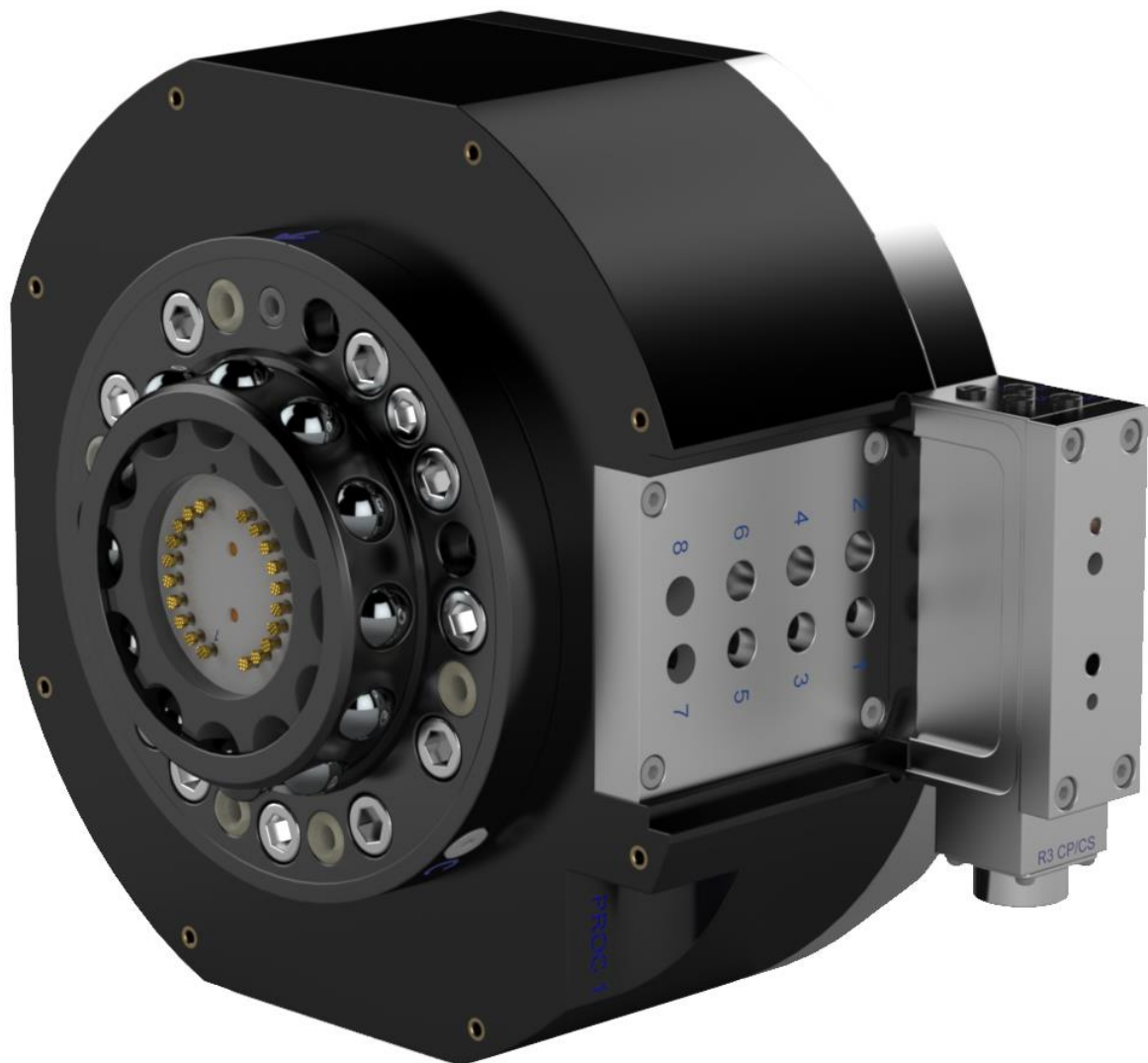


Technical Description

Swivel tool changer STC350

M0629-1

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.

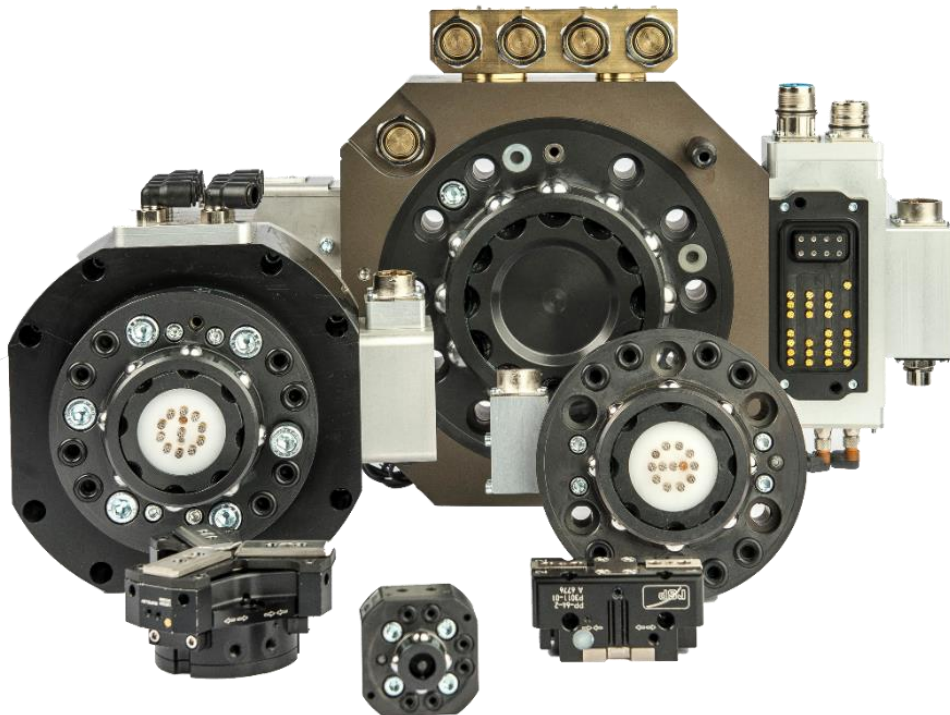
Robot System Products has a wide range of standard robot peripheral products:

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

Robot System Products' swivel 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 you can provide compressed air, water, electrical and data signals as well as weld and servo power to your tools with robot motion capabilities fully maintained. Our swivel tool changers unite the TrueConnect™ tool changing mechanism with our swivel technology, combining the best out of two technologies.

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 swivel tool changer

The Robot System Products' swivel tool changer integrates the advantages of swivels and tool changers into one single product maximizing the flexibility and productivity of the robot.

Our tool changer technology enables robots to handle and switch between multiple tools. The principle behind the patented locking device TrueConnect™ is that load is distributed uniformly through pressing locking balls into spherical grooves in the tool attachment. With TrueConnect™ the play is a minimum and the position repeatability is practically absolute through the lifespan. In consequence substantially larger positional deviations are accepted when docking, A built-in spring ensures that the tool remains in place in the swivel tool changer even if the air pressure drops.

When using a swivel tool changer compressed air and electric signals will be directly available at the tool without loose, hanging cables and hoses which has to be considered during programming. The combination of RSP's hose packages with the swivel tool changer does in addition significantly reduce the design and installation times for the system integrator.

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* (M0412-1) 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
Valve unit	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 swivel tool changers and tool attachments

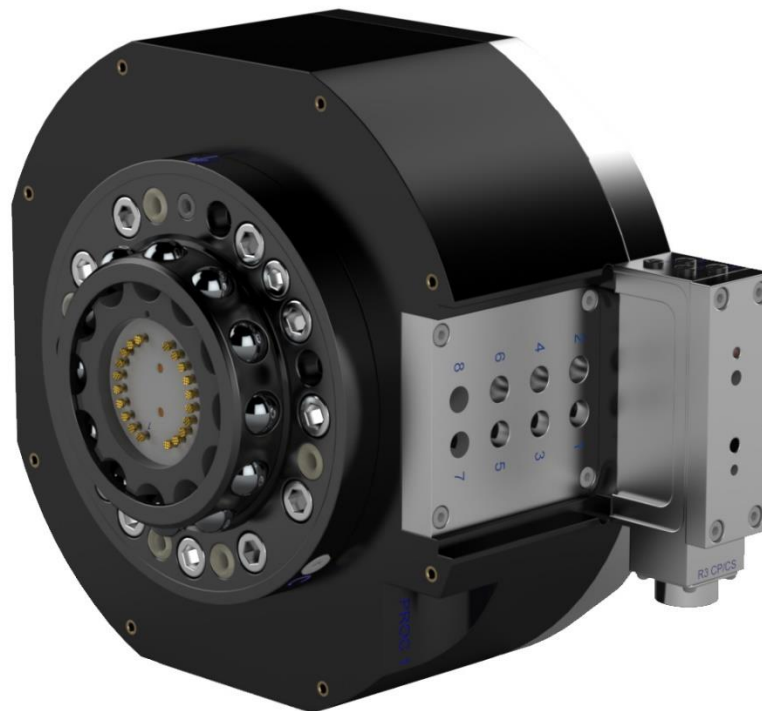
This document presents the Robot System Products STC350-6 and STC350-6E swivel tool changers including tool attachments dedicated for material handling. Likewise presented are adaptation kits, connection kits to facilitate electrical installation and a tool stand kit.

The swivel tool changer STC350-6 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 versions are designated 'E'. The swivel tool changer STC350-6 and STC350-6E cannot transport fluids.

The spring-loaded signal pins of STC350-6E are placed and protected along a circle close to the centre of the swivel tool changer. 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 pins and contact surfaces. A built-in inductive sensor can be used for checking that the tool changer is in open position. Locking of tool changer and presence of tool attachment can be checked through a built-in signal jumper.

The electrical unit can be used for identification and checking the presence of tools by using signal jumpers and binary coding of signals on the tool attachment.

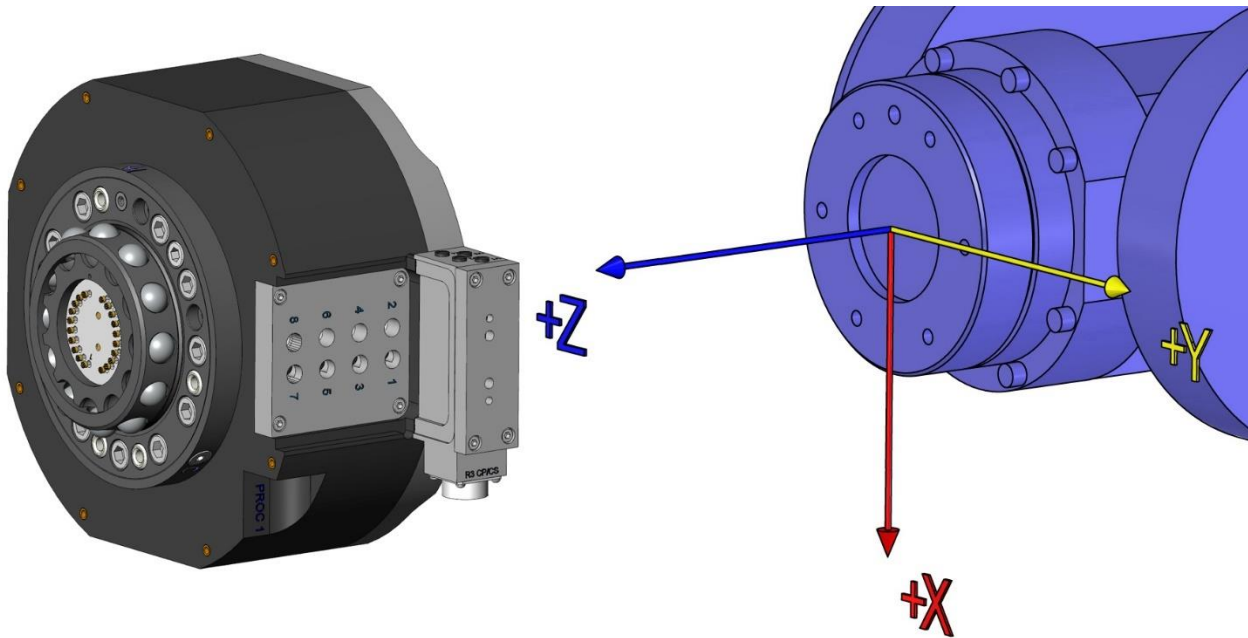
For other bolt circles adaptation plates between the swivel tool changer and the turning disc on the robot may be needed. Such adaptation plates are available from RSP.



STC350-6E

2.1.1 Coordinate System Definition

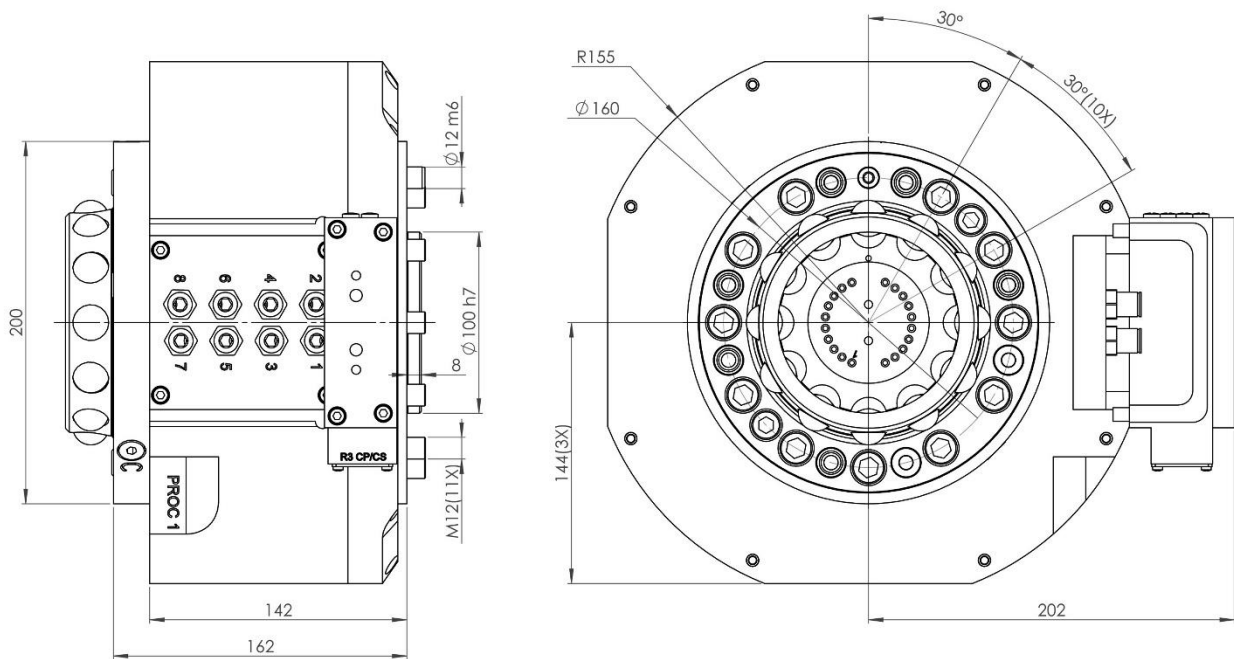
A swivel tool changer adds load to the robot. If the arm and tool loads are not stated correctly during programming the behaviour of the robot and the wear of the equipment will be affected. Information about weight and centre of gravity can, in accordance with the co-ordinate system stated below, be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



NOTE!

For the swivel tool changer origo is situated on the surface in the centre of the robot mounting flange.

2.1.2 Swivel tool changer STC350-6. Article: P0605

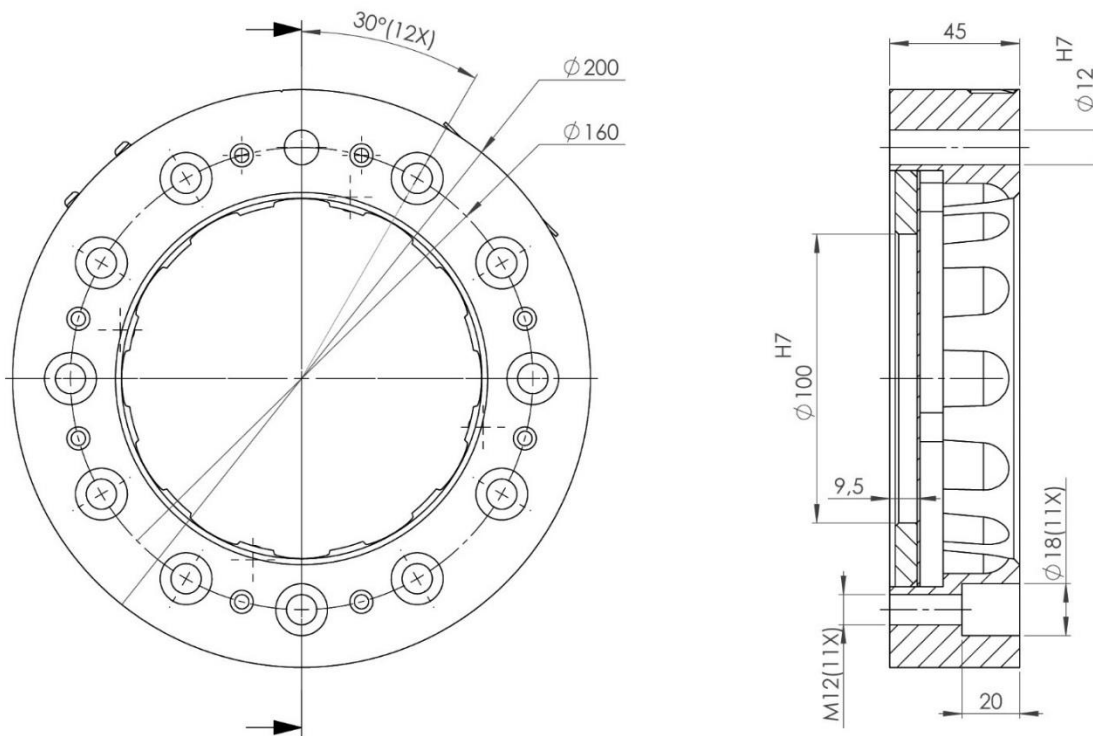


Swivel tool changer STC350-6 transfers 6 pneumatic channels to the tool attachment. To be used together with tool attachments P0606 and P0602.

Technical data

Working temperature	+10°C - +60°C	
Bolt pattern	ISO 9409-1-160-11-M12	
Maximum tool load	Fz (static)	± 3500 N
	Mx/My (dynamic)	± 3500 Nm
	Mz (dynamic)	± 3500 Nm
Weight and centre of gravity (Z)		
	P0605	22.8 kg / 94 mm
	P0605 with P0606	28.0 kg / 111 mm
	P0605 with P0602	28.4 kg / 112 mm
Rotational torque	170 Nm	
Air channels	Pneumatic diagram	See section 2.1.9
	User channels, robot side	6 x G 1/4" (800 l/min, max 10 bar)
	Dedicated channels, G 1/4"	Open TC marked 8, Close TC marked 7 (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: P0606



Tool attachment TA350-8 transfers 8 pneumatic channels to the tool. To be used together with swivel tool changer P0605.

Technical data

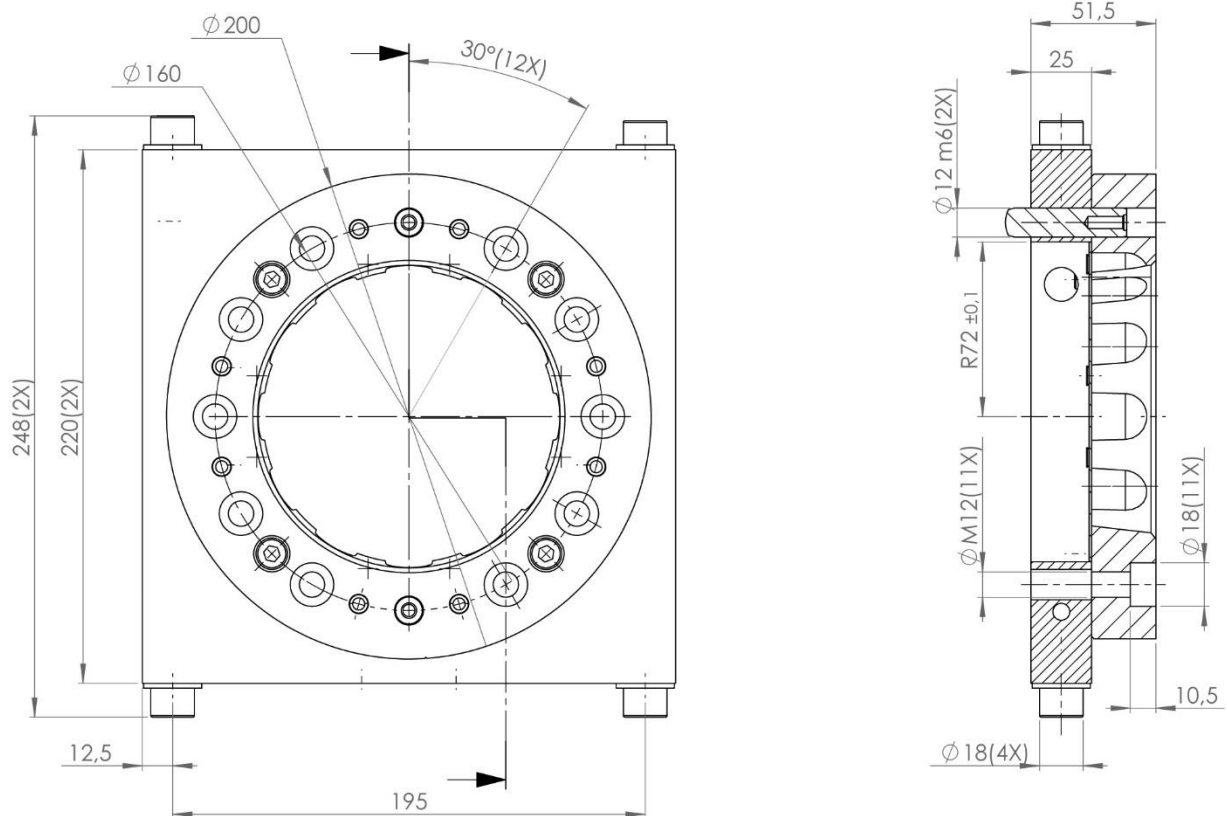
Working temperature		+10°C--+60°C
Bolt pattern		ISO9409-1-160-11-M12
Weight		5.2 kg
Maximum tool load (M12-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
Maximum tool load (M10-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±2 500 Nm
Air channels	Connection, tool side	8 x G 1/4"



NOTE!

Tools can be mounted to the tool attachment using 11 M12-screws, alternatively the tool attachment can be mounted to the tool using 11 M10-screws.

2.1.4 Tool attachment, TA350-8 square. Article: P0602



Tool attachment TA350-8 transfers 8 pneumatic channels to the tool. To be used together with swivel tool changer P0605.

Technical data

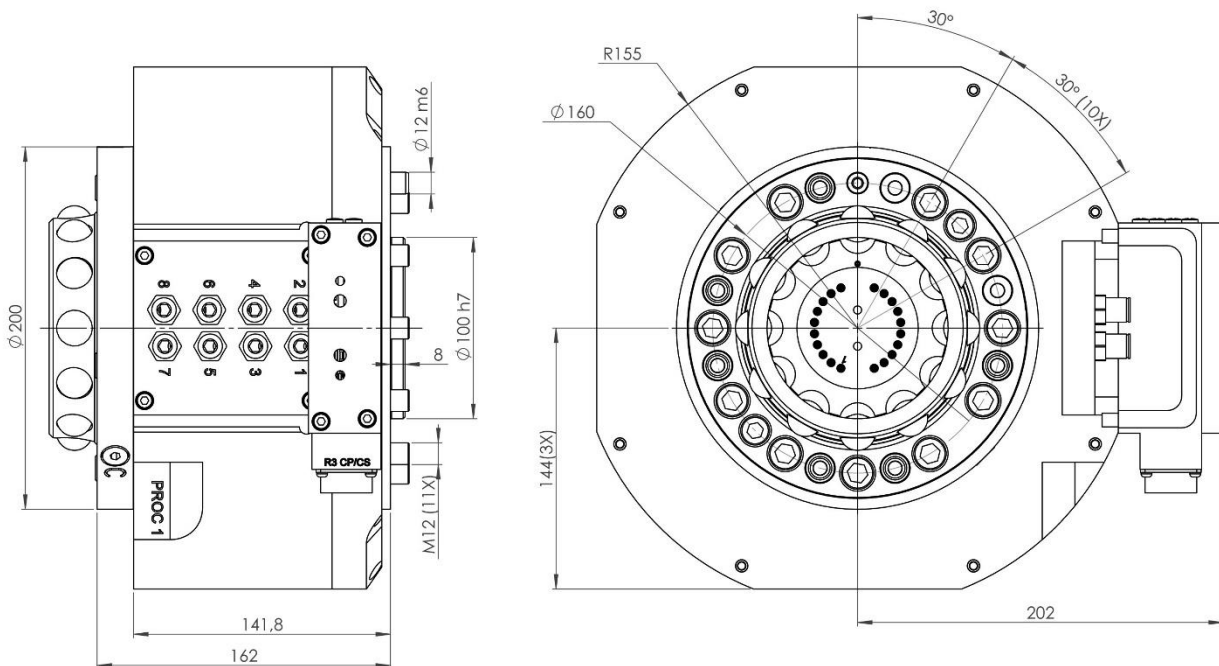
Working temperature		+10°C--+60°C
Bolt pattern		ISO9409-1-160-11-M12
Weight		5.7 kg
Maximum tool load (M12-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±3 500 Nm
Maximum tool load (M10-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±2 500 Nm
Air channels	Connection, tool side	8 x G 1/4"



NOTE!

Tools can be mounted to the tool attachment using 11 M12-screws, alternatively the tool attachment can be mounted to the tool using 11 M10-screws.

2.1.5 Swivel tool changer STC350-6E. Article: P0607

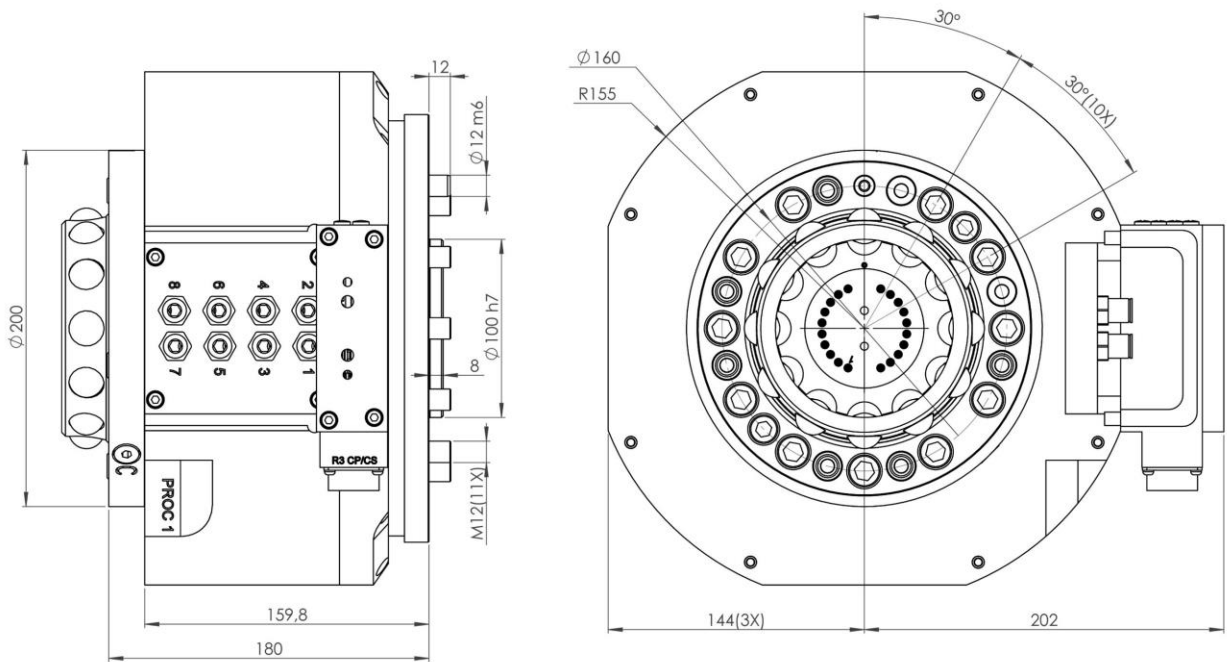


Swivel tool changer STC350-6E transfers 6 pneumatic channels and 13 electrical signals to the tool attachment. To be used together with tool attachments P0608 and P0604.

Technical data

Working temperature		+10°C - +60°C
Bolt pattern		ISO 9409-1-160-11-M12
Maximum tool load	Fz (static)	± 3500 N
	Mx/My (dynamic)	± 3500 Nm
	Mz (dynamic)	± 3500 Nm
Weight and centre of gravity (Z)		
P0607		23.0 kg / 93 mm
P0607 and P0608		28.5 kg / 110 mm
P0607 and P0604		29.2 kg / 113 mm
Rotational torque		170 Nm
Air channels	Pneumatic diagram	See section 2.1.9
	User channels, robot side Dedicated channels, G 1/4"	6 x G 1/4" (800 l/min, max 10 bar) Open TC marked 8, Close TC marked 7 (6-10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content
Electrical signals	Circuit diagram	E0167-006 (see section 2.1.10)
	Total signals	13 x (2A, 60V) + PE
	Dedicated signals	24V, 0V, TC Coupled, TC Uncoupled
	Connection, robot side	Souriau 23P (UT001823PH)
Connection kits (optional)	P8002 (connector)	Souriau 23S (straight)
	P8002-1 (connector)	Souriau 23S (angled)
	P8129-50 (cable kit)	Souriau 23S, 5-meter cable, open end

2.1.6 Swivel tool changer STC350-6E Sealed. Article: P0695A

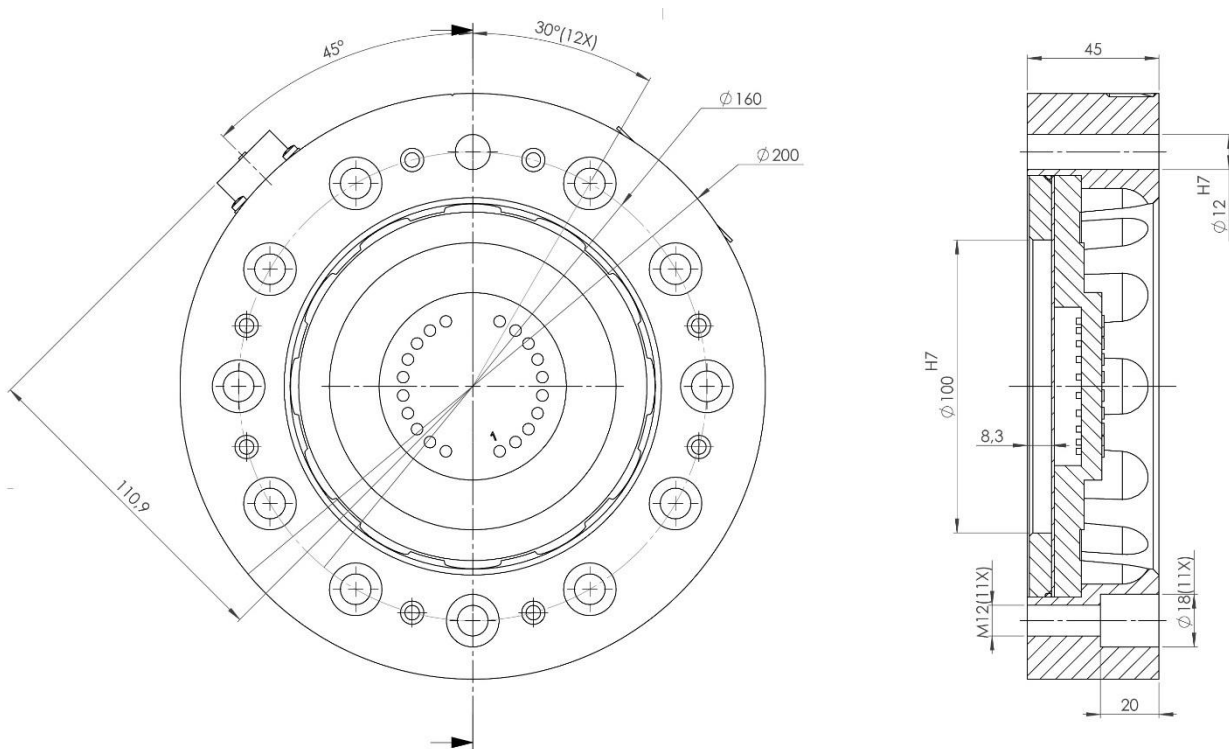


Swivel tool changer STC350-6E transfers 6 pneumatic channels and 13 electrical signals to the tool attachment. To be used together with tool attachments P0608 and P0604.

Technical data

Working temperature		+10°C - +60°C
Bolt pattern		ISO 9409-1-160-11-M12
Maximum tool load	Fz (static)	± 3500 N
	Mx/My (dynamic)	± 3500 Nm
	Mz (dynamic)	± 3500 Nm
Weight and centre of gravity (Z)		
P0695A		24.6 kg / 104 mm
P0695 and P0608		29.8 kg / 121 mm
P0695A and P0604		30.7 kg / 124 mm
Rotational torque		170 Nm
Air channels	Pneumatic diagram	See section 2.1.9
	User channels, robot side	6 x G 1/4" (800 l/min, max 10 bar)
	Dedicated channels, G 1/4"	Open TC marked 8, Close TC marked 7 (6-10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content
Electrical signals	Circuit diagram	E0167-006 (see section 2.1.10)
	Total signals	13 x (2A, 60V) + PE
	Dedicated signals	24V, 0V, TC Coupled, TC Uncoupled
	Connection, robot side	Souriau 23P (UT001823PH)
Connection kits (optional)	P8002 (connector)	Souriau 23S (straight)
	P8002-1 (connector)	Souriau 23S (angled)
	P8129-50 (cable kit)	Souriau 23S, 5-meter cable, open end

2.1.7 Tool attachment round, TA350-8E. Article: P0608



Tool attachment TA350-8E round transfers 8 pneumatic channels and 13 electrical signals to the tool. To be used together with tool changers P0607 and P0695A.

Technical data

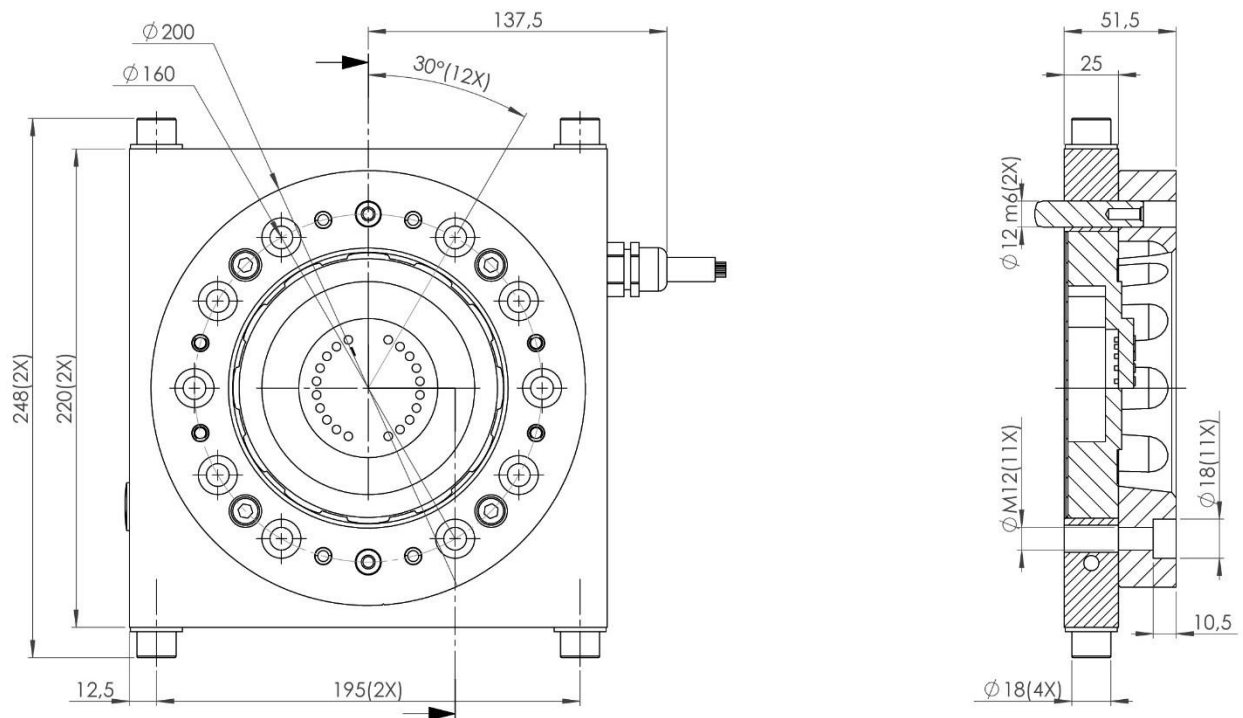
Working temperature		+10°C--+60°C
Bolt pattern		ISO9409-1-160-11-M12
Weight		5.5 kg
Maximum tool load (M12-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
Maximum tool load (M10-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±2 500 Nm
Air channels	Connection, tool side	8 x G 1/4"
Electrical signals	Circuit diagram	E0166-003 (see section 2.1.11)
	Total signals	13 + PE
	Dedicated signals	24 V, 0V, TC Coupled
	Connection, tool side	Souriau 19S (UT001619SH)



NOTE!

Tools can be mounted to the tool attachment using 11 M12-screws, alternatively the tool attachment can be mounted to the tool using 11 M10-screws.

2.1.8 Tool attachment square, TA350-8E. Article: P0604



Tool attachment TA350-8E square transfers 8 pneumatic channels and 13 electrical signals to the tool. To be used together with swivel tool changers P0607 and P0695A.

Technical data

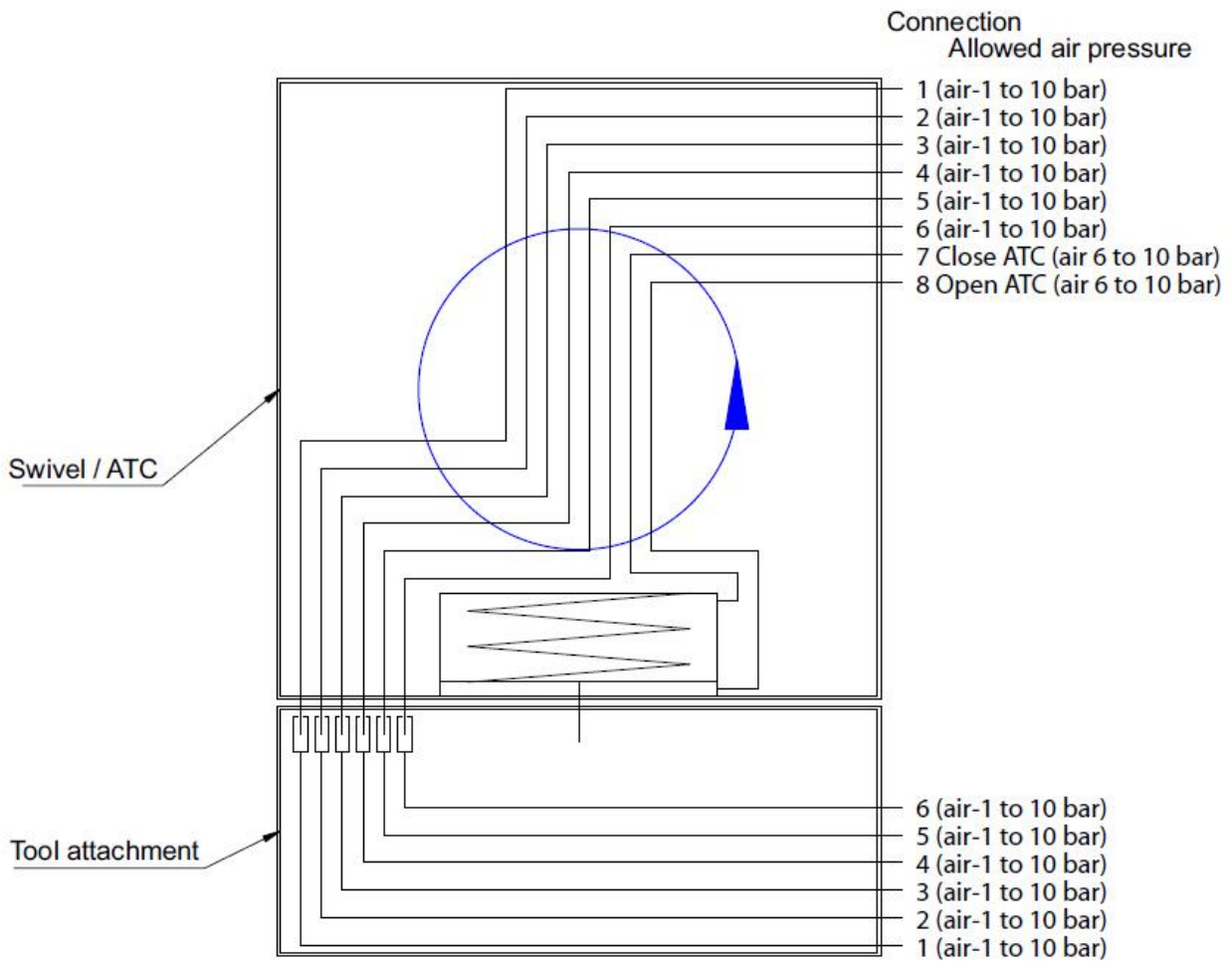
Working temperature		+10°C–+60°C
Bolt pattern		ISO9409-1-160-11-M12
Weight		6.1 kg
Maximum tool load (M12-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
Maximum tool load (M10-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±2 500 Nm
Air channels	Connection, tool side	8 x G 1/4"
Electrical signals	Circuit diagram	E0166-005 (see section 2.1.12)
	Total signals	13 + PE
	Dedicated signals	24 V, 0V, TC Coupled
	Connection, tool side	1.0 m cable (20x0.5mm ²) with free end



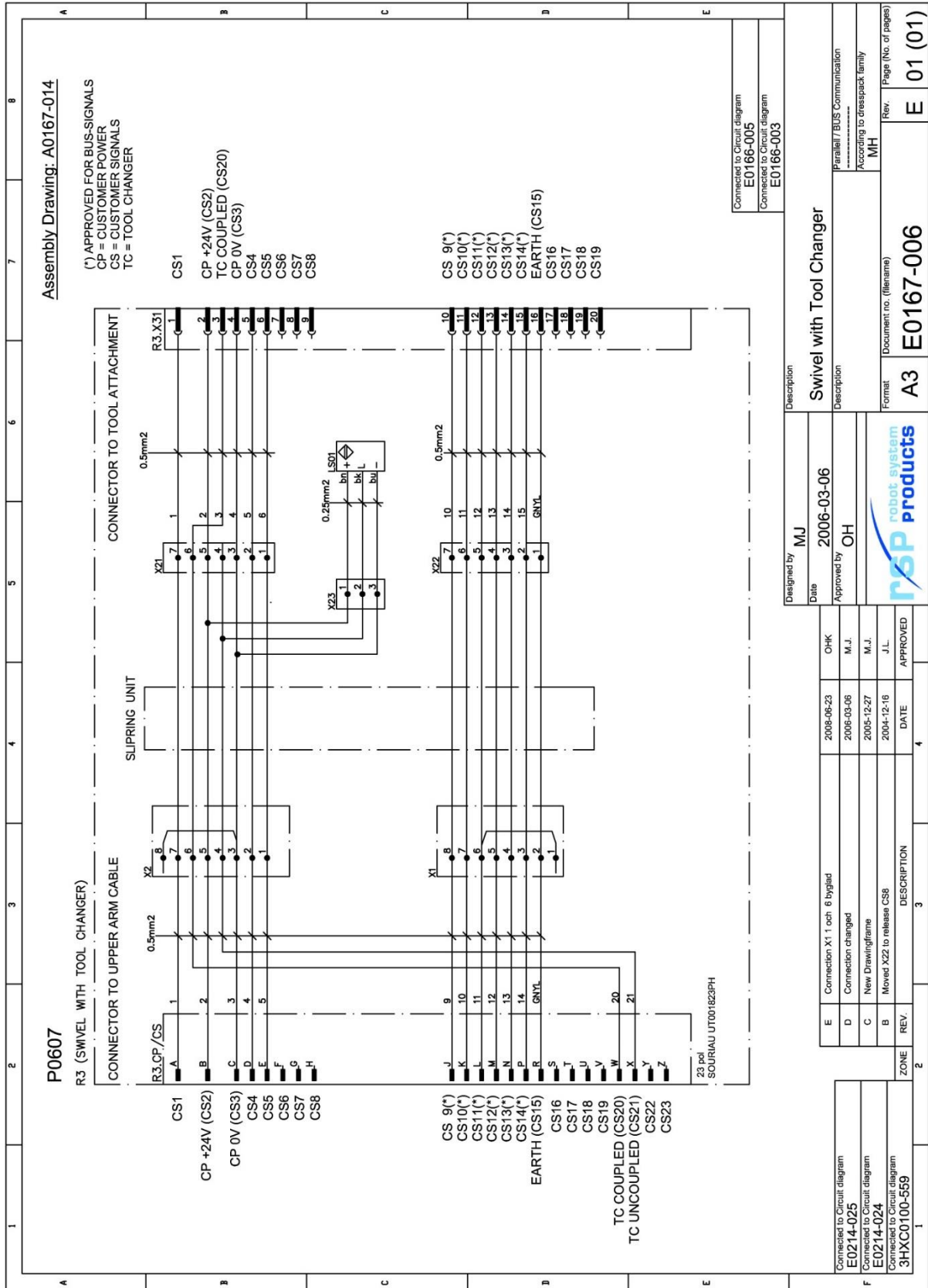
NOTE!

Tools can be mounted to the tool attachment using 11 M12-screws, alternatively the tool attachment can be mounted to the tool using 11 M10-screws.

2.1.9 Pneumatic diagram

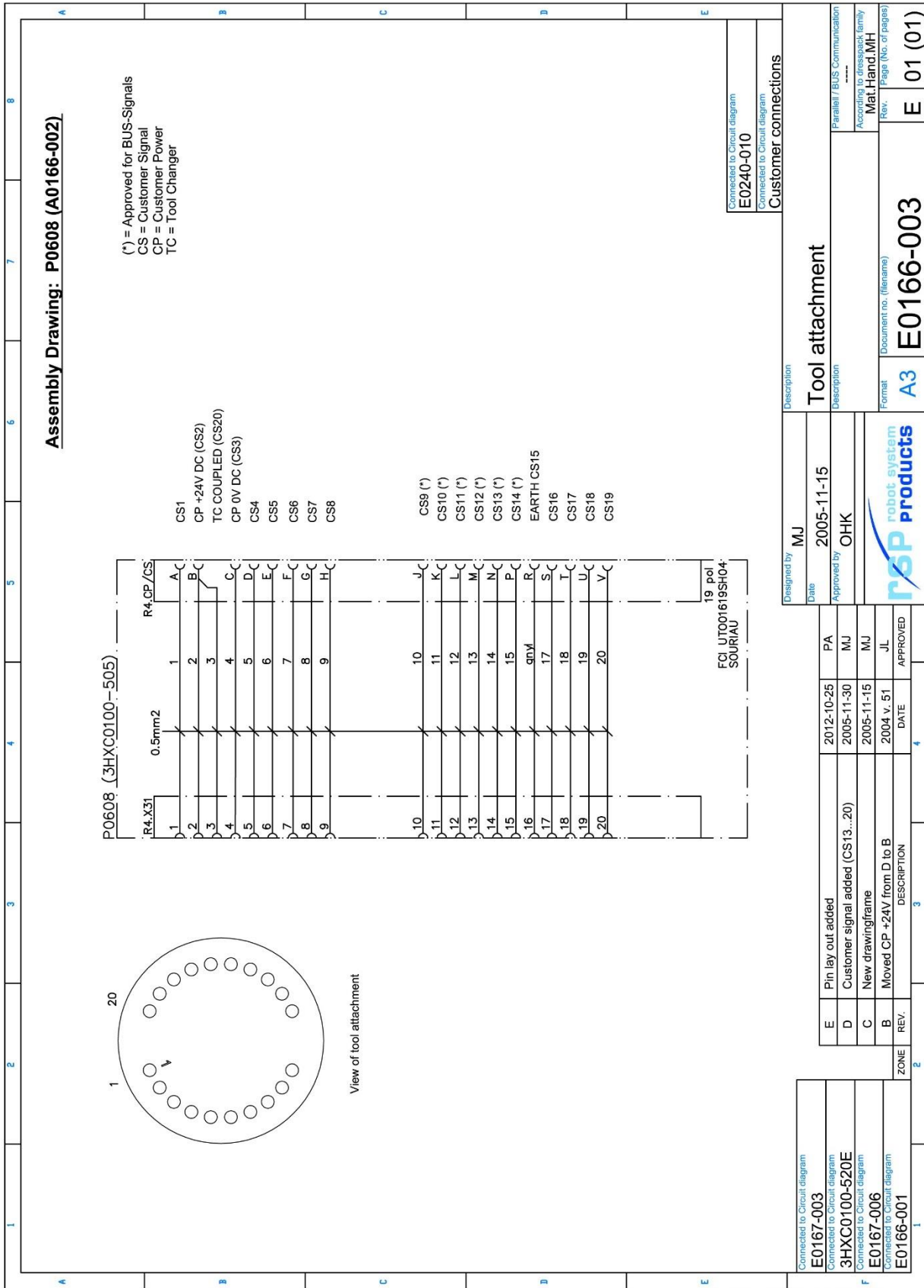


2.1.10 Circuit diagram E0167-006 for P0607 and P0695A



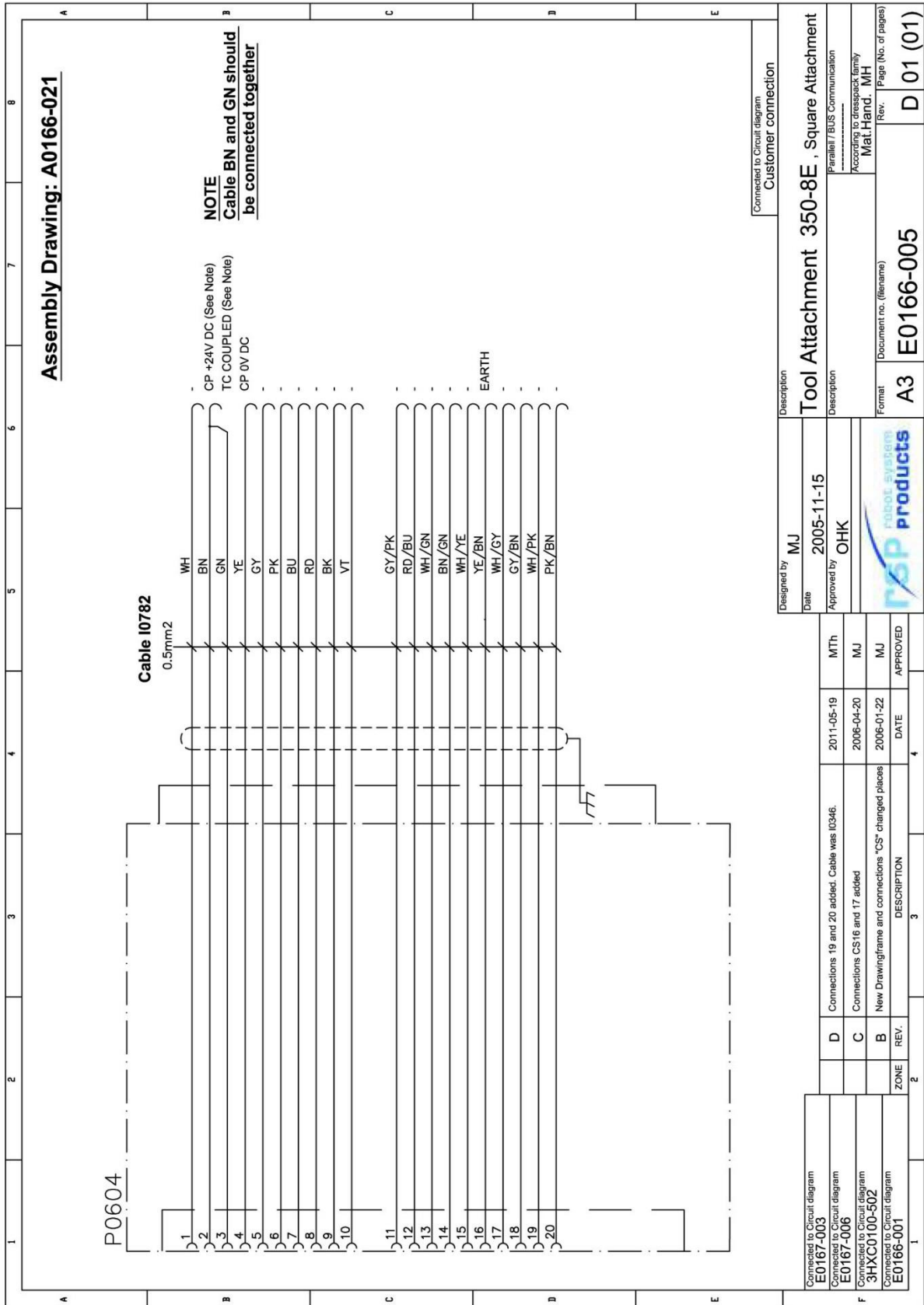
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2.1.11 Circuit diagram E0166-003 for P0608



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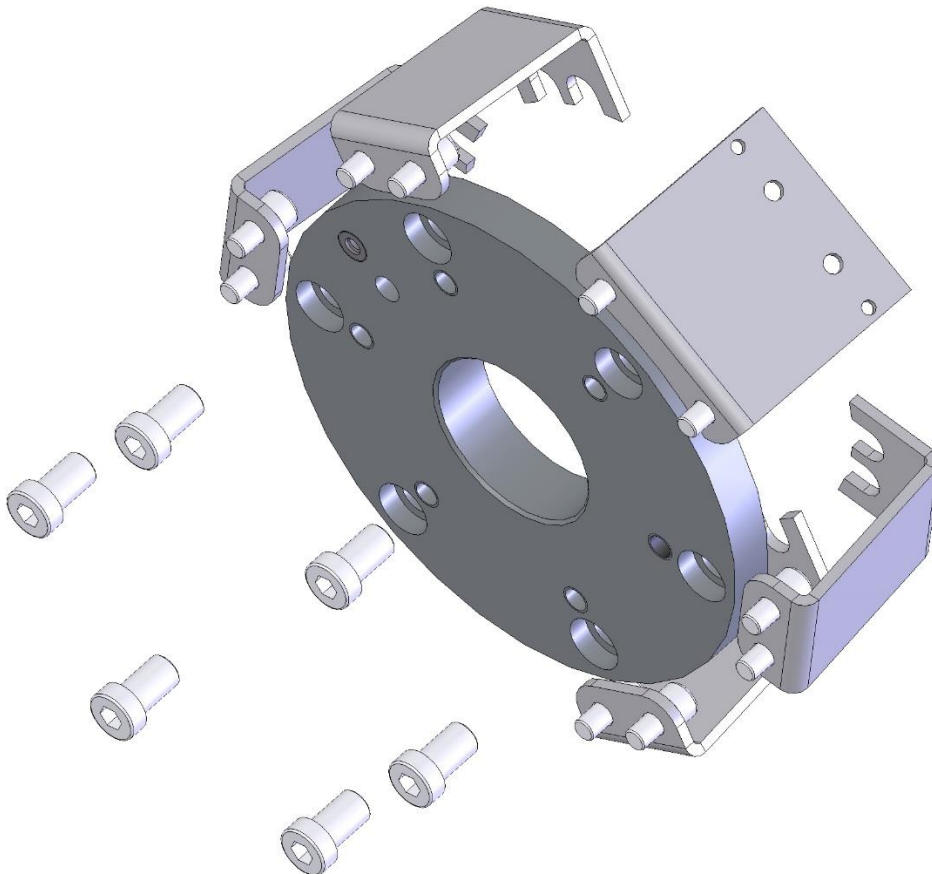
2.1.12 Circuit diagram E0166-005 for P0604



2.2 Options for swivel tool changer

2.2.1 Robot adaptation kit

A robot adaptation kit is mandatory for mounting of a swivel tool changer to a robot. The adaptation kits always include rotation stops which are prohibiting the swivel tool changers to rotate in relation to the robots. Dependent on robot model an adaptation kit may also include an adaptation plate for other bolt circles. Robot adaptation kits are available from RSP.

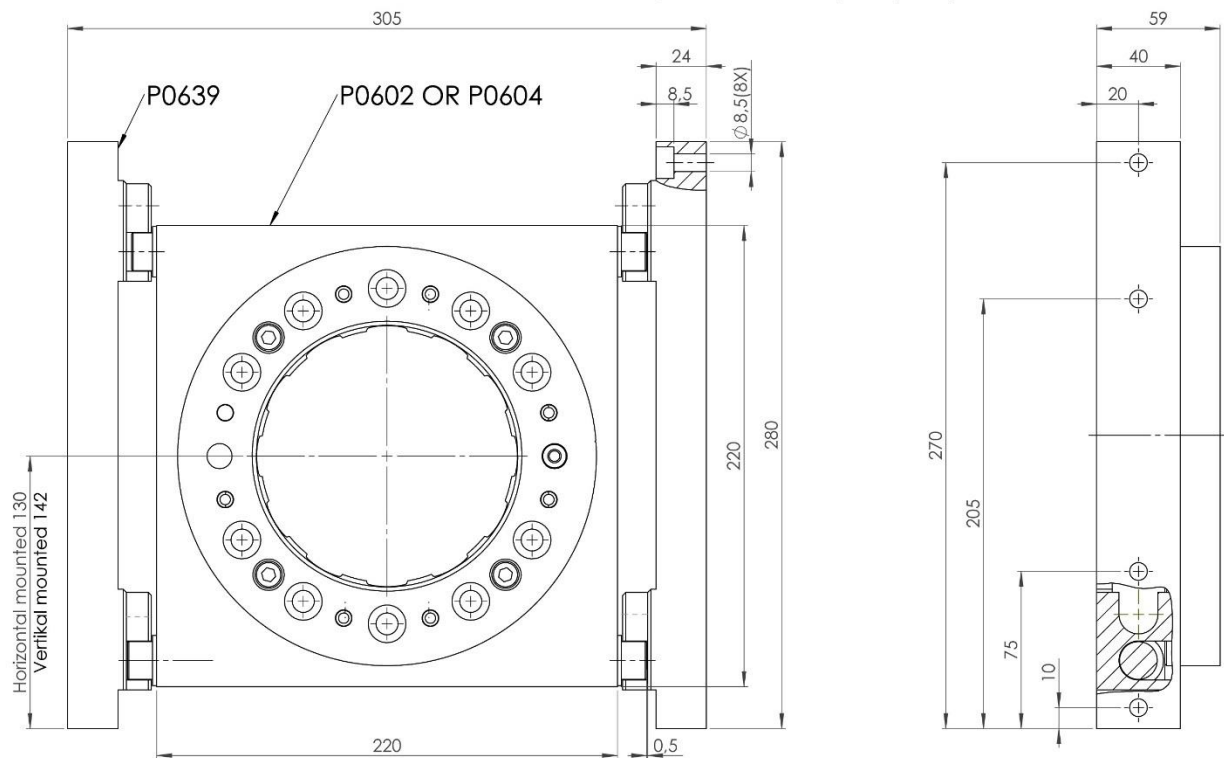


NOTE! Dependent on robot model and rotation stop, there can be limitations on the freedom of movement of axis 5. Contact Robot System Products for more information.

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 swivel tool changer.

2.2.3 Tool stand kit. Article: 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



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



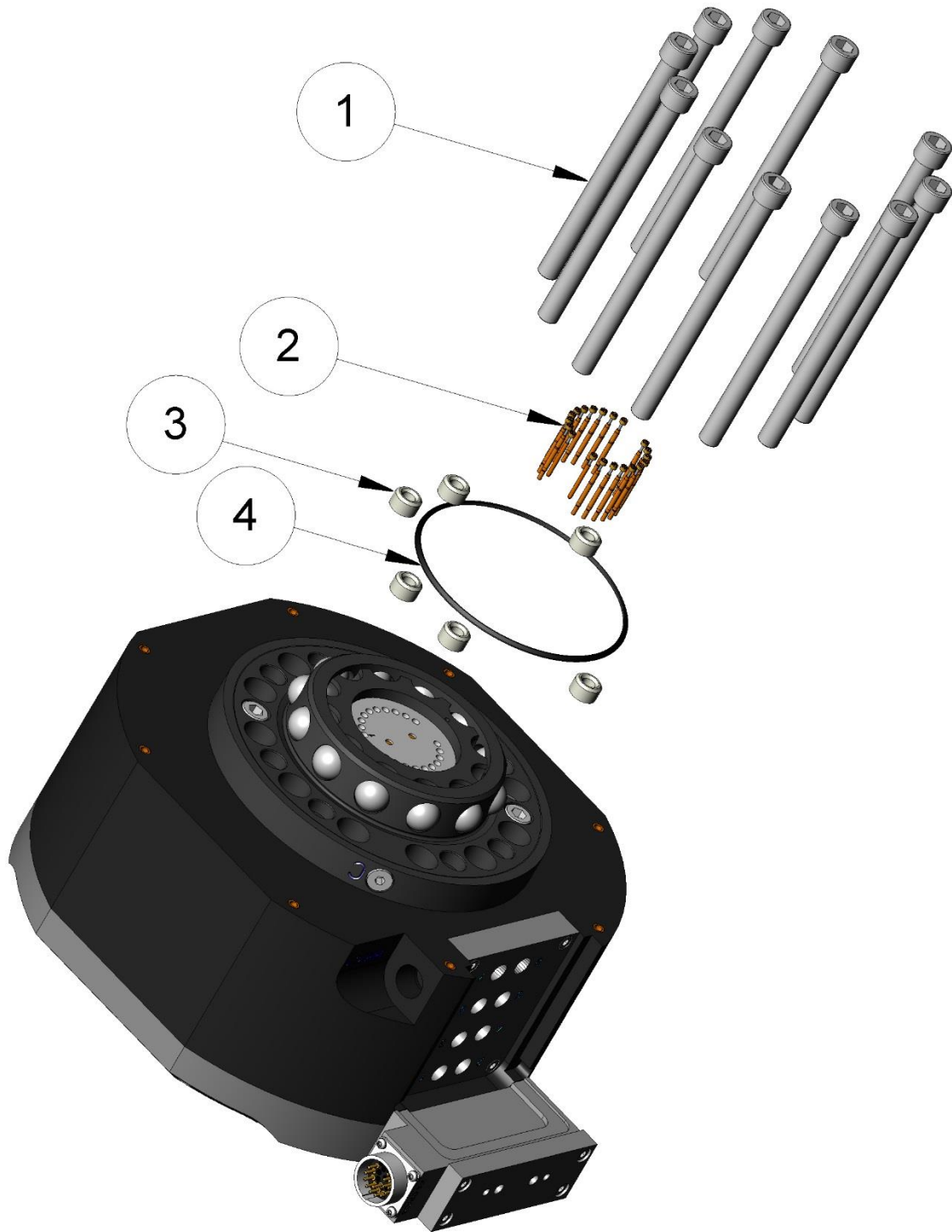
NOTE!
The tool stand must not be spring-loaded!

2.2.4 Limitation of Robot movements

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

3 SPARE PARTS

3.1 Part list for swivel tool changer, P0605, P0607 and P0695A



Item	Description	Part number	Wear part	Pcs
1	Locking screw	MC6S 12x160		11
2	Spring loaded signal pin (STC350-6E only)	I0042	X	20
3	Air sealings	63550006-462	X	6
4	O-ring	I1466	X	1

