Technical Description

Tool changer TC100

M0417-1

Tool changers | Swivels | Swivel tool changers | Grippers | Hose packages | Valve units | Tool systems

rsp robot system products

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1 INTRODUCTION

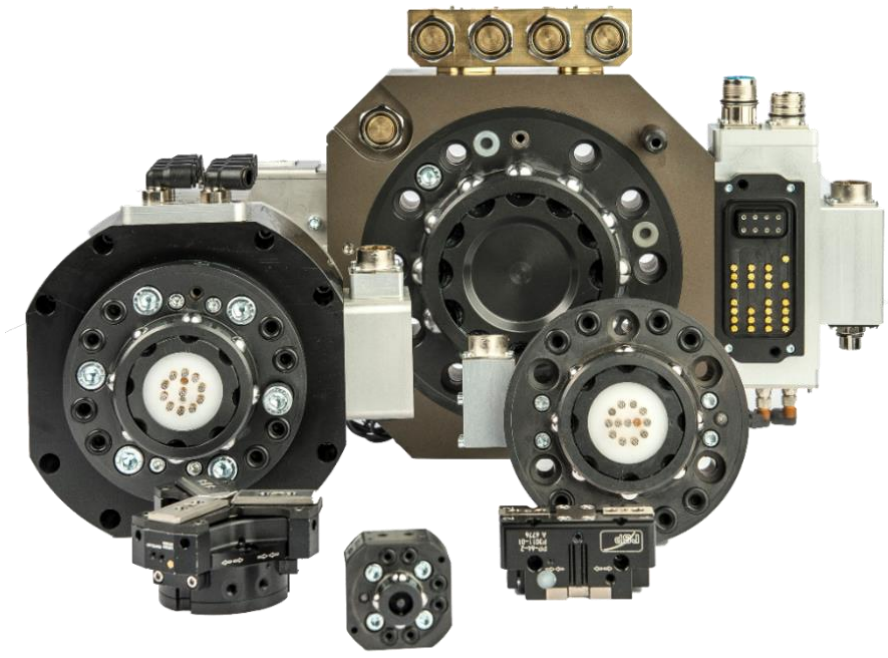
Robot System Products is a front-rank provider of peripheral products for high performance robot applications. We provide complete system solutions for your robot installations, aiming to improve your productivity with the most reliable and cost-effective tooling on the market. Continuously we explore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



1.1 RSP tool changer

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 grooves. In consequence, substantially larger positional tolerances are accepted during docking.

1.2 Documents

This *Technical Description* contains product information and data, drawings, circuit and pneumatic diagrams and lists of spare parts. In the document *Installation and Maintenance* (M0416-1) procedures for mounting, installation and replacement of equipment are described together with descriptions of inspection, cleaning and lubrication activities including recommended maintenance 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:

- Signal pins
- Air sealings
- O-rings

1.4 Complementary Equipment

Complementary equipment is described in separate documents.

Article	Note
External valve units	Mounted at the rear of the upper arm. Shuts off the air automatically during tool changing.
Cable and Hose Package	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, X_T and IGES-format.

2 TECHNICAL SPECIFICATIONS

2.1 Description of tool changers and tool attachments

This document presents the Robot System Products TC100-8 and TC100-8E tool changers including tool attachments dedicated for material handling. Likewise presented are adaptation kits, connection kits to facilitate electrical installation and a tool stand kit.

The tool changer TC100-8 transfers compressed air to the tool. It can be equipped with transfer of electrical signals, via spring loaded signal pins, to the tool attachment. The electrical version is designated 'E'. The tool changers TC100-8 and TC100-8E cannot transport fluids.

The spring-loaded signal pins of TC100-8E are placed and protected at the centre of the tool changer. The contact surface of the tool attachment and the signal pins are not in connection until at the very end of the docking cycle when the tool attachment is already properly aligned. This guarantees a minimum of wear of the contact surfaces.

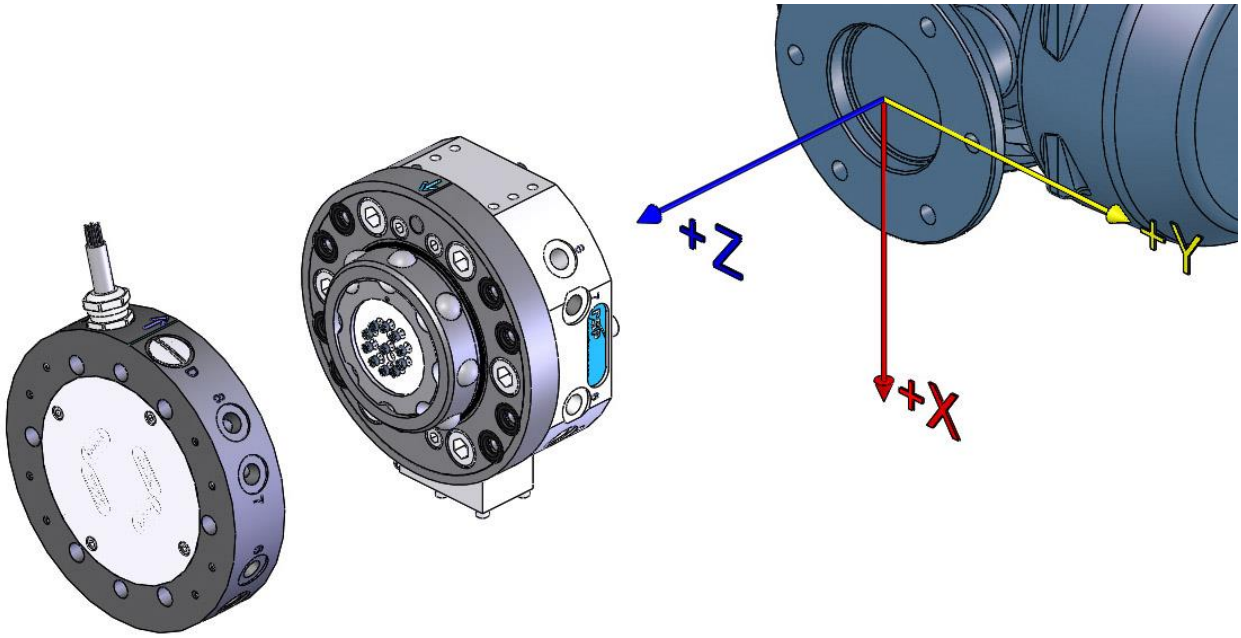
The electrical unit is primarily intended for transfer of sensor signals from grippers. In addition, it can be used for checking the presence and identifying tools by using signal jumpers and binary coding of signals on the tool attachment.

For other bolt circles adaptation plates between the tool changer and the turning disc on the robot may be needed. Such adaptation plates are available from RSP.

TC100-8E

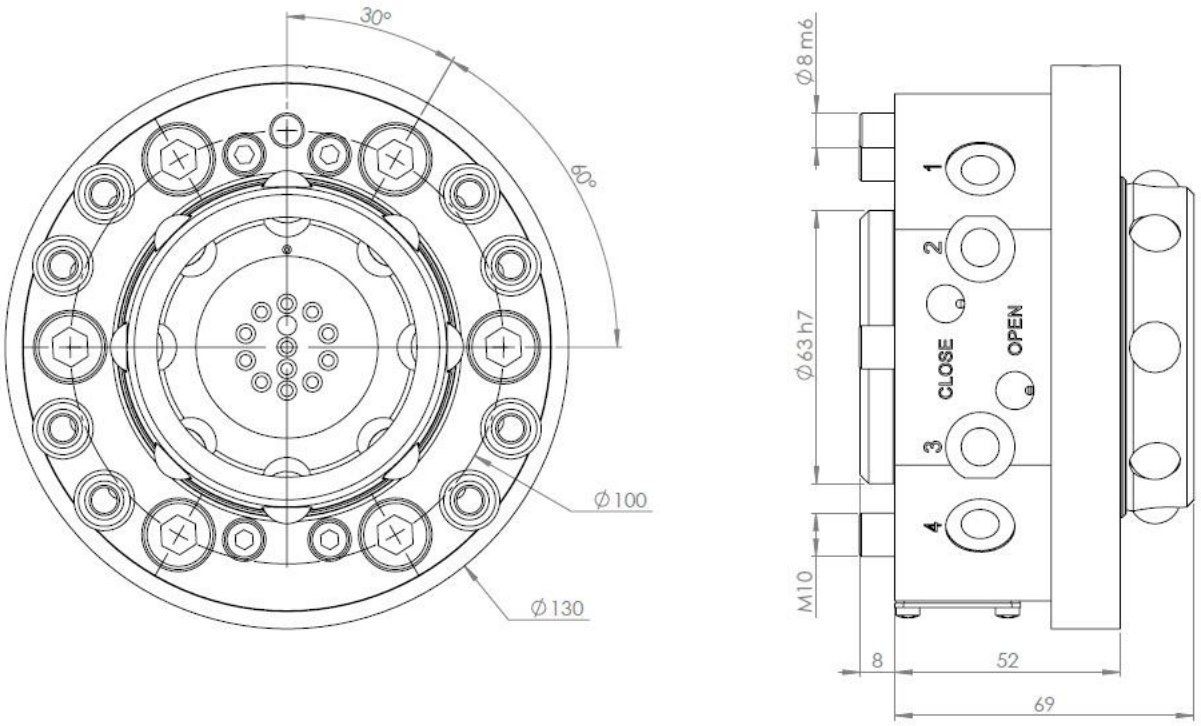
2.1.1 Coordinate System Definition

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 centre of gravity can, in accordance with the co-ordinate system stated below, be found in the technical specification tables of the tool changer.



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 TC100-8. Article no: P0401

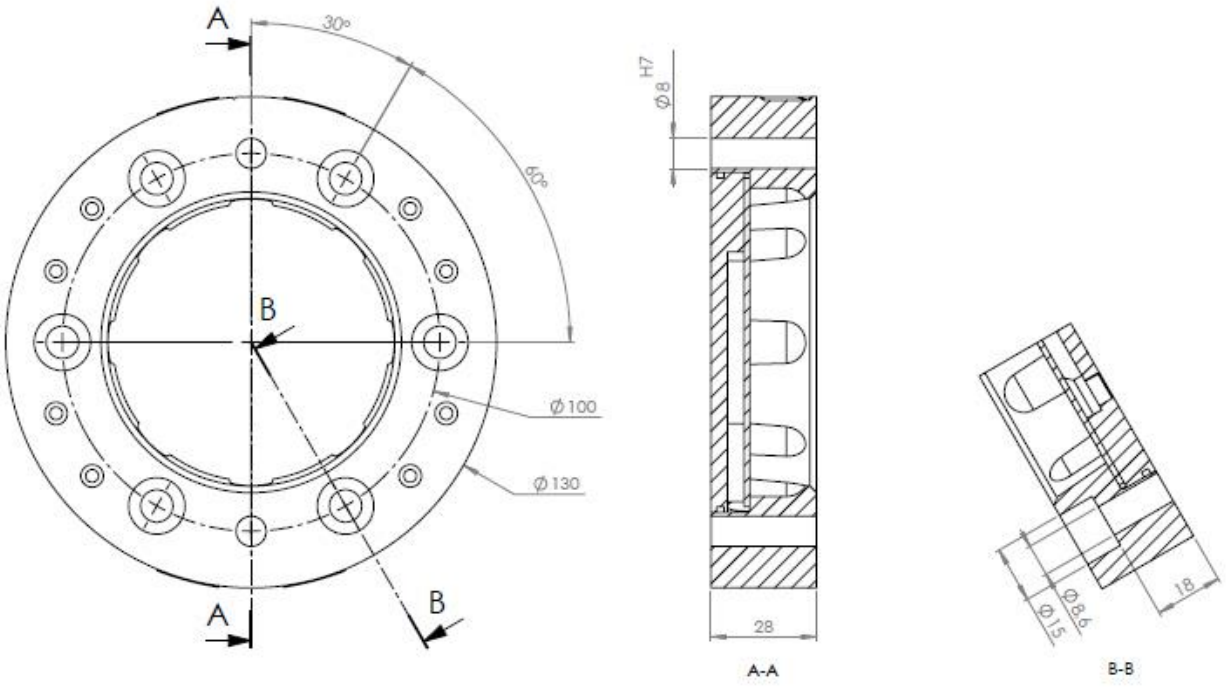


Tool changer TC100-8 transfers 8 pneumatic channels to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with P0407 or P0402.

Technical data

Working temperature		+10°C − +50°C
Bolt pattern		ISO 9409-1 100-6-M10
IP classification		IP 54
Maximum tool load	Fz (static)	±1 000 N
	Mx/My (dynamic)	±1 000 Nm
	Mz (dynamic)	±1 000 Nm
Weight and centre of gravity (Z)		
P0401		2.9 kg / 35 mm
P0401 with P0407		4.4 kg / 46 mm
P0401 with P0402		5.1 kg / 51mm
Air channels	Pneumatic diagram	See section 2.1.10
	User channels, robot side	8 x G 1/8" (800 l/min, max 10 bar)
	Dedicated channels, G 1/8"	Open TC marked Open, 6-10 bar
		Close TC marked Close, 6-10 bar
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

2.1.3 Tool attachment, TA100-8. Article: P0407



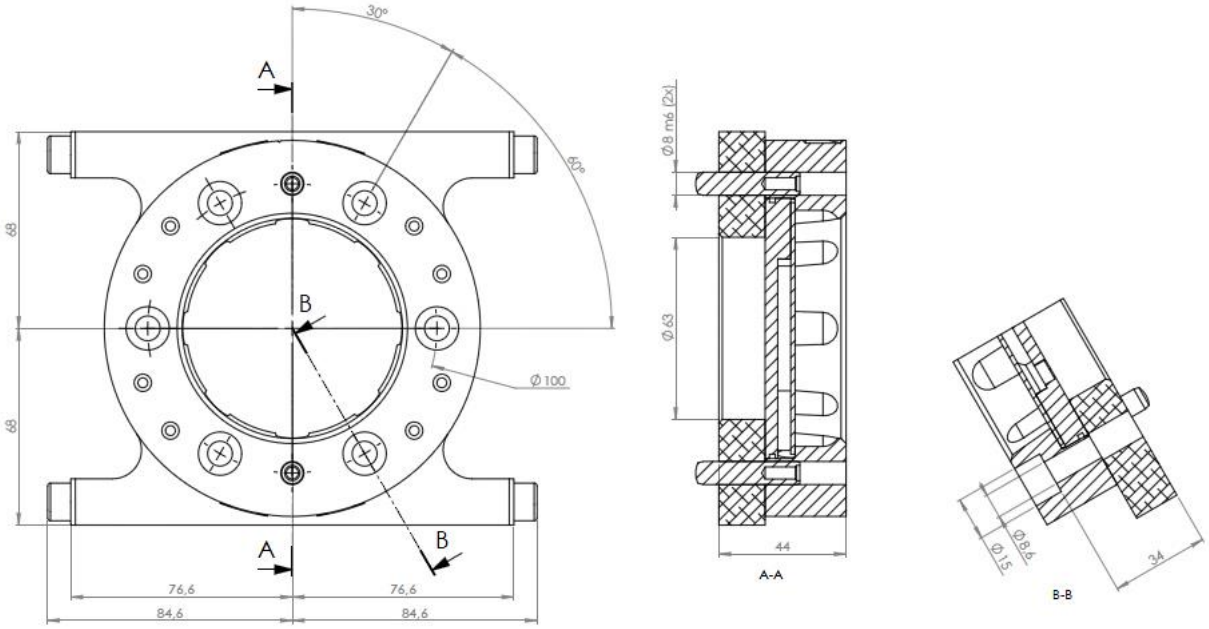
Tool attachment TA 100-8 transfers 8 pneumatic channels to the tool. To be used together with P0401.

Technical data

Working temperature		+10°C − +50°C
Bolt pattern		100-6-M8
Weight		1.5 kg
Maximum tool load (screw class 8.8)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±600 Nm
Maximum tool load (screw class 12.9)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±1 000 Nm
Air channels	Connection, tool side	8 x G 1/8”

NOTE!
The tool attachment shall be mounted to the tool using six M8-screws.

2.1.4 Square tool attachment, TA100-8. Article no: P0402



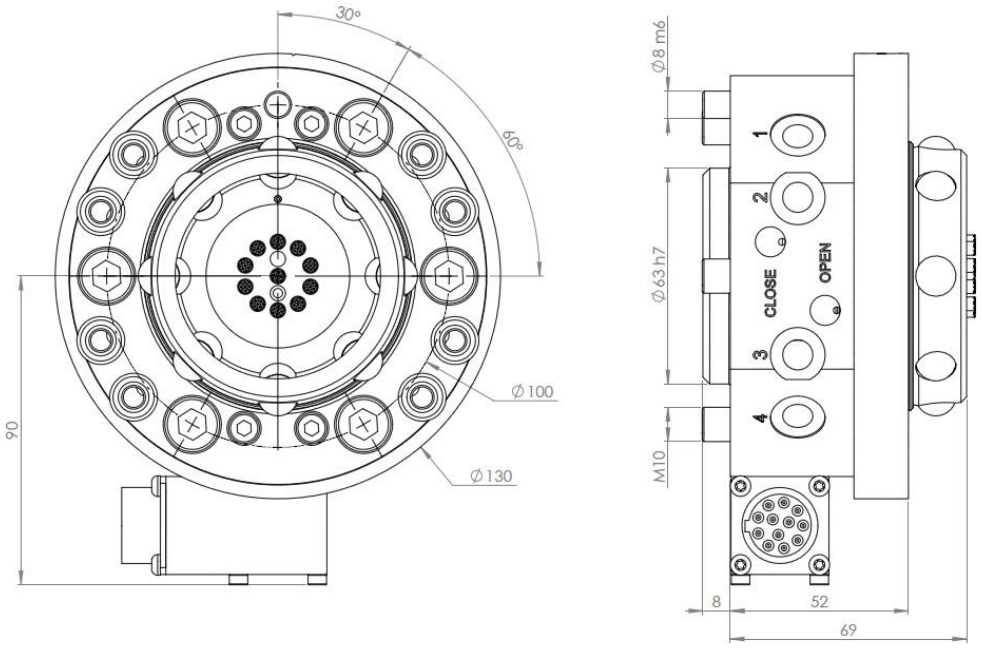
Square tool attachment TA 100-8 transfers 8 pneumatic channels to the tool and gives together with option P0423 a stable tool stand for easy tool changing. To be used together with P0401.

Technical data

Working temperature		+10°C − +50°C
Bolt pattern		100-6-M8
Weight		2.2 kg
Maximum tool load (screw class 8.8)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±600 Nm
Maximum tool load (screw class 12.9)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±1 000 Nm
Air channels	Connection, tool side	8 x G 1/8”

NOTE!
The tool attachment shall be mounted to the tool using six M8-screws.

2.1.5 Tool changer TC100-8E. Article: P0403

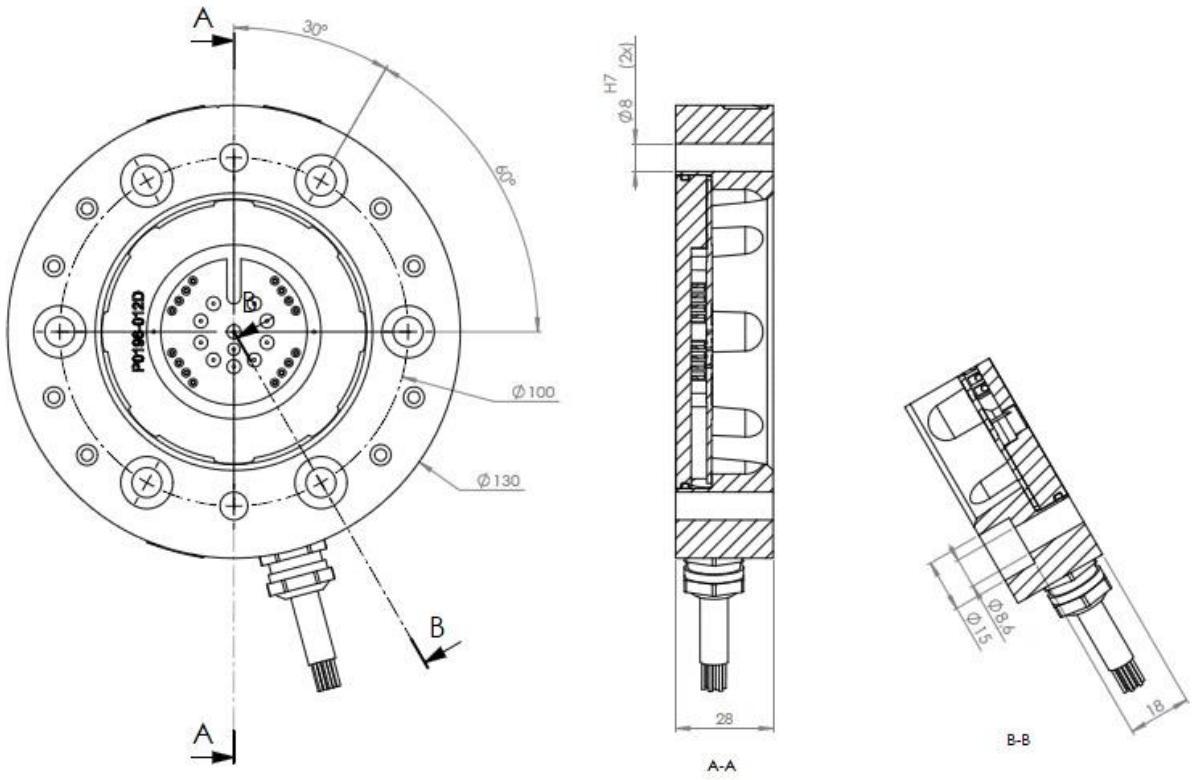


Tool changer TC120-8E transfers 8 pneumatic channels and 11 electrical signals to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with P0409, P0418, P0404 or P0474.

Technical data

Working temperature		+10°C − +50°C
Bolt pattern		ISO 9409-1 100-6-M10
IP classification		IP 54
Maximum tool load	Fz (static)	±1 000 N
	Mx/My (dynamic)	±1 000 Nm
	Mz (dynamic)	±1 000 Nm
Weight and centre of gravity (Z)		
P0403		3.0 kg / 35 mm
P0403 with P0409/ P0418		4,5 kg / 45 mm
P0403 with P0404/ P0474		5.2 kg / 51 mm
Air channels	Pneumatic diagram	See section 2.1.10
	User channels, robot side	8 x G 1/8" (800 l/min, max 10 bar)
	Dedicated channels, G 1/8"	Open TC marked Open, 6-10 bar Close TC marked Close, 6-10 bar
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content
Electrical signals	Circuit diagram	E0199-001 (section 2.1.11)
	Total signals	12 x (2A, 60V)
	Dedicated signals	24 V, 0 V, TC Coupled, TC Uncoupled
	Connection, robot side	Souriau 12P (UT001412PHT)
Connection kits (optional)	P8006 (connector)	Souriau 12S (straight)
	P8006-2 (connector)	Souriau 12S (angled)
	P8116-40 (cable kit)	Souriau 12S, 4-meter cable, open end

2.1.6 Tool attachment, TA100-8E. Article no: P0409



Tool attachment TA 100-8E transfers 8 pneumatic channels and 10 electrical signals to the tool. To be used together with P0403.

Technical data

Working temperature		+10°C − +50°C
Bolt pattern		100-6-M8
Weight		1.5 kg
Maximum tool load (screw class 8.8)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±600 Nm
Maximum tool load (screw class 12.9)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±1 000 Nm
Air channels	Connection, tool side	8 x G 1/8”
Electrical signals	Circuit diagram Total number of signals Dedicated signals Connection, tool side	E0199-001 (section 2.1.11) 10 24 V, 0V 1-meter cable (0.5 mm²), open end

NOTE!
The tool attachment shall be mounted to the tool using six M8-screws.

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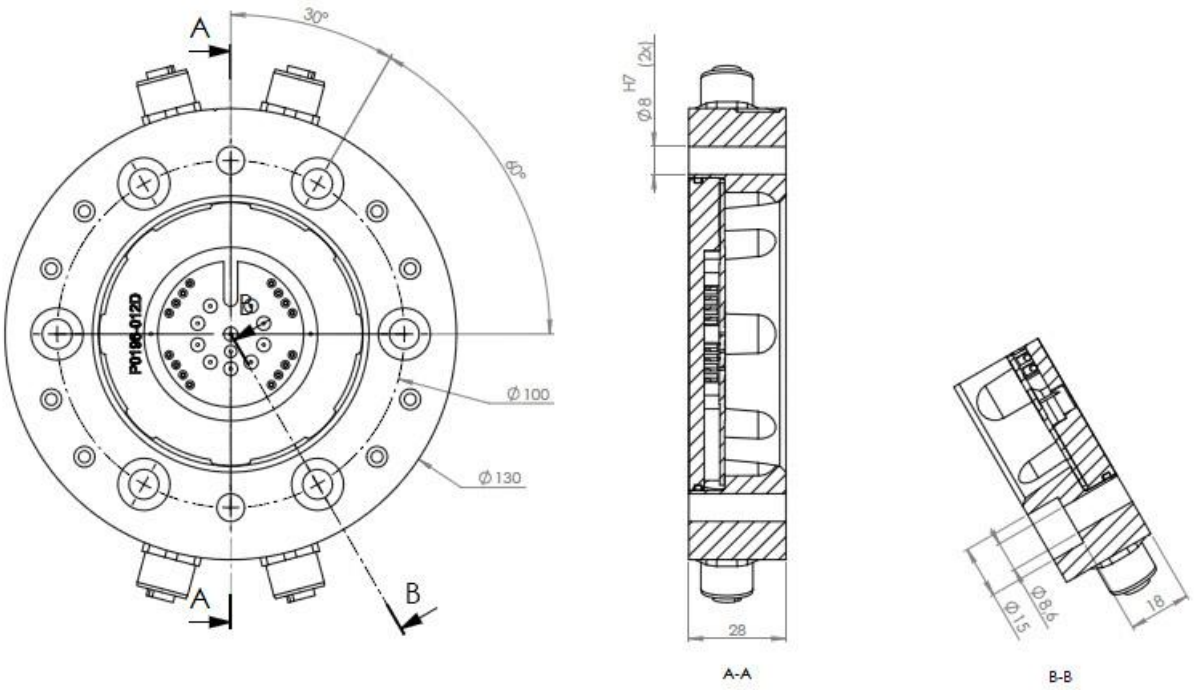
2.1.7 Tool attachment, TA100-8E. Article no: P0418



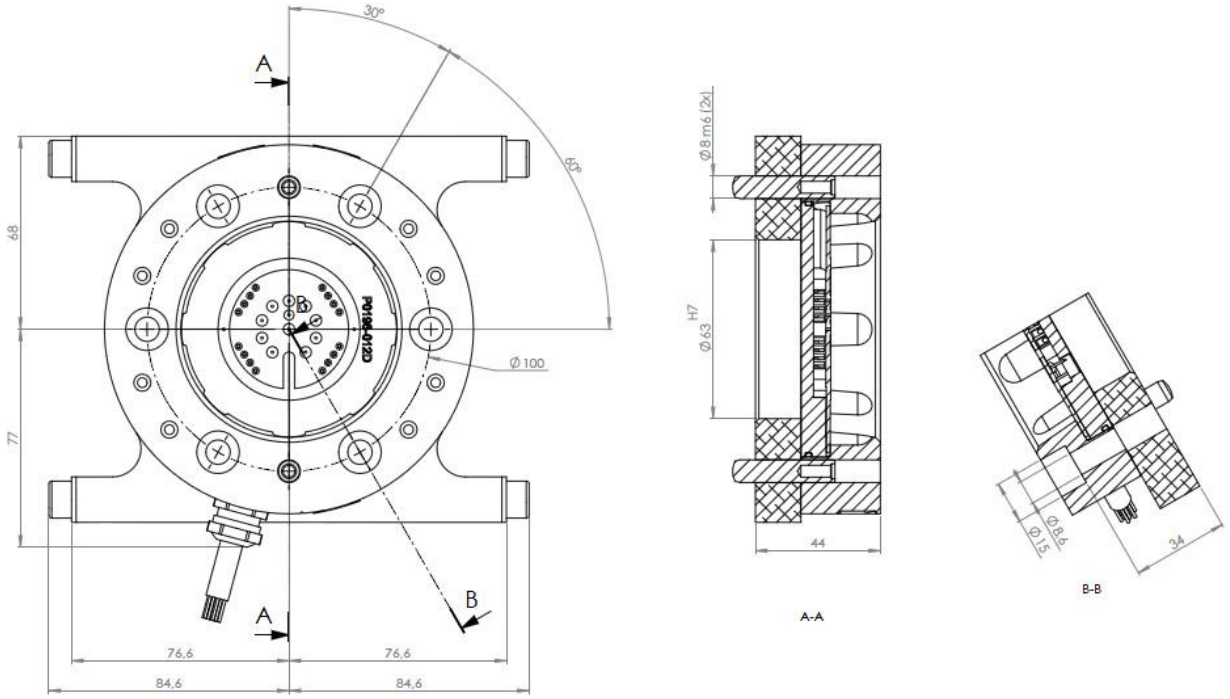
Tool attachment TA 100-8E transfers 8 pneumatic channels and 16 electrical signals to the tool. To be used together with P0403.

Technical data

Working temperature		+10°C − +50°C
Bolt pattern		100-6-M8
Weight		1.5 kg
Maximum tool load (screw class 8.8)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±600 Nm
Maximum tool load (screw class 12.9)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±1 000 Nm
Air channels	Connection, tool side	8 x G 1/8”
Electrical signals	Circuit diagram Total number of signals Dedicated signals Connection, tool side	E0199-001 (section 2.1.11) 16 4 x 24V, 4 x 0V 4 x M12 4S
Connection kits (optional)	4 x I0615 (cable kit)	M12 4P, 5-meter cable, open end

NOTE!
The tool attachment shall be mounted to the tool using six M8-screws.

2.1.8 Square tool attachment, TA100-8E. Article no: P0404



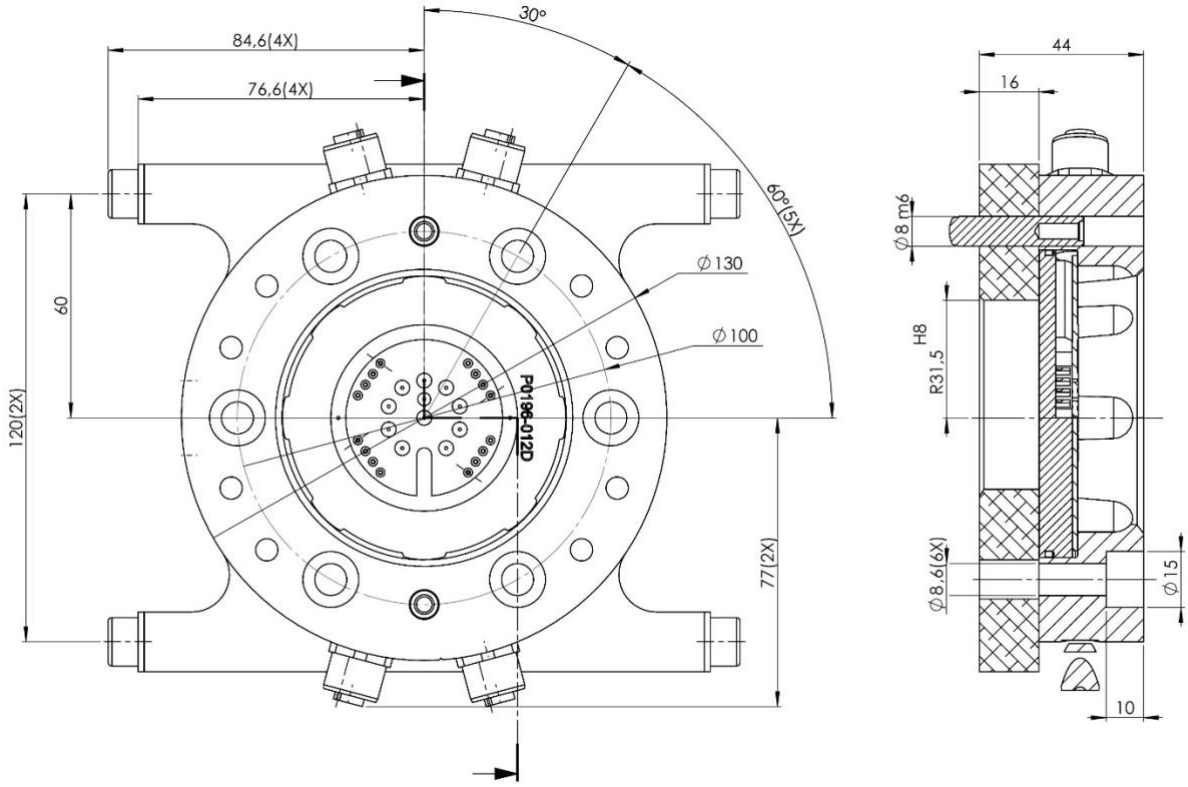
Tool attachment TA 100-8E transfers 8 pneumatic channels and 10 electrical signals to the tool and gives together with option P0423 a stable tool stand for easy tool changing. To be used together with P0403.

Technical data

Working temperature		+10°C − +50°C
Bolt pattern		100-6-M8
Weight		2.2 kg
Maximum tool load (screw class 8.8)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±600 Nm
Maximum tool load (screw class 12.9)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1 000 N ±1 000 Nm ±1 000 Nm
Air channels	Connection, tool side	8 x G 1/8”
Electrical signals	Circuit diagram Total number of signals Dedicated signals Connection, tool side	E0199-001 (section 2.1.11) 10 24 V, 0V 1-meter cable (0.5 mm²), open end

NOTE!
The tool attachment shall be mounted to the tool using six M8-screws.

2.1.9 Square tool attachment, TA100-8E. Article no: P0474



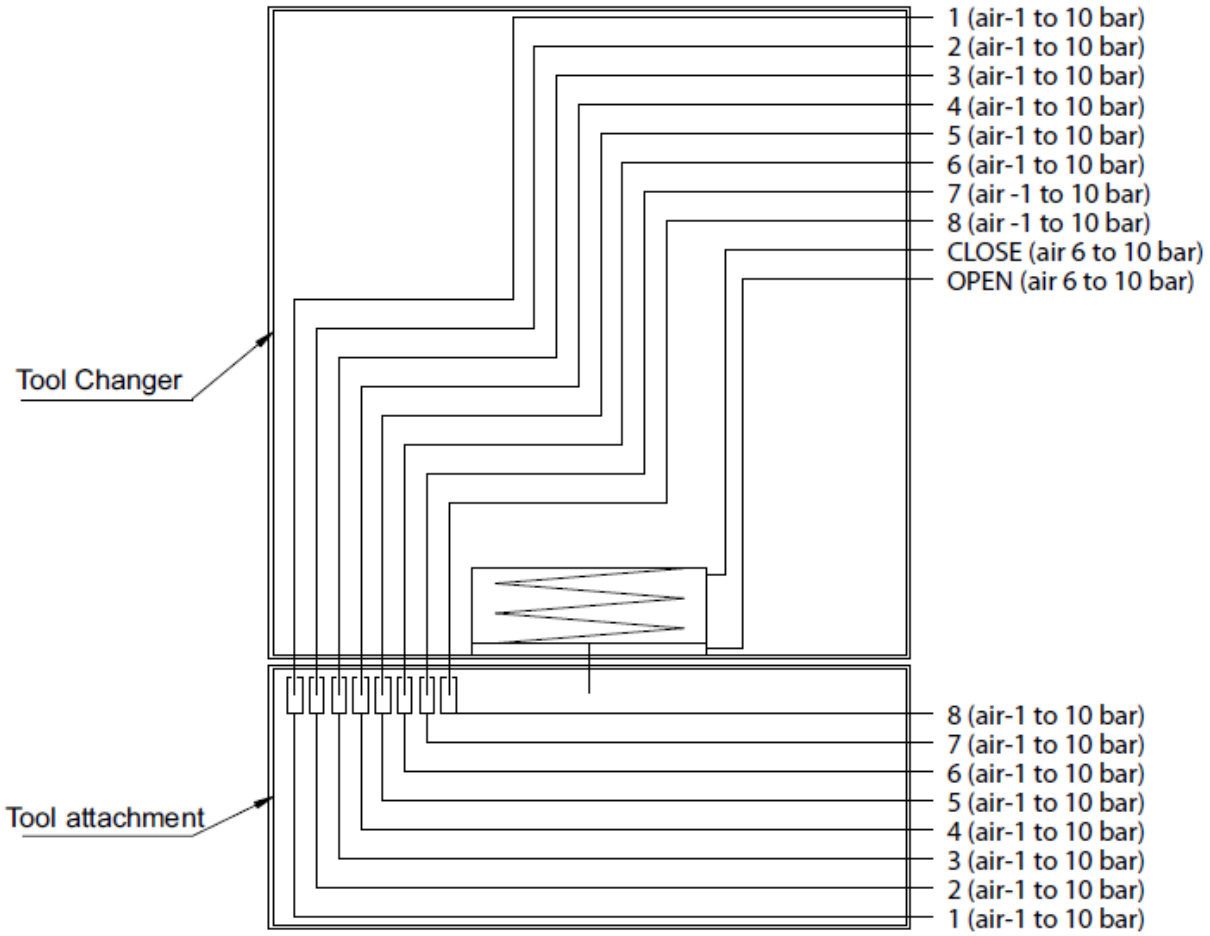
Tool attachment TA 100-8E transfers 8 pneumatic channels and 16 electrical signals to the tool and gives together with option P0423 a stable tool stand for easy tool changing. To be used together with P0403.

Technical data

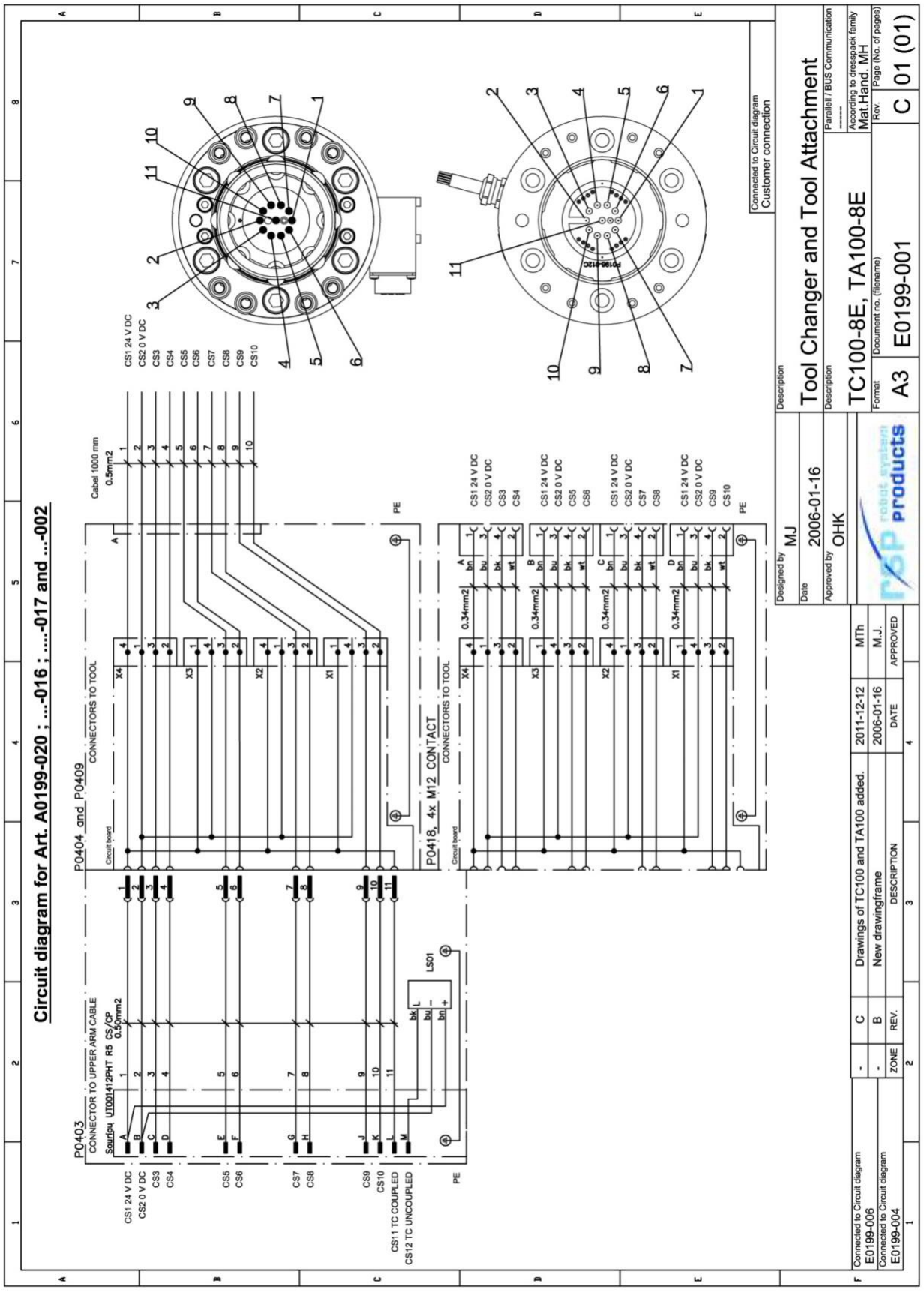
Working temperature		+10°C − +50°C
Bolt pattern		100-6-M8
Weight		2.2 kg
Maximum tool load (screw class 8.8)	Fz (static)	±1 000 N
	Mx/My (dynamic)	±1 000 Nm
	Mz (dynamic)	±600 Nm
Maximum tool load (screw class 12.9)	Fz (static)	±1 000 N
	Mx/My (dynamic)	±1 000 Nm
	Mz (dynamic)	±1 000 Nm
Air channels	Connection, tool side	8 x G 1/8”
Electrical signals	Circuit diagram	E0199-001 (section 2.1.11)
	Total number of signals	16
	Dedicated signals	4 x 24V, 4 x 0V
	Connection, tool side	4 x M12 4S
Connection kits (optional)	4 x I0615 (cable kit)	M12 4P, 5-meter cable, open end

NOTE!
The tool attachment shall be mounted to the tool using six M8-screws.

2.1.10 Pneumatic diagram for TC100-8



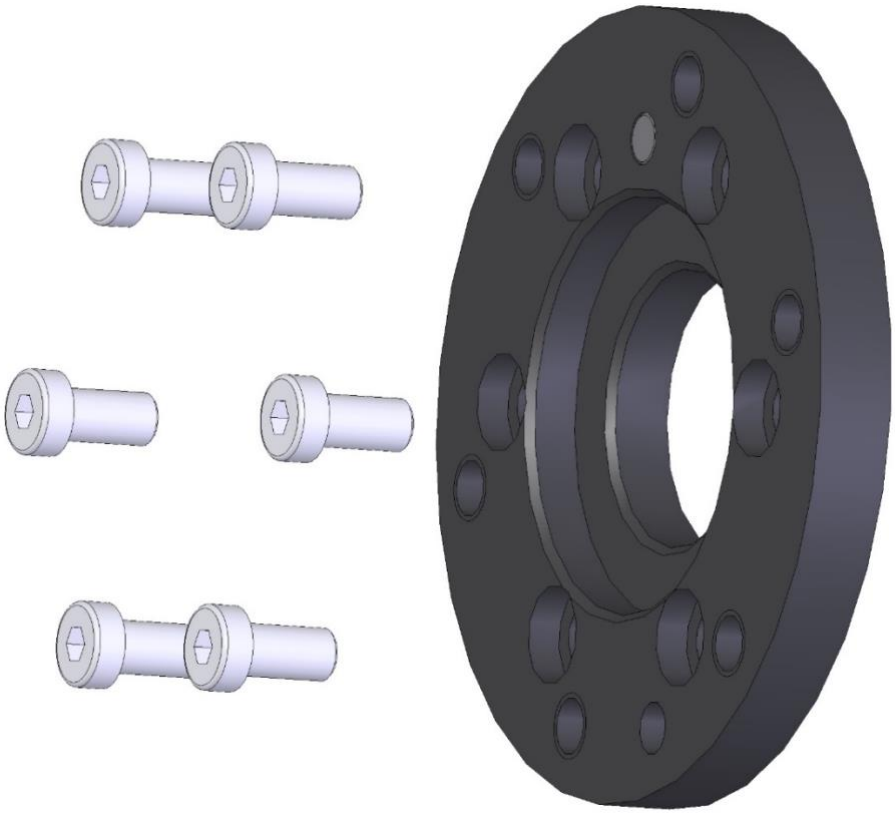
2.1.11 Circuit diagram E0199-001



2.2 Options for tool changer

2.2.1 Robot adaptation kits

Robot adaptation kits are required for mounting on robot flanges using alternative bolt patterns and consist of an adaptation plate including mounting screws. Robot adaptation kits for various robot models are available from RSP.



Example of adaptation plate with mounting screws

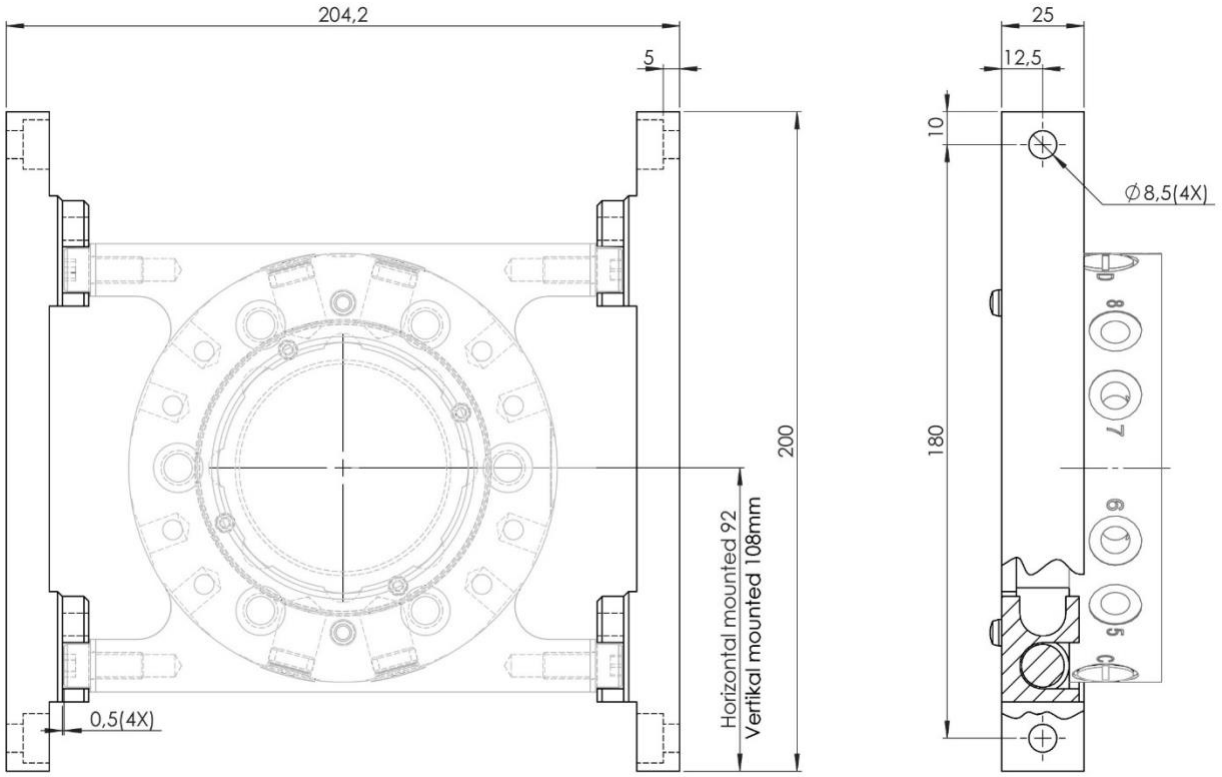
2.2.2 Tool Identification

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

2.2.3 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.

2.2.4 Tool stand kit. Article no: P0423



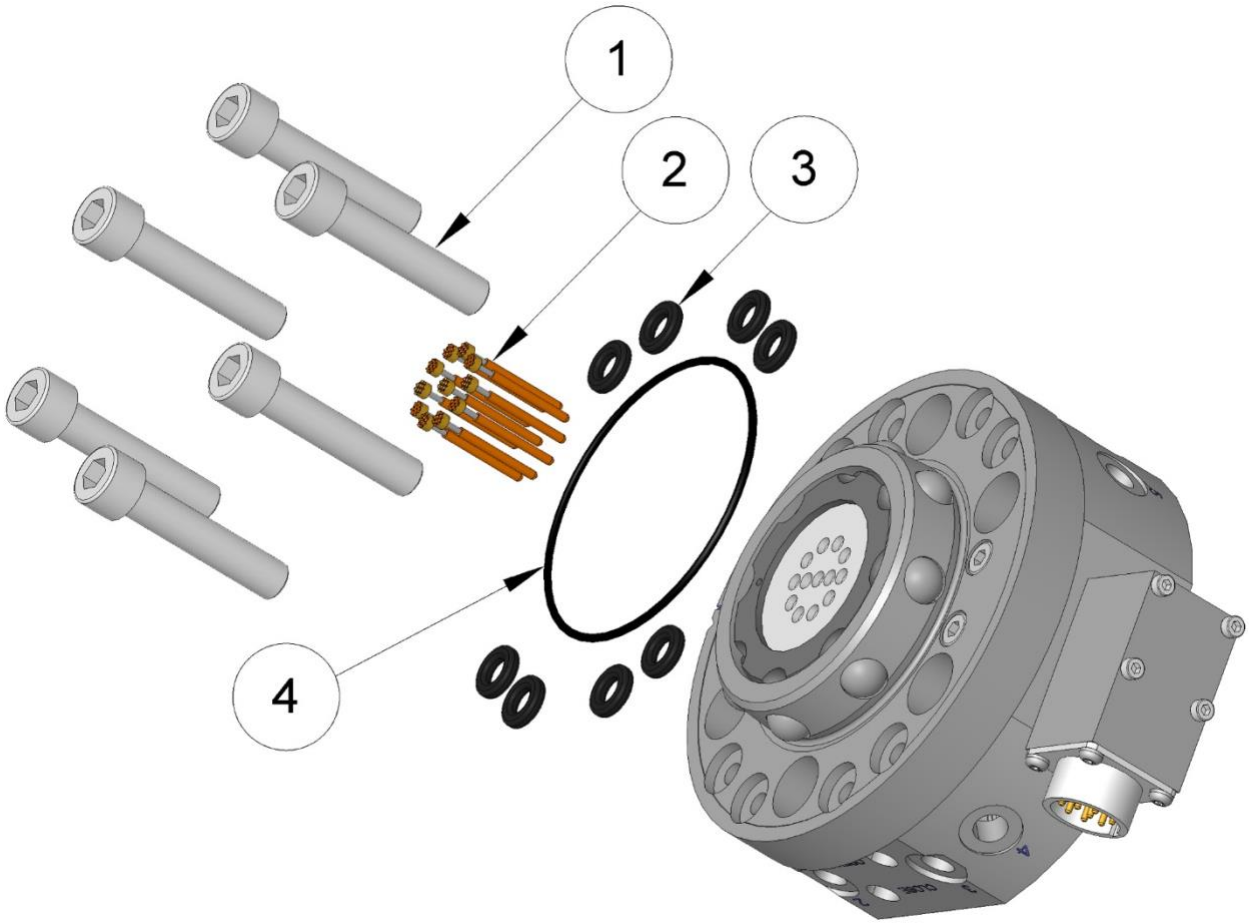
This tool stand kit, mounted on a stand, gives in combination with square tool attachments P0402 or P0404 a robust tool stand for easy tool changing.

Technical data

Weight	0.7 kg
Maximum load	180 kg

3 SPARE PARTS

3.1 Part list for tool changer P0401 and P0403



Item	Description	Part number	Wear part	Pcs
1	Fastening screw M10x50	21212519-501		6
2	Spring loaded signal pin (TC100-8E only)	I0042	X	11
3	Air sealings	I0230	X	8
4	O-ring	I1459	X	1