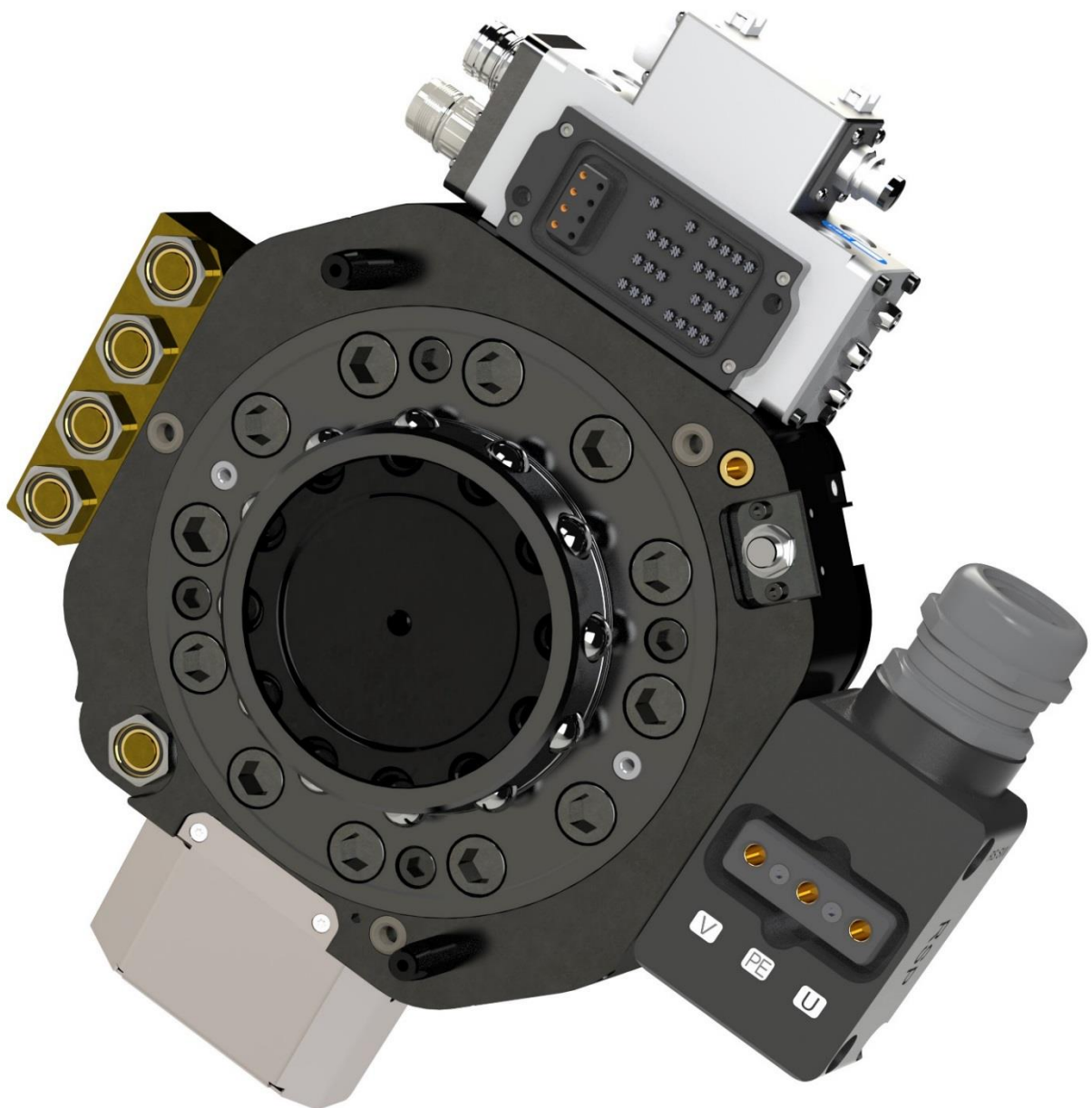


# Product Description

## Tool changers Moduflex-series

M0723-1

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





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# CONTENTS

<b>1 INTRODUCTION</b> .....	<b>6</b>
1.1 RSP tool changers .....	7
1.2 Documents .....	7
1.3 Wear parts.....	7
1.4 Complementary equipment from RSP .....	7
<b>2 TECHNICAL SPECIFICATIONS</b> .....	<b>8</b>
2.1 Description of tool changers and tool attachments .....	8
2.1.1 Coordinate System Definition.....	9
2.1.2 Tool changer TC240-1, basic unit. Article: P6701A.....	10
2.1.3 Tool attachment TA240-1, basic unit. Article: P6702.....	11
2.1.4 Tool changer TC480-1, basic units. Article: P6801A .....	12
2.1.5 Tool attachment TA480-1, basic unit. Article: P6802.....	13
2.1.6 Tool changer TC480-1, basic units. Article: P6851A .....	14
2.1.7 Tool attachment TA480-1, basic unit. Article: P6872.....	15
2.1.8 Tool changer TC720-1, basic unit. Article: P6901A.....	16
2.1.9 Tool attachment TA720-1, basic unit. Article: P6902A .....	17
2.1.10 Tool changer TC960-1, basic unit. Articles: P7901A and P7901A-1 .....	18
2.1.11 Tool attachment TA960-1, basic unit. Article: P7902A .....	19
2.1.12 Pneumatic diagram Pne0230-008 for TC240-1 and TC480-1 .....	20
2.1.13 Pneumatic diagram Pne0230-011 for TC720-1 and TC960-1 .....	21
2.2 Options for tool changers and tool attachments.....	22
2.2.1 Integrated valve, TC Open/Close for TC240 and TC480. Article: P6718 .....	22
2.2.2 Integrated valve, TC Open/Close for TC720 and TC960. Article: P7710 .....	23
2.2.3 Valve adapter (external valve). Article: P7084 .....	24
2.2.4 Magnetic sensors TC Opened/TC Closed: P6789, P6873-2, P7174 and P7175 .....	25
2.2.5 Signal interface Souriau, robot side. Article: P6738-1 .....	26
2.2.6 Signal interface Souriau, tool side, Article: P6739 .....	27
2.2.7 Circuit diagram E0178-246 for P6738-1.....	28
2.2.8 Circuit diagram E0178-247 for P6739.....	29
2.2.9 Signal interface Souriau, robot side. Article: P7224.....	30
2.2.10 Signal interface Souriau, tool side, Article: P7225 .....	31
2.2.11 Circuit diagram E0178-764 for P7224.....	32
2.2.12 Circuit diagram E0178-765 for P7225.....	33
2.2.13 Signal interface Souriau, robot side. Article: P6711.....	34
2.2.14 Signal interface Souriau, tool side, Article: P6721 .....	35
2.2.15 Circuit diagram E0178-207 for P6711.....	36
2.2.16 Circuit diagram E0178-208 for P6721.....	37
2.2.17 Servo interface M23, robot side. Article: P6768-2.....	38
2.2.18 Servo interface M23, tool side, Article: P6772-2.....	39
2.2.19 Circuit diagram E0178-314 for P6768-2.....	40
2.2.20 Circuit diagram E0178-321 for P6772-2.....	41
2.2.21 Field bus interface Profinet, robot side. Article: P6771 .....	42
2.2.22 Field bus interface Profinet, tool side, Article: P6775 .....	43
2.2.23 Circuit diagram E0178-317 for P6771 .....	44
2.2.24 Circuit diagram E0178-320 for P6775.....	45
2.2.25 Signal and servo interface, robot side. Article: P6778 .....	46
2.2.26 Signal and servo interface, tool side. Article: P6779.....	47
2.2.27 Circuit diagram E0230-290 for P6778.....	48
2.2.28 Circuit diagram E0230-291 for P6779.....	50
2.2.29 Signal and field bus interface, robot side. Article: P6780.....	51
2.2.30 Signal and field bus interface, tool side. Article: P6781 .....	52

2.2.31 Circuit diagram E0230-292 for P6780.....	53
2.2.32 Circuit diagram E0230-293 for P6781.....	55
2.2.33 Water/air coupling, 1–4 channels, robot side. Article: P6715A.....	56
2.2.34 Water/air coupling, 1–4 channels, tool side. Article: P6725A.....	57
2.2.35 Weld power connector M40, robot side. Article: P6716.....	58
2.2.36 Weld power connector M50, robot side. Article: P6784.....	59
2.2.37 Weld power connector with MC connector, robot side. Article: P6717.....	60
2.2.38 Weld power connector with RobiFix, robot side. Article: P6794.....	61
2.2.39 Weld power with cable gland, tool side. Article: P6726.....	62
2.2.40 Weld power connector 2 x M40, robot side. Article: P6766.....	63
2.2.41 Weld power with 2 x cable gland, tool side. Article: P6767.....	64
2.2.42 Weld power contact cover, tool side. Article: P6742.....	65
2.2.43 Air coupling, 8 channels, robot side. Article: P6847.....	66
2.2.44 Air coupling, 8 channels, tool side. Article: P6848.....	67
2.2.45 Programming tool for TC480. Article: P7160.....	68
2.2.46 Programming tool for TC480. Article: P7161.....	68
2.2.47 TC ground socket. Article: P7239.....	69
2.2.48 TA ground socket. Article: P7147.....	69
2.2.49 Forced opening kit. Article: P6910.....	70
2.2.50 Robot adaptation kits.....	70
2.3 Limitation of Robot movements.....	70
<b>3 TC OPERATION AND INTERFACE.....</b>	<b>71</b>
3.1 Required software function.....	71
3.2 Sparking.....	74
3.3 Programming.....	74
3.4 Tool Stand.....	74
3.5 Tool Identification.....	74
<b>4 SPARE PARTS.....</b>	<b>75</b>
4.1 Tool changer.....	75
4.1.1 Parts list for TC240-1, P6701A.....	75
4.1.2 Parts list for TC480-1, P6801A and P6851A.....	76
4.1.3 Parts list for TC720-1, P6901A.....	77
4.1.4 Parts list for TC960-1, P7901A and P7901A-1.....	78
4.1.5 Parts list for integrated valve, P7710.....	79
4.1.6 Parts list for Valve adapter, P7084.....	80
4.1.7 Parts list for magnetic sensors, P7172, P7173, P7174 and P7175.....	80
4.1.8 Parts list for forced opening kit, P6910.....	81
4.1.9 Parts list for signal interface, P6738-1, P7224, P6711 and P6771.....	81
4.1.10 Parts list for servo interface M23, P6768-2.....	82
4.1.11 Parts list for signal interface, P6778 and P6780.....	82
4.1.12 Parts list for weld power connector, P6716, P6784 and P6717.....	83
4.1.13 Parts list for water/air coupling, P6715A.....	84
4.1.14 Parts list for air coupling, P6847.....	84
4.2 Tool attachment.....	85
4.2.1 Parts list for tool attachments, P6702, P6802 and P6872.....	85
4.2.2 Parts list for tool attachments, P6902A and P7902A.....	85
4.2.3 Parts list for signal interface, P6739, P7225, P6721 and P6775.....	86
4.2.4 Parts list for power interface M23, P6772-2.....	86
4.2.5 Parts list for signal interface, P6779 and P6781.....	87
4.2.6 Parts list for weld power connector, P6726.....	88
4.2.7 Parts list for water/air coupling, P6725A.....	89
4.2.8 Parts list for air coupling, P6848.....	89

# 1 INTRODUCTION

**Robot System Products** is a front-rank provider of peripheral products for high performance robot applications. We provide complete system 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.

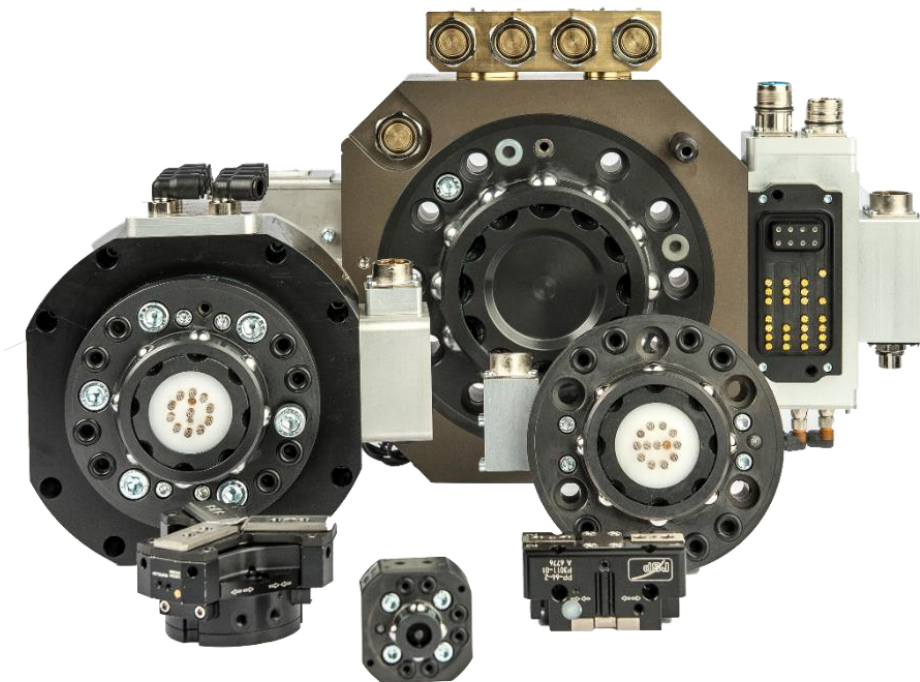
**Robot System Products** has a wide range of standard robot peripheral products:

- 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 RSP's cost-effective CiRo, cables and hoses can be freely selected with high robot flexibility maintained, and 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

The Robot System Products' 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 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 Documents

This document, *Product Description*, contains product information, drawings, data, electrical and pneumatic diagrams, required safety software functions and lists of spare parts. In the document *Installation and Maintenance* (M0716-1) procedures for mounting, installation, replacement of equipment is described together with instructions related to maintenance activities and intervals.

## 1.3 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

## 1.4 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.
Cable and hose packages	Complete packages for most robots on the market ready to be mounted without any modifications.
Tool parking systems	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 X_T-format.

## 2 TECHNICAL SPECIFICATIONS

### 2.1 Description of tool changers and tool attachments

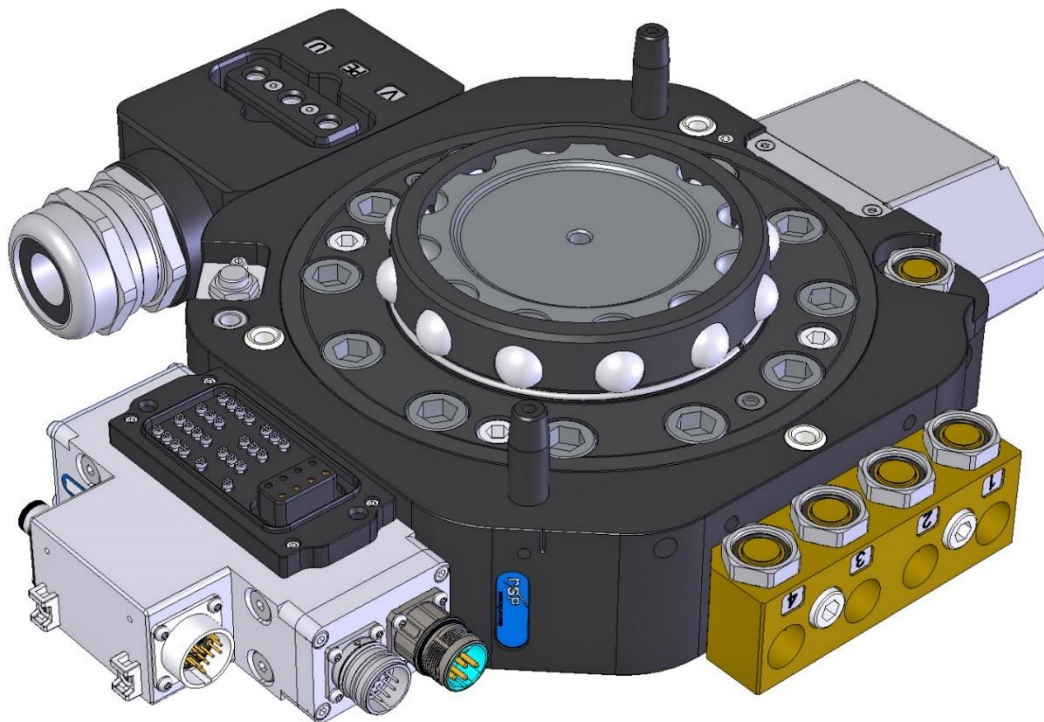
This document presents the RSP product family Moduflex, which is designed for maximum flexibility. It can be used for various applications combining a large number of options in different configurations which are generally useable within the entire product family. This document presents:

- The Robot System Products TC240, TC480, TC720 and TC960 tool changers including tool attachments.
- Options to configure tool changers and tool attachments. These options can, as well, be ordered as accessories for retrofitting.
- Connection kits to facilitate electrical installation.

An adaptation plate between the tool changer and the turning disc on the robot may be needed, depending on the robot model. Such adaptation plates are available from RSP.

Dependent on model two or three guide pins are mounted in order to precisely align the tool attachment with the tool changer before the electrical connectors are connected at a tool change operation, this extends the lifetime for not spring-mounted signal pins.

The figure below is an example that shows a configuration for spot welding.

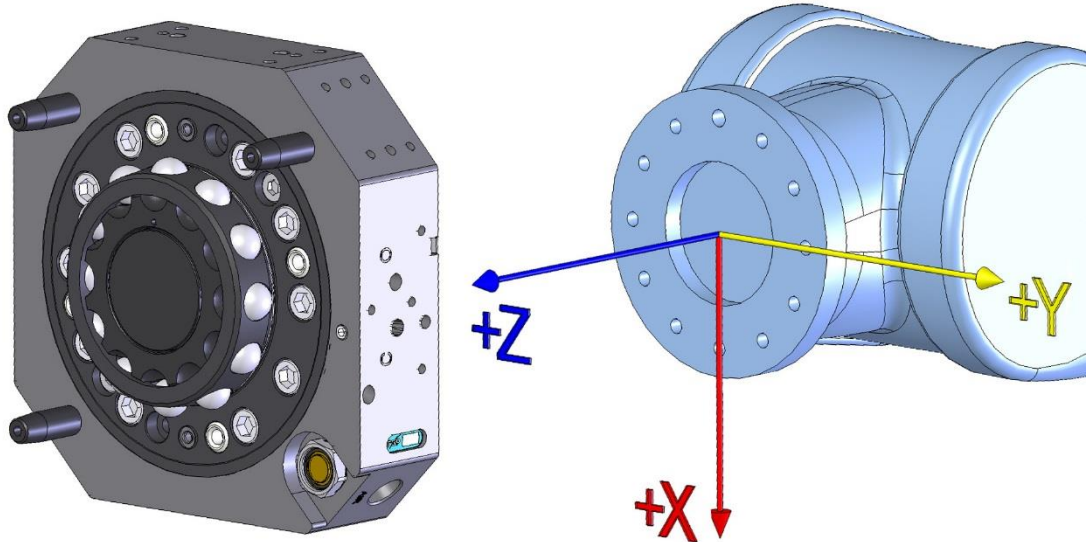


**TC720-SWS**



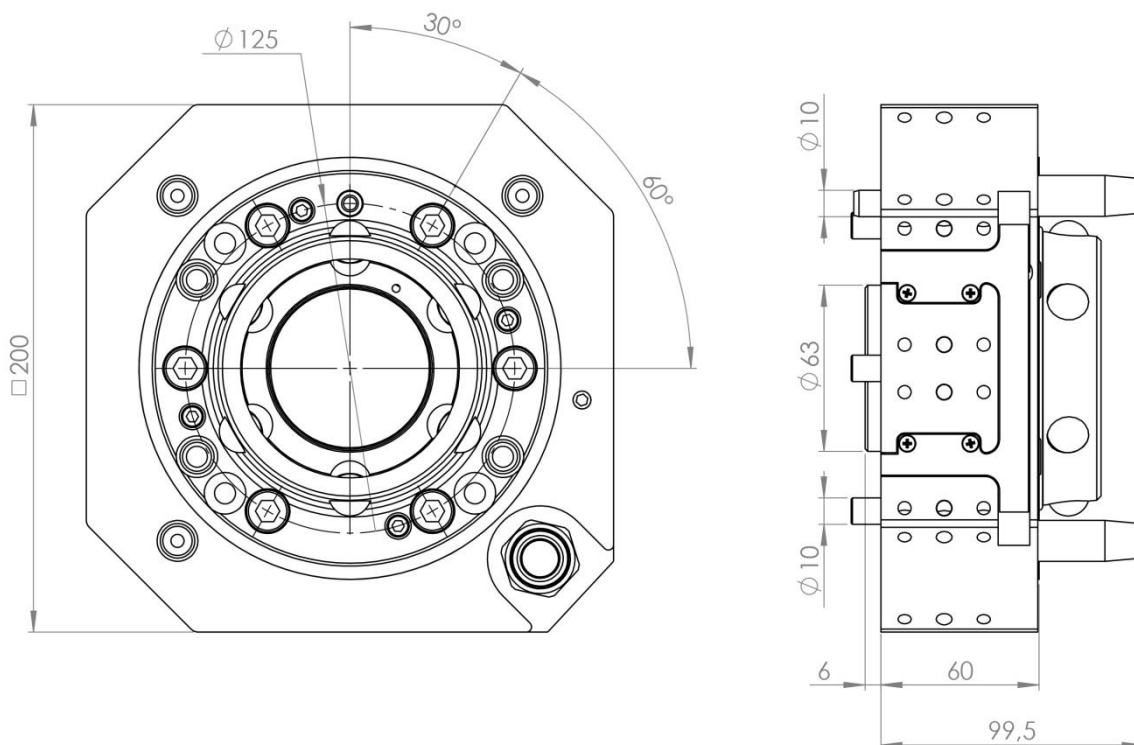
## 2.1.1 Coordinate System Definition

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, the origo of the co-ordinate system is situated in the centre of the robot mounting flange.

## 2.1.2 Tool changer TC240-1, basic unit. Article: P6701A

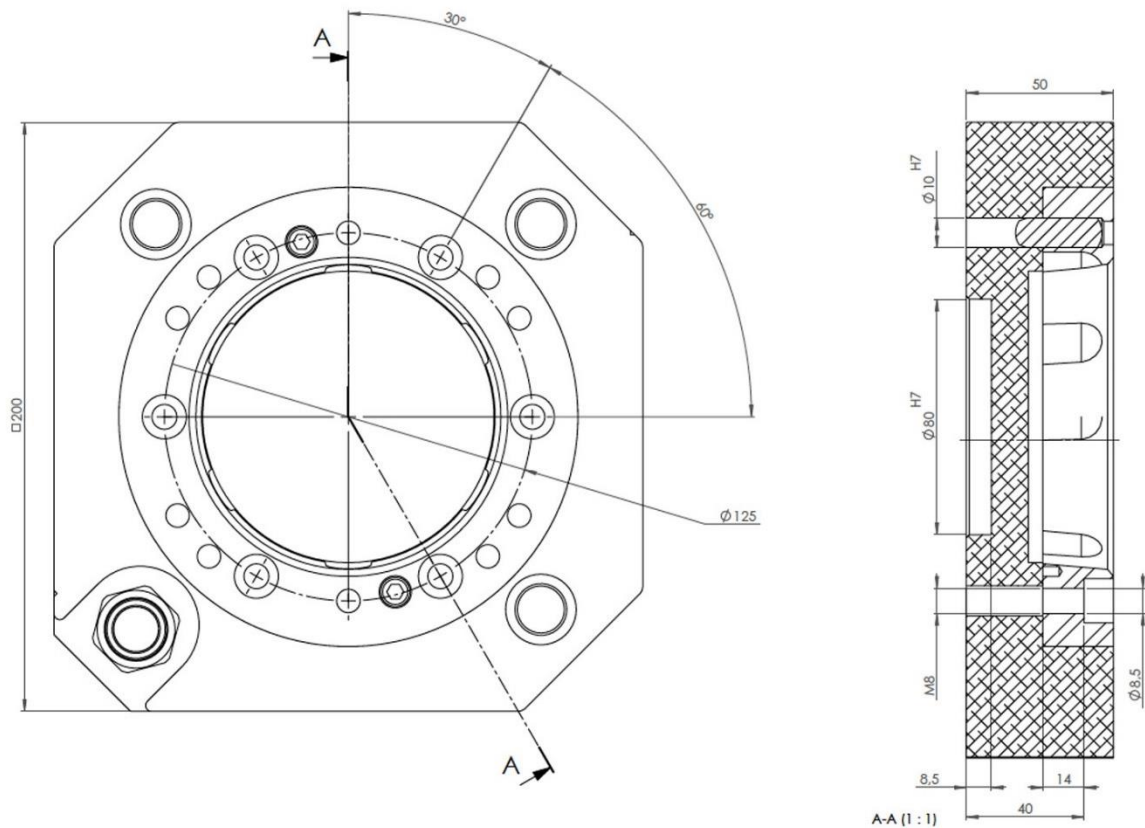


The tool changer P6701A transfers 1 pneumatic channel to the tool attachment, has separate inlets for Open TC and Close TC, 5 positions for options and 1 for magnetic sensors. To be used together with tool attachment P6702.

### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO 9409-1-125-6-M10
<b>Maximum tool load</b>	Fz (static)	±2 400 N
	Mx/My (dynamic)	±2 400 Nm
	Mz (dynamic)	±2 000 Nm
<b>Weight and centre of gravity (Z)</b>		
P6701A		8.2 kg / 38 mm
P6701A with P6702		13.5 kg / 55 mm
<b>Air channels</b>	Pneumatic diagram	Pne0230-008 ( <a href="#">section 2.1.12</a> )
	User channels, robot side	1 x G 1/2" (2 000 l/min, max 10 bar)
	Dedicated channels, G 1/8"	Open TC marked O (6–10 bar) Close TC marked C (6–10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

### 2.1.3 Tool attachment TA240-1, basic unit. Article: P6702



The tool attachment TA240-1 transfers 1 pneumatic channel to the tool and has 5 positions for options. To be used together with tool changer P6701A.

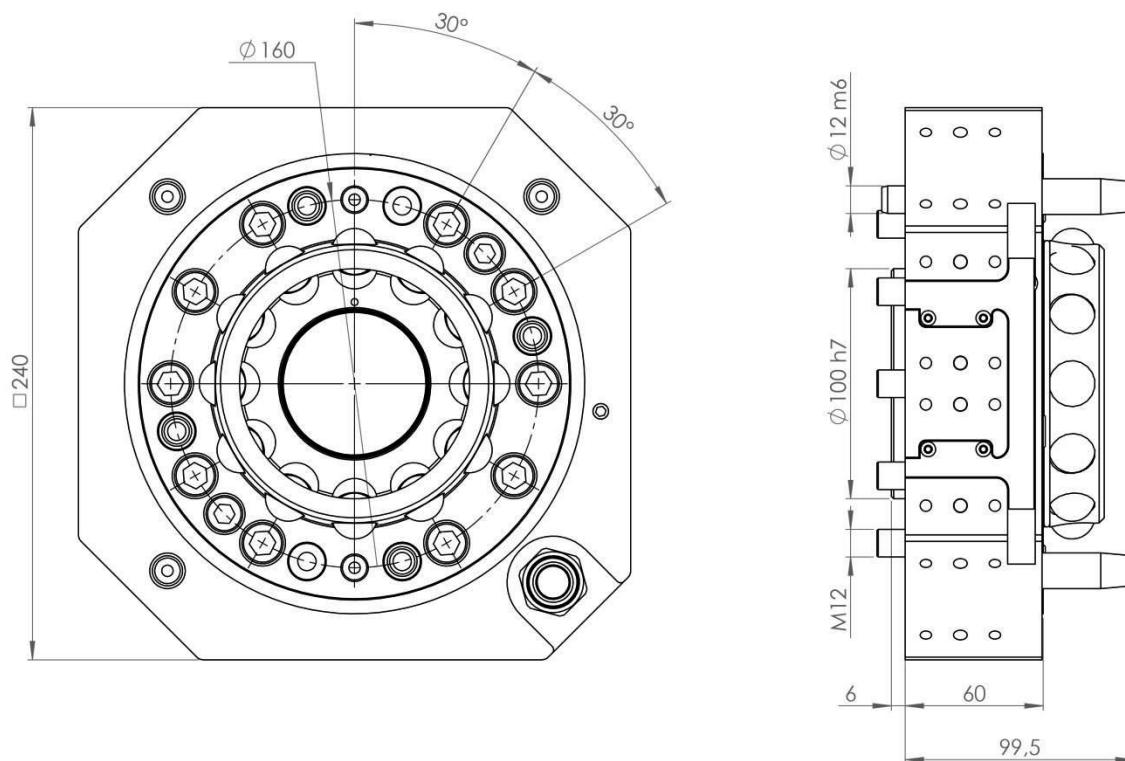
#### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO 9409 1-125-10-M10
<b>Weight</b>		5.1 kg
<b>Maximum tool load</b> (M10 screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±2 400 N ±2 400 Nm ±2 000 Nm
<b>Maximum tool load</b> (M8 screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±2 400 N ±2 400 Nm ±1 200 Nm
<b>Air channels</b>	Connection, tool side	1 x G ½"



**NOTE!** Tools can be mounted to the tool attachment using ten M10 screws, alternatively the tool attachment can be mounted to the tool using ten M8 screws.

## 2.1.4 Tool changer TC480-1, basic units. Article: P6801A

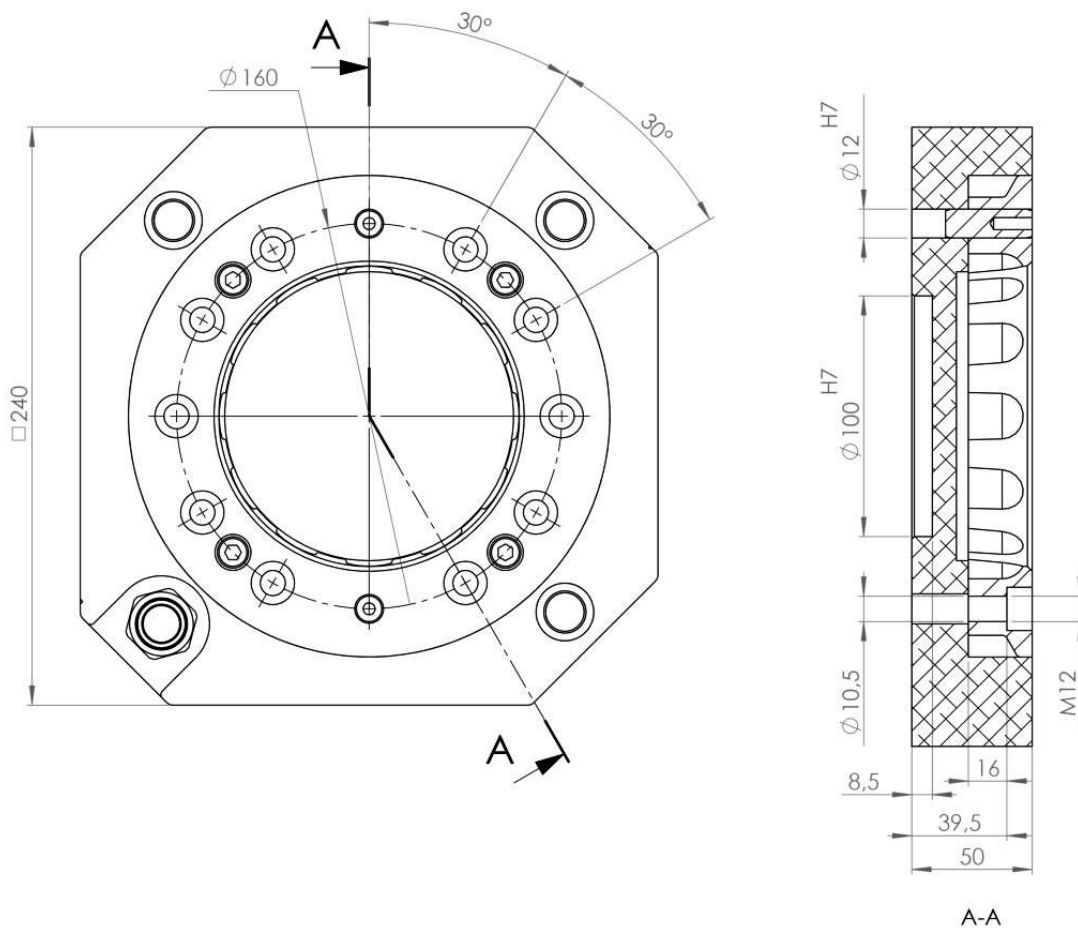


The tool changer P6801A transfers 1 pneumatic channel to the tool attachment, has separate inlets for Open TC and Close TC, 5 positions for options and 1 for magnetic sensors. To be used together with tool attachment P6802 or P6872.

### Technical data

<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)	±5000 N
	Mx/My (dynamic)	±5000 Nm
	Mz (dynamic)	±3500 Nm
<b>Weight and centre of gravity (Z)</b>		
P6801A		13.1 kg / 39 mm
P6801A with P6802/P6872		20.8 kg / 55 mm
<b>Air channels</b>	Pneumatic diagram	Pne0230-008 ( <a href="#">section 2.1.12</a> )
	User channels, robot side	1 x G 1/2" (2 000 l/min, max 10 bar)
	Dedicated channels, G 1/8"	Open TC marked O (6–10 bar) Close TC marked C (6–10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

## 2.1.5 Tool attachment TA480-1, basic unit. Article: P6802



The tool attachment P6802 transfers 1 pneumatic channel to the tool and has 5 positions for options. To be used together with tool changer P6801A or P6851A.

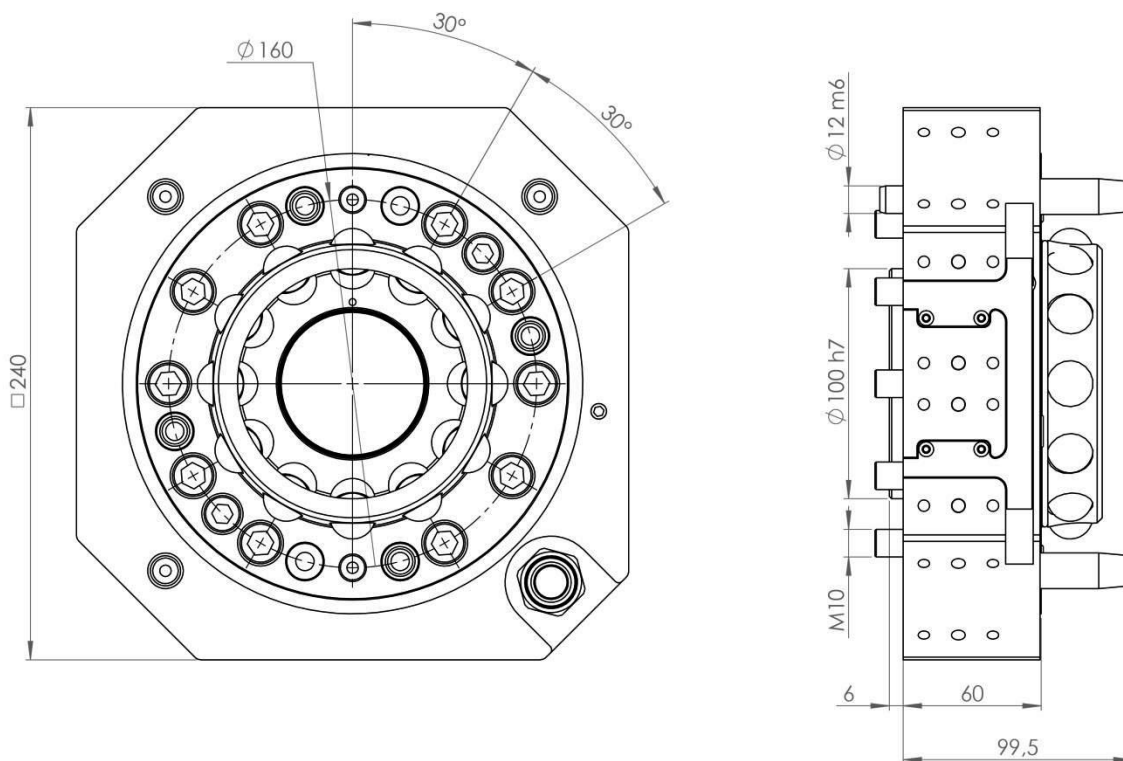
### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO 9409-1-160-10-M12
<b>Weight</b>		7.7 kg
<b>Maximum tool load</b> (M12-screws)	Fz (static)	±5000 N
	Mx/My (dynamic)	±5000 Nm
	Mz (dynamic)	±3500 Nm
<b>Maximum tool load</b> (M10-screws)	Fz (static)	±5000 N
	Mx/My (dynamic)	±5000 Nm
	Mz (dynamic)	±2500 Nm
<b>Air channels</b>	Connection, tool side	1 x G ½"



**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.

## 2.1.6 Tool changer TC480-1, basic units. Article: P6851A

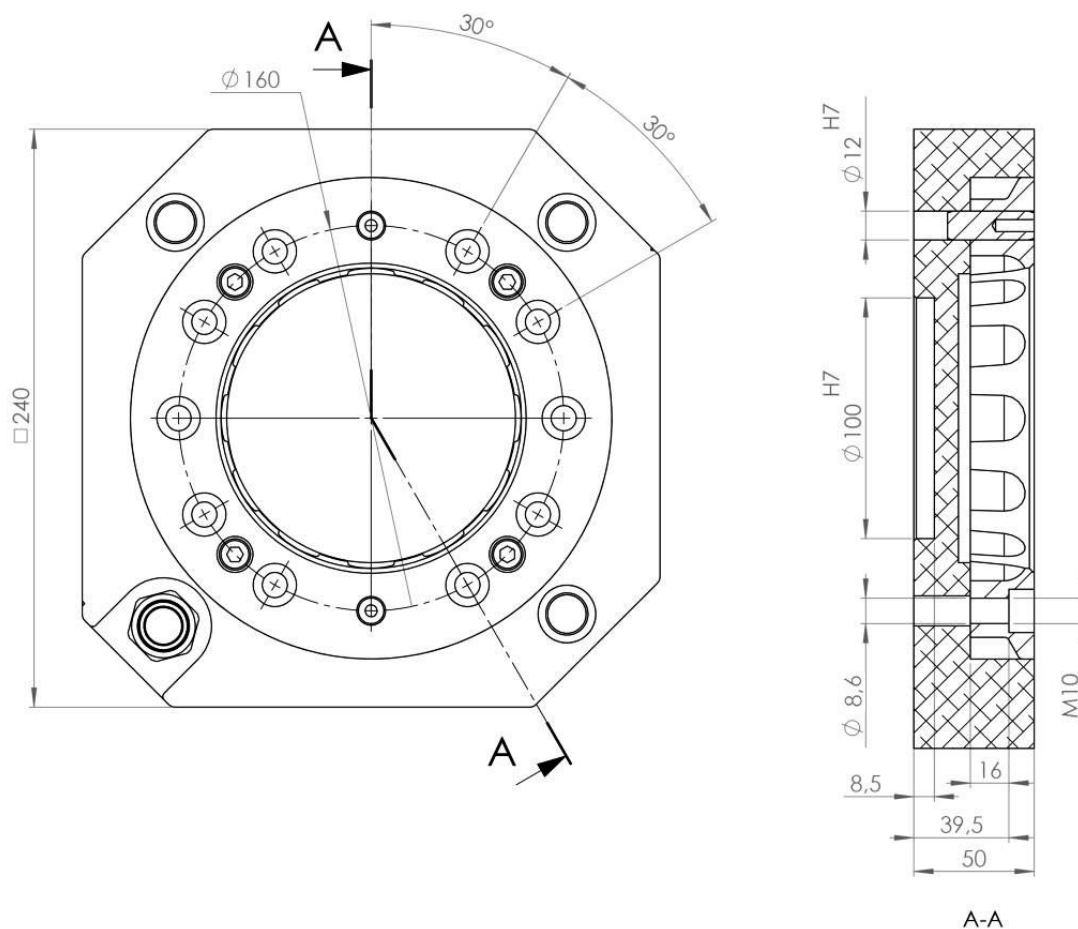


The tool changer P6851A transfers 1 pneumatic channel to the tool attachment, has separate inlets for Open TC and Close TC, 5 positions for options and 1 for magnetic sensors. To be used together with tool attachment P6802 or P6872.

### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO 9409-1-160-10-M10
<b>Maximum tool load</b>	Fz (static)	±5000 N
	Mx/My (dynamic)	±5000 Nm
	Mz (dynamic)	±2500 Nm
<b>Weight and centre of gravity (Z)</b>		
P6851A		13.1 kg / 39 mm
P6851A with P6802/P6872		20.8 kg / 55 mm
<b>Air channels</b>	Pneumatic diagram	Pne0230-008 ( <a href="#">section 2.1.12</a> )
	User channels, robot side	1 x G 1/2" (2 000 l/min, max 10 bar)
	Dedicated channels, G 1/8"	Open TC marked O (6–10 bar) Close TC marked C (6–10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

## 2.1.7 Tool attachment TA480-1, basic unit. Article: P6872



The tool attachment P6872 transfers 1 pneumatic channel to the tool and has 5 positions for options. To be used together with tool changer P6801A or P6851A.

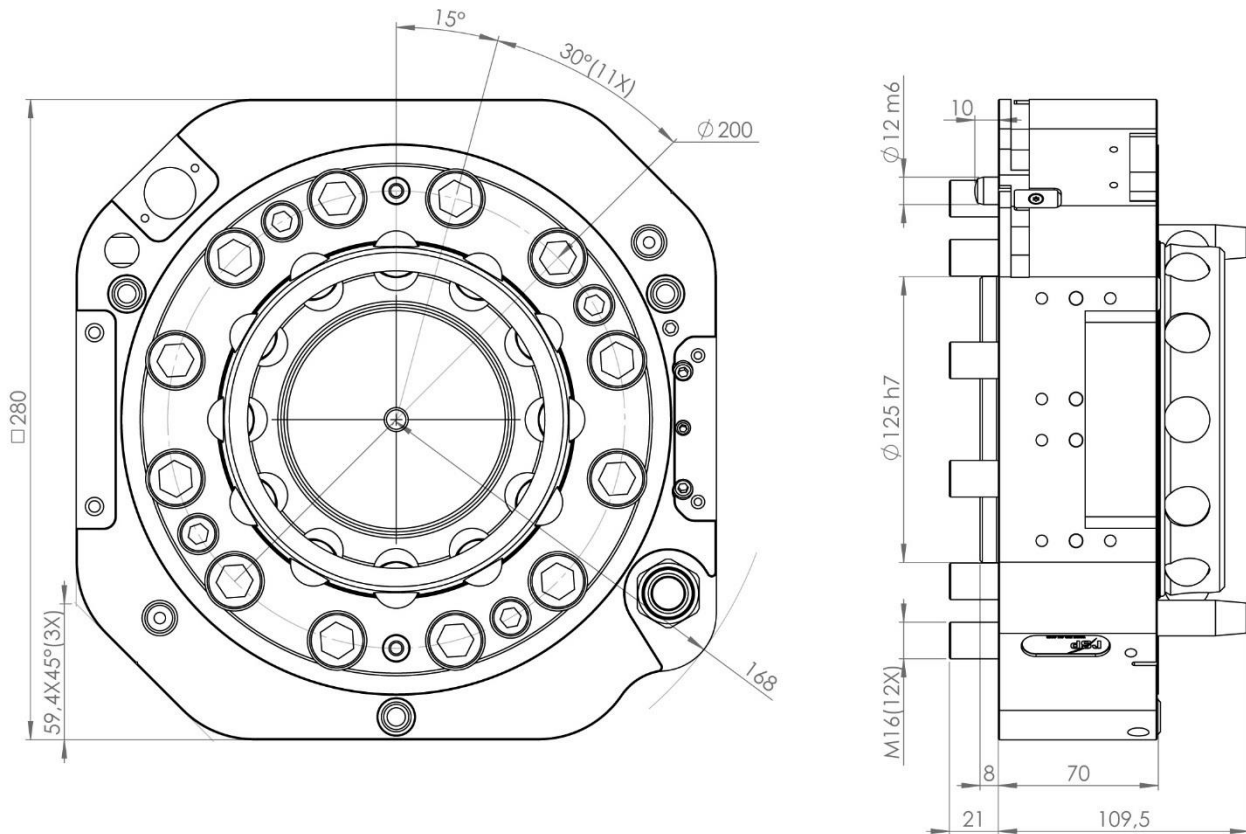
### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO 9409-1-160-10-M10
<b>Weight</b>		7.7 kg
<b>Maximum tool load</b> (M10-screws, screw class 8.8)	Fz (static)	±5000 N
	Mx/My (dynamic)	±5000 Nm
	Mz (dynamic)	±2500 Nm
<b>Maximum tool load</b> (M8-screws, screw class 12.9)	Fz (static)	±5000 N
	Mx/My (dynamic)	±5000 Nm
	Mz (dynamic)	±2500 Nm
<b>Air channels</b>	Connection, tool side	1 x G 1/2"



**NOTE!** Tools can be mounted to the tool attachment using ten M10 screws, alternatively the tool attachment can be mounted to the tool using ten M8 screws.

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



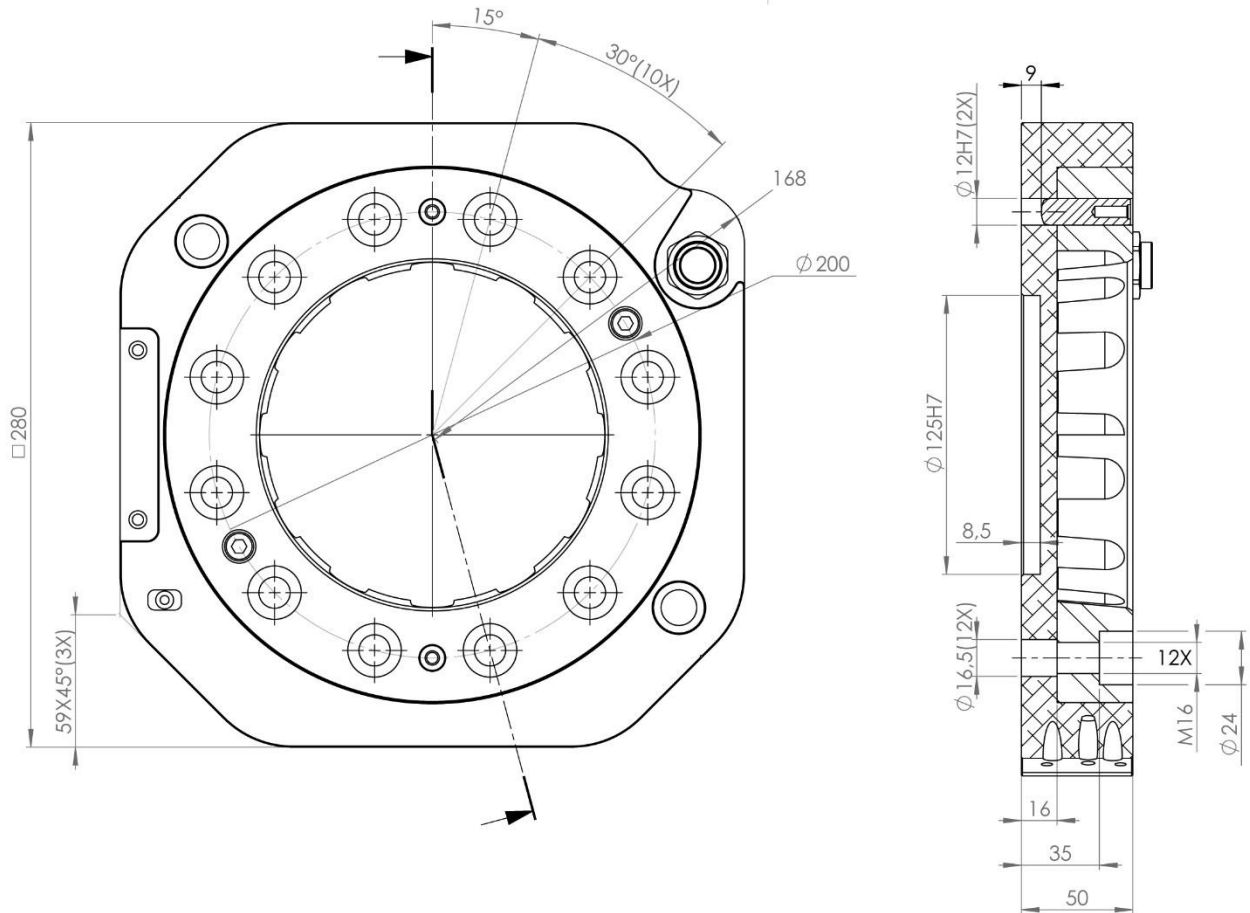
The tool changer P6901A transfers 1 pneumatic channel to the tool attachment, has separate inlets for Open TC and Close TC, 5 positions for options and 1 for magnetic sensors. To be used together with tool attachment P6902A.

### Technical data

<b>Working temperature</b>		+10°C–+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>		
P6901A		20,4 kg / 45 mm
P6901A with P6902A		30.6 kg / 61 mm
<b>Air channels</b>	Pneumatic diagram User channels, robot side Dedicated channels, G 1/8"  Air quality	Pne0230-011 ( <a href="#">section 2.1.13</a> ) 1 x G 1/2" (2 000 l/min, max 10 bar) Open TC marked O (6–10 bar) Close TC marked C (6–10 bar) Oil-clean and waterless filtered air, with max 25µm particle content



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



The tool attachment P6902A transfers 1 pneumatic channel to the tool and has 5 positions for options. To be used together with tool changer P6901A.

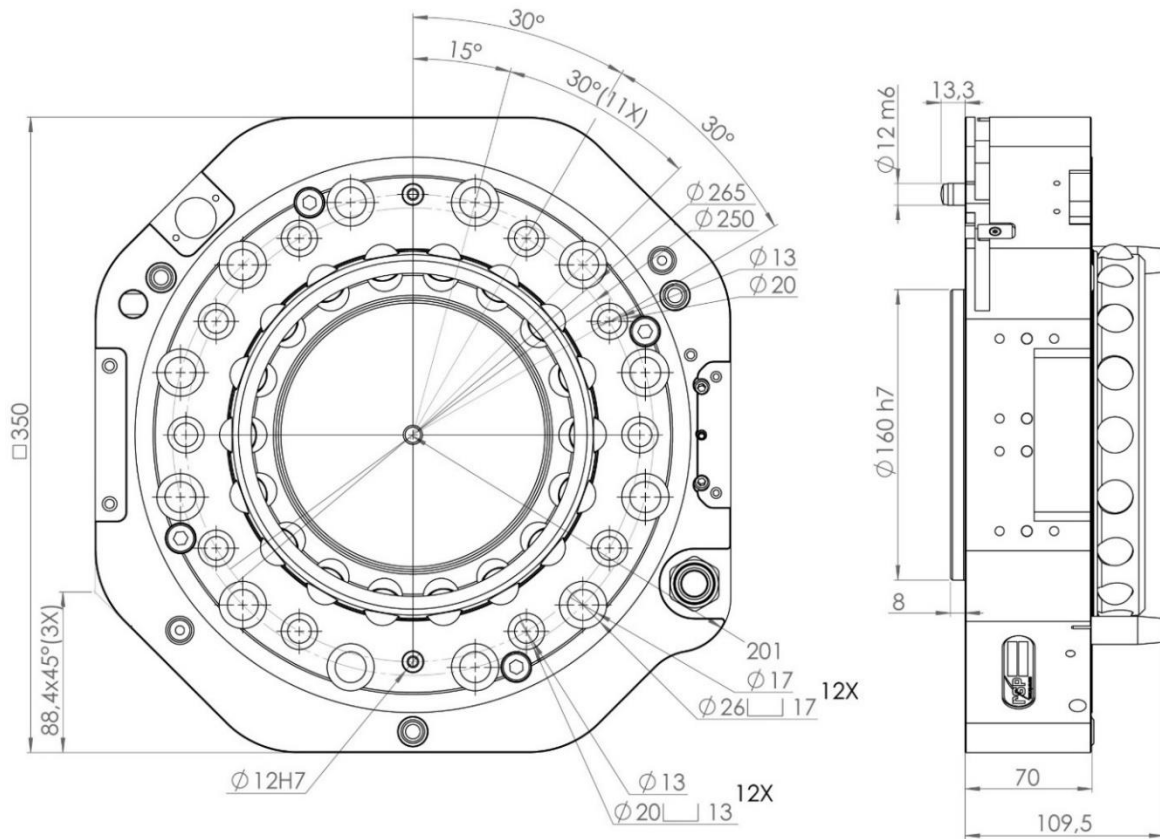
### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO 9409 1-200-12-M16
<b>Weight</b>		10.2 kg
<b>Maximum tool load</b> (M16 screws)	Fz (static)	±10 000 N
	Mx/My (dynamic)	±10 000 Nm
	Mz (dynamic)	±10 000 Nm
<b>Maximum tool load</b> (M14 screws)	Fz (static)	±10 000 N
	Mx/My (dynamic)	±10 000 Nm
	Mz (dynamic)	±7 500 Nm
<b>Air channels</b>	Connection, tool side	1 x G ½"



**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.

## 2.1.10 Tool changer TC960-1, basic unit. Articles: P7901A and P7901A-1

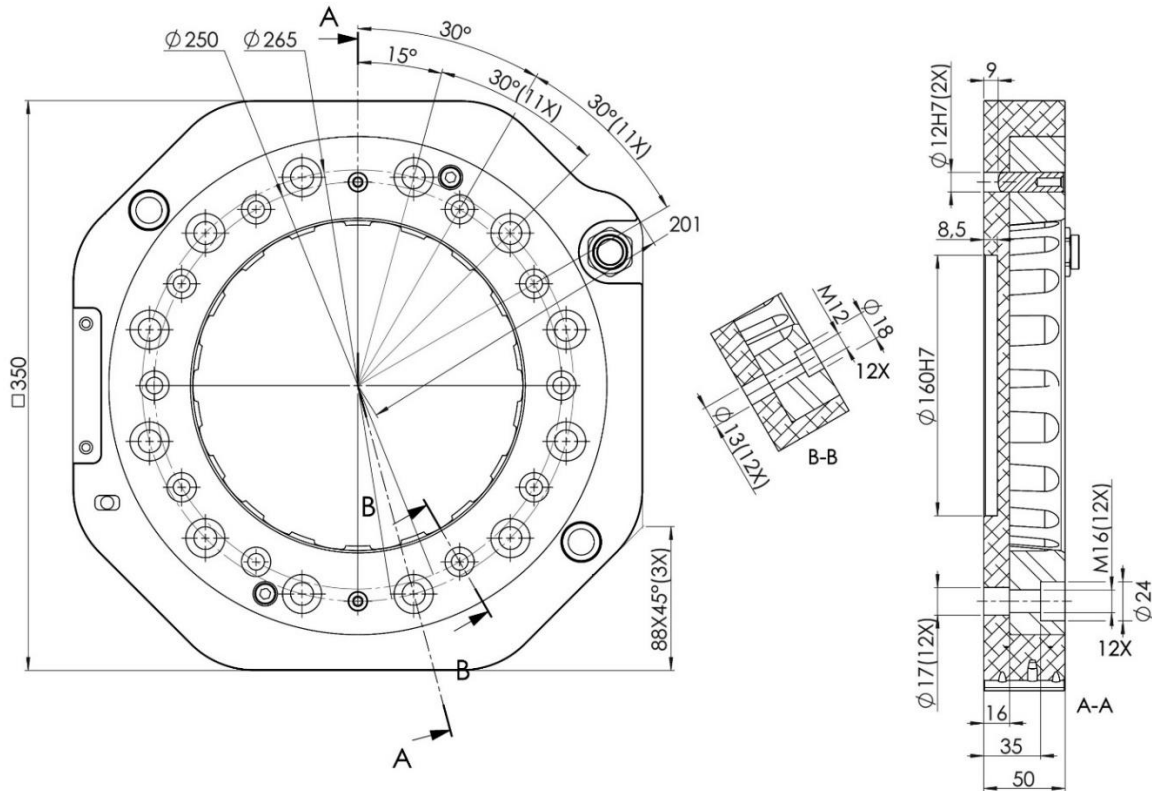


The tool changer P7901A (265-12-M16) and P7901A-1 (250-10-M12) transfers 1 pneumatic channel to the tool attachment, has separate inlets for Open TC and Close TC, 5 positions for options and 1 for magnetic sensors. To be used together with tool attachment P7902A.

### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt patterns</b>		265-12-M16 250-10-M12
<b>Maximum tool load</b> (P7901A)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±15 000 N ±15 000 Nm ±12 500 Nm
<b>Maximum tool load</b> (P7901A-1, screw class 12.9)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±15 000 N ±10 000 Nm ±9 000 Nm
<b>Weight and centre of gravity (Z)</b> P7901A/ P7901A-1 P7901A/ P7901A-1 with P7902A		27,7 kg / 46 mm 43.6 kg / 61 mm
<b>Air channels</b>	Pneumatic diagram User channels, robot side Dedicated channels, G 1/8"  Air quality	Pne0230-011 (see <a href="#">section 2.1.13</a> ) 1 x G 1/2" (2 000 l/min, max 10 bar) Open TC marked O (6–10 bar) Close TC marked C (6–10 bar) Oil-clean and waterless filtered air, with max 25µm particle content

## 2.1.11 Tool attachment TA960-1, basic unit. Article: P7902A



The tool attachment TA960-1 transfers 1 pneumatic channel and to the tool and has 5 positions for options. To be used together with tool changer P7901A.

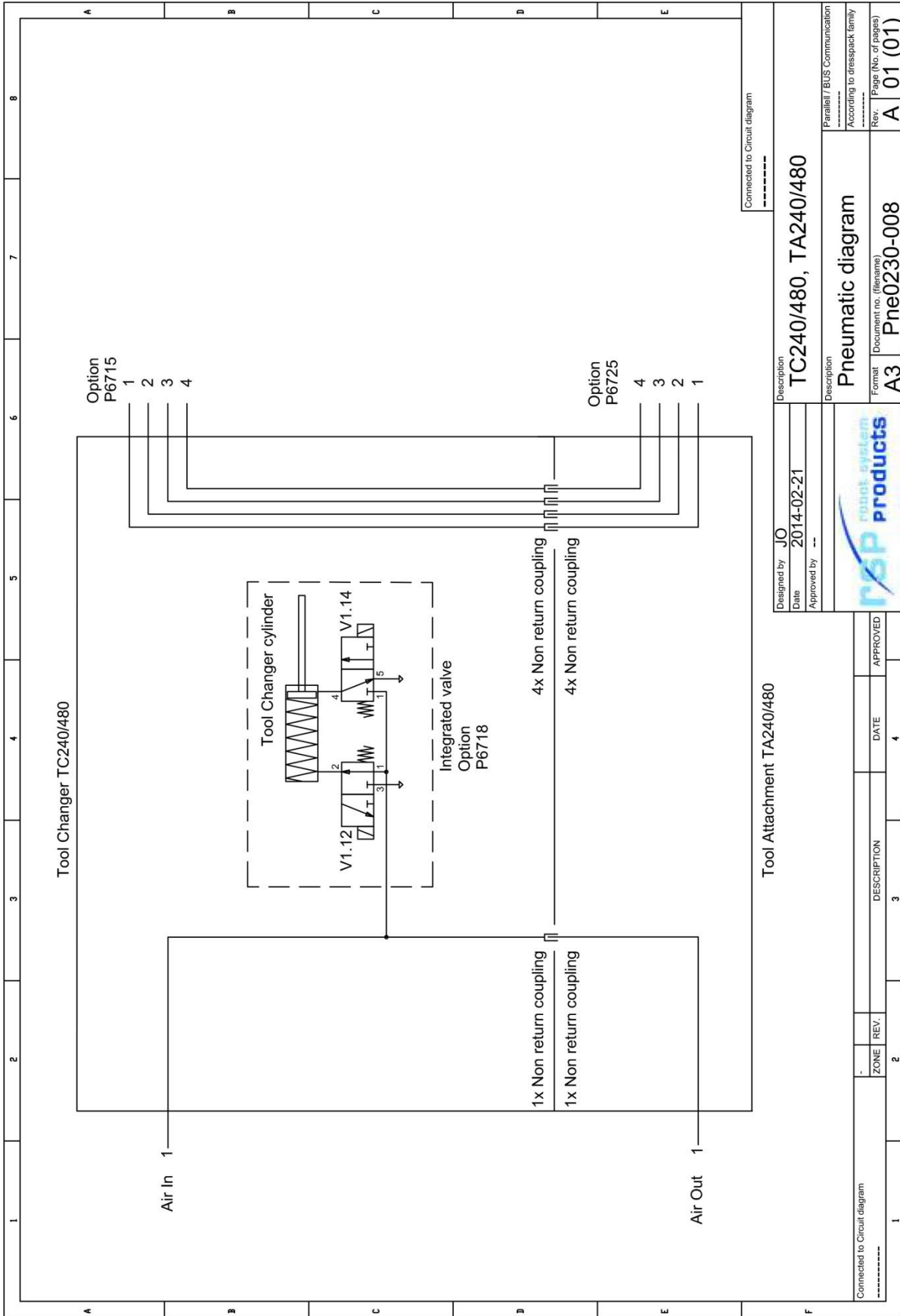
### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt patterns</b>		265-12-M16 250-10-M12
<b>Weight</b>		15.9 kg
<b>Maximum tool load</b> (265-12-M16 with M16 screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±15 000 N ±15 000 Nm ±12 500 Nm
<b>Maximum tool load</b> (265-12-M16 with M14 screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±15 000 N ±15 000 Nm ±10 000 Nm
<b>Maximum tool load</b> (250-10-M12 with M12, screw class 12.9)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±15 000 N ±10 000 Nm ±9 000 Nm
<b>Maximum tool load</b> (250-10-M12 with M10, screw class 12.9)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±15 000 N ±7 000 Nm ±6 000 Nm
<b>Air channels</b>	Connection, tool side	1 x G ½"

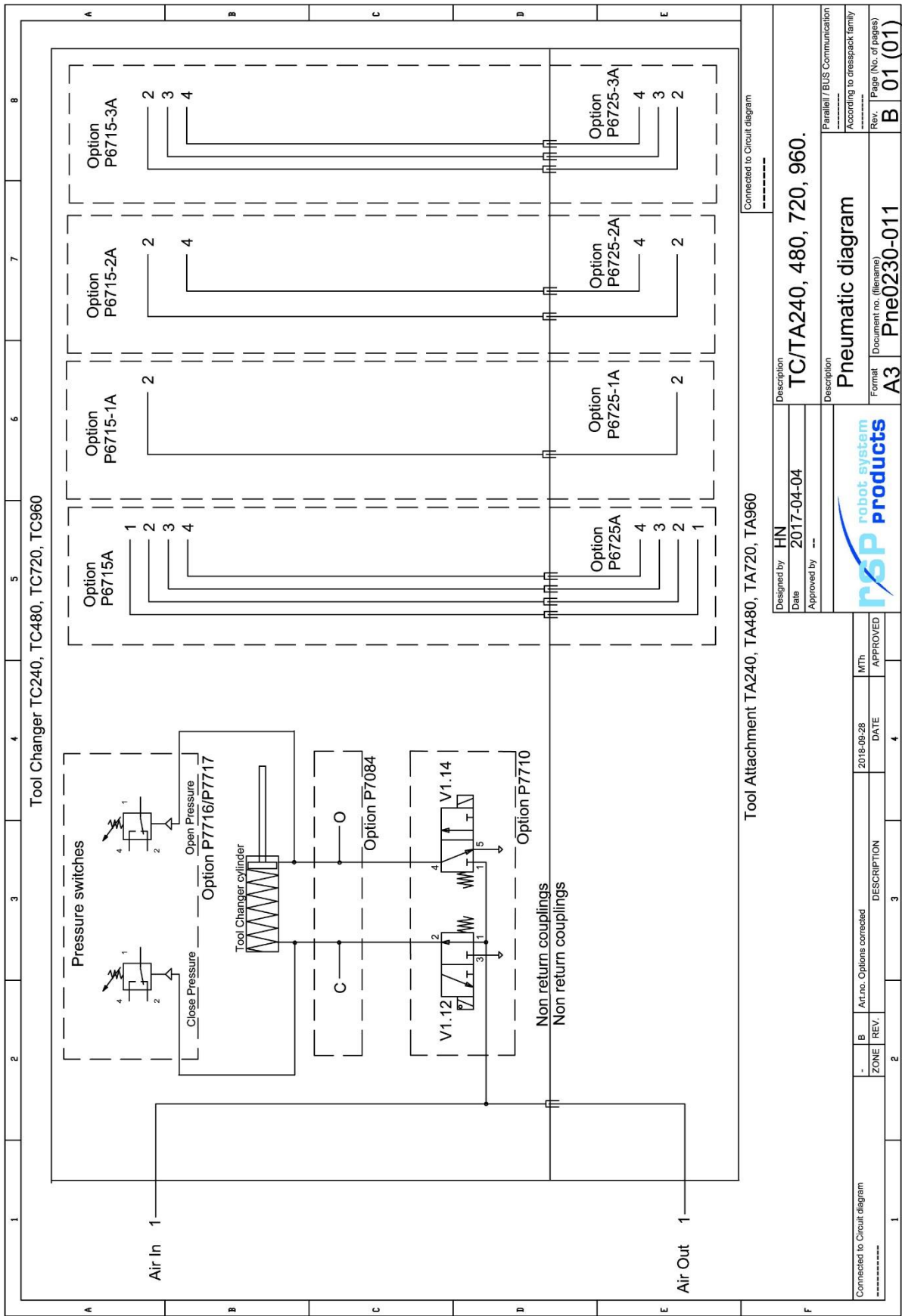


**NOTE!** Tools can be mounted to the tool attachment using twelve M16 screws or ten M12 screws, alternatively the tool attachment can be mounted to the tool using twelve M14 screws or ten M10 screws.

## 2.1.12 Pneumatic diagram Pne0230-008 for TC240-1 and TC480-1

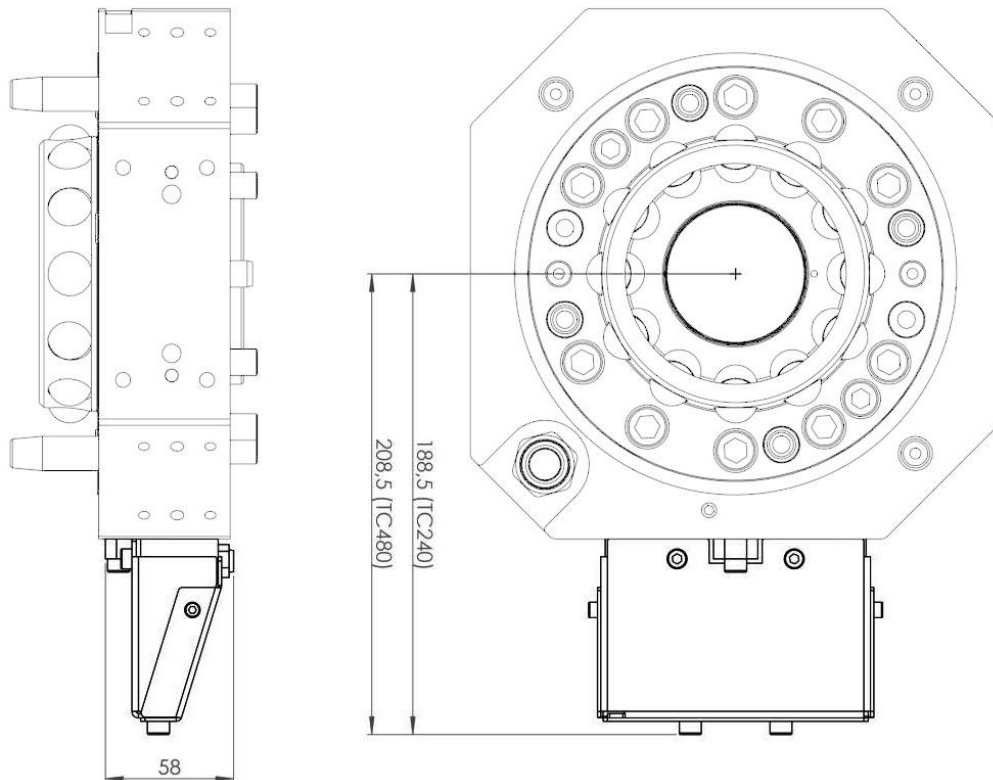


### 2.1.13 Pneumatic diagram Pne0230-011 for TC720-1 and TC960-1



## 2.2 Options for tool changers and tool attachments

### 2.2.1 Integrated valve, TC Open/Close for TC240 and TC480. Article: P6718



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 changers P6701A (TC240) or P6801A and P6851 (TC480).



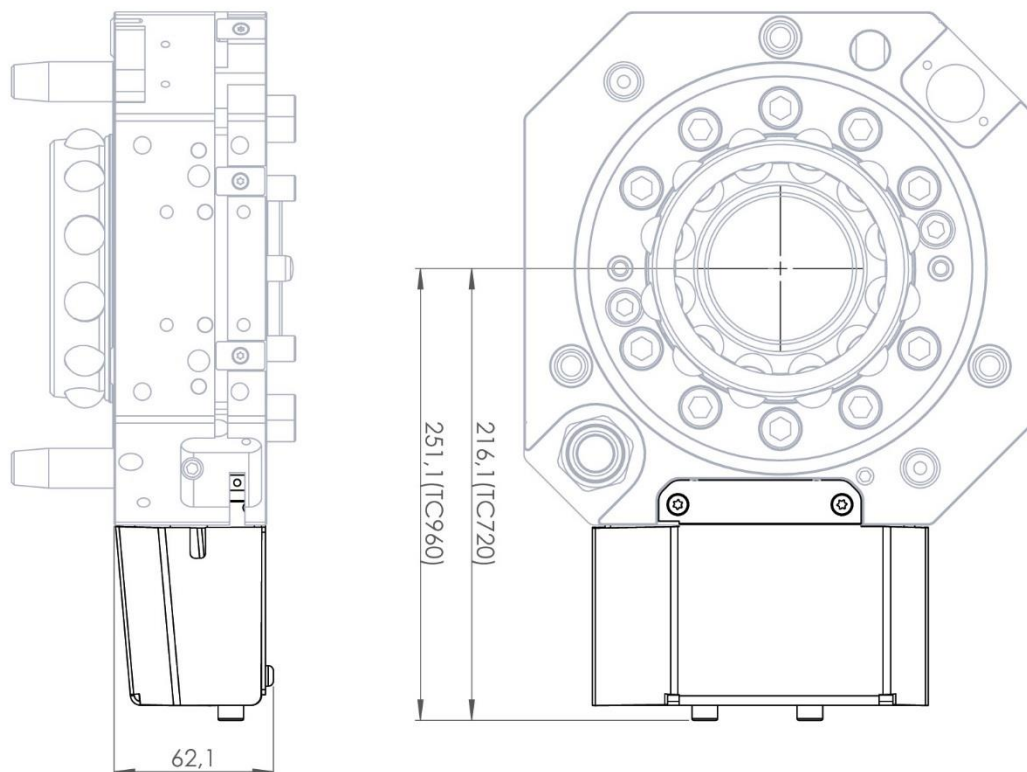
#### NOTE!

Are prepared for options P6738-1, P7224, P6778 or P6780.

#### Technical data

<b>Weight</b>		0.5 kg
<b>Electrical signals</b>	Circuit diagram	See respective signal module. doOpen TC 1 (24V DC) doOpen TC 2 (24V DC) 0V DC
	Dedicated signals	
	Connection	M8 3p
<b>Air channels</b>	Pneumatic diagram	Pne0230-008 ( <a href="#">section 2.1.12</a> ) Air in marked “AIR” on TC (6-10 bar) Oil-clean and waterless filtered air, with max 25µm particle content
	Air supply	
	Air quality	

## 2.2.2 Integrated valve, TC Open/Close for TC720 and TC960. Article: P7710



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 P6901A (TC720) or P7901A (TC960).



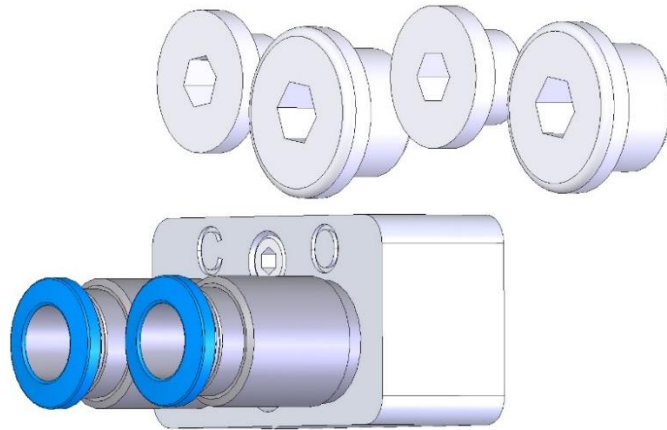
### NOTE!

Are prepared for options P6738-1, P7224, P6778 or P6780.

### Technical data

<b>Weight</b>		0.3 kg
<b>Electrical signals</b>	Circuit diagram Dedicated signals	See respective signal module. doOpen TC 1 (24V DC) doOpen TC 2 (24V DC) 0V DC
	Connection	M8 3p
<b>Air channels</b>	Pneumatic diagram Air supply Air quality	Pne0230-011 ( <a href="#">section 2.1.13</a> ) Air in marked “AIR” on TC (6-10 bar) Oil-clean and waterless filtered air, with max 25µm particle content

### 2.2.3 Valve adapter (external valve). Article: P7084



To be used for connecting external valves to tool changer. Includes blind plugs for covering connections to the integrated valve and sensors on the tool changer when they are not in use.

To be mounted at one dedicated position on the tool changers P6901A (TC720-1) or P7901A (TC960-1).



**NOTE!**

To be mounted when option P7710 Integrated valve is not used.

#### Technical data

<b>Weight</b>		0.1 kg
<b>Air channels</b>	Pneumatic diagram	Pne0230-011 ( <a href="#">section 2.1.13</a> )
	Dedicated channels, 8 mm hose	Open TC marked O (6–10 bar) Close TC marked C (6–10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content



## 2.2.4 Magnetic sensors TC Opened/TC Closed. Articles: P6789, P6873-2, P7174 and P7175



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.



**NOTE!**

Are prepared for options P6738-1, P7224, P6778 or P6780.



**NOTE!**

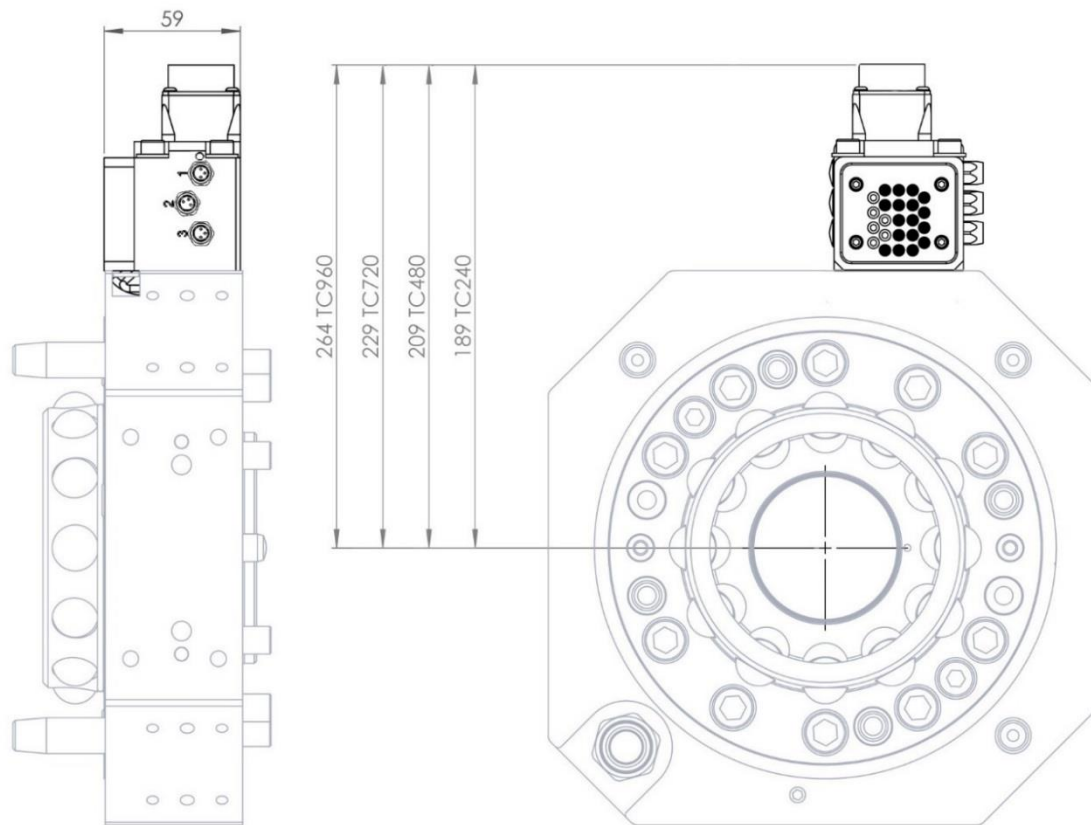
The magnetic sensors are each dedicated for a specific tool changer (see below).

### Technical data

<b>Weight</b>		0.05 kg
<b>Electrical signals</b>	Circuit diagram	See respective signal module.
	Dedicated signals	0V DC, 24V DC
	Connections	TC Closed (24V DC), TC Opened (24V DC) 2 x M8 3P

<b>Magnetic sensor</b>	<b>Tool changers</b>
P6789	P6701A (TC240-1)
P6873-2	P6801A and P6851A (TC480-1)
P7174	P6901A (TC720-1)
P7175	P7901A (TC960-1)

## 2.2.5 Signal interface Souriau, robot side. Article: P6738-1



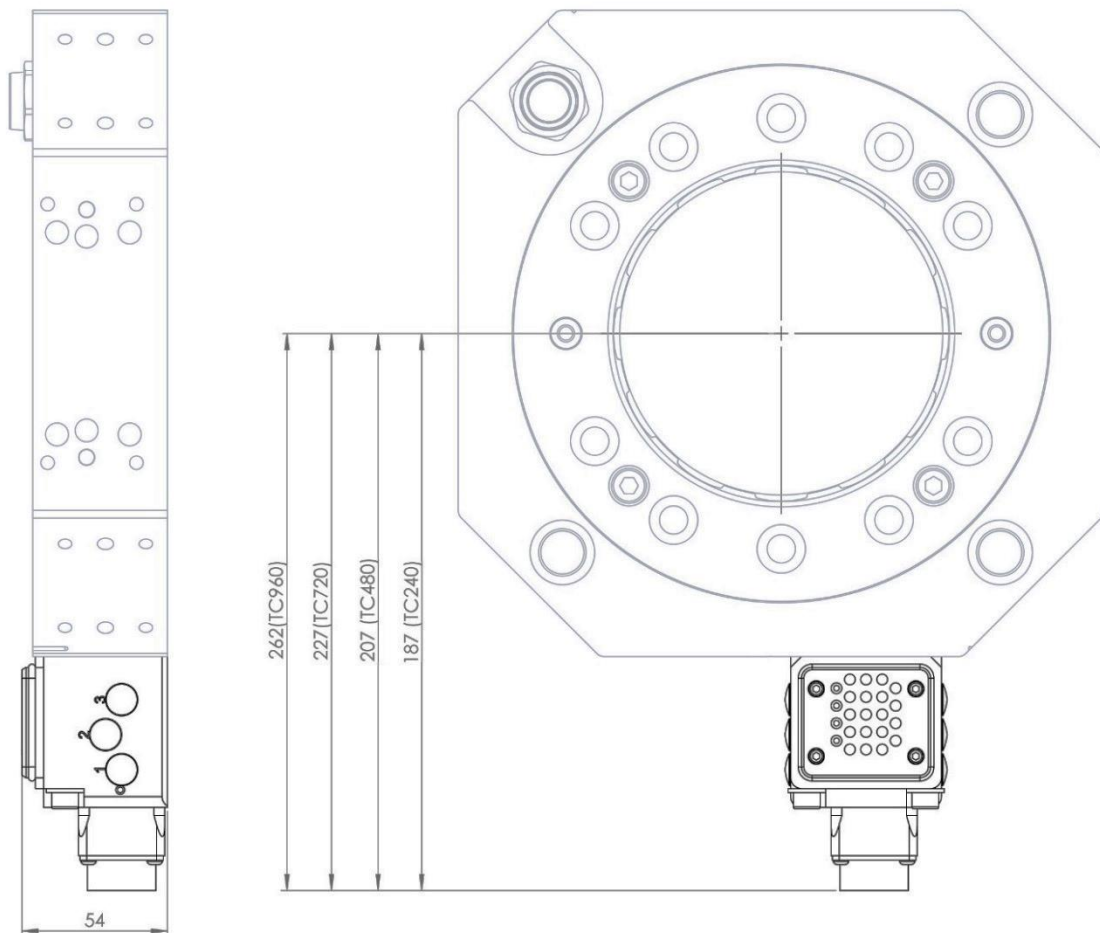
Transfers 16 electrical signals to the tool attachment. Can be mounted at 4 different positions on tool changer TC240 and TC 480 and 3 different positions on TC720 and TC960. To be used together with option P6739 attached to the tool attachment.

On the housing 3 separate M8-contacts for connecting integrated valve and magnetic sensors are mounted, which can be used for sensor-options P6789, P6873-2, P7174 or P7175 and valve-options P6718 or P7710.

### Technical data

<b>Weight</b>		0.2 kg
<b>Electrical signals</b>	Circuit diagram Souriau 23P (UT001823PH) Dedicated signals, 3 x M8 3S	E0178-246 ( <a href="#">section 2.2.7</a> ) 16 x (2A, 60V) + PE 24V (for sensors) 0V (for valves and sensors) TC Opened (sensor) TC Closed (sensor) doOpen TC 1 (valve) doOpen TC 2 (valve)
<b>Connection kits (optional)</b>	P8002 (connector) P8002-1 (connector)	Souriau 23S (straight) Souriau 23S (angled)

## 2.2.6 Signal interface Souriau, tool side, Article: P6739

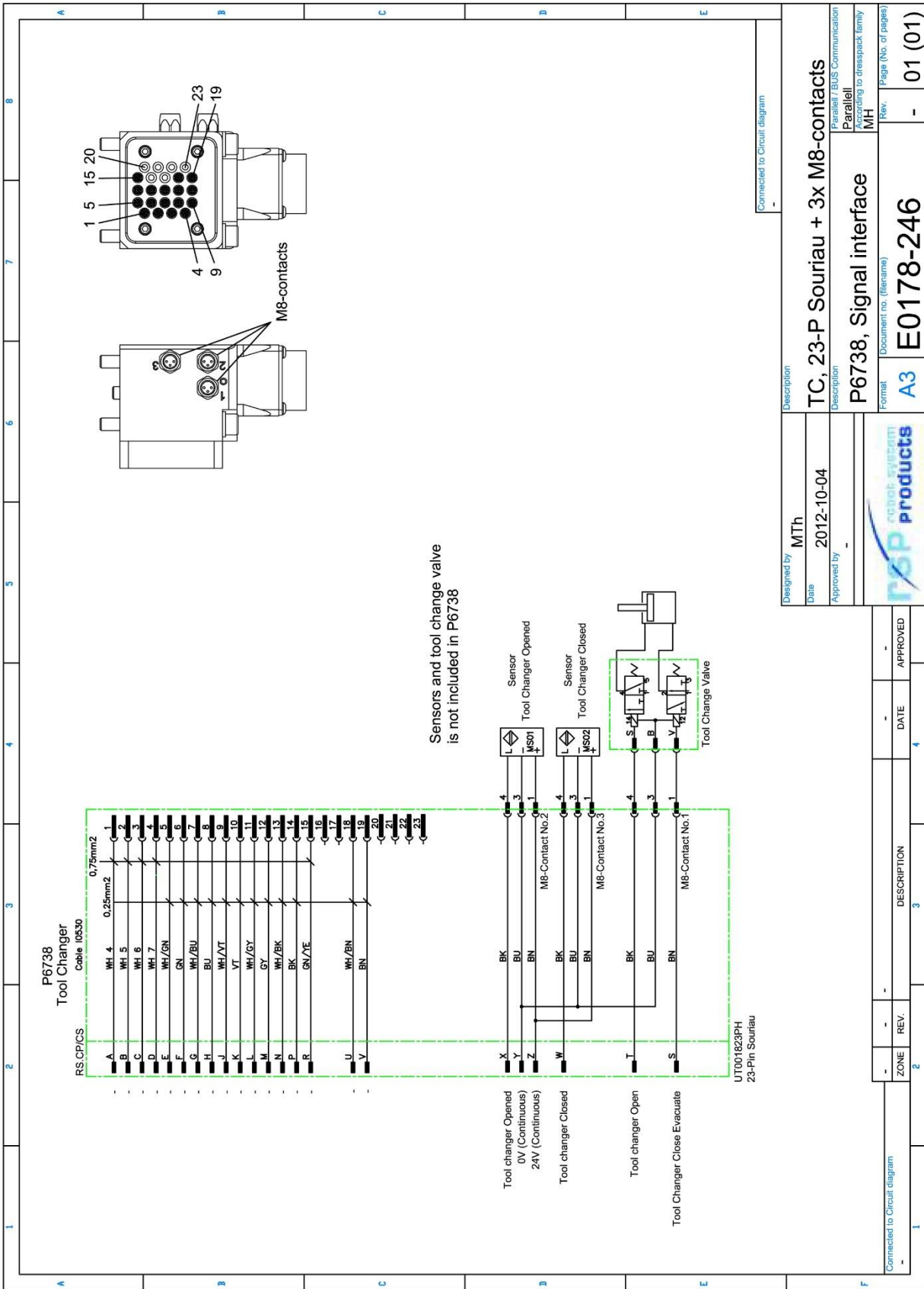


Transfers 16 electrical signals to the tool. To be mounted at the tool attachment and used together with option P6738-1 attached to the tool changer.

### Technical data

<b>Weight</b>		0.2 kg
<b>Electrical signals</b>	Circuit diagram Souriau 19S (UT001619SH)	E0178-247 ( <a href="#">section 2.2.8</a> ) 16 signals + PE
<b>Connection kits (optional)</b>	P8003 (connector) P8003-1 (connector)	Souriau 19P (straight) Souriau 19P (angled)

## 2.2.7 Circuit diagram E0178-246 for P6738-1

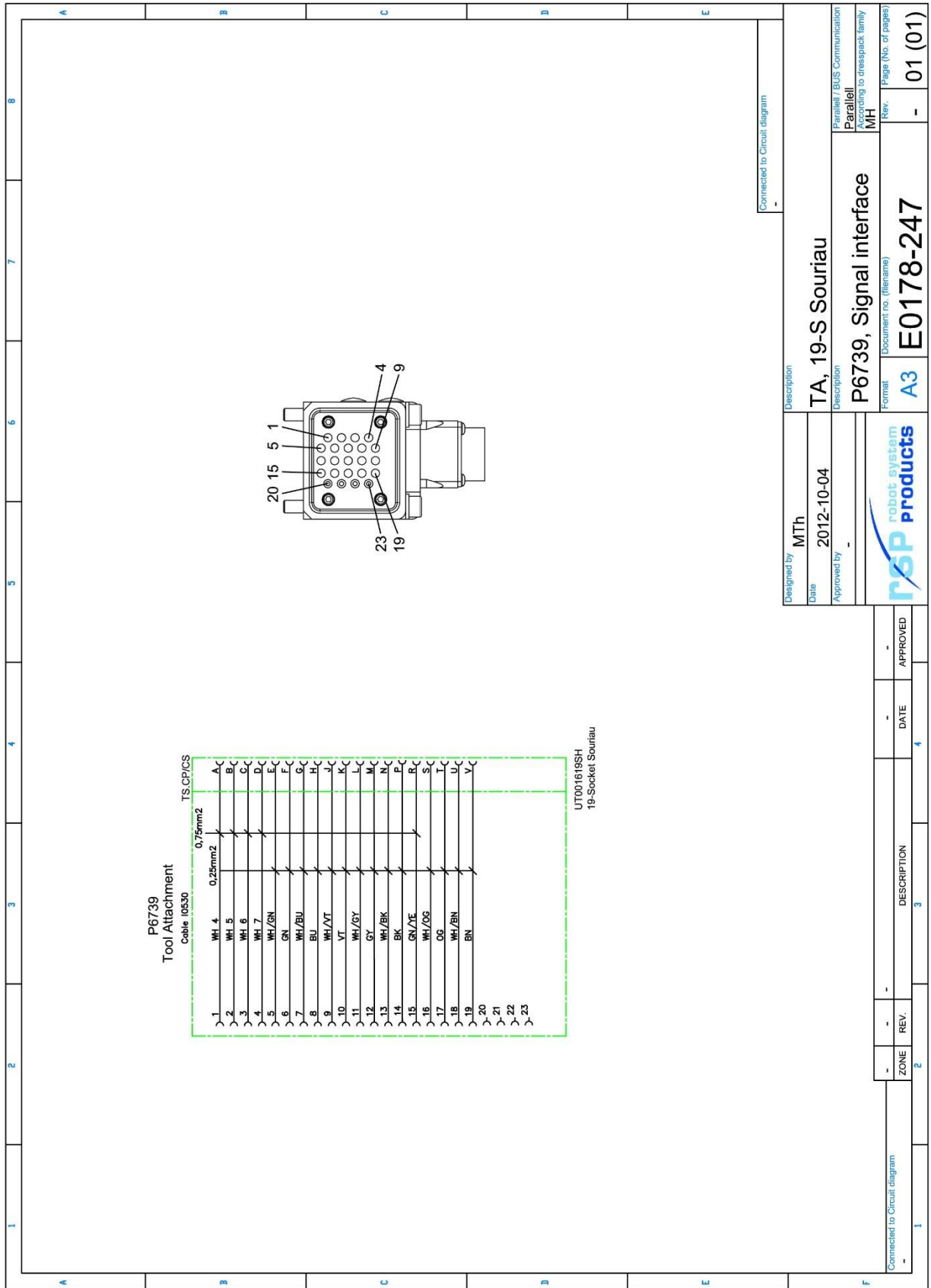


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Designed by	MTh	Description	TC, 23-P Souriau + 3x M8-contacts
Date	2012-10-04	Description	P6738, Signal interface
Approved by	-	Format	A3
		Document no. (if same)	E0178-246
		Rev.	-
		Page (No. of pages)	01 (01)

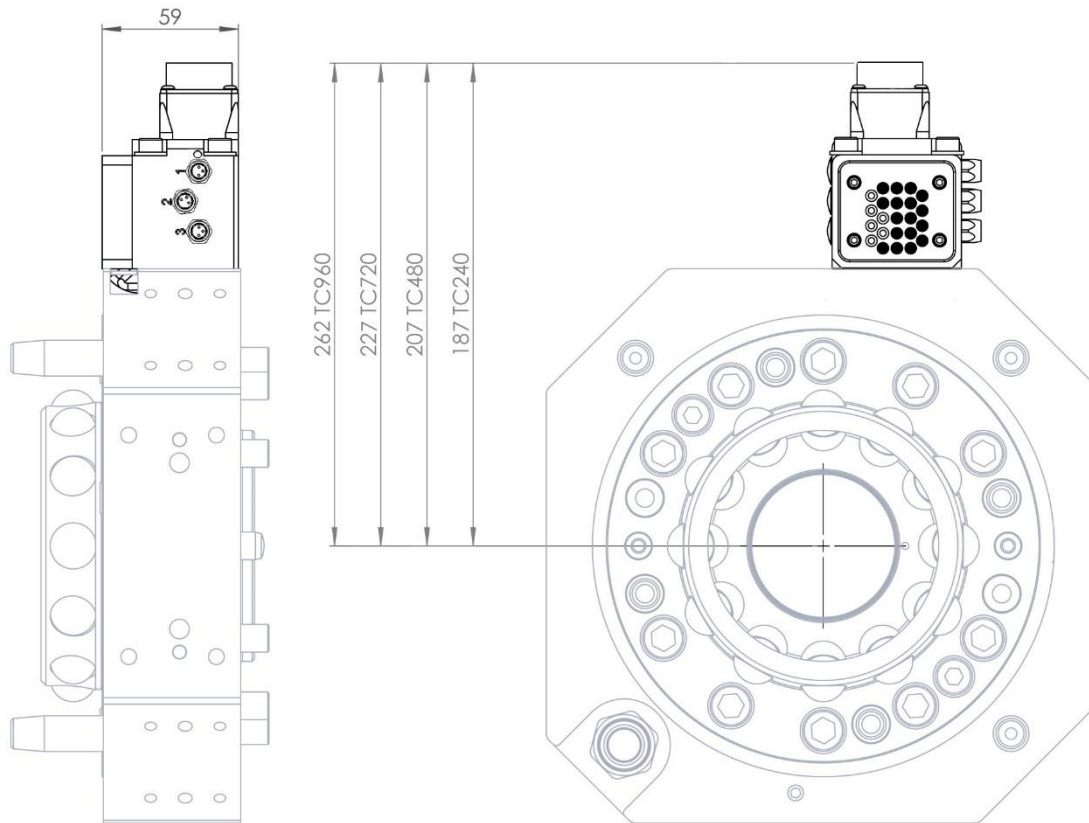
ZONE	REV.	DESCRIPTION	DATE	APPROVED
2	-		-	
3	-		-	
4	-		-	

## 2.2.8 Circuit diagram E0178-247 for P6739



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## 2.2.9 Signal interface Souriau, robot side. Article: P7224



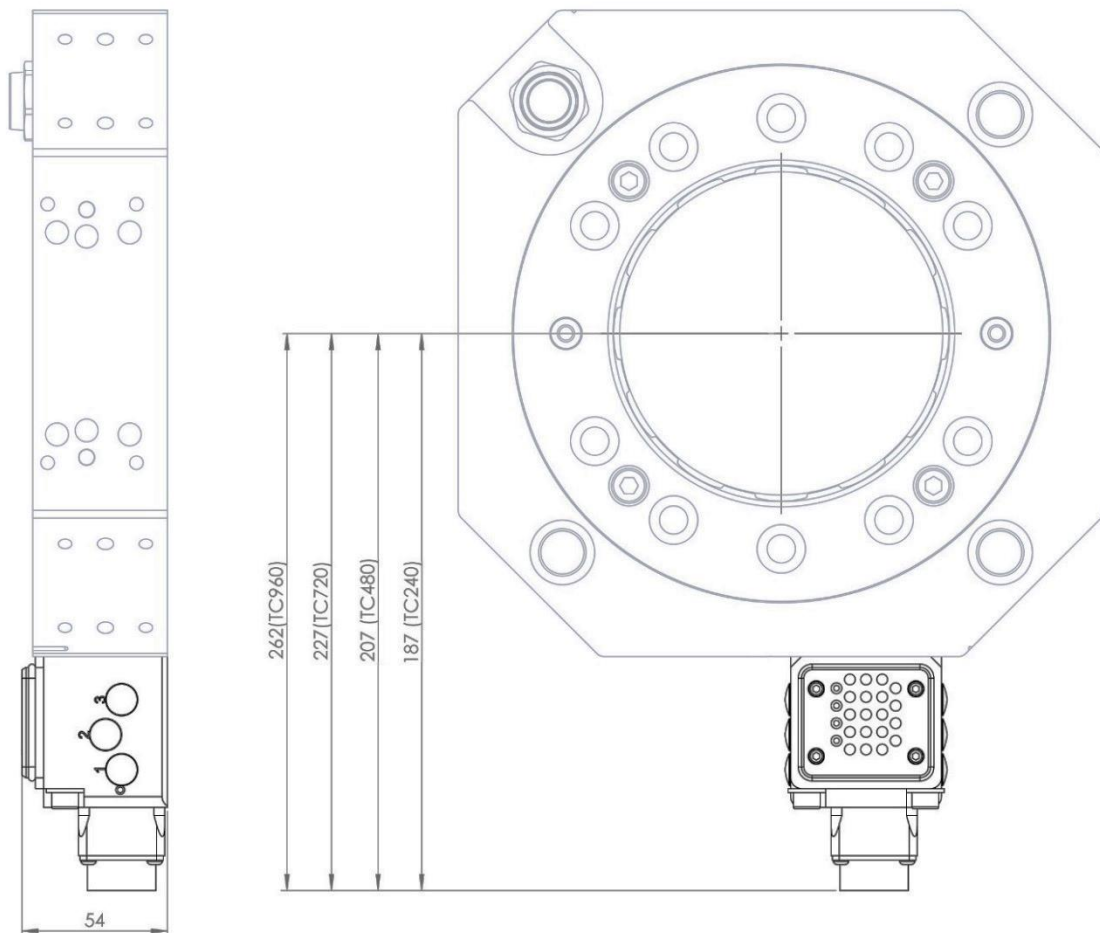
Transfers 19 electrical signals to the tool attachment. Can be mounted at 4 different positions on tool changer TC240 and TC 480 and 3 different positions on TC720 and TC960. To be used together with option P7225 attached to the tool attachment.

On the housing 3 separate M8-contacts for connecting integrated valve and magnetic sensors are mounted, which can be used for sensor-options P6789, P6873-2, P7174 or P7175 and valve-options P6718 or P7710.

### Technical data

<b>Weight</b>		0.2 kg
<b>Electrical signals</b>	Circuit diagram Souriau 26P (UT001626PH) Dedicated signals, 3 x M8 3S	E0178-764 ( <a href="#">section 2.2.11</a> ) 19 x (2A, 60V) + PE 24V (for tool attachment) 24V (for sensors) 0V (for valves and sensors) TC Opened (sensor) TC Closed (sensor) doOpen TC 1 (valve) doOpen TC 2 (valve)
<b>Connection kits (optional)</b>	P8025 (connector)	Compact Souriau 26S (straight)

## 2.2.10 Signal interface Souriau, tool side, Article: P7225

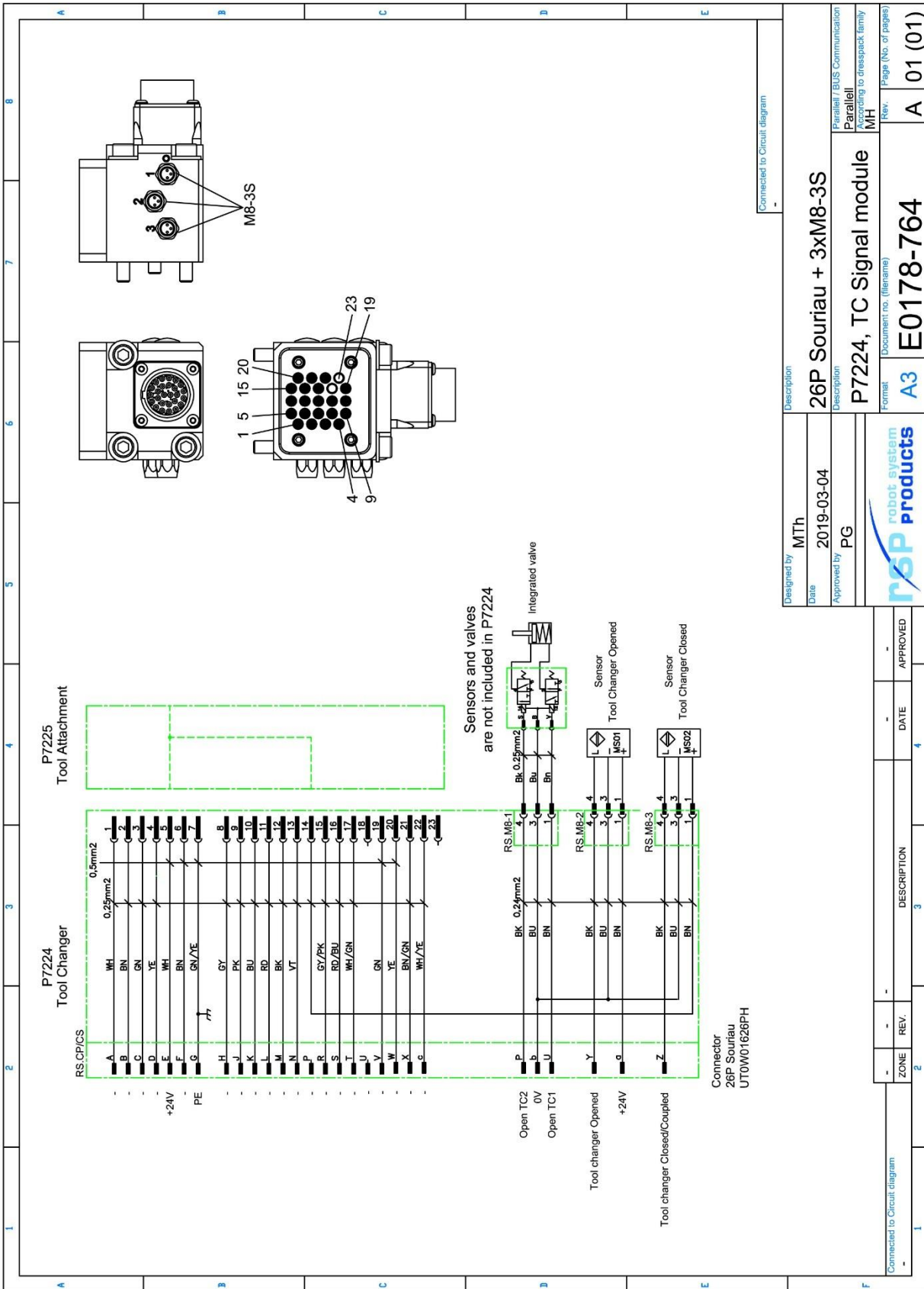


Transfers 19 electrical signals to the tool. To be mounted at the tool attachment and used together with option P7224 attached to the tool changer.

### Technical data

<b>Weight</b>		0.2 kg
<b>Electrical signals</b>	Circuit diagram Souriau 26S (UT001626SH)	E0178-765 ( <a href="#">section 2.2.12</a> ) 19 signals + PE
<b>Connection kits (optional)</b>	P8012 (connector) P8012-1 (connector)	Souriau 26P (straight) Souriau 26P (angled)

## 2.2.11 Circuit diagram E0178-764 for P7224



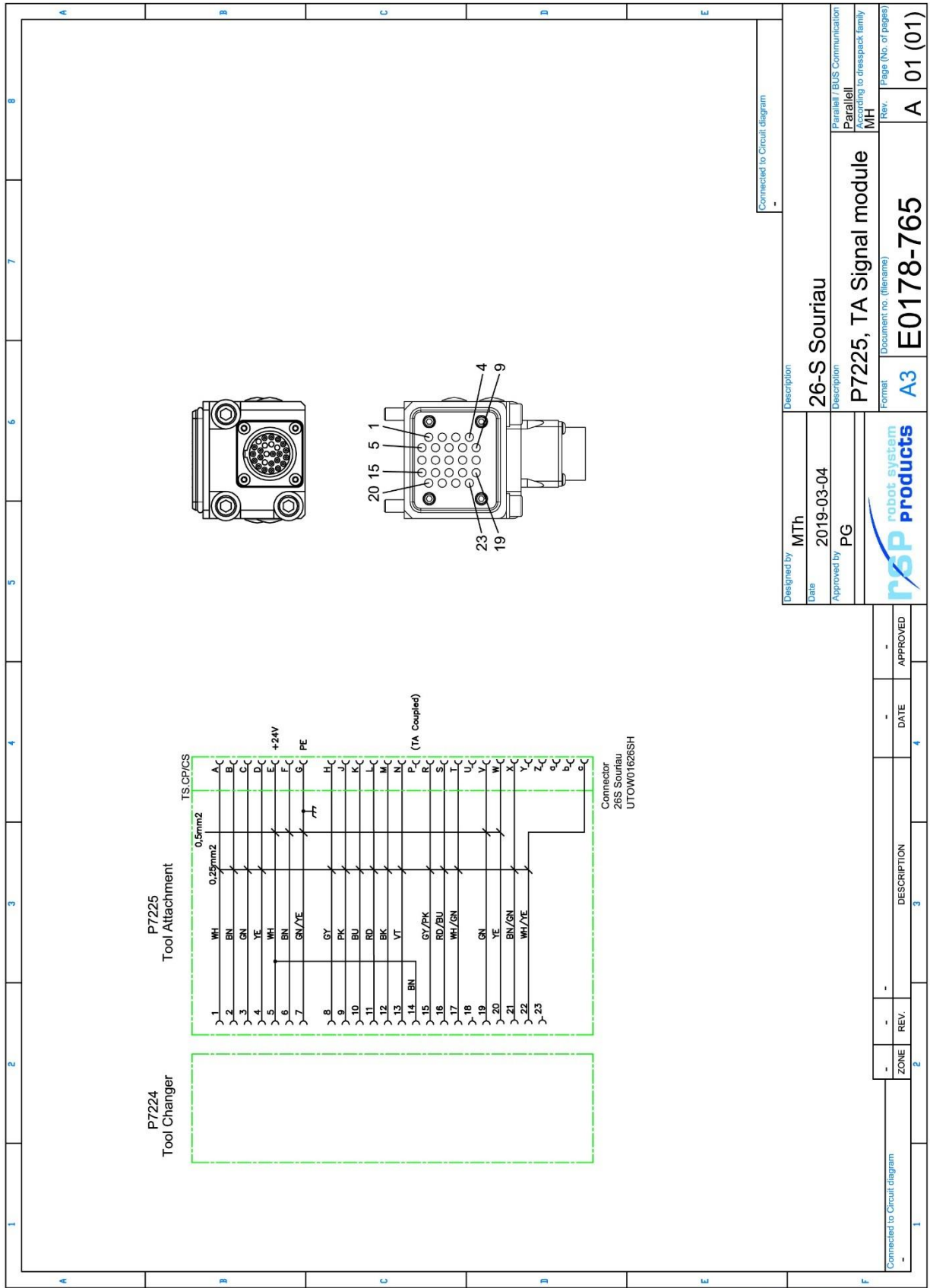
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Designed by	MTh	Description	26P Souriau + 3xM8-3S
Date	2019-03-04	Description	P7224, TC Signal module
Approved by	PG	Format	A3
		Document no. (if same)	E0178-764
		Parallel / BUS Communication	Parallel
		Mounting to drosspack family	MH
		Rev.	Page (No. of pages)
			A 01 (01)

ZONE	REV.	DESCRIPTION	DATE	APPROVED
2	-	3	4	

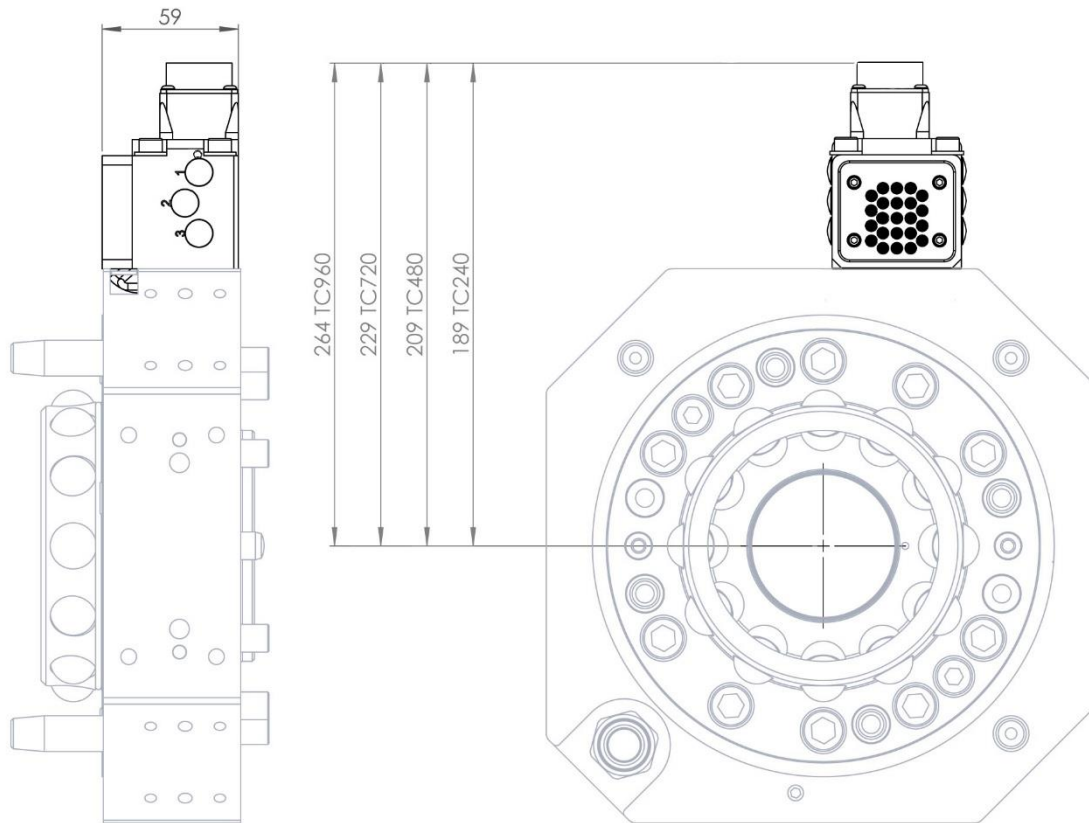


## 2.2.12 Circuit diagram E0178-765 for P7225



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## 2.2.13 Signal interface Souriau, robot side. Article: P6711

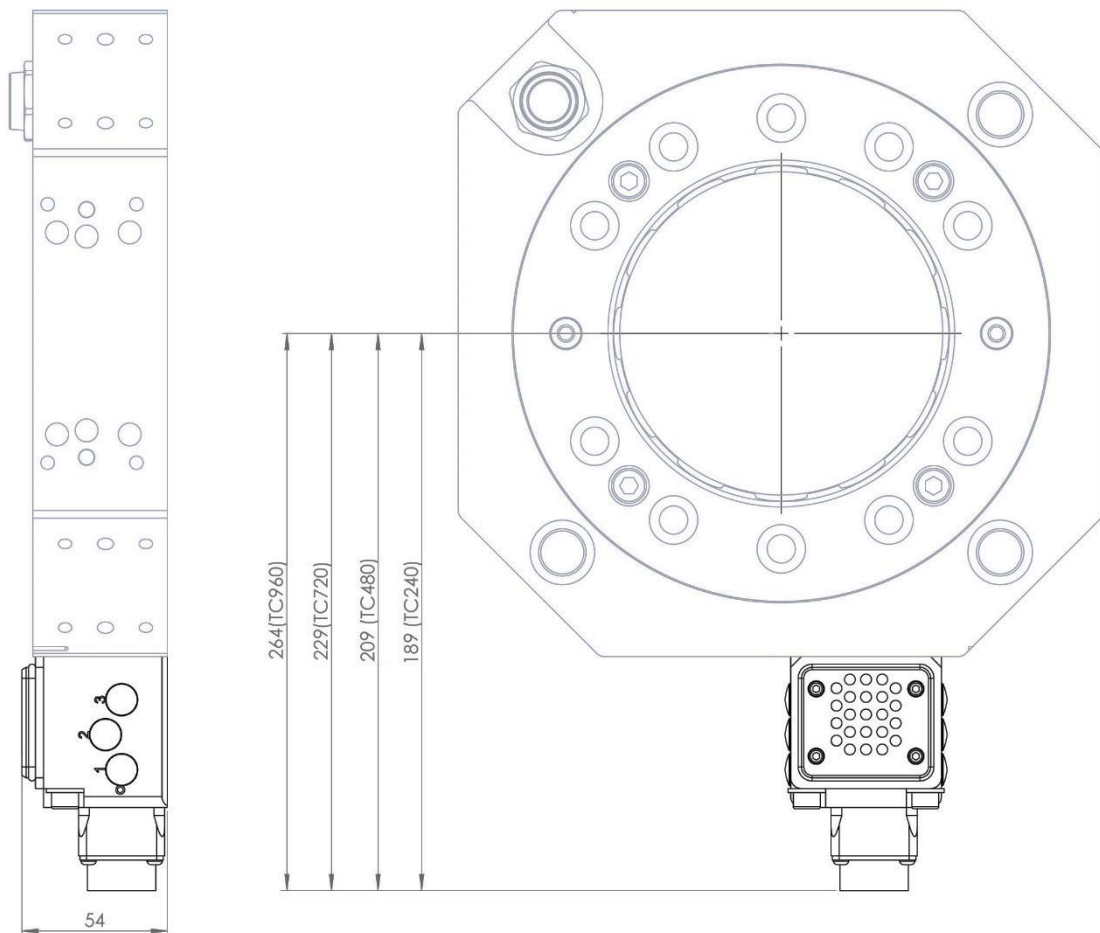


Transfers 23 electrical signals to the tool attachment. Can be mounted at 4 different positions on tool changer TC240 and TC 480 and 3 different positions on TC720 and TC960. To be used together with option P6721 attached to the tool attachment.

### Technical data

<b>Weight</b>		0.2 kg
<b>Electrical signals</b>	Circuit diagram Souriau 23P (UT001823PH)	E0178-207 ( <a href="#">section 2.2.15</a> ) 23 x (2A, 60V)
<b>Connection kits (optional)</b>	P8002 (connector) P8002-1 (connector)	Souriau 23S (straight) Souriau 23S (angled)

## 2.2.14 Signal interface Souriau, tool side, Article: P6721

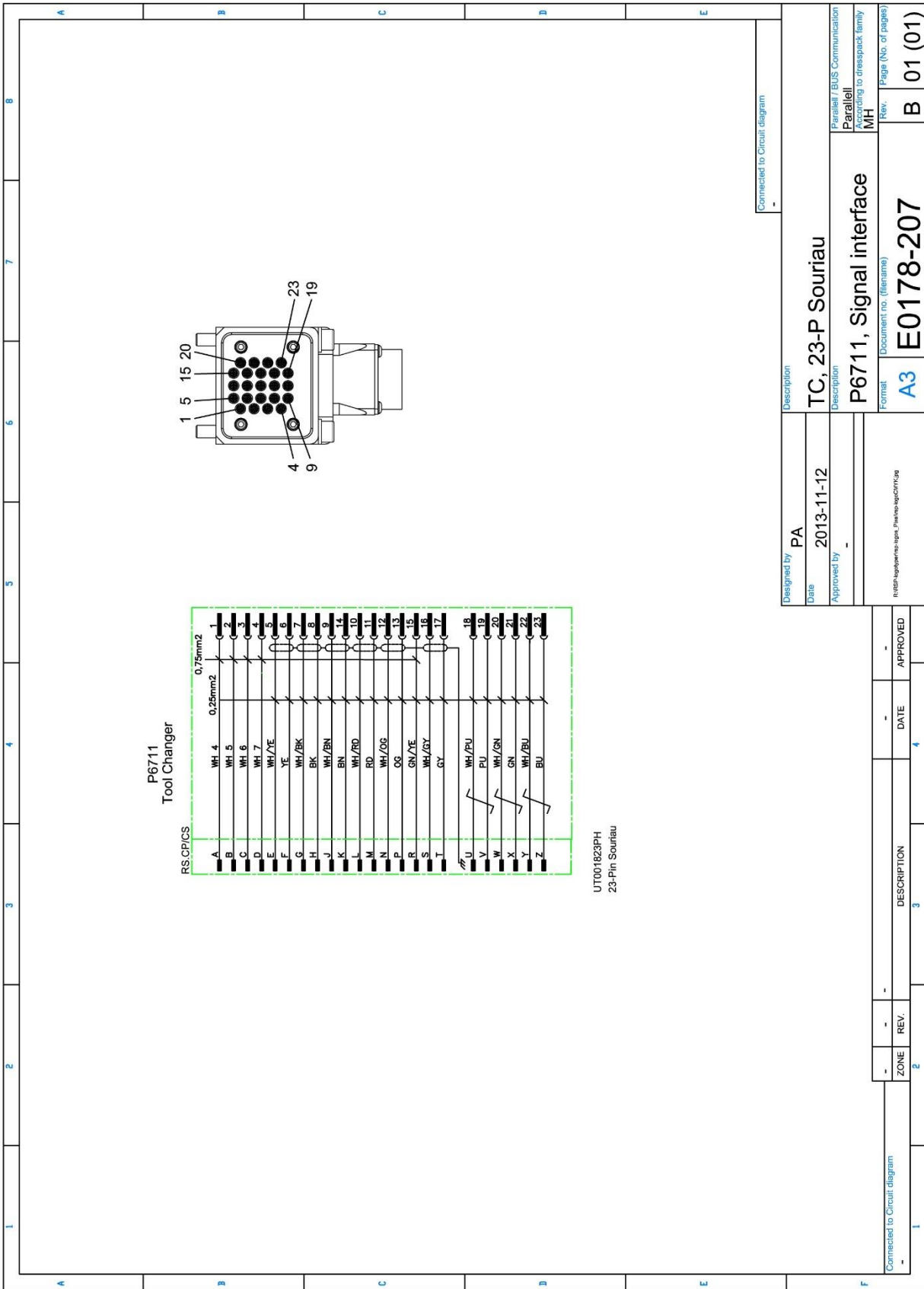


Transfers 23 electrical signals to the tool. To be mounted at the tool attachment and used together with option P6721 attached to the tool changer.

### Technical data

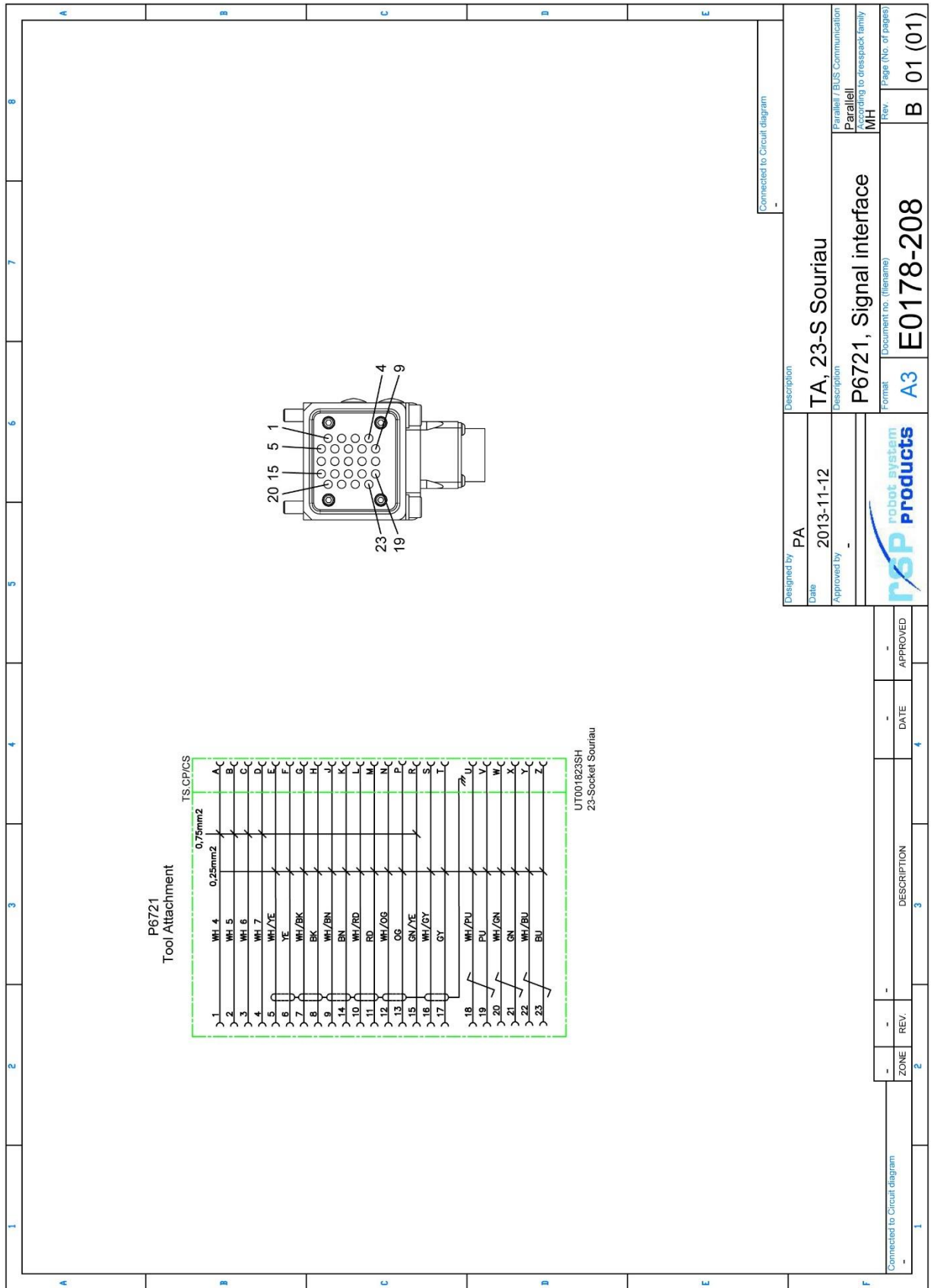
<b>Weight</b>		0.2 kg
<b>Electrical signals</b>	Circuit diagram Souriau 23S (UT001823SH)	E0178-208 ( <a href="#">section 2.2.16</a> ) 23 signals
<b>Connection kits (optional)</b>	P8001 (connector) P8001-1 (connector)	Souriau 23P (straight) Souriau 23P (angled)

## 2.2.15 Circuit diagram E0178-207 for P6711



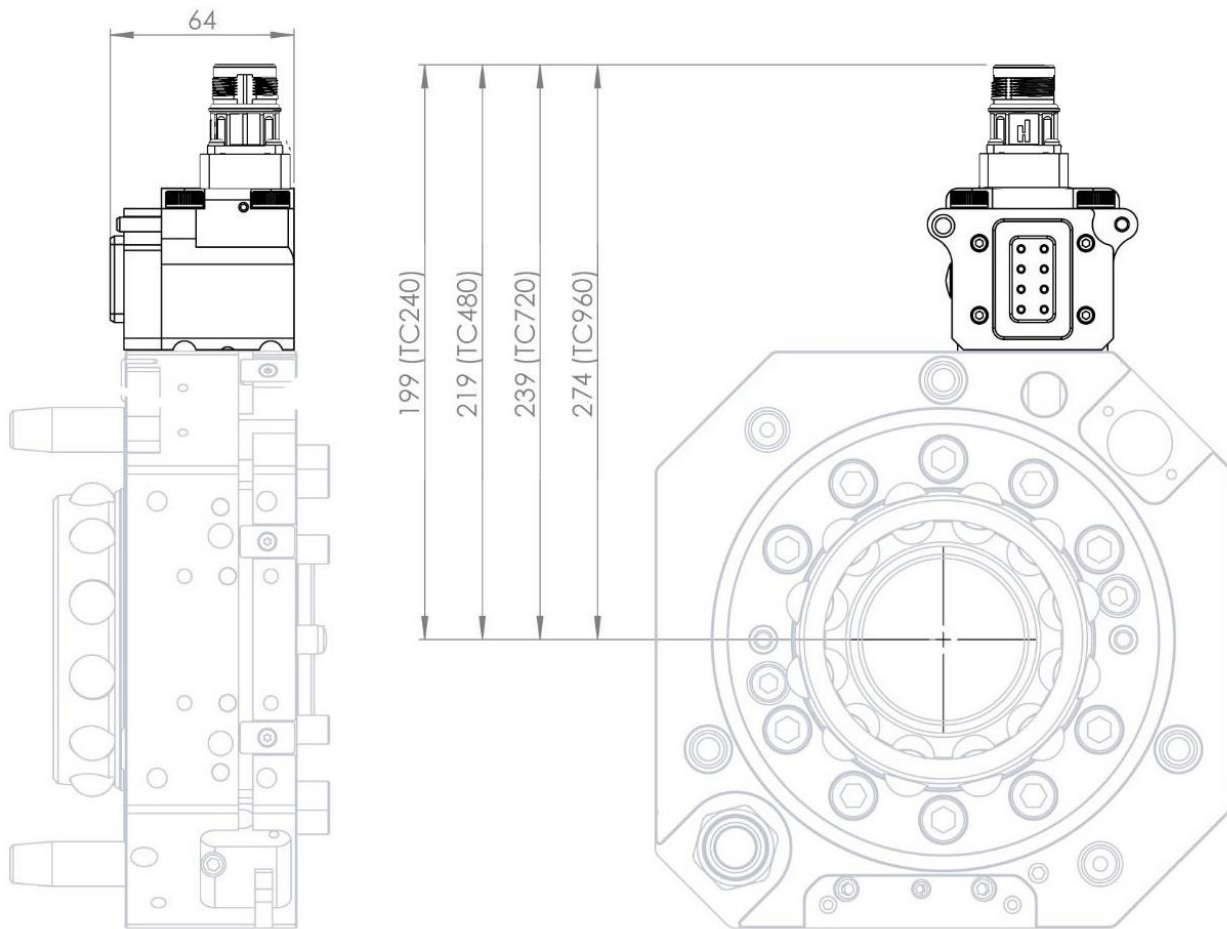
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## 2.2.16 Circuit diagram E0178-208 for P6721



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## 2.2.17 Servo interface M23, robot side. Article: P6768-2

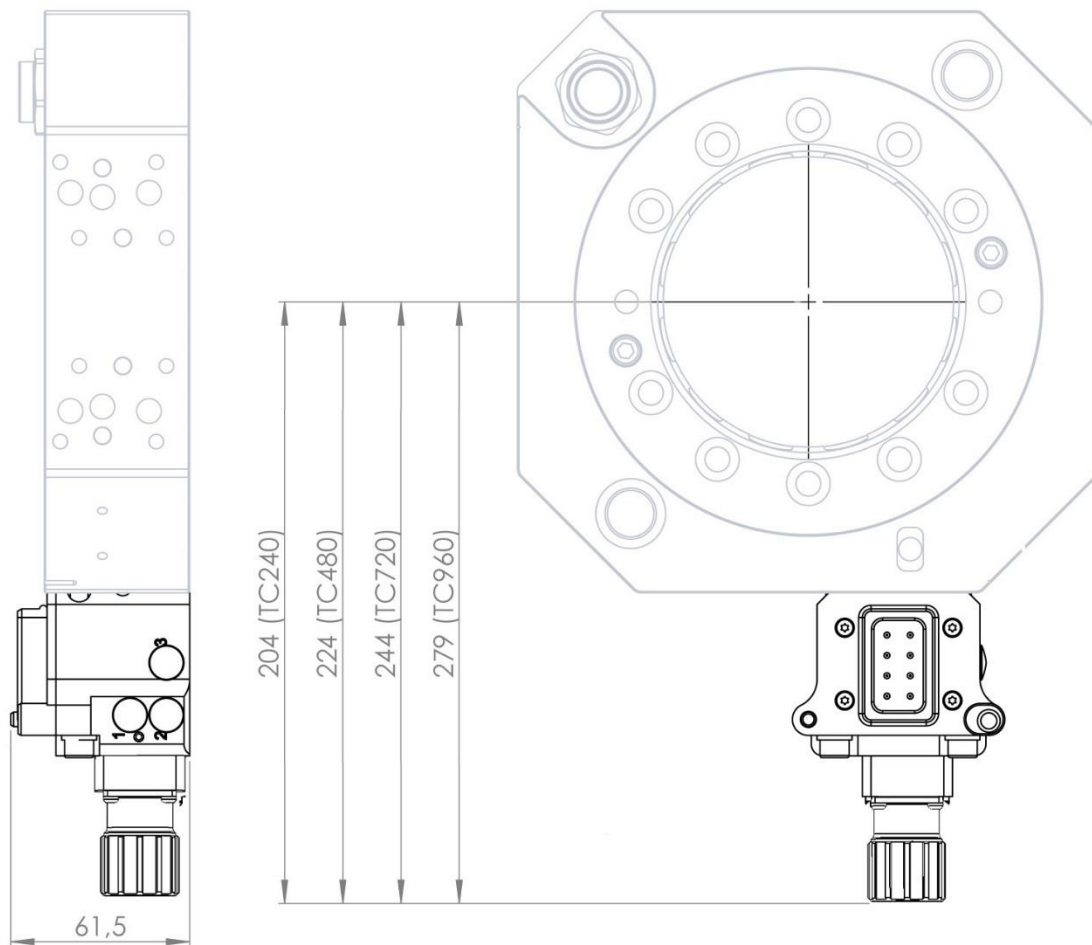


Transfers 8 servo power signals to the tool attachment. Can be mounted at 4 different positions on tool changer TC240 and TC 480 and 3 different positions on TC720 and TC960. To be used together with option P6772 attached to the tool attachment.

### Technical data

<b>Weight</b>		0.2 kg
<b>Servo power</b>	Circuit diagram M23 8P (Hummel 7.601.000.000, insert 7.084.943.121)	E0178-314 ( <a href="#">section 2.2.19</a> ) 4 x (15A, 300V) + 3 x (15A, 600V) + PE
<b>Connection kits (optional)</b>	P8030 (Connector) P8030-1 (Connector)	M23 8S (straight) M23 8S (angled)

## 2.2.18 Servo interface M23, tool side, Article: P6772-2

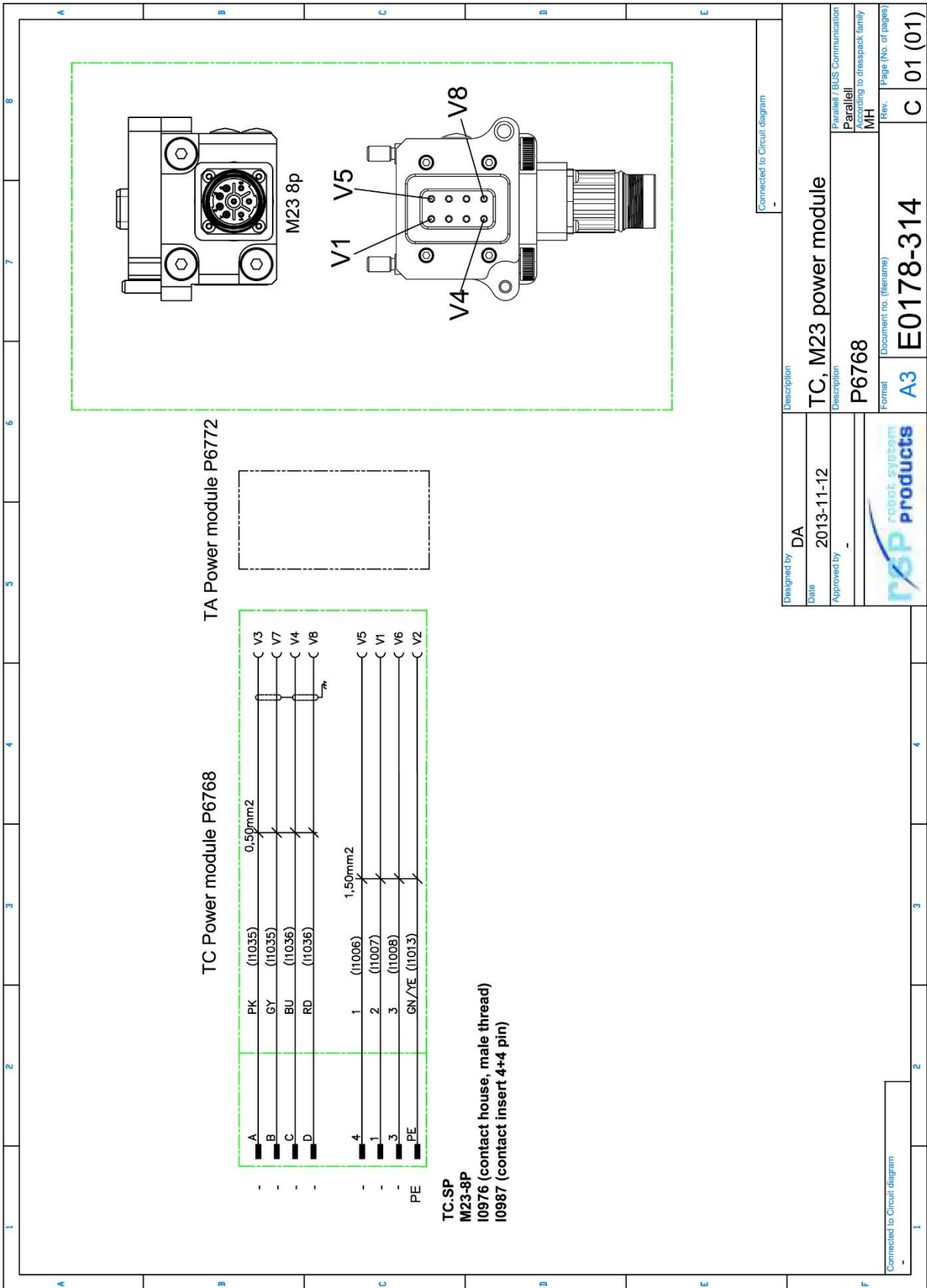


Transfers 8 servo power signals to the tool. To be mounted at the tool attachment and used together with option P6768 attached to the tool changer.

### Technical data

<b>Weight</b>		0.2 kg
<b>Servo power</b>	Circuit diagram M23 8S (Hummel 7.641.000.000, insert 7.084.943.102)	E0178-321 ( <a href="#">section 2.2.20</a> ) 8 power signals
Connection kits (optional)	P8033 (Connector)	M23 8P (Hummel 7550 6000 000, insert 7084 943 101)

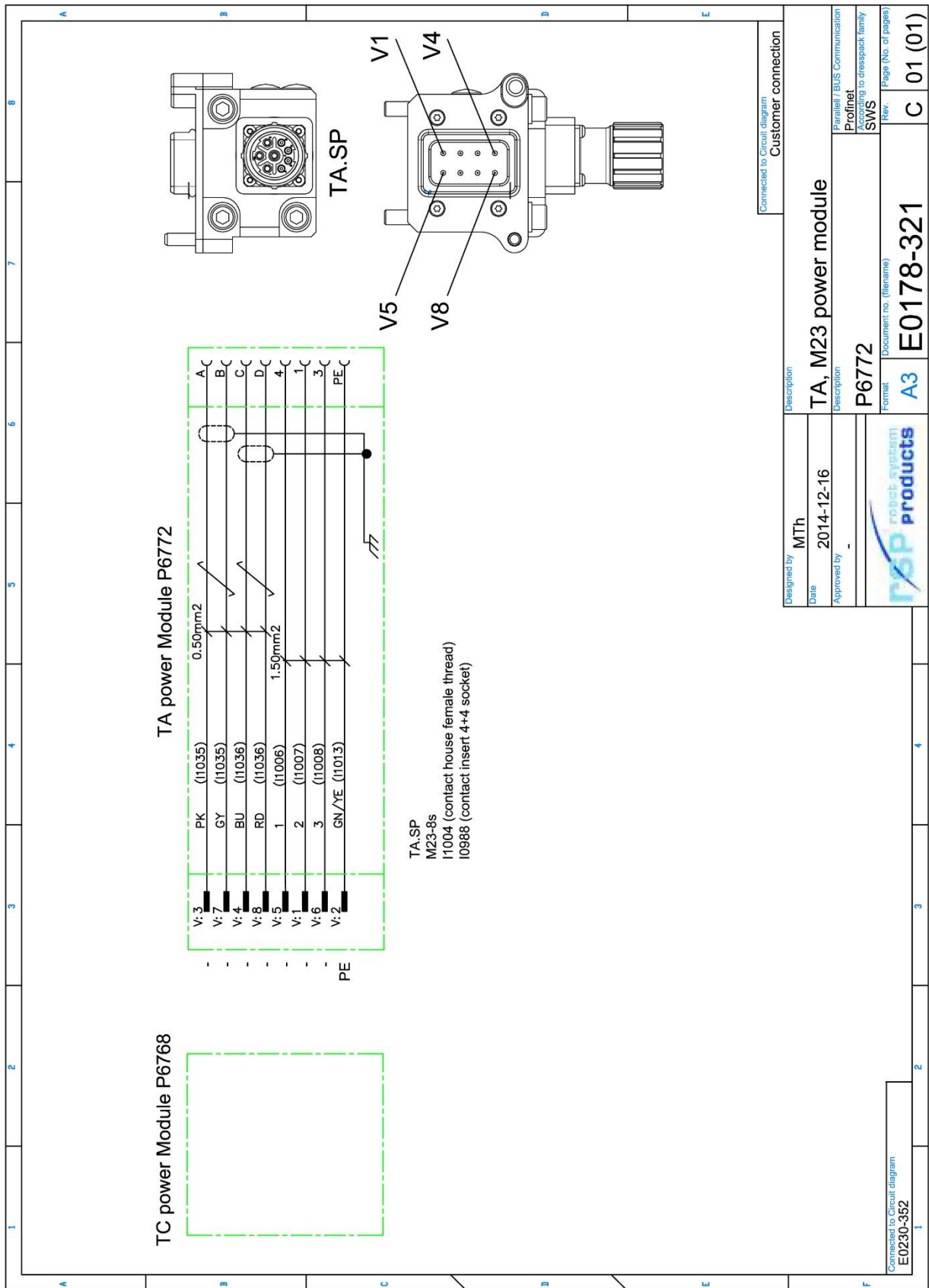
## 2.2.19 Circuit diagram E0178-314 for P6768-2



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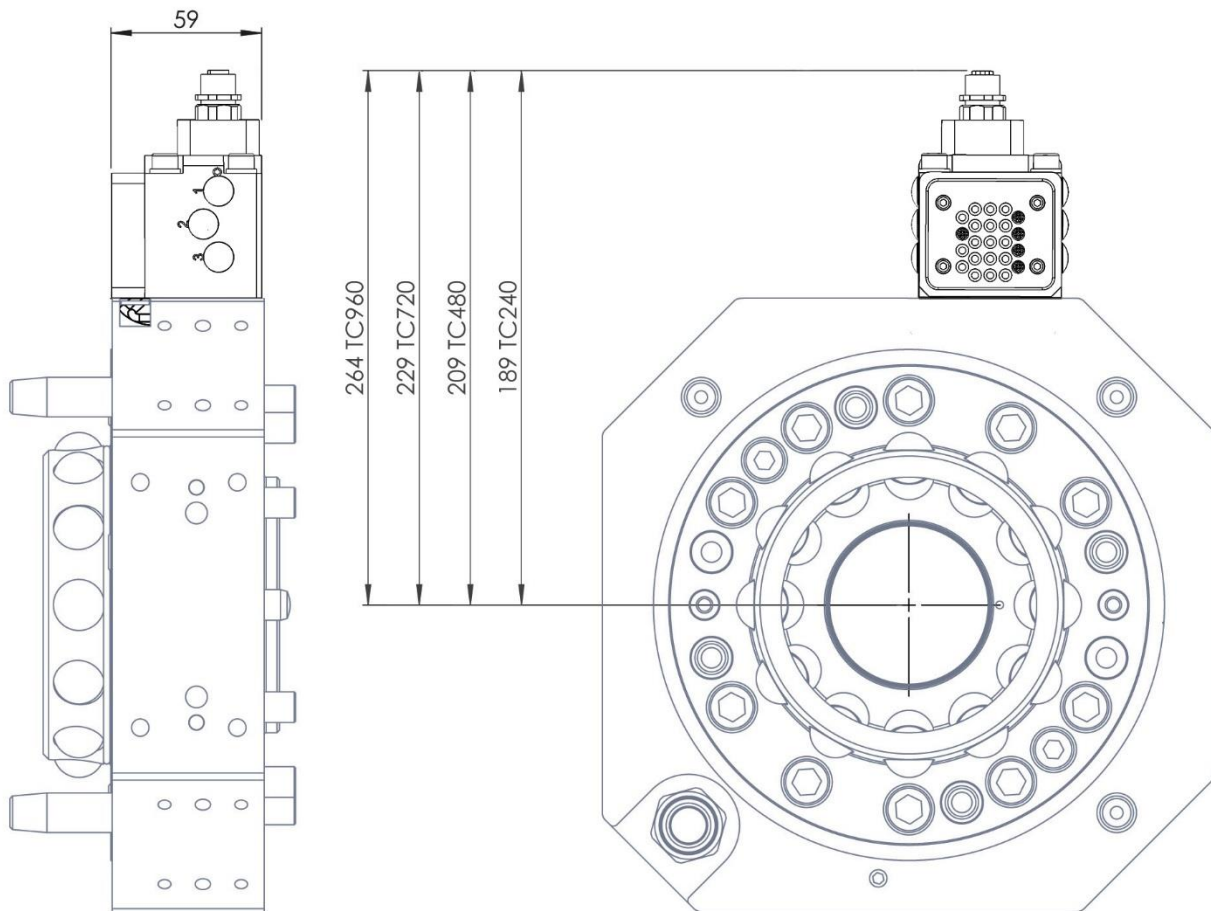


## 2.2.20 Circuit diagram E0178-321 for P6772-2



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## 2.2.21 Field bus interface Profinet, robot side. Article: P6771

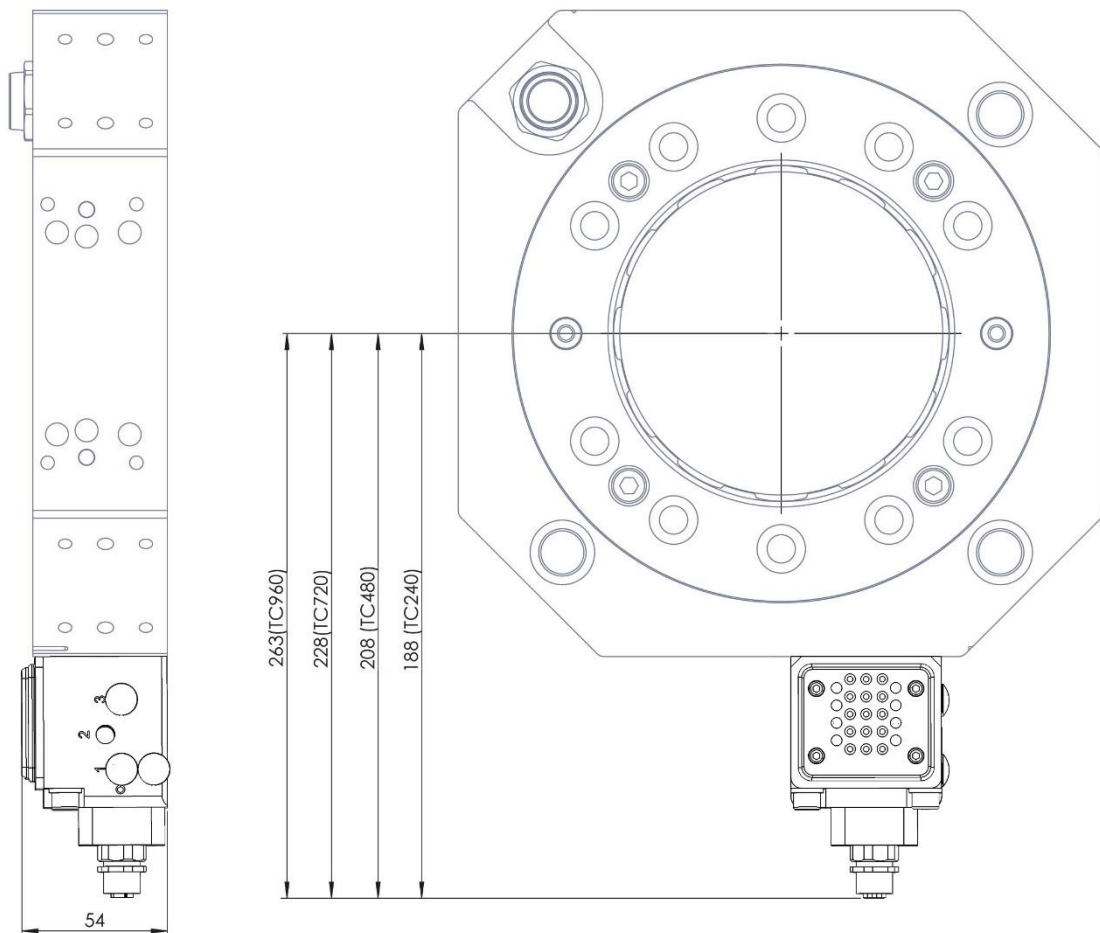


Transfers 4 field bus signals to the tool attachment. Can be mounted at 4 different positions on tool changer TC240 and TC 480 and 3 different positions on TC720 and TC960. To be used together with option P6775 attached to the tool attachment.

### Technical data

<b>Weight</b>		0.2 kg
<b>Field bus</b>	Field bus type Circuit diagram M12 4S D-code	Profinet, Ethernet, EtherCAT E0178-317 ( <a href="#">section 2.2.23</a> ) 4 field bus channels
<b>Connection kits (optional)</b>	I1175 (field bus)	M12 4P D-code

## 2.2.22 Field bus interface Profinet, tool side, Article: P6775

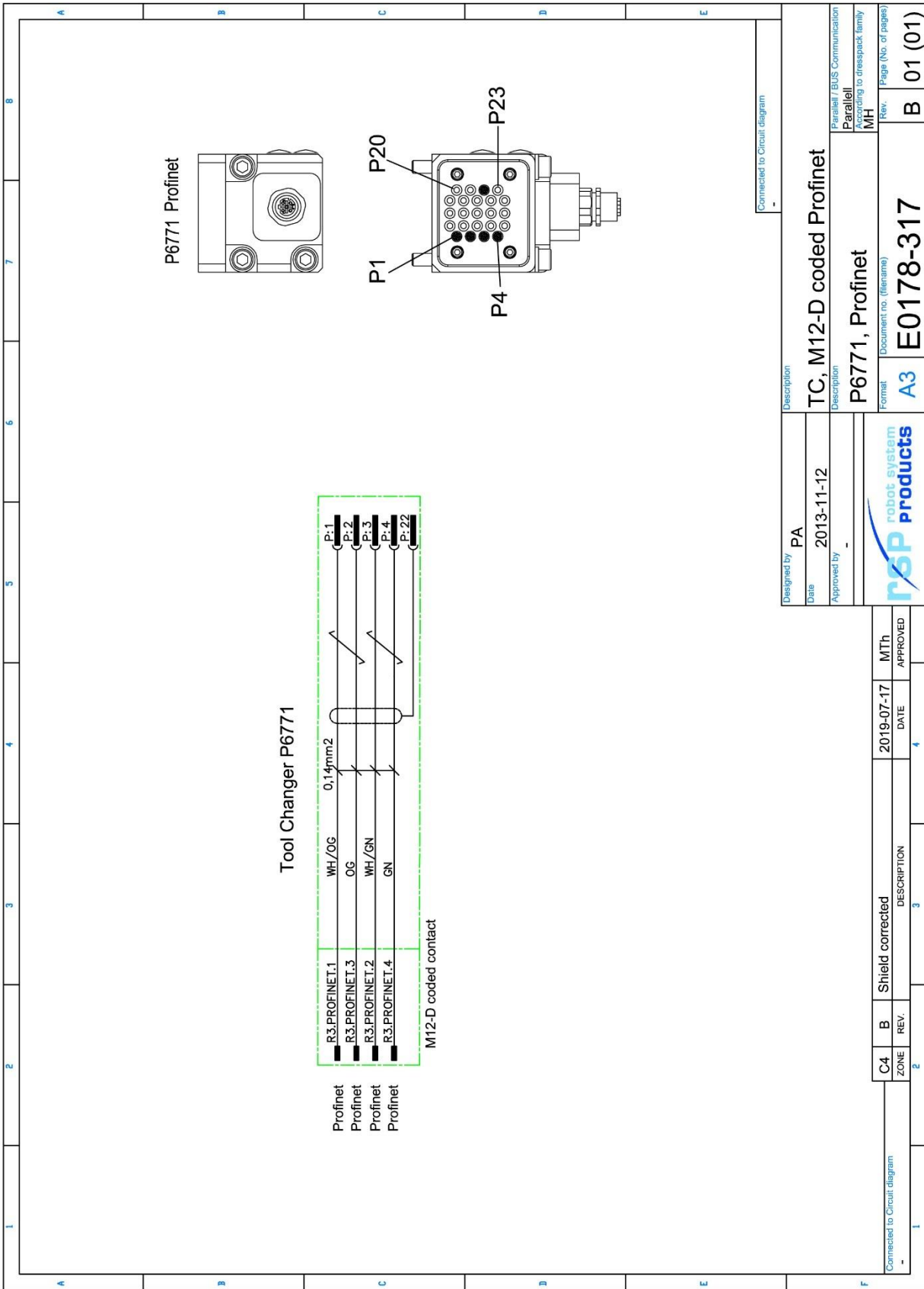


Transfers 4 field bus signals to the tool. To be mounted at the tool attachment and used together with option P6771 attached to the tool changer.

### Technical data

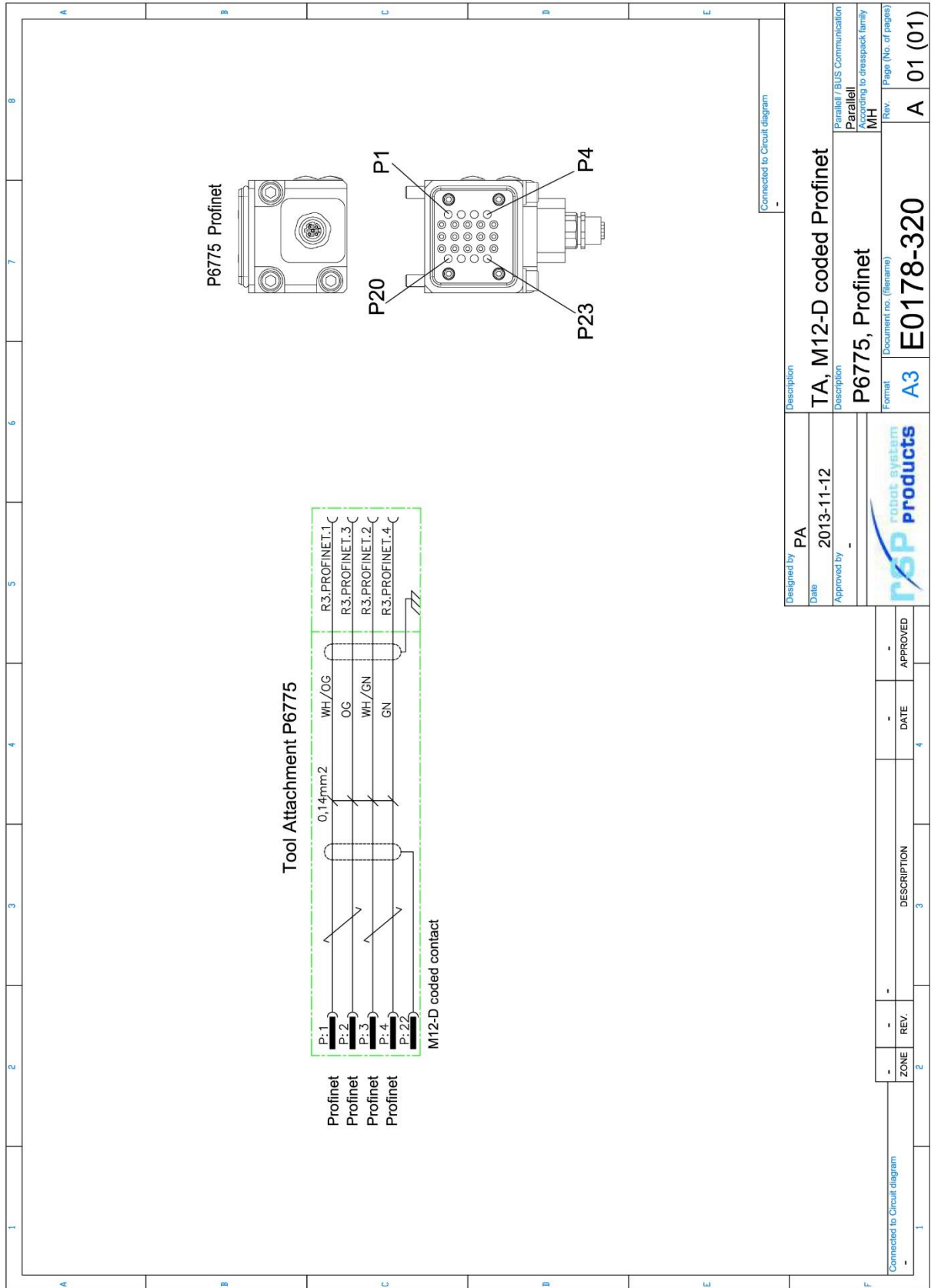
<b>Weight</b>		0.2 kg
Field bus	Circuit diagram M12 4P D-code	E0178-320 ( <a href="#">section 2.2.24</a> ) 4 field bus channels
Connection kits (optional)	I1257 (field bus)	M12 4S D-code

## 2.2.23 Circuit diagram E0178-317 for P6771



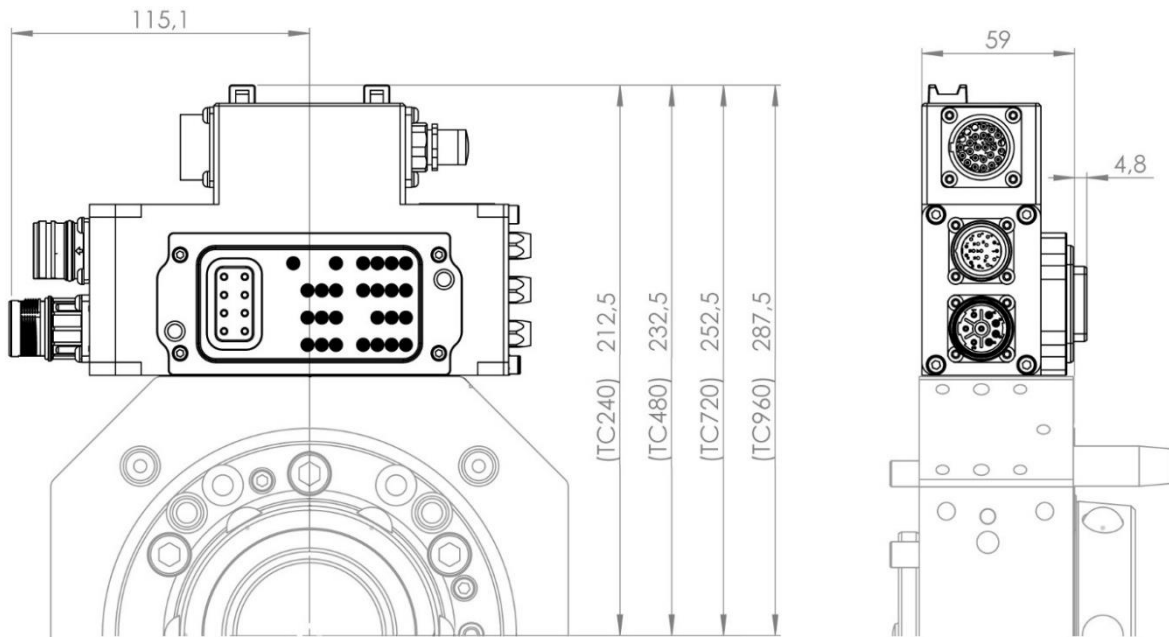
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## 2.2.24 Circuit diagram E0178-320 for P6775



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## 2.2.25 Signal and servo interface, robot side. Article: P6778



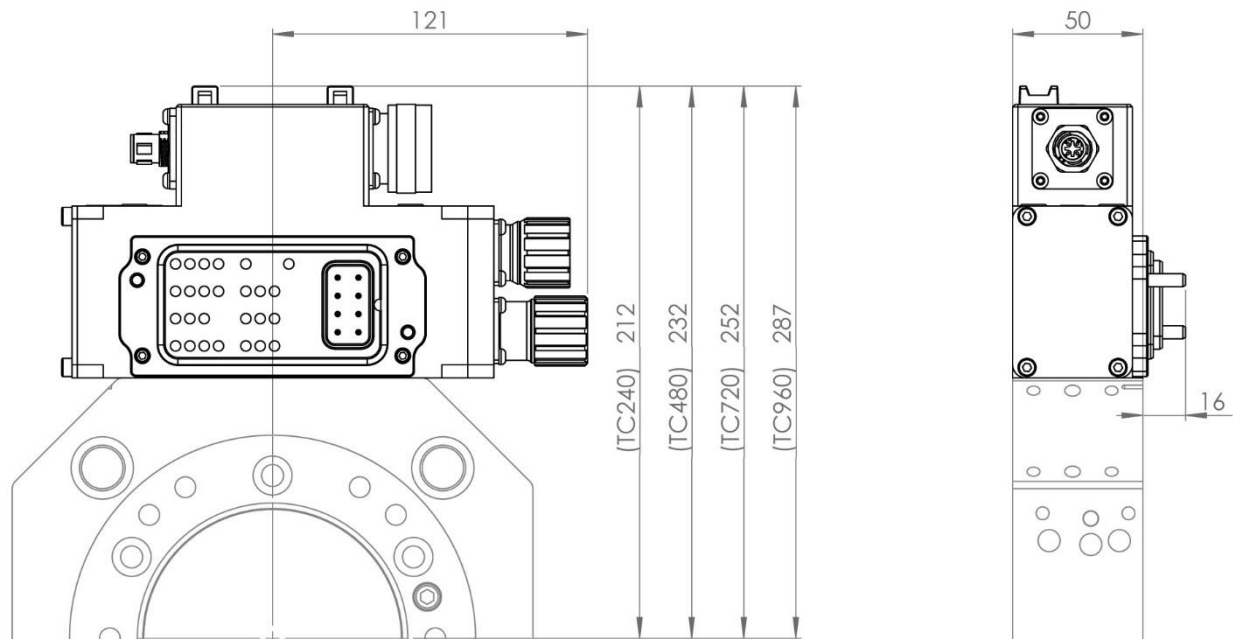
Transfers 19 electrical signals, 7 servo power signals and 4 field bus signals to the tool attachment. To be mounted at one dedicated position on the tool changer and used together with option P6779 at the TA.

On the housing 3 separate M8-contacts for connecting integrated valve and magnetic sensors are mounted, which can be used for sensor-options P6789, P6873-2, P7174 or P7175 and valve-options P6718 or P7710.

### Technical data

<b>Weight</b>		1.1 kg
<b>Electrical signals</b>	Circuit diagram Compact Souriau 26P (UT0W01626PH) Dedicated signals, 3 x M8 3S	E0230-290 ( <a href="#">section 2.2.27</a> ) 19 x (2A, 30V) + PE 24V (for sensors) 0V (for valves and sensors) TC Opened (sensor) TC Closed (sensor) doOpen TC 1 (valve) doOpen TC 2 (valve)
	M23 17P (7410 000 000, 7003 917 101)	6 x (2A, 60V)
<b>Servo power</b>	M23 8P (7601 000 000, 7084 943 101)	4 x (5A, 300V) + 3 x (15A, 600V) + PE
<b>Field bus</b>	Field bus type M12 4S D-code, socket	Profinet, Ethernet, EtherCAT 4 (2 pairs) field bus channels, 100 Mbit/s
<b>Connection kits (optional)</b>	P8025 (signals) P8029 (signals) P8030 (servo) I1175 (field bus)	Compact Souriau 26S (straight) M23 17S (straight) M23 8S (straight) M12 4P D-code, pin

## 2.2.26 Signal and servo interface, tool side. Article: P6779

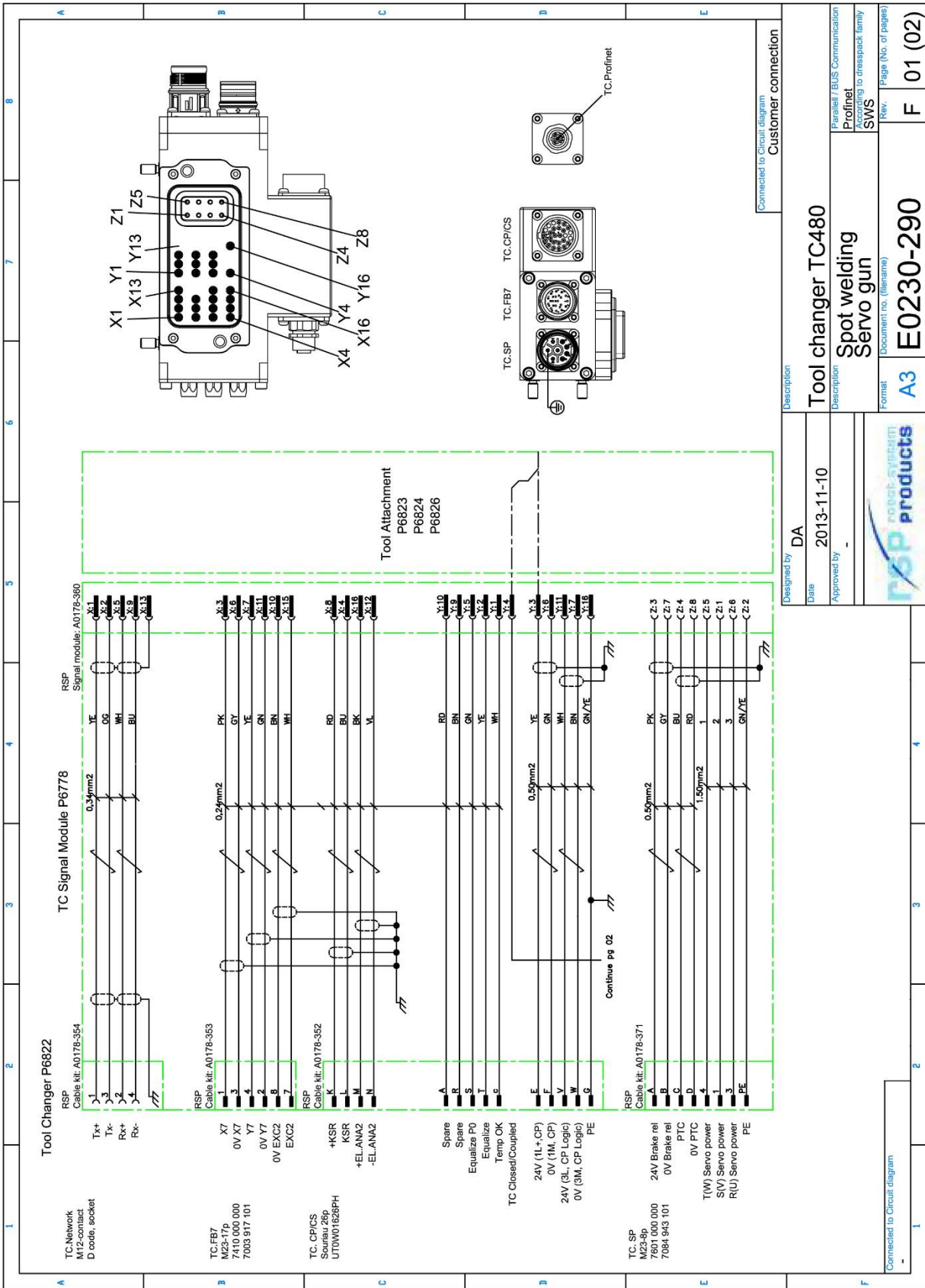


Transfers 19 electrical signals, 7 servo power signals and 4 field bus signals to the tool. To be mounted at the tool attachment and used together with option P6778 attached to the tool changer.

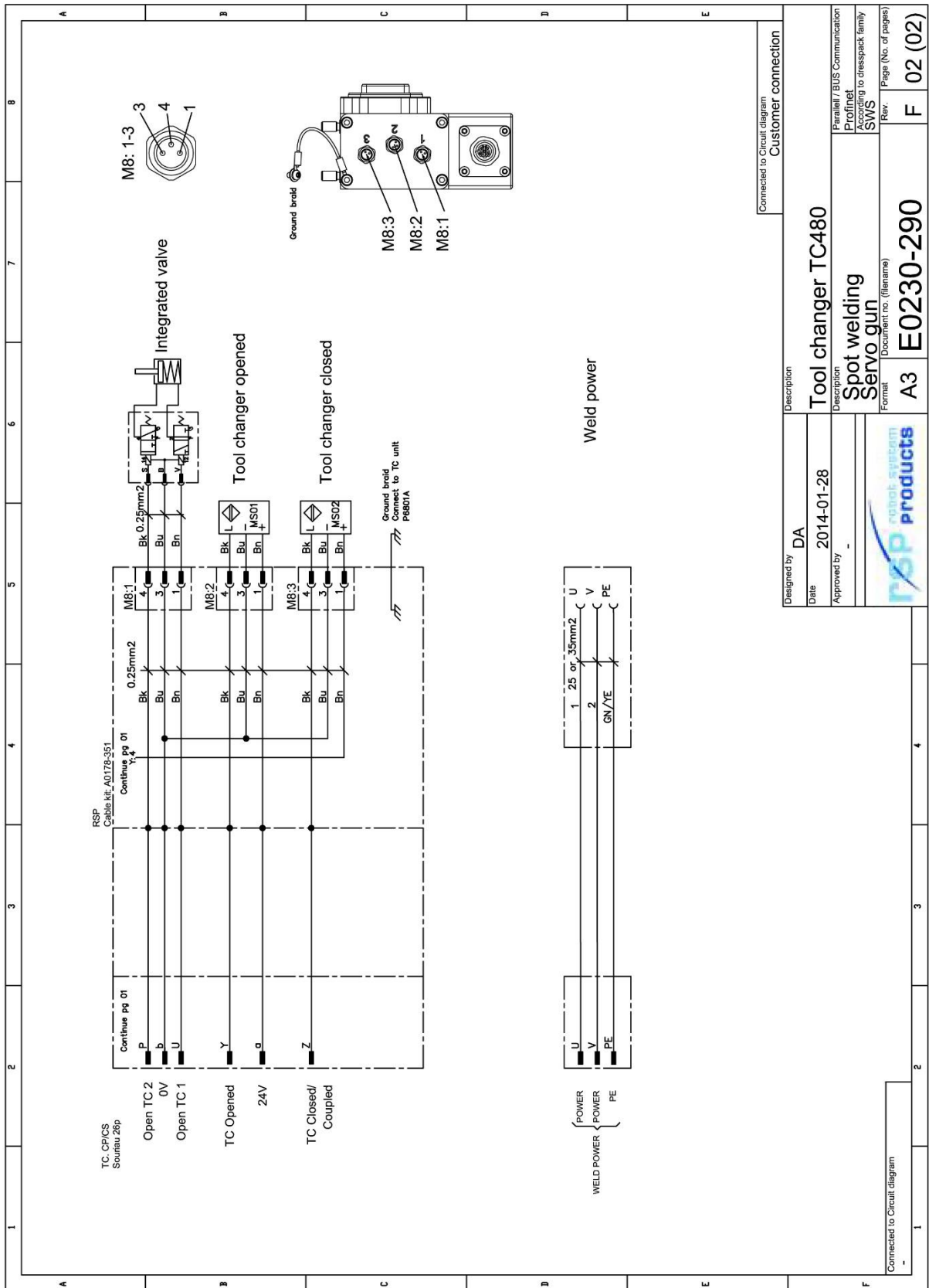
### Technical data

<b>Weight</b>		1.1 kg
<b>Electrical signals</b>	Circuit diagram Compact Souriau 26S (UT0W61626SH) M23 17S (7440 000 000, 7003 917 102)	E0230-291 (see <a href="#">section 2.2.28</a> ) 13 + PE 6
<b>Servo power</b>	M23 8S (7641 000 000, 7084 943 102)	7 + PE
<b>Field bus</b>	Field bus type M12 4P D-code, pin	Profinet, Ethernet, EtherCAT 4 (2 pairs) field bus channels
<b>Connection kits (optional)</b>	P8022 (signals) P8031 (signals) P8032 (servo) I1257 (field bus)	Compact Souriau 26P (straight) M23 17P (straight) M23 8P (straight) M12 4S D-code, socket

## 2.2.27 Circuit diagram E0230-290 for P6778





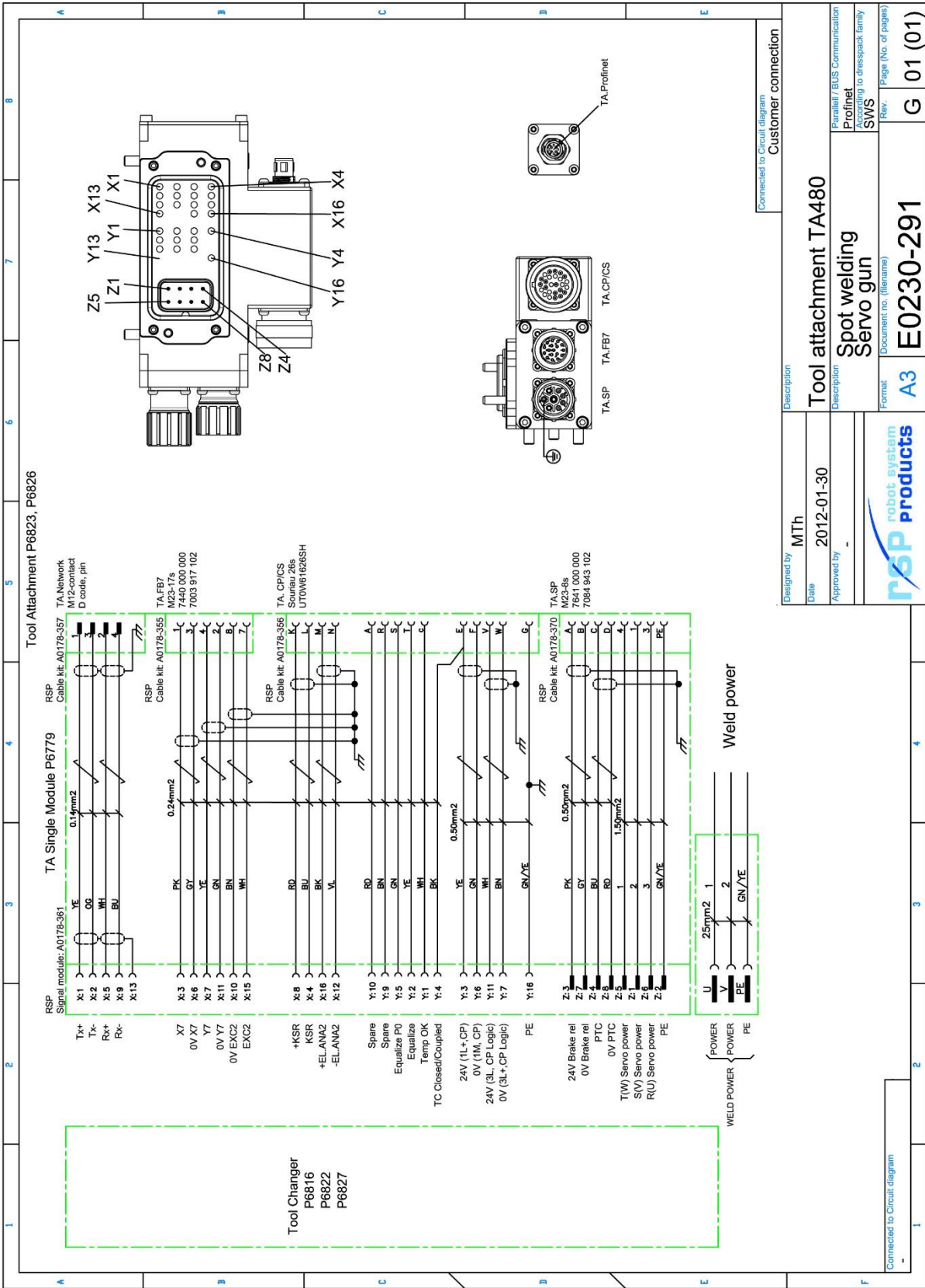


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Designed by	DA	Description	Connected to Circuit diagram
Date	2014-01-28	Customer connection	
Approved by	-	Tool changer TC480	
		Description	Parallel / BUS Communication
		Spot welding	Profinet
		Servo gun	According to dresspack family
		Format	SWS
		Document no. (filename)	Rev.
		A3	Page (No. of pages)
		E0230-290	F
			02 (02)

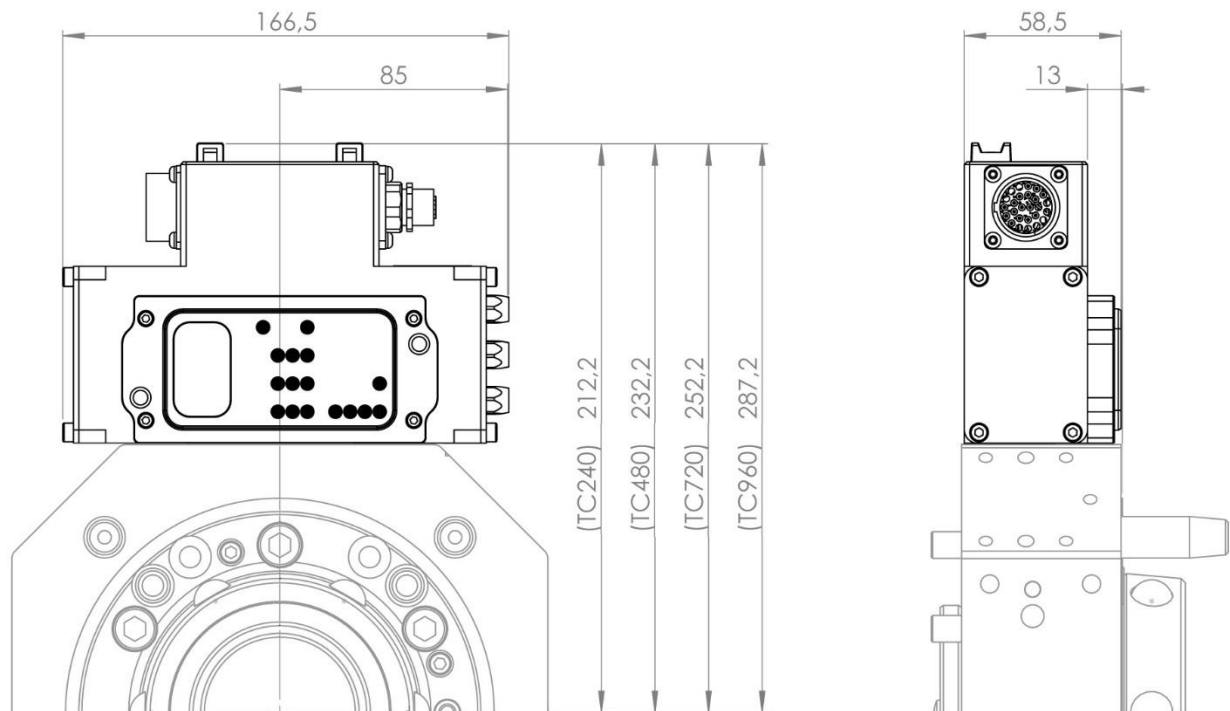
Connected to Circuit diagram

## 2.2.28 Circuit diagram E0230-291 for P6779



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## 2.2.29 Signal and field bus interface, robot side. Article: P6780



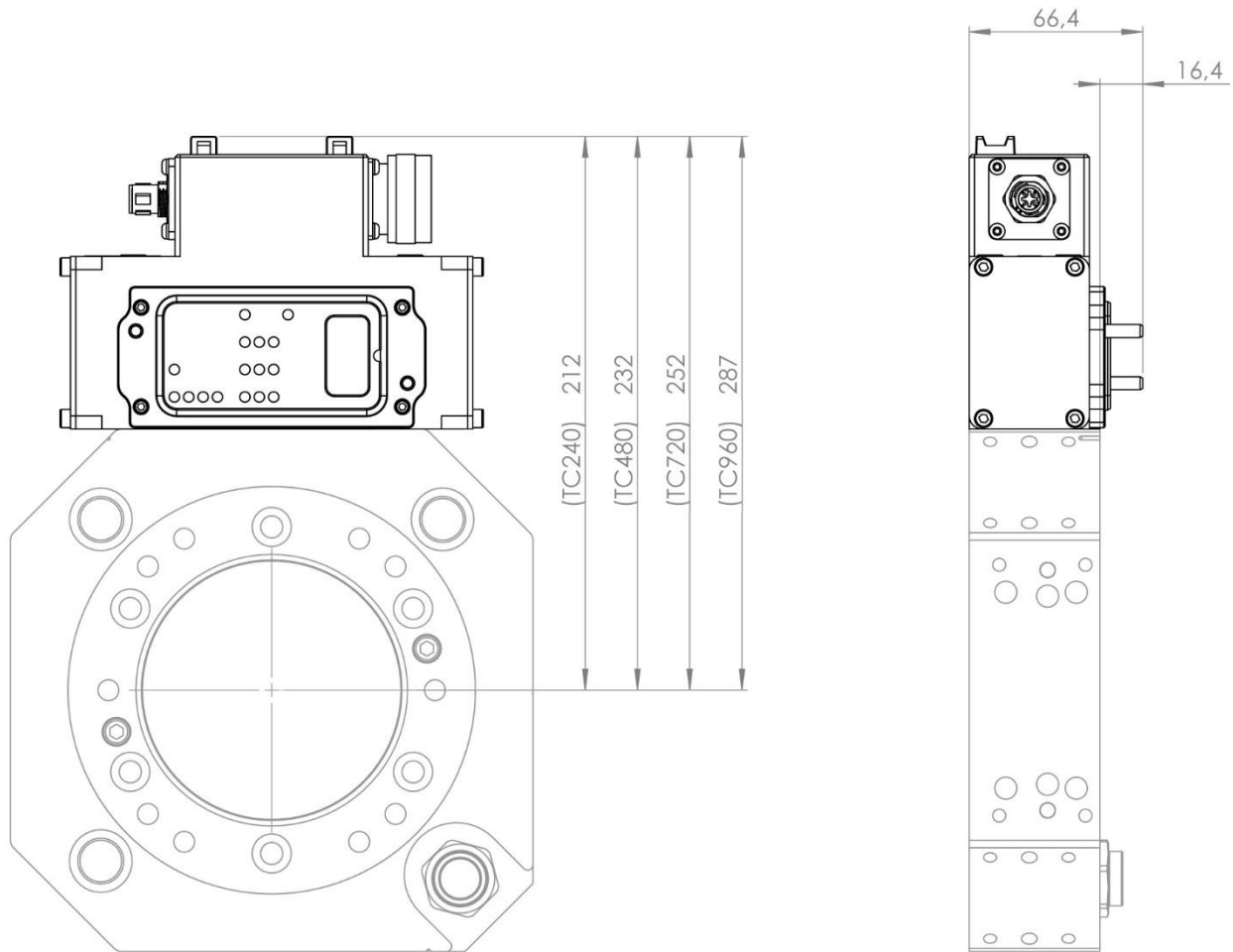
Transfers 9 electrical signals and 4 field bus signals to the tool attachment. To be mounted at one dedicated position on the tool changer and used together with option P6781 attached to the tool attachment.

On the housing 3 separate M8-contacts for connecting integrated valve and magnetic sensors are mounted, which can be used for sensor-options P6789, P6873-2, P7174 or P7175 and valve-options P6718 or P7710.

### Technical data

<b>Weight</b>		1.1 kg
<b>Electrical signals</b>	Circuit diagram Compact Souriau 26P (UT0W01626PH) Dedicated signals, 3 x M8 3S	E0230-292 ( <a href="#">section 2.2.31</a> ) 9 x (2A, 30V) + PE 24V (for sensors) 0V (for valves and sensors) TC Opened (sensor) TC Closed (sensor) doOpen TC 1 (valve) doOpen TC 2 (valve)
<b>Field bus</b>	Field bus type M12 4S D-code	Profinet, Ethernet, EtherCAT 4 (2 pairs) field bus channels, 100 Mbit/s
<b>Connection kits (opt.)</b>	P8025 (signals) I1175 (field bus)	Compact Souriau 26S (straight) M12 4P D-code

## 2.2.30 Signal and field bus interface, tool side. Article: P6781

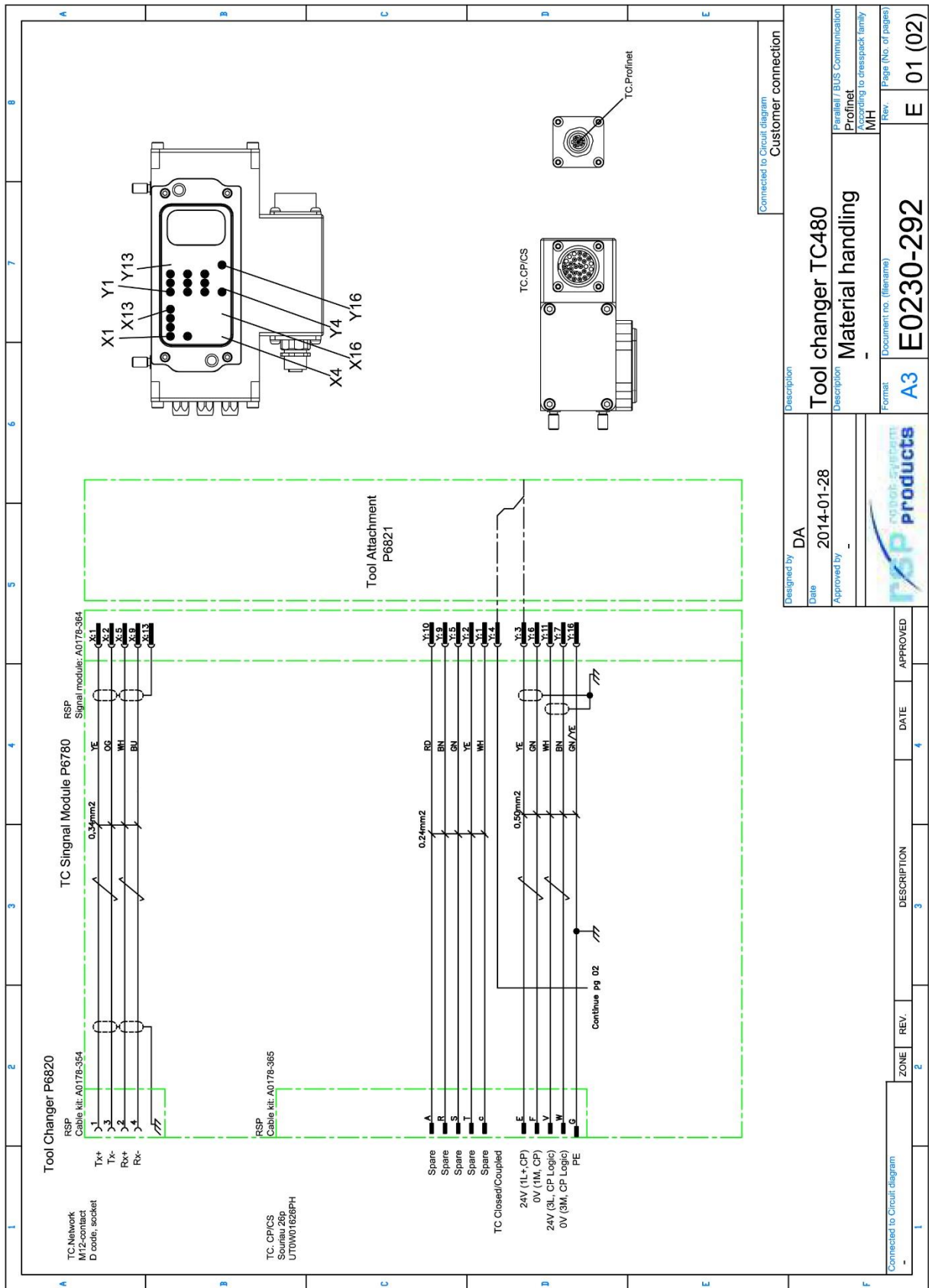


Transfers 9 electrical signals and 4 field bus signals to the tool. To be mounted at the tool attachment and used together with option P6780 attached to the tool changer.

### Technical data

<b>Weight</b>		1.0 kg
<b>Electrical signals</b>	Circuit diagram Compact Souriau 26S (UT0W61626SH)	E0230-293 ( <a href="#">section 2.2.32</a> ) 9 + PE
<b>Field bus</b>	Field bus type M12 4P D-code	Profinet, Ethernet, EtherCAT 4 (2 pairs) field bus channels
<b>Connection kits (optional)</b>	P8022 (connector) I1257 (field bus)	Compact Souriau 26P (straight) M12 4S D-code

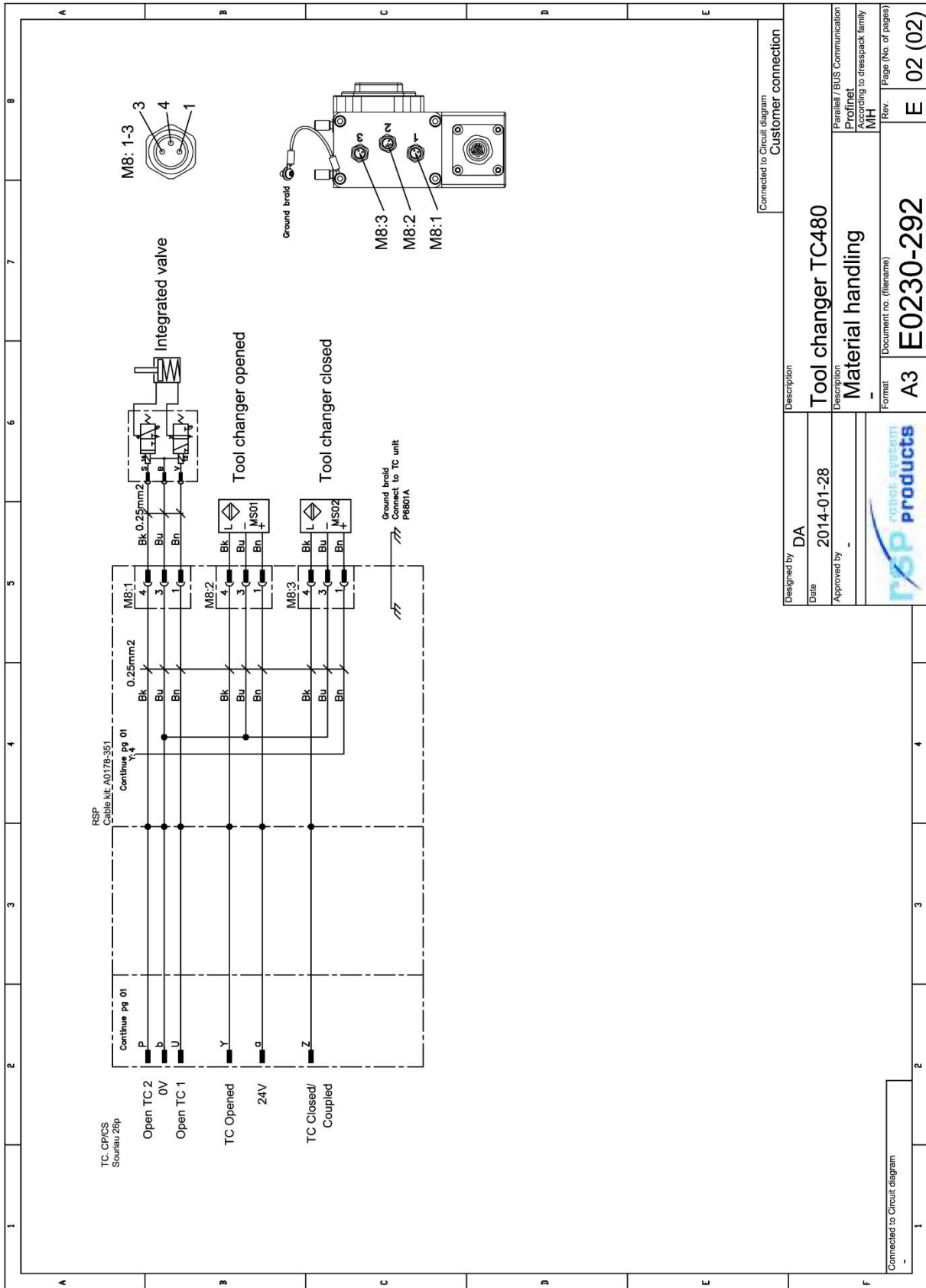
## 2.2.31 Circuit diagram E0230-292 for P6780




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Designed by	DA	Description	Connected to Circuit diagram
Date	2014-01-28	Tool changer TC480	Customer connection
Approved by	-	Material handling	
		Parallel / BUS Communication	Profinet
		According to dresspack family	MH
		Rev.	Page (No. of pages)
		Format	E 01 (02)
		Document no. (filename)	
		A3	E0230-292
Connected to Circuit diagram	ZONE	REV.	DATE
	2		4
		DESCRIPTION	APPROVED
		3	

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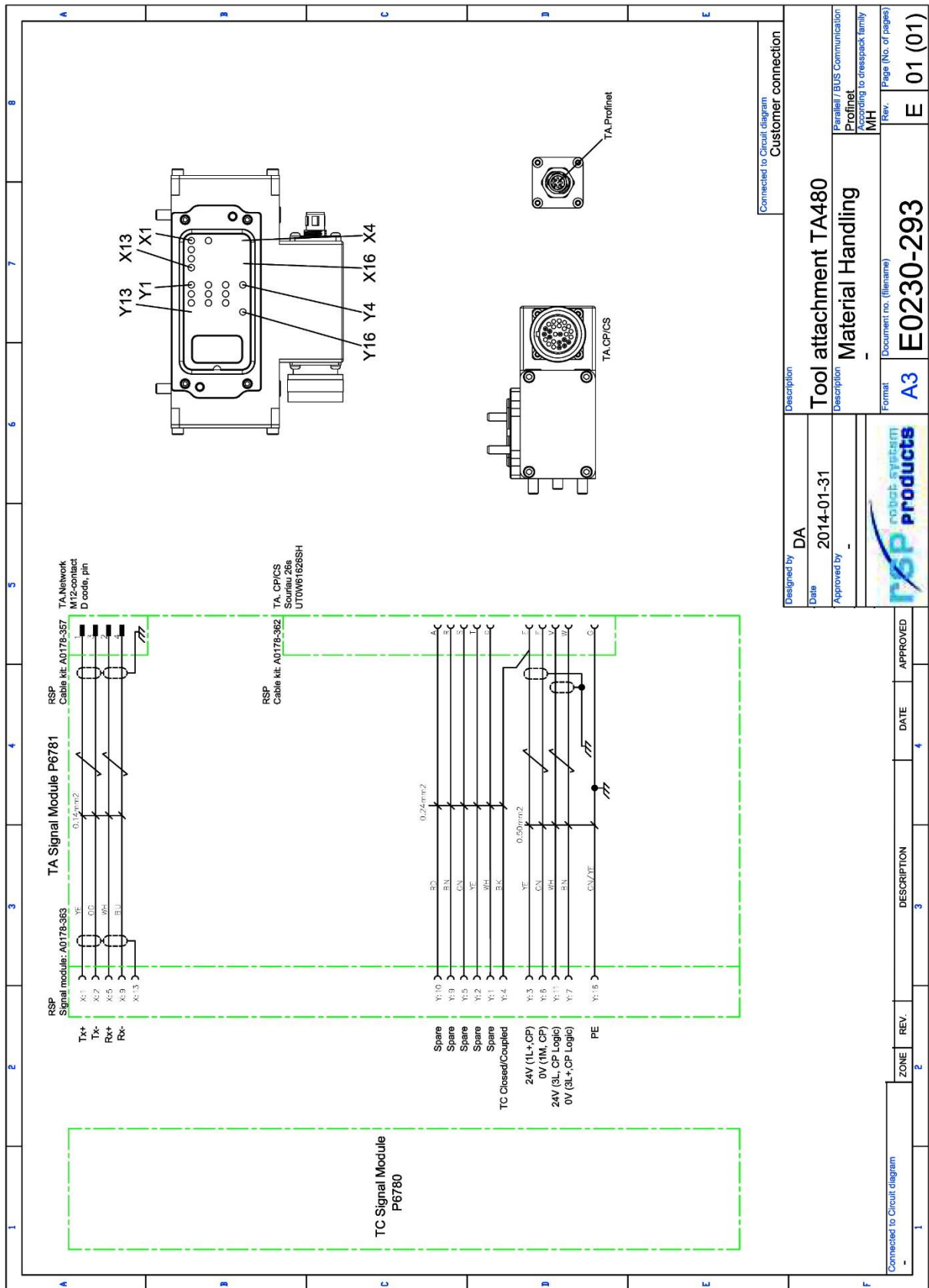
Designed by	DA
Date	2014-01-28
Approved by	-
	
Connected to Circuit diagram Customer connection	

Description	Tool changer TC480
Description	Material handling
Format	A3
Document no. (filename)	E0230-292

Parallel / BUS Communication	Profinet
According to dresspack family	MH
Page (No. of pages)	E 02 (02)

Connected to Circuit diagram	1	2	3	4	5	6	7	8
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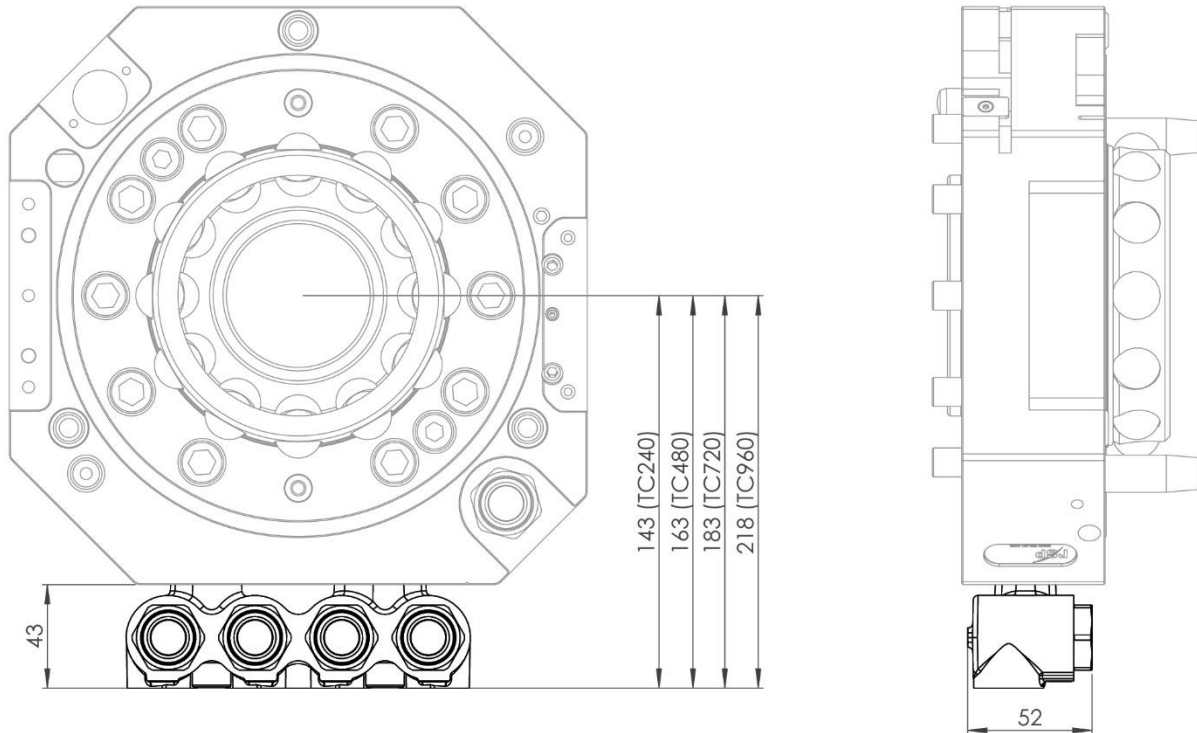
## 2.2.32 Circuit diagram E0230-293 for P6781



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 is strictly forbidden. Robot System Products

Designed by	DA	Description	Connected to Circuit diagram
Date	2014-01-31		
Approved by	-	Tool attachment TA480	
RSP products		Material Handling	
Format	A3	Document no. (filename)	E0230-293
Rev.	01 (01)	Page (No. of pages)	E 01 (01)

## 2.2.33 Water/air coupling, 1–4 channels, robot side. Article: P6715A



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 P6725A attached to the tool attachment.

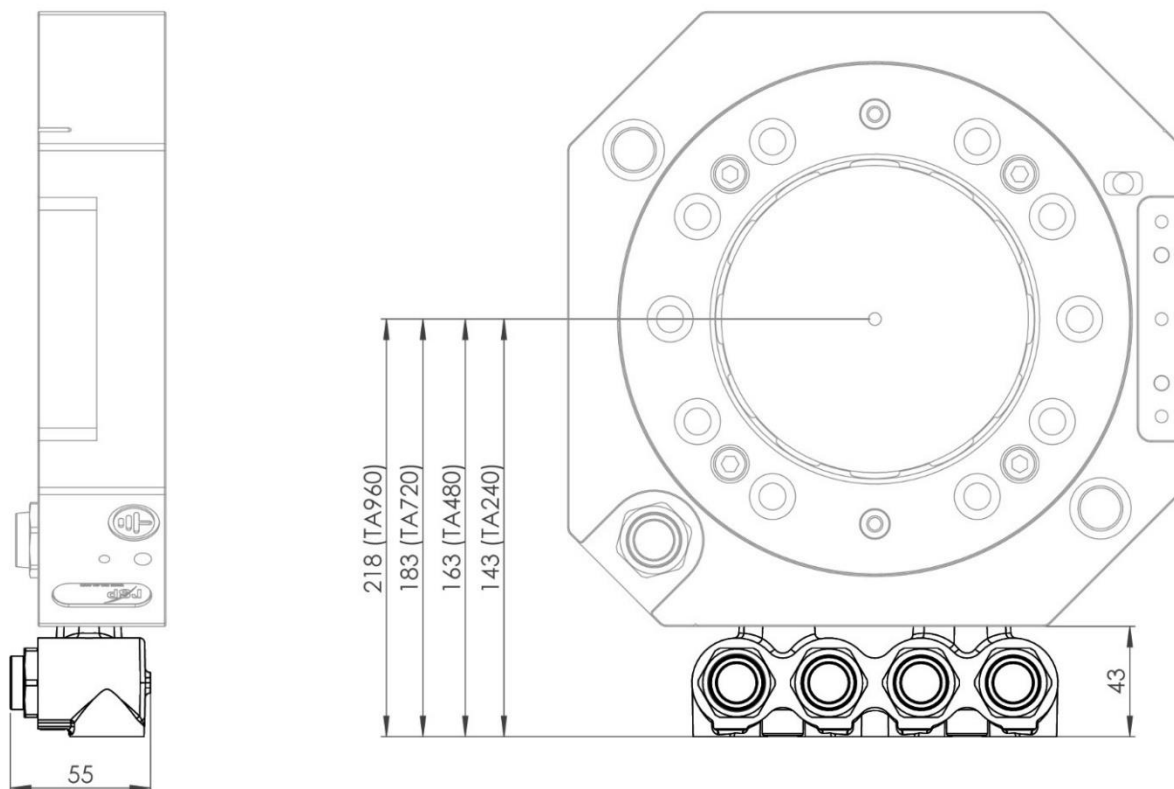
### Technical data

<b>Weight</b>		1.4–1.6 kg (depending on no. of ducts)
<b>Water/air channels</b>	Pneumatic diagram	Pne0230-011 ( <a href="#">section 2.1.13</a> )
	Water/air connections	1–4 x G½" (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	P6715-1A
	2	P6715-2A
	3	P6715-3A
	4	P6715-4A



## 2.2.34 Water/air coupling, 1–4 channels, tool side. Article: P6725A



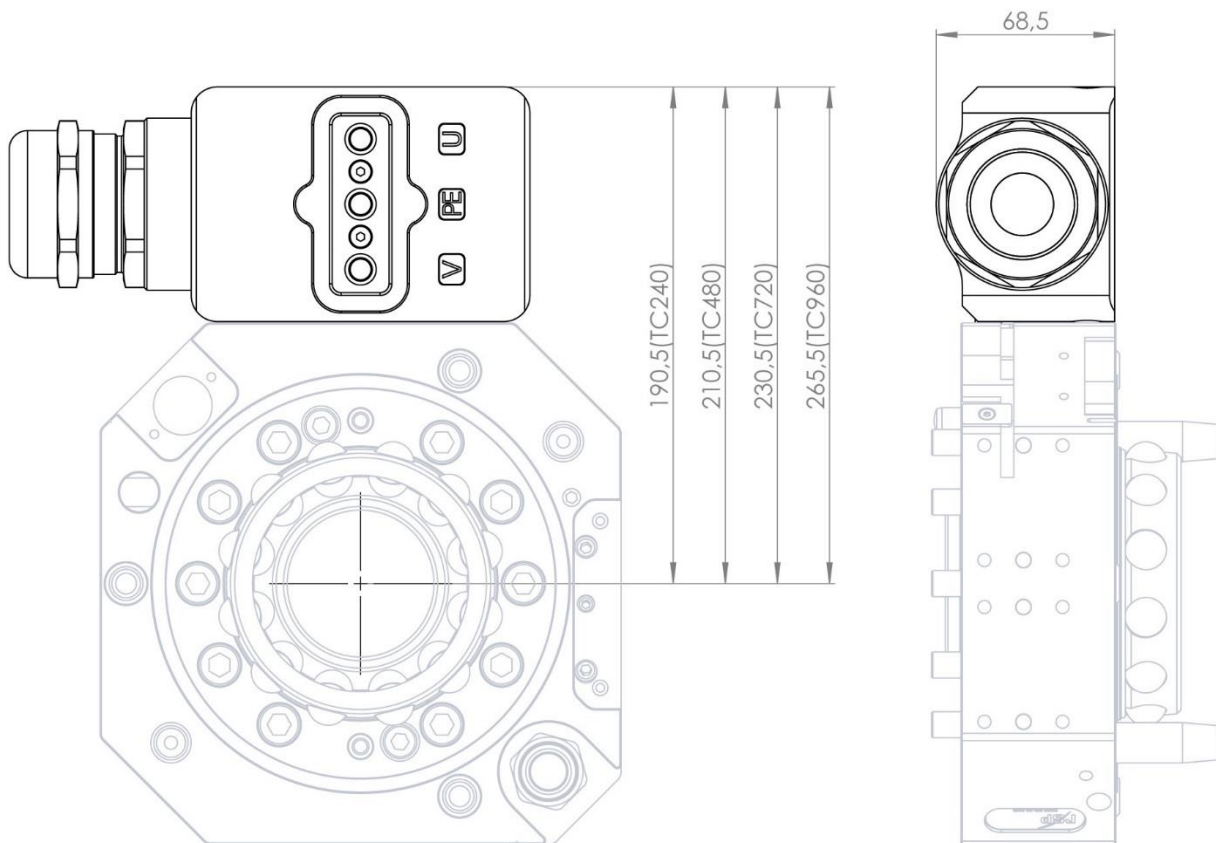
Transfers 1–4 water/air-channels, with non-return valves, to the tool. To be mounted at the tool attachment and used together with option P6715A attached to the tool changer.

### Technical data

<b>Weight</b>		1.4–1.6 kg (depending on no. of ducts)
<b>Water/air channels</b>	Total number of ducts	1–4 (see article numbers. below)
	Water/air quality	Max 25µm particle content

<b>Number of ducts</b>		<b>Article number</b>
Water/air channels	1	P6725-1A
	2	P6725-2A
	3	P6725-3A
	4	P6725-4A

## 2.2.35 Weld power connector M40, robot side. Article: P6716

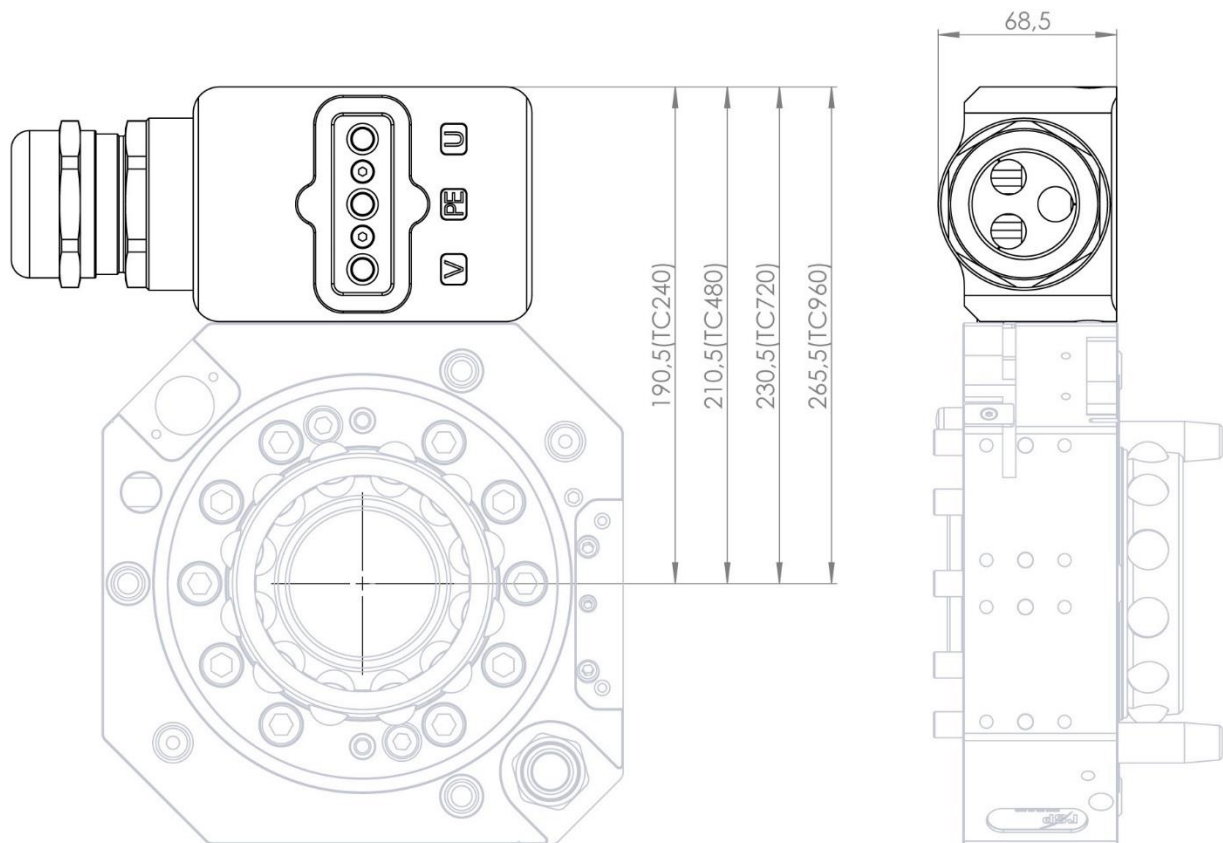


Connects 3 weld power conductors to the tool attachment. Can be mounted at 2 different positions at the tool changer with the cable gland to the left or the right. To be used together with option P6726 attached to the tool attachment.

### Technical data

<b>Weight</b>		1.1 kg
<b>Weld power</b>	Total number of conductors	3 x (690V, 140A)
	Connection	Cable gland (M40x1.5) for a 3-conductor 19–28 mm cable

## 2.2.36 Weld power connector M50, robot side. Article: P6784

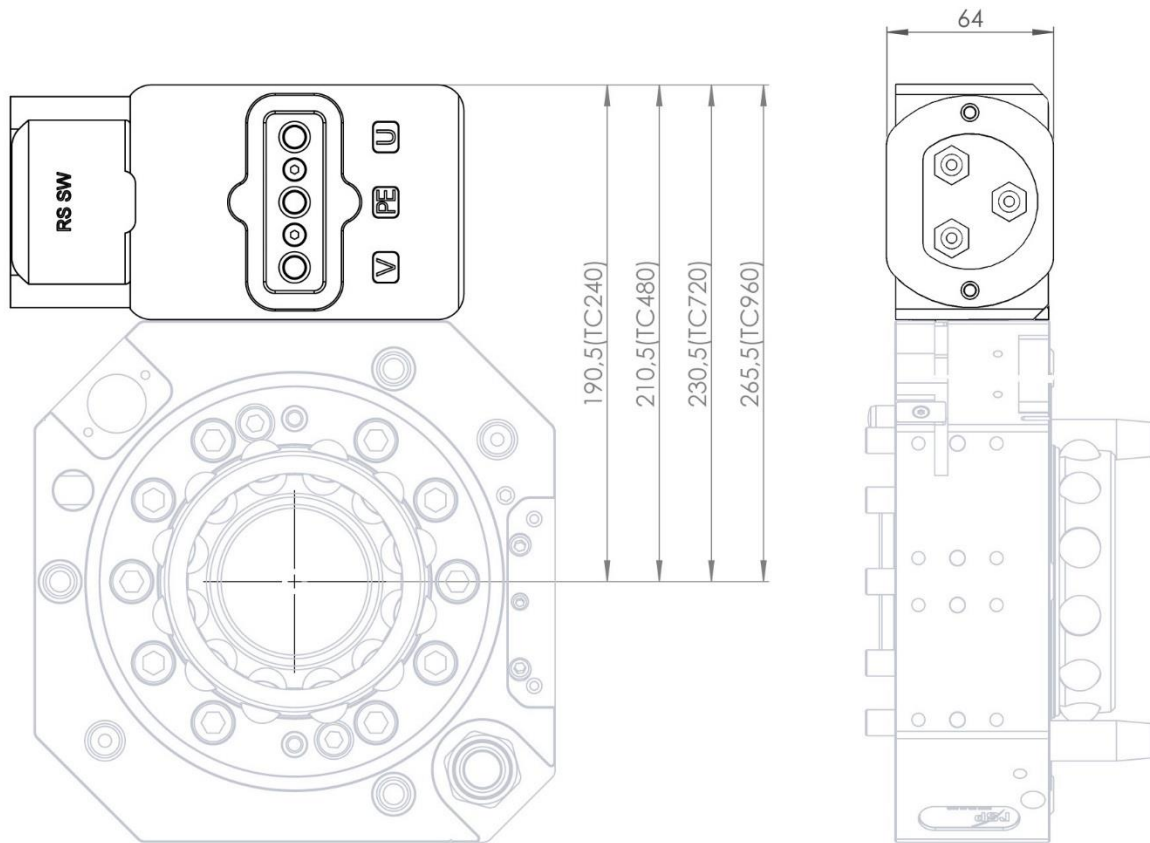


Connects 3 weld power conductors to the tool attachment Can be mounted at 2 different positions at the tool changer with the cable to the left or the right. To be used together with option P6726 attached to the tool attachment.

### 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

## 2.2.37 Weld power connector with MC connector, robot side. Article: P6717

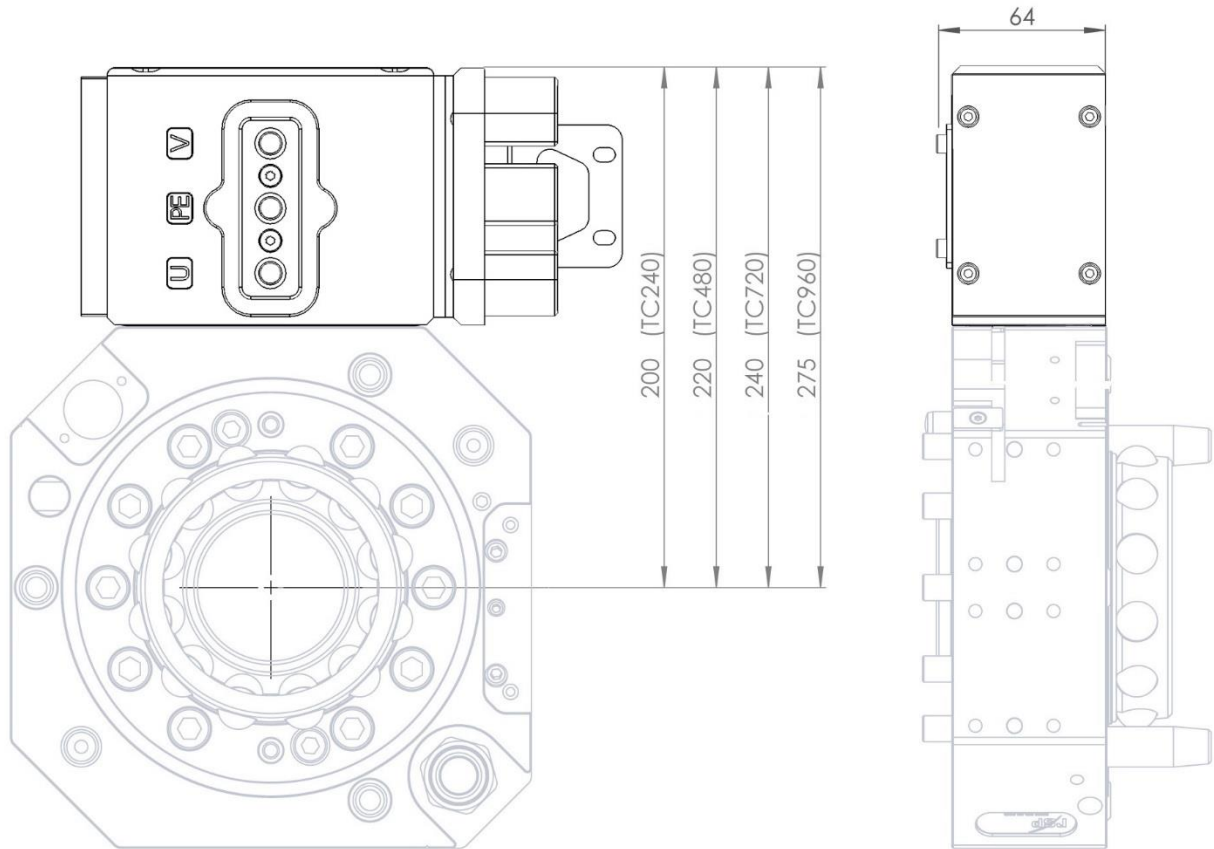


Connects 3 weld power conductors to the tool attachment. Can be mounted at 2 different positions at the tool changer with the MC connector to the left or the right. To be used together with option P6726 attached to the tool attachment.

### Technical data

<b>Weight</b>		1.1 kg
<b>Weld power</b>	Total number of conductors	3 x (690V, 140A)
	Connection	Corresponds to MC TSB150

## 2.2.38 Weld power connector with RobiFix, robot side. Article: P6794

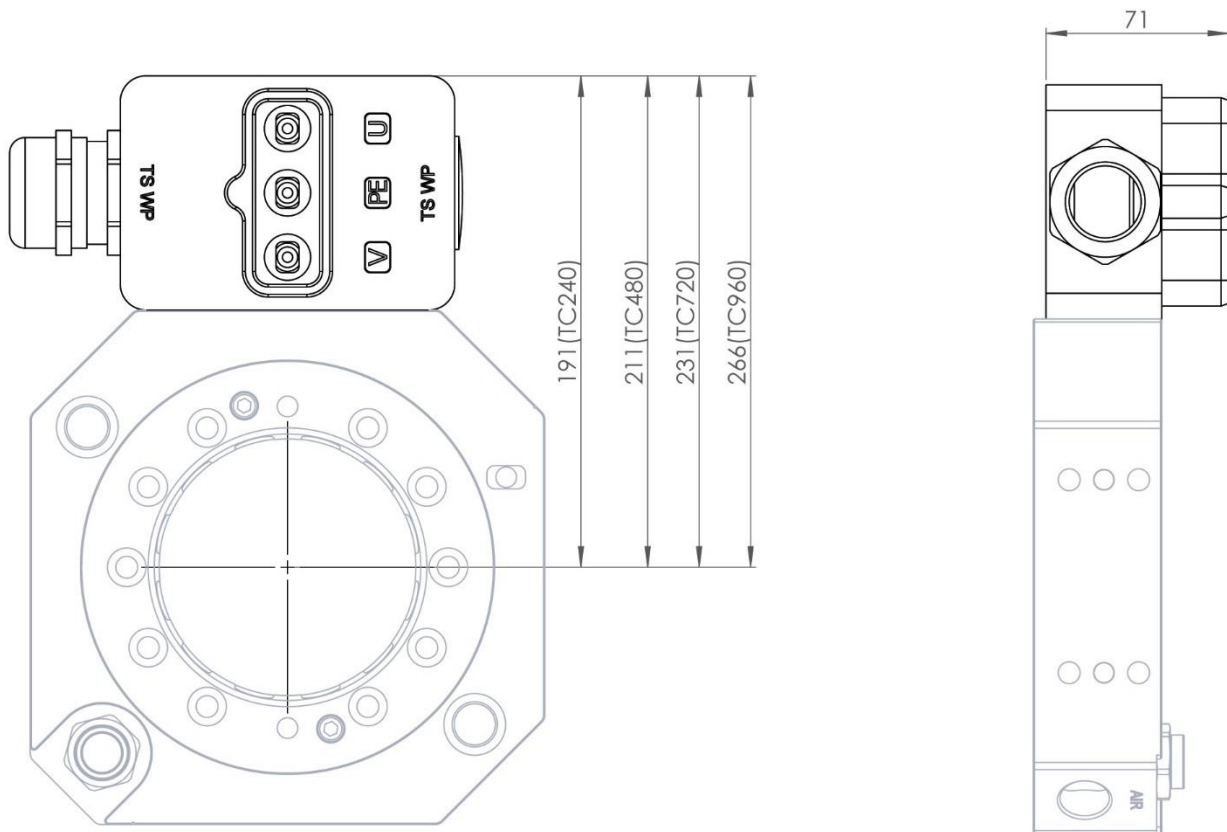


Connects 3 weld power conductors to the tool attachment. Can be mounted at one position at the tool changer with the RobiFix connector to the right. To be used together with option P6726 attached to the tool attachment.

### Technical data

<b>Weight</b>		1.1 kg
<b>Weld power</b>	Total number of conductors	3 x (690V, 140A)
	Connection	Corresponds to Robifix S35

## 2.2.39 Weld power with cable gland, tool side. Article: P6726

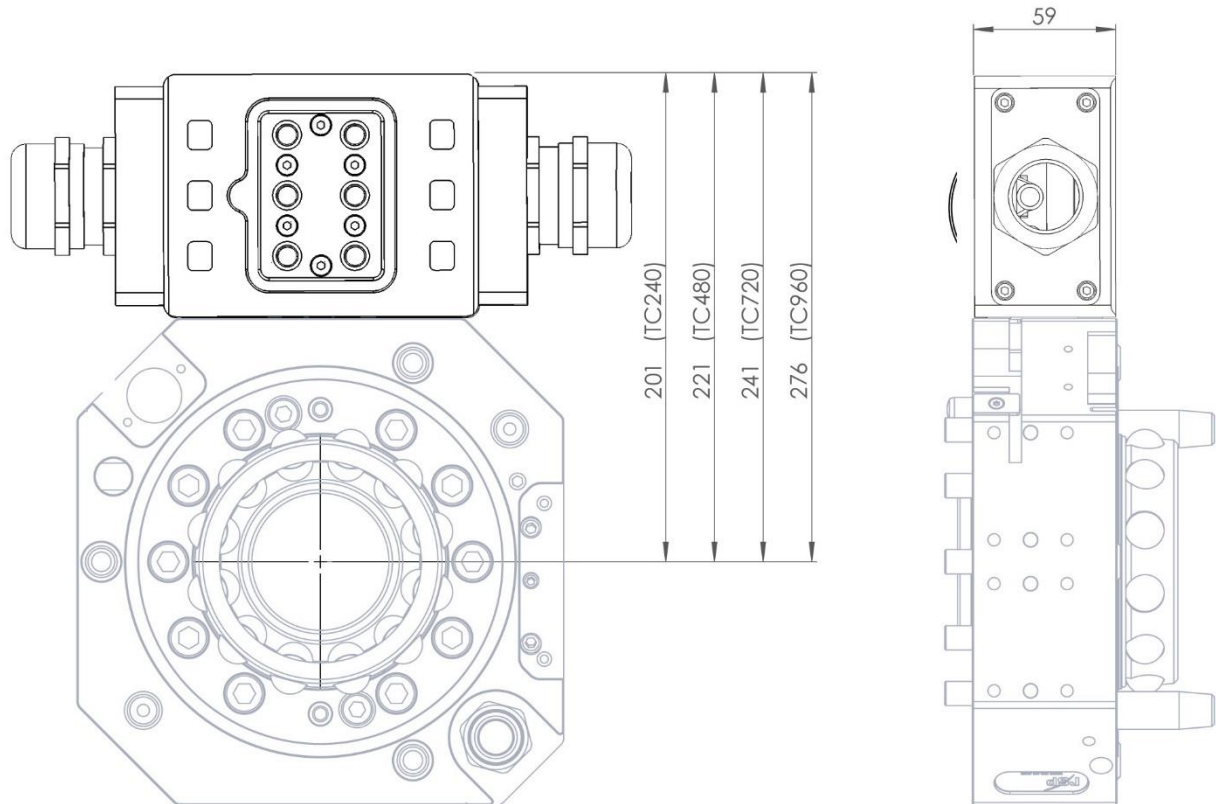


Connects 3 weld power conductors to the tool. Can be mounted at the tool attachment with cable gland to the left or the right. To be used together with option P6716, P6784 or P6794 attached to the tool changer.

### Technical data

<b>Weight</b>		1.1 kg
<b>Weld power</b>	Total number of conductors	3
	Connection	Cable gland for a 3-conductor 19–28 mm cable
<b>Connection kits (optional)</b>	P1521 (cable)	Power cable 1.5 m (3x25mm) with cable lugs

## 2.2.40 Weld power connector 2 x M40, robot side. Article: P6766

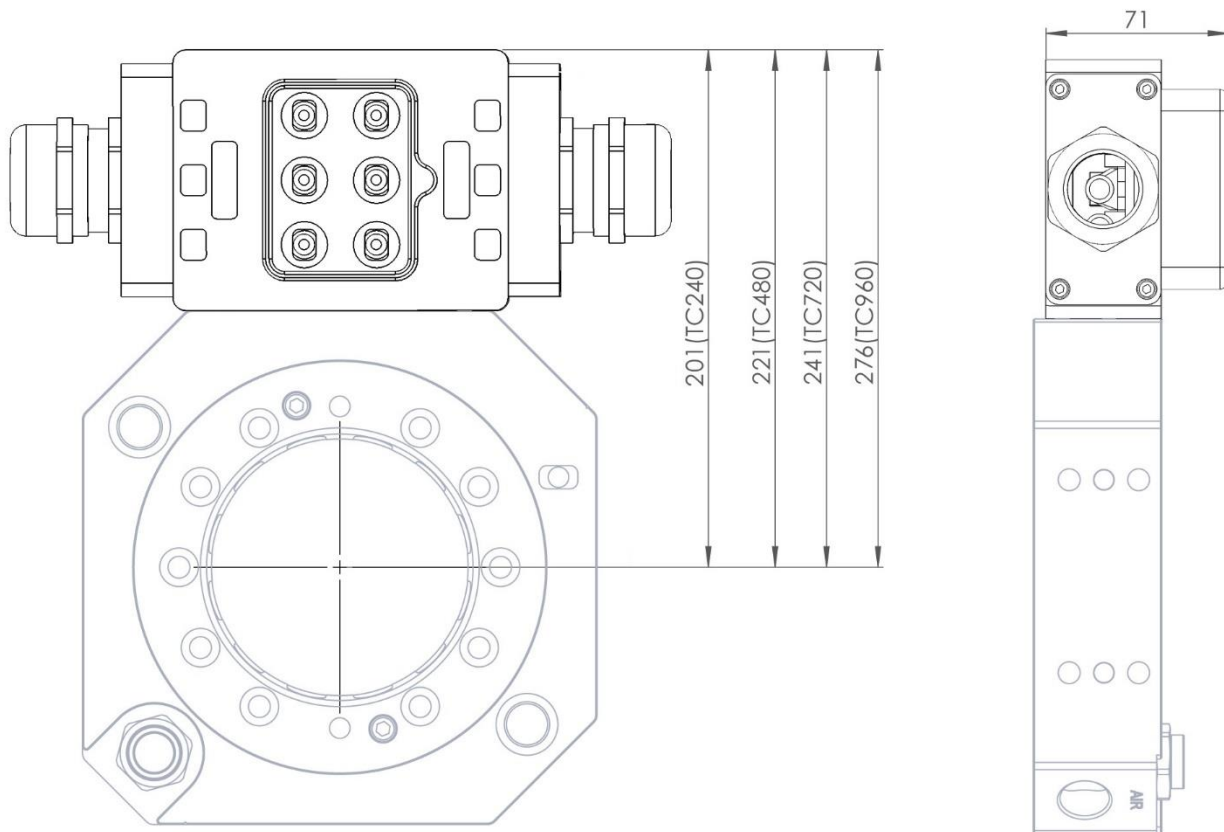


Connects 6 weld power conductors to the tool attachment Can be mounted at 2 different positions at the tool changer. To be used together with option P6767 attached to the tool attachment.

### Technical data

<b>Weight</b>		1.5 kg
<b>Weld power</b>	Total number of conductors	2 x 3 x (690V, 140A)
	Connection	2 x Cable glands (M40x1.5) for 3-conductor 19–28 mm <b>cables</b>

## 2.2.41 Weld power with 2 x cable gland, tool side. Article: P6767



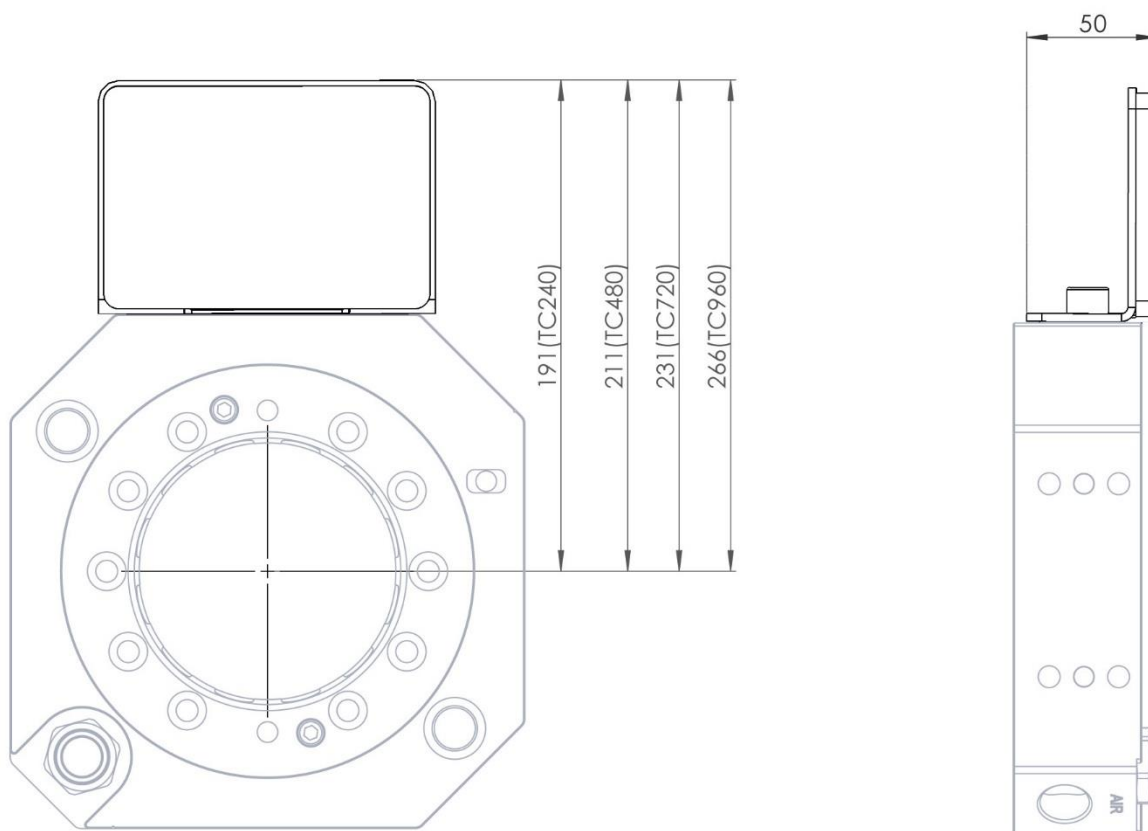
Connects 2 x 3 weld power conductors to the tool. To be mounted at the tool attachment and used together with option P6766 attached to the tool changer.

### Technical data

<b>Weight</b>		1.4 kg
<b>Weld power</b>	Total number of conductors Connection	2 x 3 2 x Cable glands for 3-conductor 19–28 mm cable
<b>Connection kits (optional)</b>	P1521 (cable)	Power cable 1.5 m (3x25mm) with cable lugs



## 2.2.42 Weld power contact cover, tool side. Article: P6742

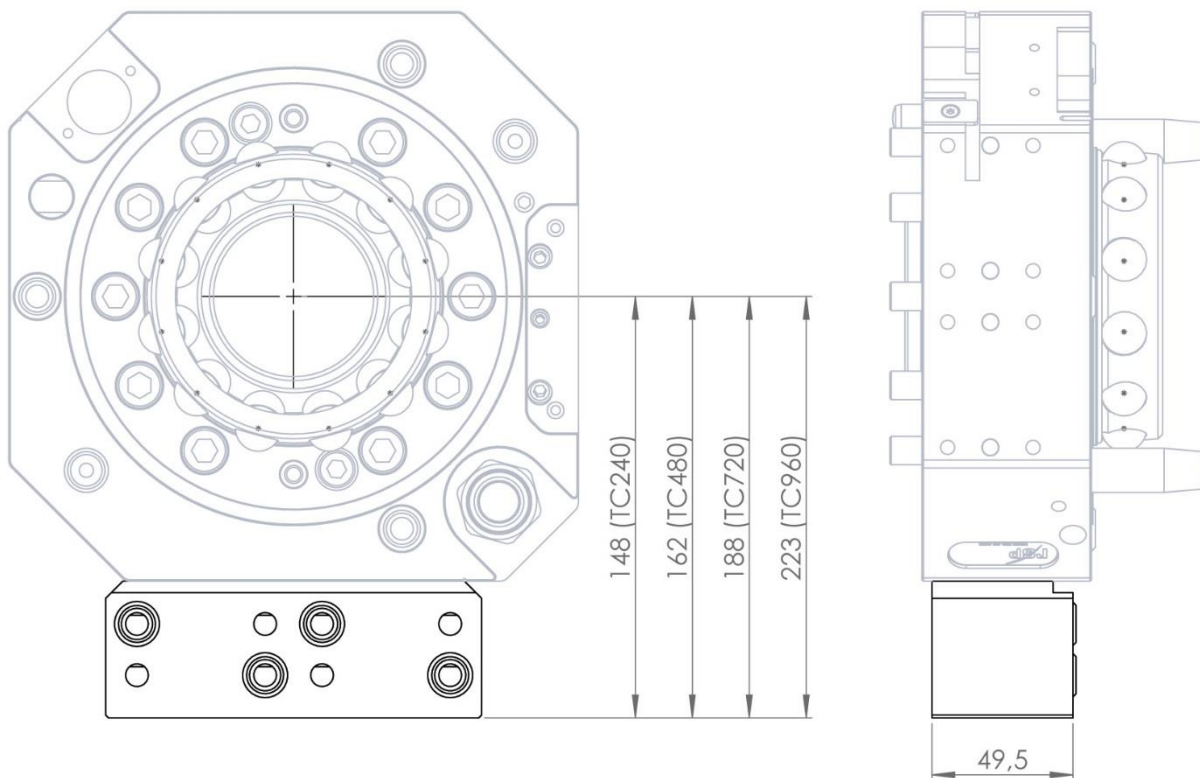


To be used together with options P6716, P6717, P6794 P6766 when no power connector are used on tool attachment.

### Technical data

<b>Weight</b>	0.2 kg
---------------	--------

## 2.2.43 Air coupling, 8 channels, robot side. Article: P6847

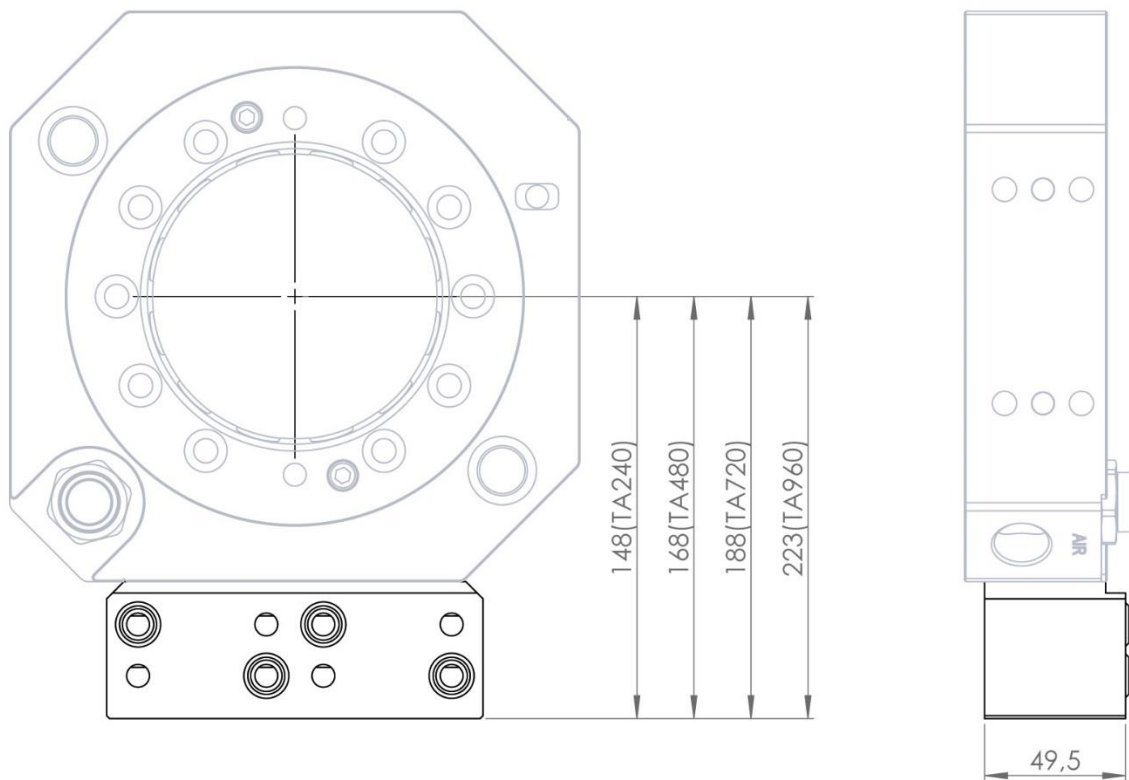


Transfers 8 pneumatic channels to the tool attachment. Can be mounted at 2 different positions on the tool changer. To be used together with option P6848 attached to the tool attachment.

### Technical data

<b>Weight</b>		0.8 kg
<b>Air channels</b>	Total number of ducts	8 x G 1/4" (1000 l/min, max 10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

## 2.2.44 Air coupling, 8 channels, tool side. Article: P6848

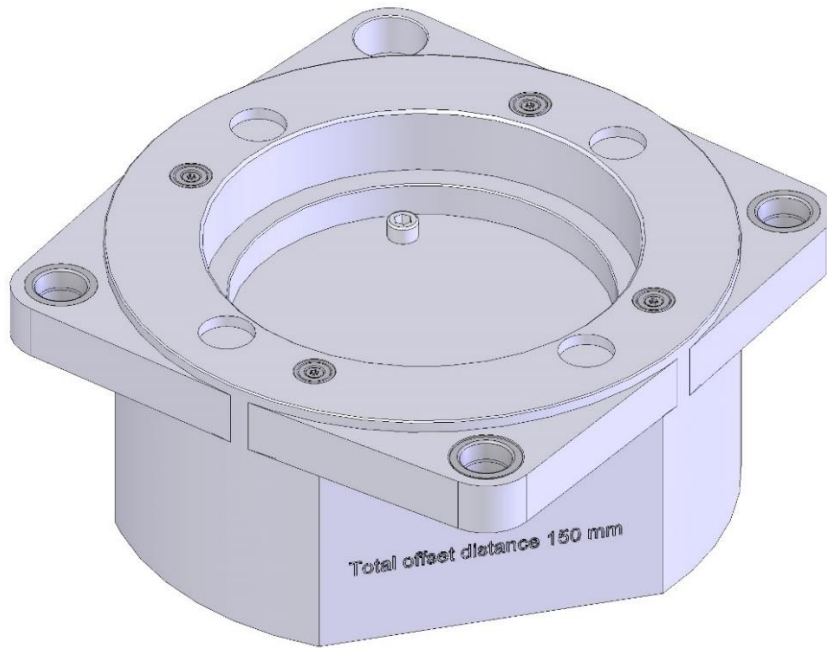


Transfers 8 pneumatic channels to the tool. To be mounted at the tool attachment and used together with option P6847 attached to the tool changer.

### Technical data

<b>Weight</b>		0.8 kg
<b>Air channels</b>	Total number of ducts	8 x G 1/4"
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

### 2.2.45 Programming tool for TC480. Article: P7160

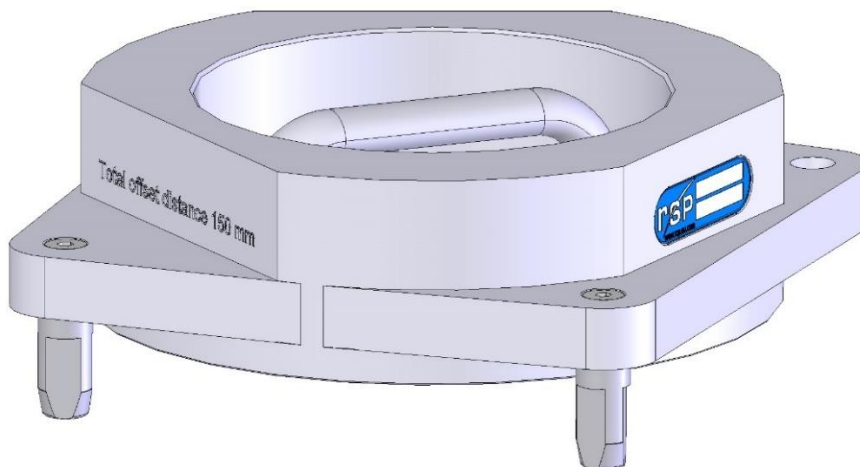


To be used on TC-side for programming of docking of TA480 to TC480 together with the programming tool P7161 mounted on the TA.

#### Technical data

Weight	4.4 kg
--------	--------

### 2.2.46 Programming tool for TC480. Article: P7161

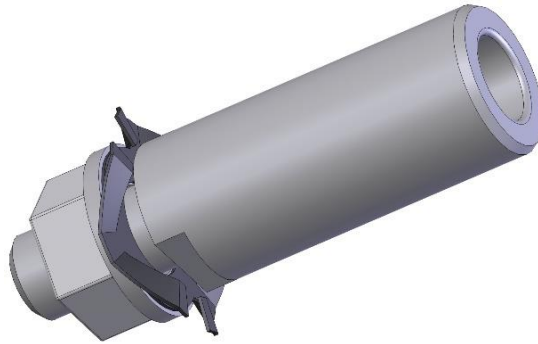


To be used on TA-side for programming of docking of TA480 to TC480 together with programming tool P7160 mounted on the TC.

#### Technical data

Weight	3.5 kg
--------	--------

### 2.2.47 TC ground socket. Article: P7239

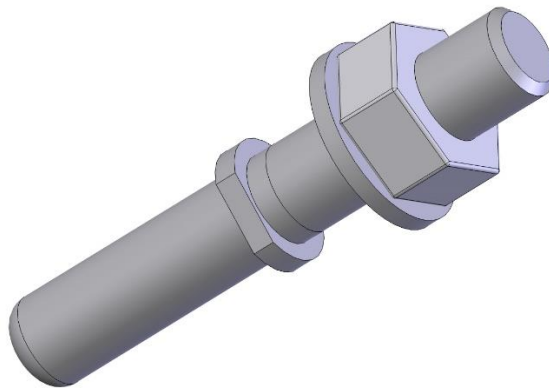


To be mounted at the tool changers TC720-1 (P6901A) or TC960-1 (P7901A and P7901A-1) and used for ground connection between the tool changer, tool attachment and robot.

#### Technical data

<b>Weight</b>	0.01 kg
Connection, ground	M5/M8 (screw holes on tool changer)
Max current	140A

### 2.2.48 TA ground socket. Article: P7147



To be mounted at the tool attachments TA720-1 (P6902A) or TA960-1 (P7902A) and used for ground connection between tool attachment, tool changer and tool.

#### Technical data

<b>Weight</b>	0.01 kg
Connection, ground	M5/M8 (screw holes on tool attachment)
Max current	140A

## 2.2.49 Forced opening kit. Article: P6910



To be mounted to dedicated connections at the tool changers TC240-1, TC480-1, TC720-1 or TC960-1 and used for manual unlocking by connecting to a grease gun.

### Technical data

Weight	0.2 kg
--------	--------

## 2.2.50 Robot adaptation kits

The flange of the tool changers has fastening holes in accordance with ISO 9409. For other bolt circles adaptation plates, to be mounted between the tool changer and the robot flange, are available. The product numbers of the adaptation kits are depending on actual combination of robot and tool changer.

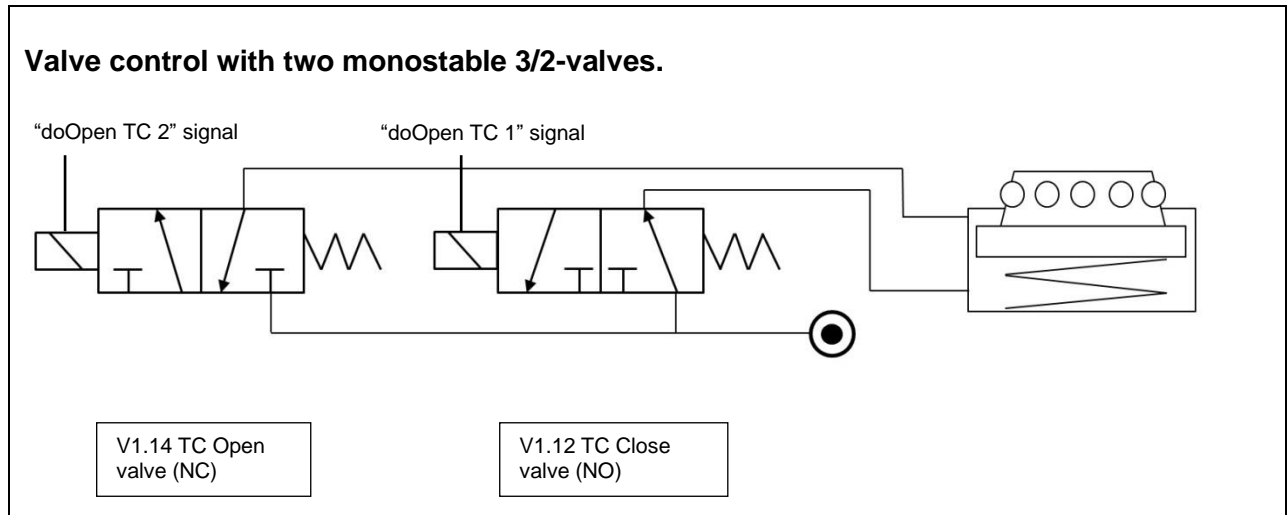
## 2.3 Limitation of Robot movements

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

## 3 TC OPERATION AND INTERFACE

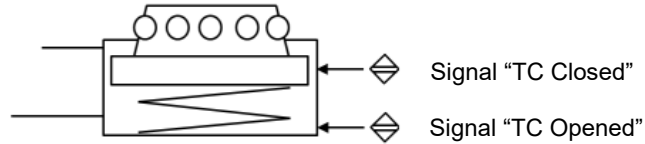
### 3.1 Required software function

The risk assessment for this tool changer (locking control function and monitoring) requires that the software logic described below is adhered to by the system integrator installing the tool changer.



- The right valve, called TC Close, will in passive position allow the air pressure to move the piston in the direction locking the tool. In active position the air will be allowed to be evacuated from the cylinder without impacting the piston.
- The left valve, called TC Open, will in active position let the air pressure move the piston in the direction unlocking the tool. In passive position the air will be evacuated from this side of the cylinder, allowing the tool to be locked.
- As a consequence, both valves must be activated to open the tool changer.
- The “doOpen TC 2” signal shall be interlocked with both a tool attachment (TA) present jumper and a tool stand switch indicating the following safe conditions for opening the tool changer:
  - \* When there is no tool attachment mounted, the tool changer can be opened.
  - \* When there is a tool attachment mounted, it is only possible to open the tool changer when it is positioned in the tool stand.

### Piston status monitoring sensors



There are two sensors built in into the main body supervising the location of the piston.

- Signal “TC Opened” is high when the piston is in open position.
- Signal “TC Closed” is high when the piston is in locked position.

### Signal logic for picking up a tool

- Open the tool changer by setting signals “doOpen TC 1” and “doOpen TC 2” to high.
- When signal “TC Opened” becomes high the tool changer has been opened and is allowed to move to the tool attachment.
- When the tool changer is in position for picking up the tool attachment, the tool changer should be closed (set signals “doOpen TC 1” and “doOpen TC 2” low).
- When signal “TC Closed” is high, the tool changer has been closed and can start to move.
- When the closed tool changer has been lifted 10mm, the signal from the switch or sensor mounted at the tool stand should be checked to confirm that the tool remains in the tool changer.

Set “doOpen TC 1” and “doOpen TC 2” to high

Is “TC Opened” high and “TC Closed” low?

Move robot to tool stand

Is robot in position in tool stand?

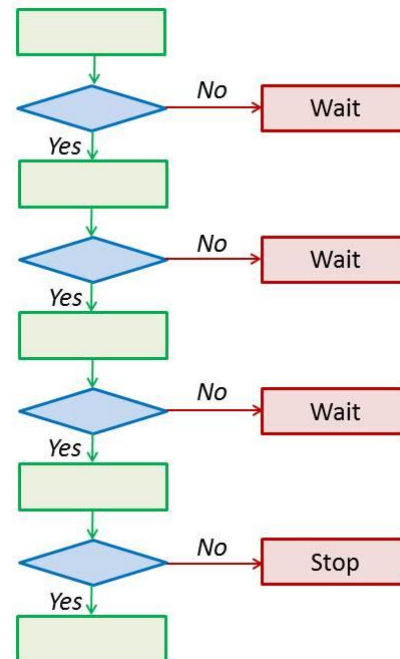
Reset “doOpen TC 1” and “doOpen TC 2”

Is “TC Closed” high and “TC Opened” low?

Move robot up 10 mm

Is tool stand switch signals correct?

Continue work cycle





### Signal logic for leaving a tool in the tool stand

- Opening of tool changer should only be possible when tool is positioned in tool stand. A switch or sensor mounted at the tool stand should give a signal that allows the tool changer to open.
- Set signals “doOpen TC 1” and “doOpen TC 2” high, when the tool attachment is positioned in the tool stand.
- When signal “TC Opened” is high, the tool changer is opened and can start to move.
- When the opened tool changer has been lifted 10mm, the signal from the switch or sensor mounted at the tool stand should be checked to confirm that the tool remains in the tool stand.

Move the robot to the tool stand position

Is robot in position in tool stand?

Is “tool in stand” signal high?

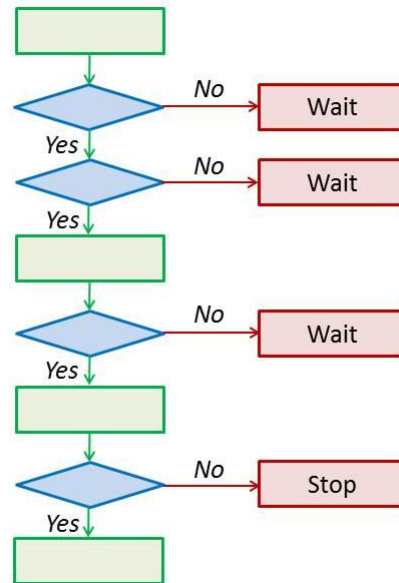
Set “doOpen TC 1” and “doOpen TC 2” to high

Is “TC Opened” high and “TC Closed” low”?

Move robot up 10 mm

Is tool stand switch signals correct?

Continue work cycle



### Functional test

For controlling that the tool change valves and the integrated locking spring are functioning following tests should be made regularly:

- With the tool changer in opened position:  
Set “doOpen TC 2” to low and let “doOpen TC 1” remain high.  
The signal “TC Closed” will become high.
- With the tool changer in opened position:  
Let “doOpen TC 2” remain high and set “doOpen TC 1” to low.  
The signal “TC Closed” will become high.

## Breaking conditions

- If signal “TC Closed” disappears when tool attachment is in tool changer, the robot should be stopped.
- If signal “TC Opened” disappears, when tool changer is going to pick up the tool attachment, the robot should be stopped.
- If signal “TC Opened” is high at the same time as “TC Closed” is high, the robot should be stopped.

## 3.2 Sparking



**WARNING!** Electrical and power signals must be switched off and disconnected when docking the tool attachment. This is to prevent sparking between signal pins and tool attachment.

## 3.3 Programming

The following will ensure a correct docking position.

	Action
1	Attach a spare tool attachment to the tool changer.
2	Position the spare tool attachment above the tool attachment that is mounted at the tool.
3	The correct position is found when the tool attachments are parallel, centered and the engraved arrows are on the same line.
4	Save the position. The robot can move to this position with high speed.
5	Dismount the spare tool attachment.
6	Go back to the saved position and move the tool changer (in axis 6 direction) the remaining distance to the tool attachment (mounted at the tool).
7	Save the position. The robot should move the final distance to this position with low speed.

## 3.4 Tool Stand



**NOTE!**

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



**NOTE!**

The tool stand must not be spring-loaded!

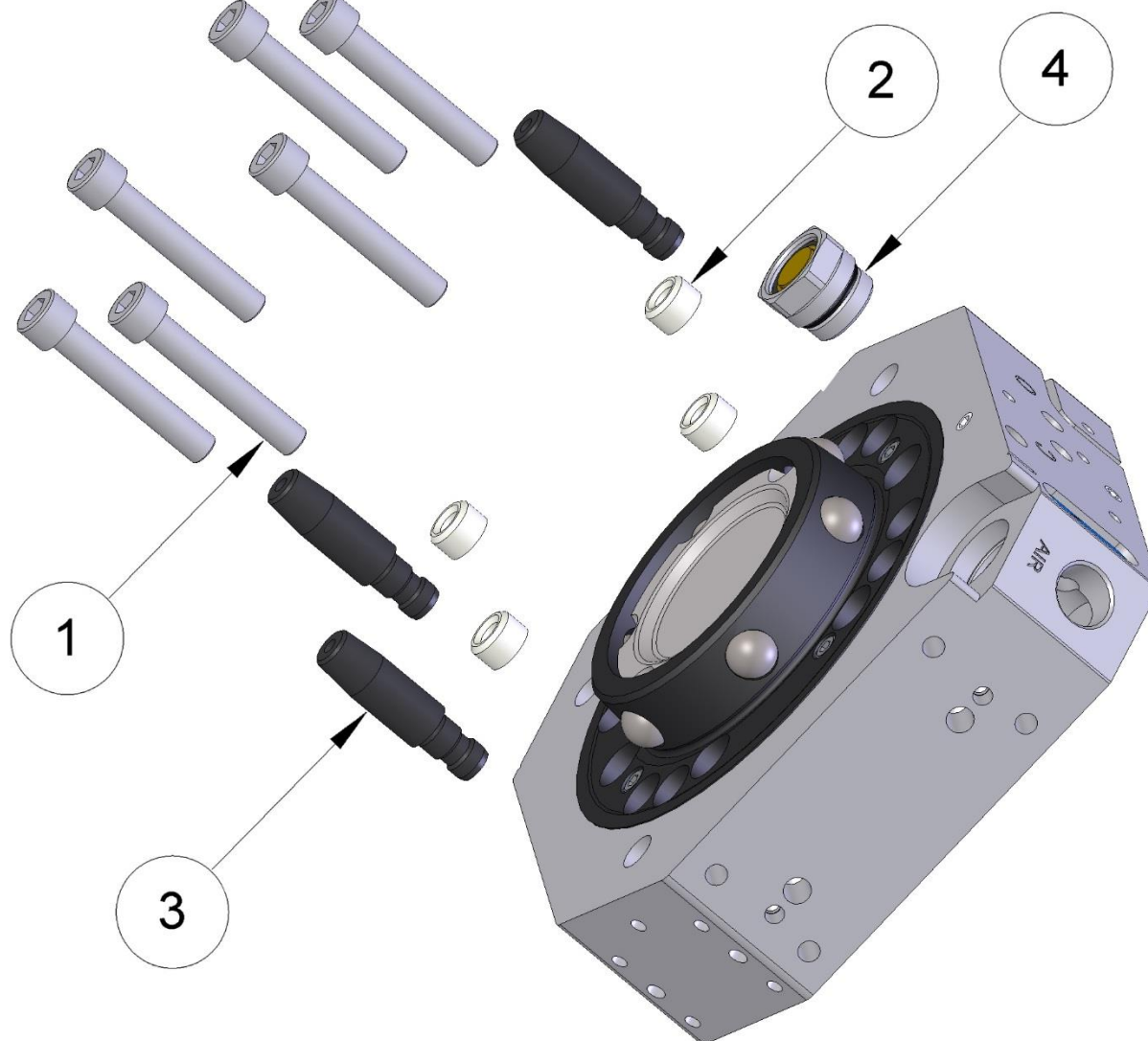
## 3.5 Tool Identification

Jumpers on signals at the tool attachment can be used to give information about which tool attachment that is docked in the tool changer.

## 4 SPARE PARTS

### 4.1 Tool changer

#### 4.1.1 Parts list for TC240-1, P6701A



Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M10x60	21212519-503		6
2	Damper	63550006-462	X	4
3	Guide pin	P0230-175	X	3
4	Water/air coupling	I0203	X	1

#### 4.1.2 Parts list for TC480-1, P6801A and P6851A



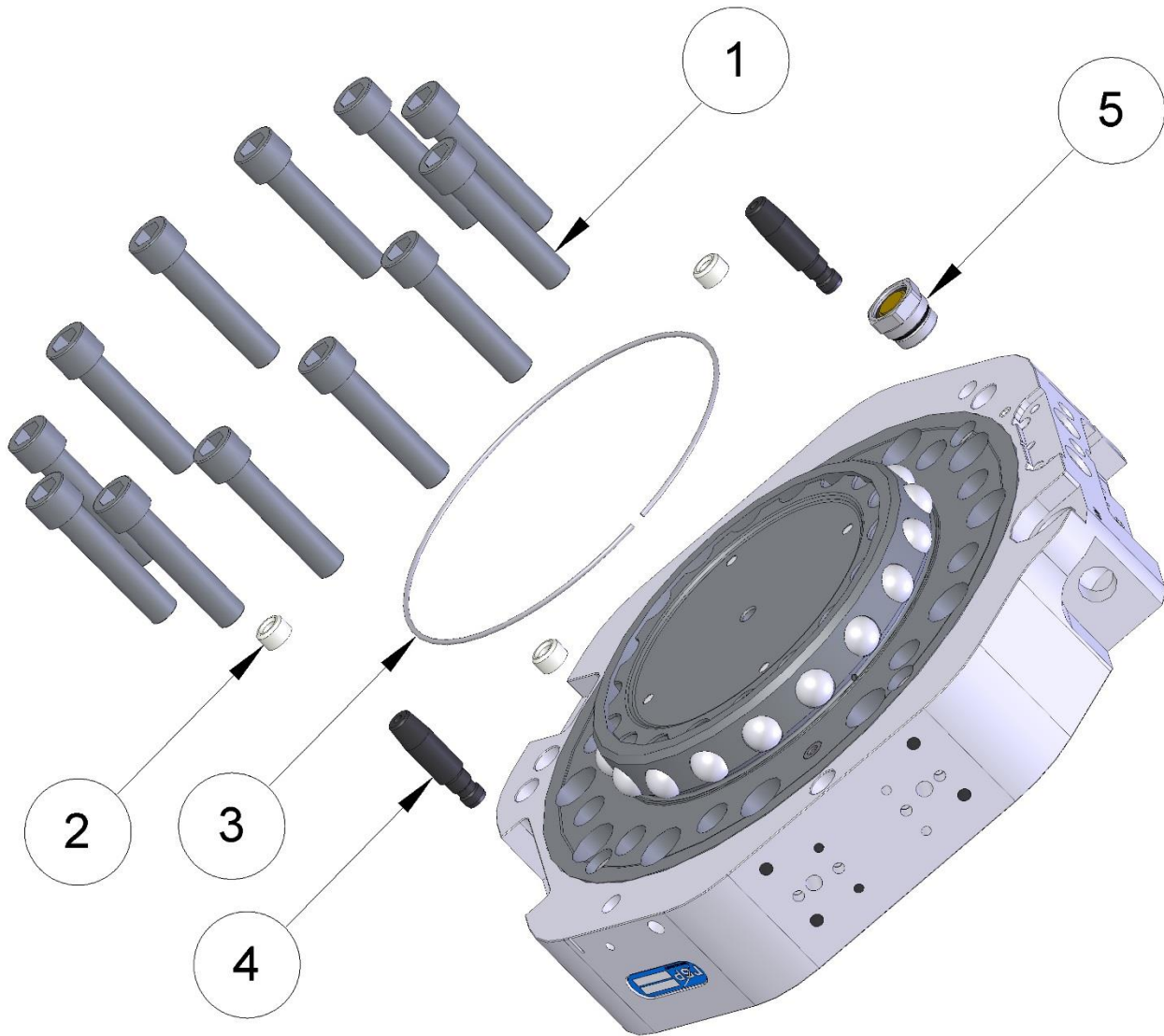
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M12x60 (P6801A only)	21212519-544		10
1	Mounting screw, M10x60 (P6851A only)	21212519-503		10
2	Damper	63550006-462	X	4
3	Circlip	I0818		1
4	Guide pin	P0230-175	X	3
5	Water/air coupling	I0203	X	1

### 4.1.3 Parts list for TC720-1, P6901A



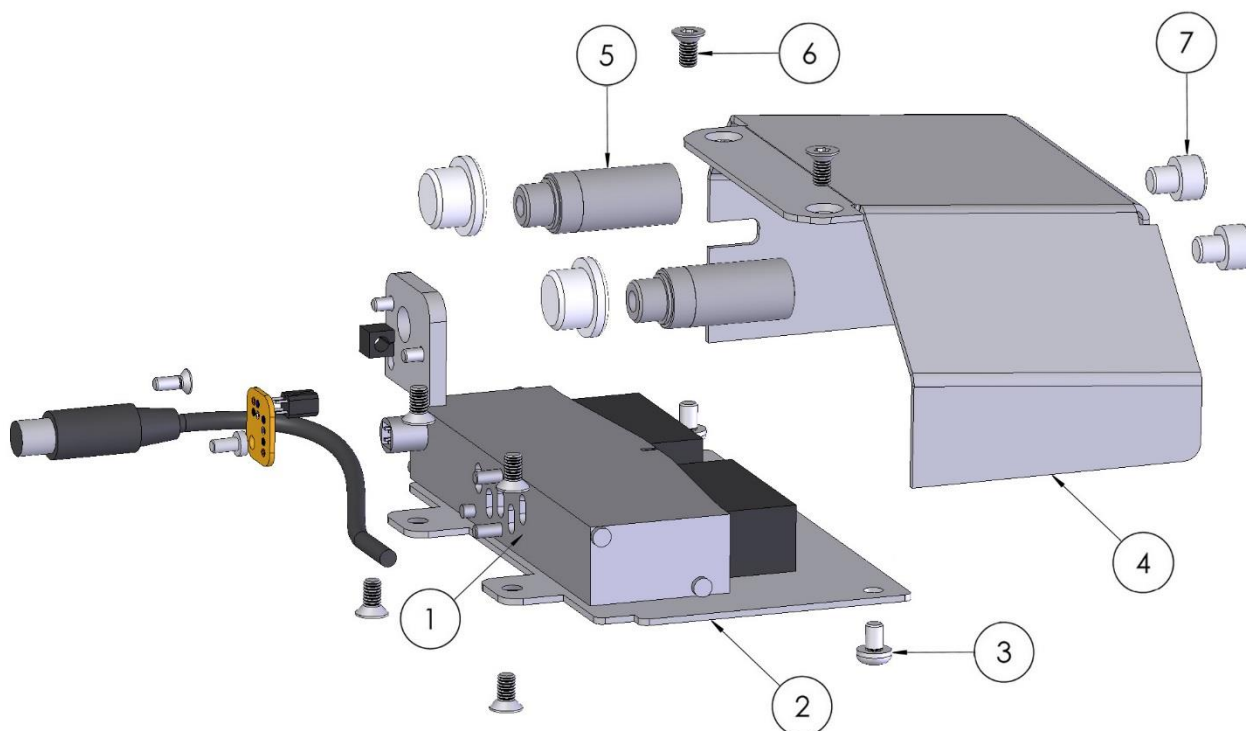
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M16x75	MC6S 16x75		12
2	Damper	63550006-462	X	3
3	Circlip	I1253		1
4	Guide pin	P0230-175	X	2
5	Water/air coupling	I0203	X	1

#### 4.1.4 Parts list for TC960-1, P7901A and P7901A-1



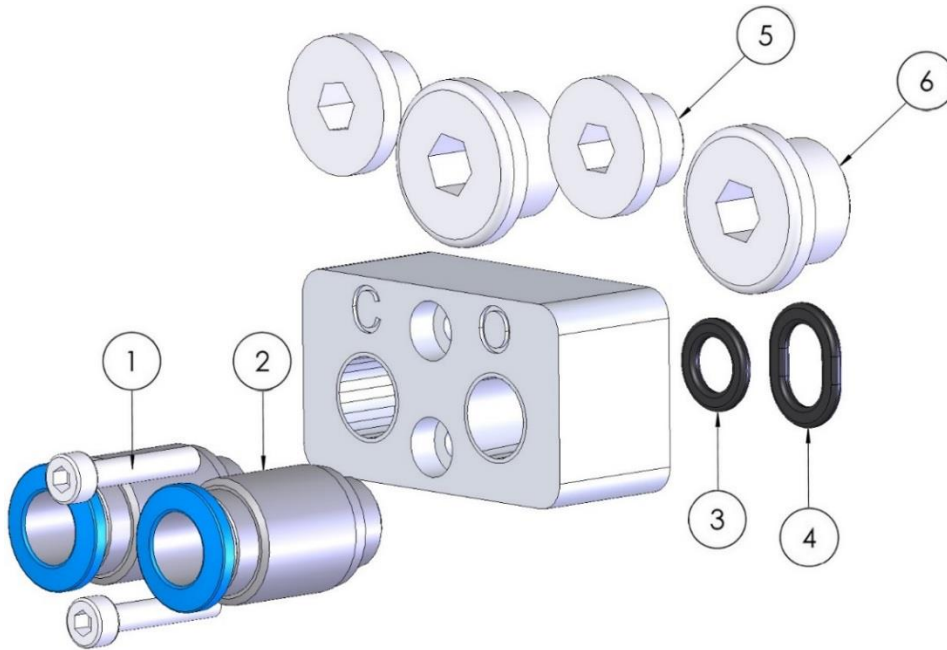
Item	Description	Part number	Wear part	Pcs
1	Mounting screws M16x75 (12X) for P7901A (screw class 8.8)	P7914		1
1	Mounting screws M12x70 (10X) for P7901A-1 (screw class 12.9)	P7915		1
2	Damper	63550006-462	X	3
3	Circlip	I1320		1
4	Guide pin	P0230-175	X	2
5	Water/air coupling	I0203	X	1

### 4.1.5 Parts list for integrated valve, P7710



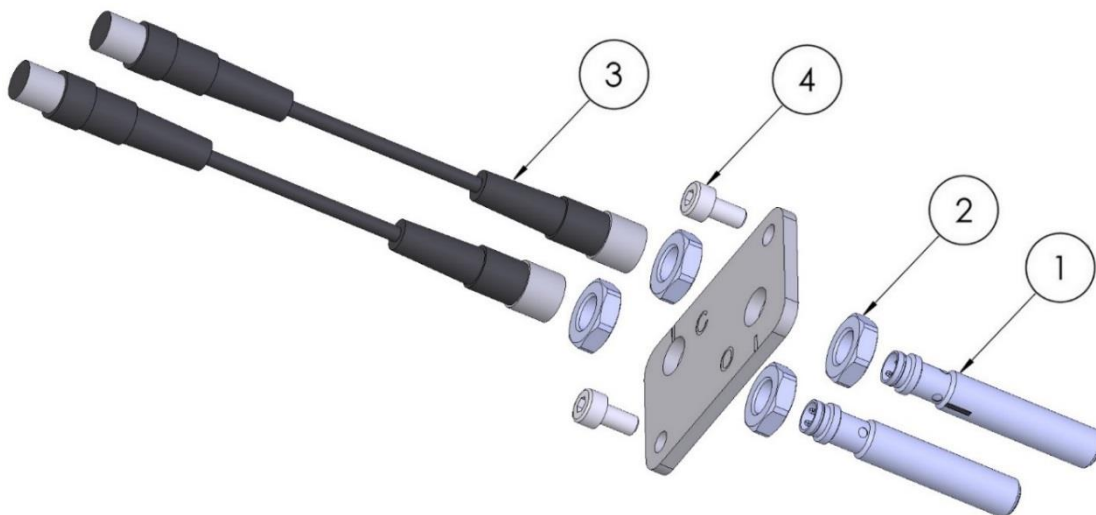
Item	Description	Part number	Wear part	Pcs
1	Valve	I0449		1
2	Rear valve cover	P0178-324		1
3	M4x6 screw	9ADA618-31		2
4	Valve cover	P0178-323		1
5	Silencer	I0903		2
6	Screw M4x8	21212711-287		4
7	Screw M6x6	MC6S 6x6		2

#### 4.1.6 Parts list for Valve adapter, P7084



Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M3x16	21212519-228		2
2	Air connection	I0371		2
3	O-ring	I0090		1
4	O-ring	I0436		1
5	Blind plug	I0093		2
6	Blind plug	I0165		2

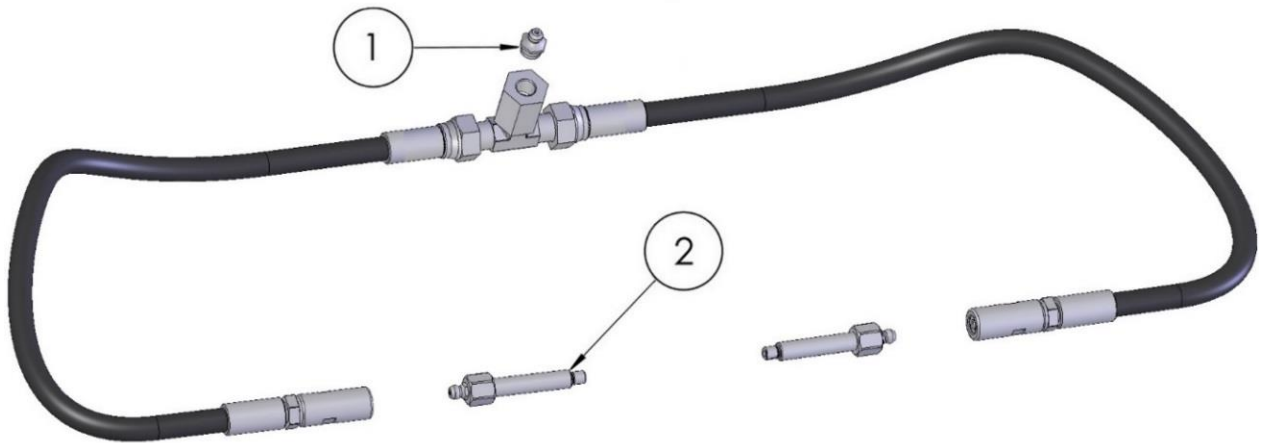
#### 4.1.7 Parts list for magnetic sensors, P7172, P7173, P7174 and P7175



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

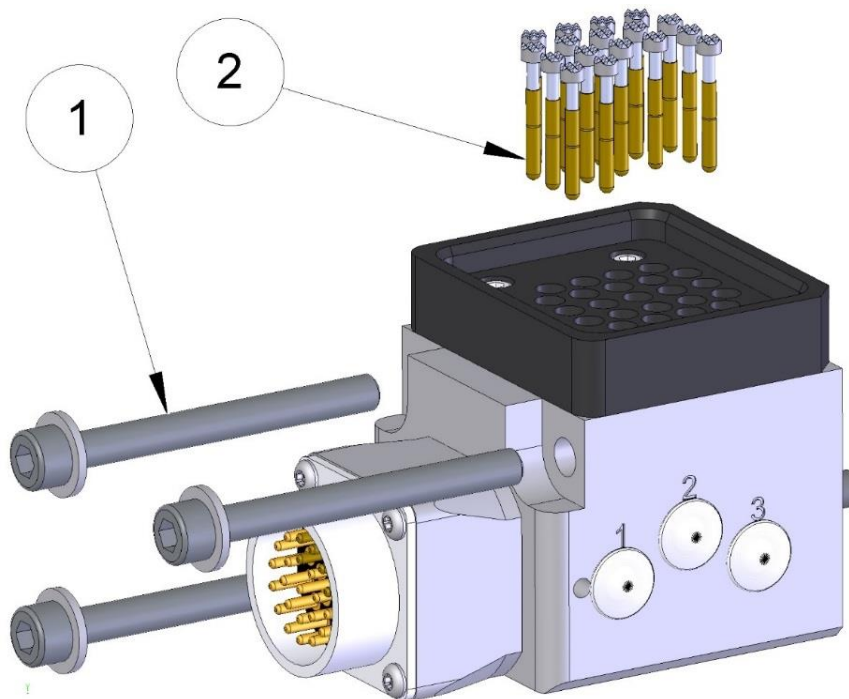


#### 4.1.8 Parts list for forced opening kit, P6910



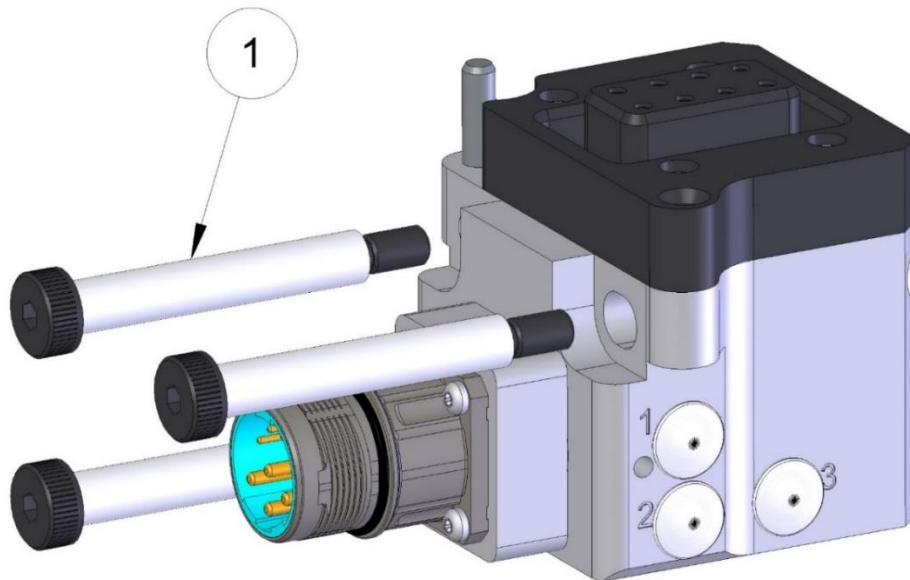
Item	Description	Part number	Wear part	Pcs
1	Nipple	I1335		1
2	Coupling extender	P0178-192		2

#### 4.1.9 Parts list for signal interface, P6738-1, P7224, P6711 and P6771



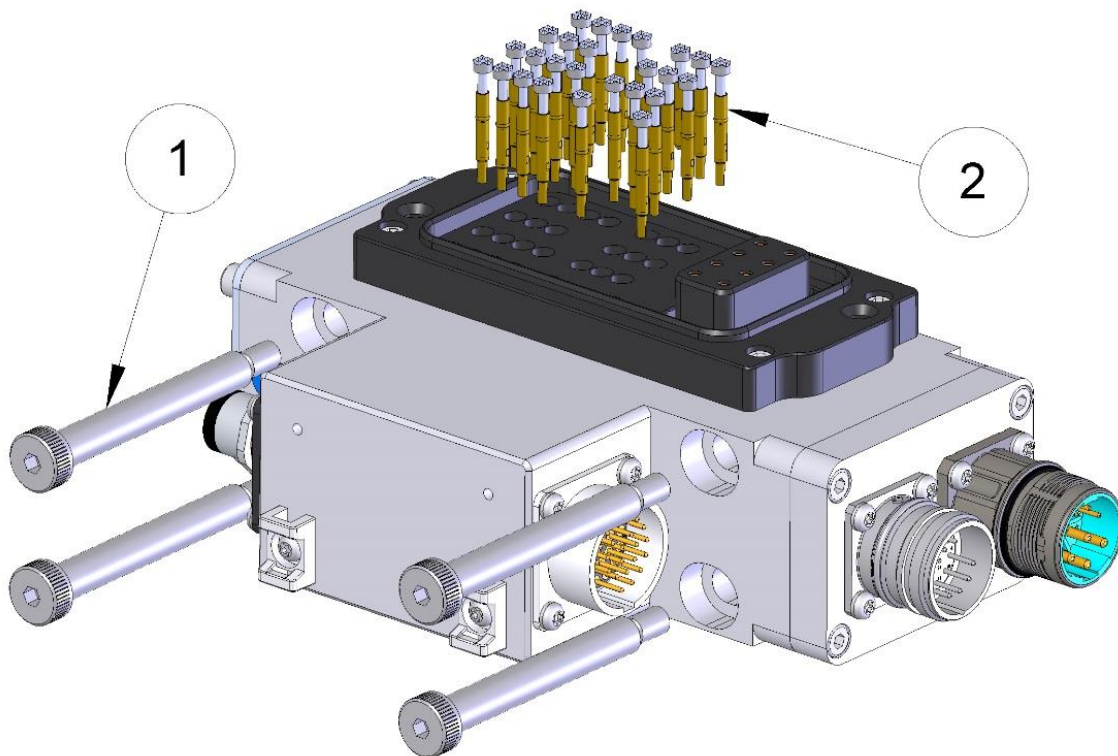
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M6x60 and washer	21212519-382 and 21512062-153		3
2	Spring-loaded signal pin (P6738-1)	I1287	X	17
2	Spring-loaded signal pin (P7224)	I1287	X	21
2	Spring-loaded signal pin (P6711)	I1287	X	23
2	Spring-loaded signal pin (P6771)	I1287	X	5

#### 4.1.10 Parts list for servo interface M23, P6768-2



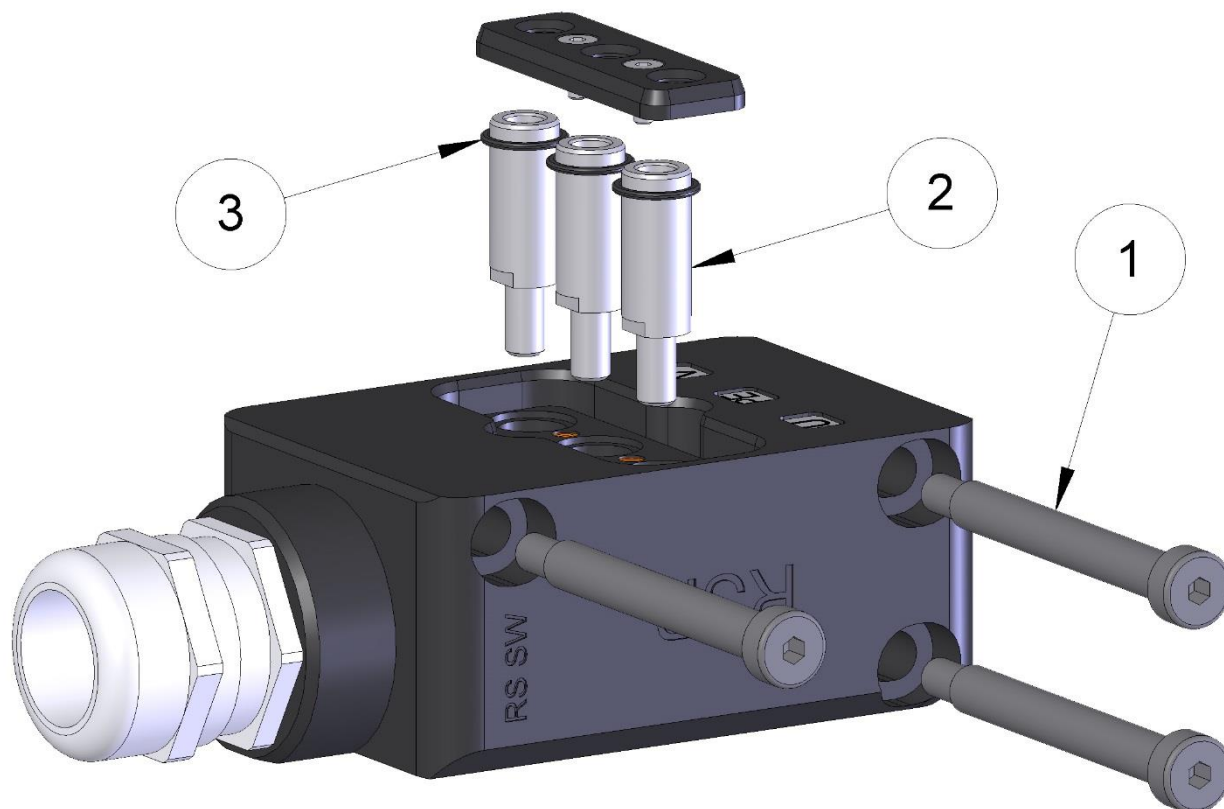
Item	Description	Part number	Wear part	Pcs
1	Shoulder screw 8x50	M6-8x50		3

#### 4.1.11 Parts list for signal interface, P6778 and P6780



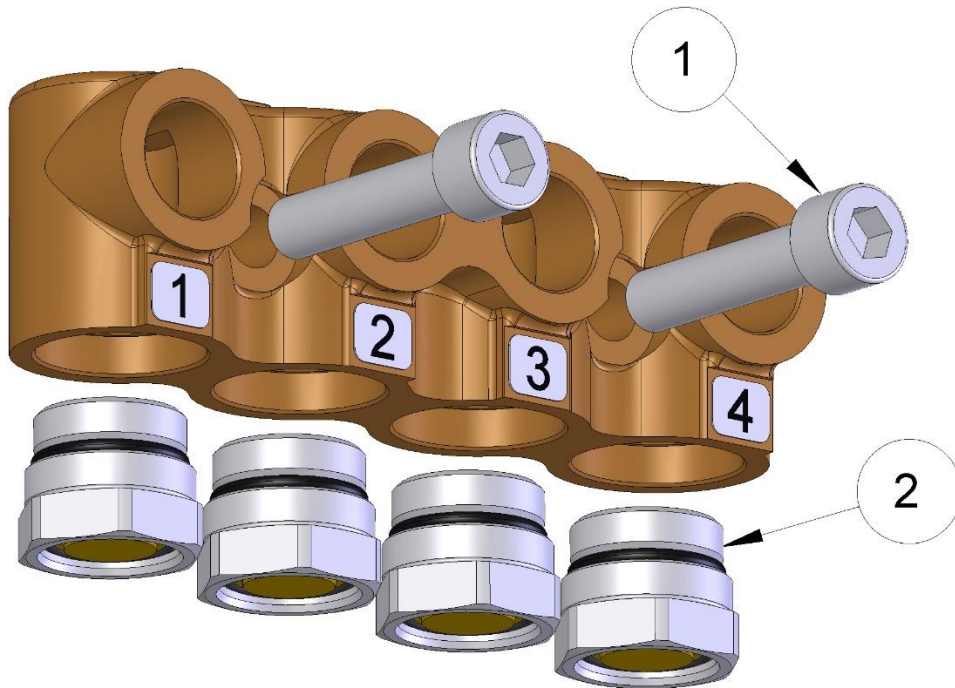
Item	Description	Part number	Wear part	Pcs
1	Shoulder screw 8x60	H 8X60		4
2	Spring-loaded signal pin (P6778)	I1287	X	26
2	Spring-loaded signal pin (P6780)	I1287	X	16

#### 4.1.12 Parts list for weld power connector, P6716, P6784 and P6717



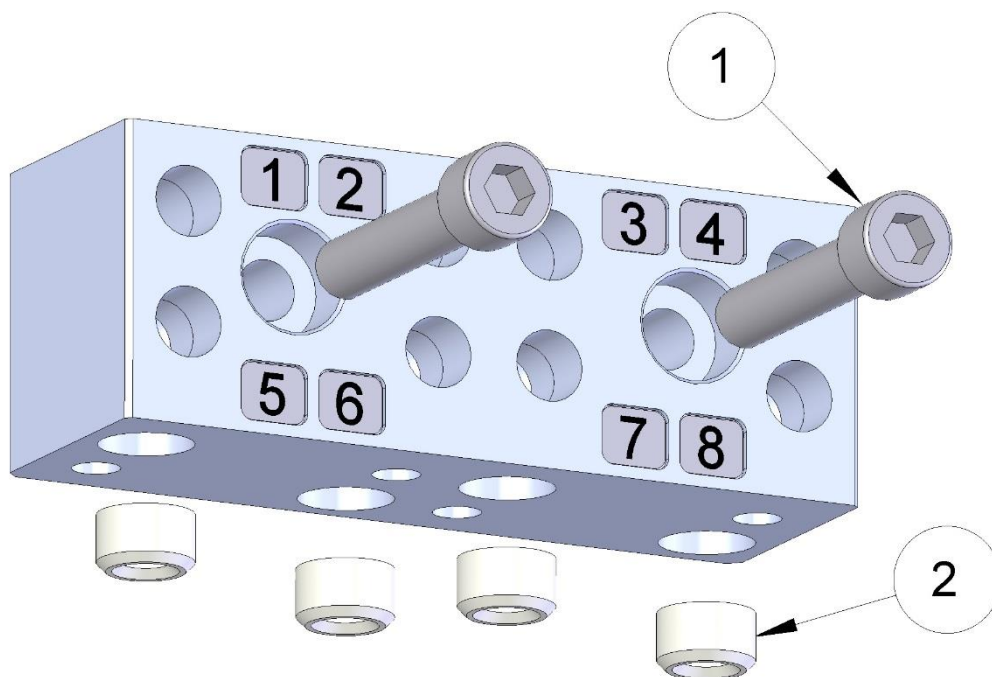
Item	Description	Part number	Wear part	Pcs
1	Shoulder screw 10x80	M8-10x80		3
2	Weld power socket	I1001	X	3
3	O-ring	I0160		3

#### 4.1.13 Parts list for water/air coupling, P6715A



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

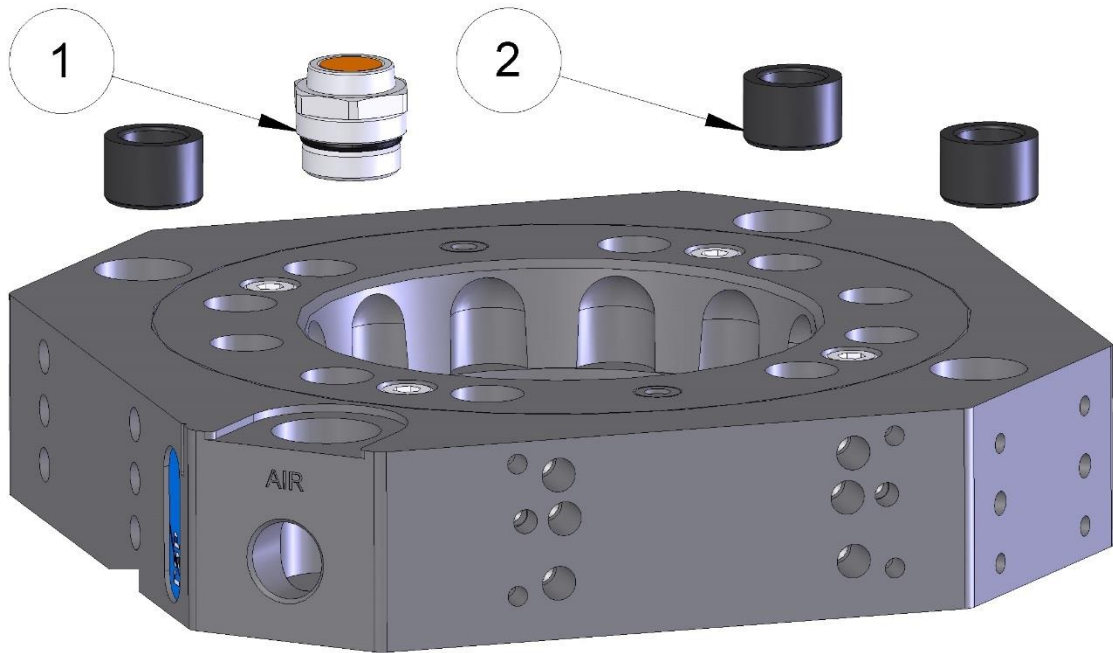
#### 4.1.14 Parts list for air coupling, P6847



Item	Description	Part number	Wear part	Pcs
2	Mounting screw, M10x50	MC6S 10x50		2
1	Air sealing	63550006-462	X	4

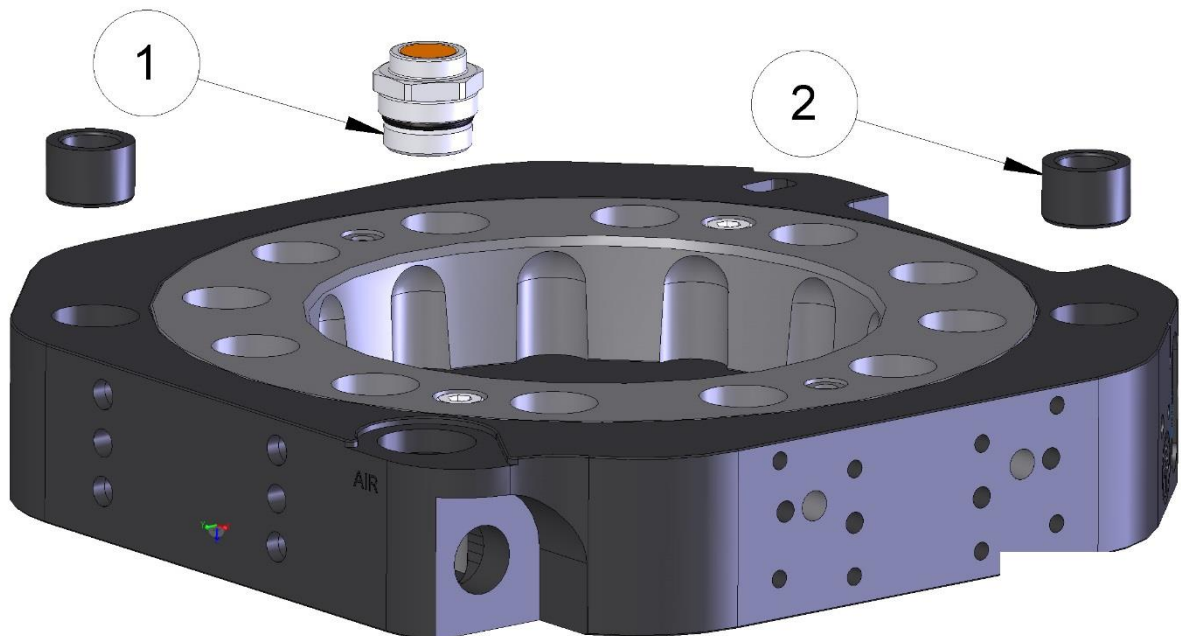
## 4.2 Tool attachment

### 4.2.1 Parts list for tool attachments, P6702, P6802 and P6872



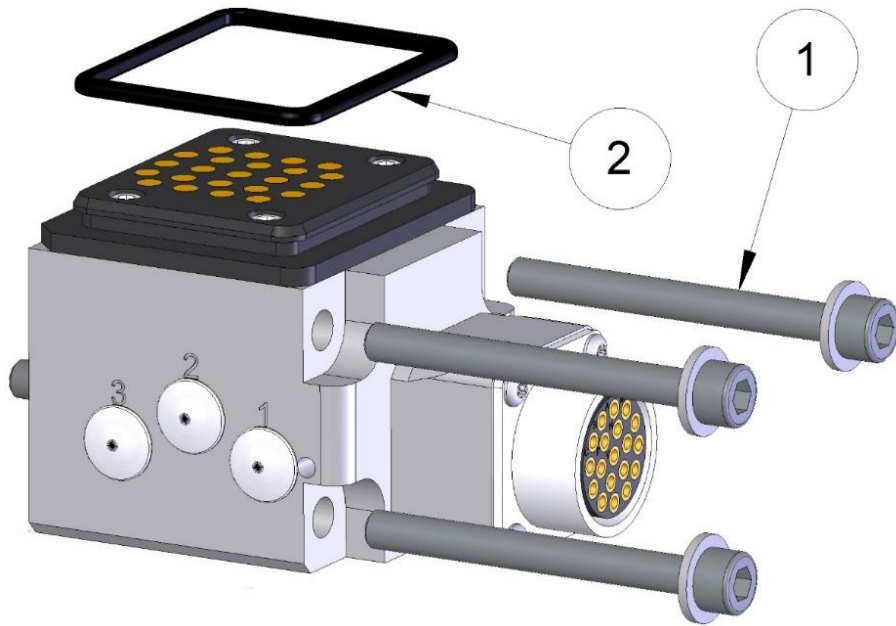
Item	Description	Part number	Wear part	Pcs
1	Water/air coupling	I0202	X	1
2	Guide bushing	P0178-064	X	3

### 4.2.2 Parts list for tool attachments, P6902A and P7902A



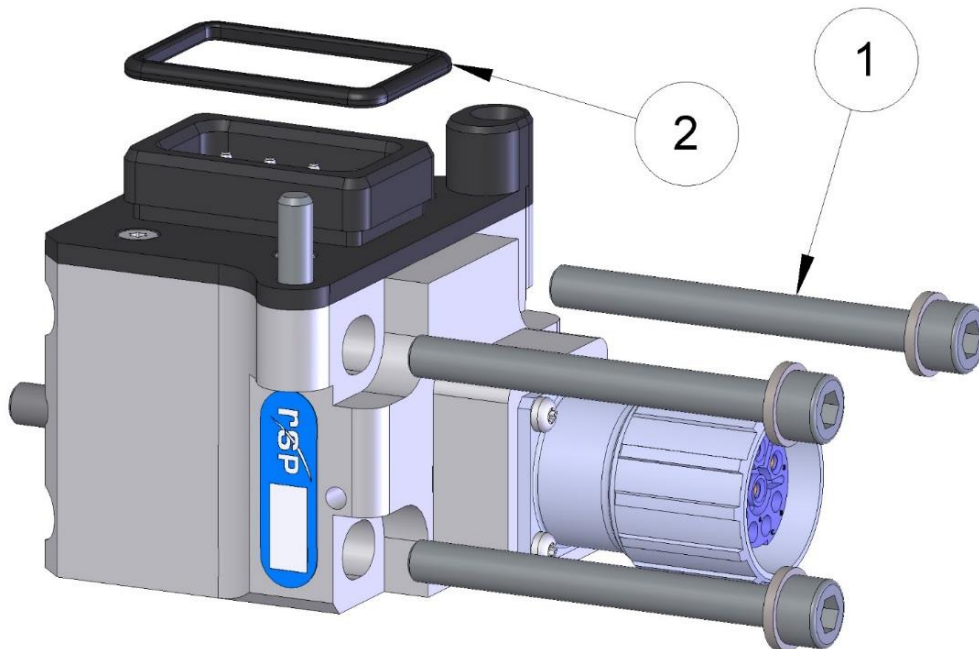
Item	Description	Part number	Wear part	Pcs
1	Water/air coupling	I0202	X	1
2	Guide bushing	P0178-064	X	2

#### 4.2.3 Parts list for signal interface, P6739, P7225, P6721 and P6775



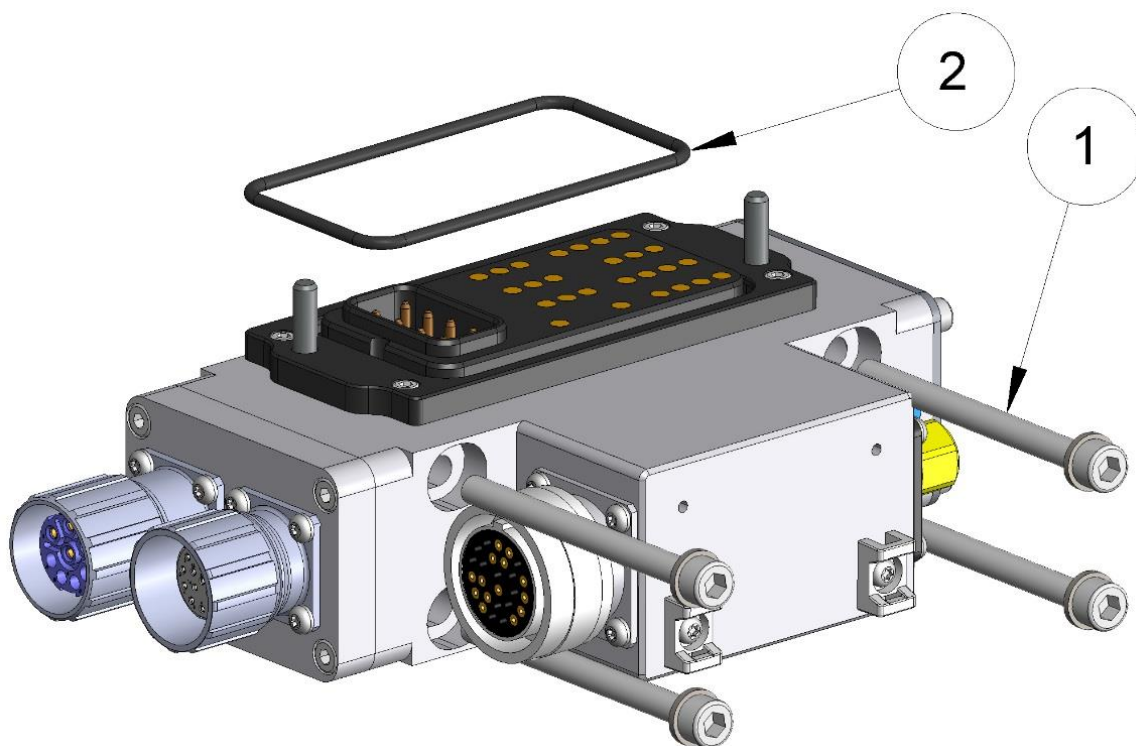
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M6x60 and washer	21212519-382 and 21512062-153		3
2	O-ring	P0178-349	X	1

#### 4.2.4 Parts list for power interface M23, P6772-2



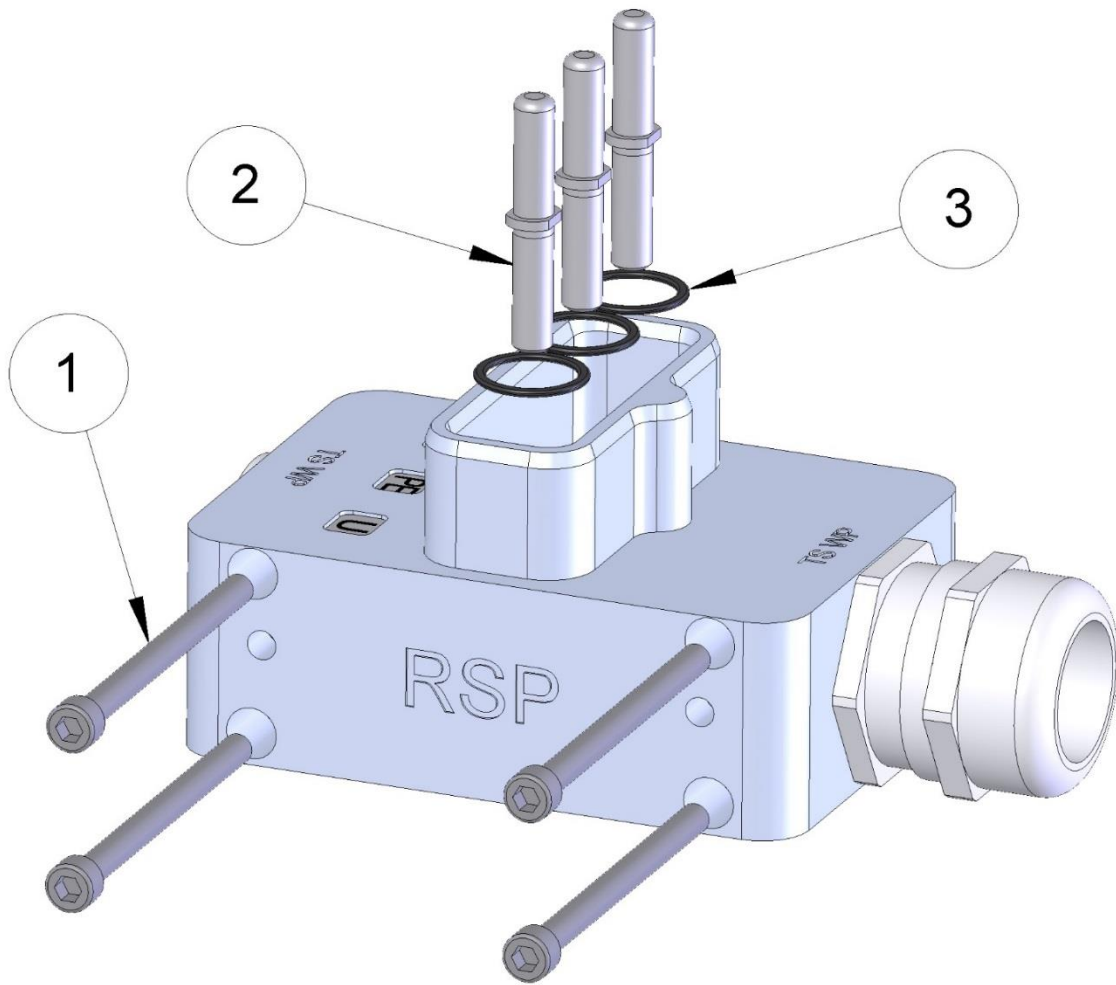
Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M6x60 and washer	21212519-382 and 21512062-153		3
2	O-ring	P0178-350	X	1

#### 4.2.5 Parts list for signal interface, P6779 and P6781



Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M6x70 and washer	21212519-384 and 21512062-153		4
2	O-ring	I1048	X	1

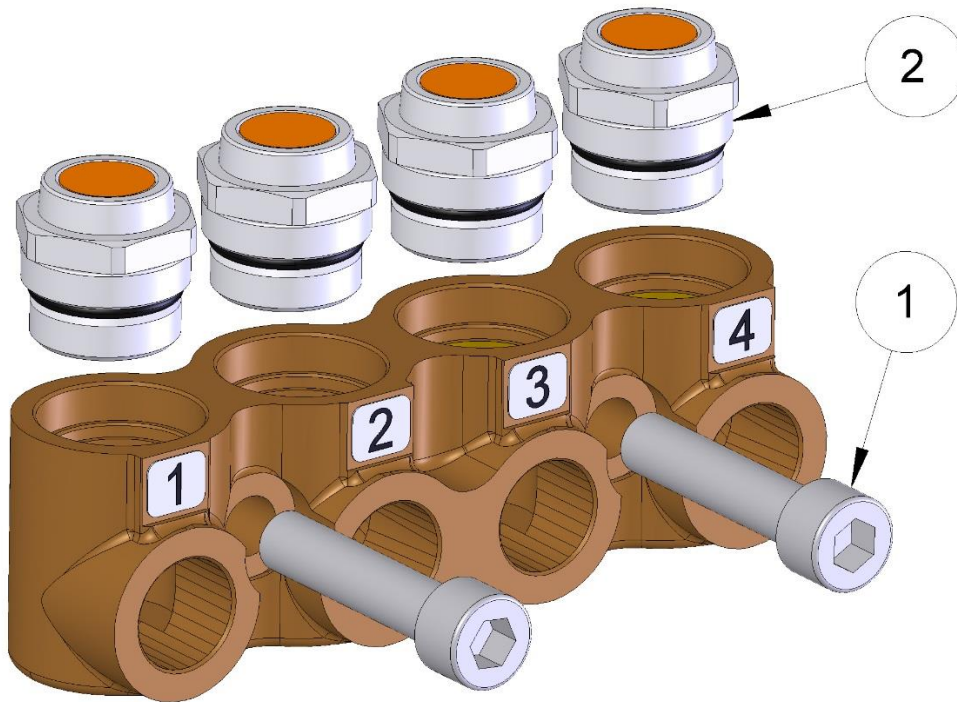
#### 4.2.6 Parts list for weld power connector, P6726



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

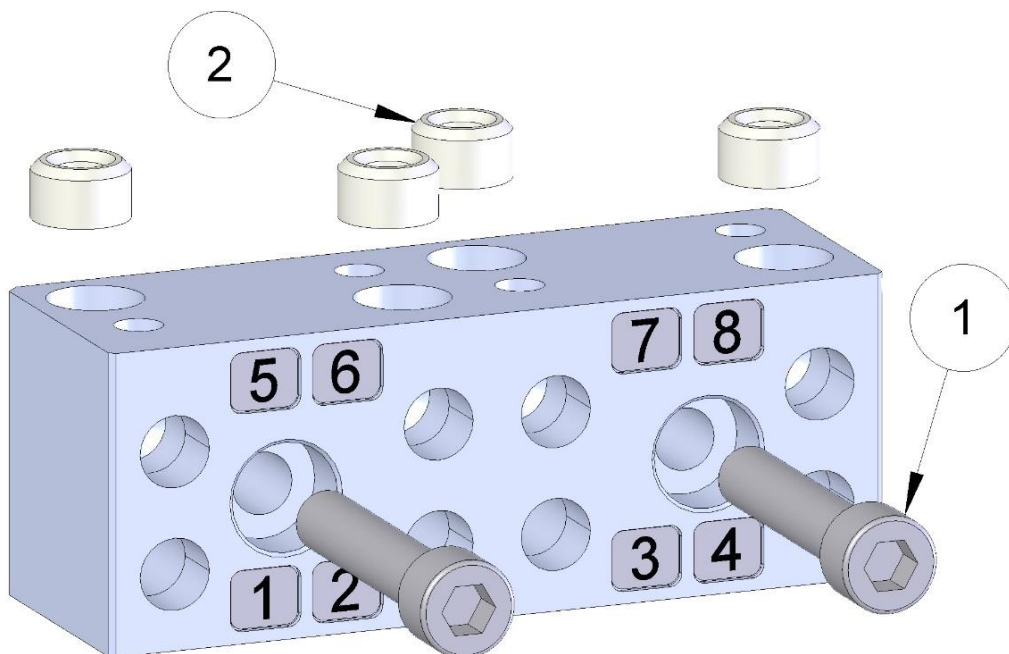


#### 4.2.7 Parts list for water/air coupling, P6725A



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

#### 4.2.8 Parts list for air coupling, P6848



Item	Description	Part number	Wear part	Pcs
1	Mounting screw, M10x50	MC6S 10x50		2
2	Air sealing	63550006-462	X	4





