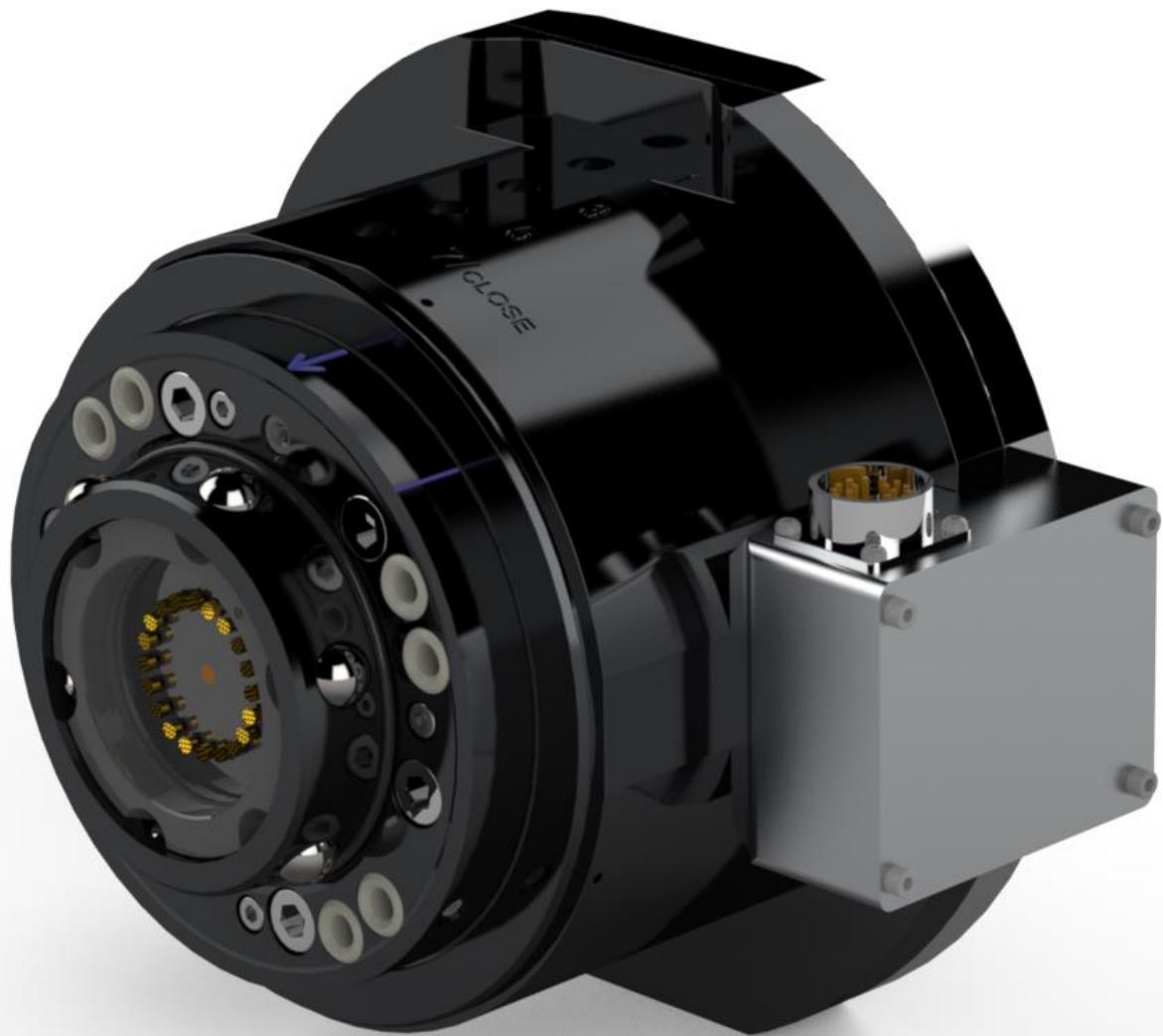


Technical Description

Swivel tool changer STC250

M0636-1

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



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1 INTRODUCTION

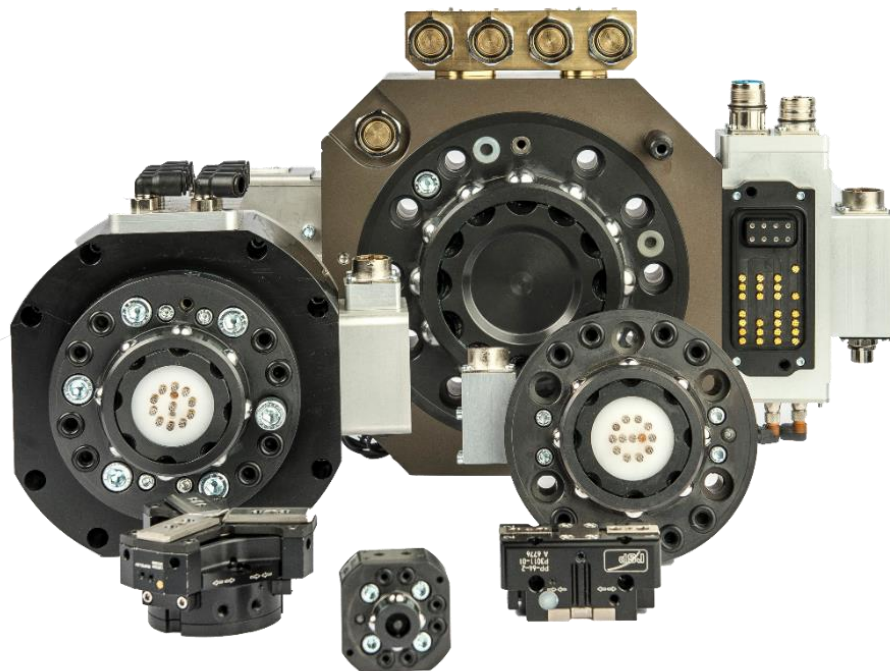
Robot System Products is a front-rank provider of peripheral products for high performance robot applications. We provide complete system solutions for your robot installations, aiming to improve your productivity with the most reliable and cost-effective tooling on the market. Continuously we explore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

2 TECHNICAL SPECIFICATIONS

2.1 Description of swivel tool changers and tool attachments

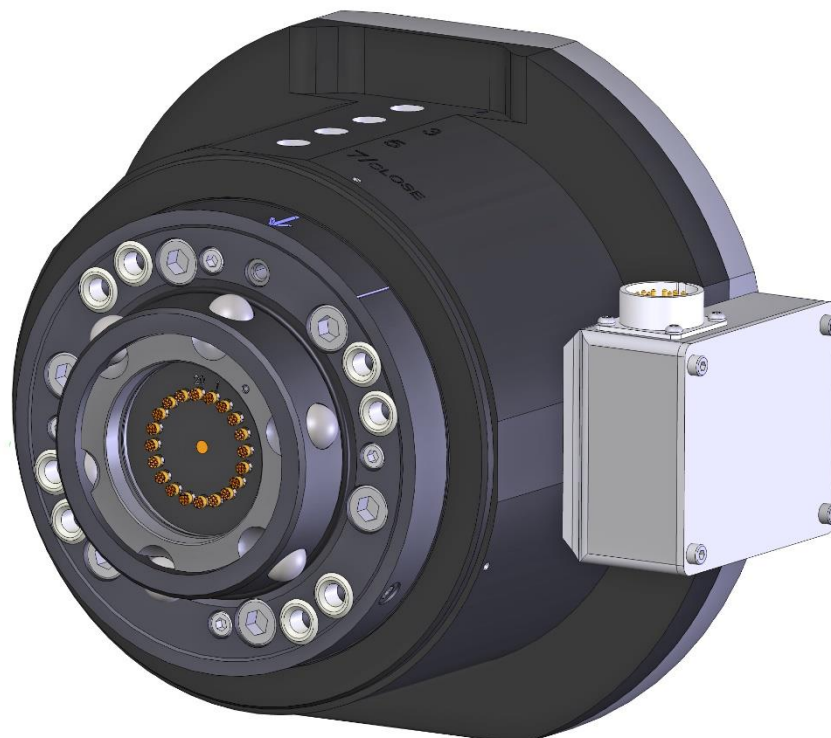
This document presents the Robot System Products STC250-6 and STC250-6E swivel tool changers including tool attachments dedicated for material handling. Likewise presented are adaptation kits, connection kits to facilitate electrical installation and a tool stand kit.

The swivel tool changer STC250-6 transfers compressed air to the tool. They can be equipped with transfer of electrical signals, via spring loaded signal pins, to the tool attachment. The electrical versions is designated 'E'. The swivel tool changers STC250-6 and STC250-6E cannot transport fluids. Sealed versions are ingress protected according to IP65.

The spring-loaded signal pins of STC250-6E 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.

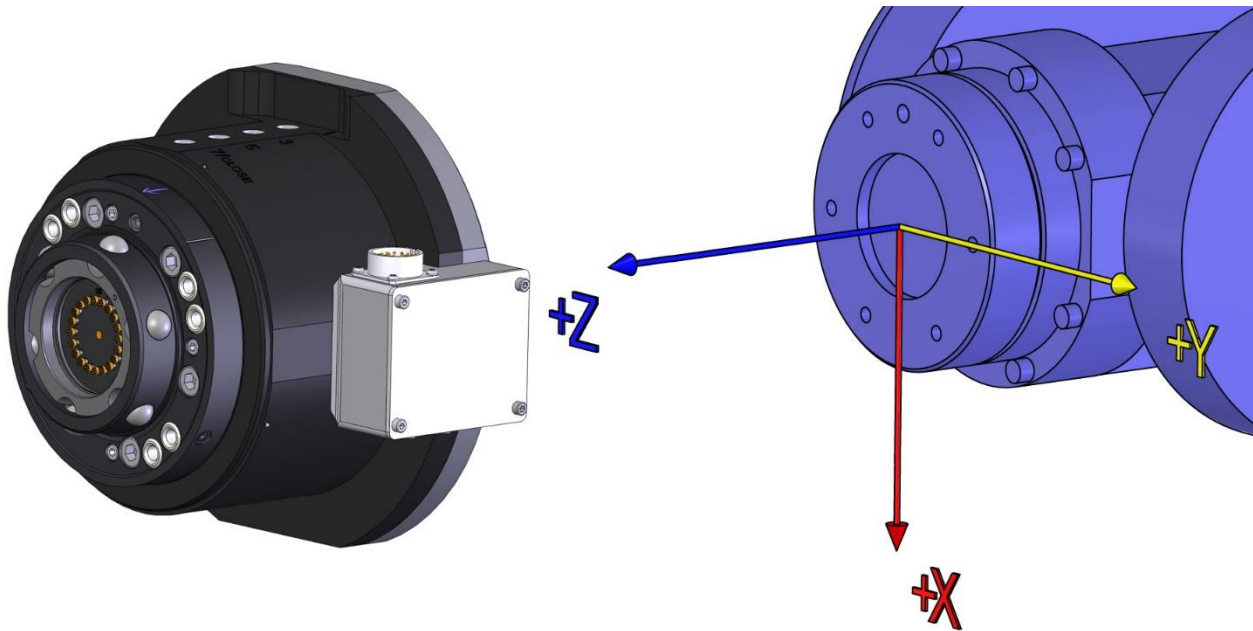
For other bolt circles adaptation plates between the swivel tool changer and the turning disc on the robot may be needed. Such adaptation plates are available from RSP.



STC250-6E

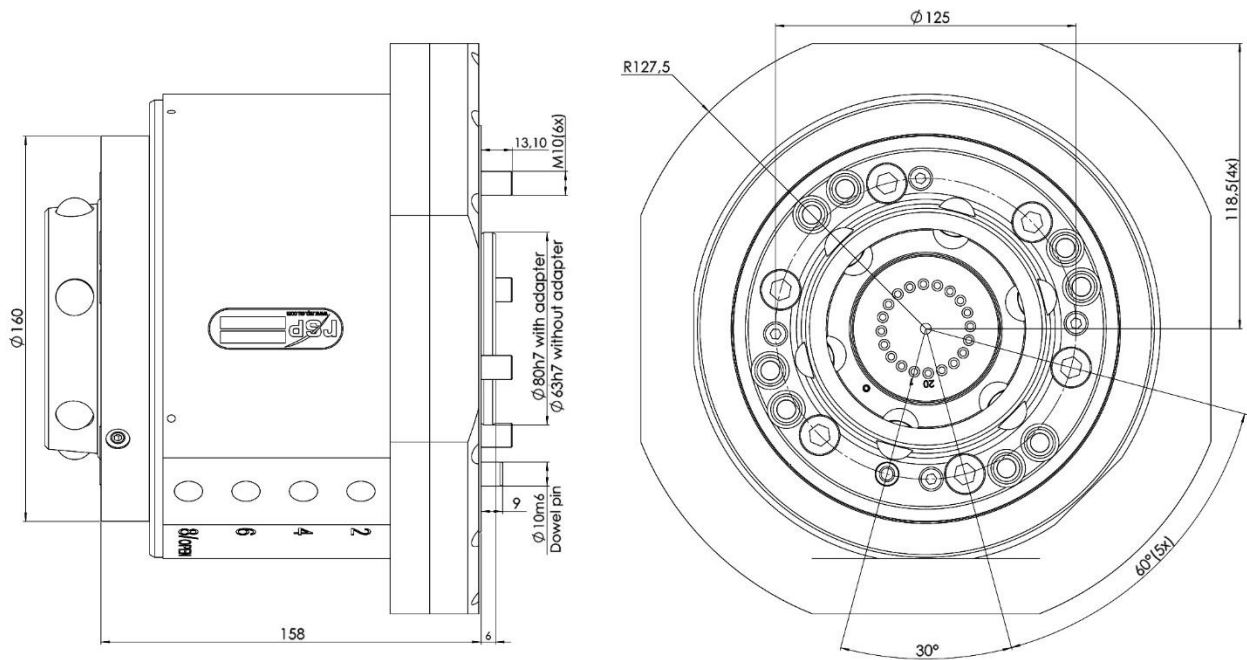
2.1.1 Coordinate System Definition

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

2.1.2 Swivel tool changer STC250-6. Article: P6305

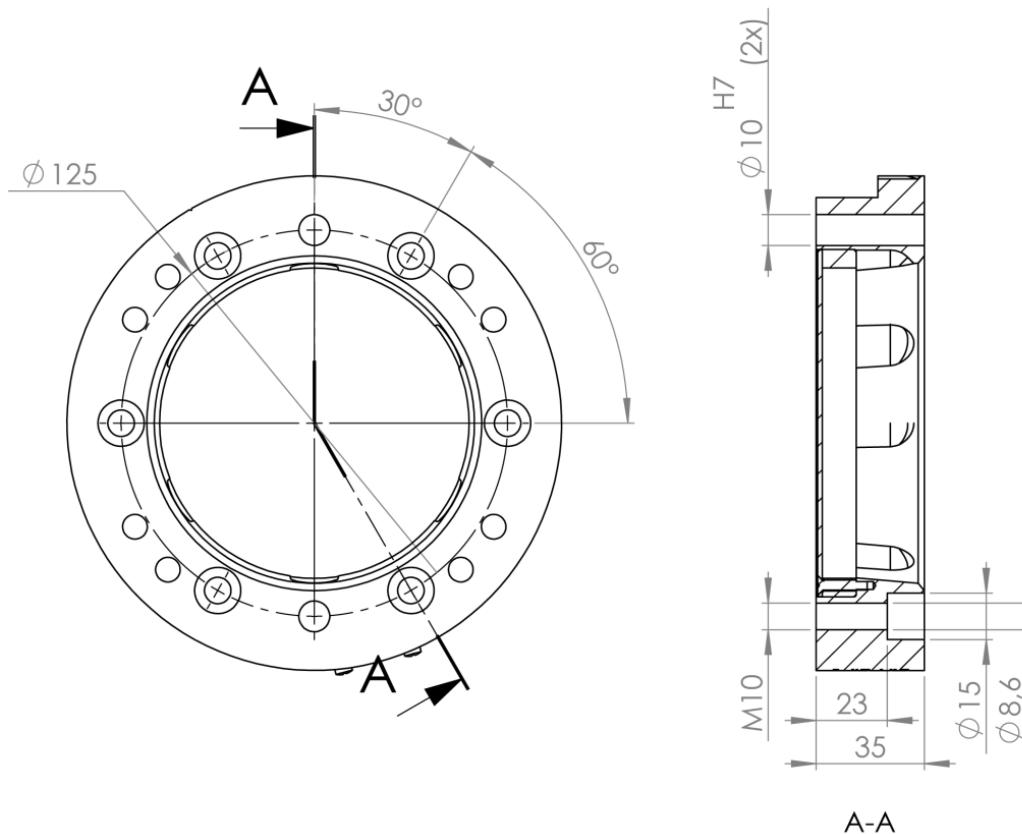


Swivel tool changer P6305 transfers 6 pneumatic channels to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with tool attachments P6417 or P6474.

Technical data

Working temperature		+10°C–+50°C
Bolt pattern		ISO 9409-1 125-6-M10
IP classification		IP 54
Maximum tool load	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Weight and centre of gravity (Z)		
P6305		13.2 kg / 87 mm
P6305 with P6417		15.8 kg / 101 mm
P6305 with P6474		16.8 kg / 107 mm
Rotational torque		80 Nm
Air channels	Pneumatic diagram	See section 2.1.9 .
	User channels, robot side	6 x G 1/4" (1600 l/min, max 10 bar)
	Dedicated channels, G 1/8"	Open TC marked Open, 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 TA250-8. Article: P6417



Tool attachment P6417 transfers 8 pneumatic channels to the tool. To be used together with tool changer P6305.

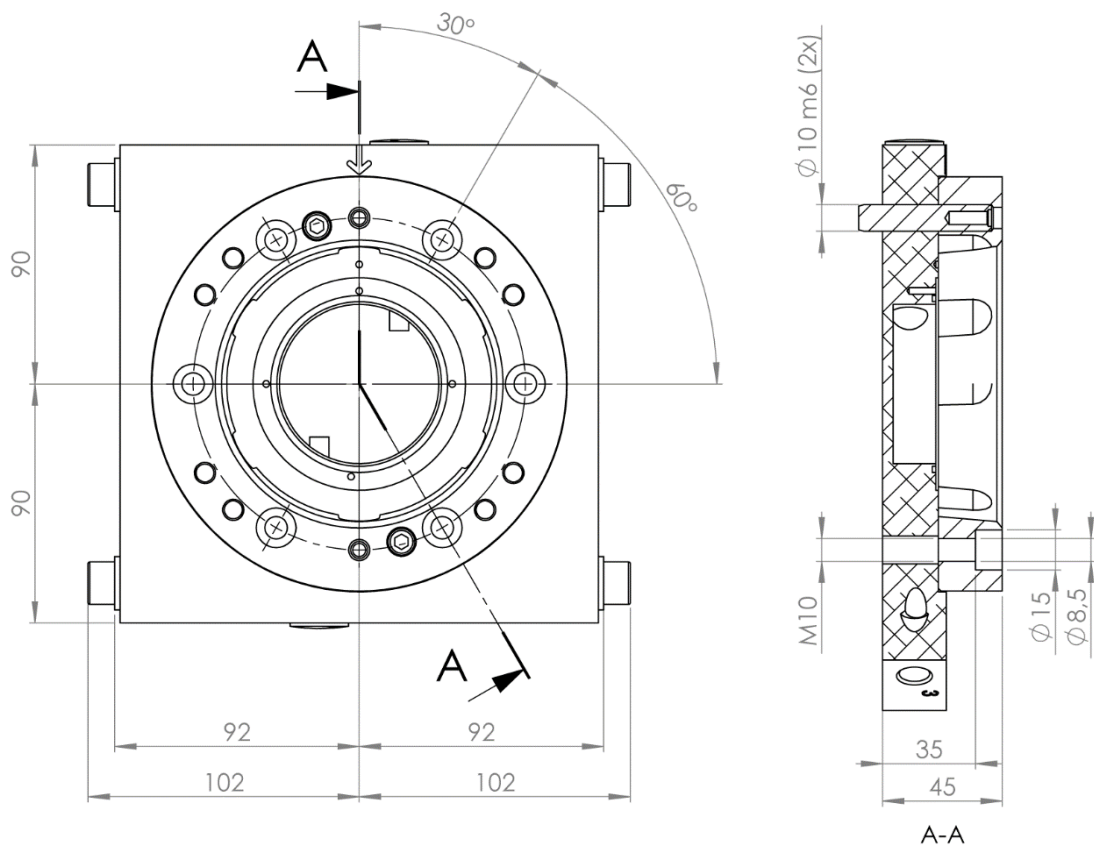
Technical data

Working temperature		+10°C–+50°C
Bolt pattern		ISO9409-1-125-6-M10
Weight		2.7 kg
Maximum tool load (M10-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Maximum tool load (M8-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±750 Nm
Air channels	Connection, tool side	8 x G ¼"



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

2.1.4 Square Tool Attachment TA250-8. Article: P6474



Square tool attachment P6474 transfers 8 pneumatic channels to the tool and gives together with tool stand kit P6472 (option) a stable tool stand for easy tool changing. To be used together with tool changer P6305.

Technical data

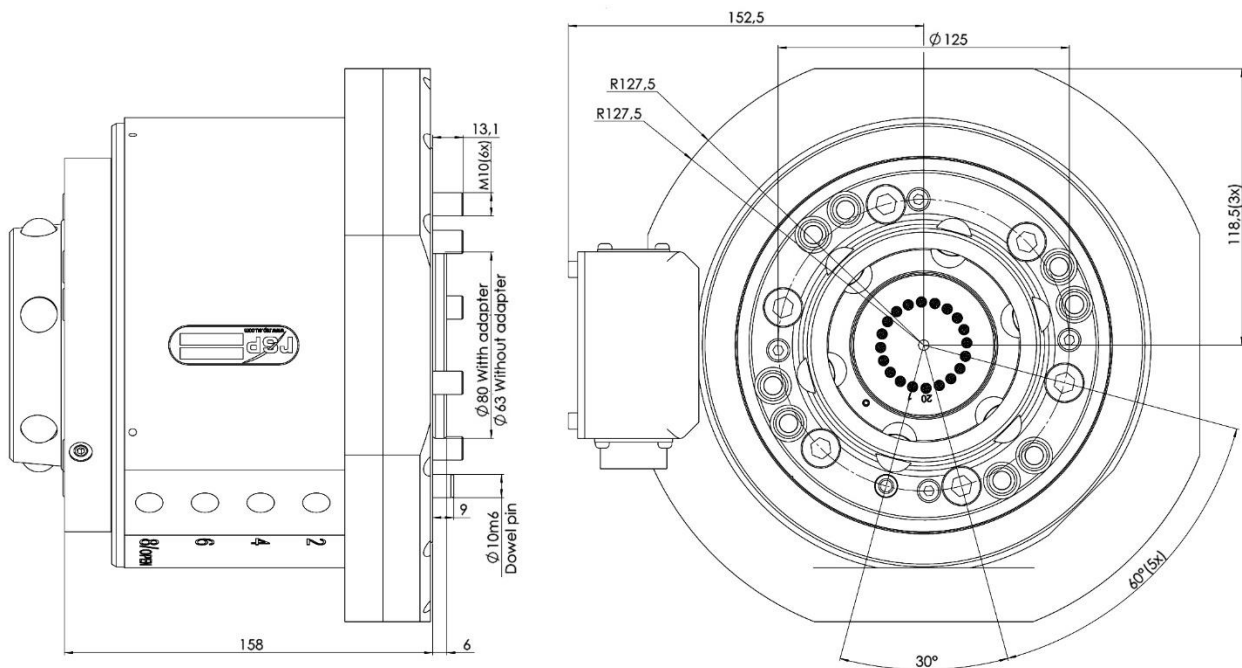
Working temperature		+10°C–+50°C
Bolt pattern		ISO9409-1-125-6-M10
Weight		3.6 kg
Maximum tool load (M10-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±2 500 N ±2 000 Nm ±1 250 Nm
Maximum tool load (M8-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±2 500 N ±2 000 Nm ±750 Nm
Air channels	Connection, tool side	8 x G ¼"



NOTE!

Tools can be mounted to the tool attachment using six M10-screws, alternatively the tool attachment can be mounted to the tool using six M8-screws.

2.1.5 Swivel tool changer STC250-6E. Article: P6306

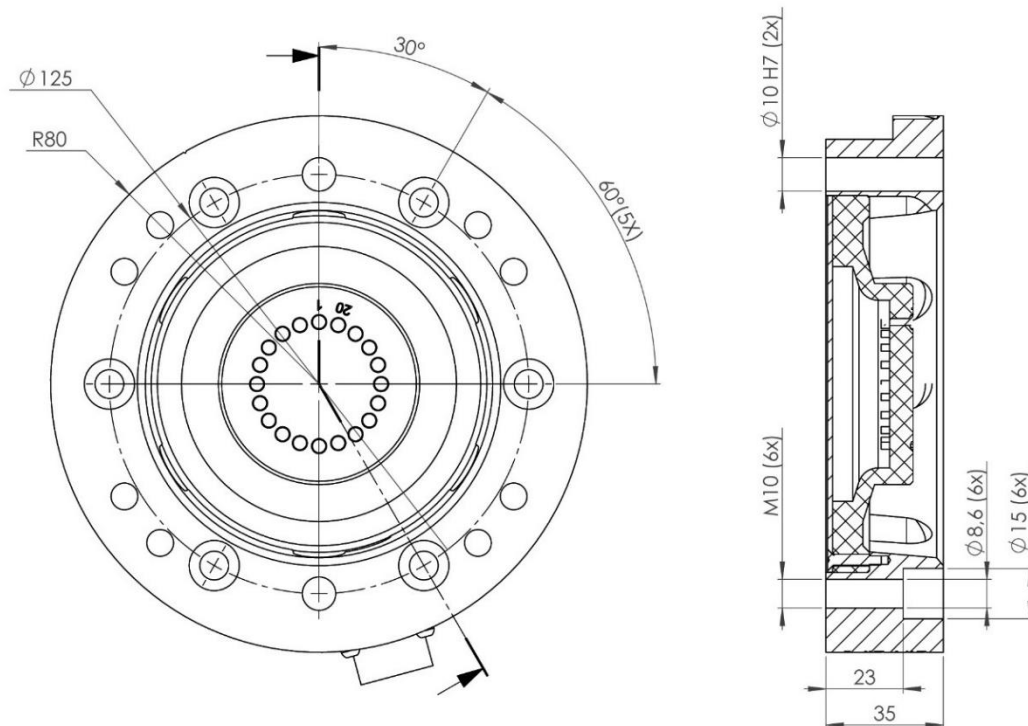


Swivel tool changer P6306 transfers 6 pneumatic channels and 16 electrical signals to the tool attachment and has separate inlets for Open TC and Close TC. To be used together with tool attachments P6418, P6431 or P6473.

Technical data

Working temperature		+10°C–+50°C
Bolt pattern		ISO 9409-1 125-6-M10
IP classification		IP 54
Maximum tool load	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Weight and centre of gravity (Z)		
P6306		13.9 kg / 85 mm
P6306 with P6418/P6431		16.7 kg / 100 mm
P6306 with P6473		17.6 kg / 105 mm
Rotational torque		80 Nm
Air channels	Pneumatic diagram	See section 2.1.9 .
	User channels, robot side	6 x G ¼" (1600 l/min, max 10 bar)
	Dedicated channels, G 1/8"	Open TC marked Open, Close TC marked Close (6-10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content
Electrical signals	Circuit diagram	E0196-004 (section 2.1.10)
	Total signals	17 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)
	P8129-50 (cable kit)	Souriau 23S, 5-meter cable, open end

2.1.6 Tool attachment TA250-8E. Article: P6418



Tool attachment P6418 transfers 8 pneumatic channels and 17 electrical signals to the tool. To be used together with tool changer P6306.

Technical data

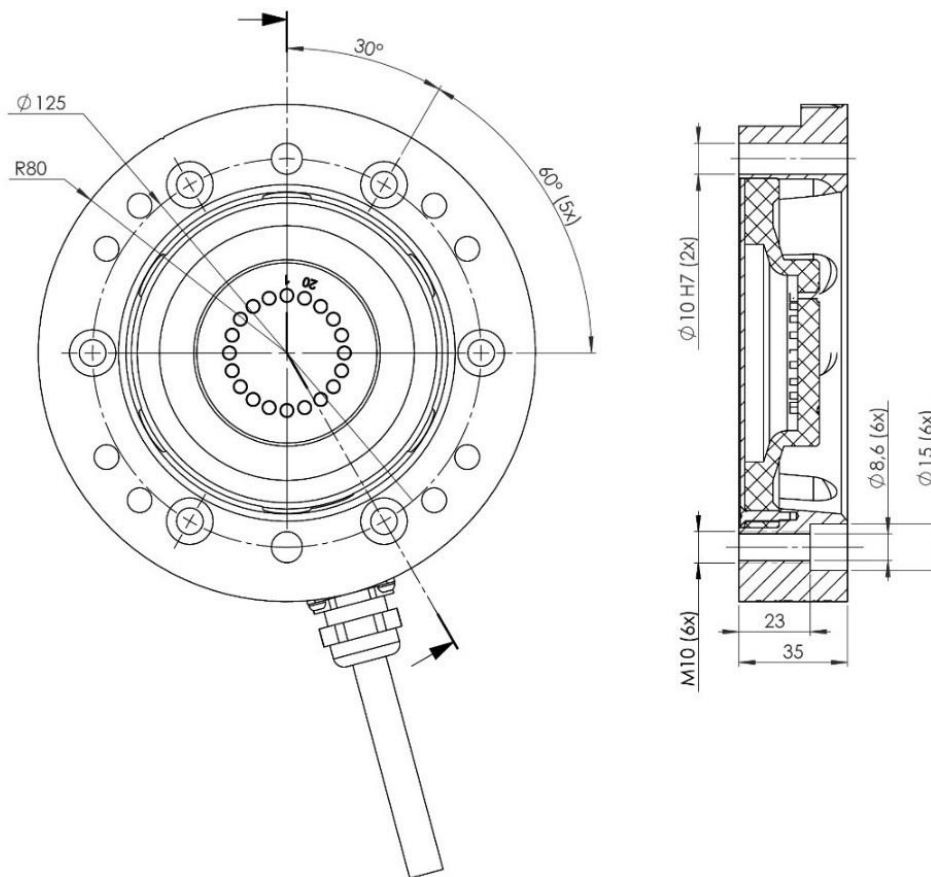
Working temperature		+10°C–+50°C
Bolt pattern		ISO9409-1-125-6-M10
Weight		2.7 kg
Maximum tool load (M10-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Maximum tool load (M8-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±750 Nm
Air channels	Connection, tool side	8 x G ¼"
Electrical signals	Circuit diagram	E0196-002 (section 2.1.11)
	Total signals	18 x (2A, 30V) + PE
	Dedicated signals	24 V, 0V, TC Coupled
	Connection, tool side	Compact Souriau 19S (UT0W01419SH)
Connection kits (optional)	P8007 (connector)	Compact Souriau 19P (straight)
	P8105-20 (cable kit)	Compact Souriau 19P, 2-meter cable, open end



NOTE!

Tools can be mounted to the tool attachment using six M10-screws, alternatively the tool attachment can be mounted to the tool using six M8-screws.

2.1.7 Tool attachment TA250-8E. Article: P6431



Tool attachment P6431 transfers 8 pneumatic channels and 17 electrical signals to the tool. To be used together with tool changer P6306.

Technical data

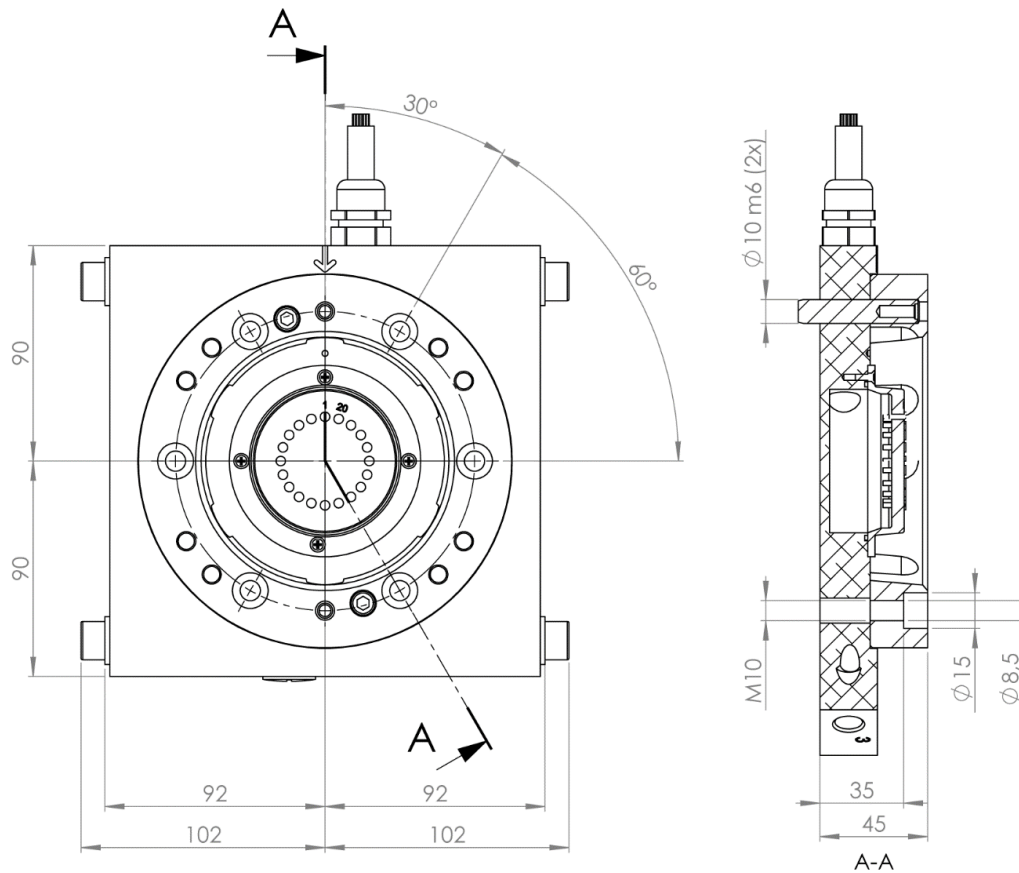
Working temperature		+10°C–+50°C
Bolt pattern		ISO9409-1-125-6-M10
Weight		2.8 kg
Maximum tool load (M10-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±2 500 N ±2 000 Nm ±1 250 Nm
Maximum tool load (M8-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±2 500 N ±2 000 Nm ±750 Nm
Air channels	Connection, tool side	8 x G ¼"
Electrical signals	Circuit diagram Total signals Dedicated signals Connection, tool side	E0196-009 (see section 2.1.12) 18 x (2A, 60V) + PE 24 V, 0V, TC Coupled 1-meter cable (0.5 mm²), open end



NOTE!

Tools can be mounted to the tool attachment using six M10-screws, alternatively the tool attachment can be mounted to the tool using six M8-screws.

2.1.8 Square Tool Attachment, TA250-8E. Article: P6473



Square tool attachment P6473 transfers 8 pneumatic channels and 17 electrical signals to the tool and gives together with tool stand kit P6472 (option) a stable tool stand for easy tool changing. To be used together with tool changer P6306.

Technical data

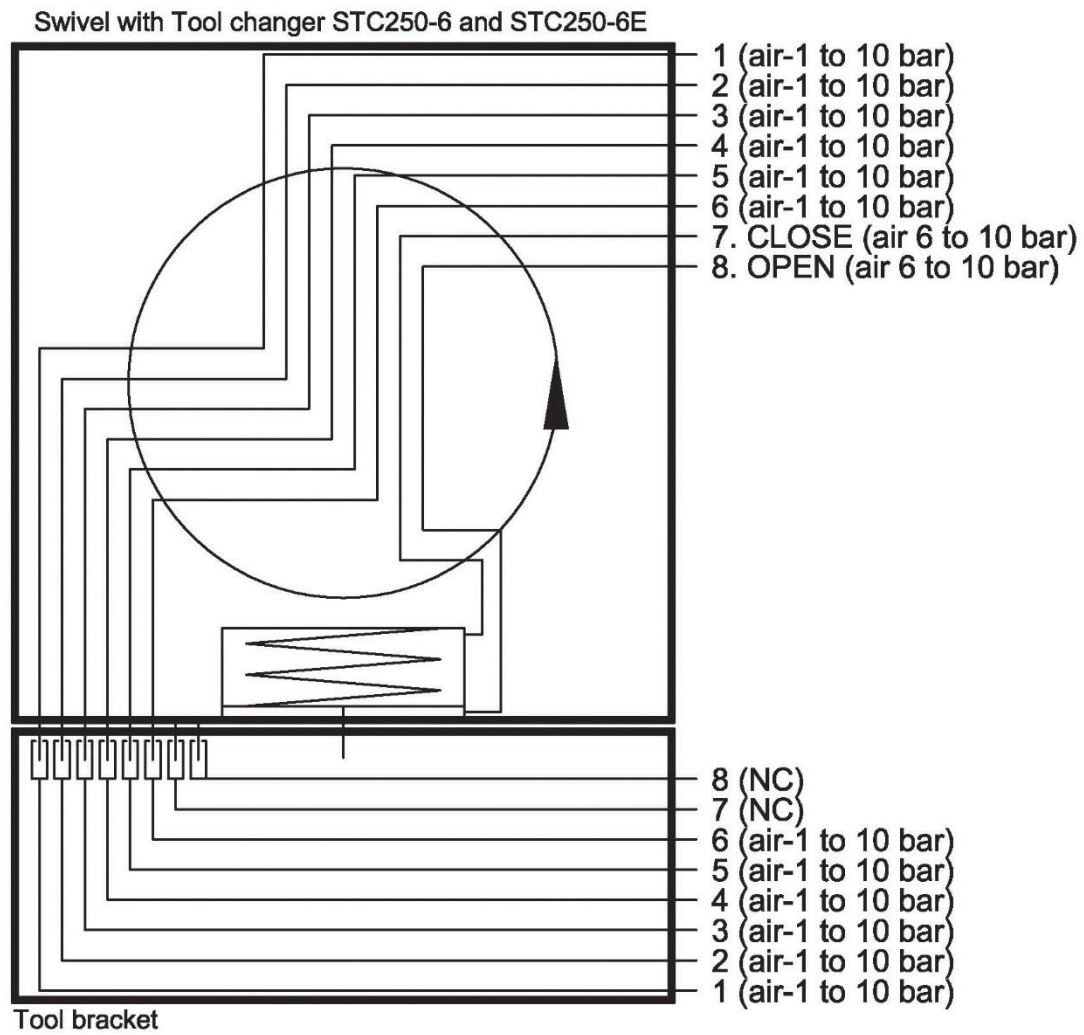
Working temperature		+10°C–+50°C
Bolt pattern		ISO9409-1-125-6-M10
Weight		3.7 kg
Maximum tool load (M10-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Maximum tool load (M8-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±750 Nm
Air channels	Connection, tool side	8 x G ¼"
Electrical signals	Circuit diagram	E0196-009 (see section 2.1.12)
	Total signals	18 x (2A, 60V) + PE
	Dedicated signals	24 V, 0V, TC Coupled
	Connection, tool side	1-meter cable (0.5 mm²), open end



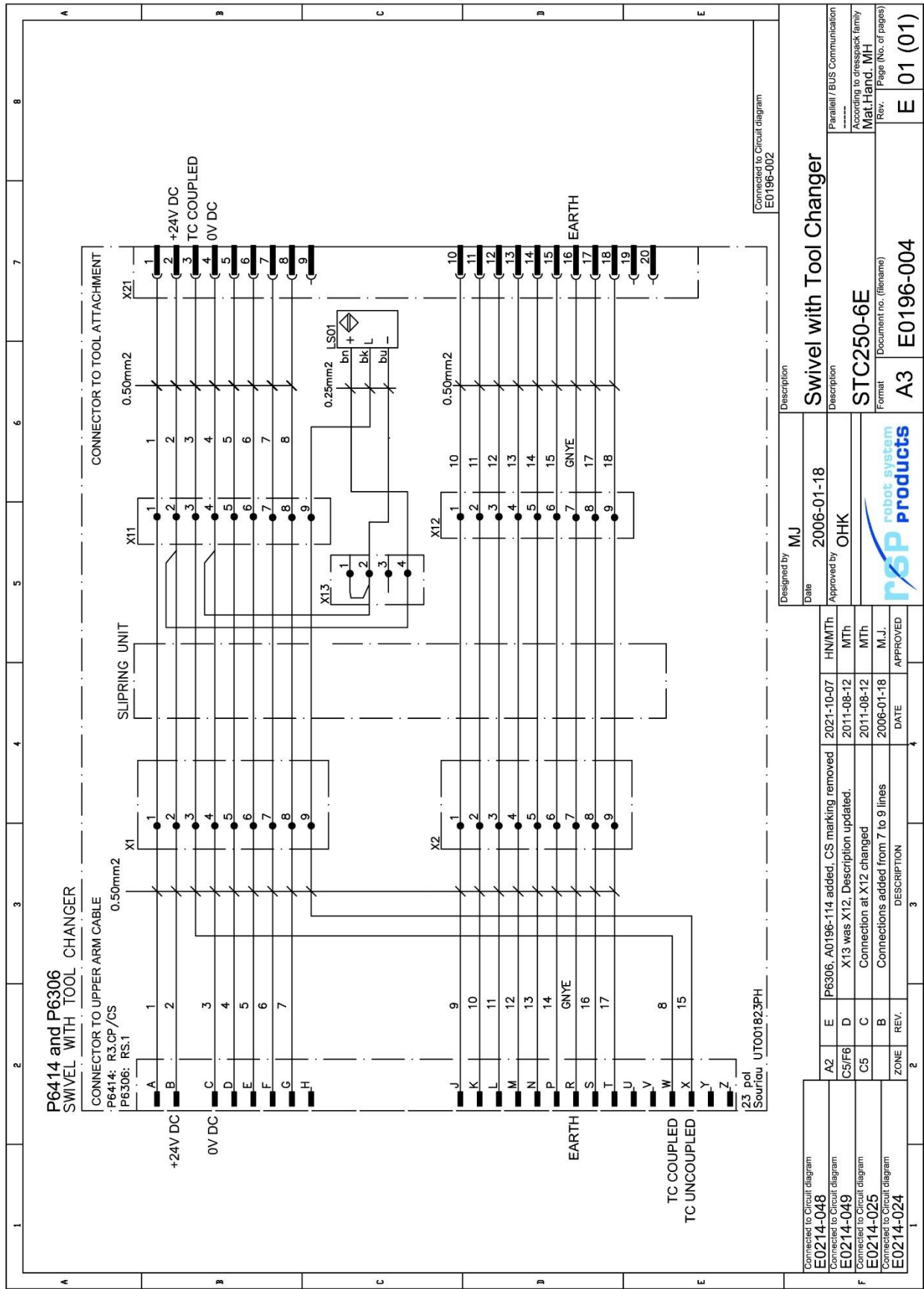
NOTE!

Tools can be mounted to the tool attachment using six M10-screws, alternatively the tool attachment can be mounted to the tool using six M8-screws.

2.1.9 Pneumatic diagram



2.1.10 Circuit diagram E0196-004 for P6306

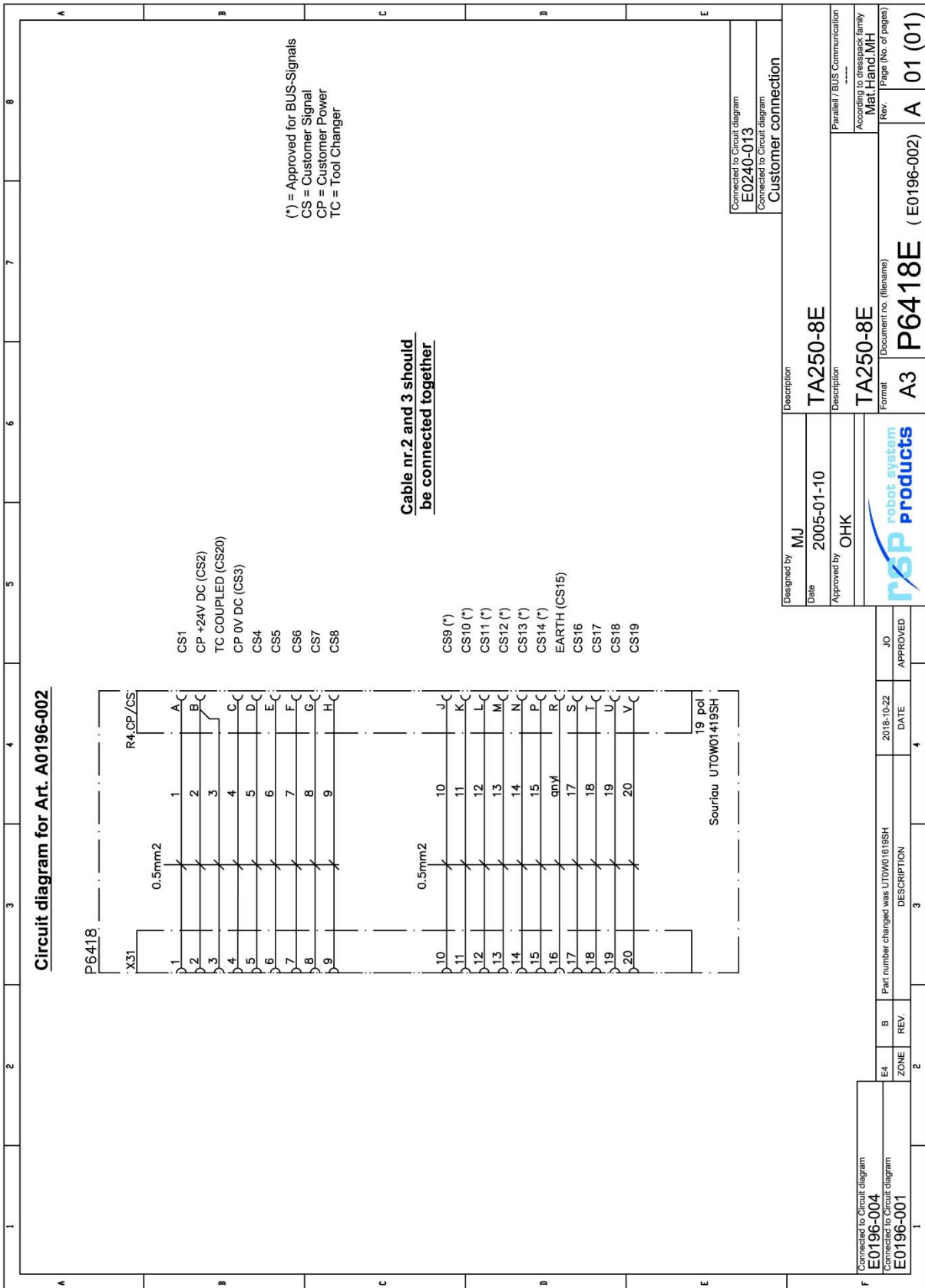


Connected to Circuit diagram
E0196-002

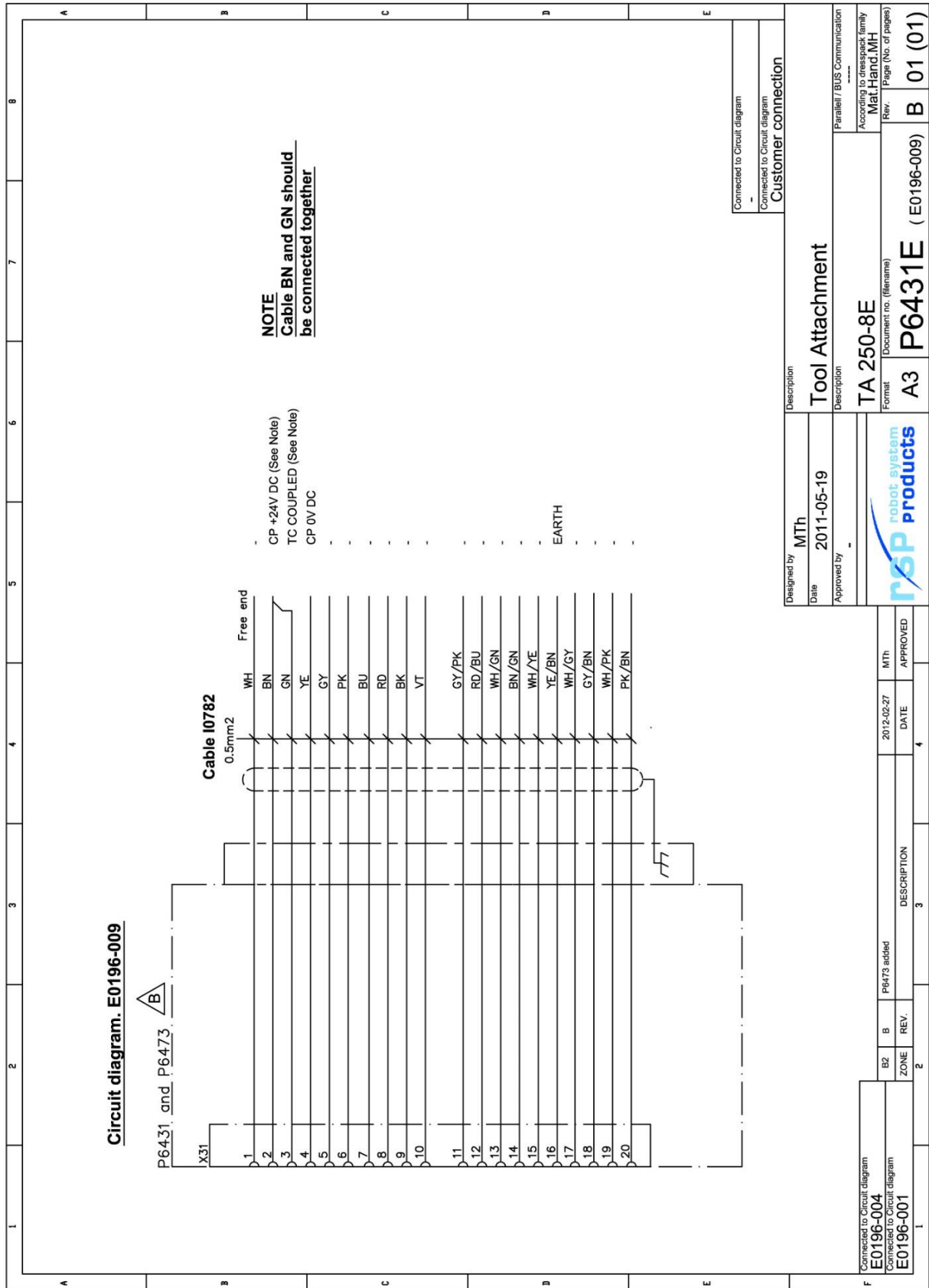
Designed by MJ		Date 2006-01-18		Description Swivel with Tool Changer	
Approved by OHK		Format STC250-6E		According to dresspack family Mat.Hand. MH	
DATE 2006-01-18		Document no. (filename) A3 E0196-004		Page (No. of pages) E 01 (01)	
H/M/Th MTH		M/J. M.J.		Rev. APPROVED	
2021-10-07		2011-08-12		2006-01-18	
CS marking removed		Description updated.		Connections added from 7 to 9 lines	
X13 was X12.		Connection at X12 changed		Connections added from 7 to 9 lines	
A2 E		D		B	
C5/F6		C		REV.	
C5		B		ZONE	
E0214-048		E0214-049		E0214-025	
E0214-024		E0214-024		E0214-024	

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2.1.11 Circuit diagram E0196-002 for P6418



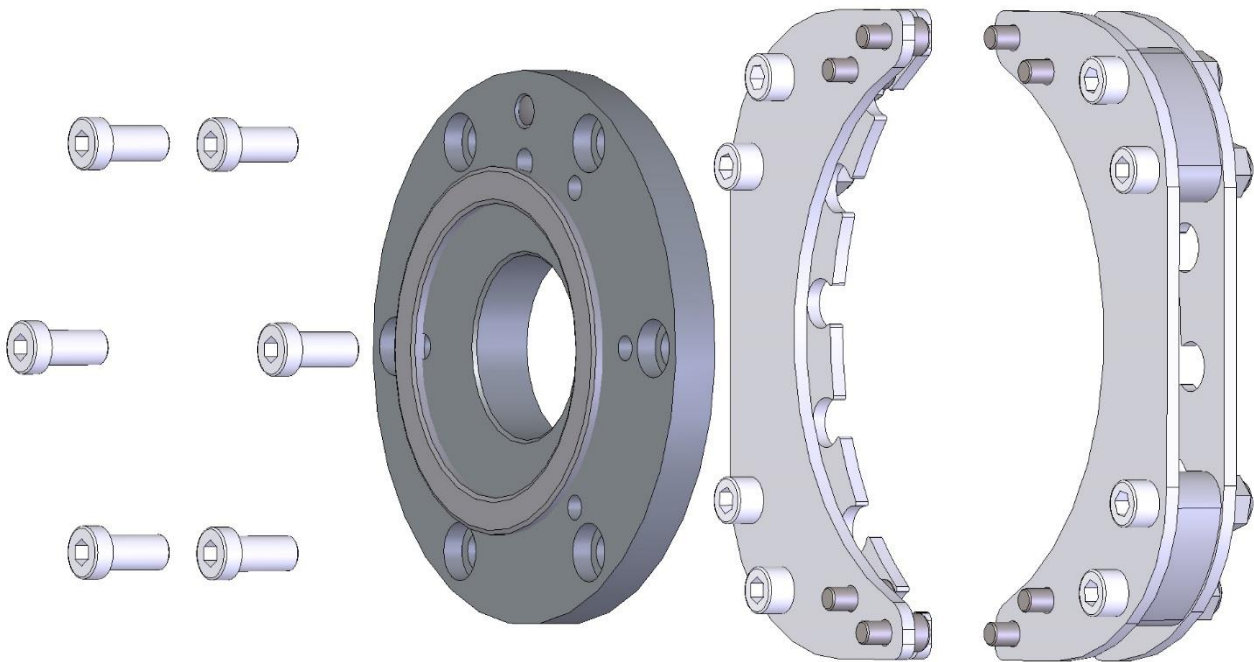
2.1.12 Circuit diagram E0196-009 for P6431 and P6473



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.



Example of adaptation kit including rotation stop, adaptation plate and hose holder

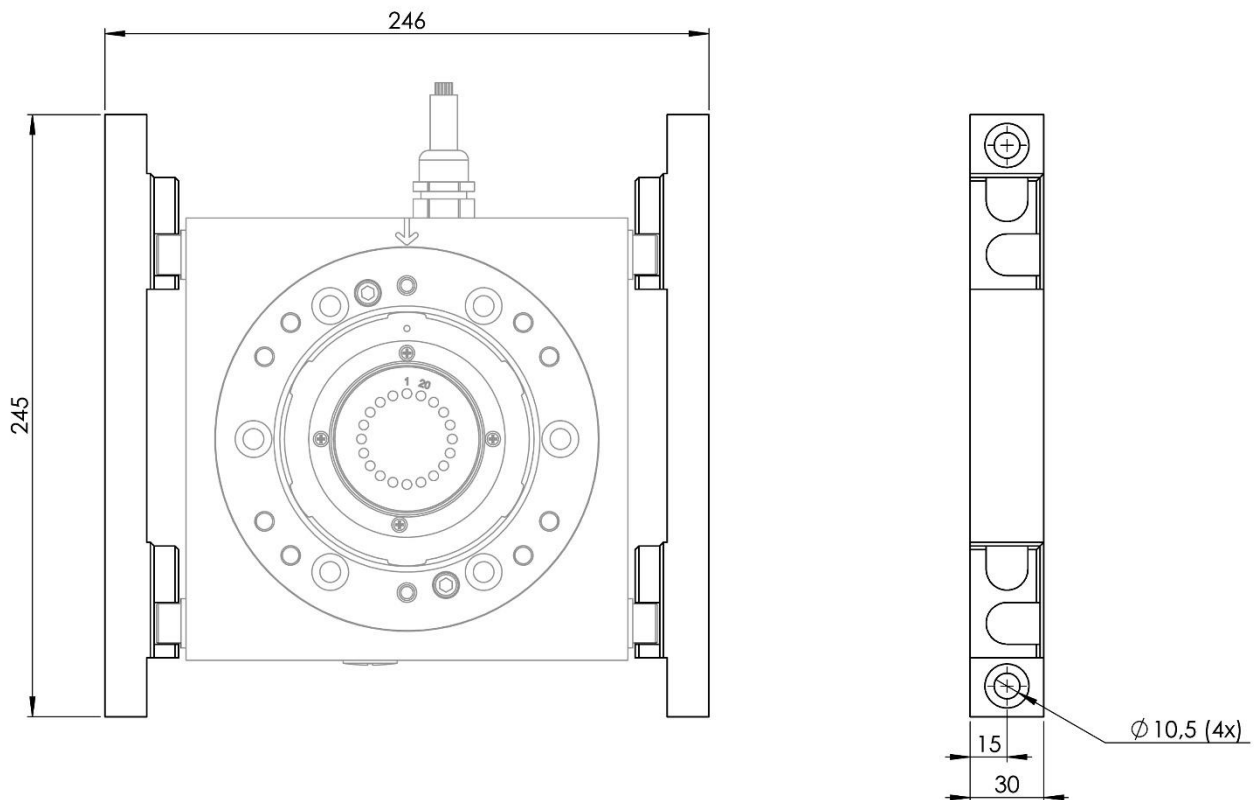


NOTE! Dependent on robot model and rotation stop, there can be limitations on the freedom of movement of axis 5. Contact Robot System Products for more information.

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: P6472



This tool stand kit gives, mounted on a stand, gives in combination with square tool attachments P6474 or P6473 a robust tool stand for easy tool changing.

Technical data

Weight	1.2 kg
Maximum load	250 kg

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 P6305 and P6306



Item	Description	Part number	Wear part	Pcs
1	Locking screw M10x160	MC6S 10X160		6
2	Spring loaded signal pins (P6306 only)	I0042	X	20
3	Air sealing	63550006-462	X	8
4	O-ring	I1464	X	1

