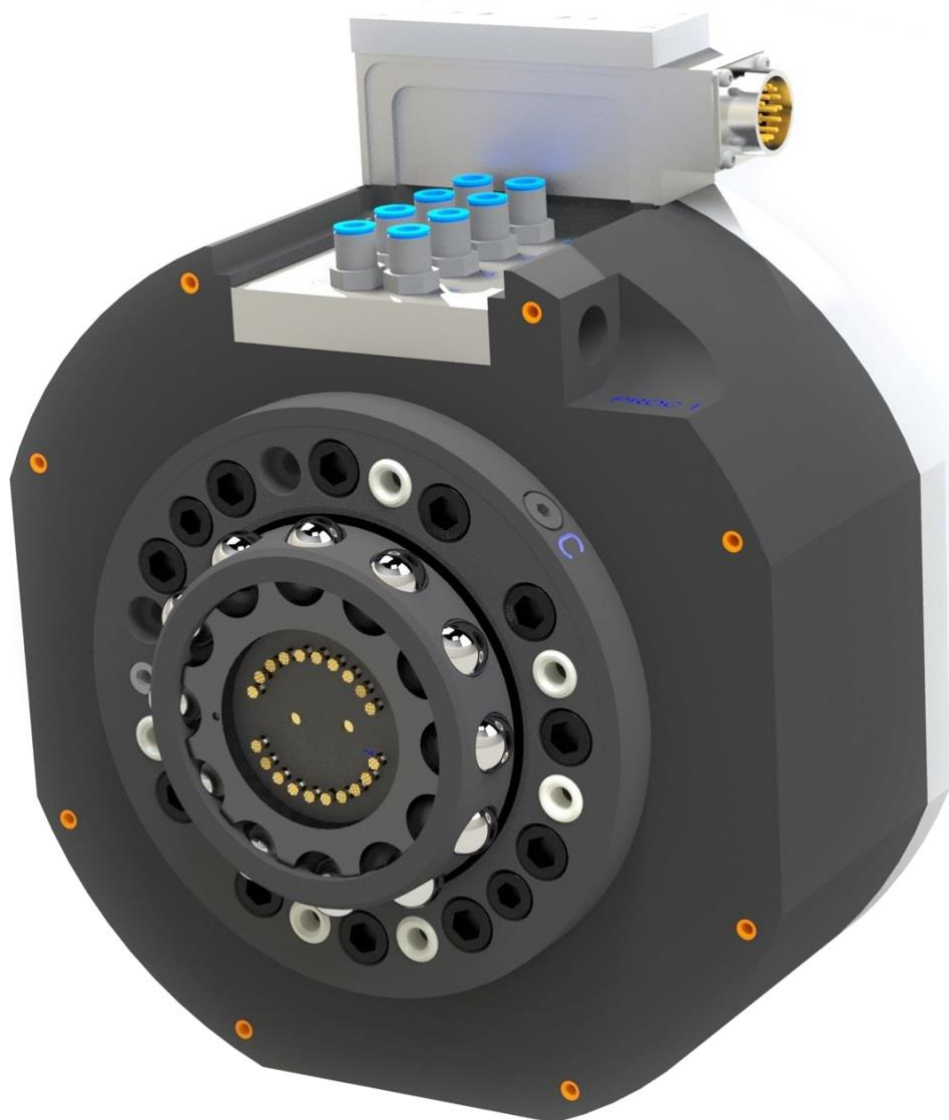


# Technical Description

## 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

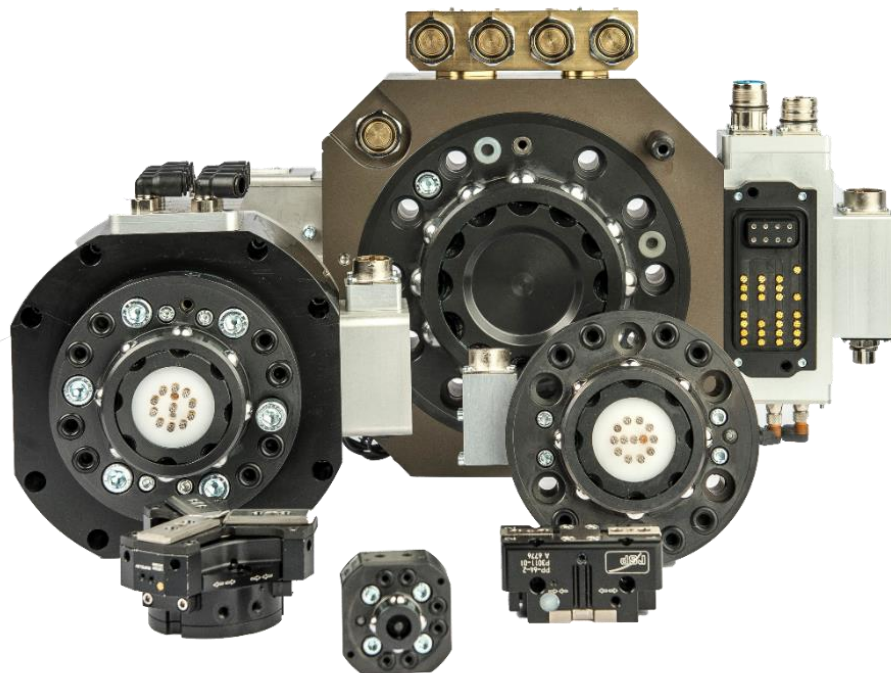
**Robot System Products** is a front-rank provider of peripheral products for high performance robot applications. We provide complete system solutions for your robot installations, aiming to improve your productivity with the most reliable and cost-effective tooling on the market. Continuously we explore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

## 2 TECHNICAL SPECIFICATIONS

### 2.1 Description of swivel tool changers and tool attachments

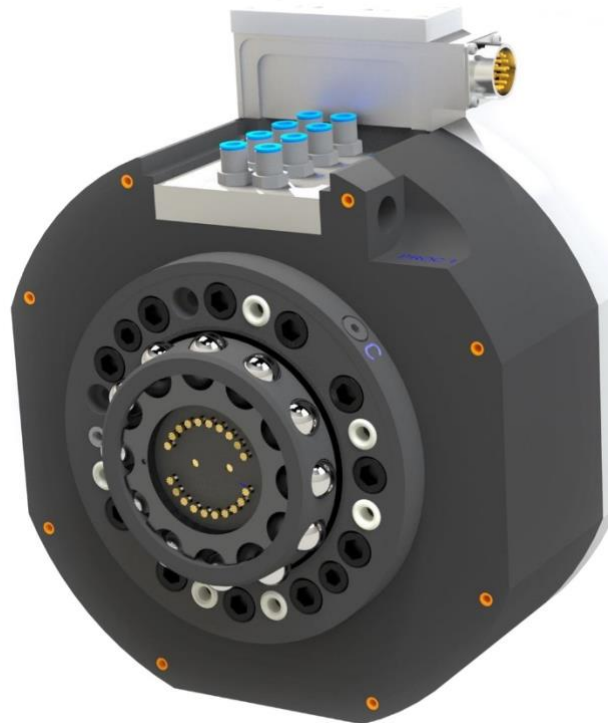
This document presents the Robot System Products STC350-6 and STC350-6E swivel tool changers including tool attachments dedicated for material handling. Likewise presented are adaptation kits, connection kits to facilitate electrical installation and a tool stand kit.

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.

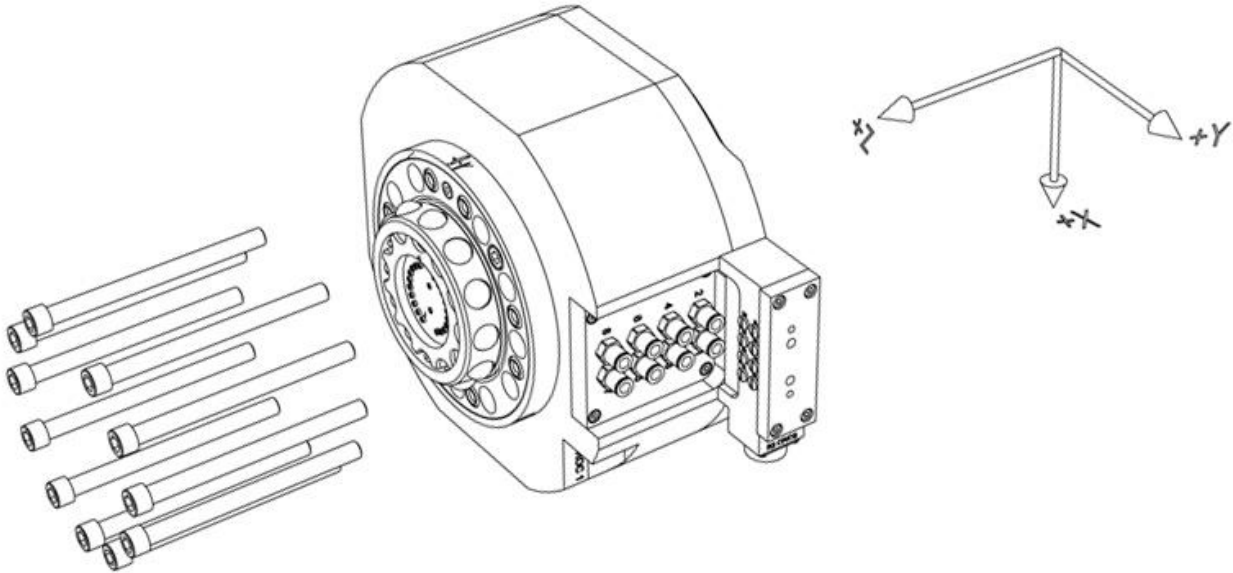
For other bolt circles adaptation plates between the swivel tool changer and the turning disc on the robot may be needed. Such adaptation plates are available from RSP.



*STC350-6E*

## 2.1.1 Coordinate System Definition

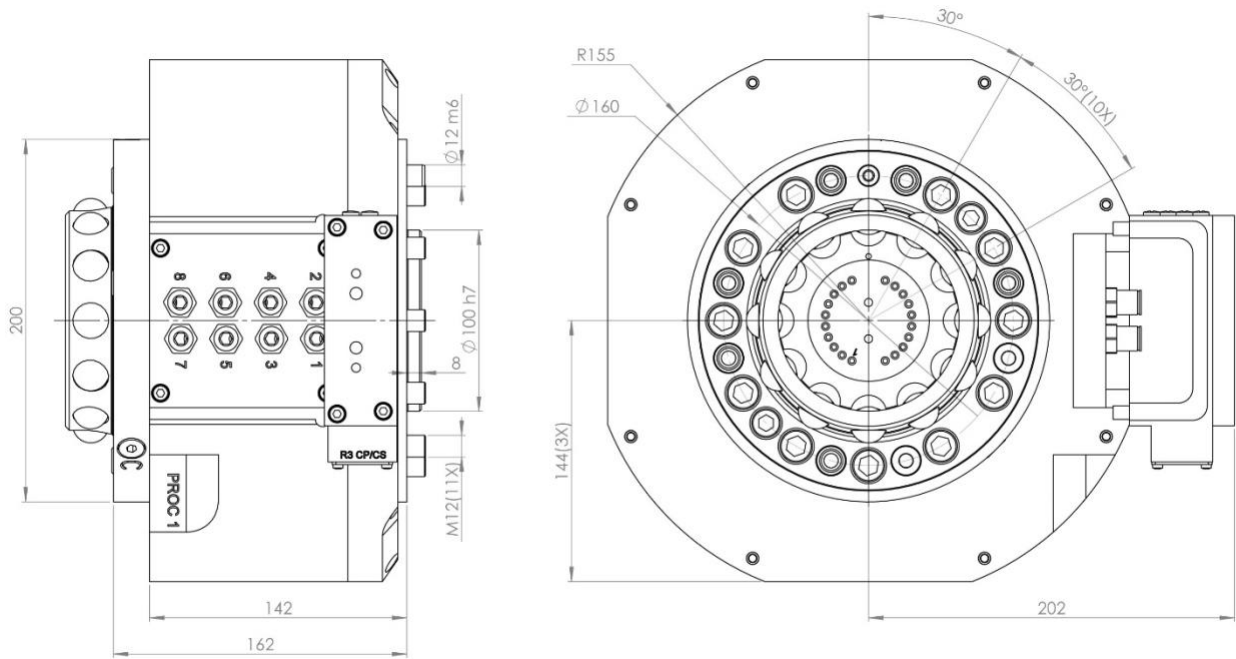
A swivel tool changer adds load to the robot. If the arm and tool loads are not stated correctly during programming the behaviour of the robot and the wear of the equipment will be affected. Information about weight and centre of gravity can, in accordance with the co-ordinate system stated below, be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



**NOTE!** For the 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 Swivel tool changer STC350-6. Article no: P0605

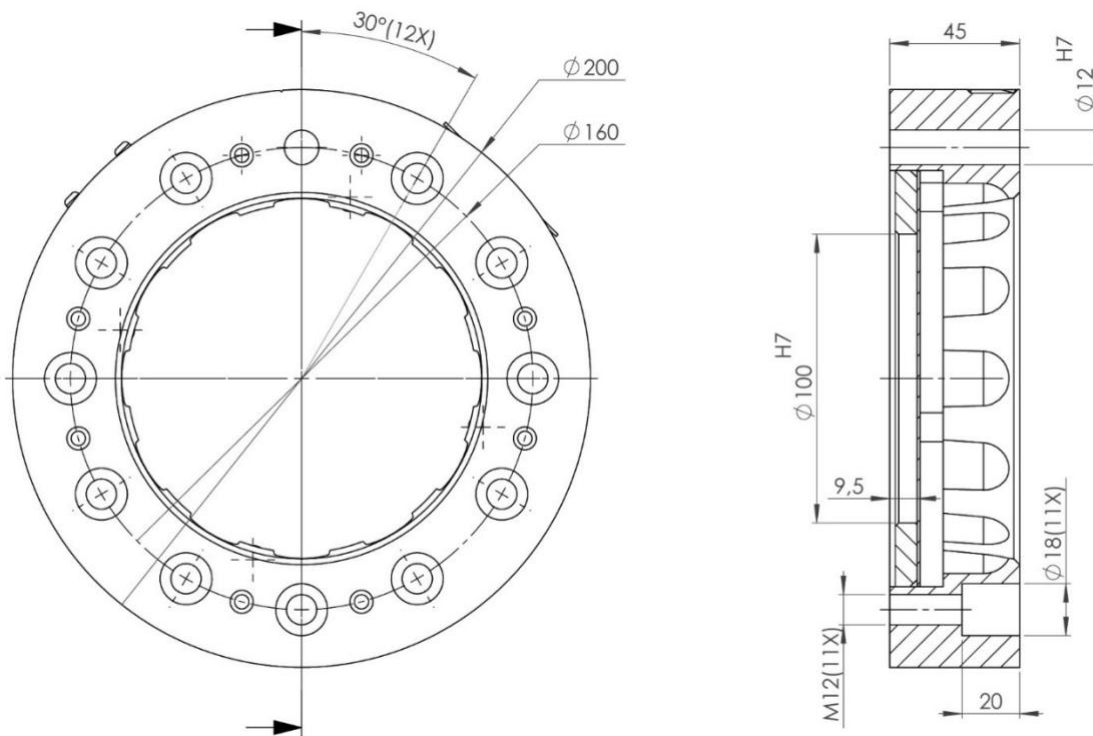


Swivel tool changer STC350-6 transfers 6 pneumatic channels to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with tool attachments P0606 and P0602.

#### Technical data

<b>Working temperature</b>		+10°C--+50°C
<b>Bolt pattern</b>		ISO 9409-1-160-11-M12
<b>Maximum tool load</b>	Fz (static)	± 3500 N
	Mx/My (dynamic)	± 3500 Nm
	Mz (dynamic)	± 3500 Nm
<b>Weight and centre of gravity (Z)</b>		
P0605		22.8 kg / 94 mm
P0605 with P0606		28.0 kg / 111 mm
P0605 with P0602		28.4 kg / 112 mm
<b>Rotational torque</b>		170 Nm
<b>Air channels</b>	Pneumatic diagram	See <a href="#">section 2.1.9</a>
	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 no: P0606



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

#### Technical data

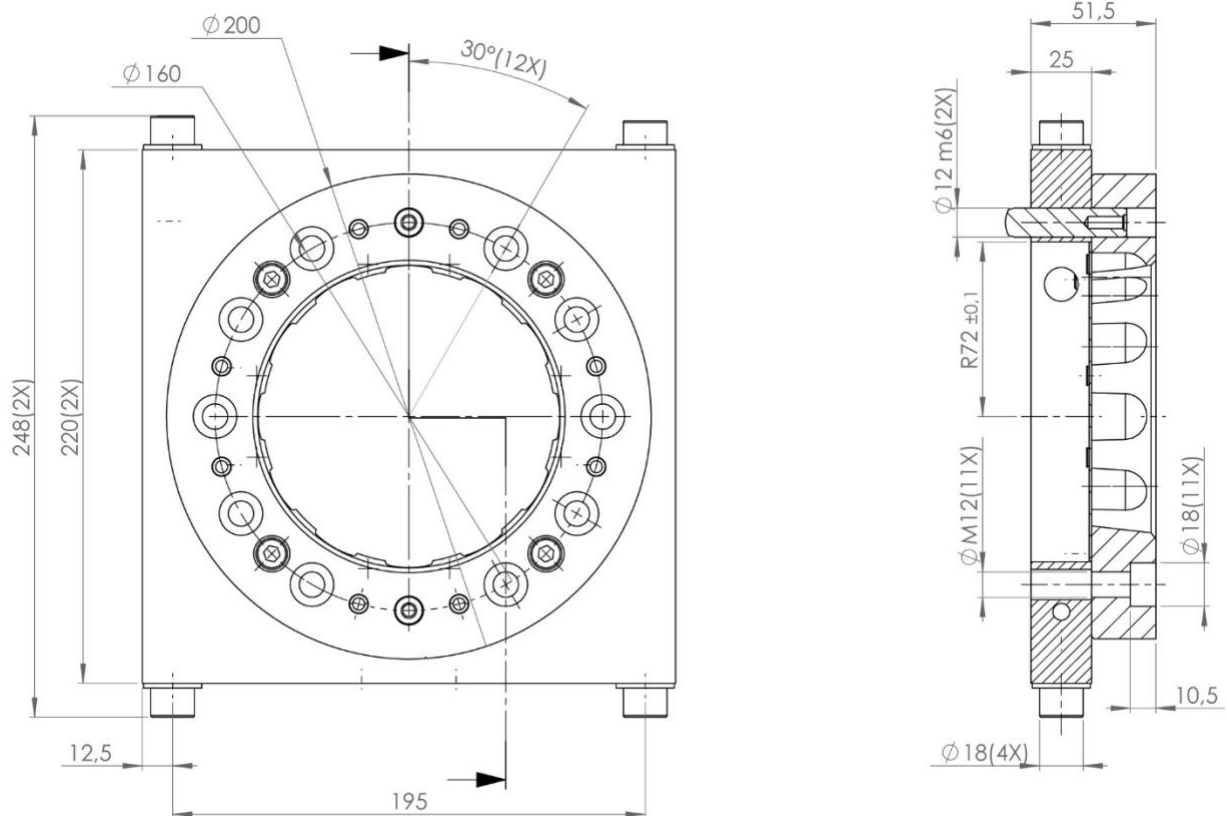
<b>Working temperature</b>		+10°C--+50°C
<b>Bolt pattern</b>		ISO9409-1-160-11-M12
<b>Weight</b>		5.2 kg
<b>Maximum tool load</b> (M12-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
<b>Maximum tool load</b> (M10-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±2 500 Nm
<b>Air channels</b>	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 no: P0602



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

### Technical data

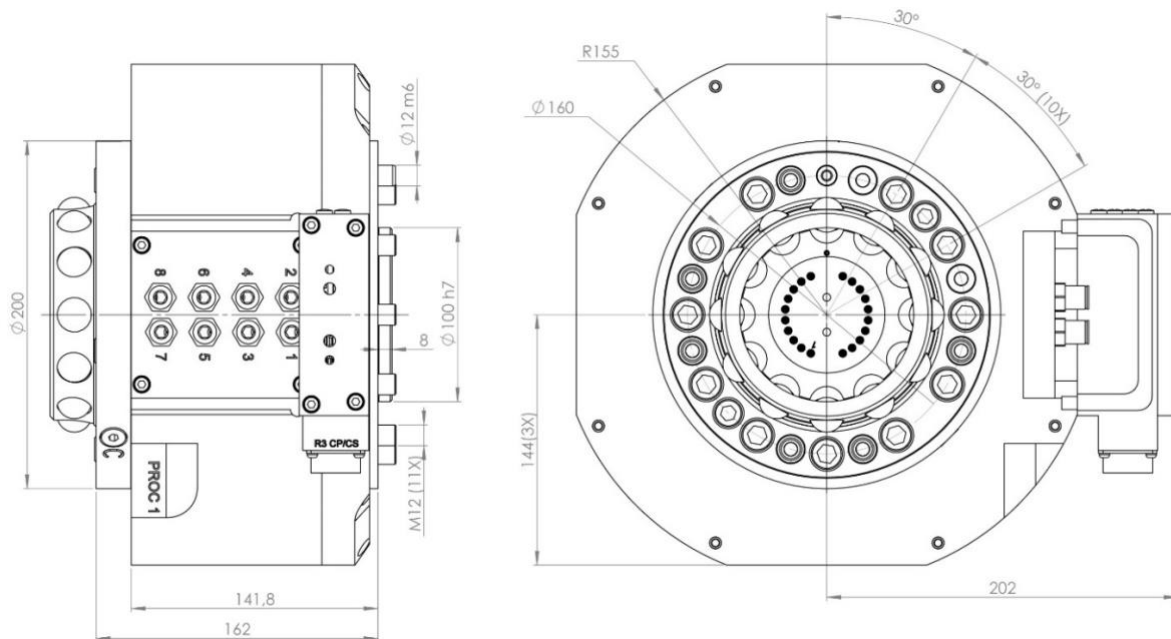
<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO9409-1-160-11-M12
<b>Weight</b>		5.7 kg
<b>Maximum tool load</b> (M12-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±3 500 Nm
<b>Maximum tool load</b> (M10-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±3 500 N ±3 500 Nm ±2 500 Nm
<b>Air channels</b>	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 no: P0607

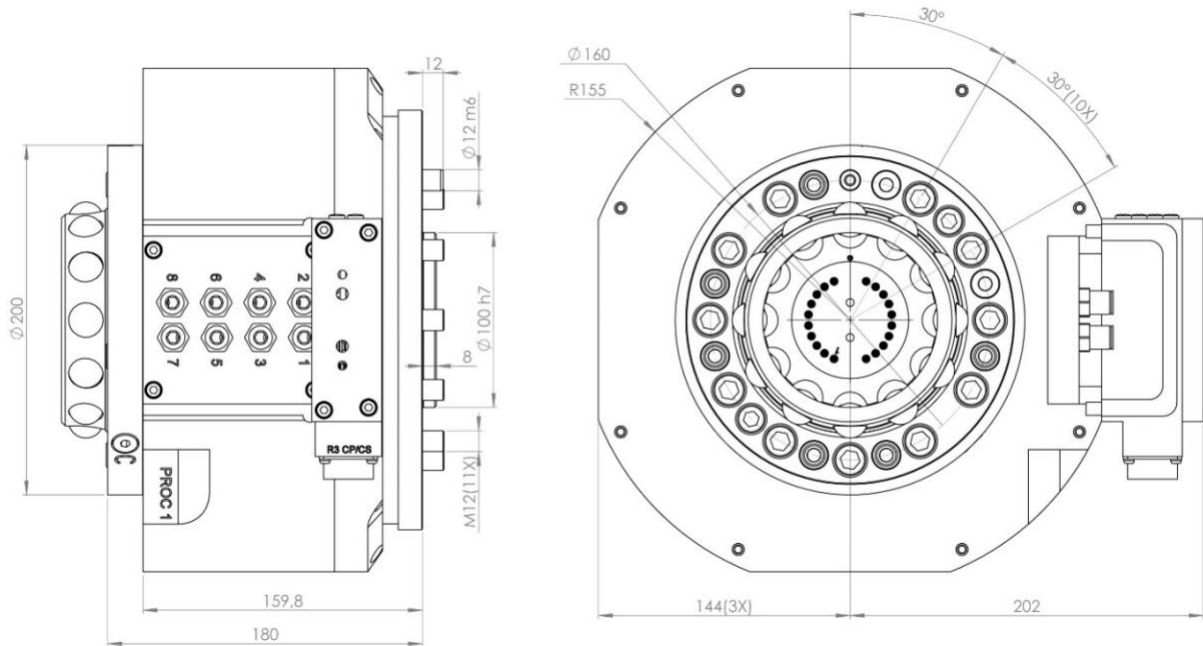


Swivel tool changer STC350-6E transfers 6 pneumatic channels and 13 electrical signals to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with tool attachments P0608 and P0604.

### Technical data

<b>Working temperature</b>		+10°C--+50°C
<b>Bolt pattern</b>		ISO 9409-1-160-11-M12
<b>Maximum tool load</b>	Fz (static)	± 3500 N
	Mx/My (dynamic)	± 3500 Nm
	Mz (dynamic)	± 3500 Nm
<b>Weight and centre of gravity (Z)</b>		
P0607		23.0 kg / 93 mm
P0607 and P0608		28.5 kg / 110 mm
P0607 and P0604		29.2 kg / 113 mm
<b>Rotational torque</b>		170 Nm
<b>Air channels</b>	Pneumatic diagram User channels, robot side Dedicated channels, G 1/4"	See <a href="#">section 2.1.9</a> 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
<b>Electrical signals</b>	Circuit diagram	E0167-006 (see <a href="#">section 2.1.10</a> )
	Total signals	13 x (2A, 60V) + PE
	Dedicated signals	24V, 0V, TC Coupled, TC Uncoupled
	Connection, robot side	Souriau 23P (UT001823PH)
<b>Connection kits (optional)</b>	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 no: P0695A

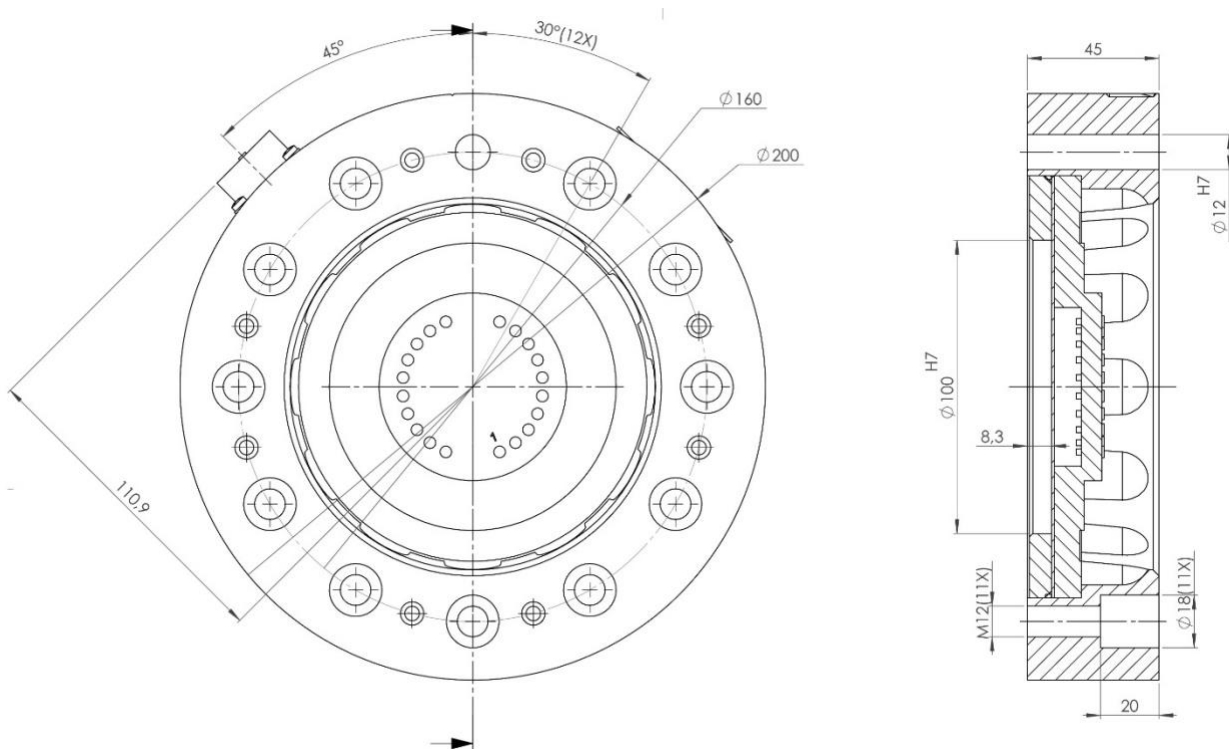


Swivel tool changer STC350-6E transfers 6 pneumatic channels and 13 electrical signals to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with tool attachments P0608 and P0604.

### Technical data

<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO 9409-1-160-11-M12
<b>Maximum tool load</b>	Fz (static)	± 3500 N
	Mx/My (dynamic)	± 3500 Nm
	Mz (dynamic)	± 3500 Nm
<b>Weight and centre of gravity (Z)</b>		
P0695A		24.6 kg / 104 mm
P0695 and P0608		29.8 kg / 121 mm
P0695A and P0604		30.7 kg / 124 mm
<b>Rotational torque</b>		170 Nm
<b>Air channels</b>	Pneumatic diagram User channels, robot side Dedicated channels, G 1/4"	See <a href="#">section 2.1.9</a> 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
<b>Electrical signals</b>	Circuit diagram	E0167-006 (see <a href="#">section 2.1.10</a> )
	Total signals	13 x (2A, 60V) + PE
	Dedicated signals	24V, 0V, TC Coupled, TC Uncoupled
	Connection, robot side	Souriau 23P (UT001823PH)
<b>Connection kits (optional)</b>	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 no: 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

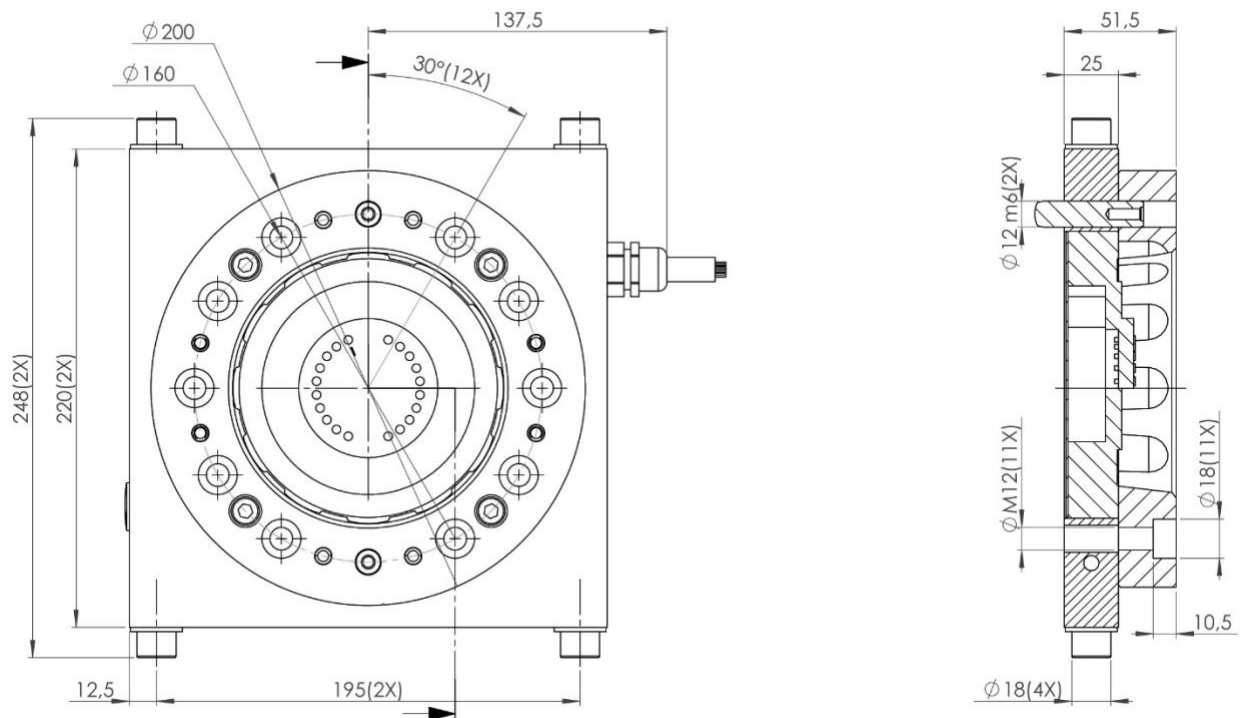
<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO9409-1-160-11-M12
<b>Weight</b>		5.5 kg
<b>Maximum tool load</b> (M12-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
<b>Maximum tool load</b> (M10-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±2 500 Nm
<b>Air channels</b>	Connection, tool side	8 x G 1/4"
<b>Electrical signals</b>	Circuit diagram	E0166-003 (see <a href="#">section 2.1.11</a> )
	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 no: 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

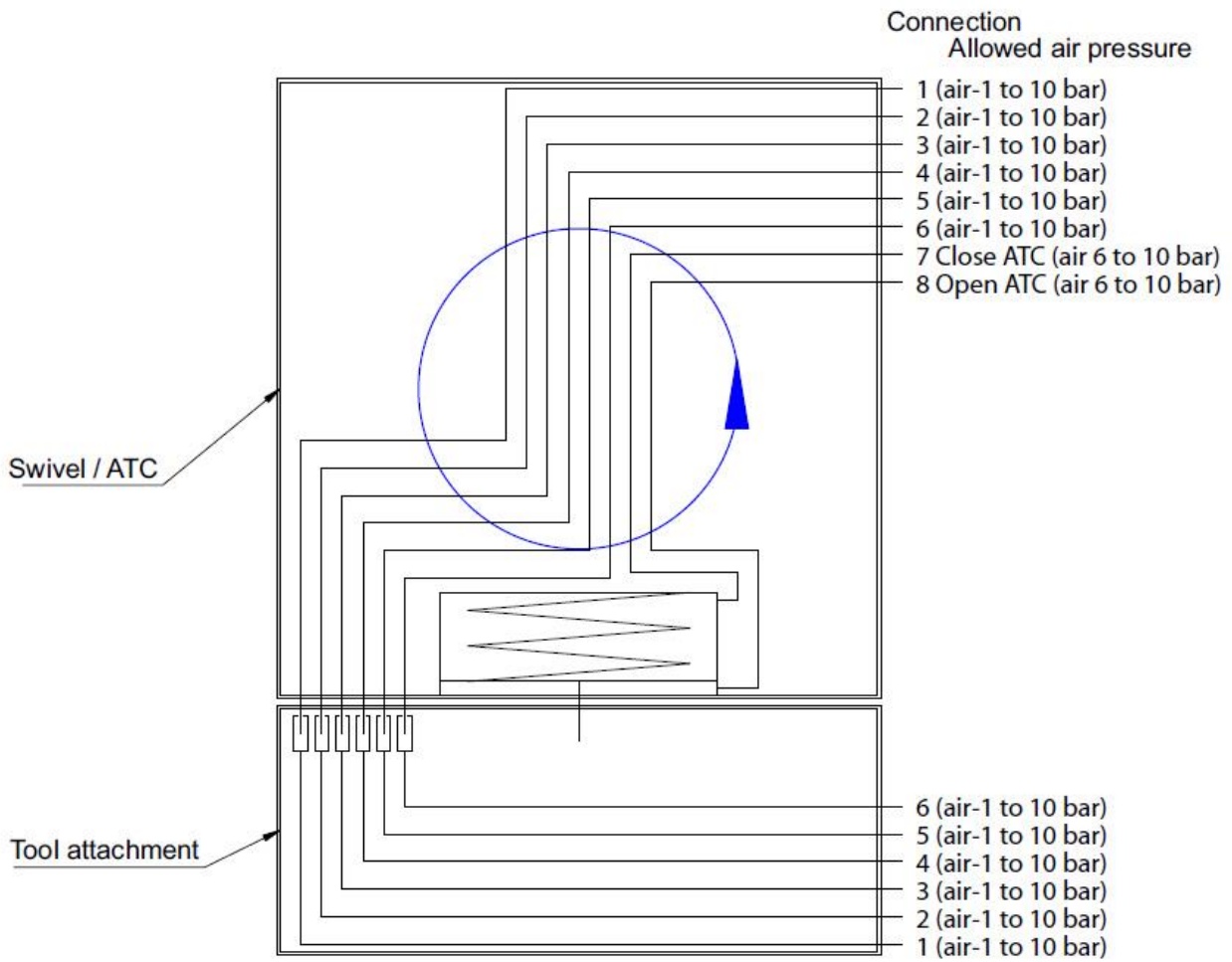
<b>Working temperature</b>		+10°C–+50°C
<b>Bolt pattern</b>		ISO9409-1-160-11-M12
<b>Weight</b>		6.1 kg
<b>Maximum tool load</b> (M12-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±3 500 Nm
<b>Maximum tool load</b> (M10-screws)	Fz (static)	±3 500 N
	Mx/My (dynamic)	±3 500 Nm
	Mz (dynamic)	±2 500 Nm
<b>Air channels</b>	Connection, tool side	8 x G 1/4"
<b>Electrical signals</b>	Circuit diagram	E0166-005 (see <a href="#">section 2.1.12</a> )
	Total signals	13 + PE
	Dedicated signals	24 V, 0V, TC Coupled
	Connection, tool side	1.0 m cable (20x0.5mm <sup>2</sup> ) with free end



### NOTE!

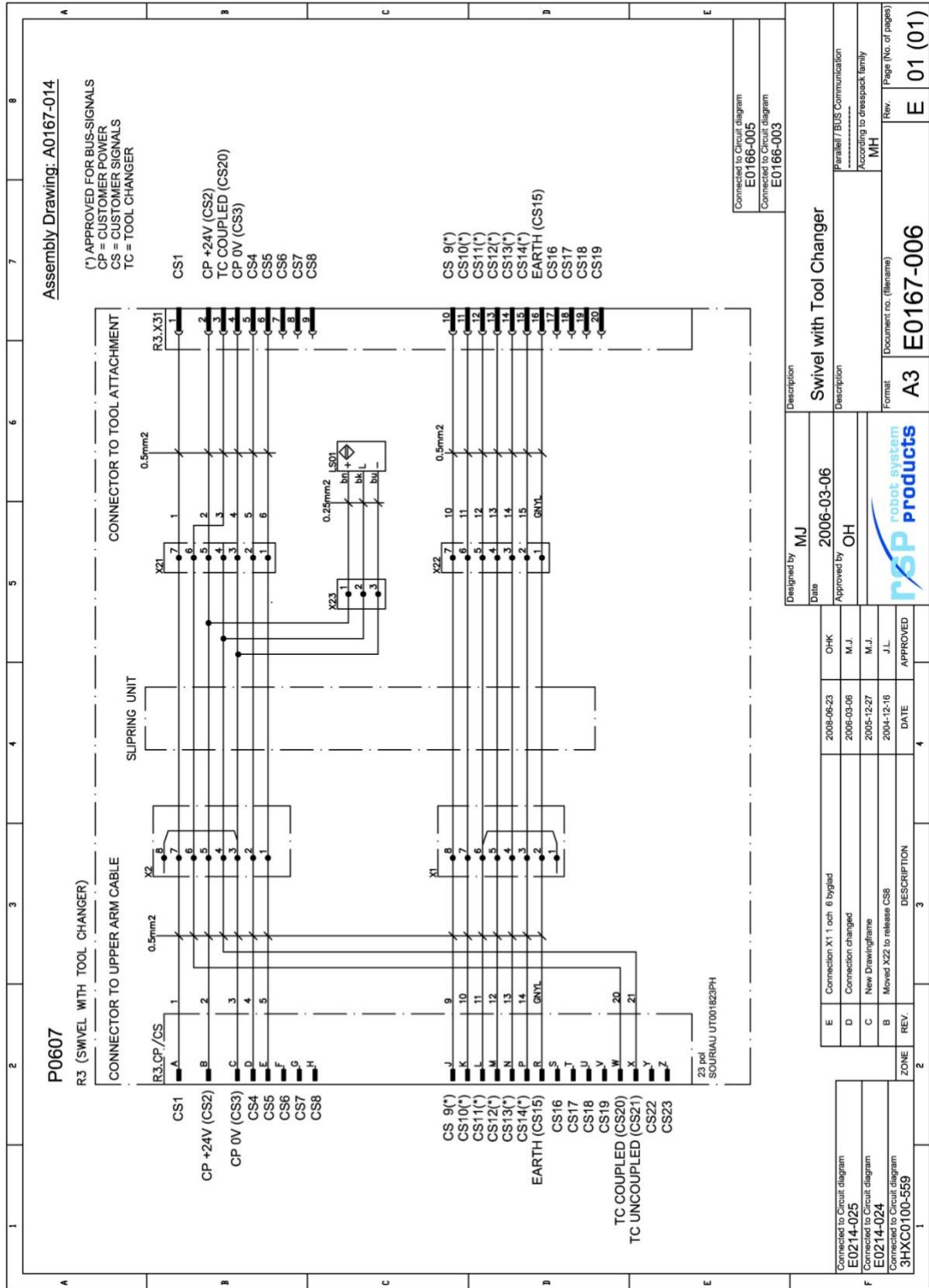
Tools can be mounted to the tool attachment using 11 M12-screws, alternatively the tool attachment can be mounted to the tool using 11 M10-screws.

## 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

**Assembly Drawing: P0608 (A0166-002)**

(\*) = Approved for BUS-Signals  
 CS = Customer Signal  
 CP = Customer Power  
 TC = Tool Changer

View of tool attachment

P0608 (3HXC0100-505)

19 pin  
FCI UT001619SH04  
SOJRAU

E	Pin lay out added	2012-10-25	PA	MJ	2005-11-15	Tool attachment
D	Customer signal added (CS13...20)	2005-11-30	MJ	MJ	2005-11-15	Parallel / BUS Communication
C	New drawing frame	2005-11-15	MJ	MJ	2004 V. 51	According to research family
B	Moved CP +24V from D to B	DATE	JL	JL	2004 V. 51	Mat.Hand.MH
REV.	DESCRIPTION	DATE	APPROVED	DATE	REV.	Page (No. of pages)
ZONE	A	3	4	4	4	E 01 (01)

Connected to Circuit diagram  
**E0167-003**

Connected to Circuit diagram  
**3HXC0100-520E**

Connected to Circuit diagram  
**E0167-006**

Connected to Circuit diagram  
**E0166-001**

Designed by **MJ**

Date **2005-11-15**

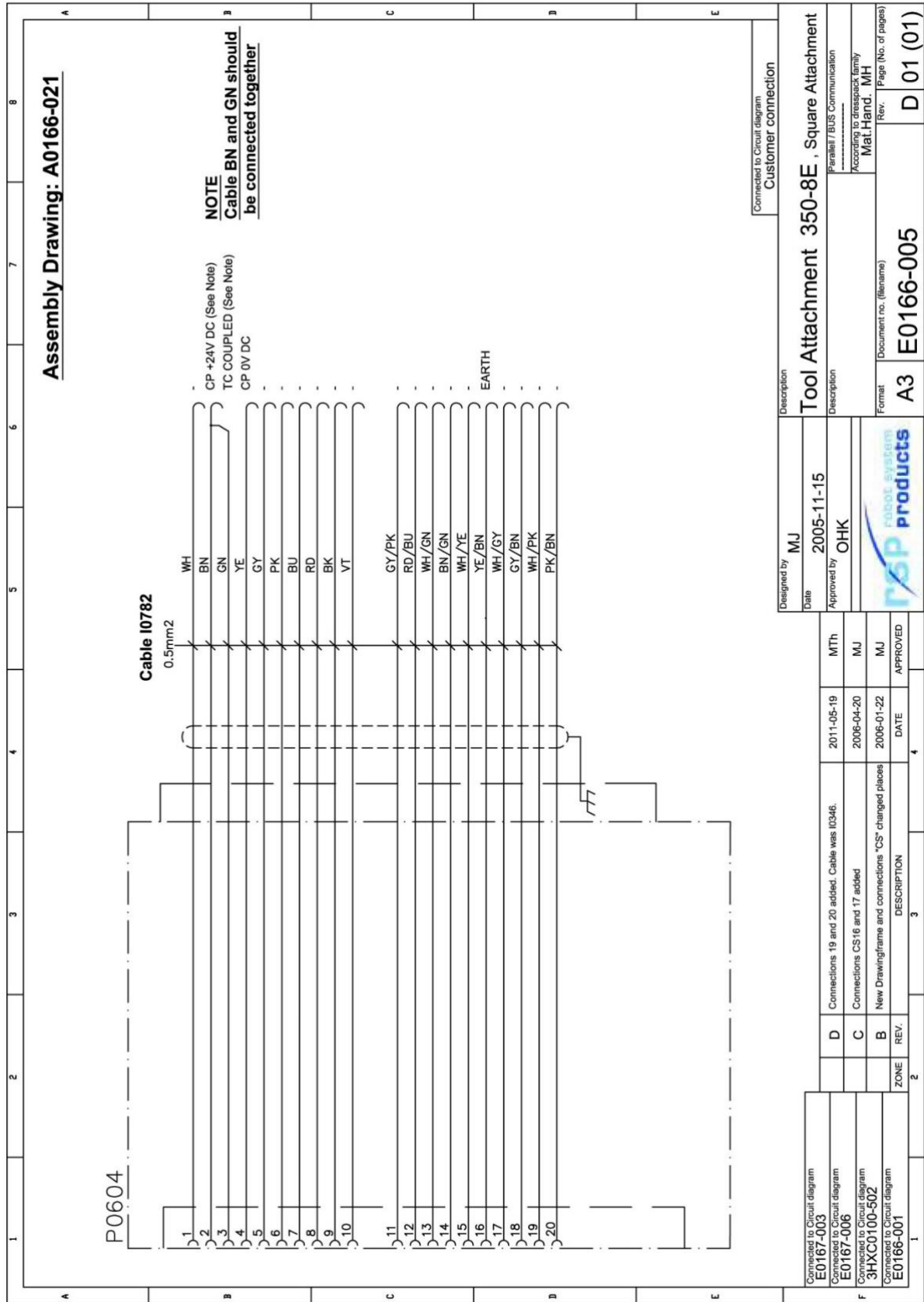
Approved by **OHK**

**rsp robot system products**

Connected to Circuit diagram  
**E0240-010**

Connected to Circuit diagram  
**Customer connections**

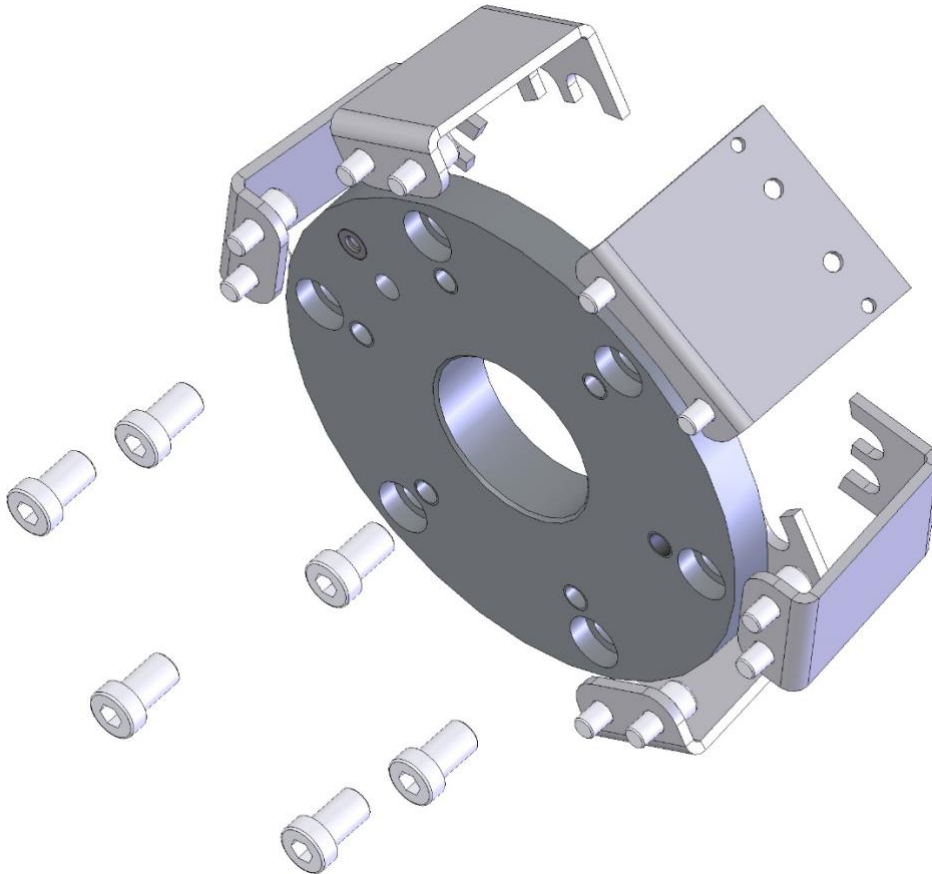
## 2.1.12 Circuit diagram E0166-005 for P0604



## 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.

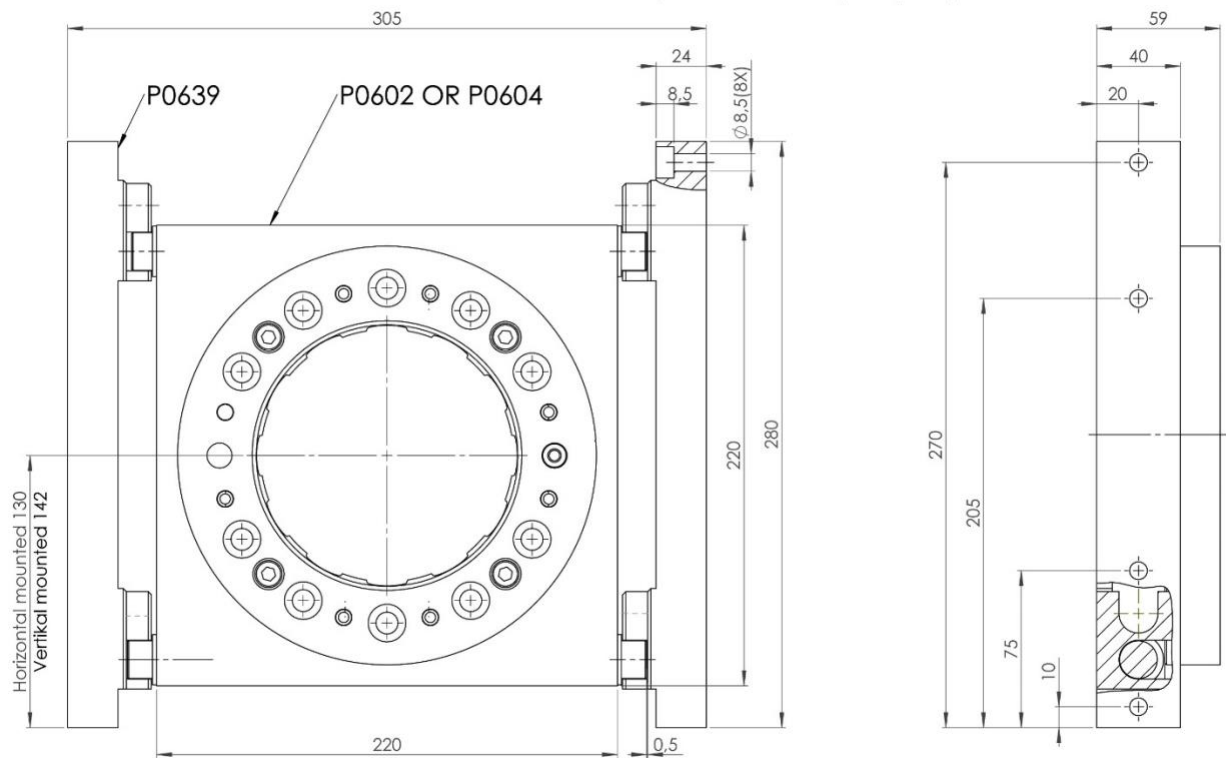


**NOTE!** Dependent on robot model and rotation stop, there can be limitations on the freedom of movement of axis 5. Contact Robot System Products for more information.

### 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 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

<b>Weight</b>	2.6 kg
<b>Maximum load</b>	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.



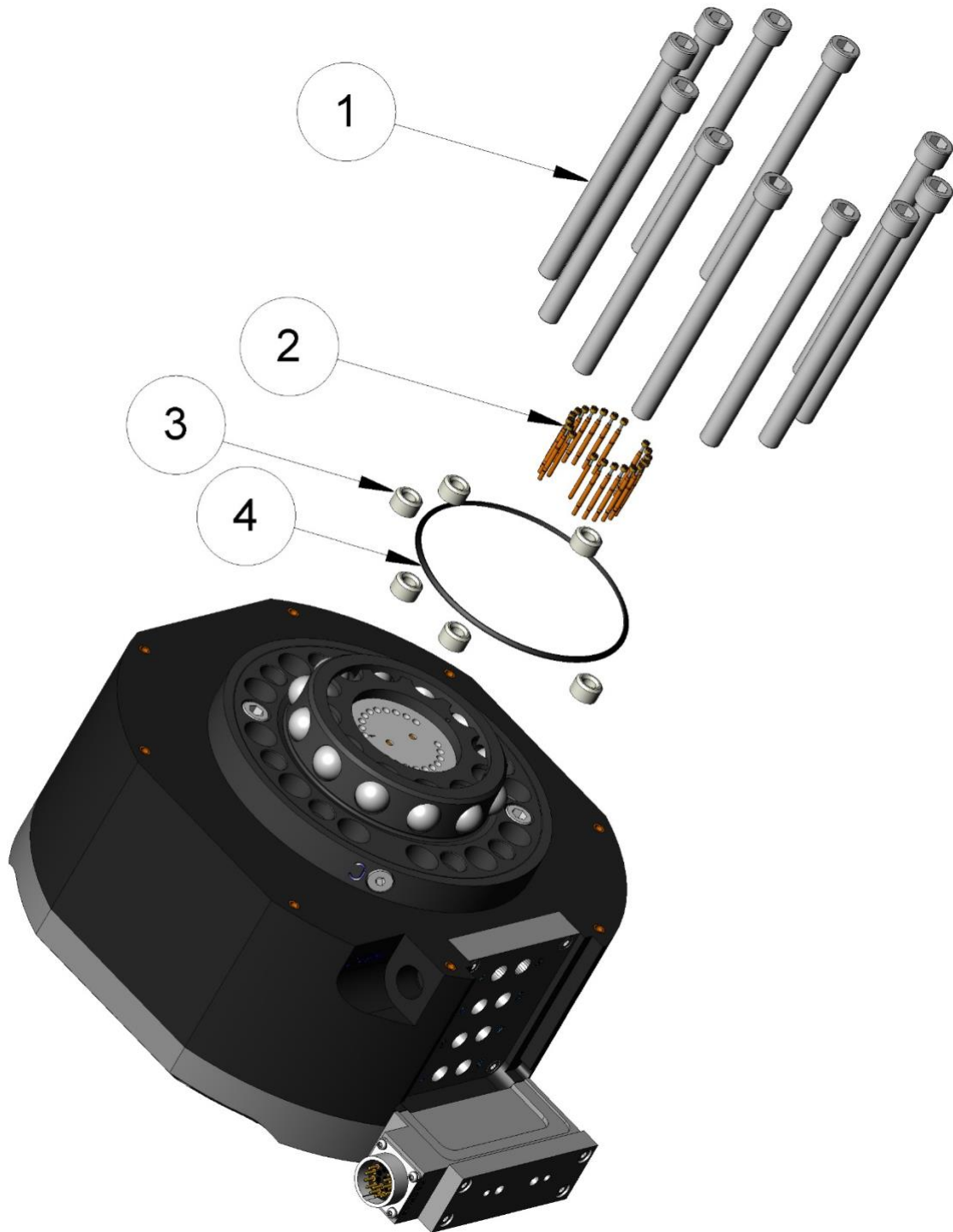
**NOTE!**  
The tool stand must not be spring-loaded!

### 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



