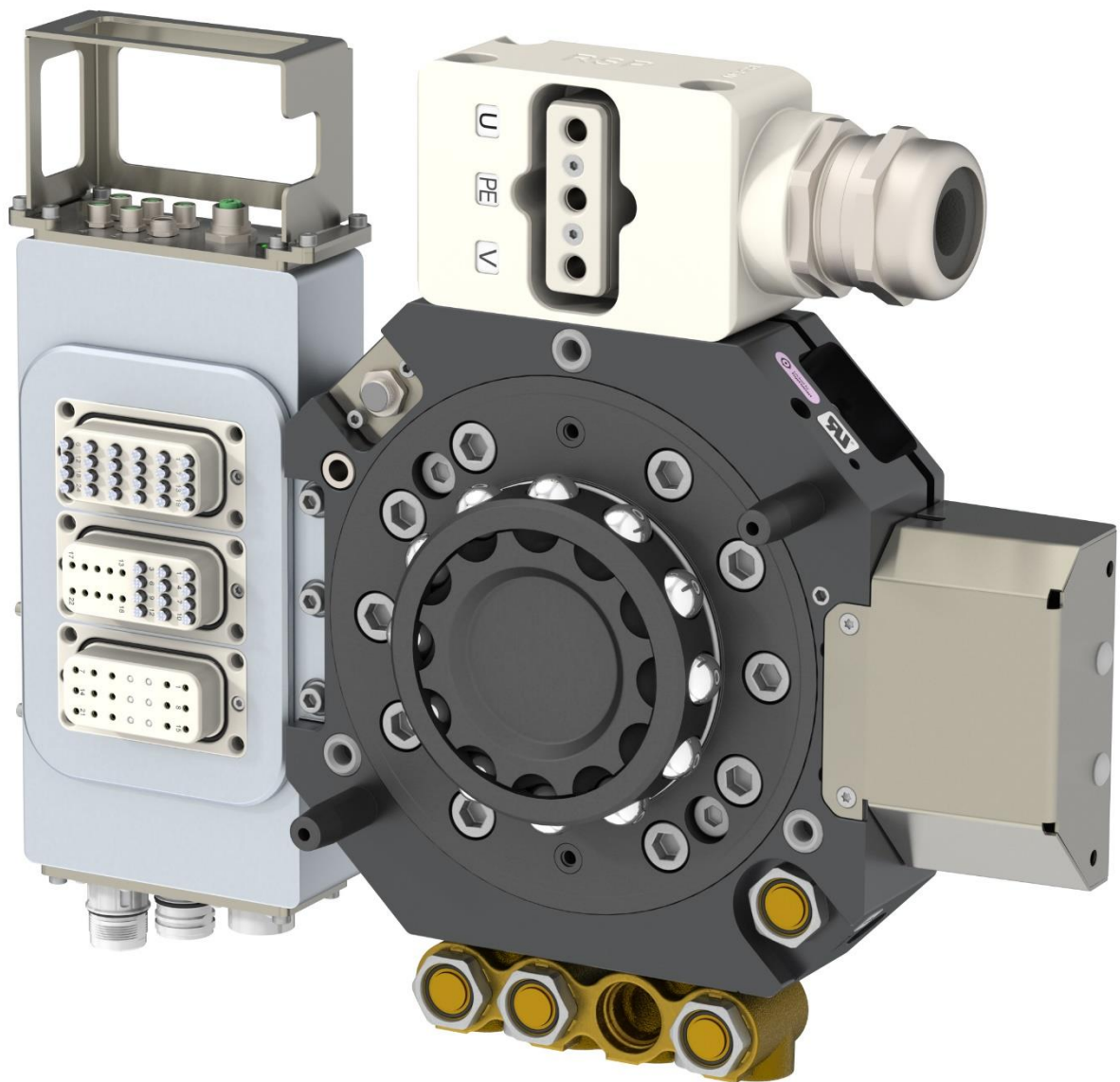


# Product Description

## Moduflex series

M0731-1 Project NRV P6700

Tool changers | Swivels | Swivels with Tool changers | Grippers | Hose packages | Valve Units | Tool systems





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## 0 CONFIGURATIONS

	<b>Robot side</b> Tool Changer (TC) Part number		<b>Tool side</b> Tool Attachment (TA) Part number		
<b>Application</b>	<b>Material Handling</b>	<b>Spot Welding</b>	<b>Material Handling</b>	<b>Material Handling</b>	<b>Spot Welding</b>
<b>Robot type</b>	<b>TC480-MH</b>	<b>TC480-SWS</b>	<b>TA480-MH</b>	<b>TA480-SWS/MH</b>	<b>TA480-SWS</b>
IRB6700 ABB Lean ID	P7548-035-UL		P7548-036-UL		
		P7548-033-UL		P7548-037-UL	P7548-034-UL
IRB7600 ABB Lean ID	P7548-035-UL +P0657		P7548-036-UL		
		P7548-033-UL +P0657		P7548-037-UL	P7548-034-UL
<b>Robot type</b>	<b>TC720-MH</b>	<b>TC720-SWS</b>	<b>TA720-MH</b>	<b>TA720-SWS/MH</b>	<b>TA720-SWS</b>
IRB7600 ABB Lean ID	P7572-014-UL		P7572-015-UL		
		P7572-016-UL		P7572-018-UL	P7572-017-UL
IRB8700 ABB Lean ID	P7572-014-UL +P6933		P7572-015-UL		
		P7572-016-UL +P6933		P7572-018-UL	P7572-017-UL

# 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.

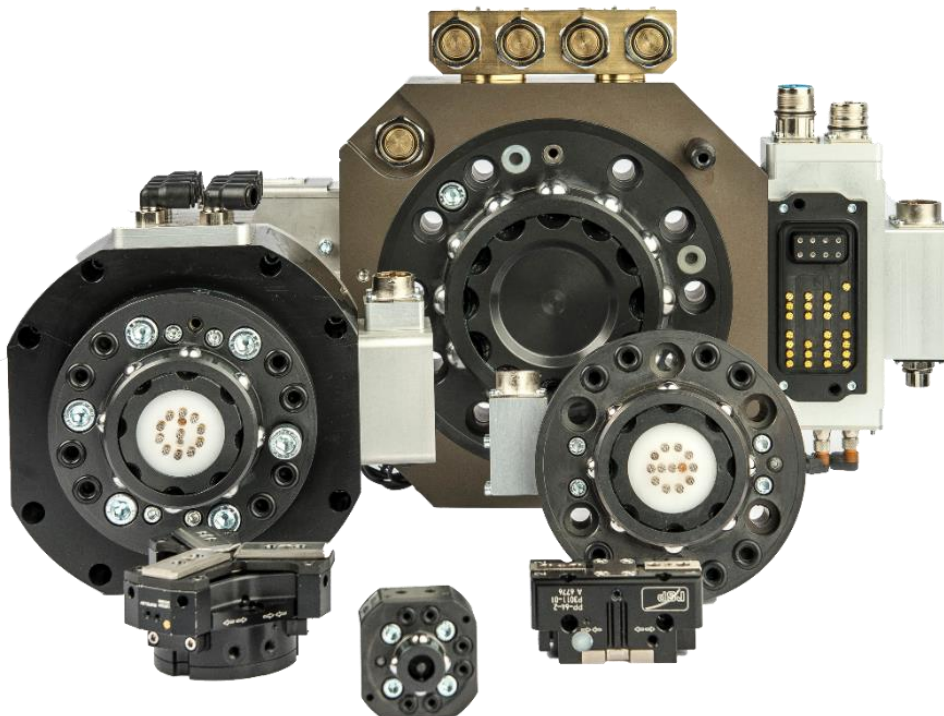
**Robot System Products** has a wide range of standard robot peripheral products:

- 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. Our 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:

[www.rsp.eu.com](http://www.rsp.eu.com)





## 1.1 RSP tool changers

Our tool changers enable robots to handle, and switch between, multiple tools. They are built to ensure reliable and smooth operation, being compact with low weight and robust design and incorporating many safety features. Depending on model and options, electrical signals, weld and servo power, data, water and compressed air are transferred from the robot side to the tool.

The patented locking device TrueConnect™ has a minimum of play and gives a practically, through the lifespan, absolute positioning repeatability. The principle behind the locking mechanism is the uniform distribution of load obtained by pressing the locking balls into spherical cavities. In consequence, substantially larger positional tolerances are accepted during docking. A built-in spring ensures that the tool remains in place in the tool changer even if the air pressure drops.

## 1.2 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:

- Water/air couplings
- Signal pins
- Servo power pins and sockets
- Weld power pins and sockets
- Guide pins and bushings
- Air sealings
- O-rings

## 1.3 Complementary equipment from RSP

Complementary equipment is described in separate documents.

Article	Note
External valve units	Mounted at the rear of the upper arm. Shuts off air automatically during tool change.
Tool parking system	RSP tool parking systems give rigid installations for easy tool changing.
Connection kits	Connection kits for tool changers and tool attachments simplifying electrical installations.
3D-models	Available in Solid Works®, STEP and Parasolid-format.

## 1.4 Limitation of Robot movements

There can be some limitations on the movement of axis 5 for some robot models. Contact Robot System Products for more information.

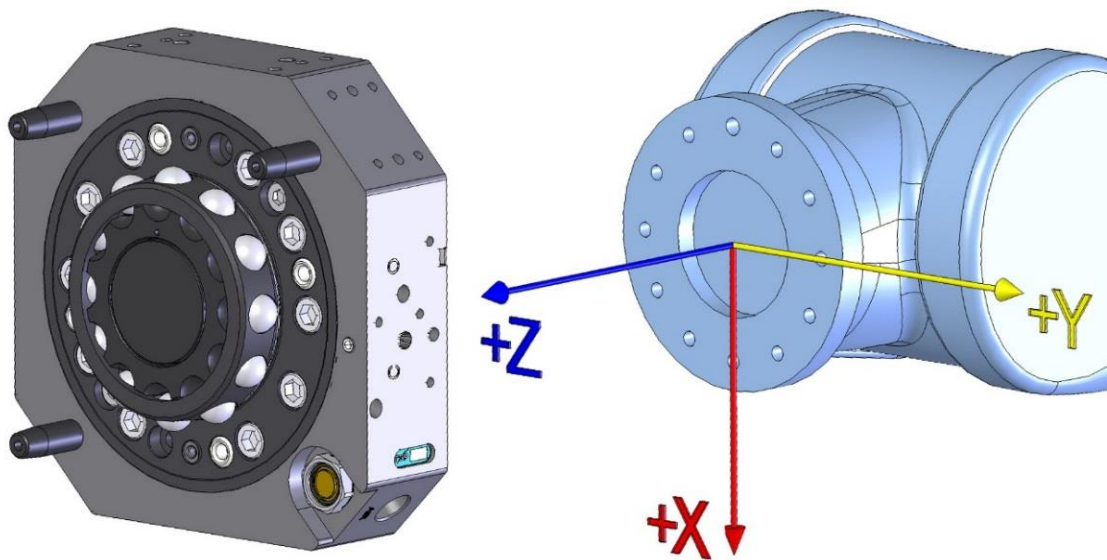
## 2 TECHNICAL SPECIFICATIONS

### 2.1 Description of tool changers and tool attachments

This document describes the RSP tool changers TC480 and TC720 configured for spot welding and material handling together with corresponding tool attachments for mounting on ABB IRB 6700, IRB 7600 and IRB 8700 robots.

#### 2.1.1 Coordinate System Definition

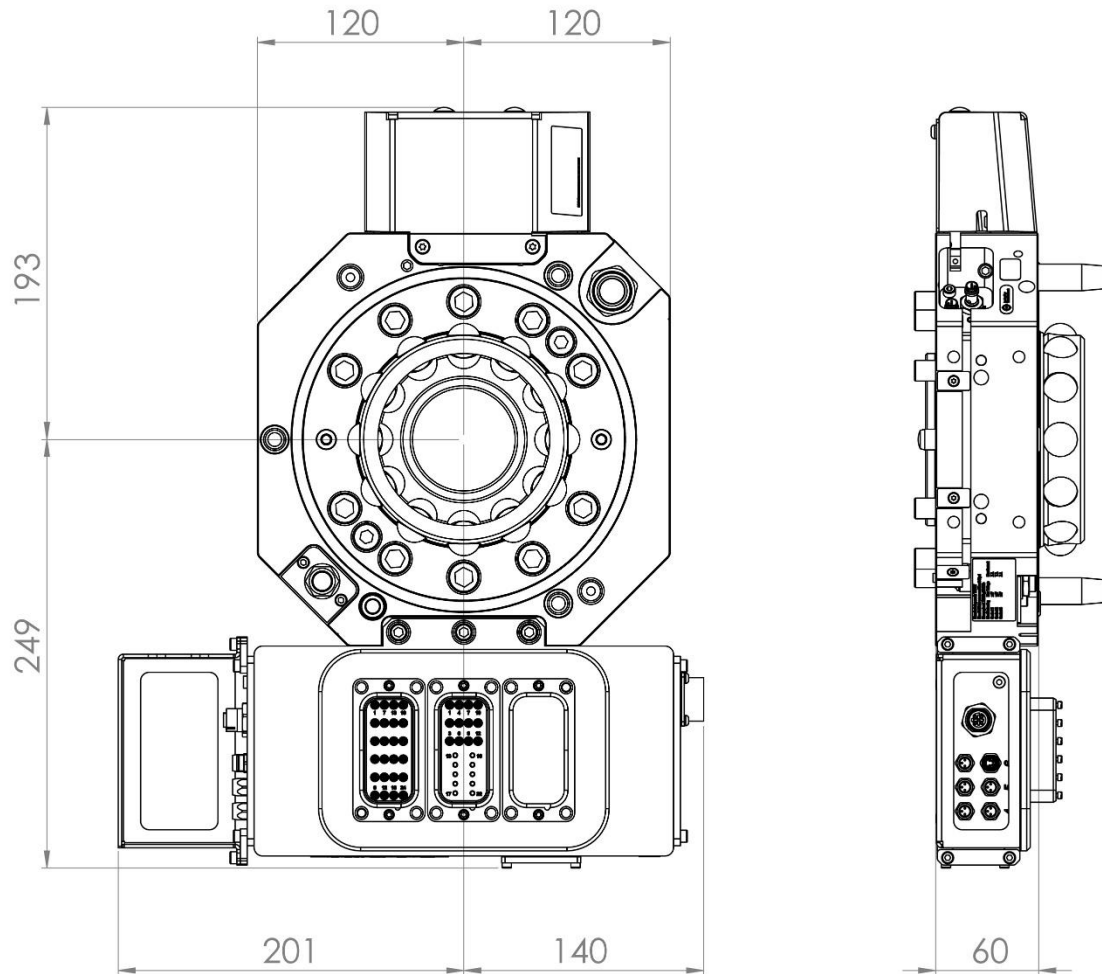
A tool changer adds load to the robot. If the arm and tool loads are not stated correctly during programming the behaviour of the robot and the wear of the equipment will be affected. Information about weight and maximum tool load can, in accordance with the co-ordinate systems shown below, be found in the technical specification tables of the tool changers.



**NOTE!** For the tool changer, and tool changer with tool attachment docked, the origo of the co-ordinate system is situated in the centre of the robot mounting flange.

## 2.2 Tool changer TC480-MH Lean ID. Article: P7548-035-UL

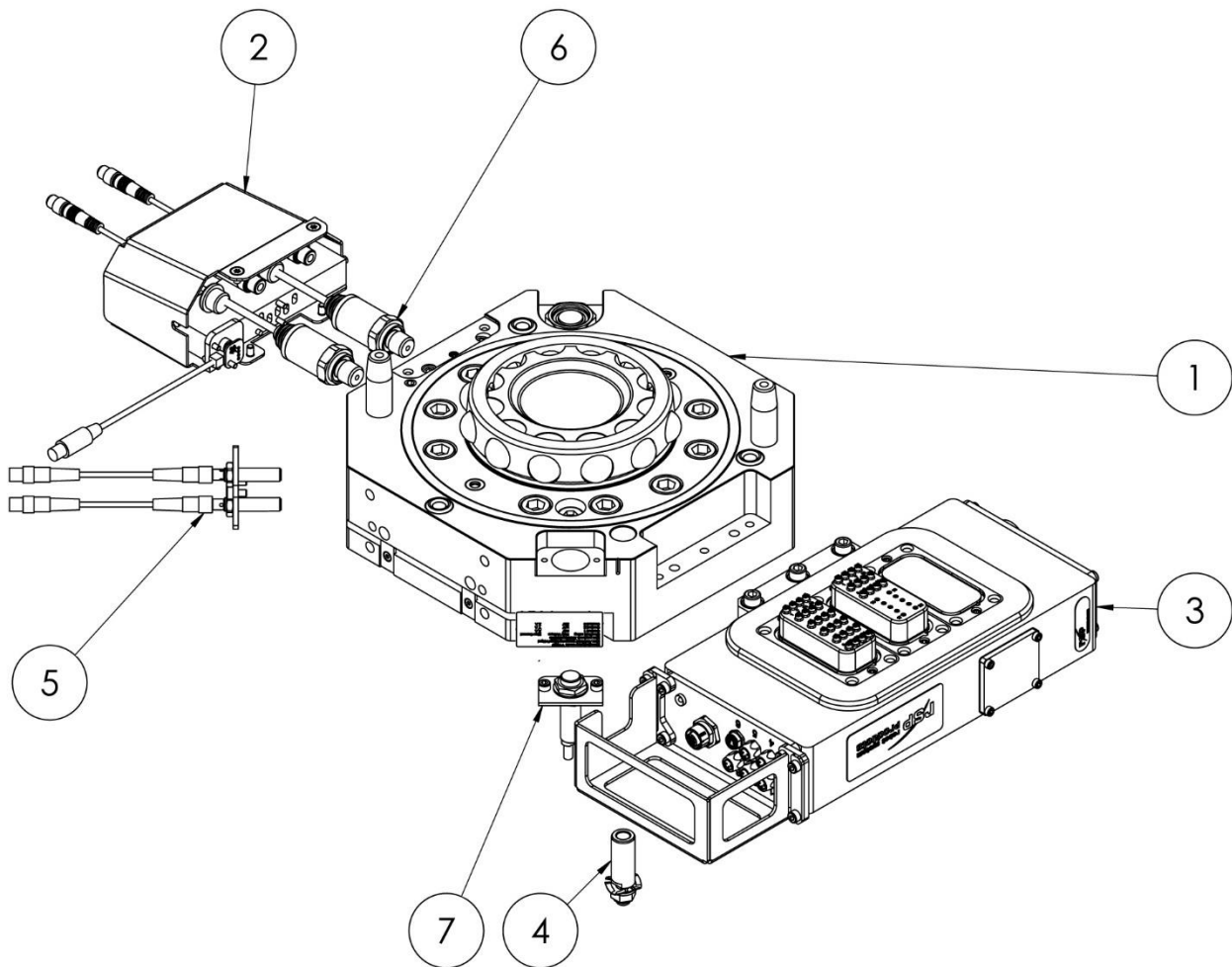
Tool changer for material handling. To be used together with tool attachment TA480-MH, P7548-036-UL.



### 2.2.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 160-10-M12
<b>Maximum tool load</b>	Fz (static)	±5 000 N
	Mx/My (dynamic)	±5 000 Nm
	Mz (dynamic)	±3 500 Nm
<b>Weight and centre of gravity (Z)</b>		
TC (P7548-035)		16.0 kg / 37 mm
TC + TA (P7548-036)		26.1 kg / 55 mm
TC (P7548-035) + P0657 (adaptation kit IRB7600)		22.2 kg / 48 mm
TC + P0657 + TA (P7548-036)		32.3 kg / 67 mm
<b>Water/air channels</b>	Pneumatic diagram	Pne0230-014 (section 2.13)
	P7801A (TC480) G 1/2"	1 x (automatic shut-off)
<b>Signal module</b>	Product manual	M8353-1
	P7501-015-UL Circuit diagram	E0203-291 (section 2.14)

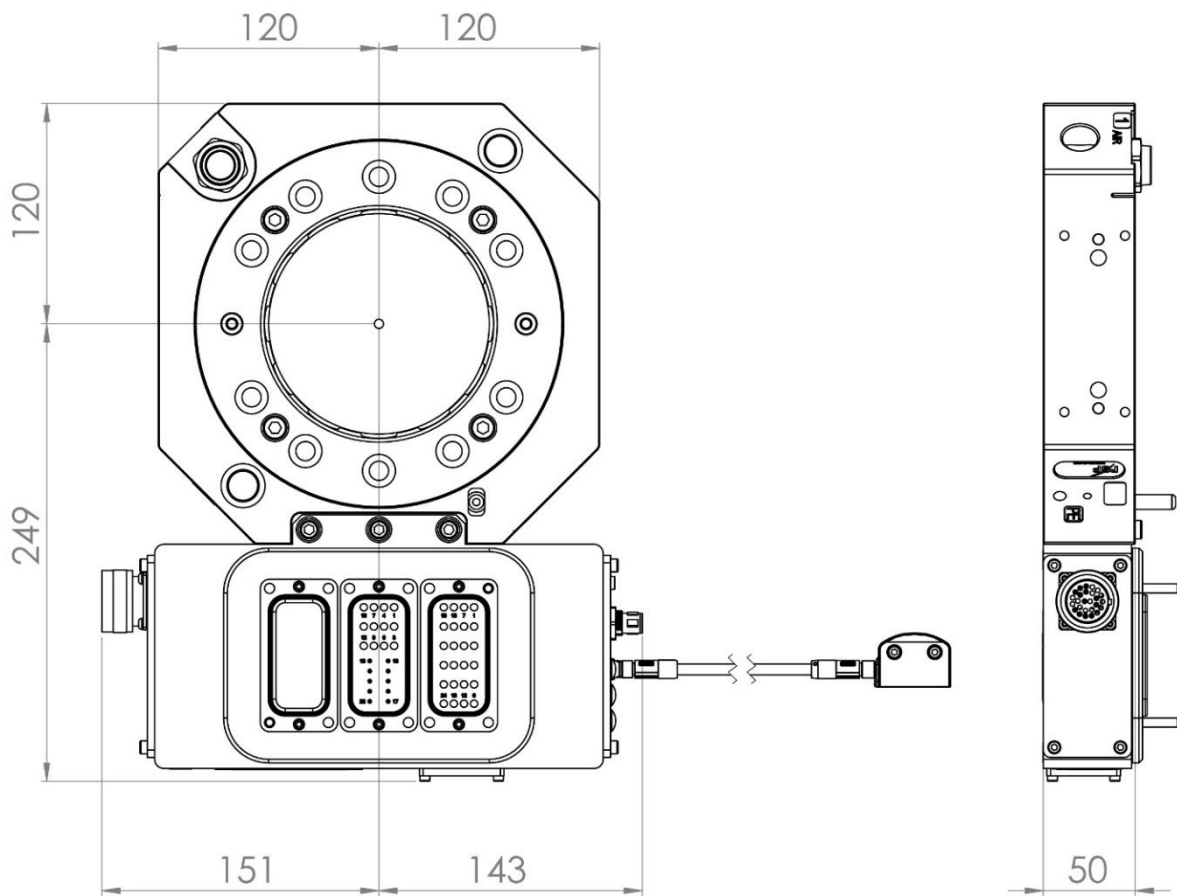
## 2.2.2 Components



POS	ITEM No	DESCRIPTION	QTY.
1	P7801A	TC480-1	1
2	P7710-4	Integrated valve	1
3	P7501-015-UL	TC Signal module MH Lean ID	1
4	P7239	TC ground socket	1
5	P7173	TC480 magnetic sensors open/close	1
6	P7257	Pressure sensors, analog	1
7	P7145-1	TC-Empty sensor ass. (inductive)	1

## 2.3 Tool attachment TA480-MH Lean ID, Article: P7548-036-UL

Tool attachment for material handling connected on the tool side. To be used together with tool changer TC480-MH, P7548-035-UL.



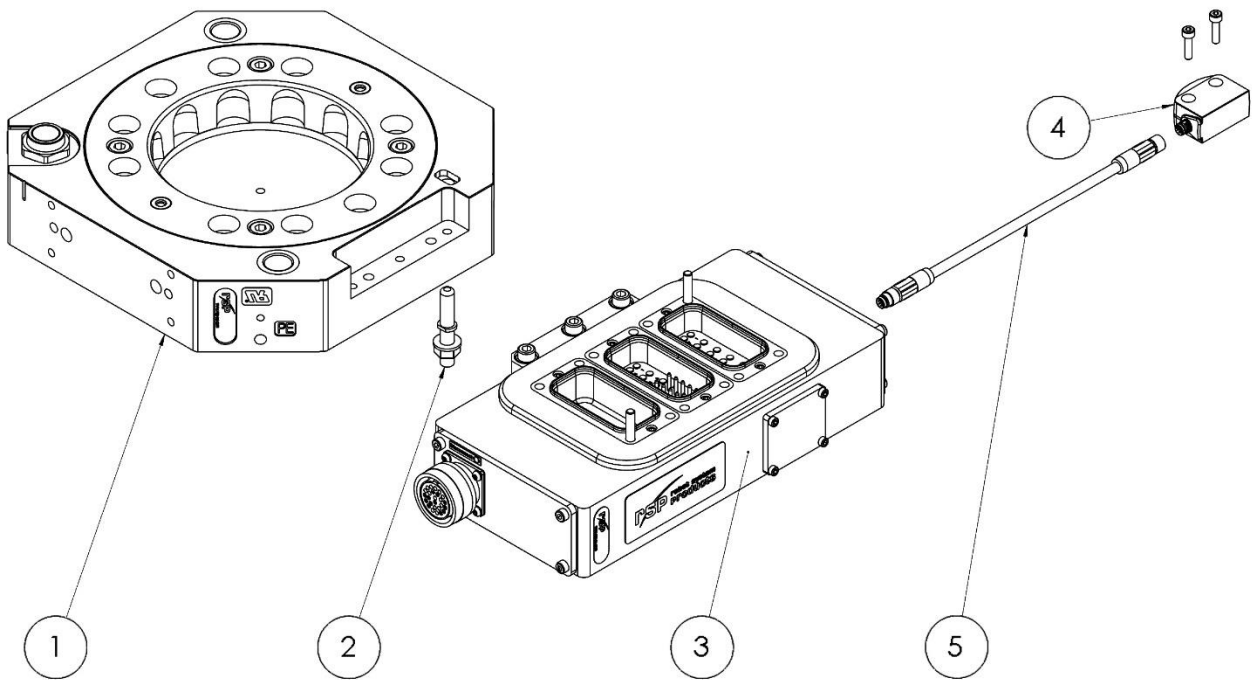
### 2.3.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 160-10-M12
<b>Maximum tool load</b> (M12 screws)	Fz (static)	±5 000 N
	Mx/My (dynamic)	±5 000 Nm
	Mz (dynamic)	±3 500 Nm
<b>Maximum tool load</b> (M10 screws)	Fz (static)	±5 000 N
	Mx/My (dynamic)	±5 000 Nm
	Mz (dynamic)	±2 500 Nm
<b>Weight</b>		10.2 kg
<b>Water/air channels</b> P7802A (TA480)	Pneumatic diagram	Pne0230-014 (section 2.13)
	G 1/2"	1 x (automatic shut-off)
<b>Signal module</b> P7501-024-UL	Product manual	M8353-1
	Circuit diagram	E0203-294 (section 2.15)



**NOTE!** Tools can be mounted to the tool attachment using ten M12 screws, alternatively the tool attachment can be mounted to the tool using ten M10 screws.

## 2.3.2 Components



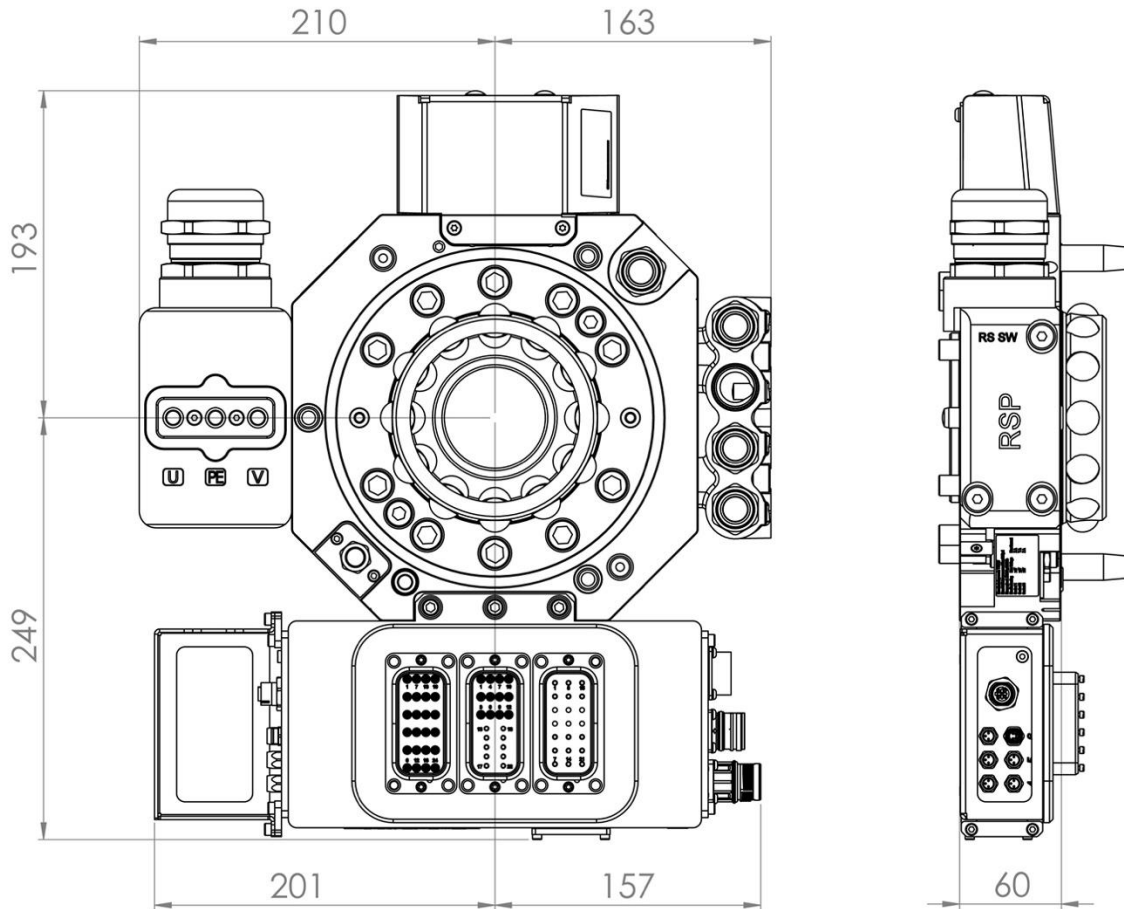
POS	ITEM No	DESCRIPTION	QTY.
1	P7802A	TA 480-1	1
2	P7147	TA ground to TA240-960	1
3	P7501-024-UL	TA Signal module MH LeanID	1
4	I1171	Position switch Active (used together with I1172)	1
5	I1260	Cable 8P M8 / 8S M8	1



**NOTE!** Depending on availability the sensor and cable combination I1171 and I1260 (section 3.12.1) may be exchanged for P8521 (section 3.12.2). In such case the passive sensor I1172, mounted on the tool stand, must be exchanged for I1852.

## 2.4 Tool changer TC480-SWS Lean ID. Article: P7548-033-UL

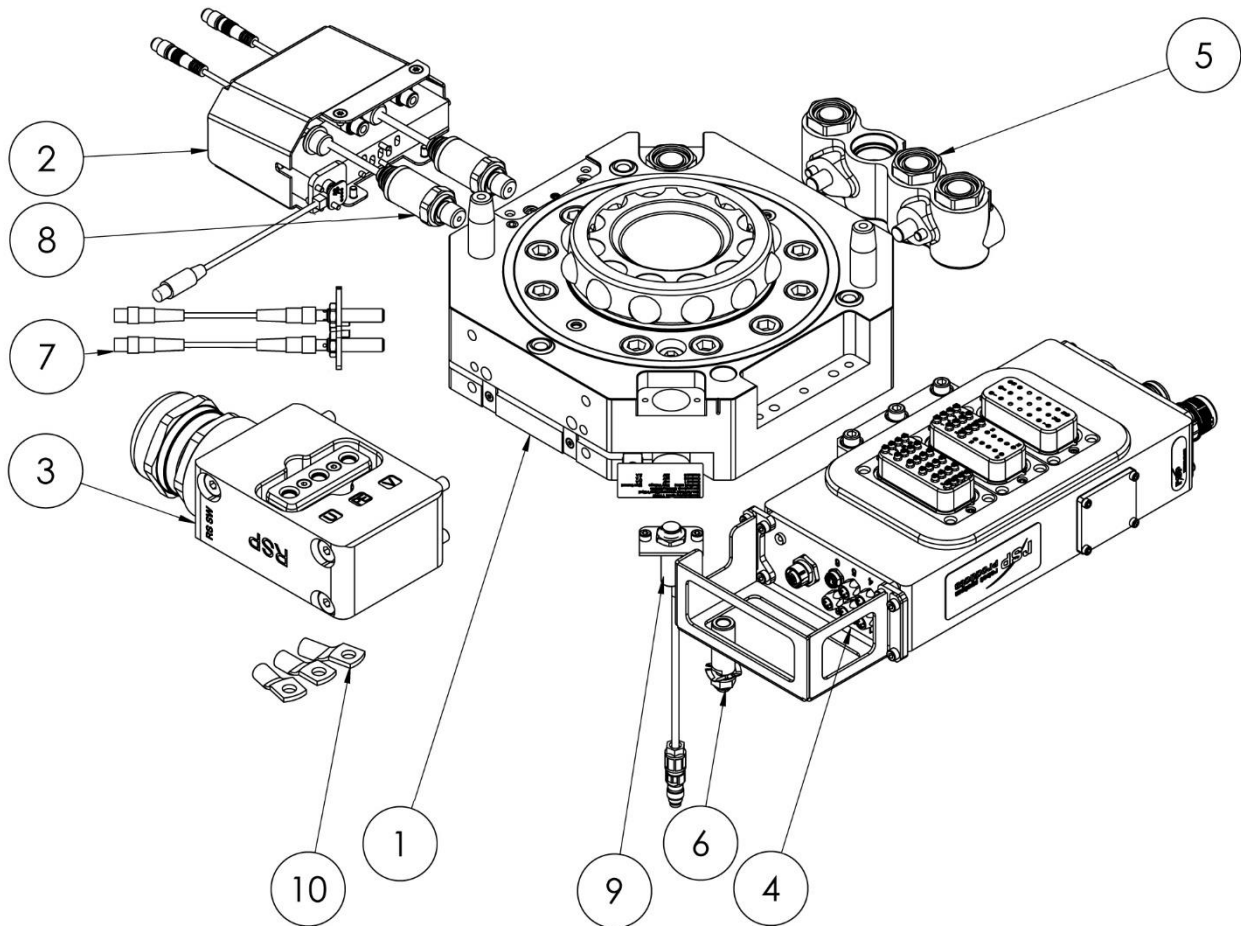
Tool changer for spot welding and material handling. To be used together with tool attachments P7548-034-UL and P7548-037-UL.



### 2.4.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 160-10-M12
<b>Maximum tool load</b>	Fz (static)	±5 000 N
	Mx/My (dynamic)	±5 000 Nm
	Mz (dynamic)	±3 500 Nm
<b>Weight and centre of gravity (Z)</b>		
TC (P7548-033)		18.5 kg / 36 mm
TC + TA (P7548-034)		31.3 kg / 55 mm
TC + TA (P7548-037)		28.9 kg / 53 mm
TC (P7548-033) + P0657 (adaptation kit IRB7600)		24.8 kg / 48 mm
TC + P0657 + TA (P7548-034)		37.6 kg / 68 mm
TC + P0657 + TA (P7548-037)		35.2 kg / 66 mm
<b>Water/air channels</b>	Pneumatic diagram	Pne0230-014 (section 2.13)
	P7801A (TC480)	G 1/2"
	P7230-3B	G 1/2"
<b>Signal module</b>	Product manual	M8353-1
	P7501-012-UL	Circuit diagram
<b>Weld power</b>	Conductors	3 x (140A, 690V)
	P6784-UL	Connection
		Cable gland (M50 with insert grommet)

## 2.4.2 Components

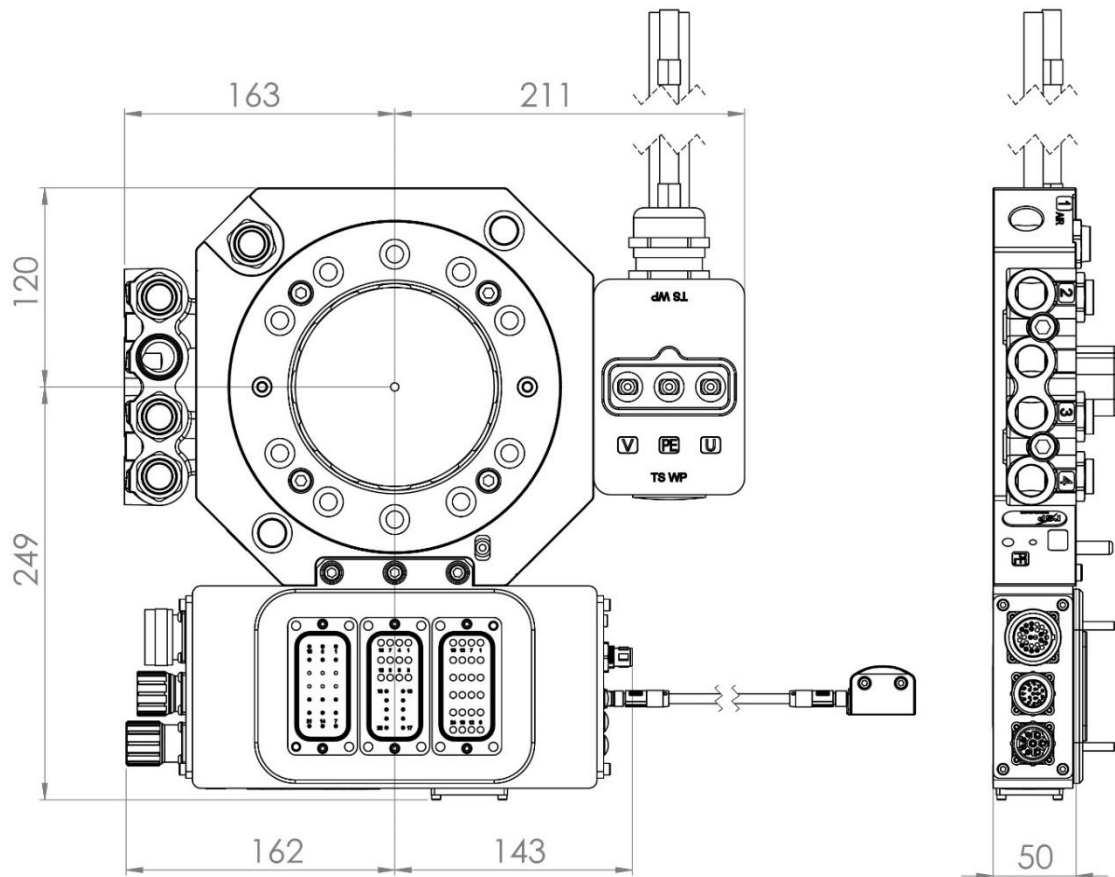


POS	ITEM No	DESCRIPTION	QTY.
1	P7801A	TC480-1	1
2	P7710-4	Integrated valve	1
3	P6784-UL	Option TC power, cable gland UL	1
4	P7501-012-UL	TC Signal module SWS Lean ID	1
5	P7230-3B	Option to TC water/air couplings	1
6	P7239	TC ground socket	1
7	P7173	TC480 magnetic sensors open/close	1
8	P7257	Pressure sensors, analog	1
9	P7145-1	TC-Empty sensor ass. (inductive)	1
10	I0049	Crimp cable lug M8-25mm2	3



## 2.5 Tool attachment TA480-SWS Lean ID, Article: P7548-034-UL

Tool attachment for spot welding connected on the tool side. To be used together with tool changer TC480-SWS, P7548-033-UL.



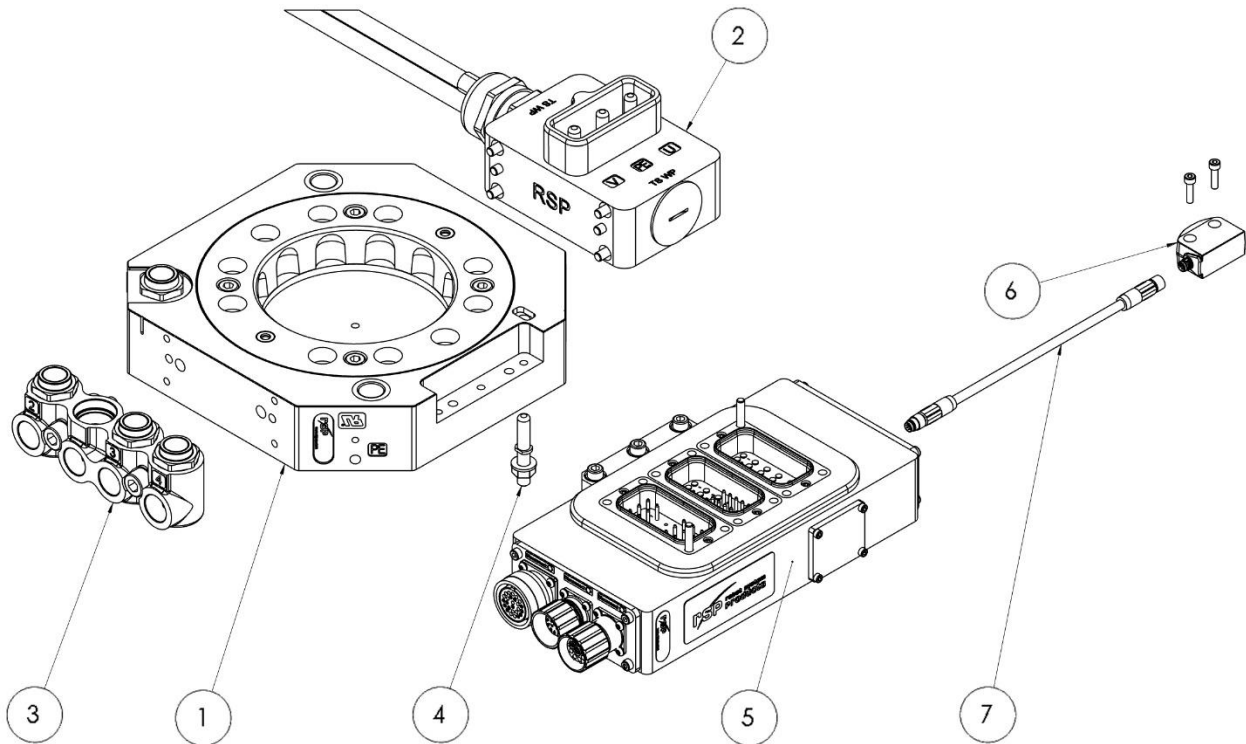
### 2.5.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 160-10-M12
<b>Maximum tool load</b> (M12 screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±5 000 N ±5 000 Nm ±3 500 Nm
<b>Maximum tool load</b> (M10 screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±5 000 N ±5 000 Nm ±2 500 Nm
<b>Weight</b>		12.8 kg
<b>Water/air channels</b> P7802A (TA480) P7231-3B	Pneumatic diagram G 1/2" G 1/2"	Pne0230-014 (section 2.13) 1 x (automatic shut-off) 3 x (automatic shut-off)
<b>Signal module</b> P7501-023-UL	Product manual Circuit diagram	M8353-1 E0203-289 (section 2.17)
<b>Weld power</b> P1517-UL	Connection Cable (included)	Cable gland for a 3-conductor 3 x 1.4m (single wire) cables, open end



**NOTE!** Tools can be mounted to the tool attachment using ten M12 screws, alternatively the tool attachment can be mounted to the tool using ten M10 screws.

## 2.5.2 Components



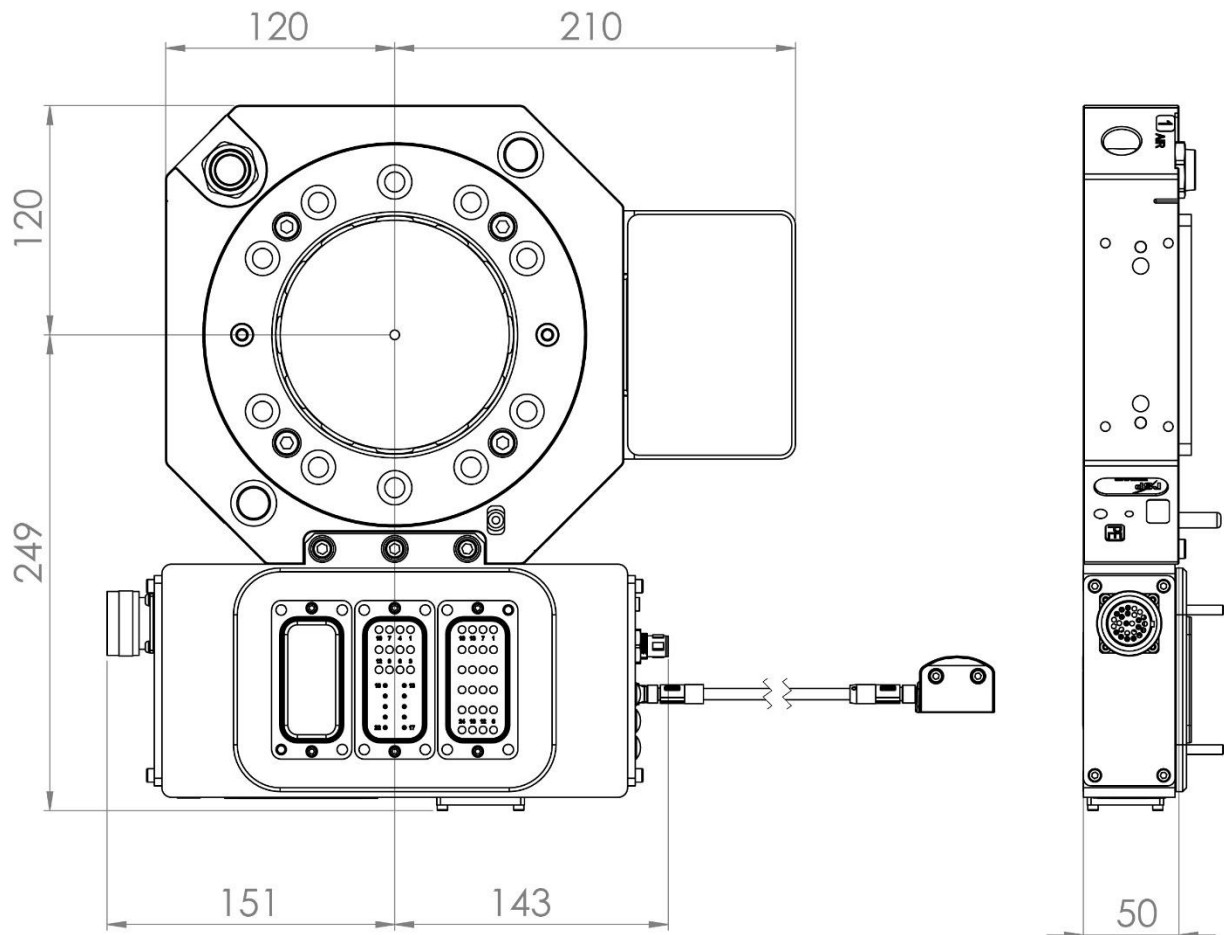
POS	ITEM No	DESCRIPTION	QTY.
1	P7802A	TA 480-1	1
2	P1517-UL	TA Weld power, 3x25mm <sup>2</sup> , UL	1
3	P7231-3B	Option to TA 3 water/air couplings	1
4	P7147	TA ground to TA240-960	1
5	P7501-023-UL	TA Signal module SWS LeanID	1
6	I1171	Position switch Active (used together with I1172)	1
7	I1260	Cable 8P M8 / 8S M8	1



**NOTE!** Depending on availability the sensor and cable combination I1171 and I1260 (section 3.12.1) may be exchanged for P8521 (section 3.12.2). In such case the passive sensor I1172, mounted on the tool stand, must be exchanged for I1852.

## 2.6 Tool attachment TA480-SWS/MH Lean ID, Article: P7548-037-UL

Tool attachment for material handling connected on the tool side. To be used together with tool changer TC480-SWS, P7548-033-UL.



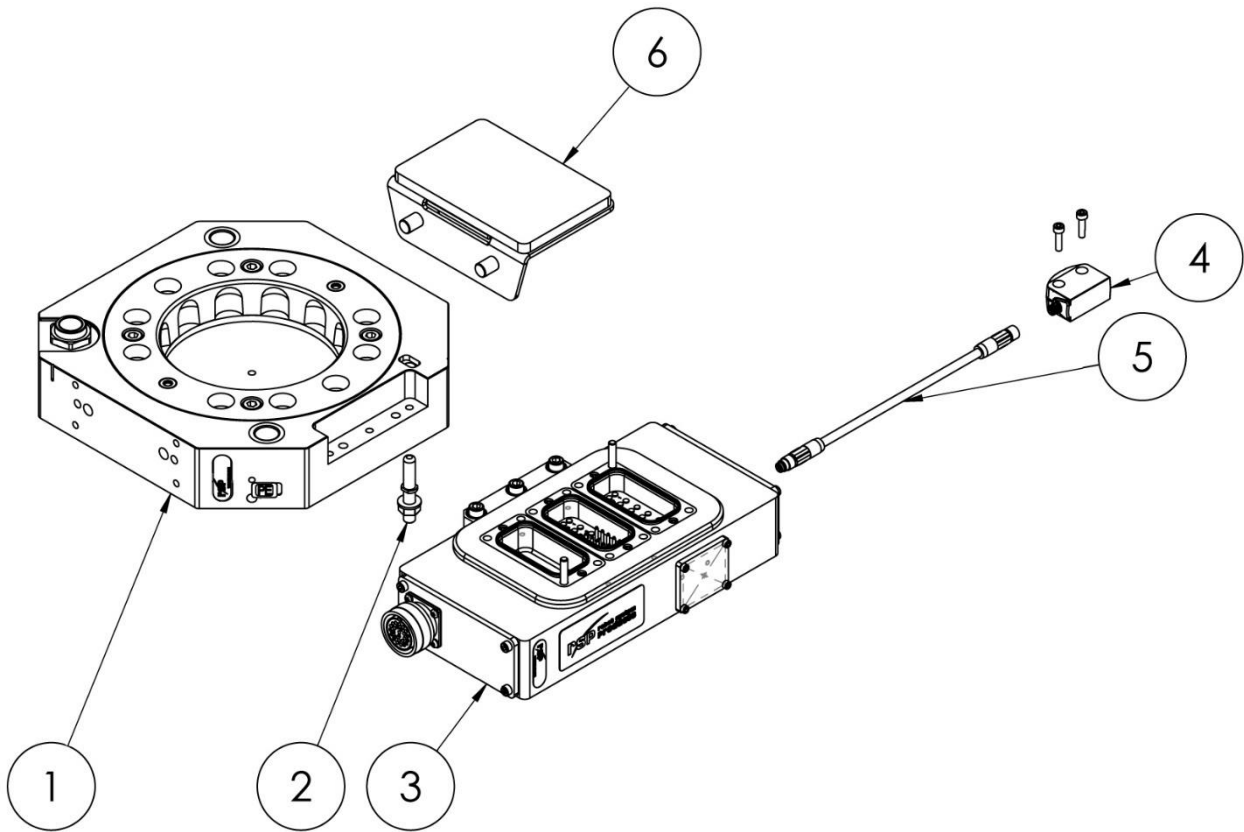
### 2.6.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 160-10-M12
<b>Maximum tool load</b> (M12 screws)	Fz (static)	±5 000 N
	Mx/My (dynamic)	±5 000 Nm
	Mz (dynamic)	±3 500 Nm
<b>Maximum tool load</b> (M10 screws)	Fz (static)	±5 000 N
	Mx/My (dynamic)	±5 000 Nm
	Mz (dynamic)	±2 500 Nm
<b>Weight</b>		10.4 kg
<b>Water/air channels</b> P7802A (TA480)	Pneumatic diagram	Pne0230-014 (section 2.13)
	G 1/2"	1 x (automatic shut-off)
<b>Signal module</b> P7501-024-UL	Product manual	M8353-1
	Circuit diagram	E0203-294 (section 2.15)



**NOTE!** Tools can be mounted to the tool attachment using ten M12 screws, alternatively the tool attachment can be mounted to the tool using ten M10 screws.

## 2.6.2 Components



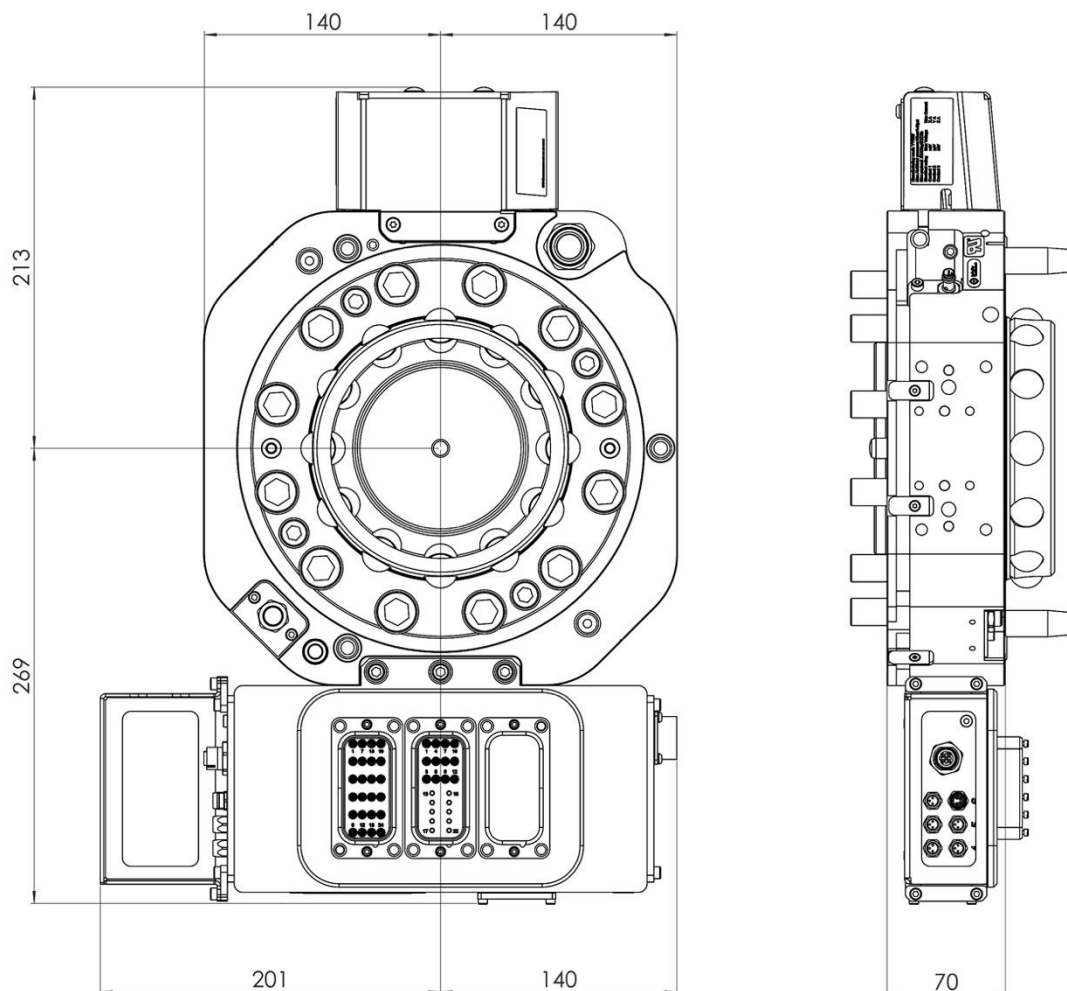
POS	ITEM No	DESCRIPTION	QTY.
1	P7802A	TA 480-1	1
2	P7147	TA ground to TA240-960	1
3	P7501-024-UL	TA Signal module MH LeanID	1
4	I1171	Position switch Active (used together with I1172)	1
5	I1260	Cable 8P M8 / 8S M8	1
6	P6742	Cover weld contact	1



**NOTE!** Depending on availability the sensor and cable combination I1171 and I1260 (section 3.12.1) may be exchanged for P8521 (section 3.12.2). In such case the passive sensor I1172, mounted on the tool stand, must be exchanged for I1852.

## 2.7 Tool changer TC720-MH Lean ID. Article: P7572-014-UL

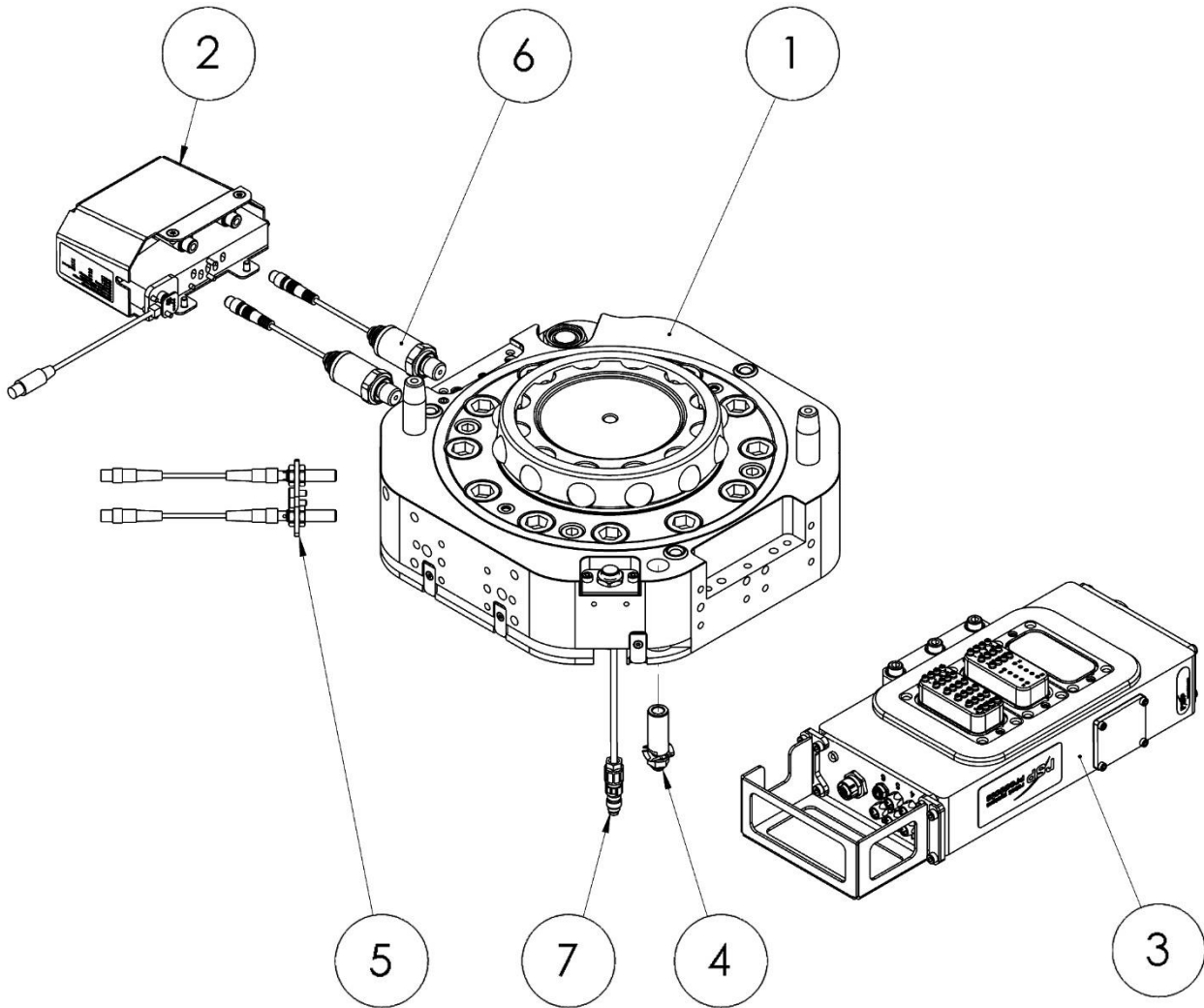
Tool changer for material handling. To be used together with tool attachment TA720-MH, P7572-015-UL.



### 2.7.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 200-12-M16
<b>Maximum tool load</b>	Fz (static)	±10 000 N
	Mx/My (dynamic)	±10 000 Nm
	Mz (dynamic)	±10 000 Nm
<b>Weight and centre of gravity (Z)</b>		
TC (P7572-014)		23.9 kg / 43 mm
TC + TA (P7572-015)		37.1 kg / 61 mm
TC (P7572-014) + P6933 (adaptation kit IRB8700)		40.4 kg / 56 mm
TC + P6933 + TA (P7572-015)		59.6 kg / 75 mm
<b>Water/air channels</b>	Pneumatic diagram	Pne0230-014 (section 2.13)
	P6901A (TC720)	G 1/2" 1 x (automatic shut-off)
<b>Signal module</b>	Product manual	M8353-1
	P7501-015-UL	Circuit diagram E0203-291 (section 2.14)

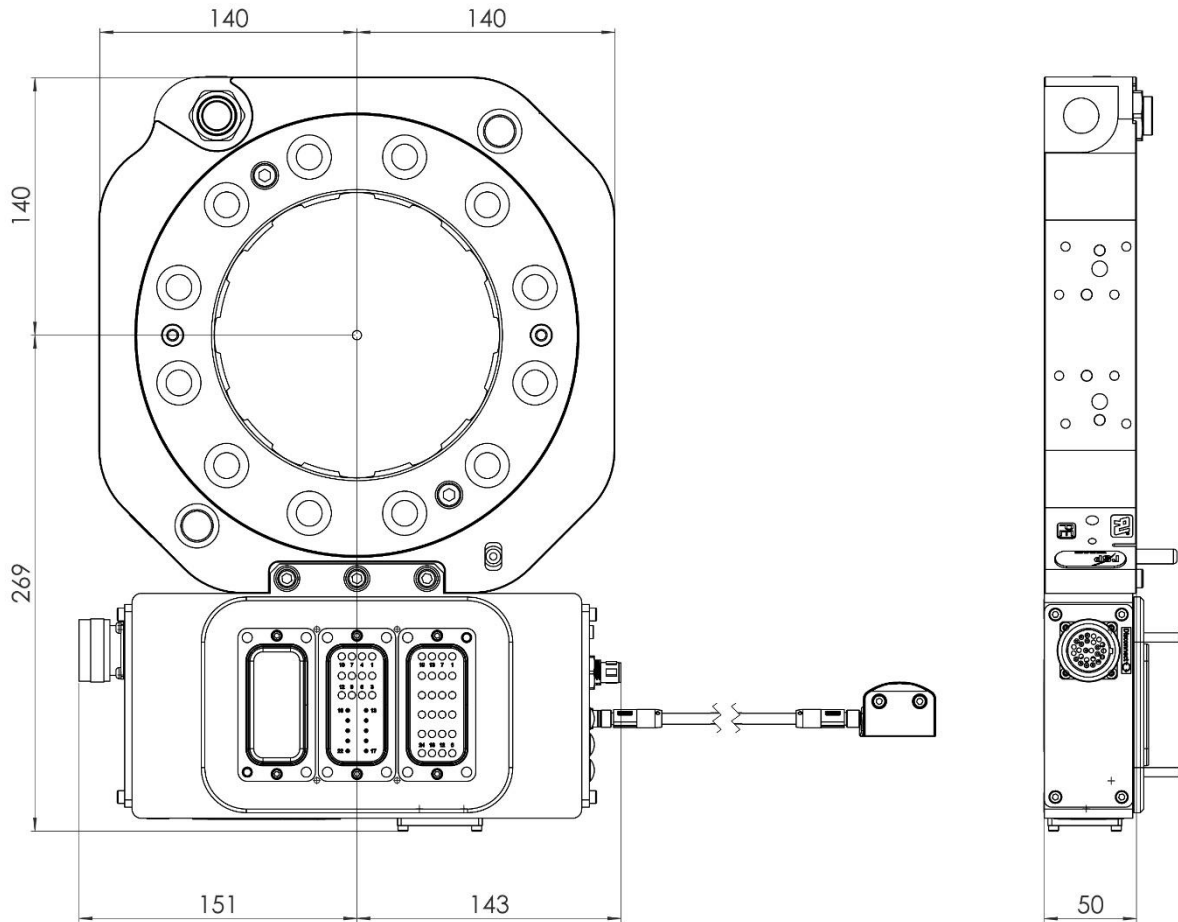
## 2.7.2 Components



POS	ITEM No	DESCRIPTION	QTY.
1	P6901A	TC720-1	1
2	P7710-4	Integrated valve	1
3	P7501-015-UL	TC Signal module MH Lean ID	1
4	P7239	TC ground socket	1
5	P7174	TC720 magnetic sensors open/close	1
6	P7257	Pressure sensors, analog	1
7	P7145-1	TC-Empty sensor ass. (inductive)	1

## 2.8 Tool attachment TA720-MH Lean ID, Article: P7572-015-UL

Tool attachment for material handling connected on the tool side. To be used together with tool changer TC720-MH, P7572-014-UL.



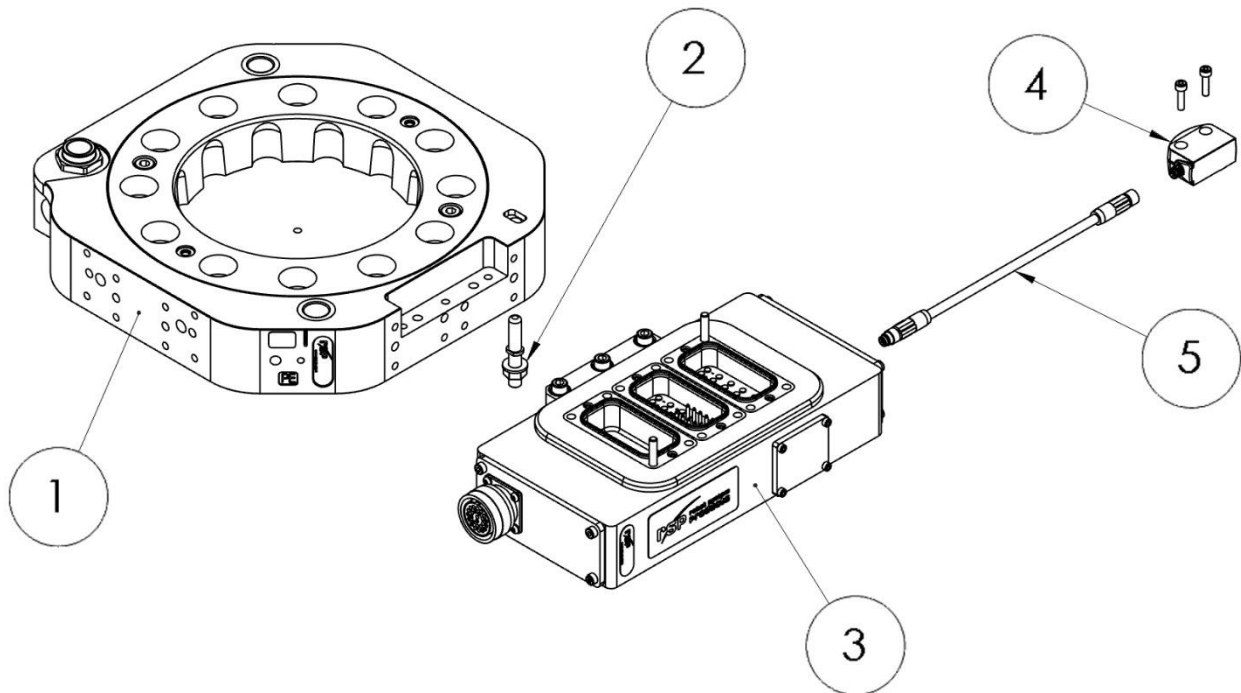
### 2.8.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 200-12-M16
<b>Maximum tool load</b>	Fz (static)	±10 000 N
	Mx/My (dynamic)	±10 000 Nm
	Mz (dynamic)	±10 000 Nm
<b>Weight</b>		13.2 kg
<b>Water/air channels</b> P6902A (TA720)	Pneumatic diagram	Pne0230-014 (section 2.13)
	G 1/2"	1 x (automatic shut-off)
<b>Signal module</b> P7501-024-UL	Product manual	M8353-1
	Circuit diagram	E0203-294 (section 2.15)



**NOTE!** Tools can be mounted to the tool attachment using twelve M16 screws, alternatively the tool attachment can be mounted to the tool using twelve M14 screws.

## 2.8.2 Components



POS	ITEM No	DESCRIPTION	QTY.
1	P6902A	TA720-1	1
2	P7147	TA ground to TA240-960	1
3	P7501-024-UL	TA Signal module MH LeanID	1
4	I1171	Position switch Active	1
5	I1260	Cable 8P M8 / 8S M8	1

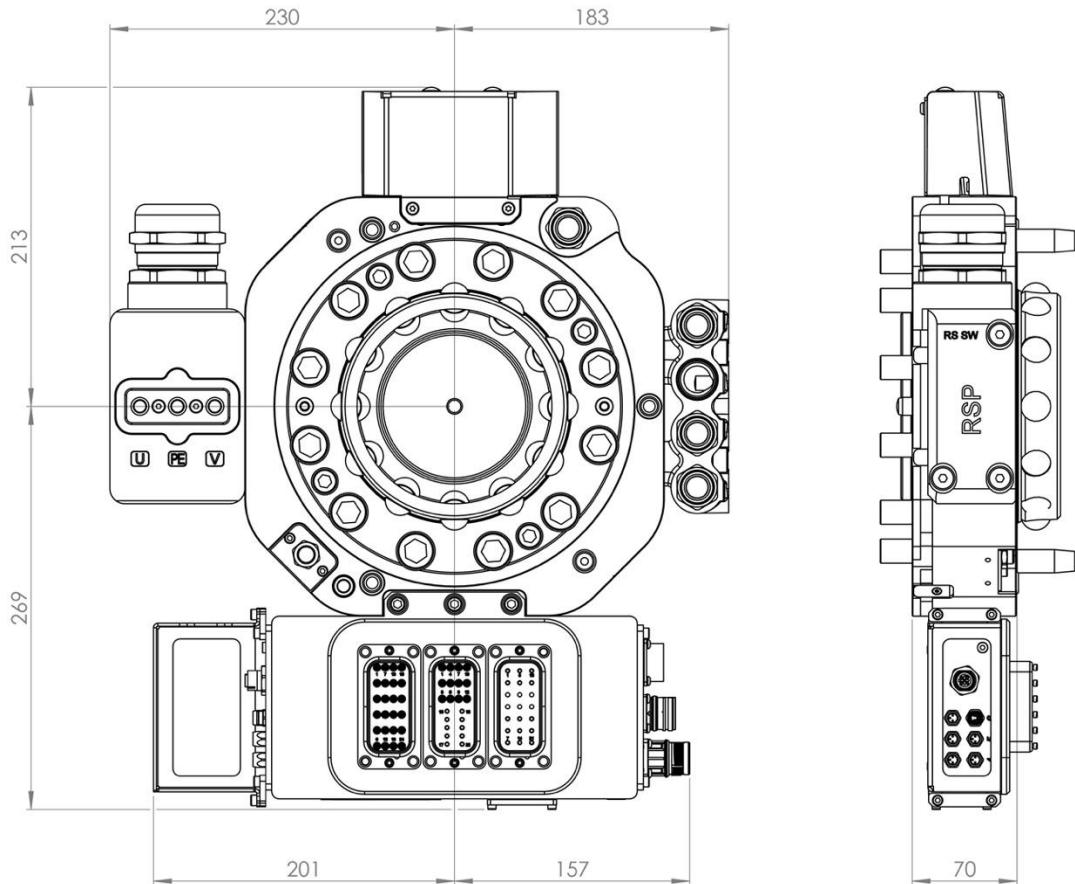


**NOTE!** Depending on availability the sensor and cable combination I1171 and I1260 (section 3.12.1) may be exchanged for P8521 (section 3.12.2). In such case the passive sensor I1172, mounted on the tool stand, must be exchanged for I1852.



## 2.9 Tool changer TC720-SWS Lean ID. Article: P7572-016-UL

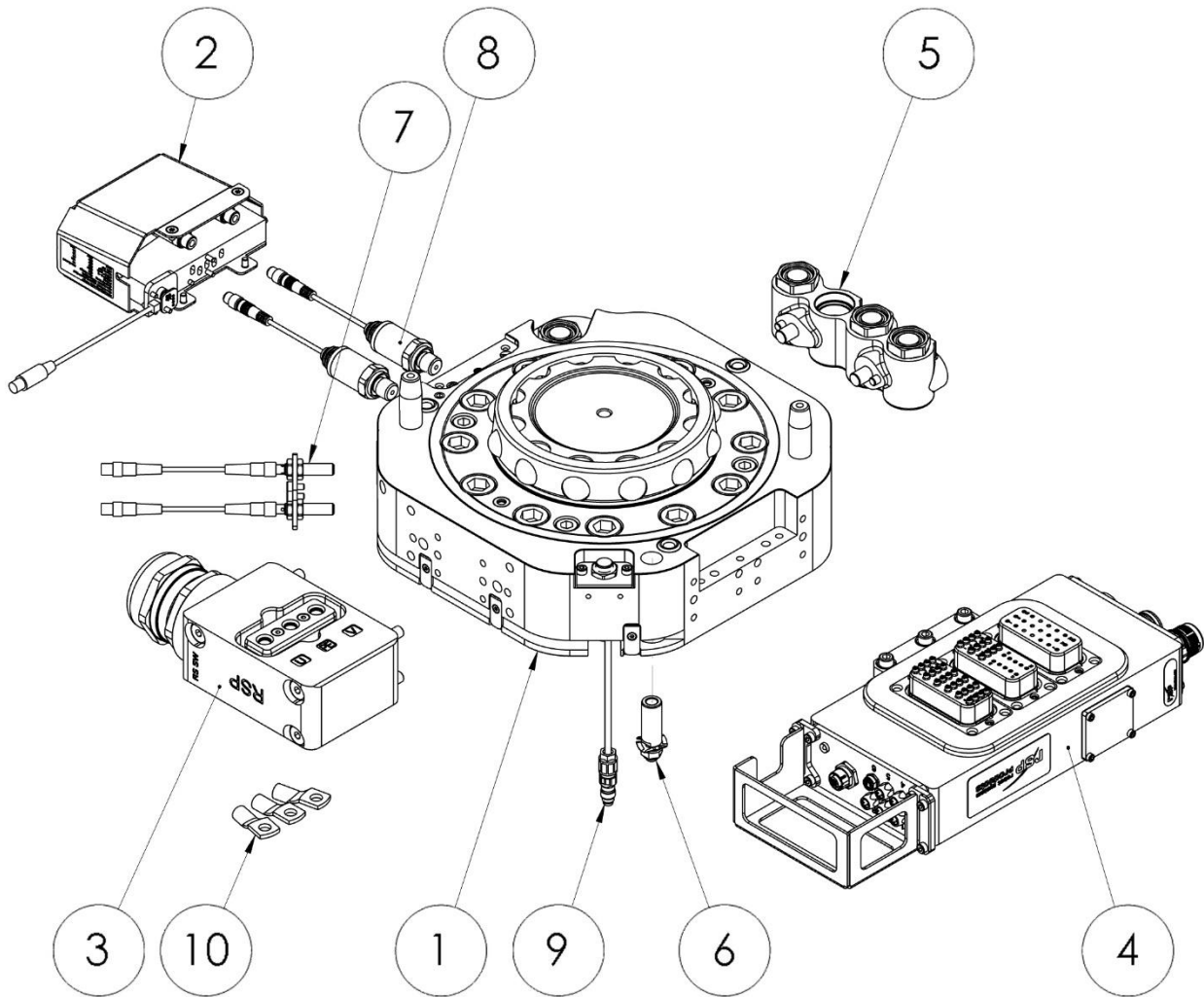
Tool changer for spot welding and material handling. To be used together with tool attachments P7572-017-UL and P7572-018-UL.



### 2.7.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 200-12-M16
<b>Maximum tool load</b>	Fz (static) Mx/My (dynamic) Mz (dynamic)	±10 000 N ±10 000 Nm ±10 000 Nm
<b>Weight and centre of gravity (Z)</b>		
TC (P7572-016)		27.0 kg / 43 mm
TC + TA (P7572-017)		42.9 kg / 61 mm
TC + TA (P7572-018)		40.4 kg / 60 mm
TC (P7572-016) + P6933 (adaptation kit IRB8700)		43.5 kg / 57 mm
TC + P6933 + TA (P7572-017)		59.4 kg / 77 mm
TC + P6933 + TA (P7572-018)		57.0 kg / 75 mm
<b>Water/air channels</b>	Pneumatic diagram	Pne0230-014 (section 2.13)
P6901A (TC720)	G 1/2"	1 x (automatic shut-off)
P7230-3B	G 1/2"	3 x (automatic shut-off)
<b>Signal module</b>	Product manual	M8353-1
P7501-012-UL	Circuit diagram	E0203-286 (section 2.16)
<b>Weld power</b>	Conductors	3 x (140A, 690V)
P6784-UL	Connection	Cable gland (M50 with insert grommet)

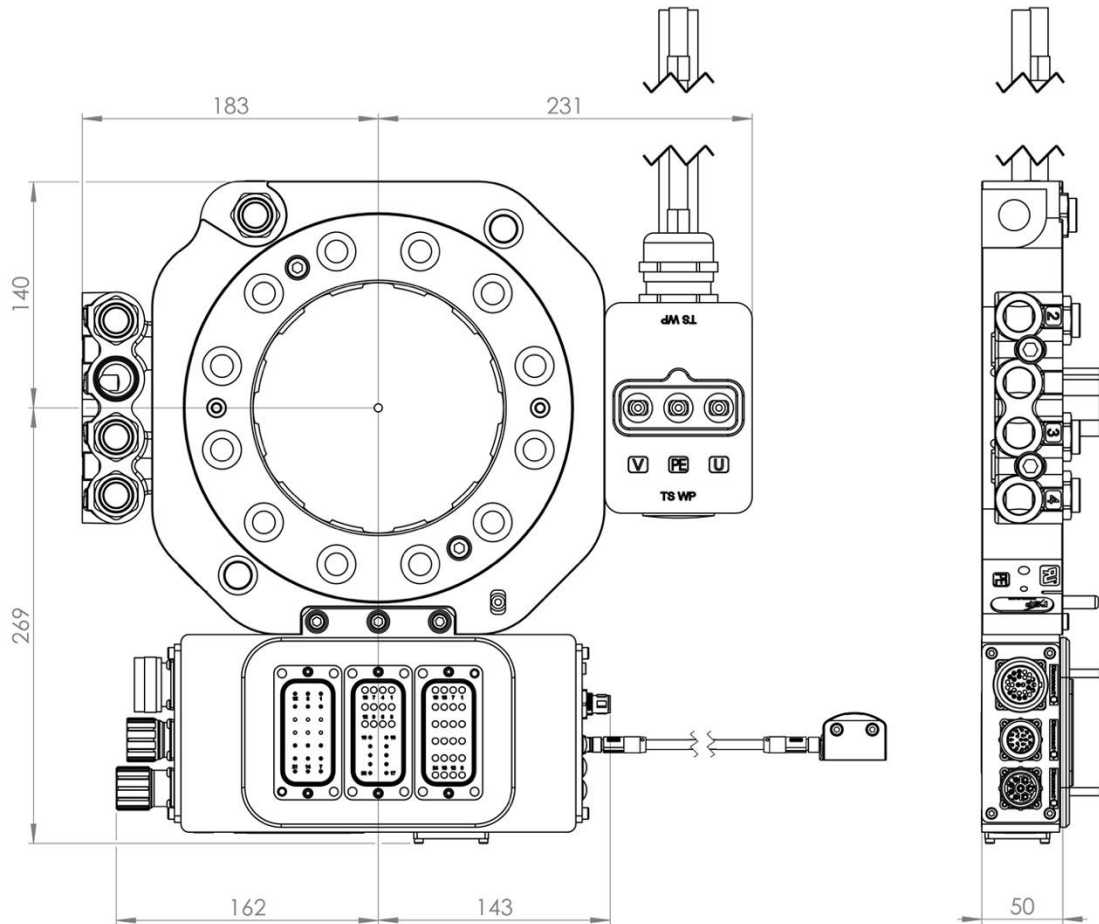
## 2.7.2 Components



POS	ITEM No	DESCRIPTION	QTY.
1	P6901A	TC720-1	1
2	P7710-4	Integrated valve	1
3	P6784-UL	Option TC power, cable gland UL	1
4	P7501-012-UL	TC Signal module SWS Lean ID	1
5	P7230-3B	Option to TC water/air couplings	1
6	P7239	TC ground socket	1
7	P7174	TC720 magnetic sensors open/close	1
8	P7257	Pressure sensors, analog	1
9	P7145-1	TC-Empty sensor ass. (inductive)	1
10	I0049	Crimp cable lug M8-25mm2	3

## 2.10 Tool attachment TA720-SWS Lean ID, Article: P7572-017-UL

Tool attachment for material handling connected on the tool side. To be used together with tool changer TC720-SWS, P7572-016-UL.



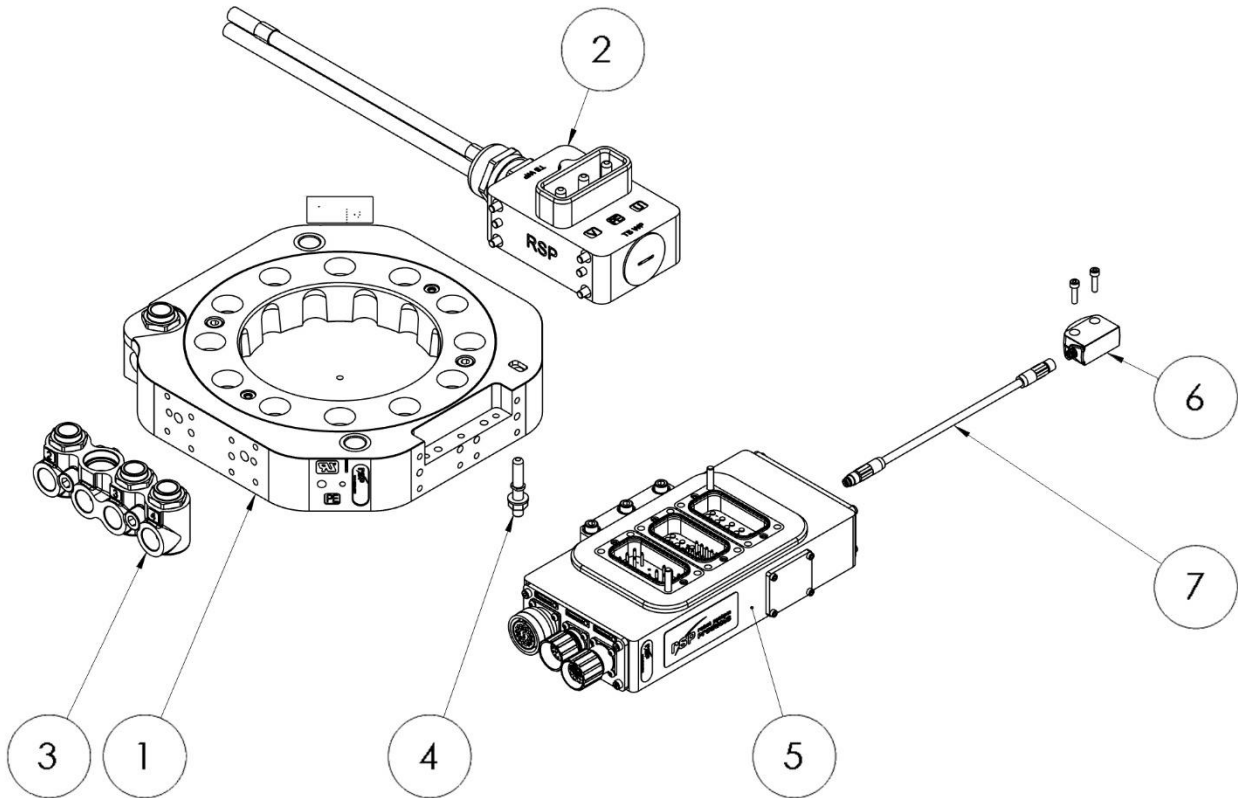
### 2.10.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C	
<b>Bolt pattern</b>		ISO 9409-1 200-12-M16	
<b>Maximum tool load</b>	Fz (static)	±10 000 N	
	Mx/My (dynamic)	±10 000 Nm	
	Mz (dynamic)	±10 000 Nm	
<b>Weight</b>		15.9 kg	
<b>Water/air channels</b>	Pneumatic diagram	Pne0230-014 (section 2.13)	
	P6902A (TA720)	G 1/2"	1 x (automatic shut-off)
	P7231-3B	G 1/2"	3 x (automatic shut-off)
<b>Signal module</b>	Product manual	M8353-1	
	P7501-023-UL	Circuit diagram	E0203-289 (section 2.17)
<b>Weld power</b>	Connection	Cable gland for a 3-conductor	
	P1517-UL	Cable (included)	3 x 1.4m (single wire) cables, open end



**NOTE!** Tools can be mounted to the tool attachment using twelve M16 screws, alternatively the tool attachment can be mounted to the tool using twelve M14 screws.

## 2.10.2 Components



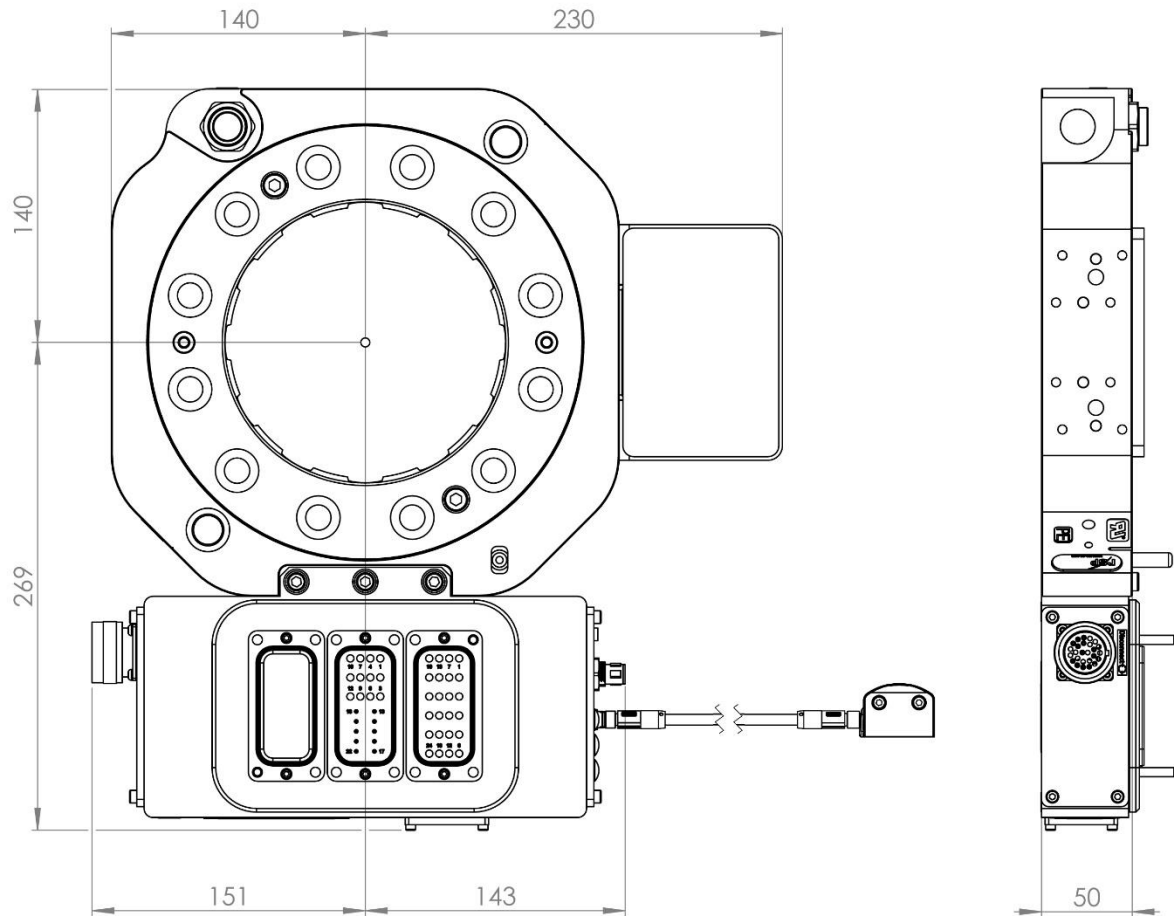
POS	ITEM No	DESCRIPTION	QTY.
1	P6902A	TA720-1	1
2	P1517-UL	TA Weld power, 3x25mm <sup>2</sup> , UL	1
3	P7231-3B	Option to TA 3 water/air couplings	1
4	P7147	TA ground to TA240-960	1
5	P7501-023-UL	TA Signal module SWS LeanID	1
6	I1171	Position switch Active	1
7	I1260	Cable 8P M8 / 8S M8	1



**NOTE!** Depending on availability the sensor and cable combination I1171 and I1260 (section 3.12.1) may be exchanged for P8521 (section 3.12.2). In such case the passive sensor I1172, mounted on the tool stand, must be exchanged for I1852.

## 2.11 Tool attachment TA720-SWS/MH Lean ID, Article: P7572-018-UL

Tool attachment for spot welding connected on the tool side. To be used together with tool changer TC720-SWS, P7572-016-UL.



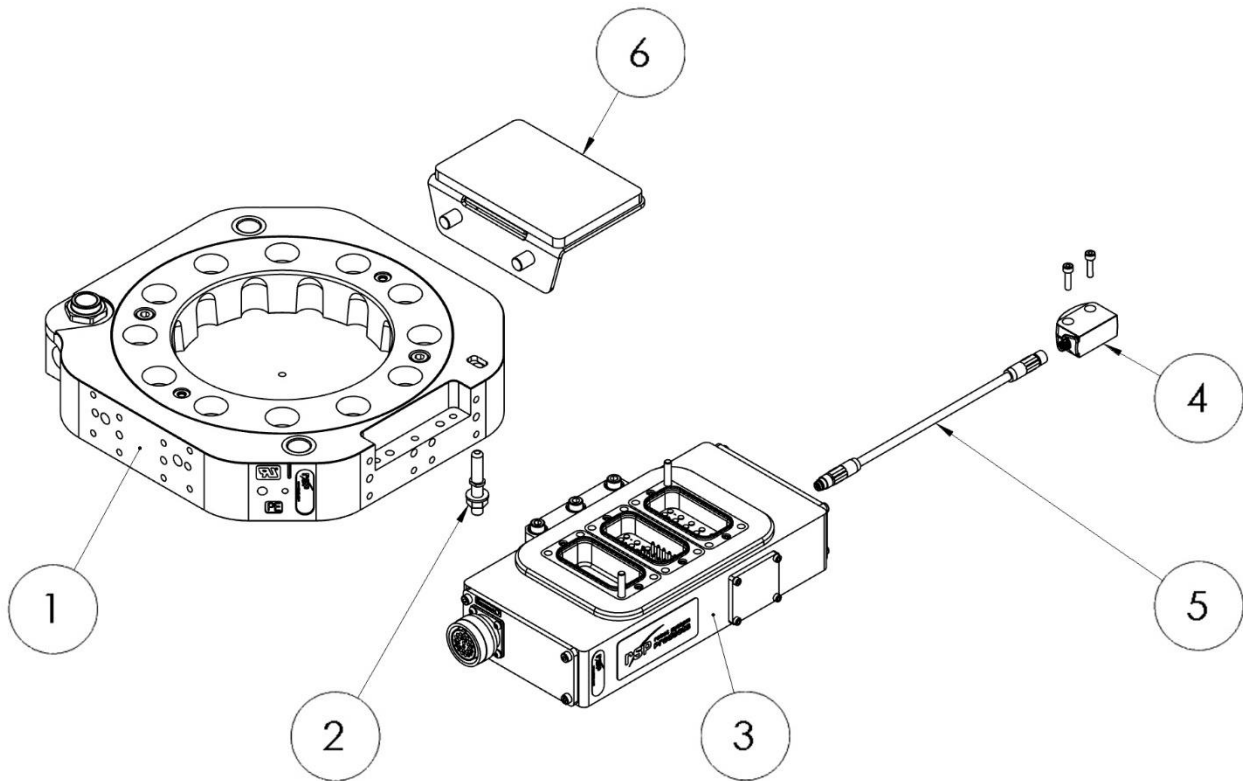
### 2.11.1 Technical summary

<b>Working temperature</b>		+10°C – +50°C
<b>Bolt pattern</b>		ISO 9409-1 200-12-M16
<b>Maximum tool load</b>	Fz (static)	±10 000 N
	Mx/My (dynamic)	±10 000 Nm
	Mz (dynamic)	±10 000 Nm
<b>Weight</b>		13.5 kg
<b>Water/air channels</b> P6902A (TA720)	Pneumatic diagram	Pne0230-014 (section 2.13)
	G 1/2"	1 x (automatic shut-off)
<b>Signal module</b> P7501-024-UL	Product manual	M8353-1
	Circuit diagram	E0203-294 (section 2.15)



**NOTE!** Tools can be mounted to the tool attachment using twelve M16 screws, alternatively the tool attachment can be mounted to the tool using twelve M14 screws.

## 2.11.2 Components



POS	ITEM No	DESCRIPTION	QTY.
1	P6902A	TA720-1	1
2	P7147	TA ground to TA240-960	1
3	P7501-024-UL	TA Signal module MH LeanID	1
4	I1171	Position switch Active	1
5	I1260	Cable 8P M8 / 8S M8	1
6	P6742	Cover weld contact	1



**NOTE!** Depending on availability the sensor and cable combination I1171 and I1260 (section 3.12.1) may be exchanged for P8521 (section 3.12.2). In such case the passive sensor I1172, mounted on the tool stand, must be exchanged for I1852.

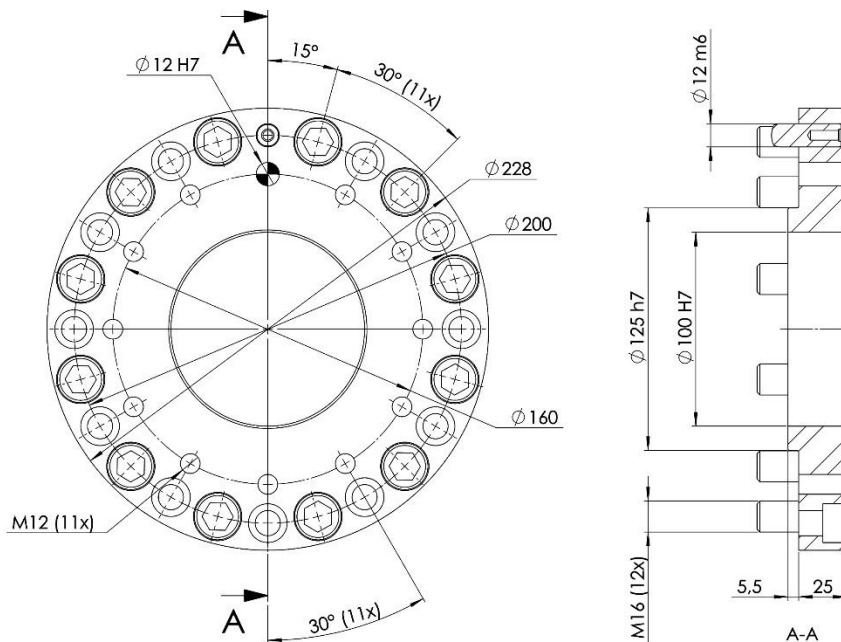
## 2.12 Robot adaptation kits Articles: P0657 and P6933

The flanges of the robot and of the tool changer, have fastening holes in accordance with ISO 9409-1. Dependent on robot model, adaptation plates for other bolt circles are needed. Adaptation plates and all required screws are delivered as parts of the robot adaptation kits.

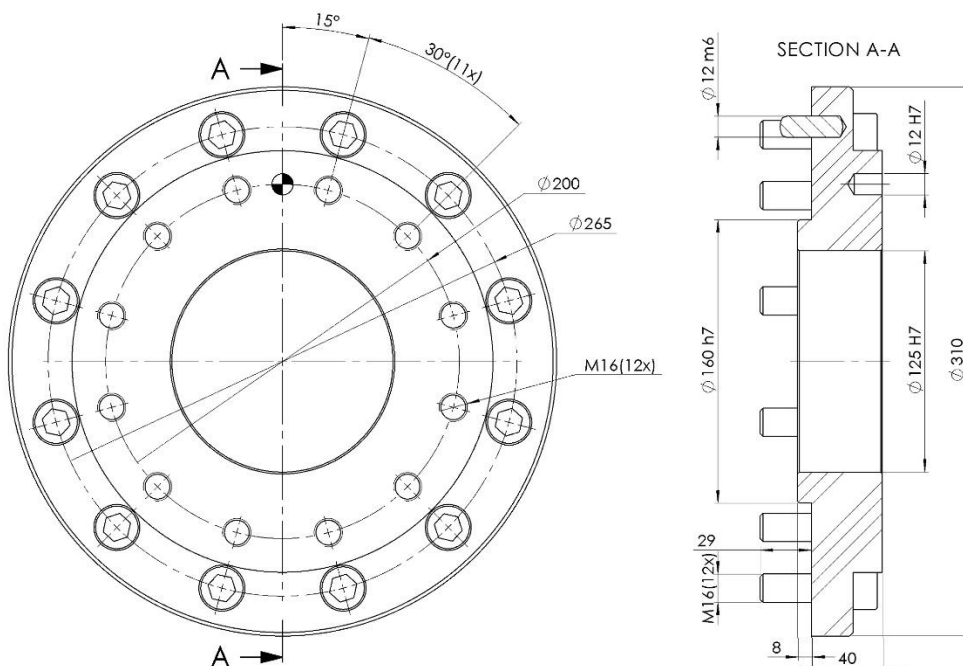
### Technical data

Article number	Description	Weight	Adapter plate thickness
P0657	Adaptation kit for TC480 for IRB 7600	6.3 kg	25 mm
P6933	Adaptation kit for TC720 for IRB 8700	16.6 kg	40 mm

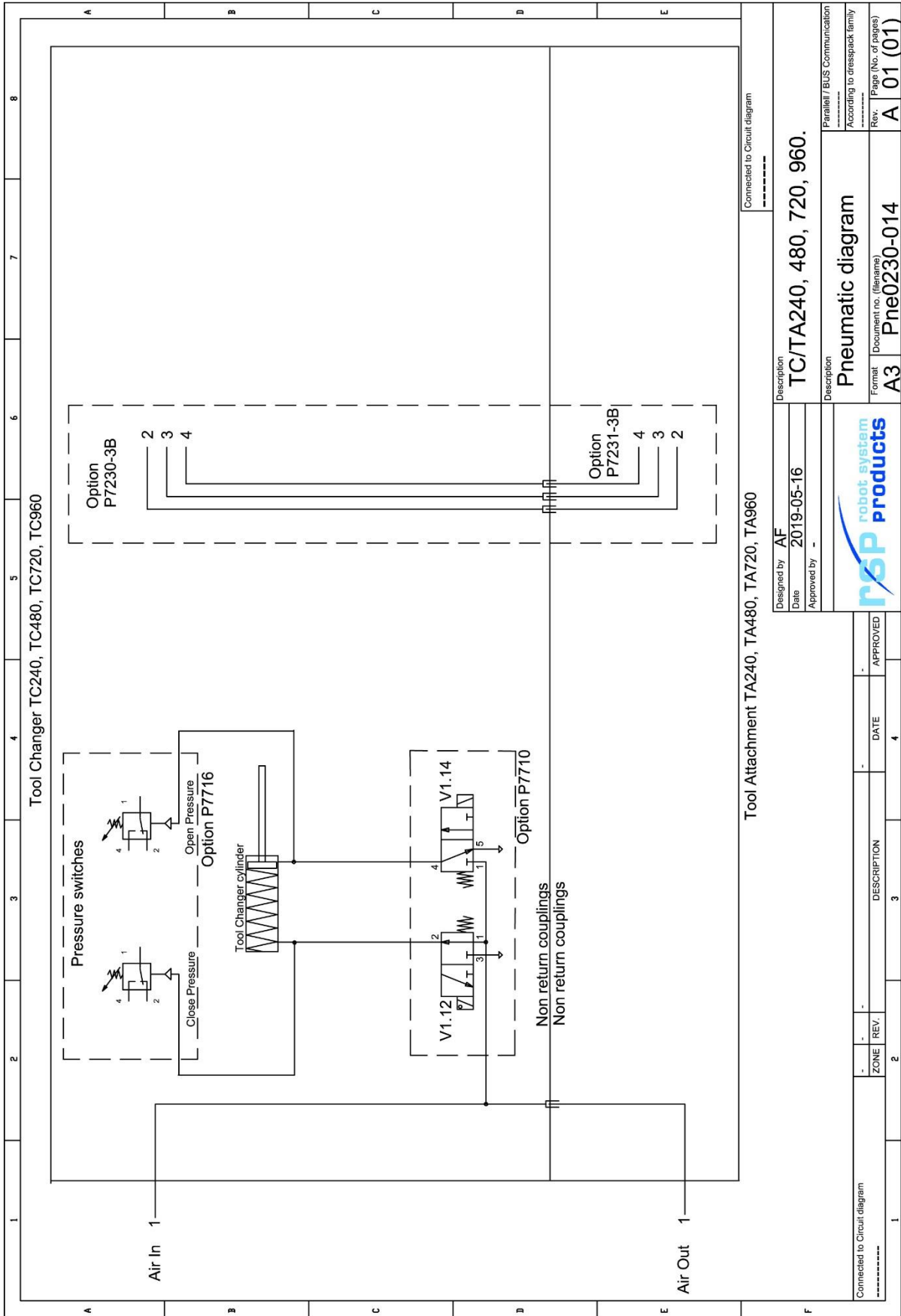
### 2.12.1 Adaptation kit for IRB7600 Article: P0657



### 2.12.2 Adaptation kit for IRB8700 Article: P6933



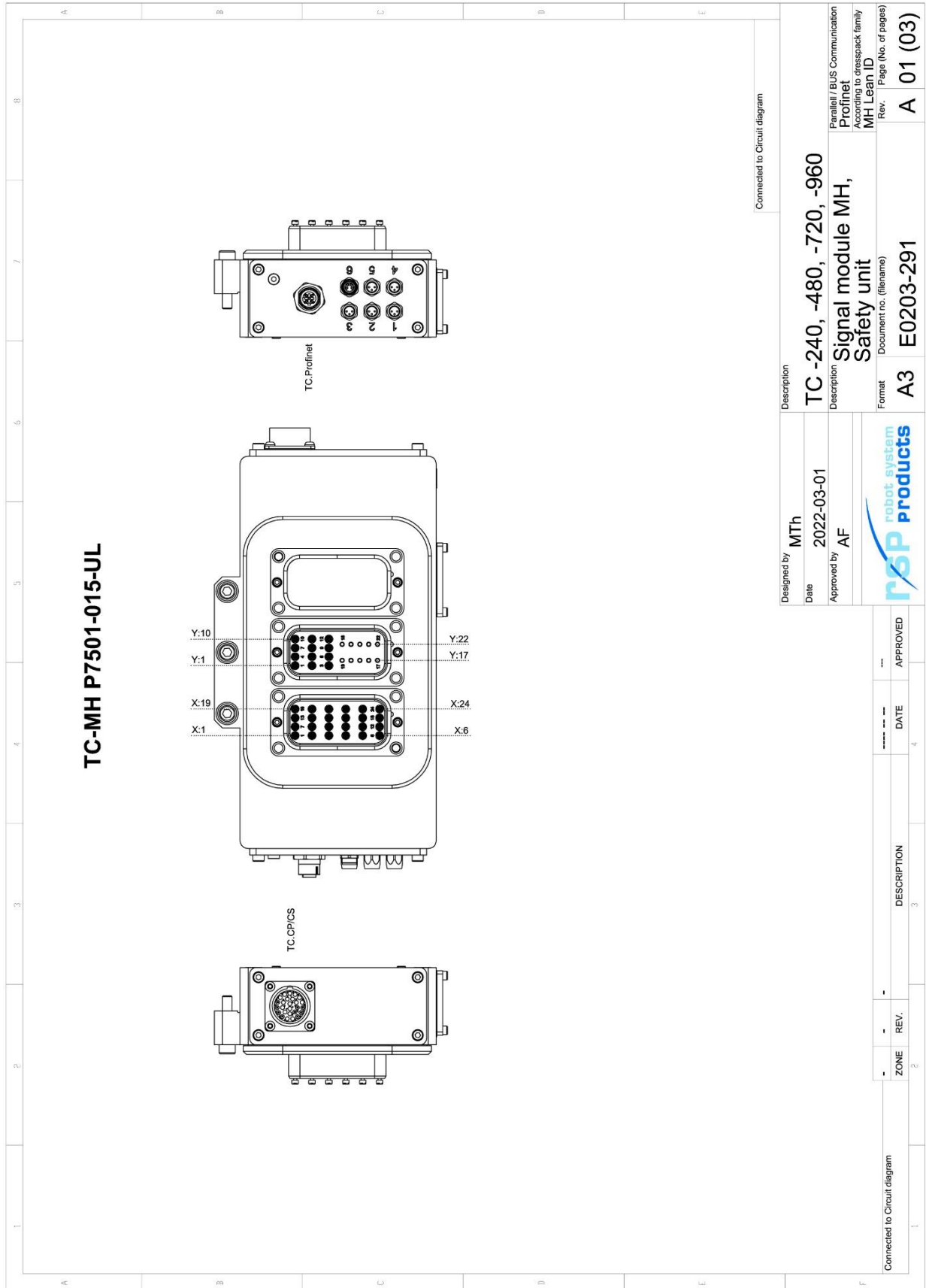
## 2.13 Pneumatic diagram, Pne0230-14

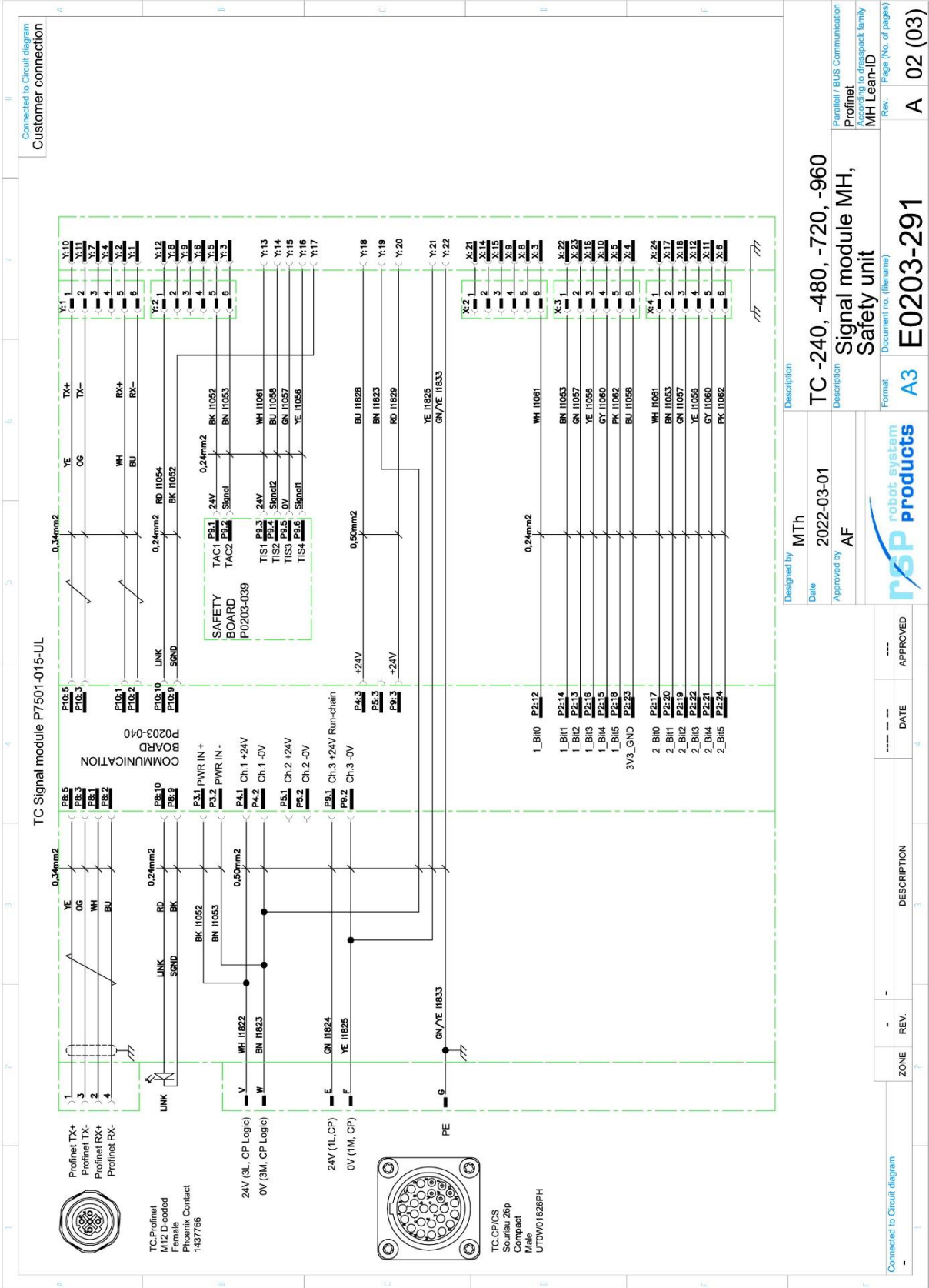


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## 2.14 Circuit diagram E0203-291





Connected to Circuit diagram  
Customer connection

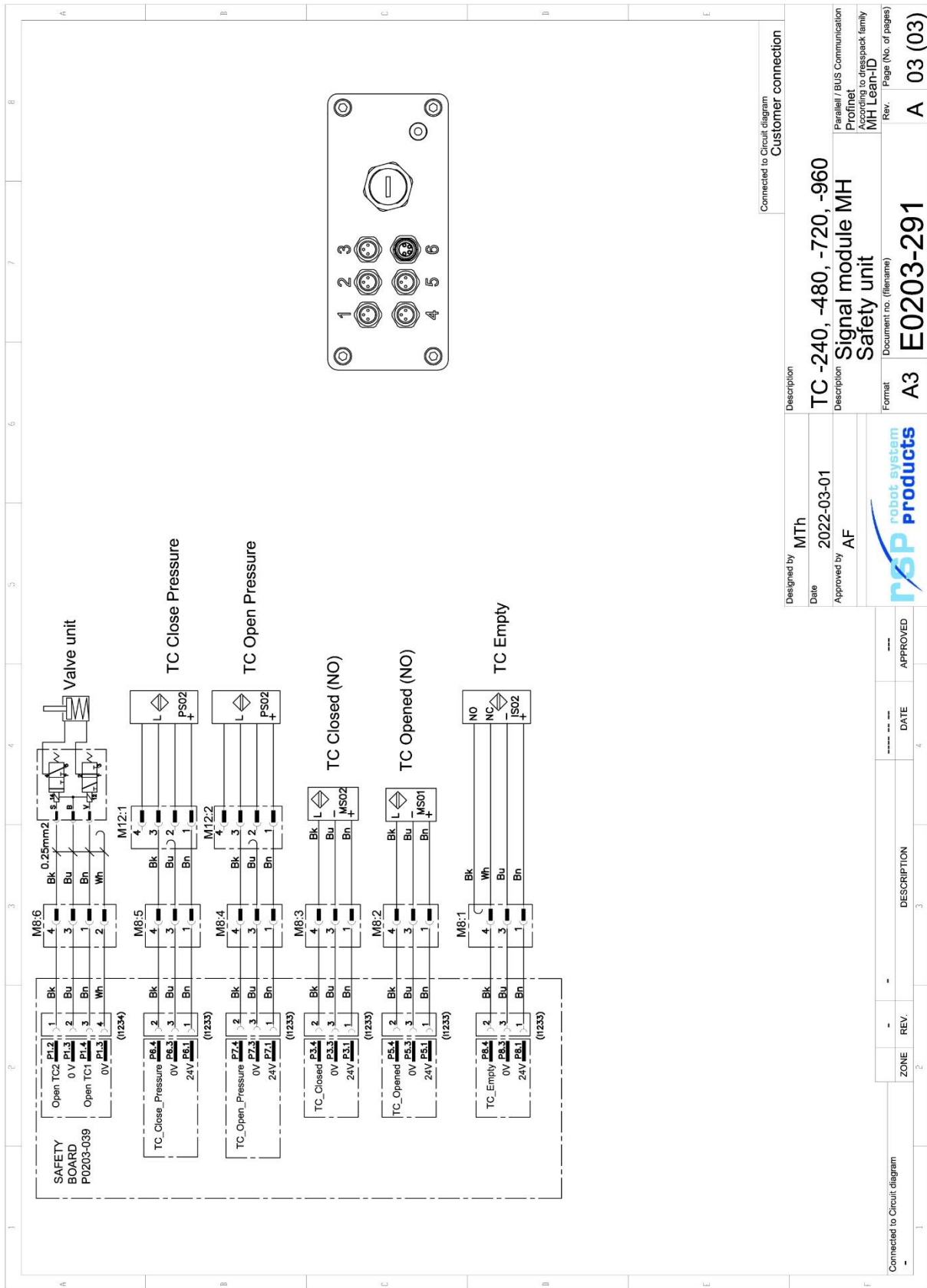
Designed by	MTh	Description	TC-240, -480, -720, -960
Date	2022-03-01	Description	Signal module MH, Safety unit
Approved by	AF	Format	Document no. (filename) <b>A3 E0203-291</b>
		Parallell / BUS Communication	Profinet
		According to dresspack family	MH Lean-ID
		Rev.	Page (No. of pages) <b>A 02 (03)</b>

Connected to Circuit diagram

ZONE	REV.	DATE	APPROVED



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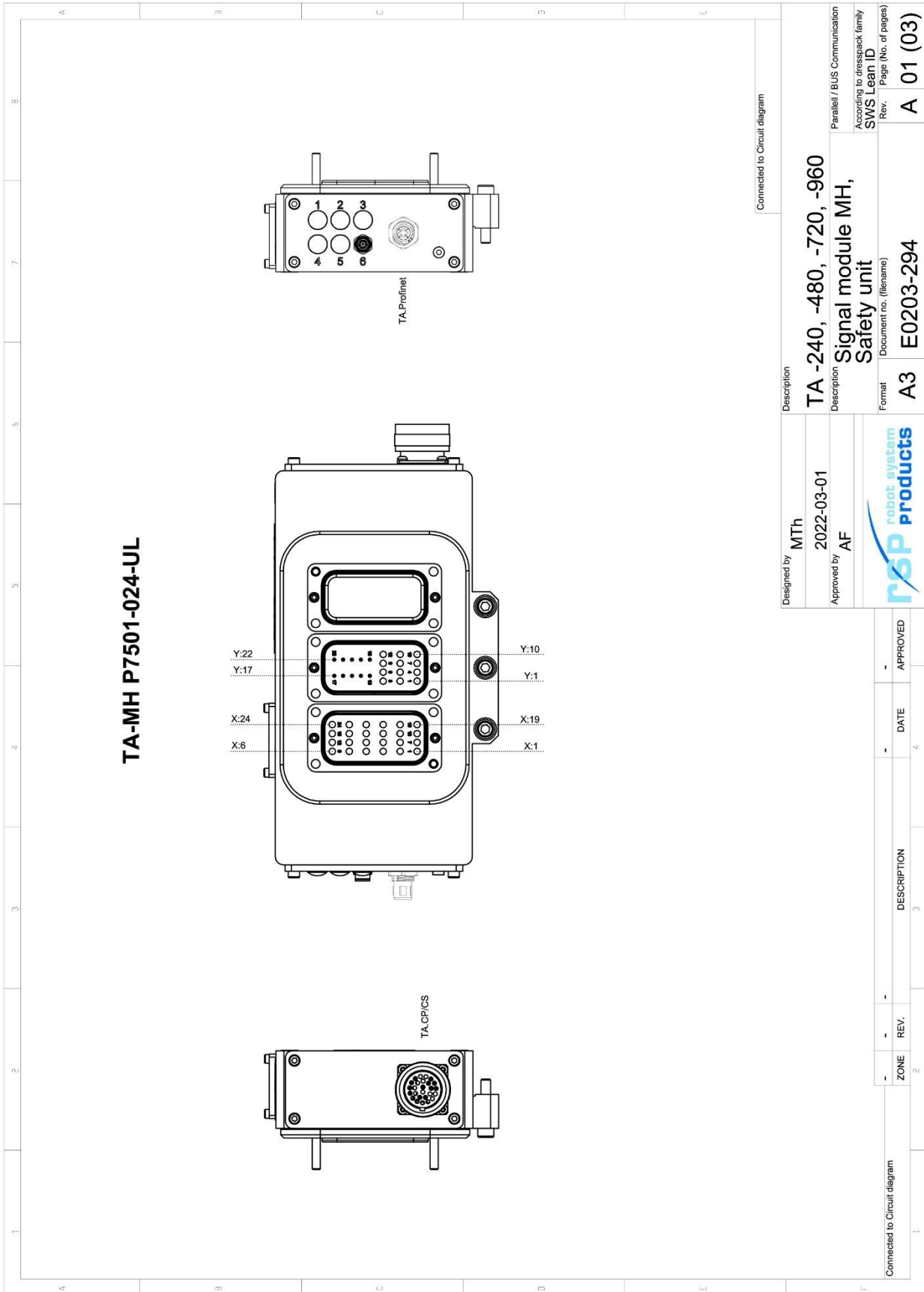
Designed by	MTh	Description	Connected to Circuit diagram
Date	2022-03-01	TC -240, -480, -720, -960	Customer connection
Approved by	AF	Signal module MH	
		Safety unit	
		Document no. (filename)	
		Format	
		A3	
		E0203-291	
		A	
		03 (03)	

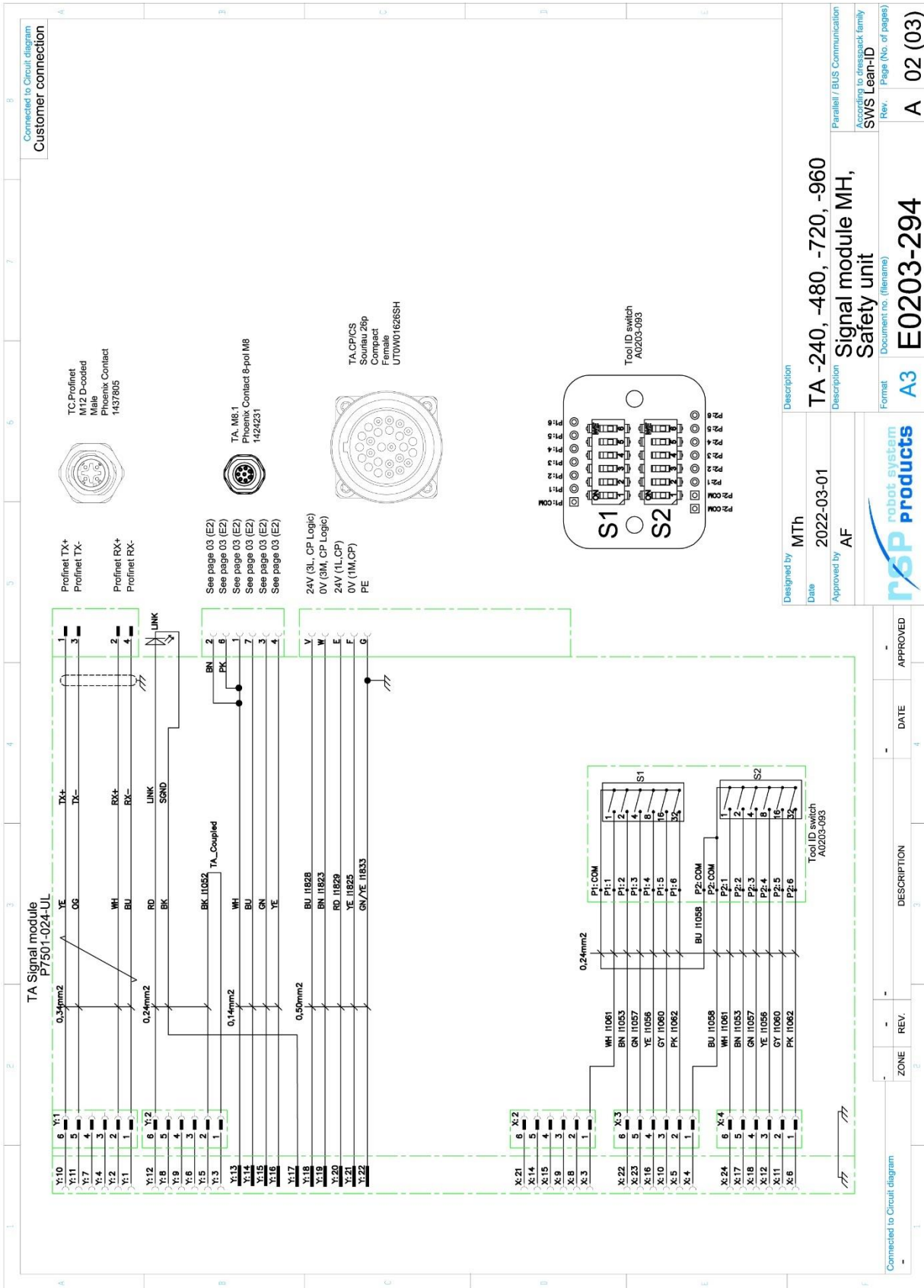


ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	-	----	---

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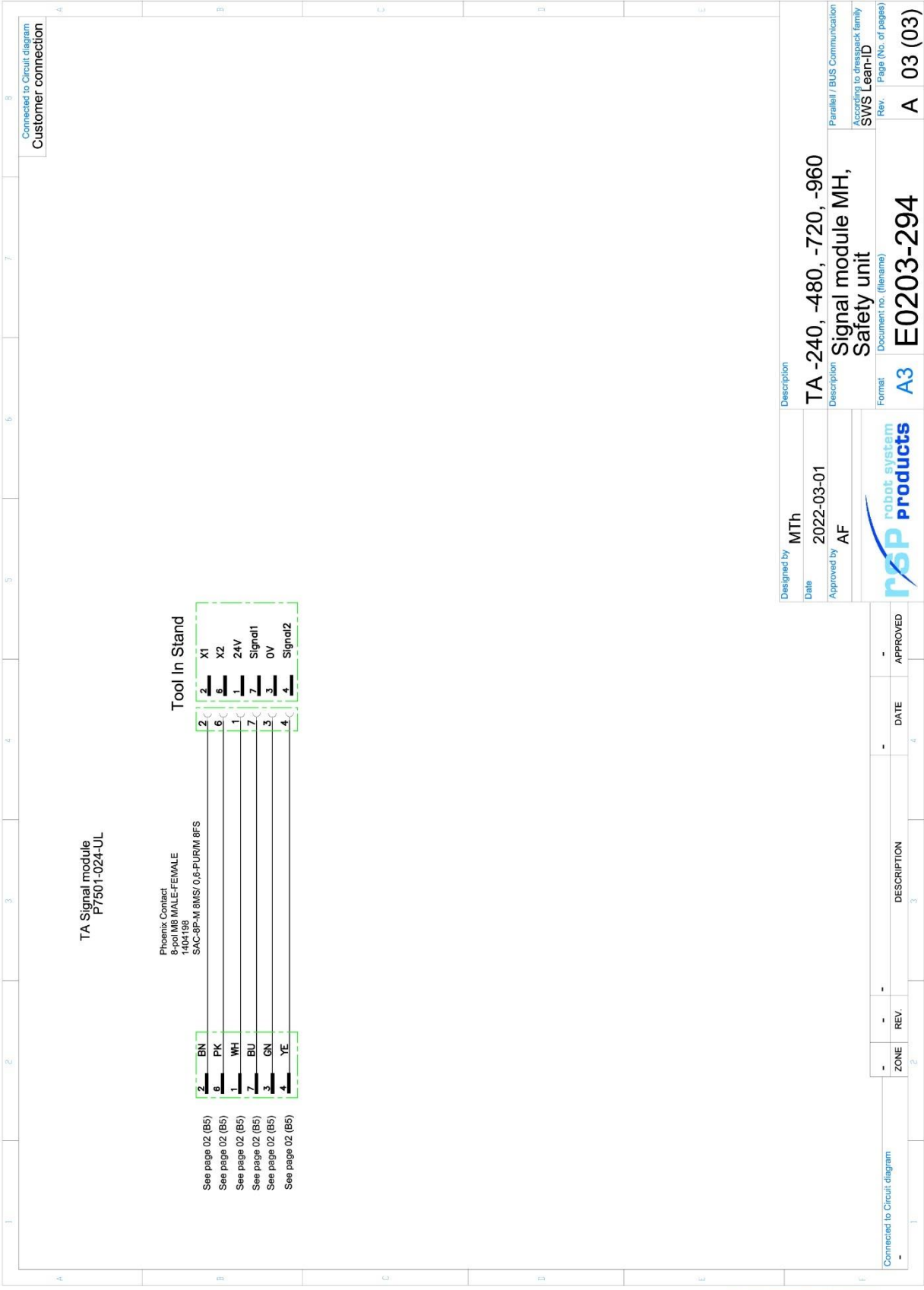
## 2.15 Circuit diagram E0203-294





Designed by	MTh	Description	TA -240, -480, -720, -960
Date	2022-03-01	Description	Signal module MH, Safety unit
Approved by	AF	Format	Document no. (filename)
		Format	A3
		Rev.	A
		Page (No. of pages)	02 (03)

robot system products



Connected to Circuit diagram  
Customer connection

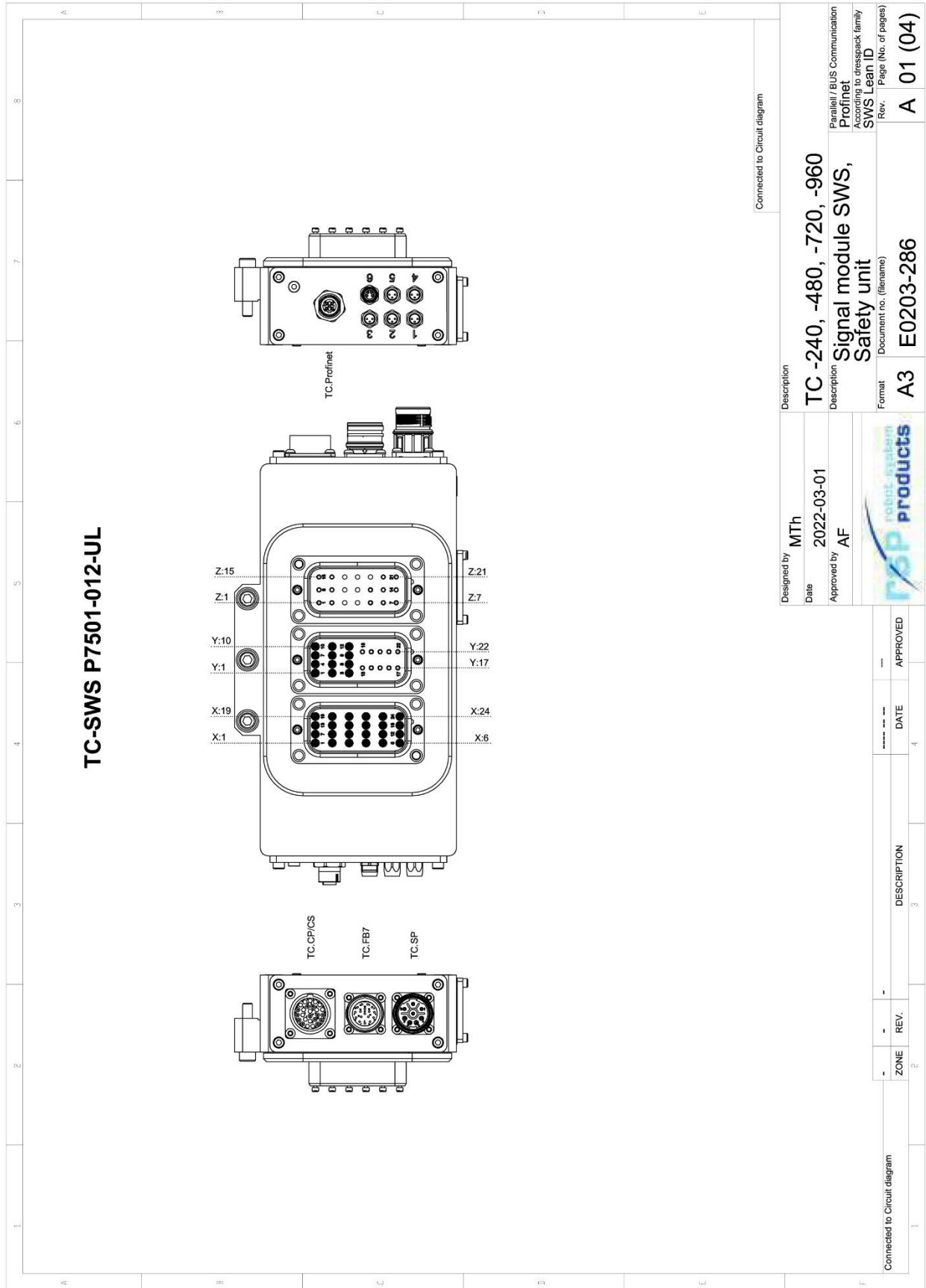
Designed by	MTh	Description	TA -240, -480, -720, -960
Date	2022-03-01	Description	Signal module MH, Safety unit
Approved by	AF	Format	A3
		Document no. (filename)	E0203-294
		According to disconnect family	SWS Learn-ID
		Rev.	Page (No. of pages)
			A 03 (03)

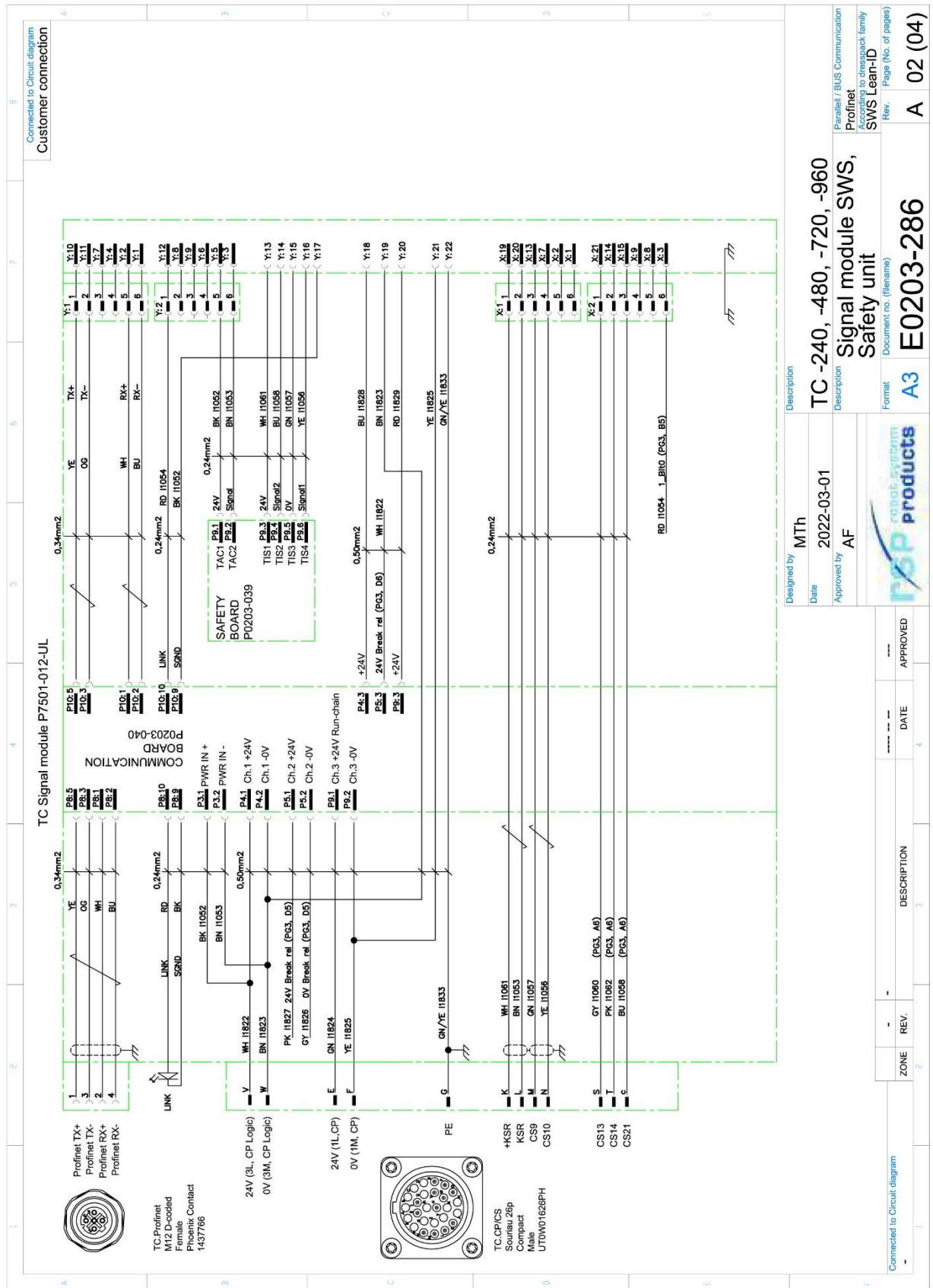
Connected to Circuit diagram	Zone	Rev.	Description	Date	Approved
-	-	-	-	-	-



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## 2.16 Circuit diagram E0203-286





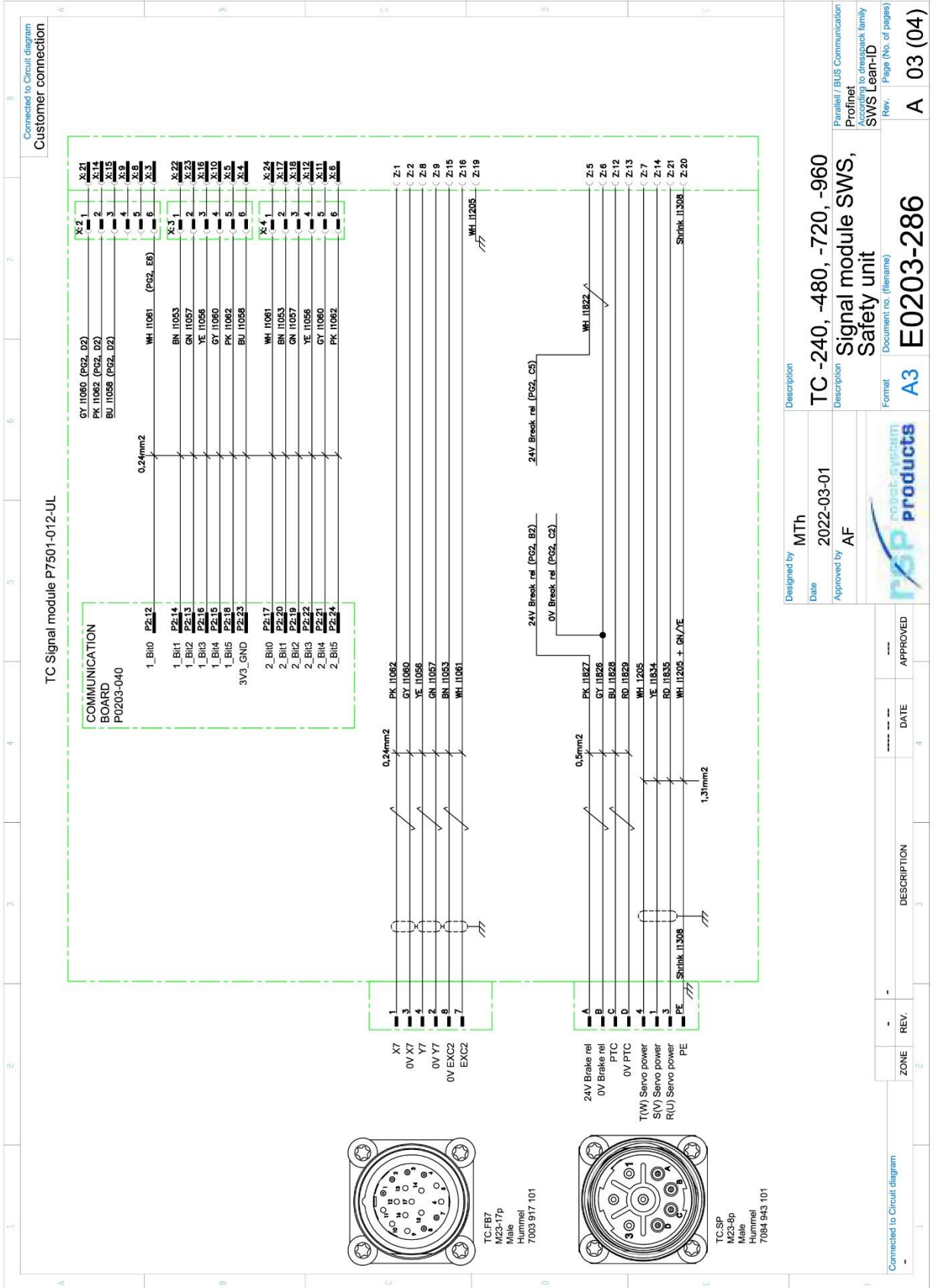
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	-	-	-

Designed by	MTH
Date	2022-03-01
Approved by	AF

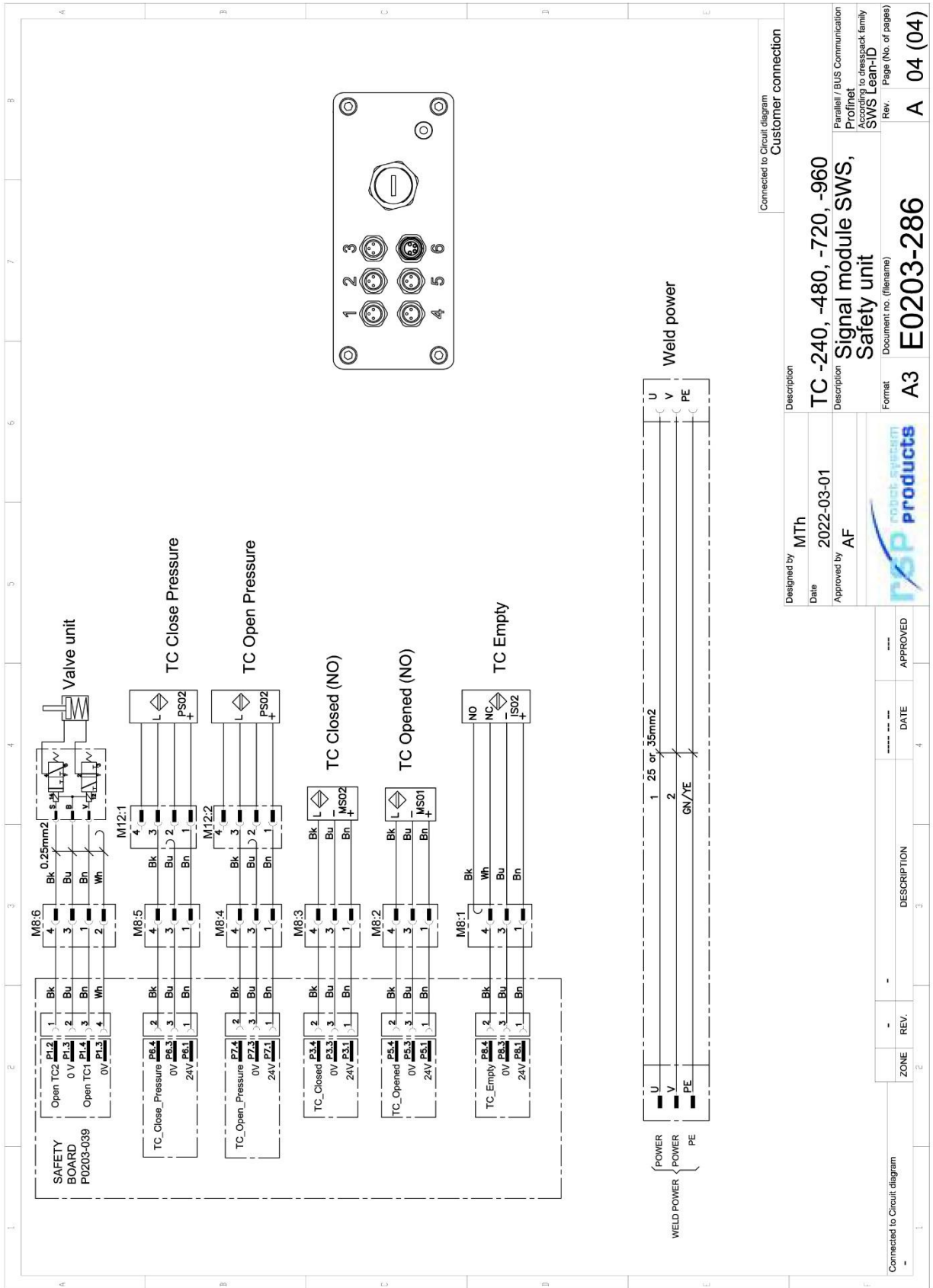
Description	TC -240, -480, -720, -960
Description	Signal module SWS, Safety unit
Format	A3
Document no. (filename)	E0203-286
Rev.	A
Page (No. of pages)	02 (04)

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Designed by	MTh	Description	Connected to Circuit diagram
Date	2022-03-01	TC -240, -480, -720, -960	Customer connection
Approved by	AF	Signal module SWS, Safety unit	
		Parallel / BUS Communication Profinet to devicepack family SWS Learn-ID Rev. Page (No. of pages) A 04 (04)	
Format	A3	Document no. (filename)	E0203-286

ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	-	----	----

Connected to Circuit diagram

U  
V  
PE

1 25 or 35mm<sup>2</sup>

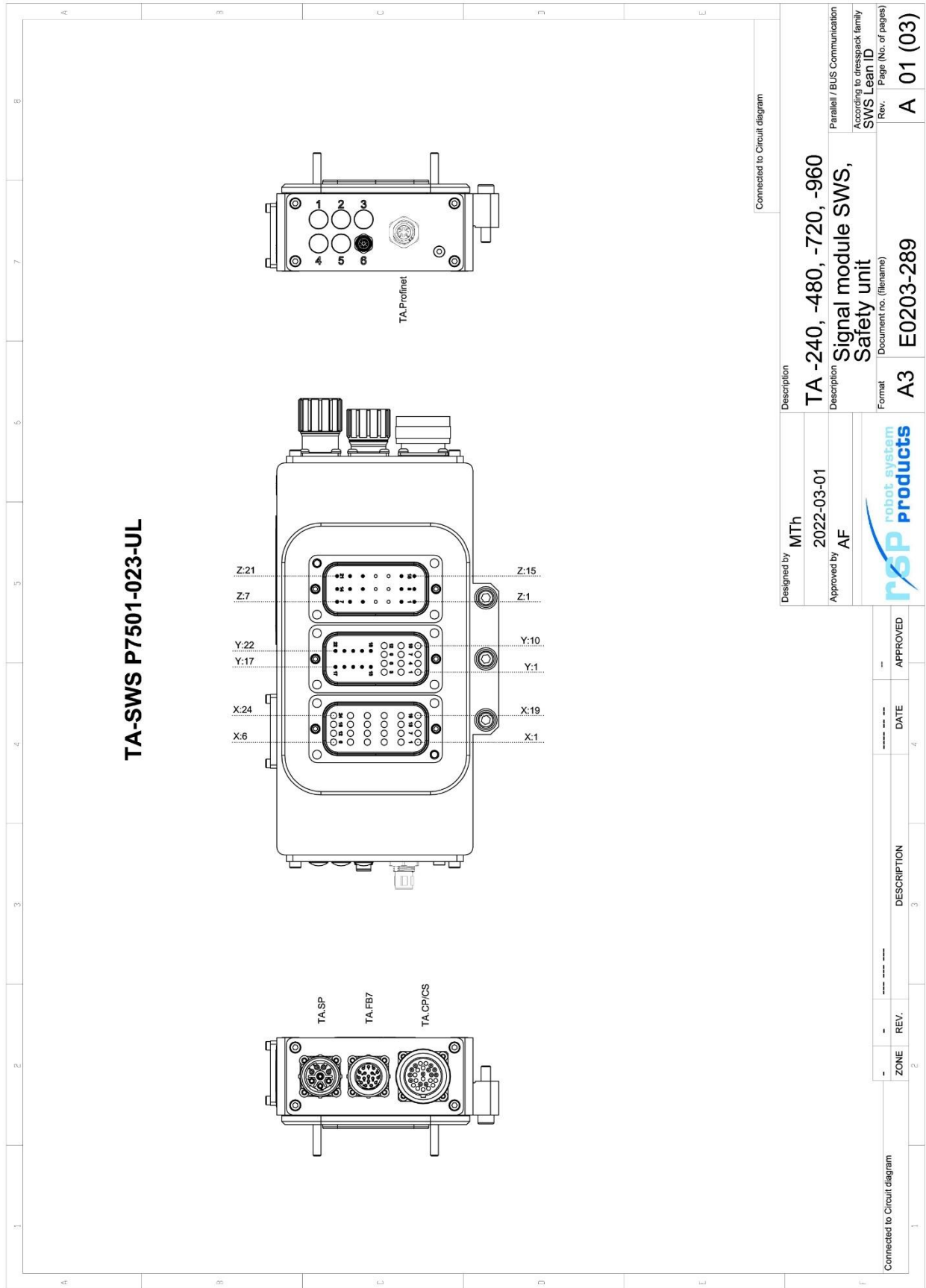
GN/YE

U  
V  
PE

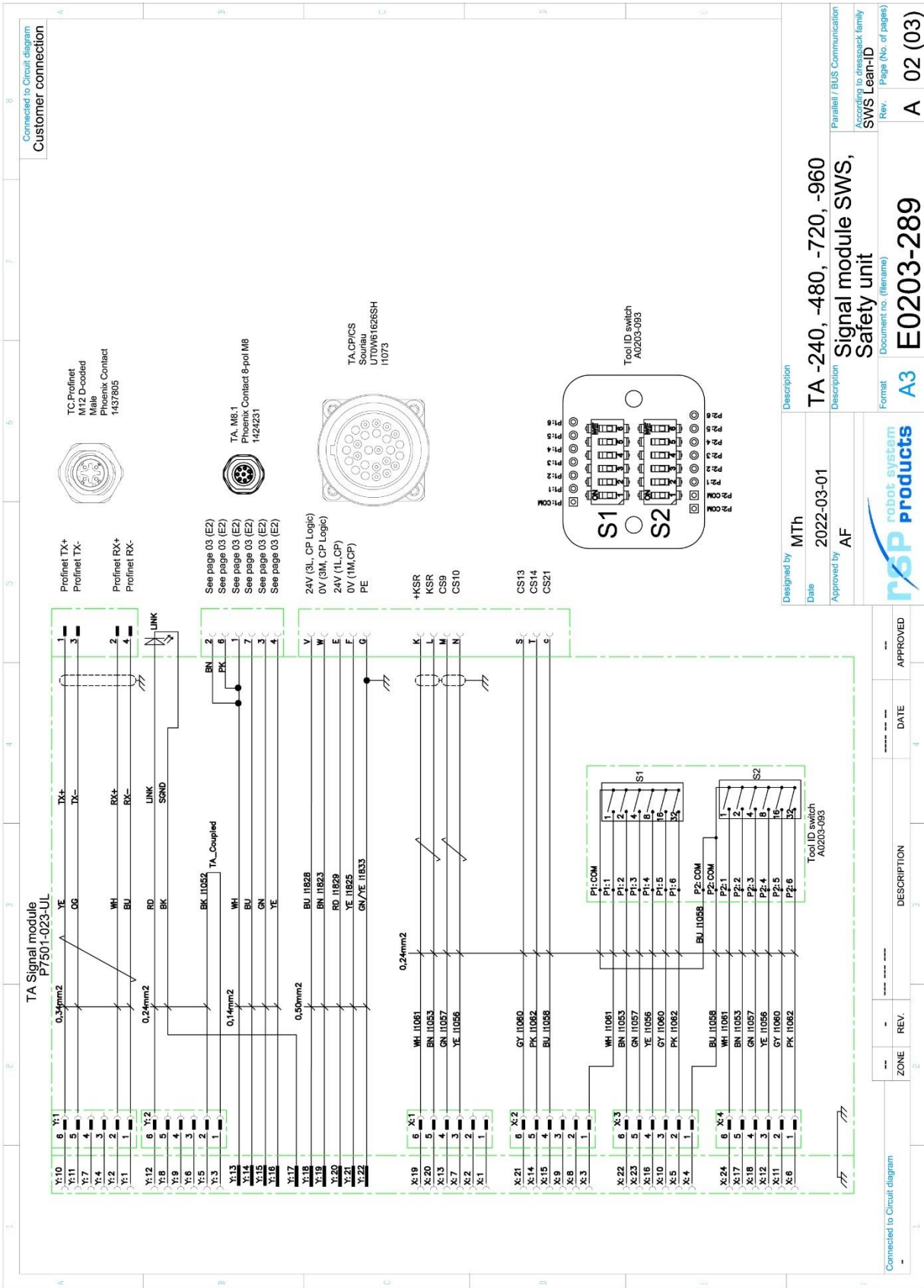
Weld power

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## 2.17 Circuit diagram E0203-289



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Designed by **MTh**  
 Date **2022-03-01**  
 Approved by **AF**

Description  
**TA -240, -480, -720, -960**  
**Signal module SWS,**  
**Safety unit**

Format **A3** Document no. (filename) **E0203-289**

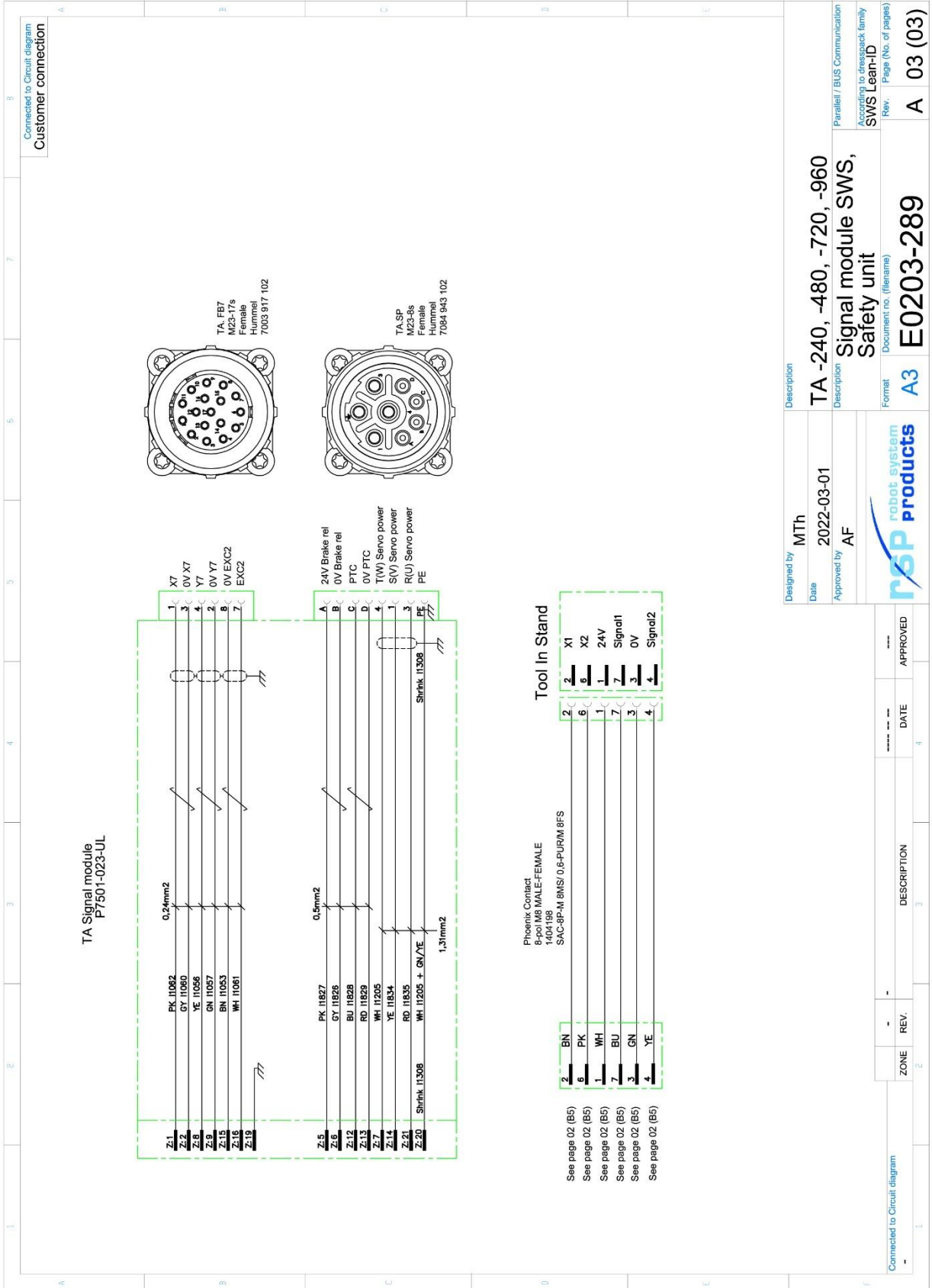
Parallell / BUS Communication  
 According to deesageck family  
 SWS Learn-ID  
 Rev. Page (No. of pages)  
**A 02 (03)**

**r&p robot products**

Connected to Circuit diagram  
Customer connection

Connected to Circuit diagram

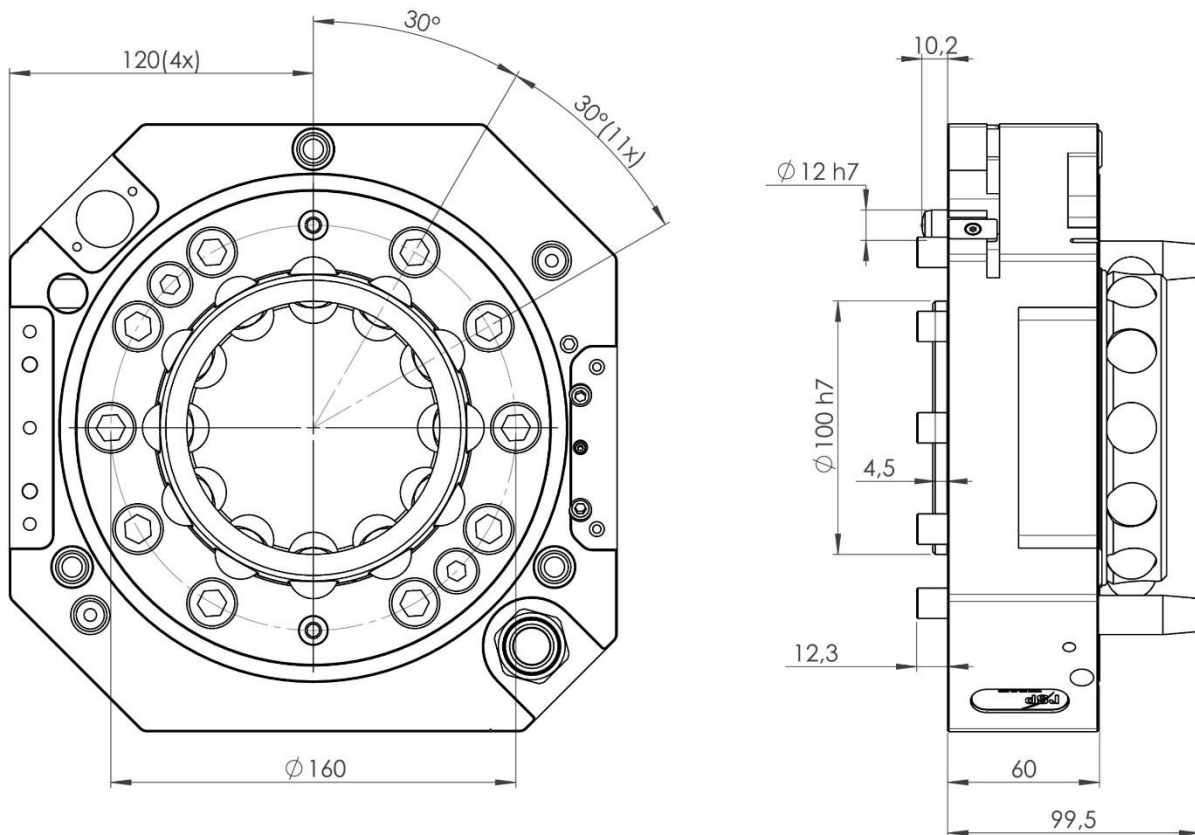
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### 3 DESCRIPTIONS OF COMPONENTS

#### 3.1 Tool changer TC480-1, basic unit. Article: P7801A

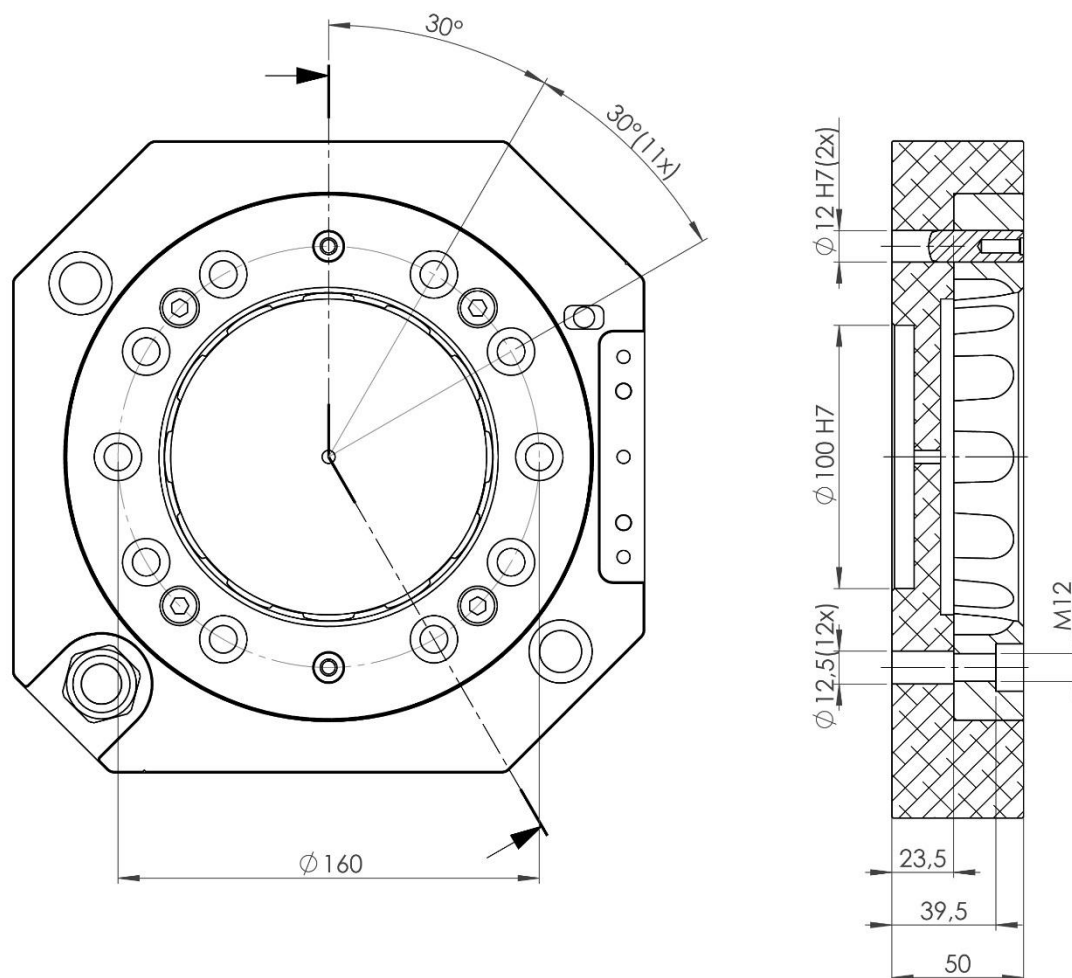


The tool changer TC480-1 transfers 1 pneumatic channel to the tool attachment, has inlets for Open TC and Close TC, 5 positions for options and 1 for magnetic sensors. To be used together with tool attachment P7802A.

#### Technical data

<b>Working temperature</b>		+10°C – +60°C
<b>Bolt pattern</b>		ISO 9409-1 160-10-M12
<b>Weight</b>		12.5 kg
<b>Water/air channels</b>	Pneumatic diagram G 1/2"	Pne0230-014 (section 2.13) 1 x (automatic shut-off)

### 3.2 Tool attachment TA480-1, basic unit. Article: P7802A



The tool attachment TA480-1 transfers 1 pneumatic channel to the tool and has 5 positions for options. To be used together with tool changer P7801A.

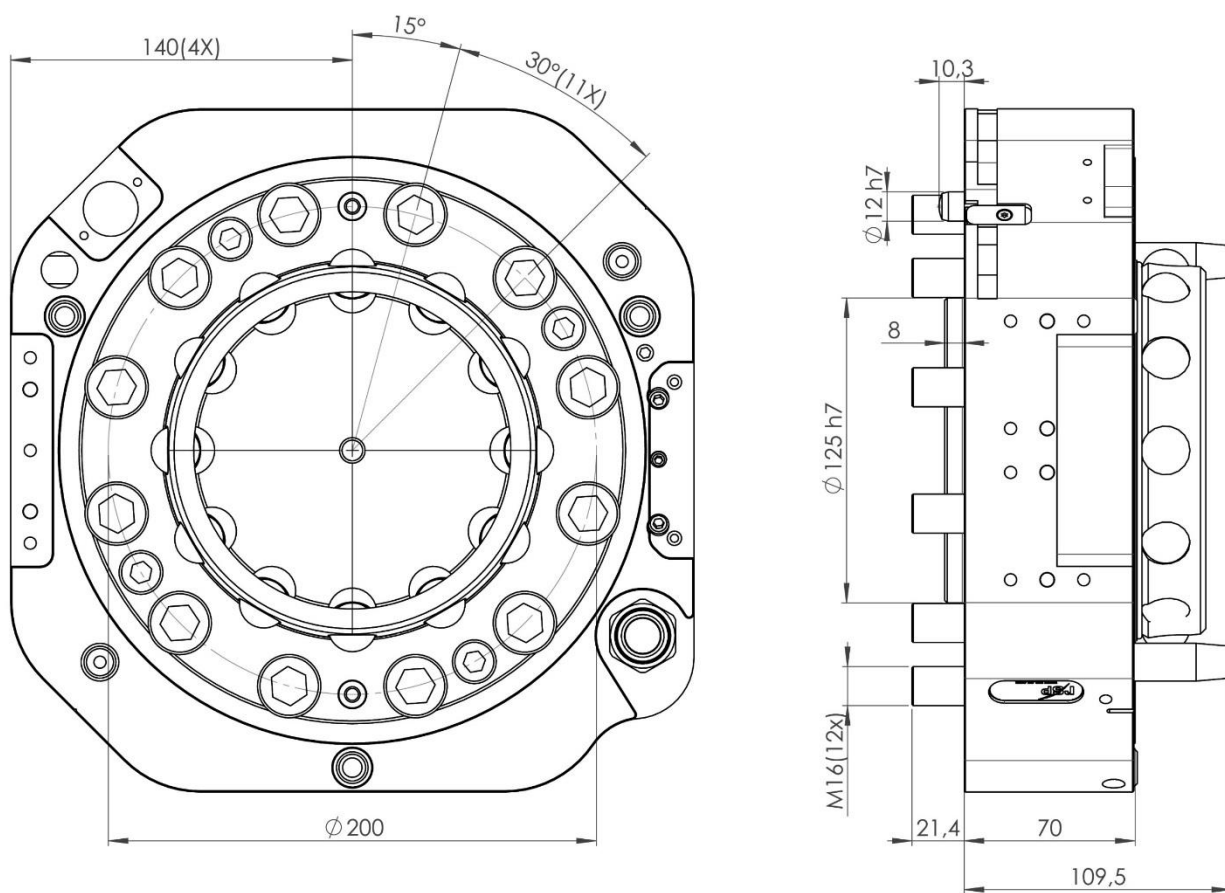
#### Technical data

<b>Working temperature</b>		+10°C – +60°C
<b>Bolt pattern</b>		ISO 9409-1 160-10-M12
<b>Weight</b>		7.8 kg
<b>Water/air channels</b>	Pneumatic diagram G 1/2"	Pne0230-014 (section 2.13) 1 x (automatic shut-off)



**NOTE!** Tools can be mounted to the tool attachment using ten M12 screws, alternatively the tool attachment can be mounted to the tool using ten M10 screws.

### 3.3 Tool changer TC720-1, basic unit. Article: P6901A



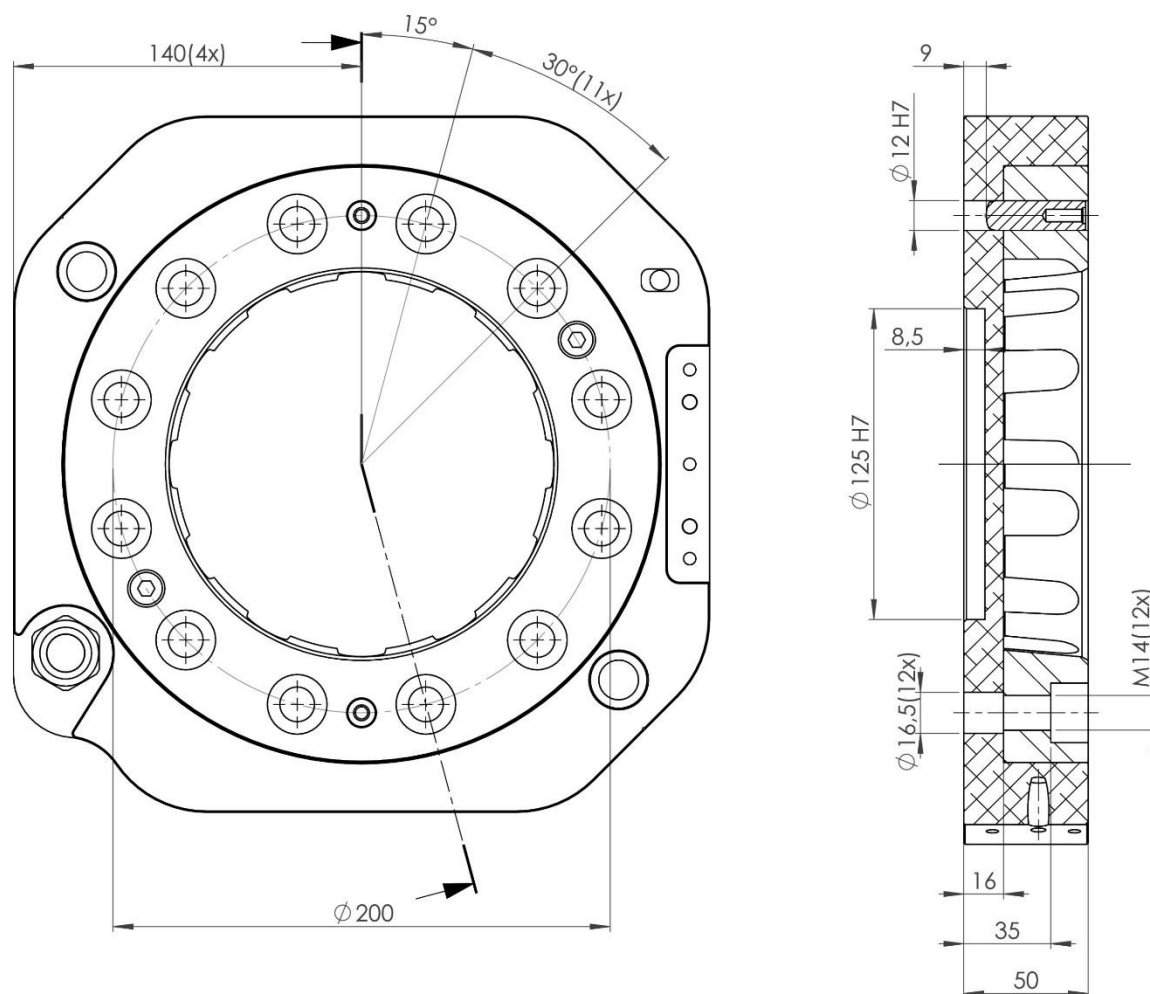
The tool changer TC720-1 transfers 1 pneumatic channel to the tool attachment, has inlets for Open TC and Close TC, 5 positions for options and 1 for magnetic sensors. To be used together with tool attachment P6902A.

#### Technical data

<b>Working temperature</b>		+10°C – +60°C
<b>Bolt pattern</b>		ISO 9409 1-200-12-M16
<b>Weight</b>		20.2 kg
<b>Water/air channels</b>	Pneumatic diagram G 1/2"	Pne0230-014 (section 2.13) 1 x (automatic shut-off)



### 3.4 Tool attachment TA720-1, basic unit. Article: P6902A



The tool attachment TA720-1 transfers 1 pneumatic channel to the tool and has 5 positions for options. To be used together with tool changer P6901A.

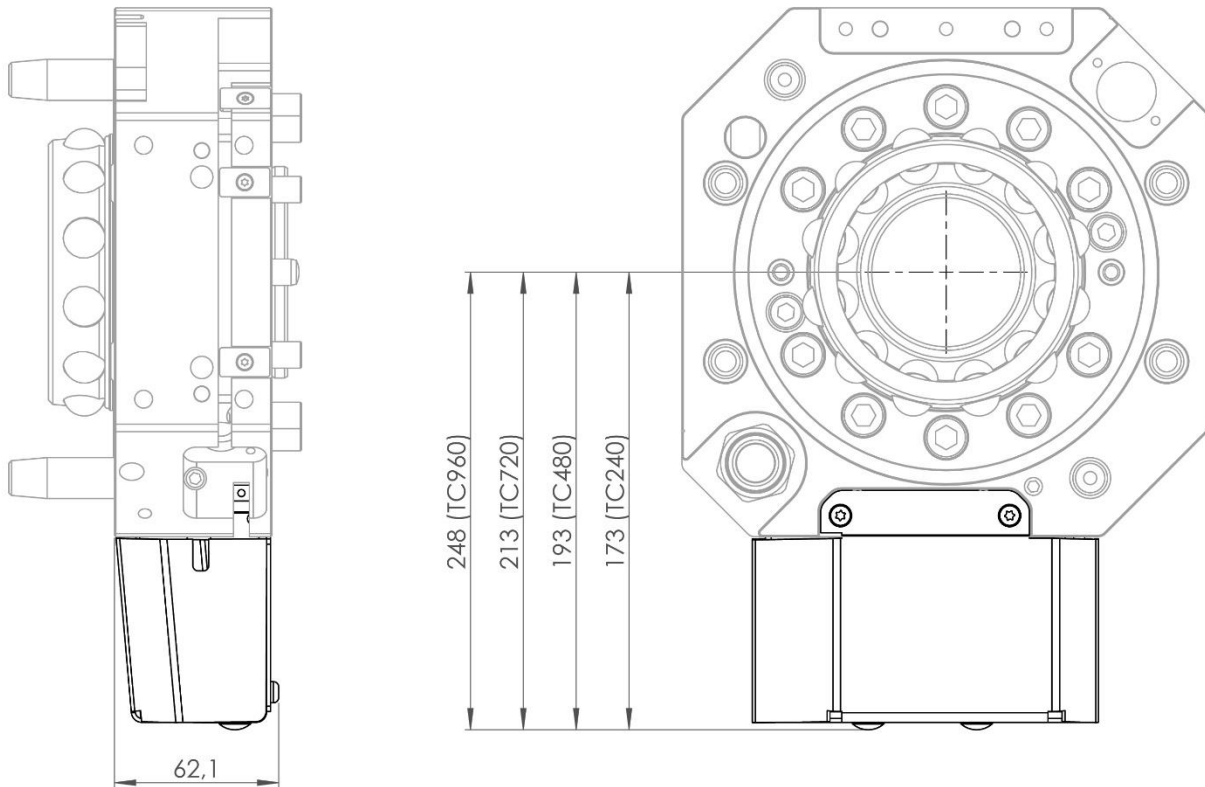
#### Technical data

<b>Working temperature</b>	+10°C – +60°C	
<b>Bolt pattern</b>	ISO 9409 1-200-12-M16	
<b>Weight</b>	10.7 kg	
<b>Water/air channels</b>	Pneumatic diagram G 1/2"	Pne0230-014 (section 2.13) 1 x (automatic shut-off)



**NOTE!** Tools can be mounted to the tool attachment using twelve M16 screws, alternatively the tool attachment can be mounted to the tool using twelve M14 screws.

### 3.5 Integrated valve for TC Open/TC Close. Article: P7710-4



Includes two integrated valves. The TC Close valve is in passive position open, which is locking the tool changer. The TC Open valve is in passive position evacuating the air from the unlocking side of the piston inside the tool changer, which is allowing the tool to be locked.

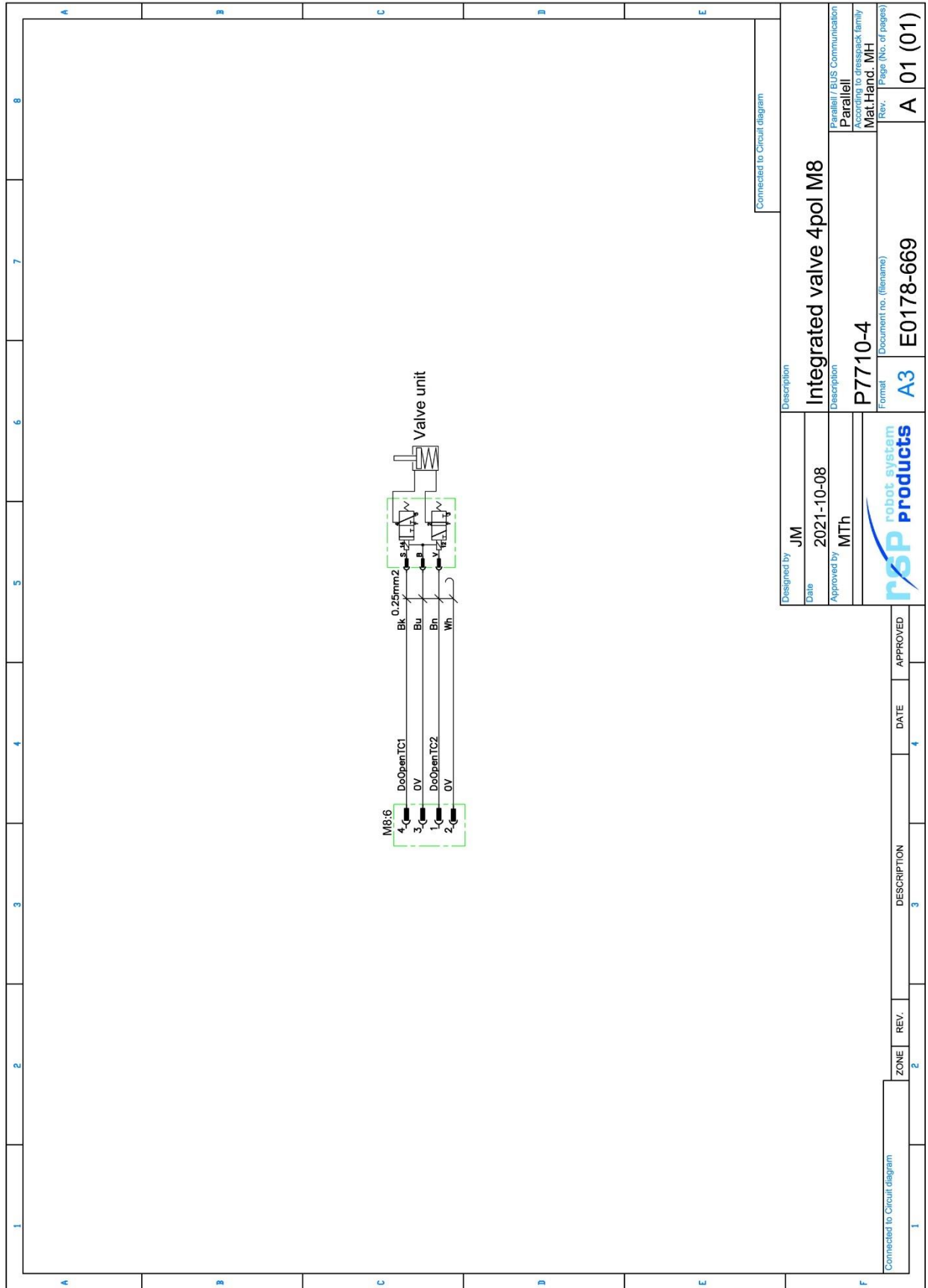
In order to Open (unlock) the tool changer, the signals “doOpen TC 1” and “doOpen TC 2” shall both be set to +24V DC. If one or both of the electrical signals disappear the tool changer will go to closed (locked) position. Air is supplied via Air in on the tool changer.

To be mounted at one dedicated position on the tool changer.

#### Technical data

<b>Weight</b>		0.3 kg
<b>Electrical signals</b>	Connection M8 4p	E0178-669 (section 3.5.1) doOpen TC 1. doOpen TC 2, 0V
<b>Air channels</b>	Pneumatic diagram Air supply Air quality	Pne0230-014 (section 2.13) Air in (marked “AIR” on TC), 6-10 bar Oil-clean and waterless filtered air, with max 25µm particle content

### 3.5.1 Circuit diagram, E0178-669 for integrated valve

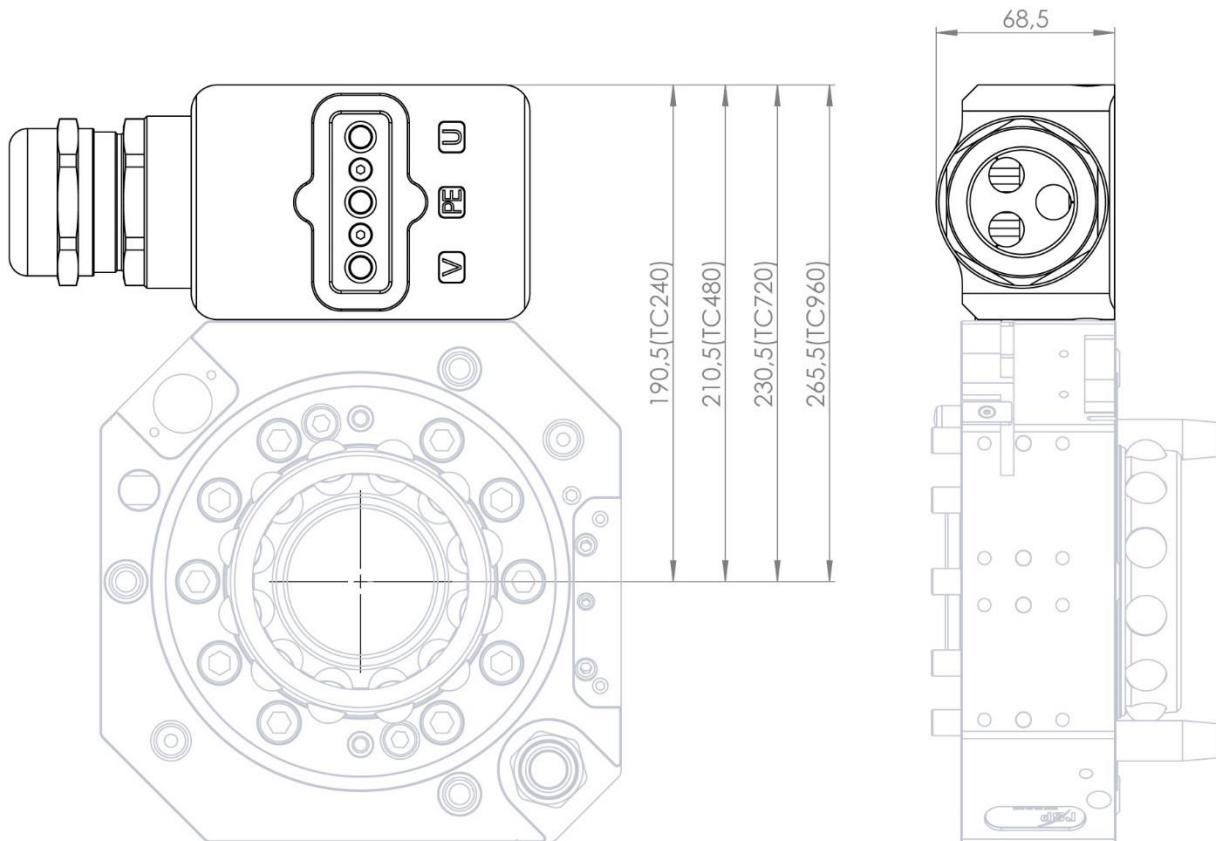


Designed by		JM	
Date		2021-10-08	
Approved by		MTh	
Description		Integrated valve 4pol M8	
Format		A3	
Document no. (filename)		E0178-669	
Revision		A 01 (01)	
According to dresspack family		Parallel	
Mat.Hand. MH		Parallel / BUS Communication	
Page (No. of pages)		1	

ZONE	REV.	DESCRIPTION	DATE	APPROVED
2			4	

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### 3.6 Weld power connector, cable gland, robot side. Article: P6784-UL

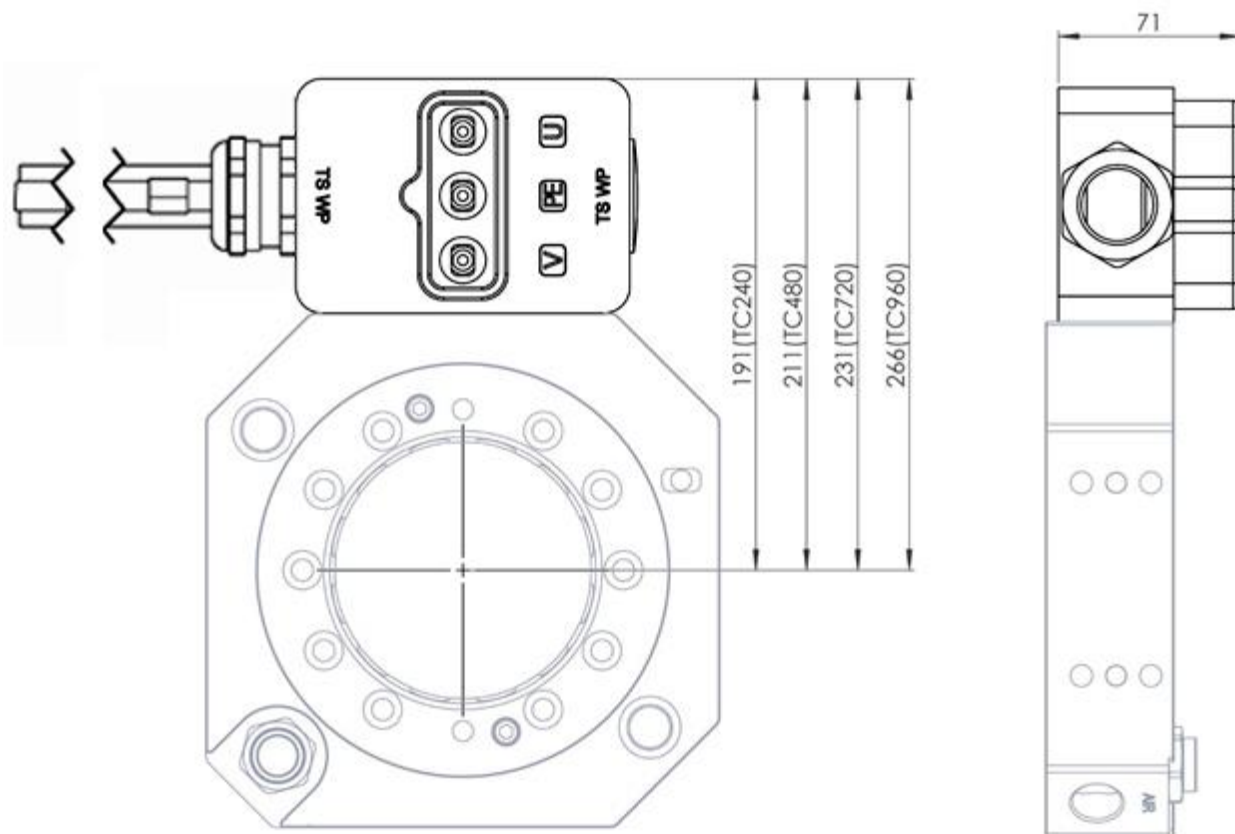


Connects 3 weld power conductors to the tool attachment. Can be mounted at 2 different positions at the tool changer. To be used together with option P1517-UL attached to the tool attachment.

#### Technical data

<b>Weight</b>		1.2 kg
<b>Weld power</b>	Total number of conductors	3 x (690V, 140A)
	Connection	Cable gland (M50 with insert grommet) for three 15 mm separate cables

### 3.7 Weld power with cable gland, tool side. Article: P1517-UL

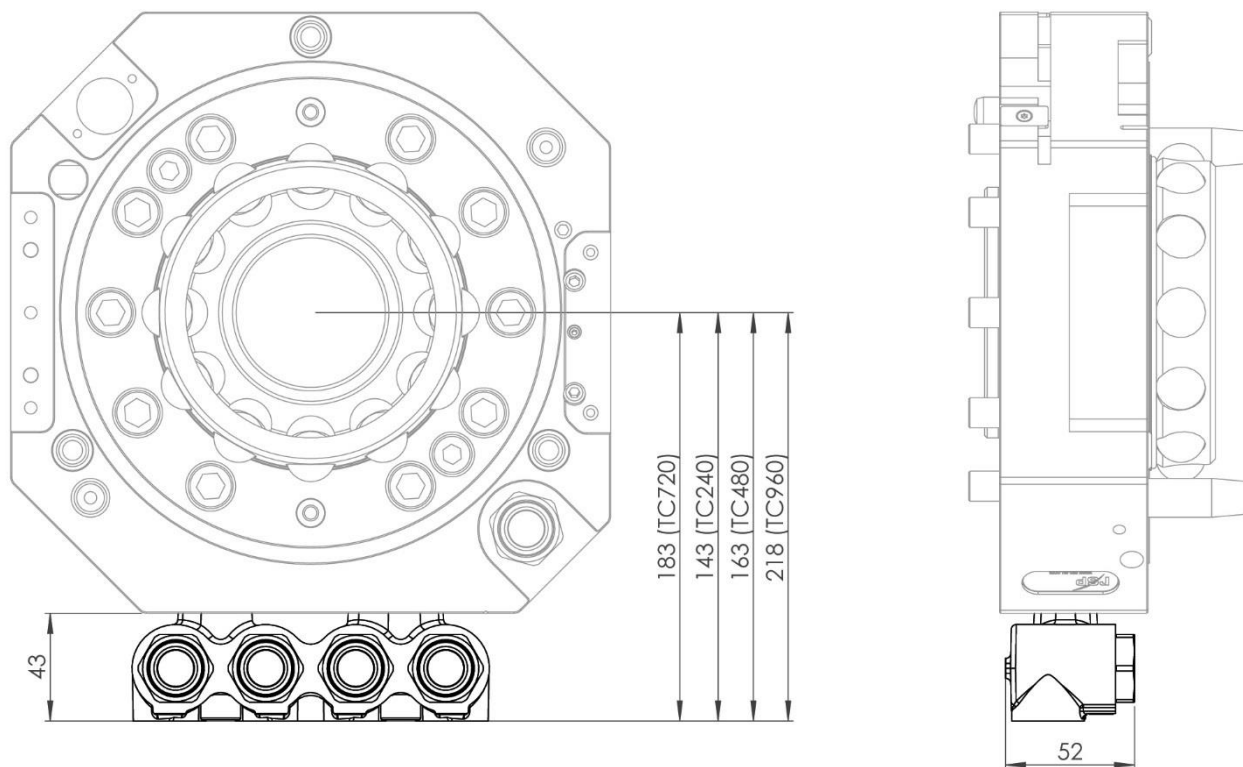


Connects 3 weld power conductors to the tool. To be mounted at the tool attachment and used together with option P6784 attached to the tool changer.

#### Technical data

<b>Weight</b>		1.2–1.4 kg
Weld power	Total number of conductors	3
	Connection	Cable gland for 3 x 11 mm cables
	Cable (included)	3 x 1.4m (single wire) cables, 25 mm <sup>2</sup>

### 3.8 Water/air coupling, 1-4 channels, robot side. Article: P7230



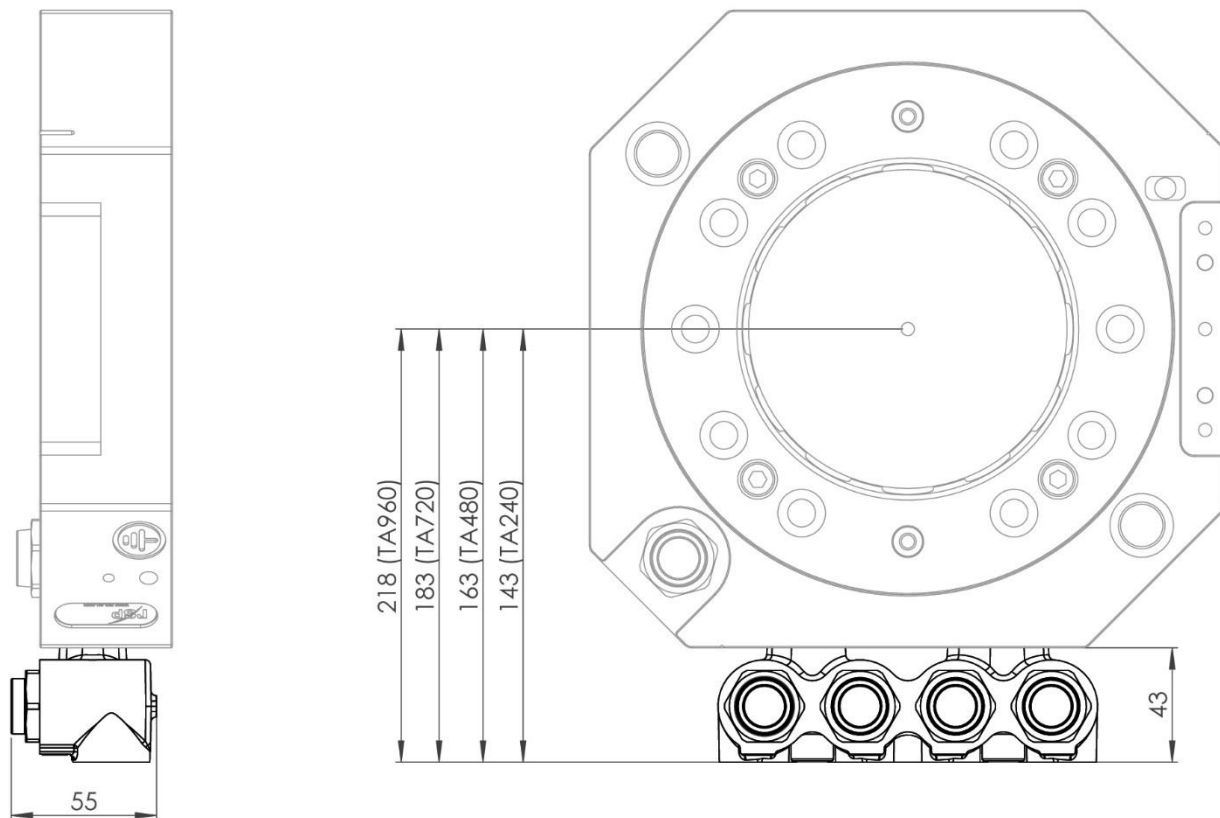
Transfers 1-4 water/air channels, with non-return valves, to the tool attachment. Can be mounted at 2 different positions on the tool changer. To be used together with option P7231 attached to the tool attachment.

#### Technical data

<b>Weight</b>		1.2–1.4 kg
<b>Water/air channels</b>	Water/air connection	1–4 x G 1/2" (2000l/min air, max 10 bar)
	Water flow	20 l/min
	Water/air quality	Max 25µm particle content

Number of ducts		Article number
Water/air channels	1	P7230-1B
	2	P7230-2B
	3	P7230-3B
	4	P7230-4B

### 3.9 Water/air coupling, 1-4 channels, tool side. Article: P7231



Transfers 1-4 water/air-channels, with non-return valves, to the tool. To be mounted at the tool attachment and used together with option P7230 attached to the tool changer.

#### Technical data

<b>Weight</b>		1.2-1.4 kg
<b>Water/air channels</b>	Water/air connection	1-4 x G 1/2" (2000l/min air, max 10 bar)
	Water flow	20 l/min
	Water/air quality	Max 25µm particle content

Number of ducts		Article number
Water/air channels	1	P7231-1B
	2	P7231-2B
	3	P7231-3B
	4	P7231-4B

### 3.10 Magnetic sensors TC Opened/TC Closed. Articles: P7173 and P7174



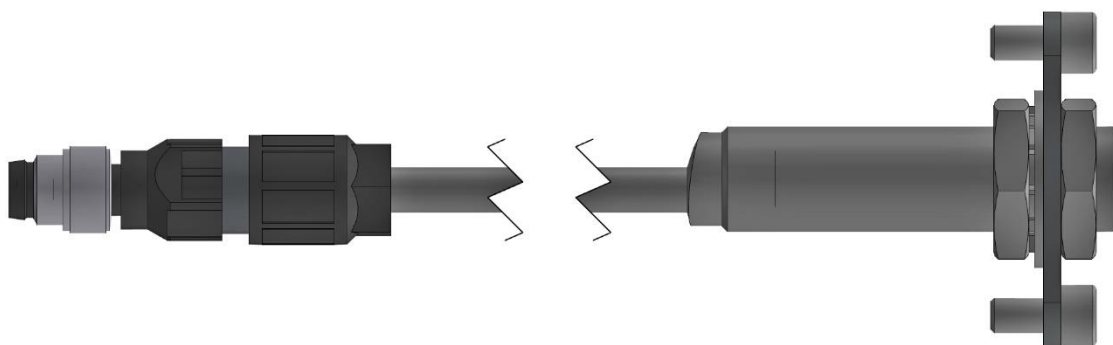
One magnetic sensor which gives +24V signal “TC Opened” when tool changer is unlocked and one magnetic sensor which gives +24V signal “TC Closed” when tool changer is locked. To be mounted at one dedicated position on the tool changer.

#### Technical data

<b>Weight</b>		0.05 kg
<b>Electrical signals</b>	2 x M8 3p	TC Closed, TC Opened, 2 x 0V, 2 x 24V

Sensor article	Tool changers	Circuit diagram
P7173	P7548-035-UL (TC480-MH Lean ID)	E0203-291 (section 2.14)
	P7548-033-UL (TC480-SWS Lean ID)	E0203-286 (section 2.16)
P7174	P7572-014-UL (TC720-MH Lean ID)	E0203-291 (section 2.14)
	P7572-016-UL (TC720-MH SWS ID)	E0203-286 (section 2.16)

### 3.11 TC Empty sensor. Article: P7145-1



One inductive sensor which gives +24V signal “TC Empty” when tool attachment is not present at tool changer. To be mounted at one dedicated position on the tool changer.

#### Technical data

<b>Weight</b>		0.05 kg
<b>Electrical signals</b>	Circuit diagram	E0203-078 (section 3.11.1)
	Connector	M8 3-pole, pins
	Dedicated signals	TC Empty, 0V, 24 V



### 3.11.1 Circuit diagram E0203-078

1	2	3	4	5	6	7	8												
A	B	C	D	E	Connected to Circuit diagram														
<p><b>NOTE!</b> Sensor will <u>not</u> give signal when TA is present. i.e. TC is empty</p>																			
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">Coupling table</th> </tr> </thead> <tbody> <tr> <td>Function</td> <td>I0837 Color</td> </tr> <tr> <td>Signal</td> <td>BK</td> </tr> <tr> <td>0V</td> <td>BU</td> </tr> <tr> <td>24V</td> <td>BN</td> </tr> </tbody> </table>								Coupling table		Function	I0837 Color	Signal	BK	0V	BU	24V	BN		
Coupling table																			
Function	I0837 Color																		
Signal	BK																		
0V	BU																		
24V	BN																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Designed by</td> <td colspan="2">JoM</td> </tr> <tr> <td>Date</td> <td colspan="2">2017-11-10</td> </tr> <tr> <td>Approved by</td> <td colspan="2">----</td> </tr> <tr> <td colspan="3" style="text-align: center;"> </td> </tr> </table>								Designed by	JoM		Date	2017-11-10		Approved by	----				
Designed by	JoM																		
Date	2017-11-10																		
Approved by	----																		
Connected to Circuit diagram			Description			TC-Empty sensor ass.(inductive)													
Zone			REV.			Format													
2			4			A3													
DESCRIPTION			DATE			Page (No. of pages)													
3			4			A 01 (01)													
<p style="font-size: small;">It is strictly forbidden, Robot System Products Reserve rights in this document and in the information contained therein. Reproduction use or disclosure to third parties without express authority.</p>																			

### 3.12 Tool in stand sensors, active

Depending on market availability the standard tool in stand sensor combination I1171 and I1260 may be exchanged for P8521, with identical functionality. In such case the passive sensor I1172, mounted on the tool stand, is exchanged with passive sensor I1852.

#### 3.12.1 Tool in stand sensor. Articles: I1171 and I1260



RFID sensors which gives +24V signal "Tool\_In\_Stand1" and "Tool\_In\_Stand2" when tool is positioned in tool stand. To be mounted at one dedicated position on the tool attachment and combined with passive sensor I1172 mounted on a dedicated position on the tool stand.

<b>Weight</b>		0.05 kg
<b>Electrical signals</b>	M8 4S	Tool_In_Stand1, Tool_In_Stand2, 0V, 24V

#### 3.12.2 Tool in stand sensor. Article: P8521



RFID sensors which gives +24V signal "Tool\_In\_Stand1" and "Tool\_In\_Stand2" when tool is positioned in tool stand. To be mounted at one dedicated position on the tool attachment and combined with passive sensor I1852 mounted on a dedicated position on the tool stand.

#### Technical data

<b>Weight</b>		0.05 kg
<b>Electrical signals</b>	Circuit diagram M8 4S	E0186-122 (section 3.12.3) Tool_In_Stand1, Tool_In_Stand2, 0V, 24V



## 4 TC OPERATION AND INTERFACE

### 4.1 Required software function



**WARNING!** The risk assessment for the tool changer (locking control function and monitoring) requires that the software logic described in Product manual for the signal module, *M8353-1*, is adhered to by the system integrator installing the tool changer.

### 4.2 Sparking



**WARNING!** Electrical signals and power must be switched off and disconnected when docking the tool attachment to prevent sparking between signal pins and tool attachment. With the configuration in chapter 2 this is automatically performed during tool change for three 8A signals and 24V customer power.

### 4.3 Tool parking system

Detailed information about tool parking systems are found in Manual *M8309-1*, Tool parking system TPS400.



**NOTE!**

To guarantee reliability and a long service-life for the tool changer, the tool parking system must be stable, both in terms of its design and attachment.

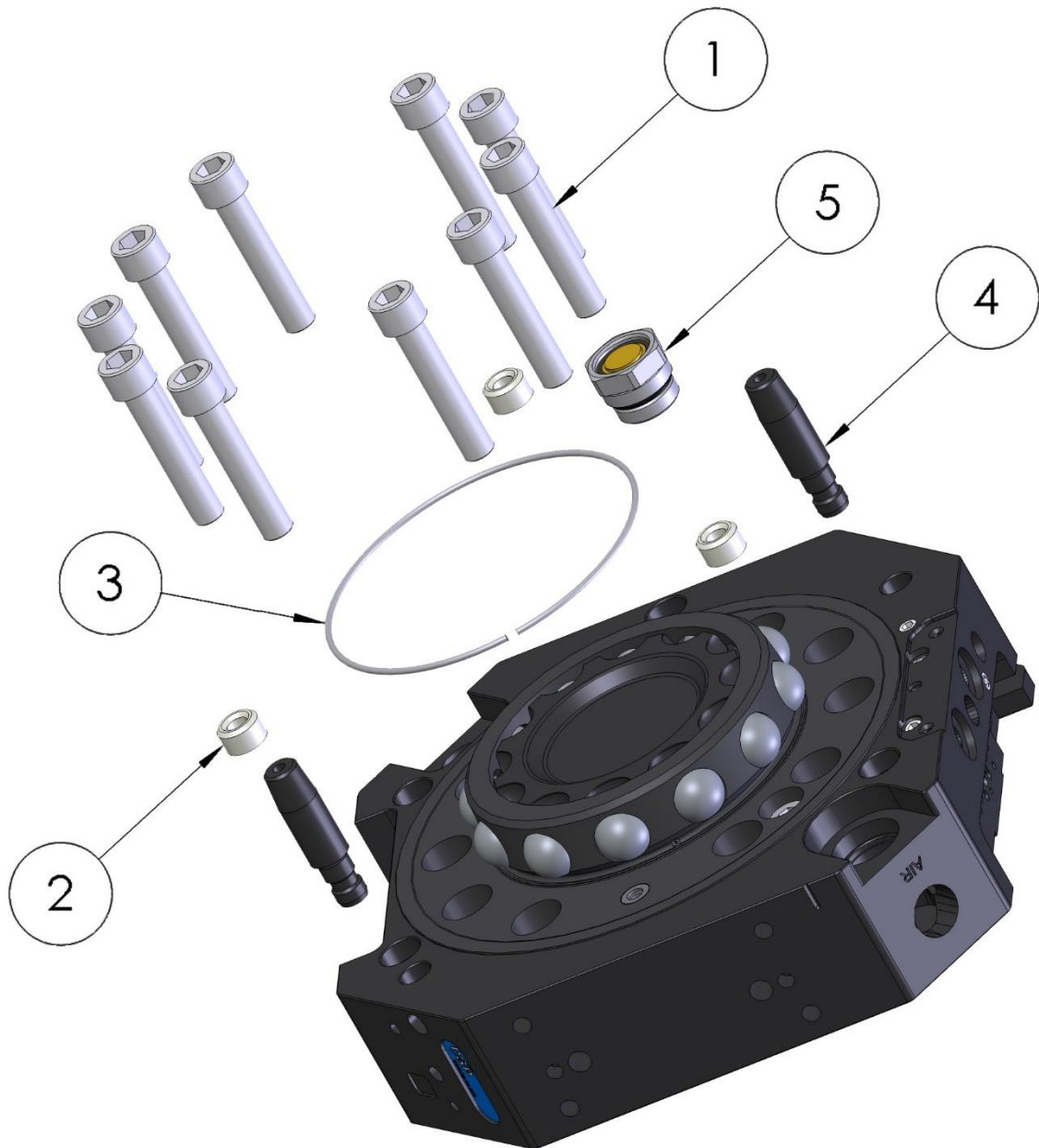


**NOTE!**

The tool parking system must not be spring-loaded!

## 5 SPARE PARTS

### 5.1 Part list for TC480-1, P7801A



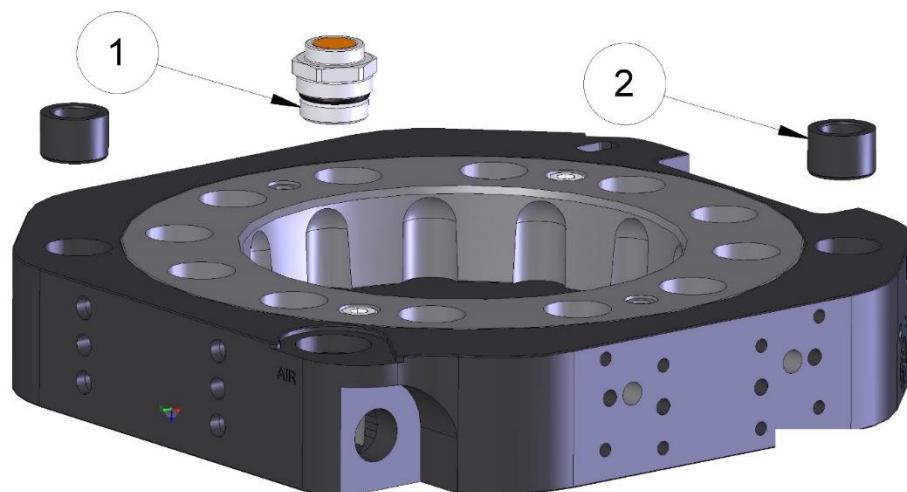
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M12x60	21212519-544		10
2	Damper	63550006-462	X	3
3	Circlip	I0818		1
4	Guide pin	P0230-175	X	2
5	Water/air coupling	I0203	X	1

## 5.2 Parts list for TC720-1, P6901A



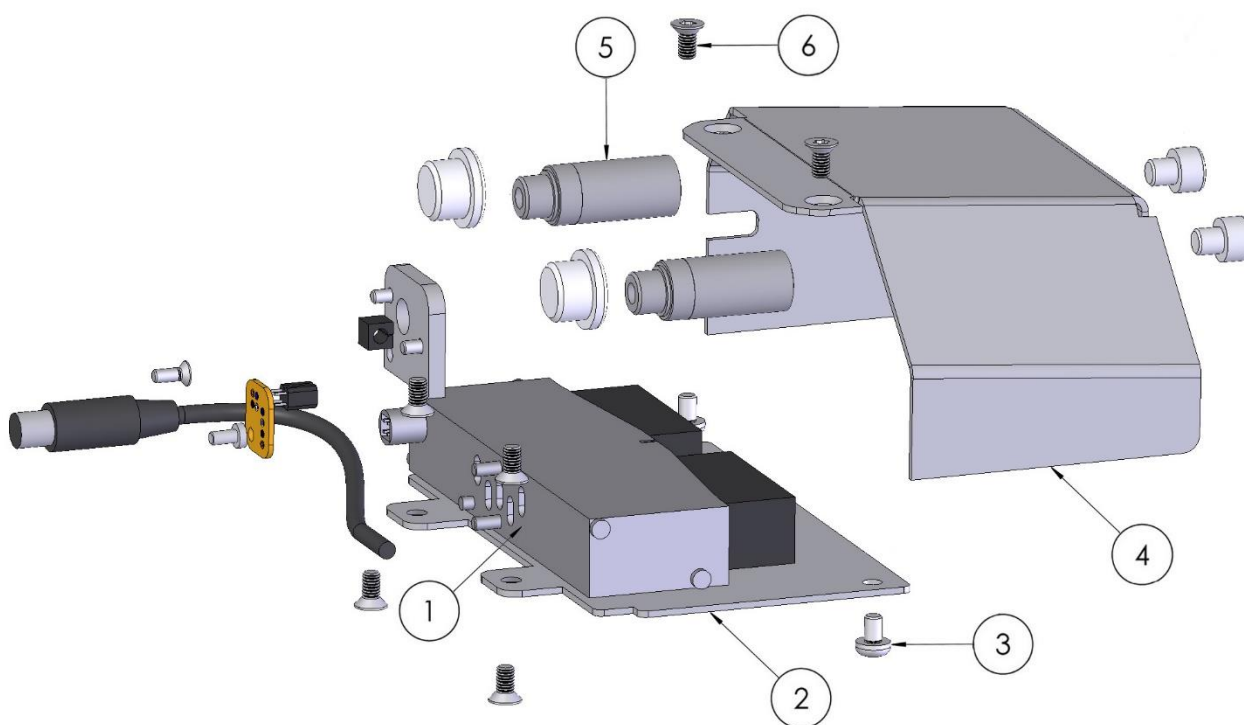
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M16x75	MC6S 16x75		12
2	Damper	63550006-462	X	3
3	Circlip	I1253		1
4	Guide pin	P0230-175	X	2
5	Water/air coupling	I0203	X	1

### 5.3 Part list for TA480-1, P7802A and TC720-1, P6902A



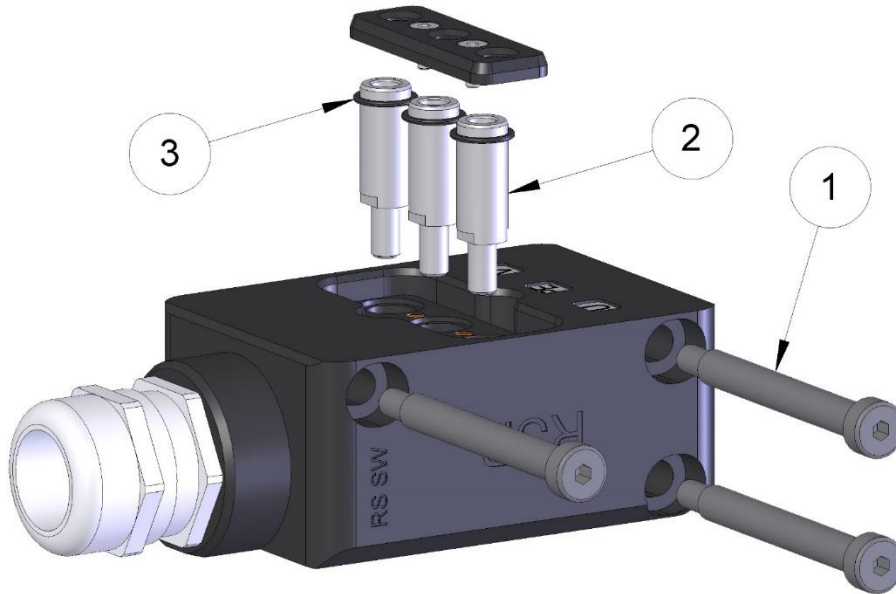
Item	Description	Part number	Wear part	Pcs
1	Water/air coupling	I0202	X	1
2	Guide bushing	P0178-064	X	2

### 5.4 Part list for integrated valve, P7710-4



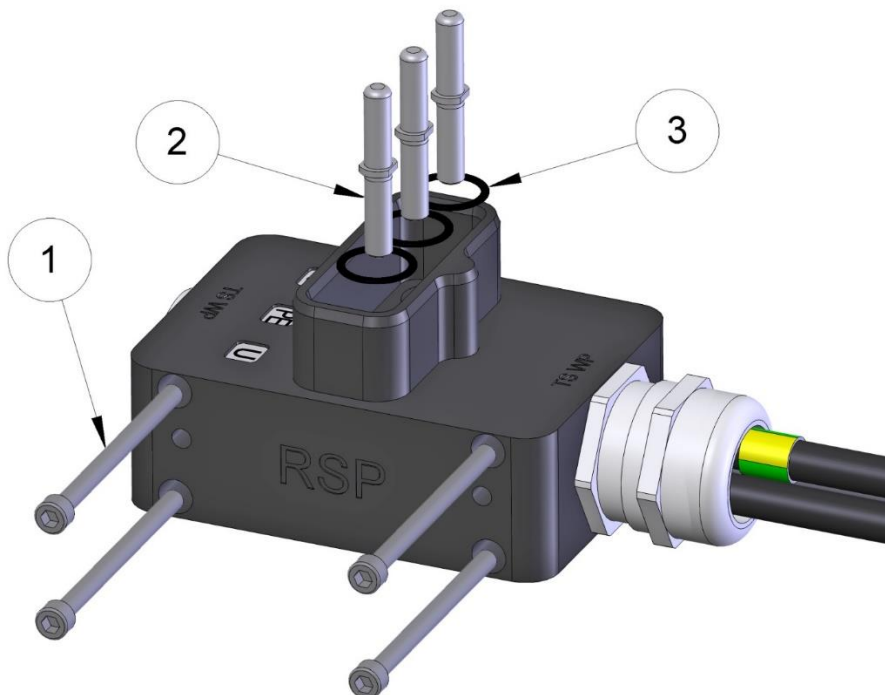
Item	Description	Part number	Wear part	Pcs
1	Valve	I0449		1
2	Rear valve cover	P0178-324		1
3	M4x6 screw	9ADA618-31		2
4	Valve cover	P0178-323		1
5	Silencer	I0903		2
6	Screw M4x8	21212711-287		4

### 5.5 Part list for weld power connector, P6784-UL



Item	Description	Part number	Wear part	Pcs
1	Shoulder screw 10x80	M8-10x80		3
2	Weld power socket	I1001	X	3
3	O-ring	I0160		3

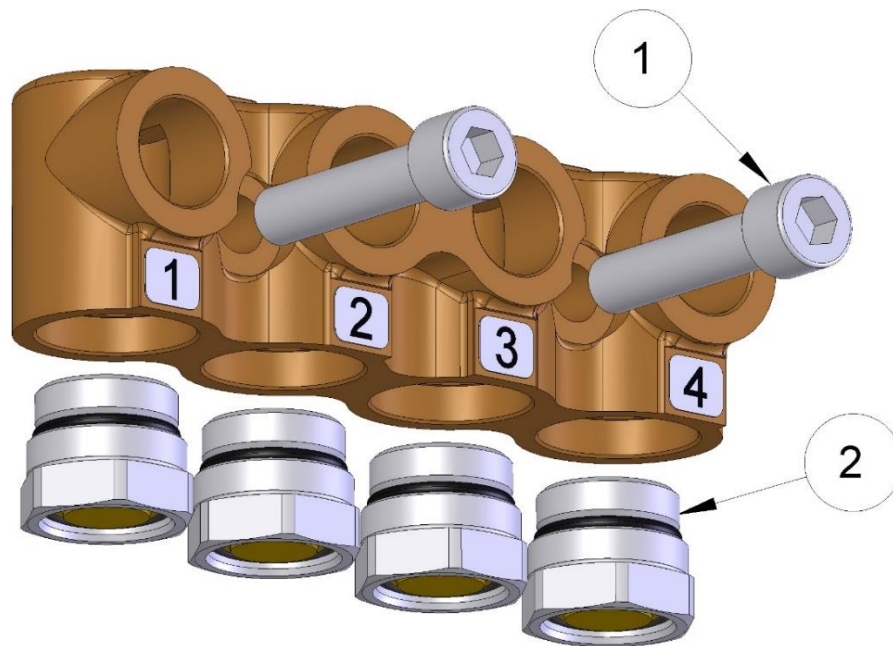
### 5.6 Part list for weld power with cable gland P1517-UL



Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M6x80	21212519-386		4
2	Weld power pin	P0230-105	X	3
3	O-ring	I0776		3

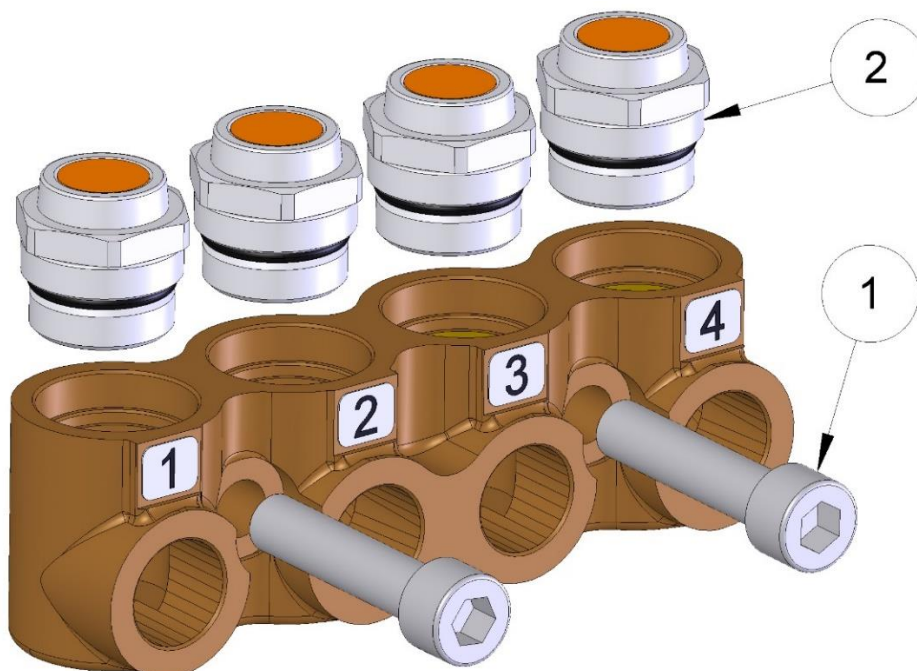


### 5.7 Parts list for water/air coupling, P7230



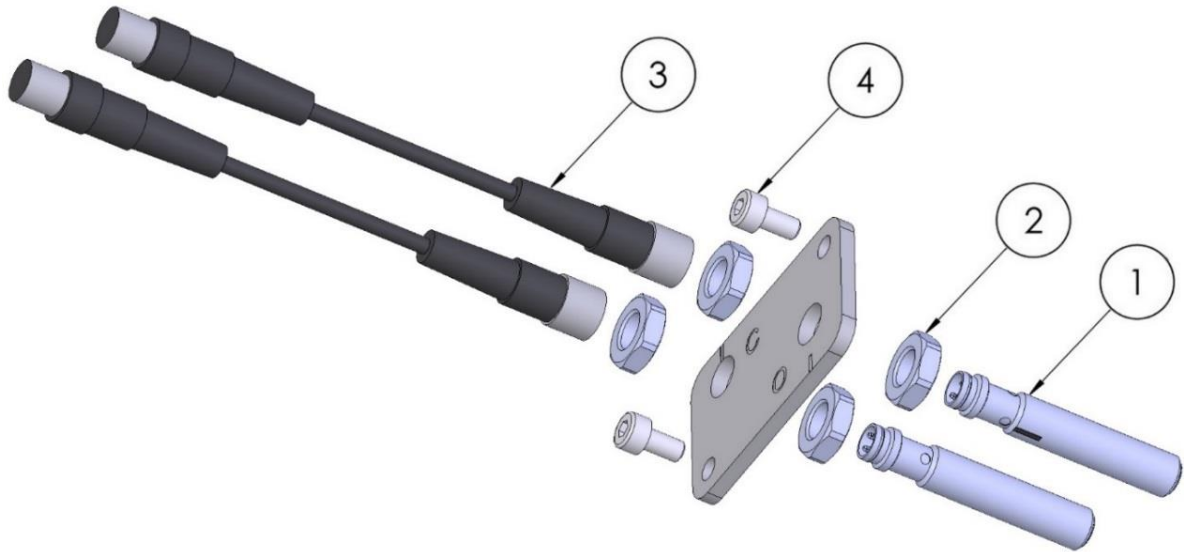
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M10x45	MC6S 10x45		2
2	Water/air coupling	I0203	X	1-4

### 5.8 Parts list for water/air coupling, P7231



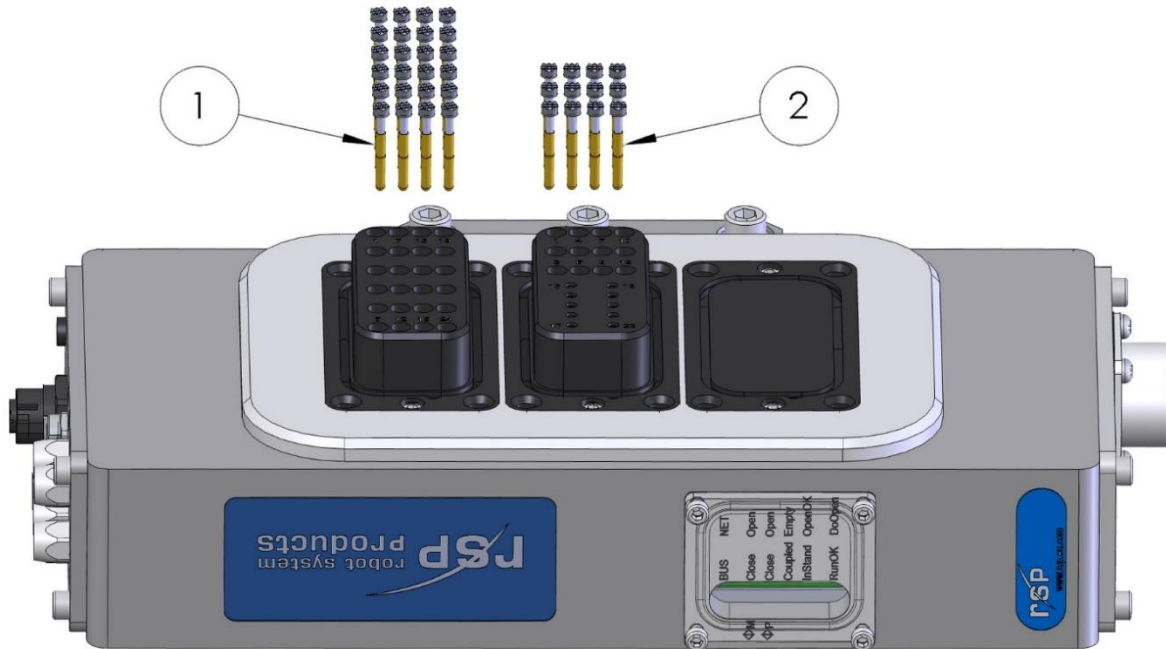
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M10x45	MC6S 10x45		2
2	Water/air coupling	I0202	X	1-4

### 5.9 Part list for magnetic sensors, P7173



Item	Description	Part number	Wear part	Pcs
1	Magnetic sensor	I1015		2
2	Nut	101469		4
3	Sensor cable M8	I1288		2
4	M4x8 screw	MC6S M4x8		2

### 5.10 Part list for signal modules P7501-015-UL and P7501-012-UL



Item	Description	Part number	Wear part	Pcs
1	Spring-loaded signal pin	I1287	X	24
2	Spring-loaded signal pin	I1287	X	12



