NOTE!

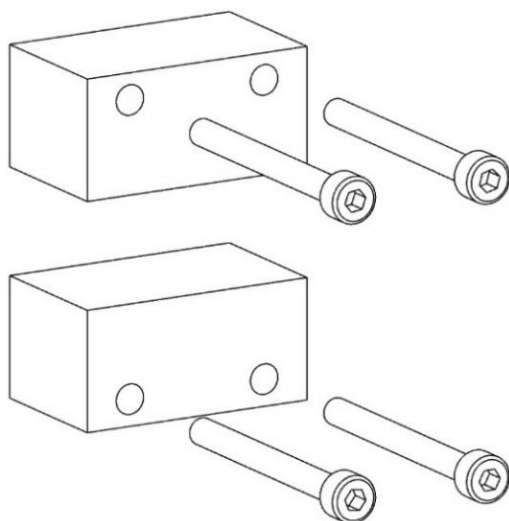
Maximum tightening torque when mounting tool-in-stand sensors is 0.8 Nm!



Technical data

Weight	0.02 kg
--------	---------

3.4.1 Spacers for tool in stand sensors. Article: P8373



Optional spacers for mounting of tool in stand sensors P8369 and I1171 on the tool stand hanger and on the tool plate.

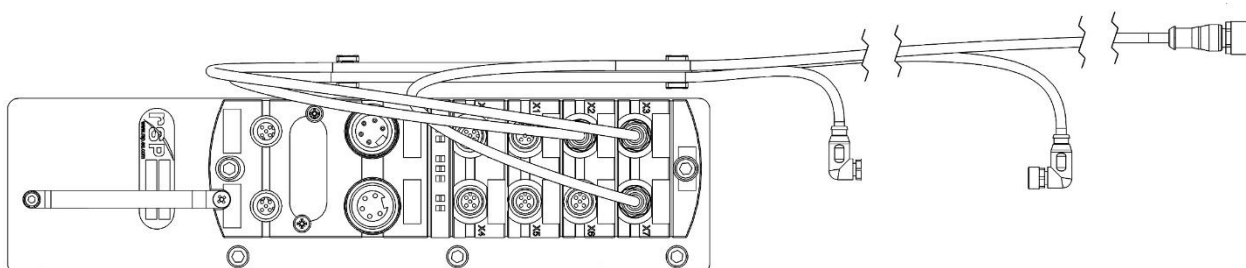
Technical data

Weight	0.1 kg
Thickness	22 mm



NOTE! To be used together with TA720 to provide clearance between sensor cable and tool attachment.

3.5 Connection module. Article no: P8516-1

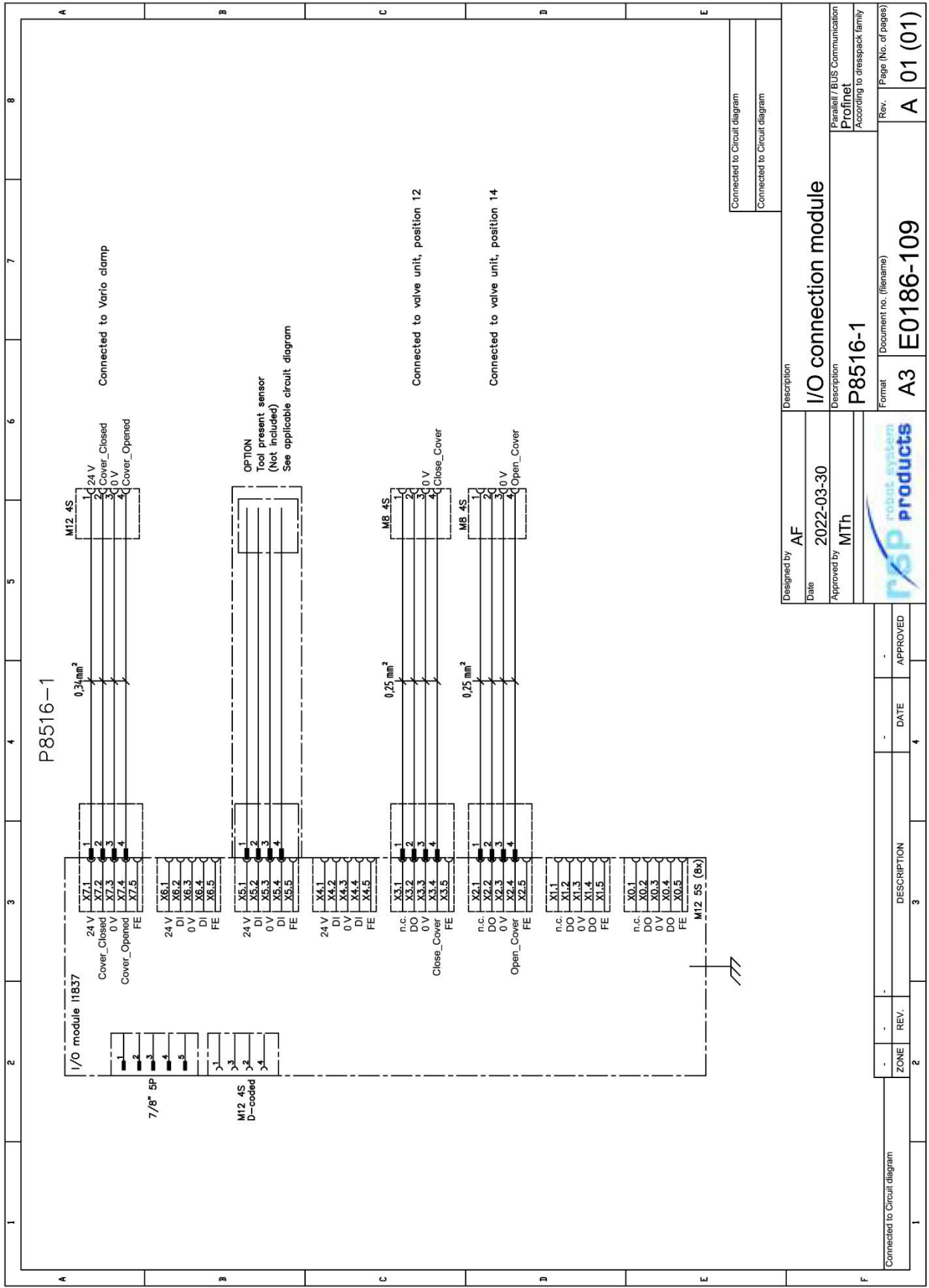


Option for tool parking system single, P8515. Cables and connectors for the dust cover with pneumatic tilting clamp (P8517-1) and the valve unit for dust cover (P8513) are included.

Technical data

Electrical signals	Circuit diagram	E0186-109 (section 3.5.1)
Input	7/8" 5-pole M12 4S, D-coded M12 4-pole, female (tilting clamp) M12 4-pole, female (tool present sensor, optional)	Power supply 24V Profinet 24V, Cover_Closed, 0V, Cover_Opened 24V, Tool present 1, 0V, Tool present 2
Output	M8 4-pole, female (valve unit) M8 4-pole, female (valve unit)	0V, Close_Cover 0V, Open_Cover

3.5.1 Circuit diagram E0186-109 for P8516-1



Designed by	AF	Description	I/O connection module
Date	2022-03-30	Format	A3
Approved by	MTh	Document no. (filename)	E0186-109
		Parallel / BUS Communication	Profinet
		According to dresspack family	
		Rev.	A 01 (01)
		Page (No. of pages)	

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4 INSTALLATION

4.1 Tightening torques

Tightening torques for mounting (screw class 8.8)

Dimension	Torque
M4	3 Nm
M5	6 Nm
M6	10 Nm
M8	24 Nm
M10	47 Nm
M12	82 Nm
M16	200 Nm

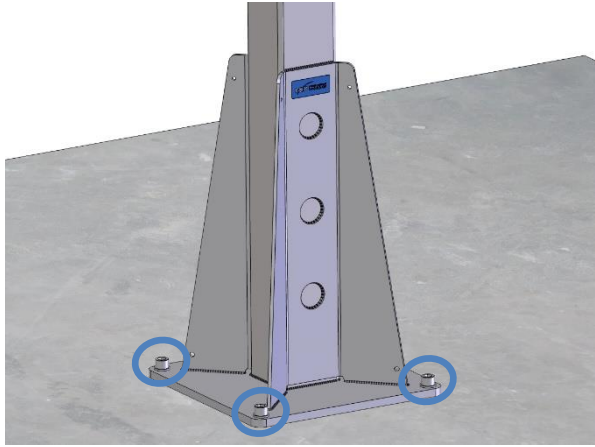
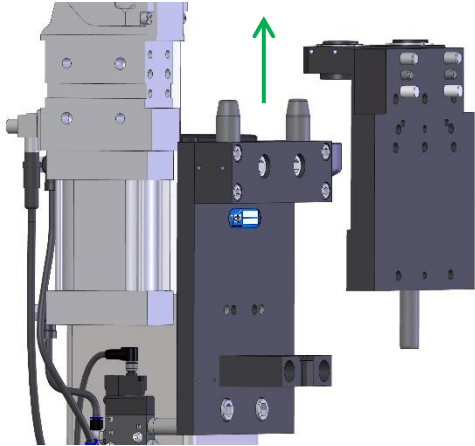
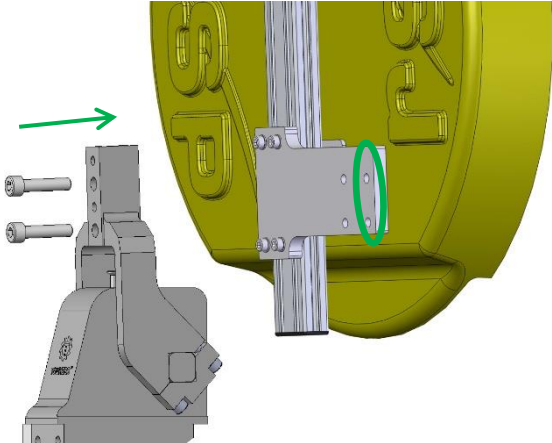
4.2 Recommended tools

Tools	Applications
Complete set of Allen keys	For dismounting and mounting.
Torque wrench	For all socket head cap screws

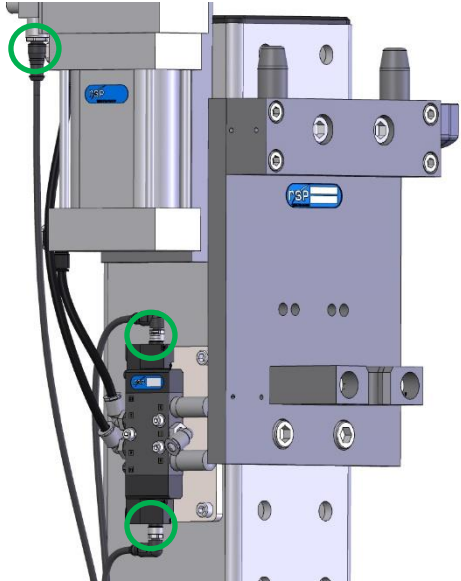
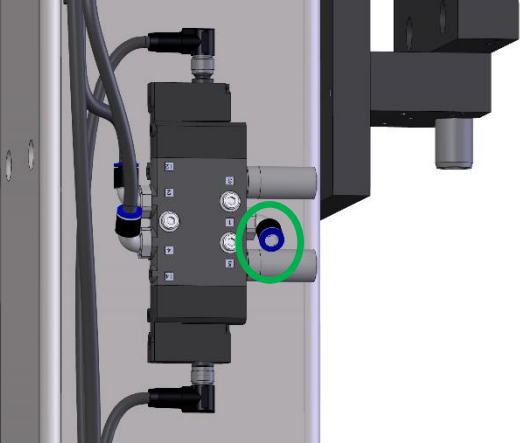
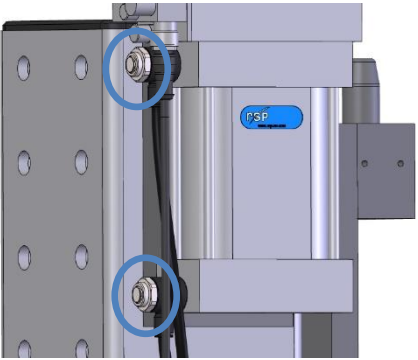


NOTE! Robot System Products' tool parking systems are normally delivered fully assembled and ready to be installed after mounting of dust cover (section 4.3). For installation and mounting of items delivered separately see section 4.4.

4.3 Mounting upon delivery

	Action	Note
1	Safety	Read the safety section (1.1).
2	Mount tool stand column 	Mount the tool stand column on a levelled and stable pavement. NOTE! The tool stand must be rigidly mounted using all four holes in the tool stand column.
3	Remove tool plate 	Remove the tool plate from the tool stand hanger by firstly removing the transport screw holding it. NOTE! Only applicable when the tool plate is not delivered separately. WARNING! The tool plate is heavy and might cause personal injury and equipment damage if dropped.
4	Mount dust cover 	Place the dust cover in position and mount it to the outer screw holes on the tool stand hanger using two M8-screws. See tightening torques above. NOTE! Except for the dust cover RSP's tool parking systems are normally delivered fully mounted.



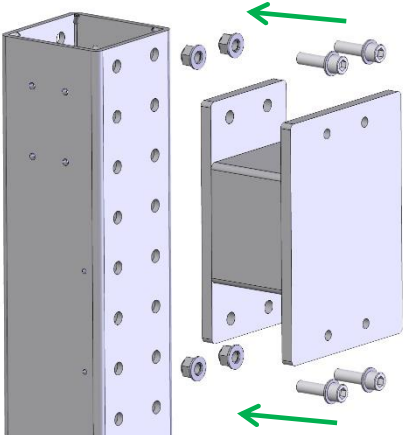
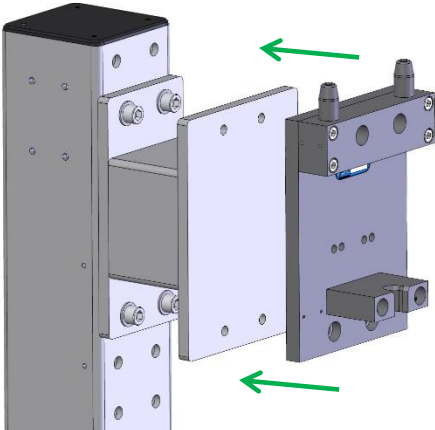
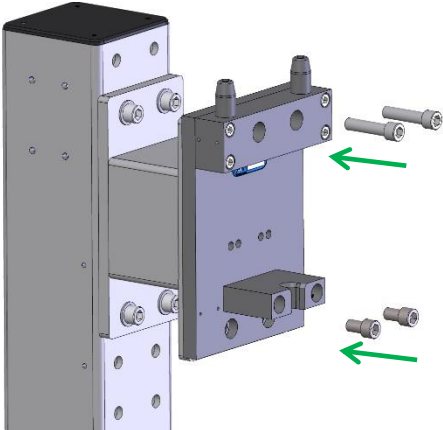
5	<p>Connect signals (if not mounted)</p> 	<p>Connect the signal cables from the valve unit for the dust cover to respective contact according to respective circuit diagram (depending on option).</p>
6	<p>Connect air</p> 	<p>Connect pneumatic air to the valve unit.</p>
7	<p>Adjust dust cover operation</p> 	<p>Adjust the opening and closing speed with the two flow control valves to ensure a smooth dust cover operation.</p> <p>NOTE! The recommended time for opening of the dust cover to fully open (135°), respectively closing, should be minimum 2,5 seconds.</p>





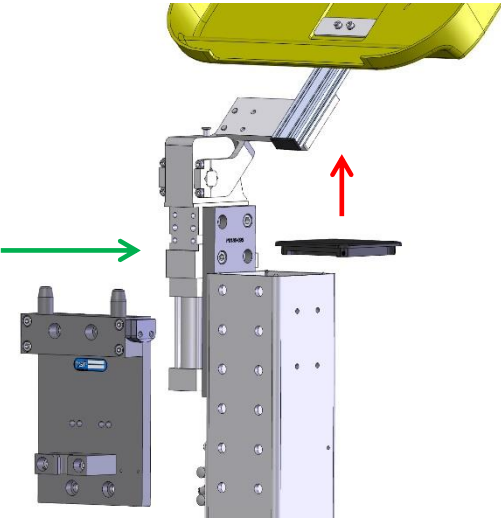

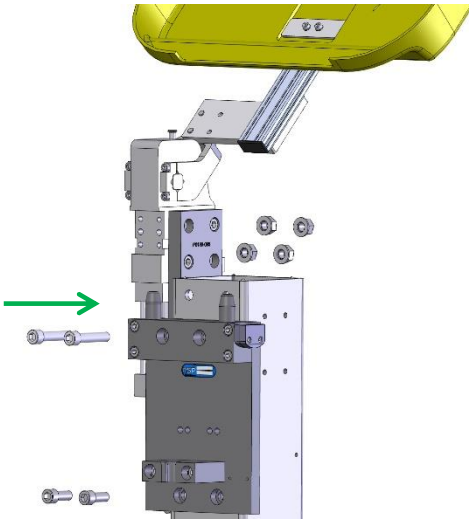
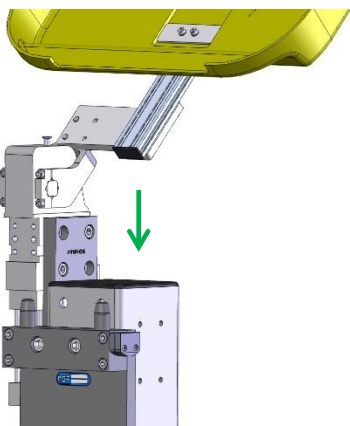
4.4 Mounting of items delivered separately

4.4.1 Mounting of tool hanger extension with tool hanger



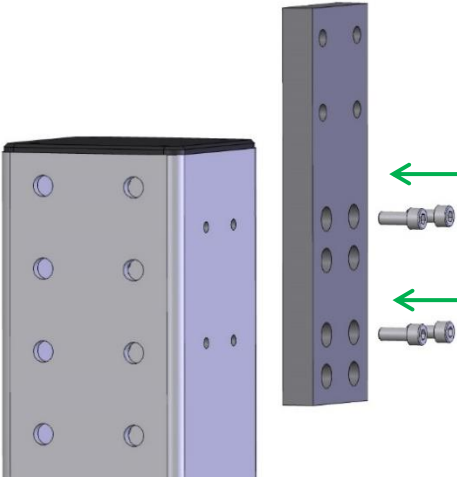
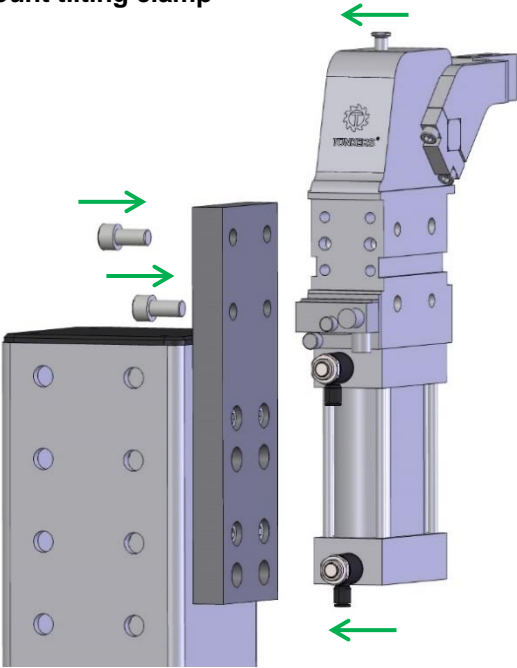
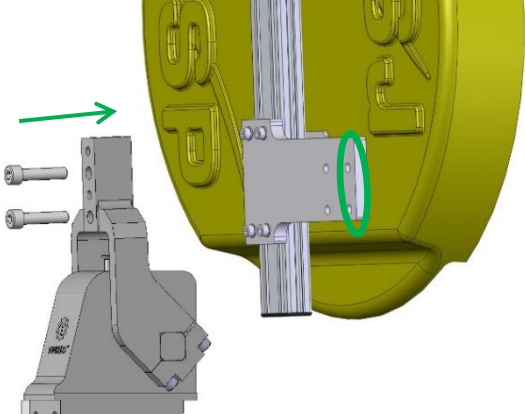
	Action	Note
1	Safety	Read the safety section (1.1).
2	Mount extension 	<p>Remove cap. Mount the tool hanger extension (P8518-YY) to the tool stand column with the enclosed four M12x40 screws and the corresponding washers and locking nuts. See tightening torques in section 4.1.</p> <p>NOTE! The nuts (with corresponding washers) must be entered through the top of the tool stand column.</p> <p>NOTE! The tool hanger extension can be placed on five different heights with 5 cm in between.</p>
3	Fit tool stand hanger 	<p>Remount cap. Lift and fit the tool stand hanger to the tool hanger extension.</p> <p>WARNING! The tool stand extension and hanger are heavy and might cause personal injury and equipment damage if dropped.</p>
4	Mount tool stand hanger 	<p>Mount the tool stand hanger on the tool hanger extension with the enclosed two M12x50 and two M12x20 screws using a torque wrench. See tightening torques in section 4.1.</p>

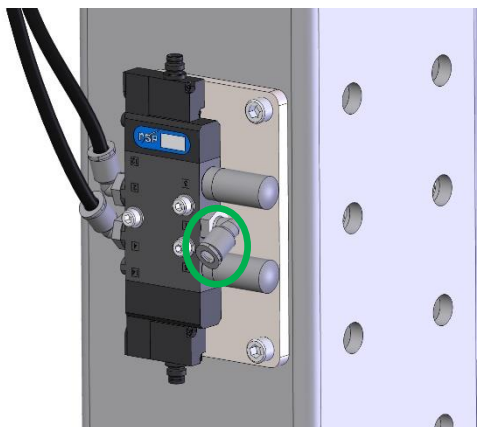
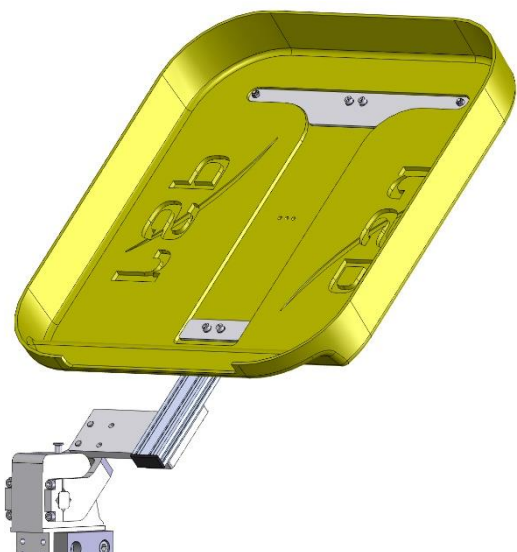
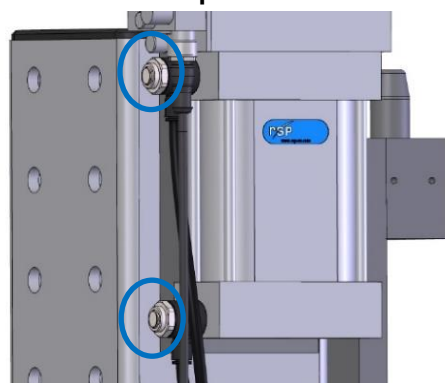
4.4.2 Mounting of tool stand hanger on tool stand column

	Action	Note
	1 Safety	Read the safety section (1.1).
 	2 Fit tool stand hanger 	<p>Remove cap. Lift and fit the tool stand hanger to the tool stand column.</p> <p>WARNING! The tool stand hanger is heavy and might cause personal injury and equipment damage if dropped.</p> <p>NOTE! The tool stand hanger can be placed on five different heights with 5 cm in between.</p>
	3 Mount tool stand hanger 	<p>Mount the tool stand hanger to the tool stand column using a torque wrench with two M12x60 screws, two M12x30 screws and the corresponding washers and locking nuts. See tightening torques in section 4.1.</p> <p>NOTE! The nuts (with corresponding washers) must be entered through the top of the tool stand column.</p>
	4 Mount cap 	Remount the cap on the top of the tool stand column.

4.4.3 Installation of dust cover with pneumatic tilting clamp



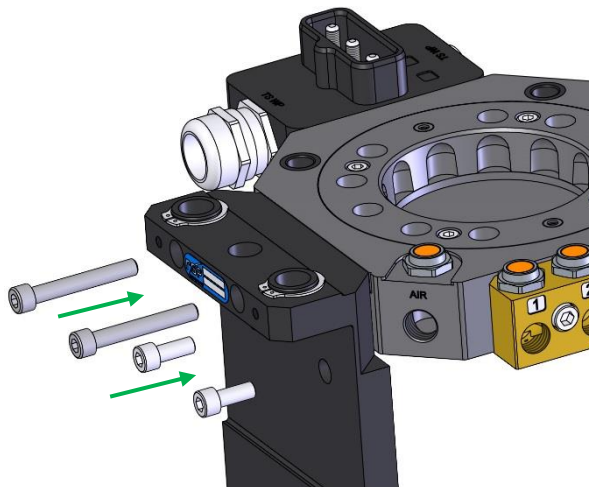
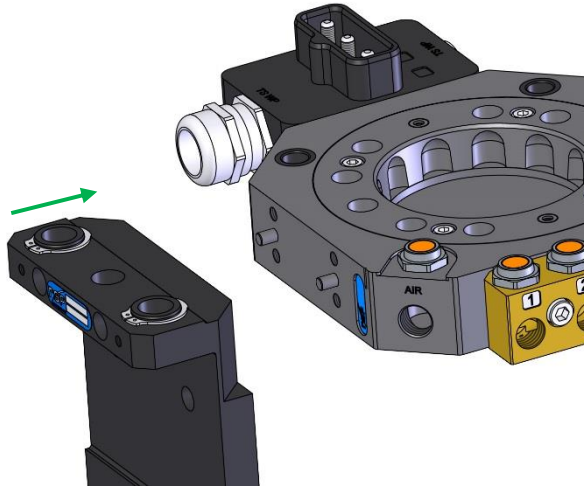
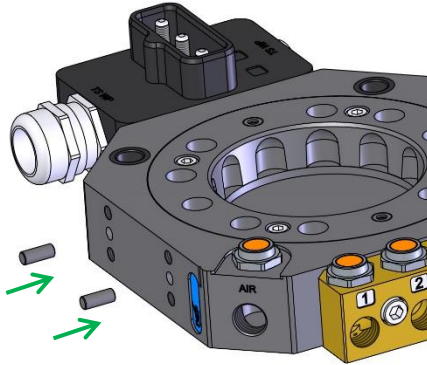
	Action	Note
1	Safety	Read the safety section (1.1).
2	Mount tilting clamp bracket 	Mount the tilting clamp bracket on the tool stand support unit with four M8-screws. See tightening torques in section 4.1. NOTE! The tilting clamp bracket can be placed on two different heights with 2.5 cm in between.
3	Mount tilting clamp 	Position the tilting clamp on the bracket. Fasten with two M6-screws. See tightening torques in section 4.1.
4	Mount dust cover 	Place the dust cover in position and mount it to the outer screw holes on the tool stand hanger using two M8-screws See tightening torques above.

5	<p>Connect air</p> 	<p>Connect pneumatic air to the valve unit.</p>
6	<p>Adjust tilting angle</p> 	<p>Adjust the tilting angles of the dust cover (section 4.5).</p> <p>NOTE! The recommended maximum tilting angle for a tool parking system (single) is 135°.</p>
7	<p>Adjust dust cover operation</p> 	<p>Adjust the opening and closing speed with the two flow control valves to ensure a smooth dust cover operation,</p> <p>NOTE! The recommended time for opening of the dust cover to fully open (135°), respectively closing, should be minimum 2,5 seconds.</p>
8	<p>Connect signals and sensors</p>	<p>Connect signals and sensors according to selected connection module.</p>


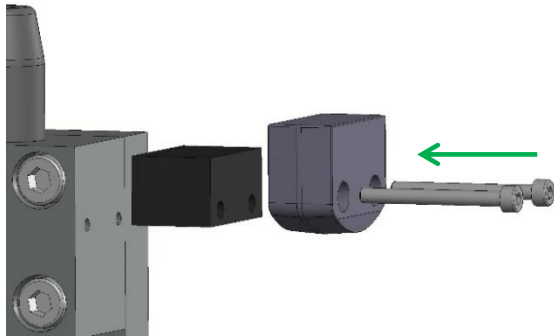

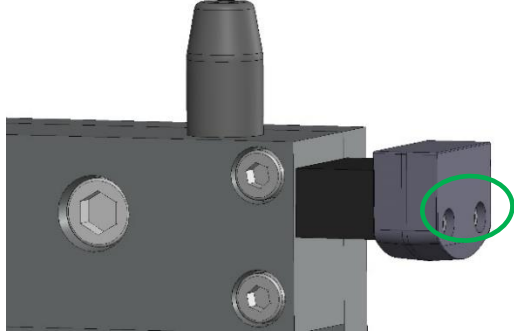

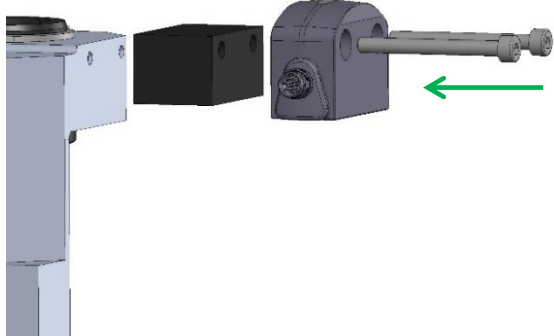
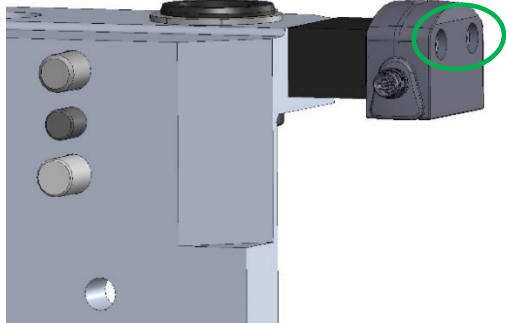


4.4.4 Mounting of tool plate on tool attachment

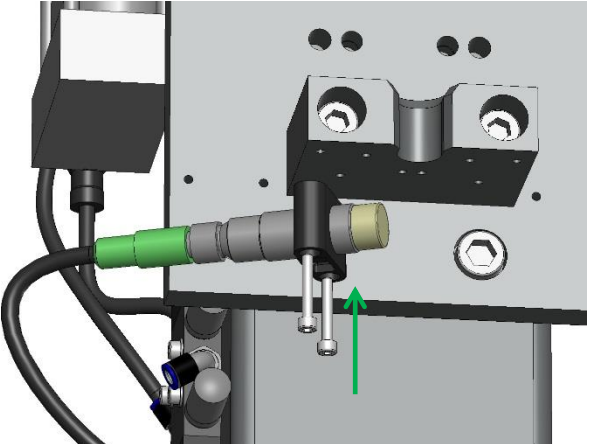
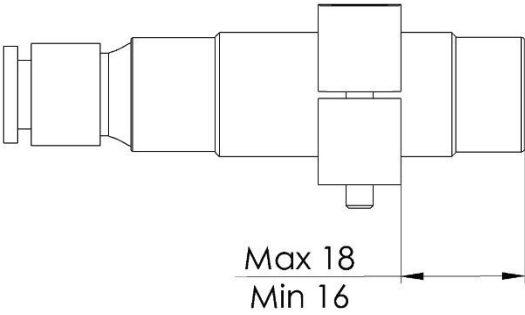
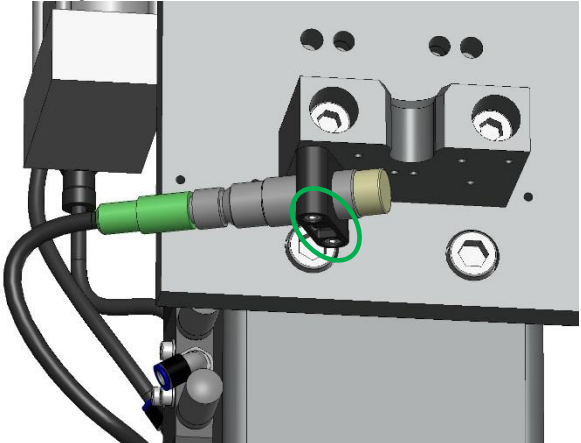
	Action	Note
1	Safety	Read the safety section (1.1).
2	Mount guide pins	Press the enclosed guide pins into the tool attachment.
3	Fit tool plate	Lift and fit the tool plate to tool attachment. WARNING! The tool plate is heavy and might cause personal injury and equipment damage if dropped.
4	Mount tool plate	Mount the tool plate to the tool attachment with two M10x70 and two M10x25 screws using a torque wrench. See tightening torques in section 4.1.



4.4.5 Mounting of tool in stand sensor with spacer (for TC720 with safety signal module P7501-XXX only)

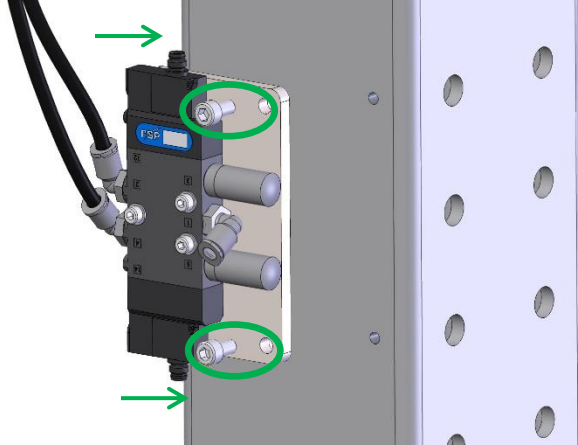
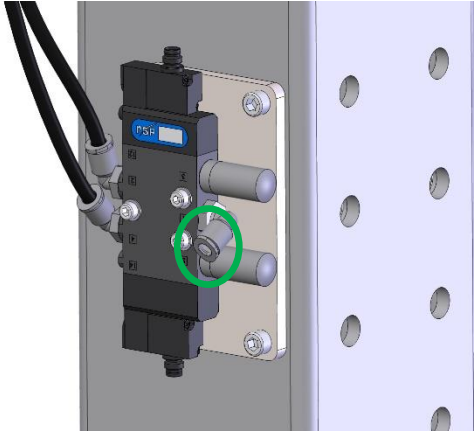
	Action	Note
1	Safety	Read the safety section (1.1).
2	 Fit spacer and sensor on tool stand hanger 	Fit the spacer, the tool in stand sensor and the two M4X40 screws to the tool stand hanger.
3	 Mount spacer and sensor on tool hanger 	Mount the spacer and the tool in stand sensor to the to the tool stand hanger with the two M4X40 screws using a torque wrench. NOTE! Maximum tightening torque 0.8 Nm.
4	 Fit spacer and sensor on tool plate 	Fit the spacer, the tool in stand sensor and the two M4X40 screws to the tool plate. WARNING! The tool plate is heavy and might cause personal injury and equipment damage if dropped.
5	Mount spacer and sensor on tool plate 	Mount the spacer and the tool in stand sensor to the to the tool plate with the two M4X40 screws using a torque wrench. See tightening torques above.

4.4.6 Mounting of tool present sensor inductive (option), P8312

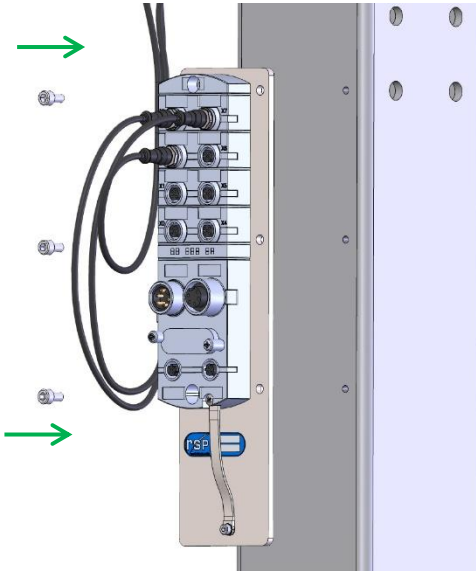
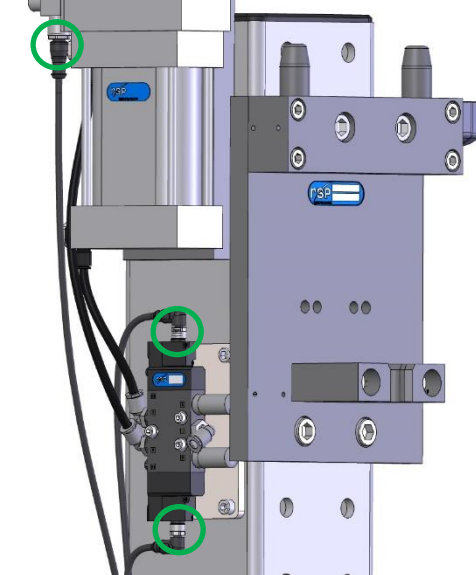
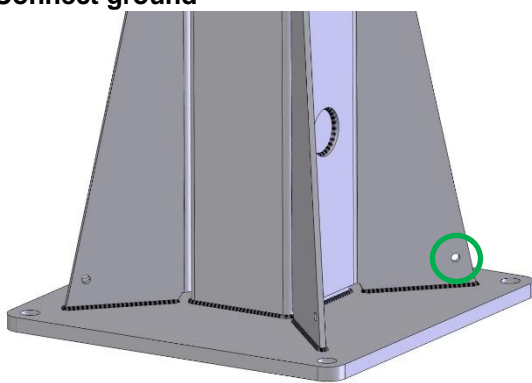
	Action	Note
1	Safety	Read the safety section (1.1).
2	Fit tool present sensor 	Fit the tool present sensor to the tool stand hanger and fasten the two enclosed M4x25 screws lightly.
3	Adjust tool present sensor 	Adjust the tool present sensor. It shall protrude between 16 and 18 mm from the sensor holder. NOTE! If present sensor protrudes more than 18 mm from the sensor holder It might be damaged during docking.
4	Fasten present sensor 	Fasten the tool present sensor with the M4x25 screws.
5	Connect present sensor	Connect the tool present sensor according to circuit diagram E0186-040 (section 3.3.1).



4.4.7 Mounting of valve unit for dust cover, P8513

	Action	Note
1	Safety	Read the safety section (1.1).
2	Mount valve unit 	Mount the valve unit for dust cover on the valve adapter. Fasten with the two enclosed M6x12 screws. See tightening torques above.
3	Connect air 	Connect pneumatic air to the valve unit.


4.4.8 Installation of connection module

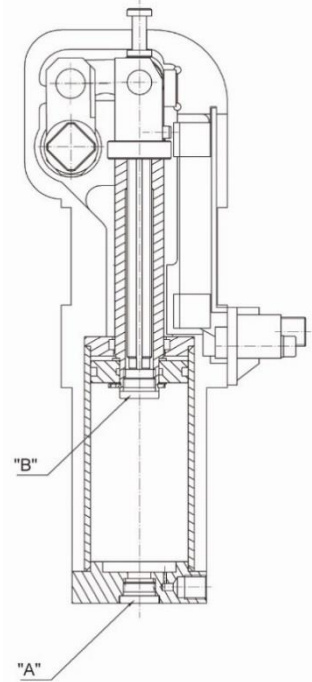
	Action	Note
1	Safety	Read the safety section (1.1).
2	Mount connection module 	<p>Mount the connection module (optional) on the tool stand column with three M6x12 screws (screw holes are situated on the right side of the module).</p> <p>See tightening torques in section 4.1.</p>
3	Connect signals 	<p>Connect the signal cables from the valve unit for the dust cover to respective contact according to respective circuit diagram (depending on option).</p>
4	Connect ground 	<p>NOTE! Four 9 mm holes are available. on the wings supporting the tool stand column, for ground connection.</p> <p>NOTE! The ground connection shall be mounted with a serrated washer, directly against the tool stand column, to ensure full contact with ground.</p>



4.5 Adjustment of tilting angle

The tilting angle of the dust cover mounted on the pneumatic tilting clamp is seamlessly adjustable within 10°–135° using the adjustment screw. The default tilting angle is 135°. Set up of maximum tilting angle is performed in the following way:

	Action	Note
1	Air off! 	WARNING! Only perform work on the pneumatic tilting clamp when the air pressure is safely switched off.
2	Open position	Bring the arm of the pneumatic tilting clamp to open position (see circuit diagram E0186-118 in section 2.3.7).
3	Read angle	Read the pre-adjusted angle at the scale.
4	Release tilting clamp for adjustment	Remove securing screw "A" in the cylinder bottom.
5	Set new tilting angle	Turn adjustment screw "B" with until desired angle has been reached, adjusting range 10°-135° (APH2 max 105), see scale at the housing.
6	Lock tilting clamp for adjustment	Remount securing screw "A" in the cylinder bottom.



WARNING! The pneumatic tilting clamp is not designed as a complete tool ready for independent applications and has not been supplied with safety features. Only when correctly installed, as a part of a production system and with a corresponding safety control system added, all safety requirements will be met.

Should any faults occur that place personnel at risk, the pneumatic tilting clamp shall be switched off immediately. Maintenance measures shall only be undertaken when the machine is at a complete standstill and by qualified specialists. After maintenance has been carried out, protection devices shall be refitted in the correct way.

5 MAINTENANCE AND SERVICE

The tool changer, tool attachment and tool stand must be maintained regularly to ensure proper function. The specified intervals are approximate and valid under normal conditions. Under extreme conditions, such as dirty environments or extreme robot movements, the intervals should be shortened.

Consider the table as a guide and update as your production experience of each system increases.



NOTE!

Only perform work on grippers or tools attached to the tool changer if the air pressure is safely switched off.



NOTE!

Equipment delivered by Robot System Products must only be dismantled and repaired by Robot System Products during the warranty period. Otherwise the warranty will not be valid.

5.1 Tools and required products

5.1.1 Recommended tools for maintenance

Tools	Applications
Complete set of Allen keys	For dismounting and mounting.
Torque wrench	For all socket head cap screws
Slide hammer	For dismounting guide pins
Plastic hammer	For mounting guide pins
Circlip plier	For dismounting and mounting circlips
Punch	For dismounting bushings

5.1.2 Required products

Product	Specification	Note
Grease	MolykoteBR2Plus	For guide pins and tool plate bushings
Glue	Loctite 638	For guide pins at tool plate
Threadlocker	Loctite 2400	For securing screws
Cleaning agent	Denatured alcohol or similar	For tool stand hanger and tool plate
Cloth	Lint free cloth	For cleaning.



NOTE! Chemical resistance protective gloves are recommended when using grease or cleaning agents such as industrial alcohol. Safety goggles are recommended when working with cleaning agents such as industrial alcohol. Adequate ventilation should be provided when chemical substances are used.

5.2 Wear parts

Wear parts should be replaced before considerable damage occurs. The interval depends on the number of tool changes and its working environment. Generally, the more contaminated environment, the closer maintenance intervals.

The following parts are considered as wear parts:

- Tool stand hanger and tool plate guide pins
- Guide block
- Tool plate bushings

5.3 Inspection and cleaning

5.3.1 Visual inspection (monthly)

Visually check the following

Equipment	Description	Action
Guide pins on tool stand hanger and tool plate	Not worn, damaged or dirty.	Replace if worn or damaged. Clean when dirty.
Bushings on tool plate	Not worn, damaged or dirty.	Replace if worn or damaged. Clean when dirty.
Cables and connector	Not worn, damaged.	Replace if worn or damaged.
Tool stand column	Not damaged or dirty	Replace if damaged. Clean when dirty.
Tool stand hanger in general	Not damaged or dirty.	Replace if damaged, Clean when dirty.

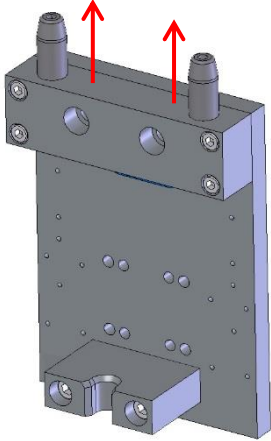
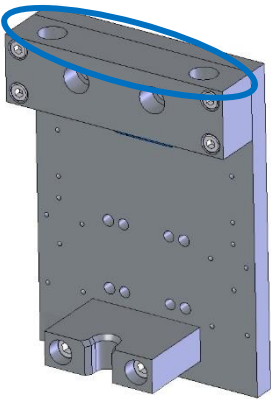
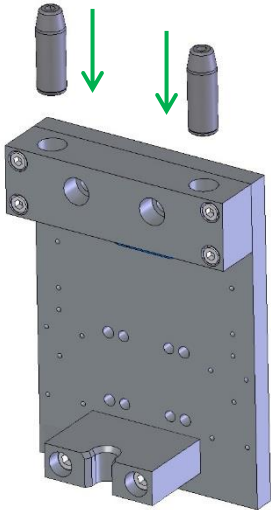
5.3.2 Cleaning (every third month)

Clean the following

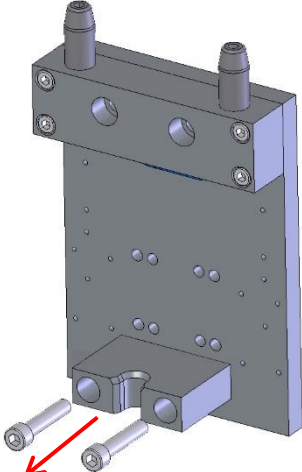
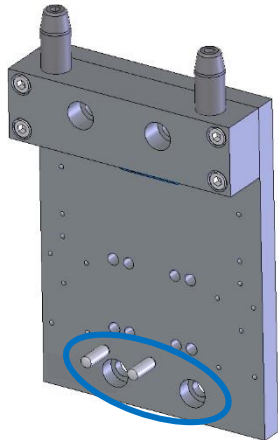
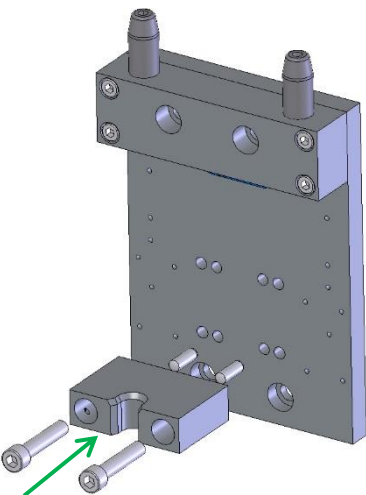
Equipment	Action
Guide pins on tool stand hanger and tool plate	Wipe clean with lint free cloth. Apply a small amount of grease (Molykote BR2Plus).
Bushings on tool plate	Wipe clean with lint free cloth. Apply a small amount of grease (Molykote BR2Plus).
Tool stand column	Wipe clean with lint free cloth.
Tool stand hanger in general	Wipe clean with lint free cloth.

5.4 Replacement of wear parts

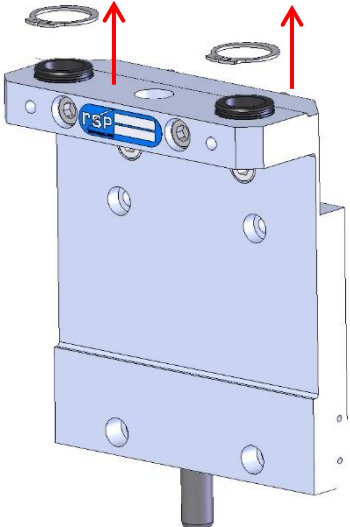
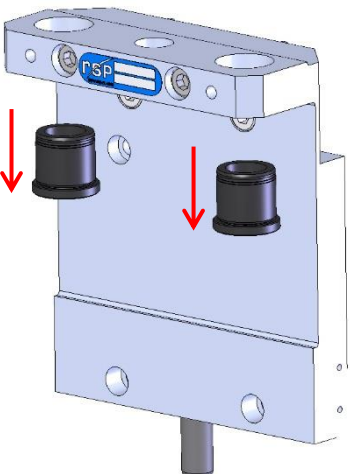
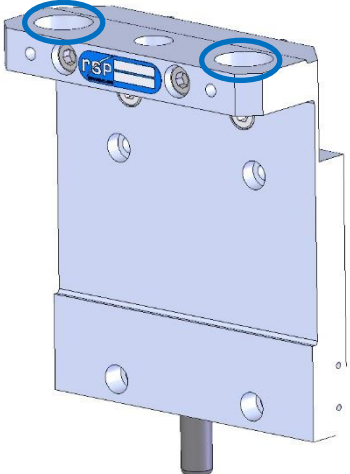
5.4.1 Replacement of tool stand hanger guide pins

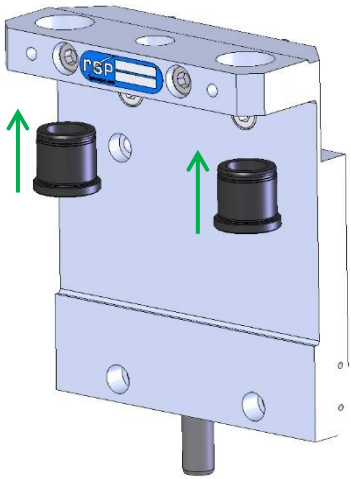
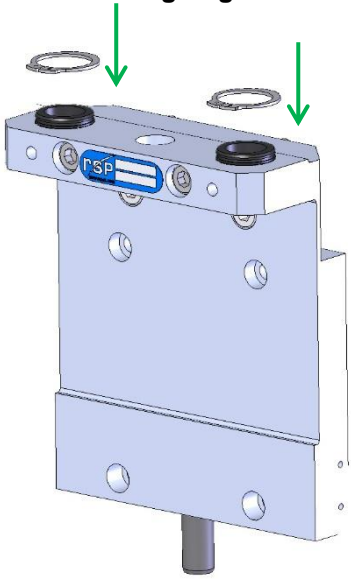
	Action	Note
1	Dismount guide pins 	Remove the guide pins with a slide hammer (M8-thread).
2	Cleaning 	Wipe clean guide pin holes seat with a cloth.
3	Lubricate	Apply a small amount of grease (Molykote BR2Plus) on guide pins and guide pin holes.
4	Mount guide pins 	Fit the new guide pins in the holes and use a plastic hammer to mount the guide pins.

5.4.2 Replacement of tool stand hanger guide block

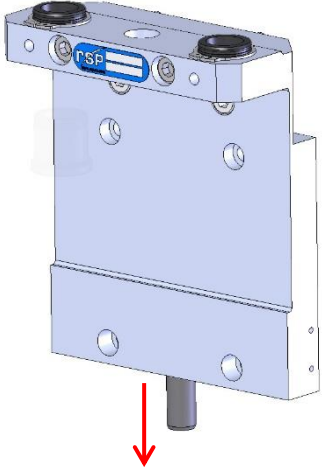
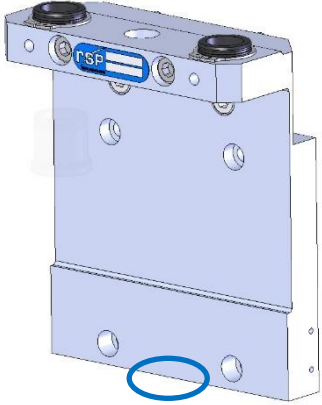
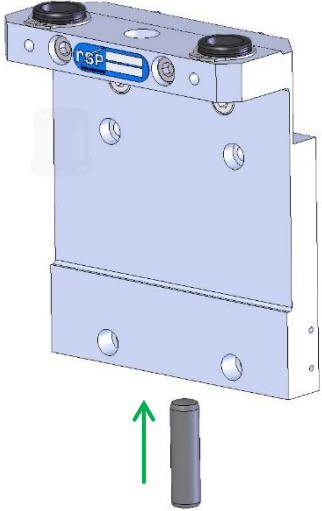
	Action	Note
1	Remove guide block 	Remove the guide block by loosening the M10 screws.
2	Cleaning 	Wipe clean the guide block seat with a cloth.
3	Attach new guide block 	Attach a new guide block using M10-screws. See tightening torques above.

5.4.3 Replacement of tool plate bushings

	Action	Note
1	Dismount circlips 	Dismount the two circlips with a circlip plier.
2	Dismount bushings 	Dismount the bushings with a punch.
3	Cleaning 	Wipe clean the bushing holes with a cloth.

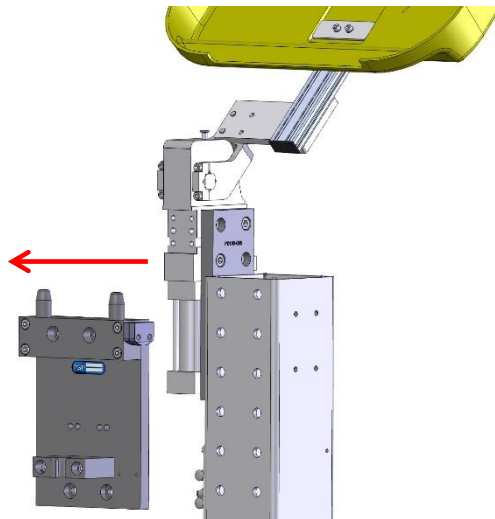
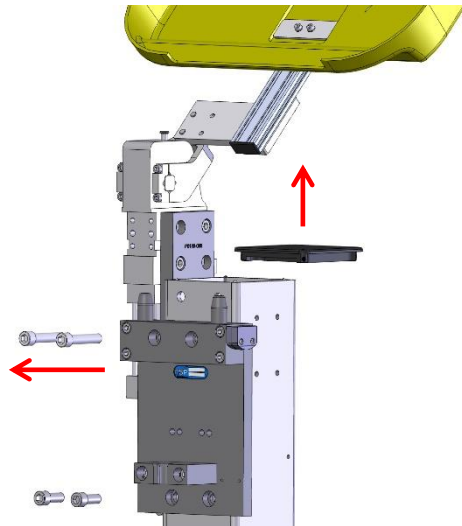
4	Mount new bushings 	Apply a small amount of grease (Molykote BR2Plus) in the bushing holes. Fit the new bushings in the holes. Insert the bushings.
5	Mount locking rings 	Mount the two circlips with a circlip plier.

5.4.4 Replacement of tool plate guide pin

	Action	Note
1	Dismount guide pin 	Dismount the guide pin with a slide hammer (M8-thread).
2	Cleaning 	Wipe clean the guide pin hole with a cloth.
3	Mount new guide pin 	Apply a small amount of glue (Loctite 638) in the guide pin hole. Fit the new guide pin in the hole and use a plastic hammer to mount the guide pin.

5.4.5 Replacement of tool stand hanger

	Action	Note
1	Safety	Read the safety section (1.1).
2	Dismount tool stand hanger	Remove the cap from the top of the tool stand column. Dismount the tool stand hanger from the tool stand column using torque wrench for the two M12x60 and the two M12x30 screws. Disconnect sensor connector.
3	Release tool stand hanger	Remove the tool stand hanger from the tool stand column. WARNING! The tool stand hanger is heavy and might cause personal injury and equipment damage if dropped.
4	Mount new tool stand hanger	See section 4.4.2 Mounting of tool stand hanger on tool stand column.



6 DISPOSAL AND RECYCLING

Taking care of spent equipment

Used equipment must be taken care of in an environmentally friendly way.

When disposed of, a major share of the material, or its energy content, can be recycled. The quantities possible to recycle vary depending on technical resources and practises in respective country. Non-recyclable components shall be handed over to an authorized environmental waste treatment facility for destruction or disposal.

Electronics

Electronic equipment shall be sent to an authorized recycling company or sorted into different component materials and treated as such.

Metals

Metals can, in general, be melted down, recycled and used in new products. They shall be sorted according to type and surface coating and handed over to an authorized recycling facility.

Metal components of steel and aluminium are substantial in size and easy to identify. Copper and brass are primarily used in transmission of electric power and in water/air modules. Brass may include small alloy of lead. Silver or gold plating of contact surfaces may occur.

Plastics

Thermoplastics can, in general, be re-heated and recycled without any major loss of quality. They shall be handed over to an authorized recycling facility. POM occurs in swivel housings, etc. PTFE in some sealings.

Rubber

Rubber shall be handed over to an authorized environmental waste treatment facility either for recycling, disposal or destruction. Rubber occurs in O-rings.

Other material

All other material shall be sorted and handed to an authorized environmental waste treatment facility in accordance with national legislation.

