

Technical Description

Tool changer TC350

M0608-1

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



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1 INTRODUCTION

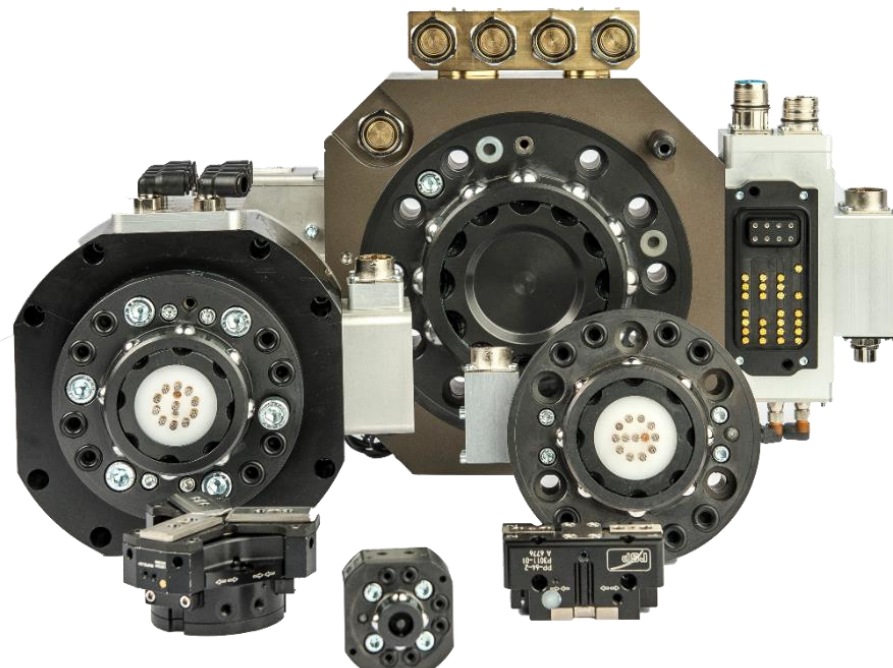
Robot System Products is a front-rank provider of peripheral products for high performance robot applications. We provide complete system solutions for your robot installations, aiming to improve your productivity with the most reliable and cost-effective tooling on the market. Continuously we explore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

2 TECHNICAL SPECIFICATIONS

2.1 Description of tool changers and tool attachments

This document presents the Robot System Products TC350-8 and TC350-8E 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 TC350-8 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 TC350-8 and TC350-8E cannot transport fluids.

The spring-loaded signal pins of TC350-8E 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.

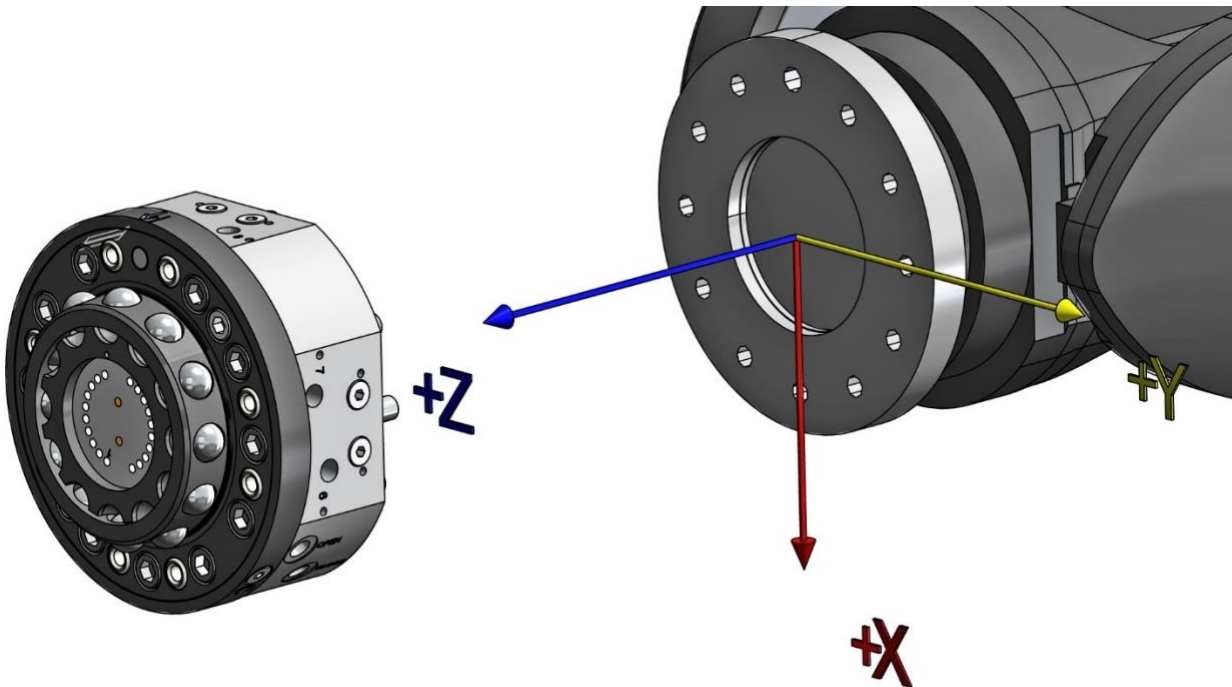
For other bolt circles adaptation plates between the tool changer and the turning disc on the robot may be needed. Such adaptation plates are available from RSP.



TC350-8E

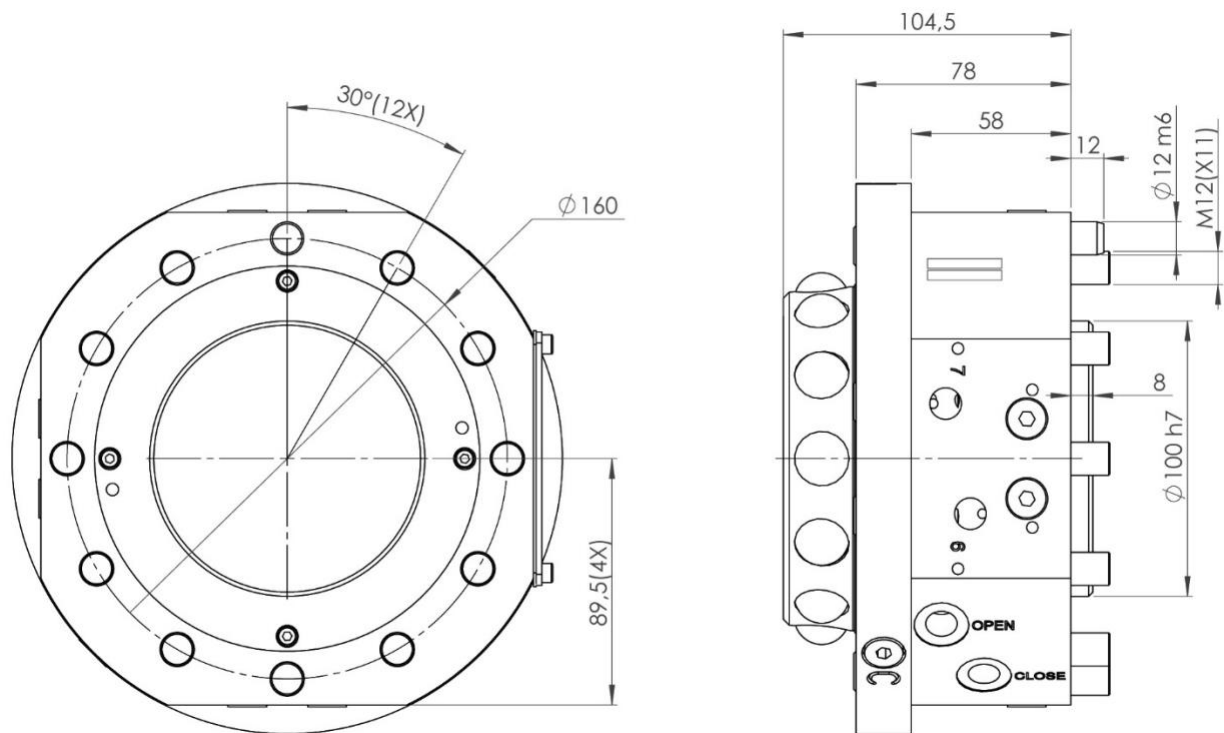
2.1.1 Coordinate System Definition

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

2.1.2 Tool changer TC350-8, Article: P0601

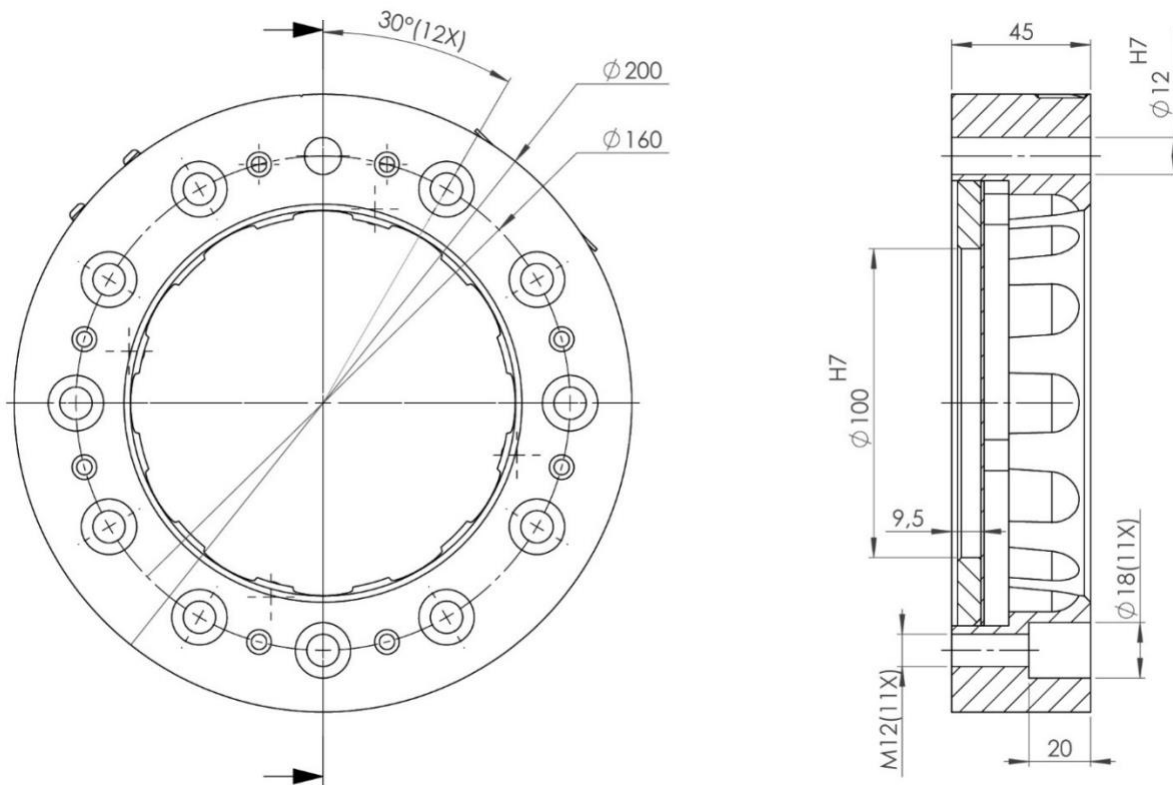


Tool changer TC350-8 transfers 8 pneumatic channels to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with tool attachments P0606 and P0602.

Technical data

Working temperature		+10°C – +50°C
Bolt pattern		ISO9409-1-160-11-M12
IP classification		IP 54
Maximum tool load	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
Weight and centre of gravity (Z)		
P0601		10.5 kg / 54 mm
P0601 and P0606		15.5 kg / 69 mm
P0601 and P0606		16.2 kg / 71 mm
Air channels	Pneumatic diagram	Pne0166-001A (section 2.1.8)
	User channels, robot side	8 x G ¼" (1 600 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, TA350-8 Round. Article no: P0606



Tool attachment TA350-8 transfers 8 pneumatic channels to the tool. To be used together with tool changer P0601.

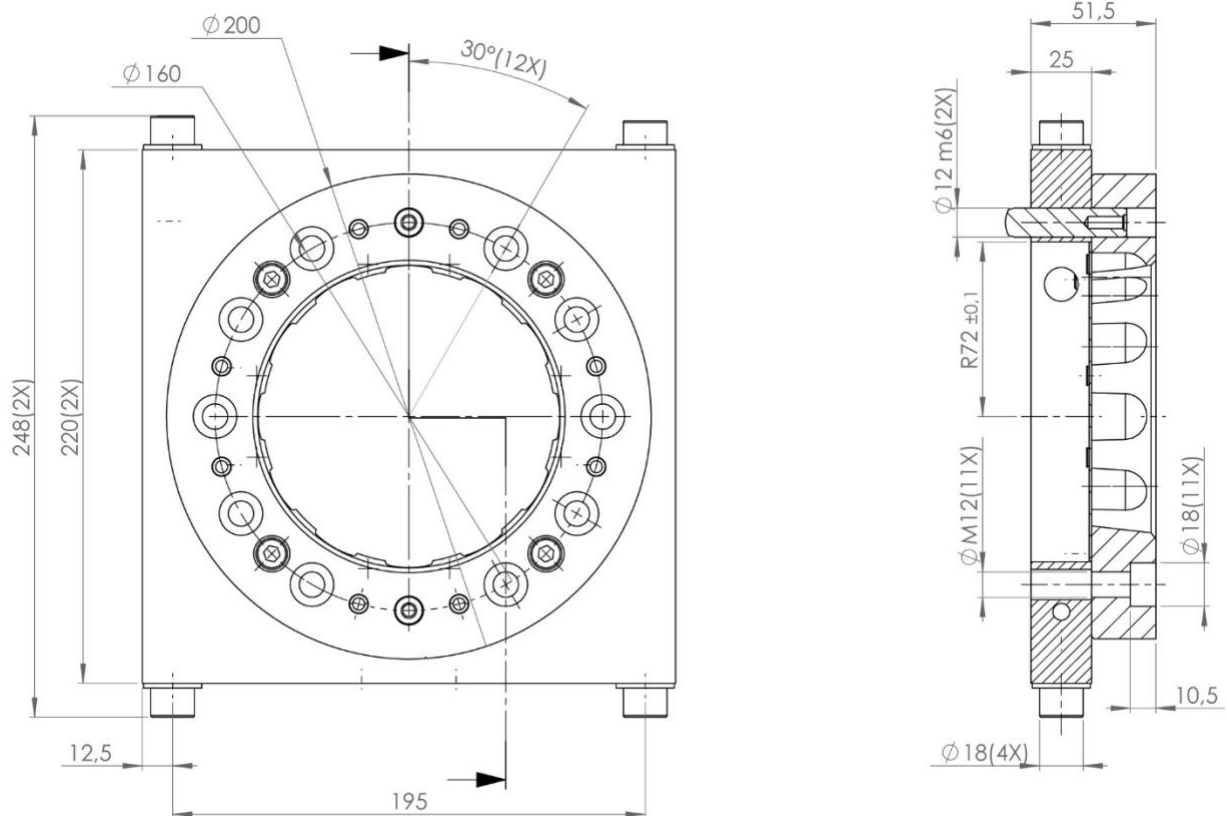
Technical data

Working temperature		+10°C – +50°C
Bolt pattern		ISO9409-1-160-11-M12
Weight		5.0 kg
Maximum tool load (M12-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
Maximum tool load (M10-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±2 500 Nm
Air channels	Connection, tool side	8 x G ¼"



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

2.1.4 Tool attachment, TA350-8 square. Article no: P0602



Tool attachment TA350-8 transfers 8 pneumatic channels to the tool. To be used together with tool changer P0601.

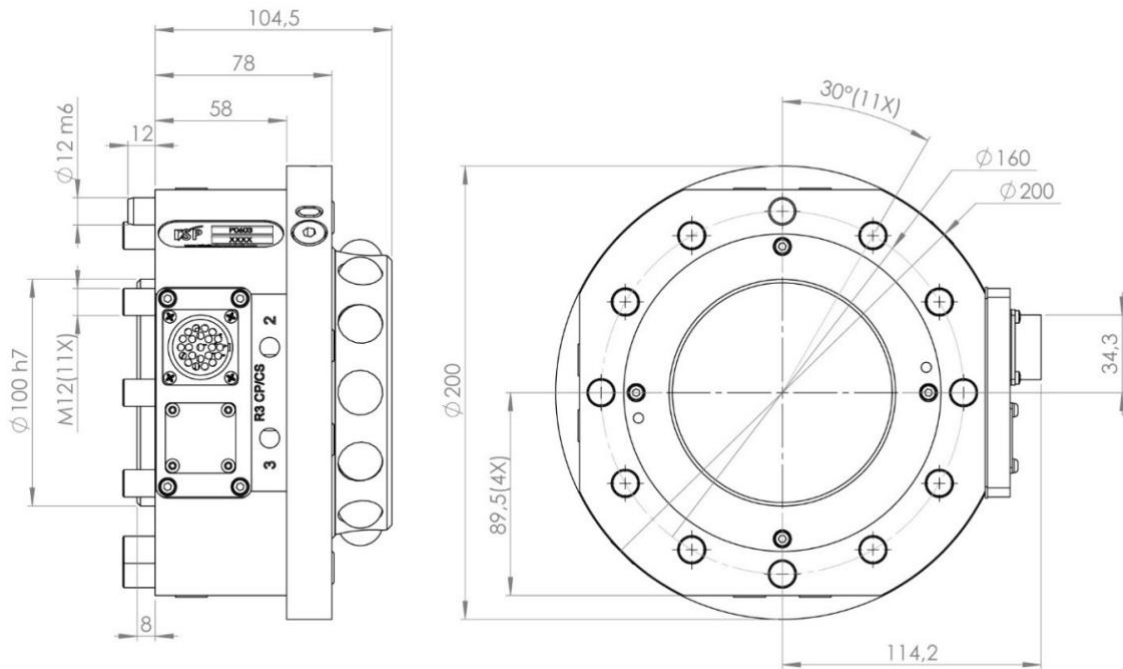
Technical data

Working temperature		+10°C – +50°C
Bolt pattern		ISO9409-1-160-11-M12
Weight		5.7 kg
Maximum tool load (M12-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
Maximum tool load (M10-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±2 500 Nm
Air channels	Connection, tool side	8 x G ¼"



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

2.1.5 Tool changer TC350-8E, Article: P0603

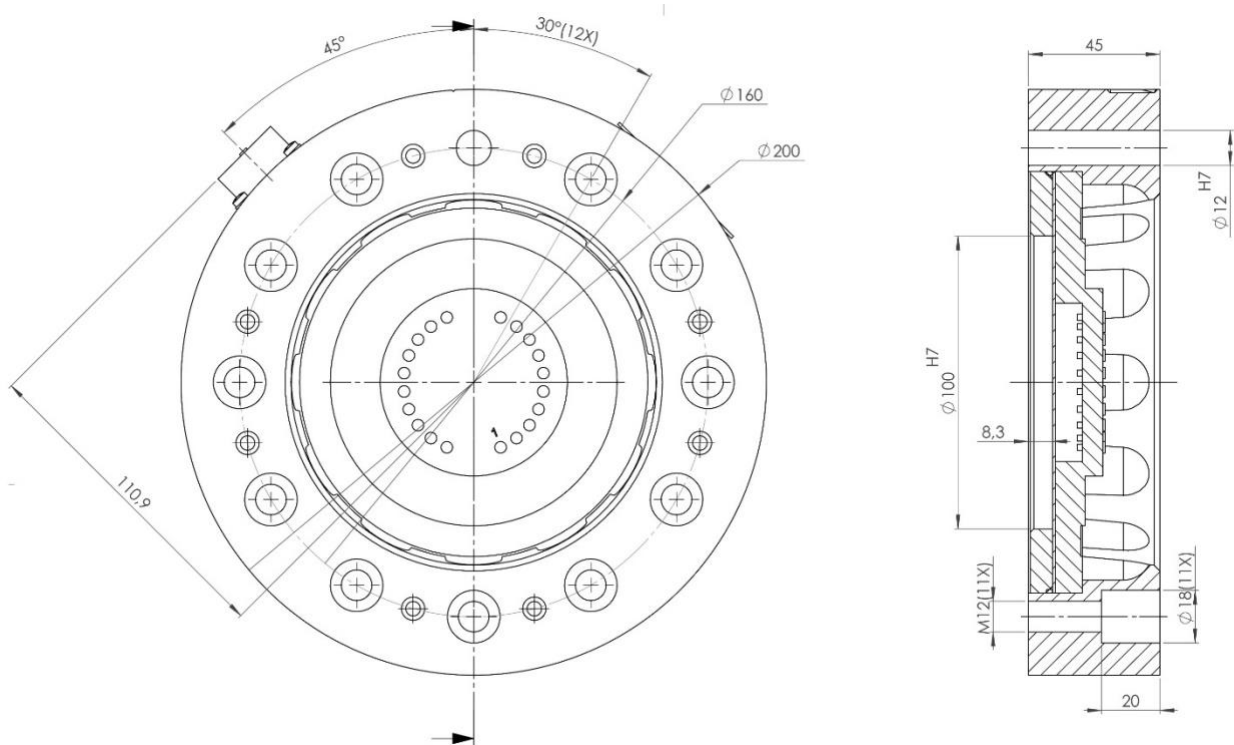


Tool changer TC350-8E transfers 8 pneumatic channels and 19 electrical signals to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with tool attachments P0608 and P0604.

Technical data

Working temperature		+10°C - +50°C
Bolt pattern		ISO9409-1-160-11-M12
IP classification		IP 54
Maximum tool load	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±3 500 Nm
Weight and centre of gravity (Z)		
	P0603	10.5 kg / 54 mm
	P0603 with P0608	16.0 kg / 70 mm
	P0603 with P0604	16.6 kg / 72 mm
Air channels	Pneumatic diagram User channels, robot side Dedicated channels, G 1/8"	Pne0166-001A (section 2.1.8) 8 x G 1/4" (1 600 l/min, max 10 bar) 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 Total signals Dedicated signals Connection, robot side	E0166-001 (see section 2.1.9) 19 x (2A, 60V) + PE 24V, 0V, TC Coupled, TC Uncoupled Souriau 23P (UT001823PHT)
Connection kits (optional)	P8002 (connector) P8129-50 (cable kit)	Souriau 23S (straight) Souriau 23S, 5-meter cable, open end

2.1.6 Tool attachment round, TA350-8E. Article no: P0608



Tool attachment TA350-8E round transfers 8 pneumatic channels and 18 electrical signals to the tool. To be used together with tool changer P0603.

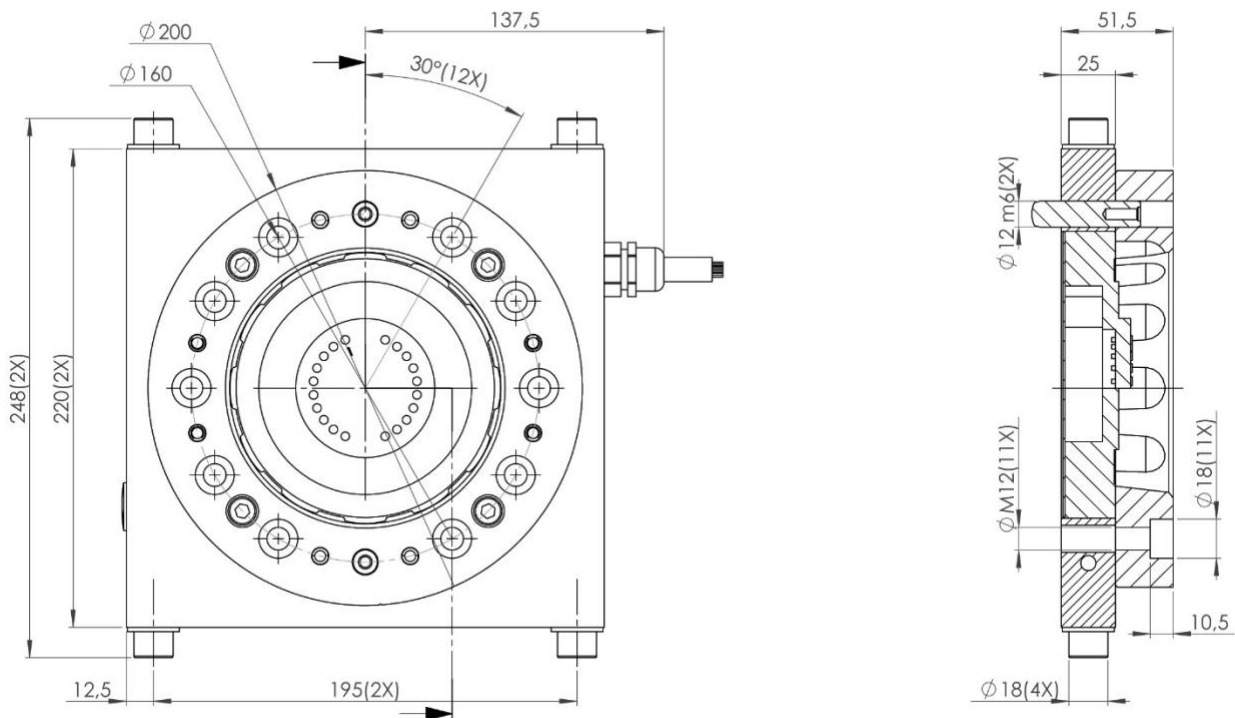
Technical data

Working temperature		+10°C – +50°C
Bolt pattern		ISO9409-1-160-11-M12
Weight		5.5 kg
Maximum tool load (M12-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±3 500 Nm
Maximum tool load (M10-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±2 500 Nm
Air channels	Connection, tool side	8 x G ¼"
Electrical signals	Circuit diagram Total number of signals Connection, tool side	E0166-003 (see section 2.1.10) 18 + PE Souriau 19S (UT001619SHT)
Connection kits (optional)	P8003 (connector) P8102-20 (cable kit)	Souriau 19P (straight) Souriau 19P, 2-meter cable, open end



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

2.1.7 Tool attachment square, TA350-8E. Article no: P0604



Tool attachment TA350-8E square transfers 8 pneumatic channels and 18 electrical signals to the tool. To be used together with tool changer P0603.

Technical data

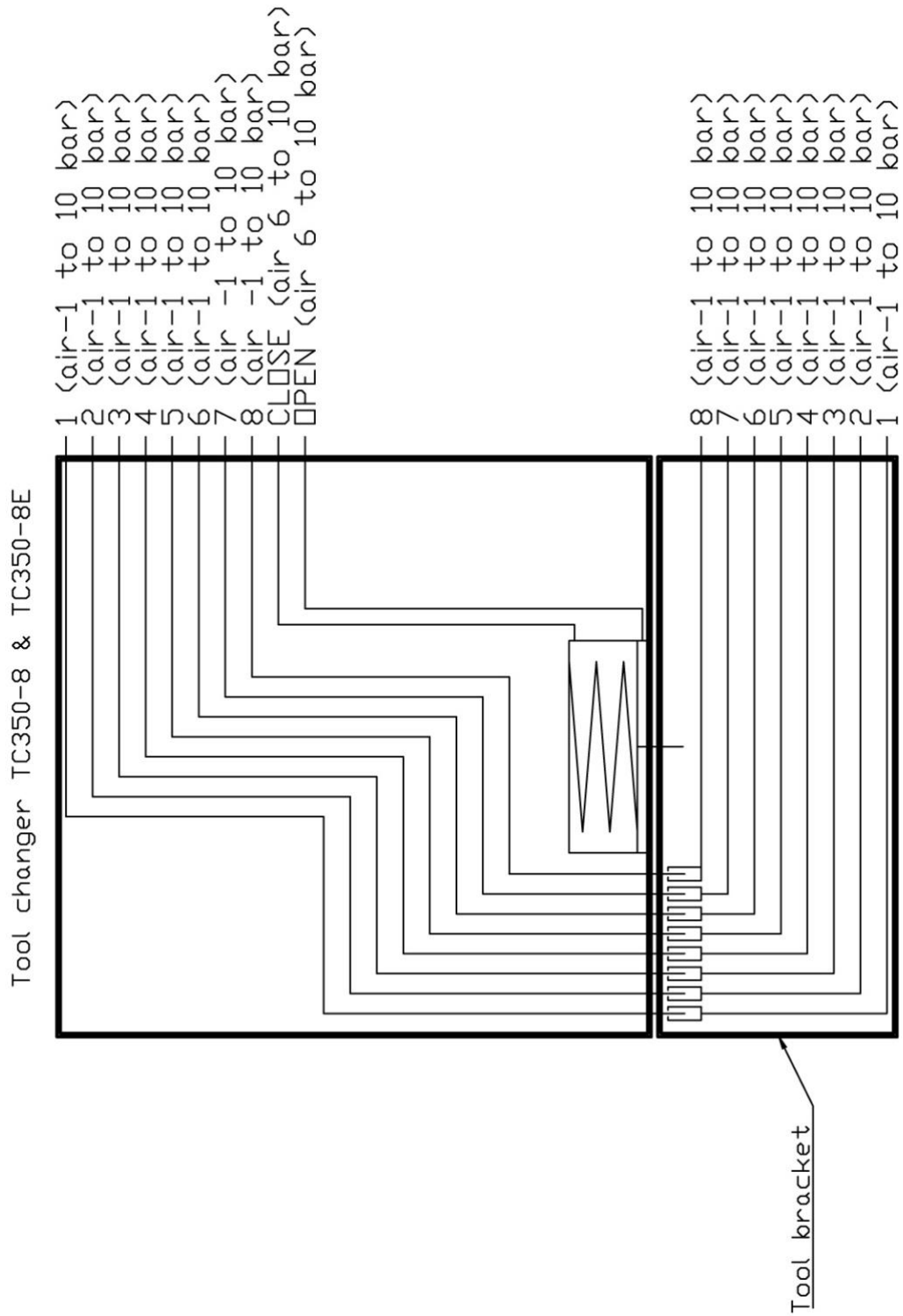
Technical data

Working temperature		+10°C – +50°C
Bolt pattern		ISO9409-1-160-11-M12
Weight		6.1 kg
Maximum tool load (M12-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±3 500 Nm
Maximum tool load (M10-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±2 500 Nm
Air channels	Connection, tool side	8 x G ¼"
Electrical signals	Circuit diagram Total number of signals Connection, tool side	E0166-005 (see section 2.1.11) 18 + PE 1-meter cable (0.5 mm ²), open end

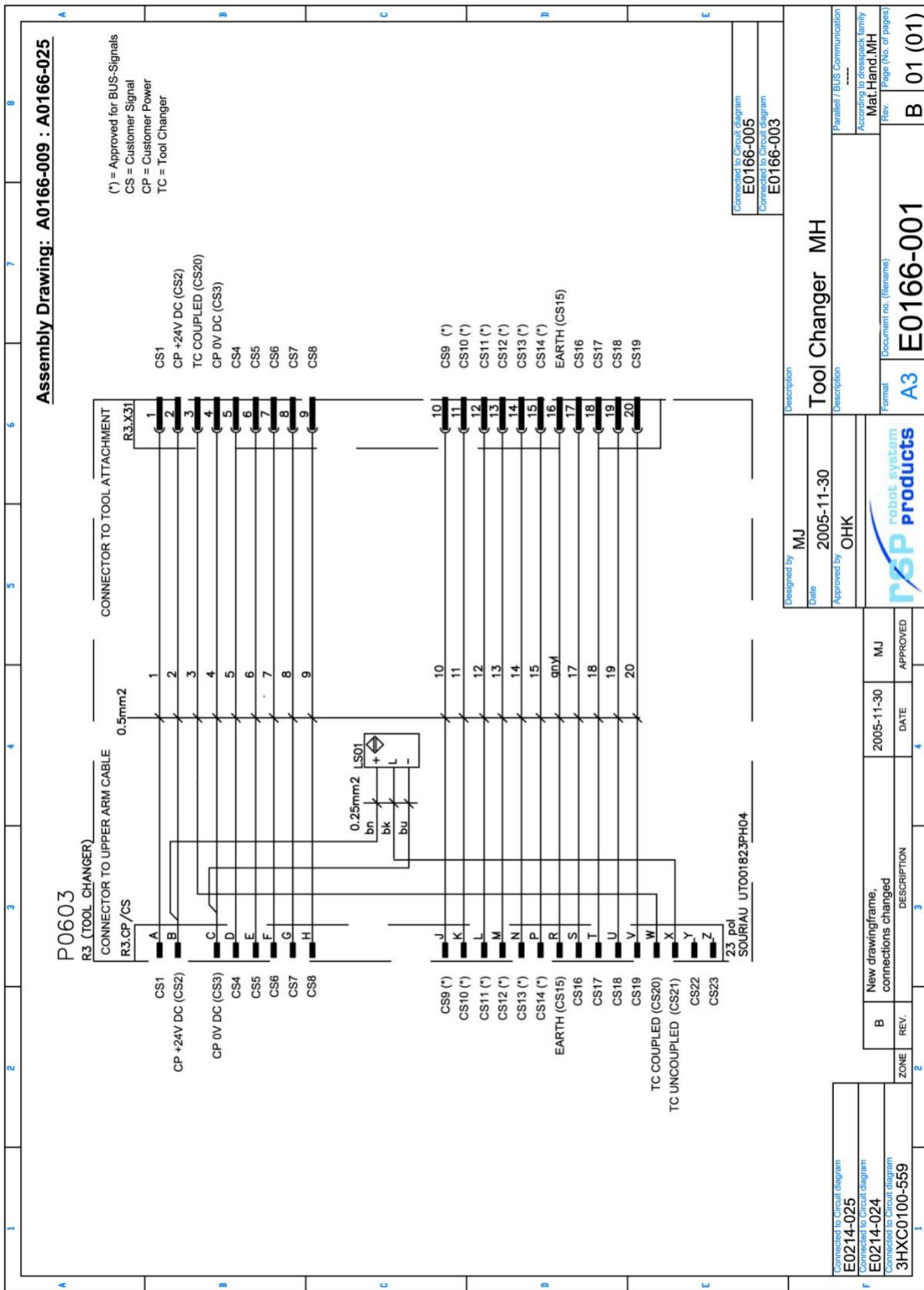


NOTE! Tools can be mounted to the tool attachment using eleven M12-screws, alternatively the tool attachment can be mounted to the tool using eleven M10-screws.

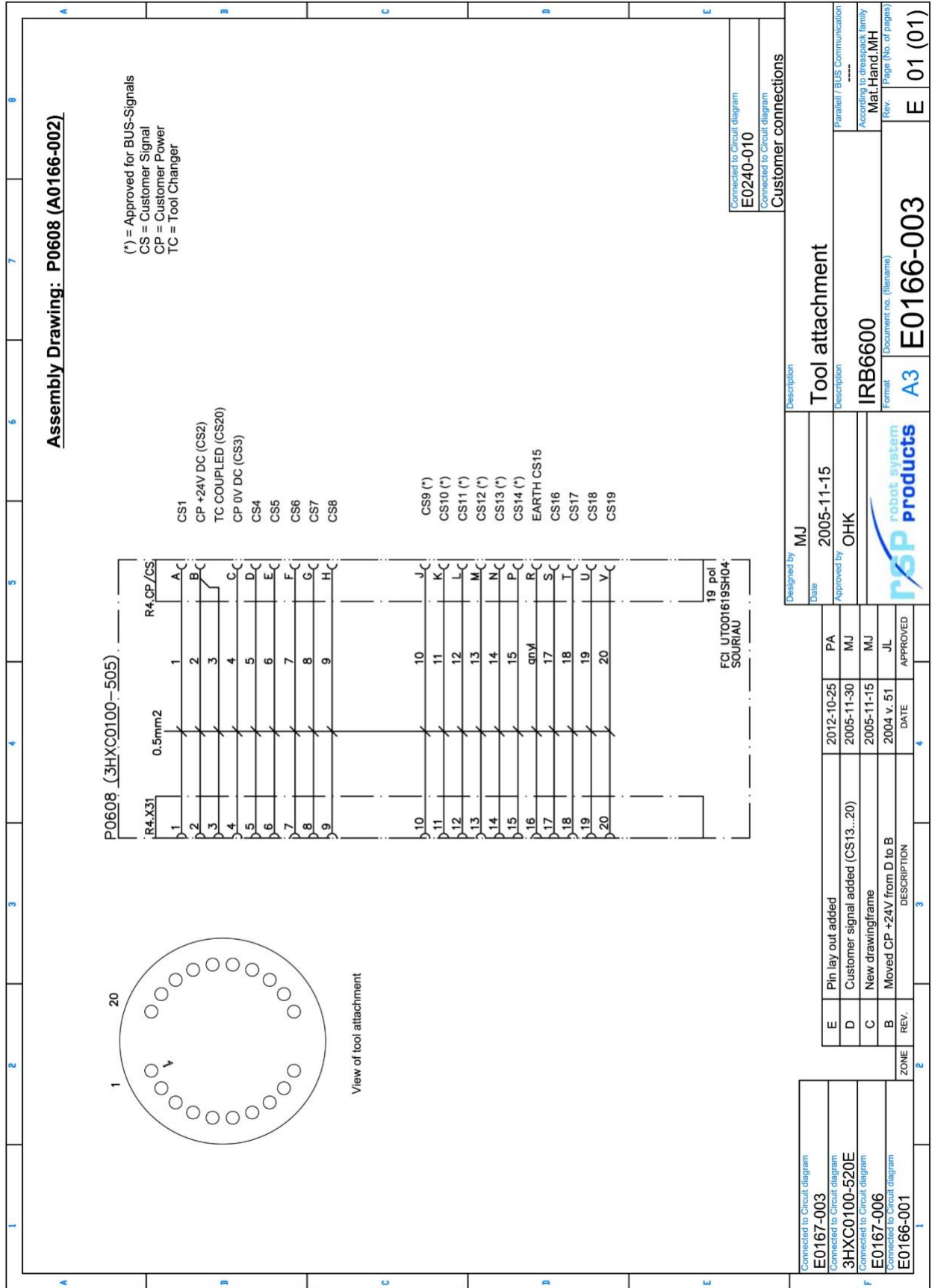
2.1.8 Pneumatic diagram Pne0166-001A



2.1.9 Circuit diagram E0166-001 for P0603

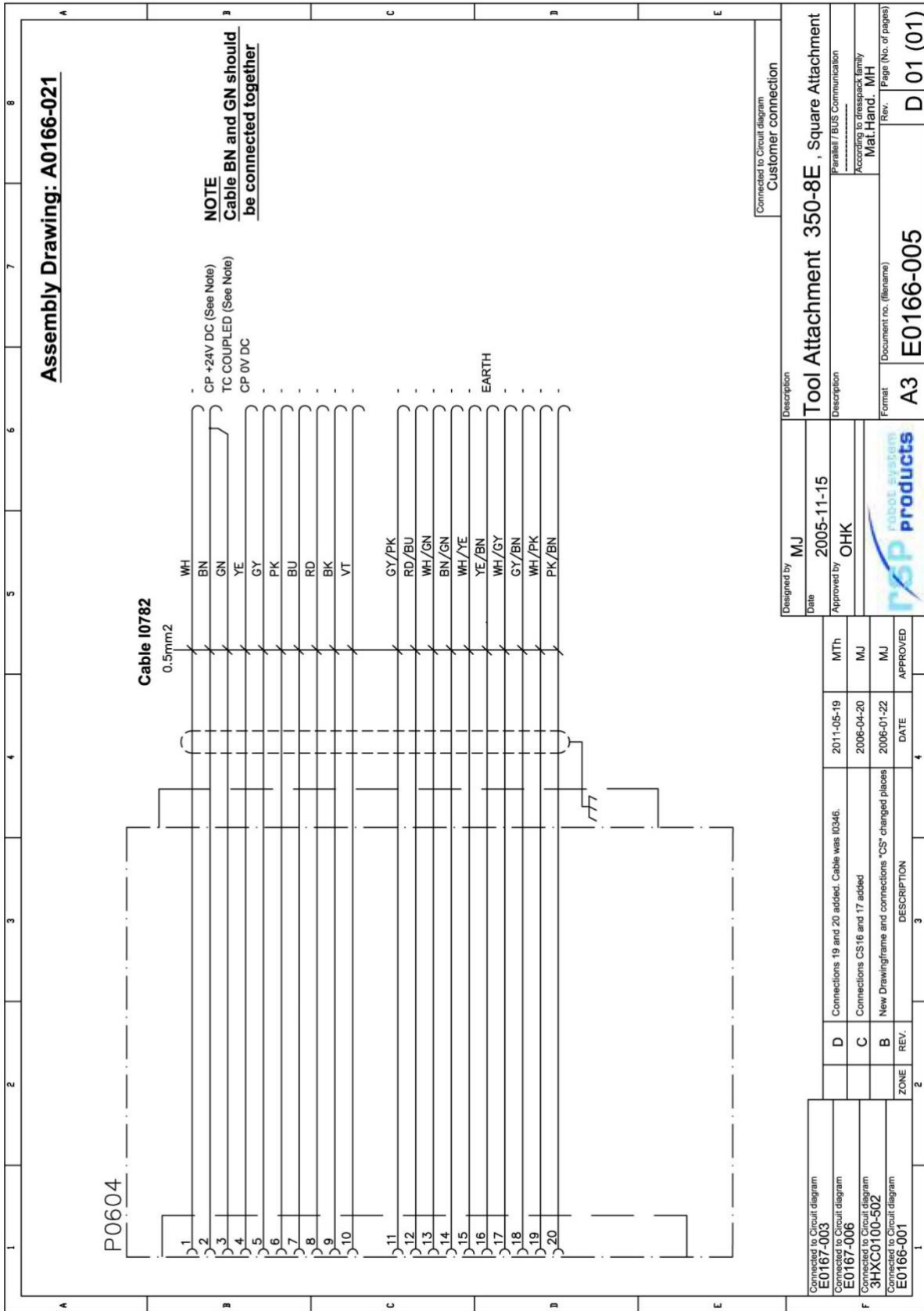


2.1.10 Circuit diagram E0166-003 for P0608



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2.1.11 Circuit diagram E0166-005 for P0604

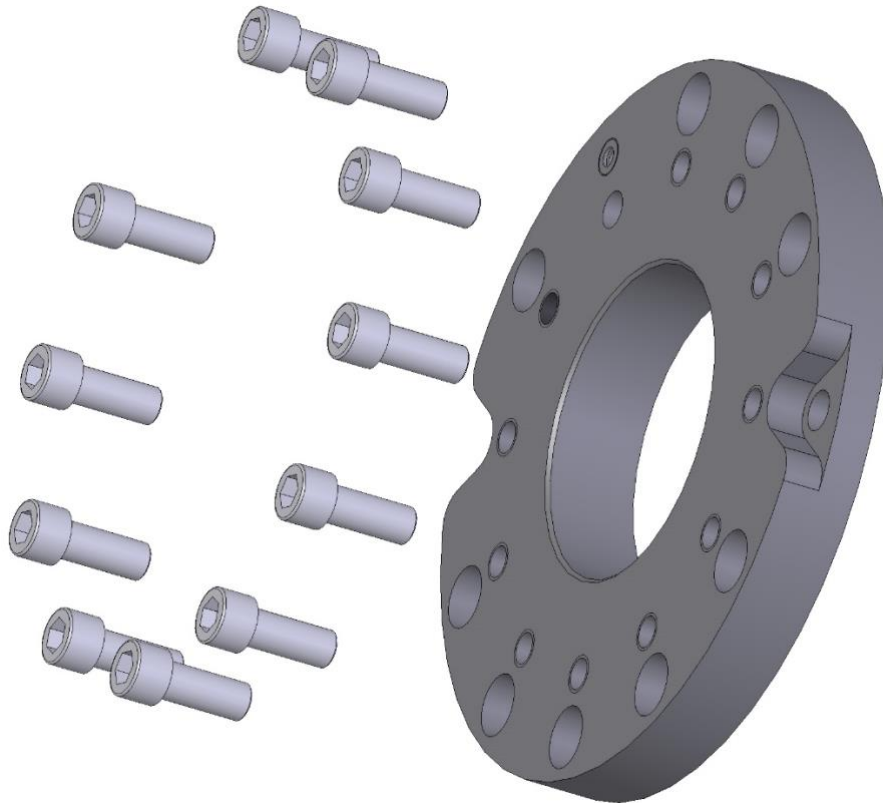


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2.2 Options for tool changer

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

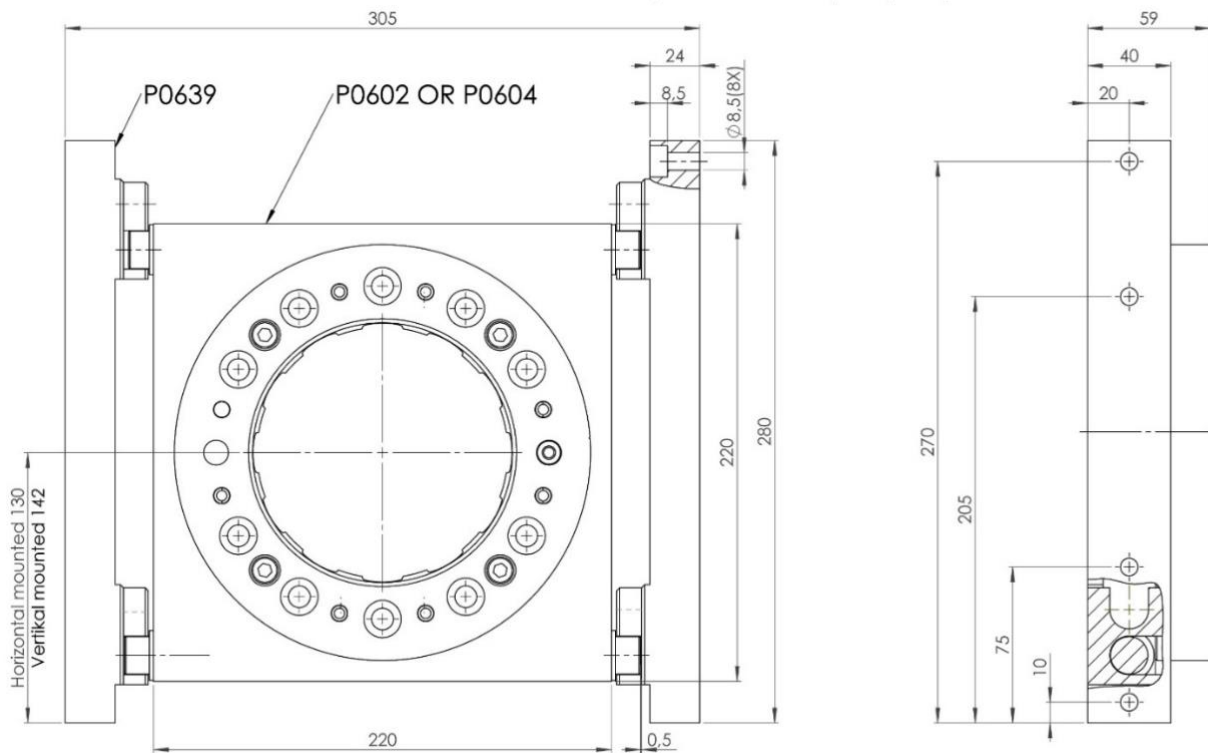
2.2.2 Tool Identification

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: P0639



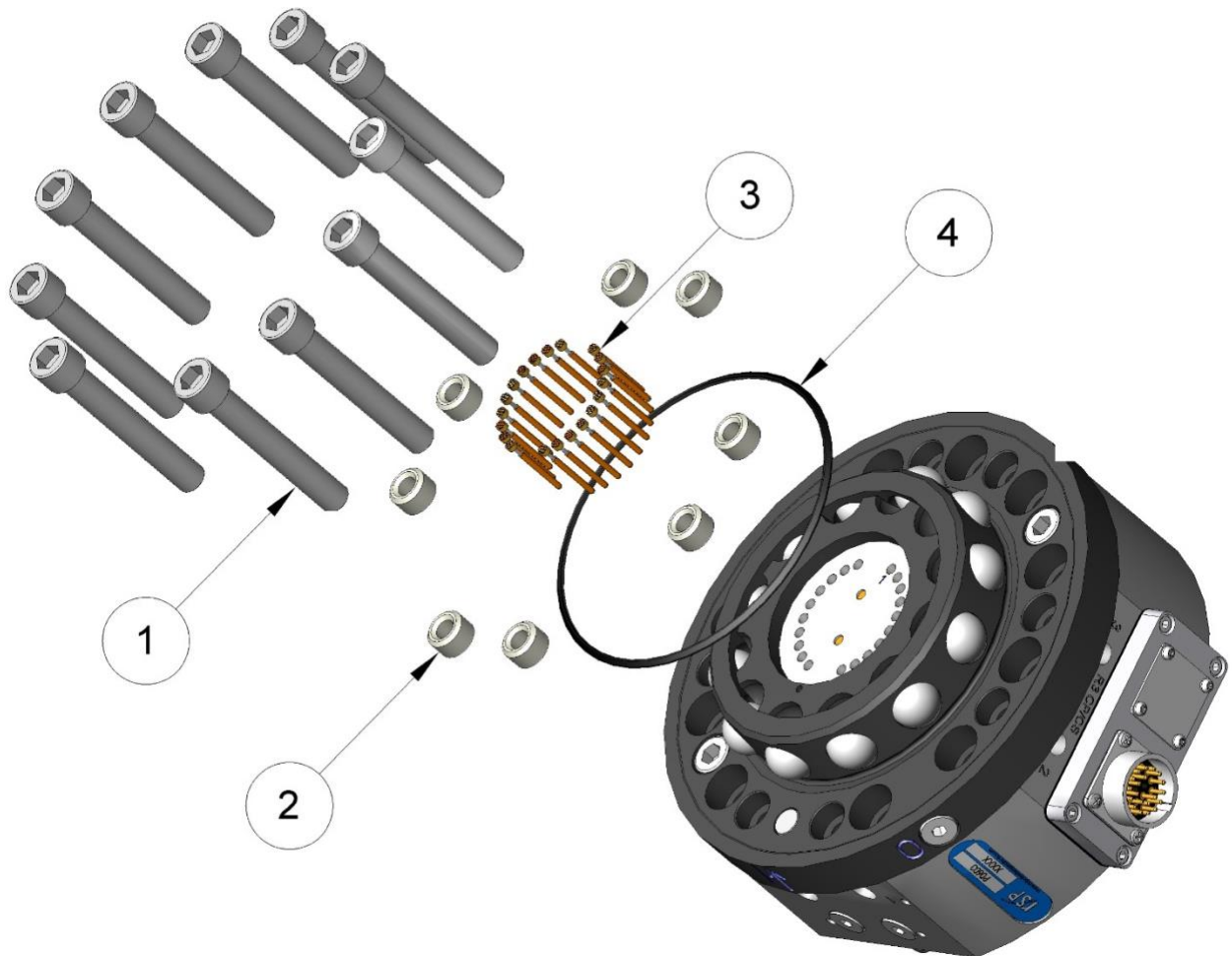
This tool stand kit, mounted on a stand, gives in combination with square tool attachments P0602 or P0604 a robust tool stand for easy tool changing.

Technical data

Weight	2.6 kg
Maximum load	350 kg

3 SPARE PARTS

3.1 Part list for tool changer P0601 and P0603



Item	Description	Part number	Wear part	Pcs
1	Fastening screws M12x80	21212519-548		11
2	Spring loaded signal pins (P0603 only)	I0042	X	20
3	Air sealings	63550006-462	X	8
4	O-ring	I1466	X	1

