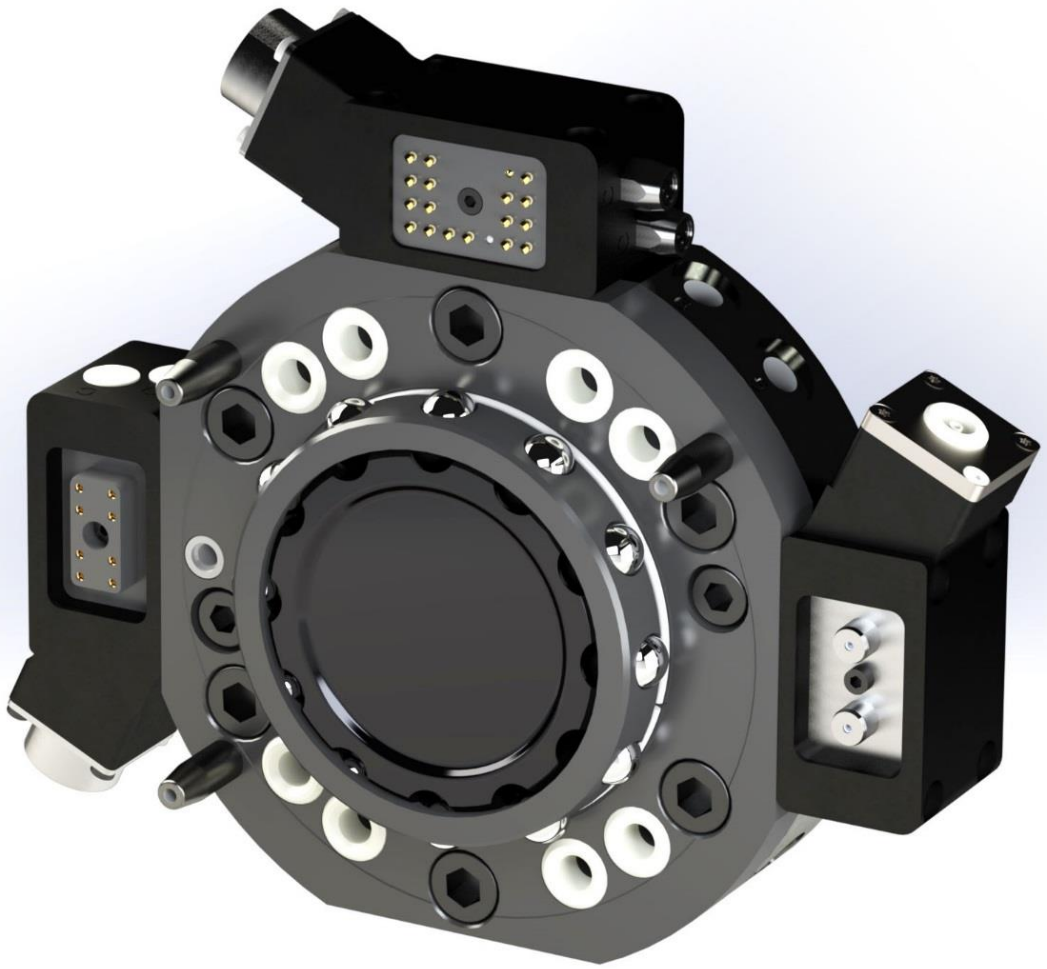
Technical Description

Tool changers TC60, TC120, TC180

M0626-1

Tool changers | Swivels | Swivels with Tool changers | Grippers | Hose packages | Valve Units | Tool systems



rsp robot system products

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CONTENTS

1 INTRODUCTION

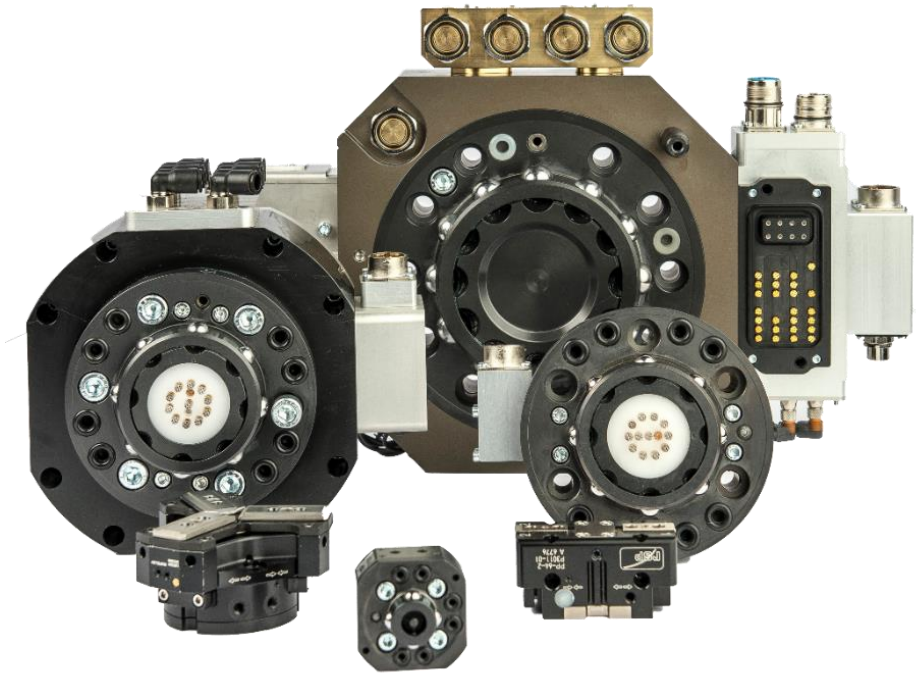
Robot System Products is a front-rank provider of peripheral products for high performance robot applications. We provide complete solutions for your robot installations, aiming to improve your productivity with the most reliable and cost-effective tooling on the market. Continuously we explore emerging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



1.1 RSP tool changers

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, power, data 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. A built-in spring ensures that the tool remains in place in the tool changer even if the air pressure drops.

1.2 Documents

This document, *Product Description*, contains product information, drawings, technical data, electrical and pneumatic diagrams and lists of spare parts. In the document *Installation and Maintenance* (M0627-1) procedures for mounting, installation, replacement of equipment is described together with descriptions of inspection, cleaning and lubrication activities including 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
- Power pins and sockets
- Guide pins and bushings
- 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 and cables for tool changers and tool attachments simplifying electrical installations.
3D-models	Available in Solid Works®, STEP and Parasolid-format.

2 TECHNICAL SPECIFICATIONS

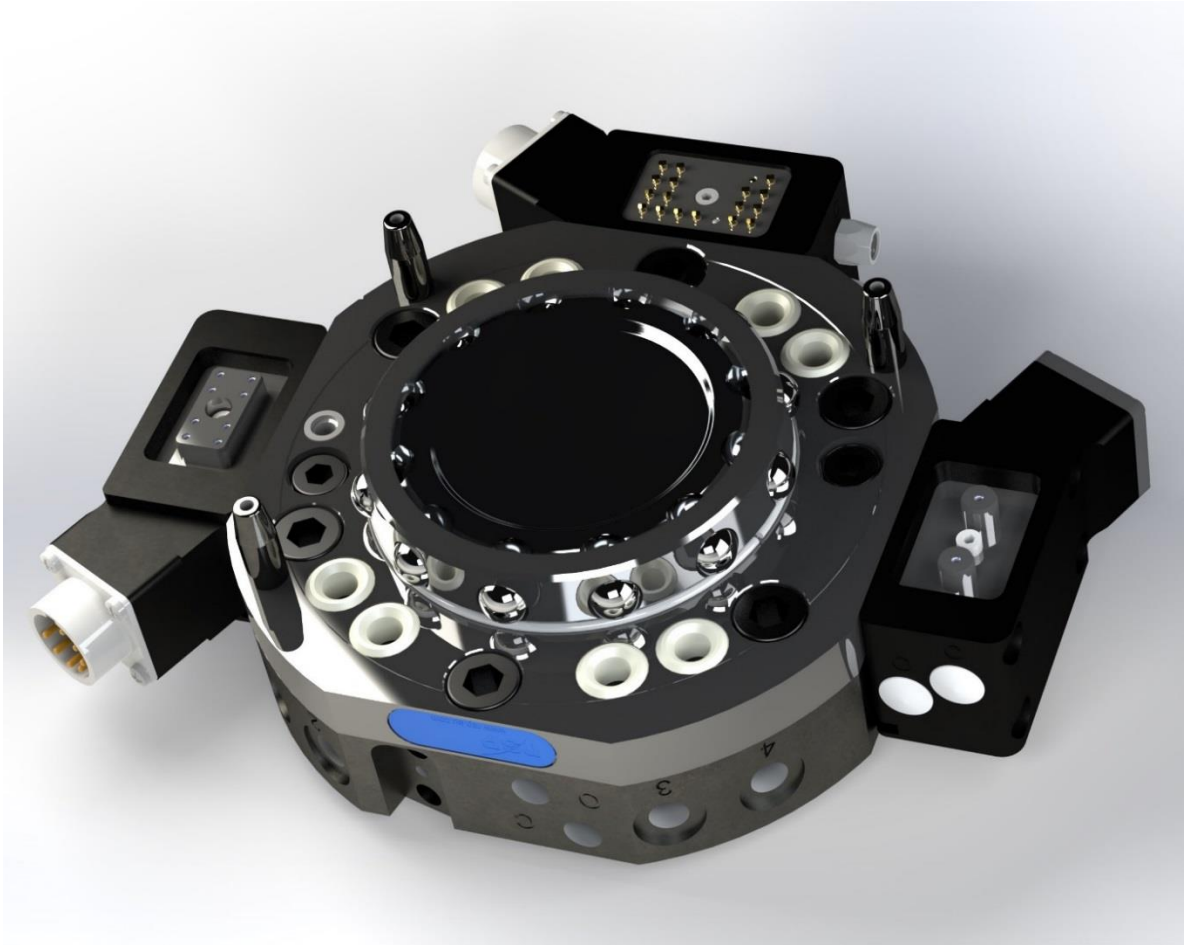
The RSP product family of TC60-8, TC120-8 and TC180-8 is designed for maximum flexibility and to be used for various applications for which a large number of options can be combined in different configurations. These options are generally useable within the product family. This document presents:

- The Robot System Products TC60-8, TC120-8 and TC180-8 tool changers including tool attachments.
- Options to configure tool changers and tool attachments. These options can as well be ordered as accessories for retrofitting.
- Connection kits to facilitate electrical installation.

An adaptation plate between the tool changer and the turning disc on the robot may be needed, depending on the robot model. Such adaptation plates are available from RSP.

Three guide pins can be mounted, as an option, in order to align the tool attachment with the tool changer before electrical interfaces connects to each other during docking, which significantly extends the lifetime for not spring-mounted signal pins.

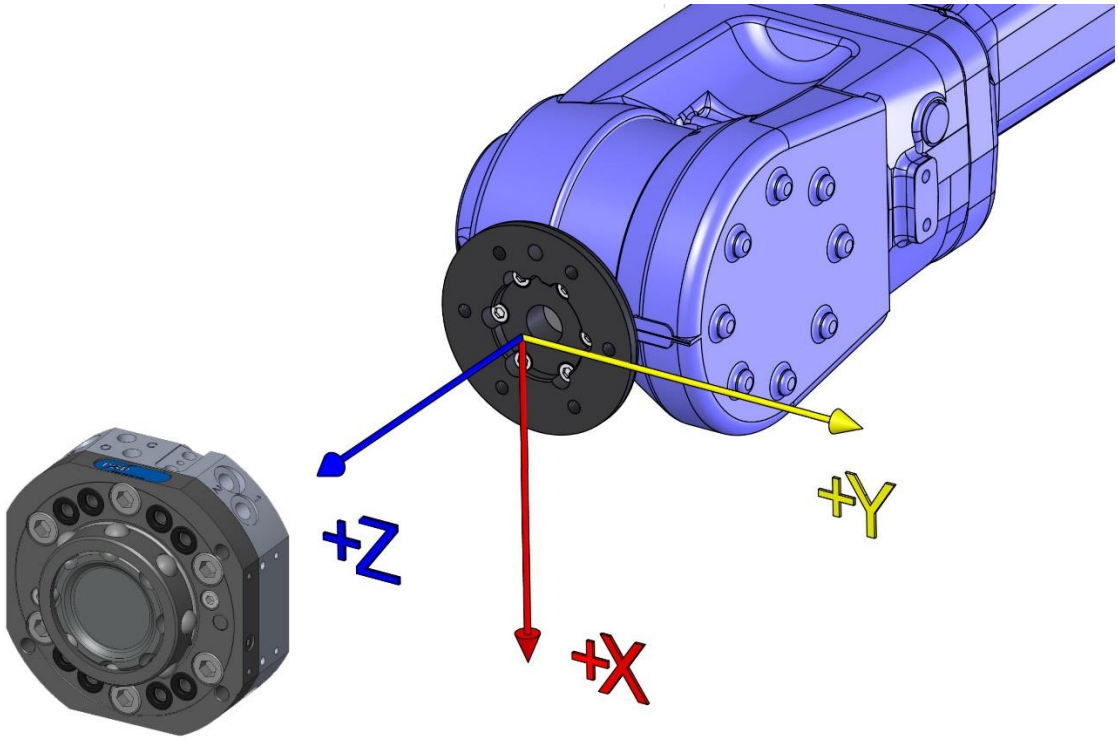
The figure below is an example of a configuration with different options:



TC60-8 with some different options mounted.

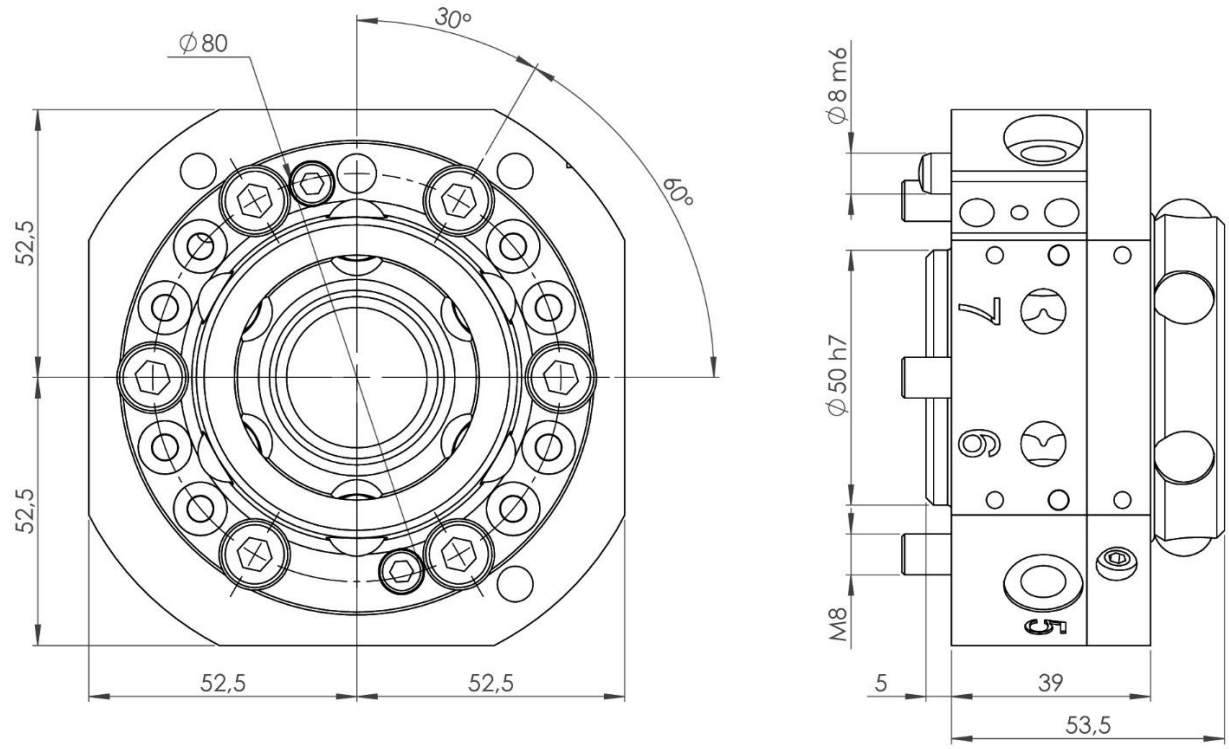
2.1 Coordinate System Definition

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 maximum tool load can, in accordance with the co-ordinate systems shown below, be found in the technical specification tables of the tool changers.



NOTE! For the tool changer, and tool changer with tool attachment docked, the origo of the co-ordinate system is situated in the centre of the robot mounting flange.

2.2 Tool changer TC60-8. Article: P1301A

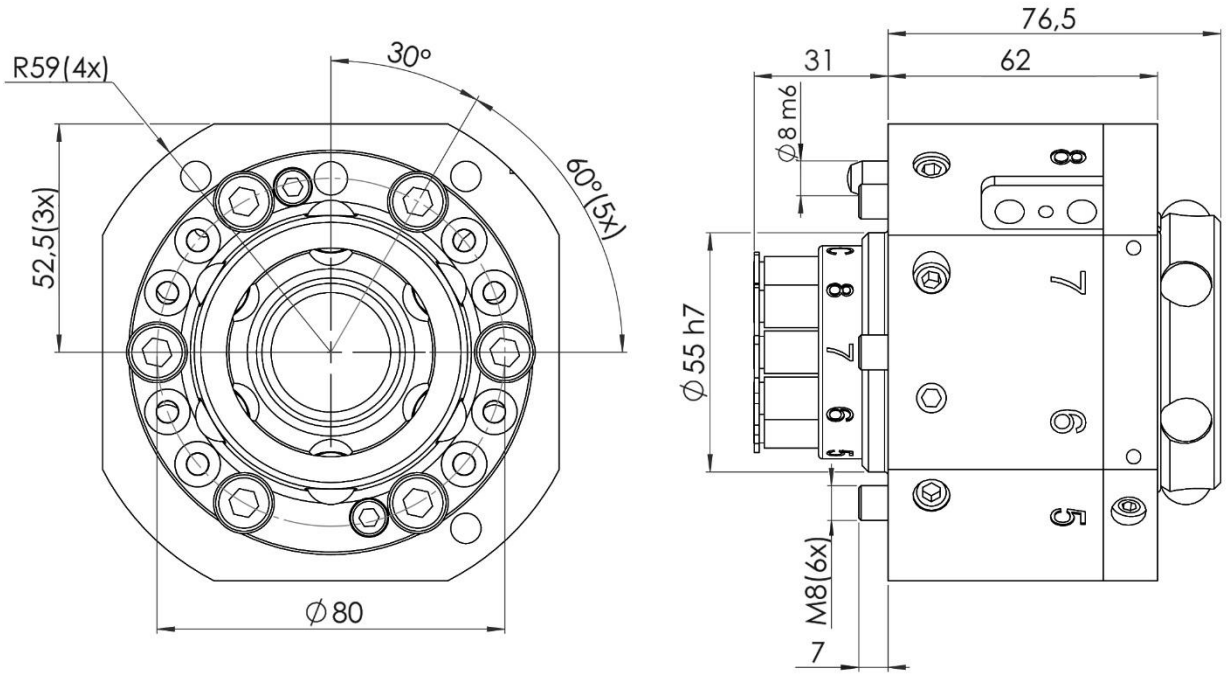


The tool changer TC60-8 transfers 8 pneumatic channels to the tool attachment, has inlets for Open TC and Close TC, 3 positions for options and 1 for TC Opened/Closed sensors. To be used together with tool attachment P1302.

Technical data

Working temperature		+10°C−+50°C
Bolt pattern		ISO 9409-1 80-6-M8
Weight and centre of gravity (Z)		
P1301A		1.8 kg / 26 mm
P1301A with P1302		2.8 kg / 35 mm
Maximum tool load	Fz (static)	±600 N
	Mx/My (dynamic)	±600 Nm
	Mz (dynamic)	±500 Nm
Air channels	Pneumatic diagram	See section 2.10
	User channels, robot side	8 X G 1/8” (400 l/min, max 10 bar)
	Dedicated channels, G 1/8”	Open TC marked O (6-10 bar) Close TC marked C (6-10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

2.3 Tool changer TC60-8 ID. Article: P1336

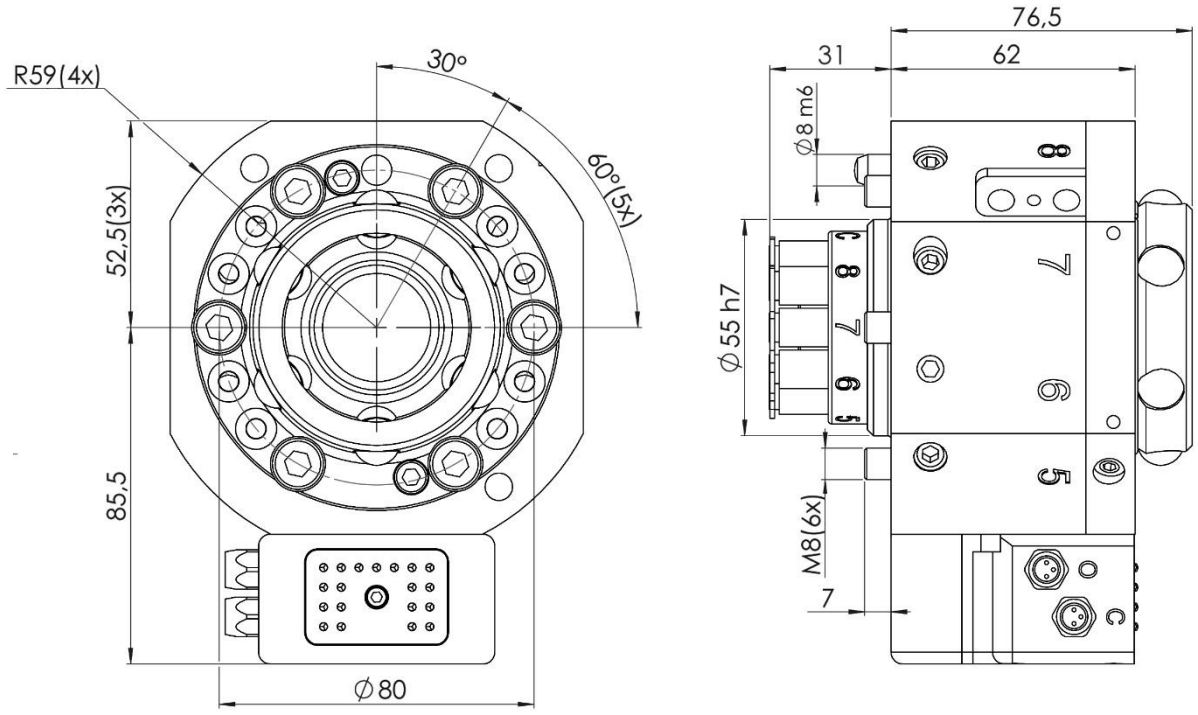


The tool changer TC60-8 ID transfers 8 pneumatic channels to the tool attachment, has inlets for Open TC and Close TC, 1 position for options and 1 for TC Opened/Closed sensors. To be used together with tool attachment P1302.

Technical data

Working temperature		+10°C−+50°C
Bolt pattern		ISO 9409-1 80-6-M8
Weight and centre of gravity (Z)		
P1336		2.4 kg / 35 mm
P1336 with P1302		3.4 kg / 49 mm
Maximum tool load	Fz (static)	±600 N
	Mx/My (dynamic)	±600 Nm
	Mz (dynamic)	±500 Nm
Air channels	Pneumatic diagram	See section 2.10
	User channels, robot side	8 x Ø6 mm (Push-in fitting, Festo QSM-M7-6-I), 150 l/min, max 10 bar
	Dedicated channels, Ø6 mm	Open TC marked O (6-10 bar) Close TC marked C (6-10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

2.4 Tool changer TC60-8E ID. Article: P1337

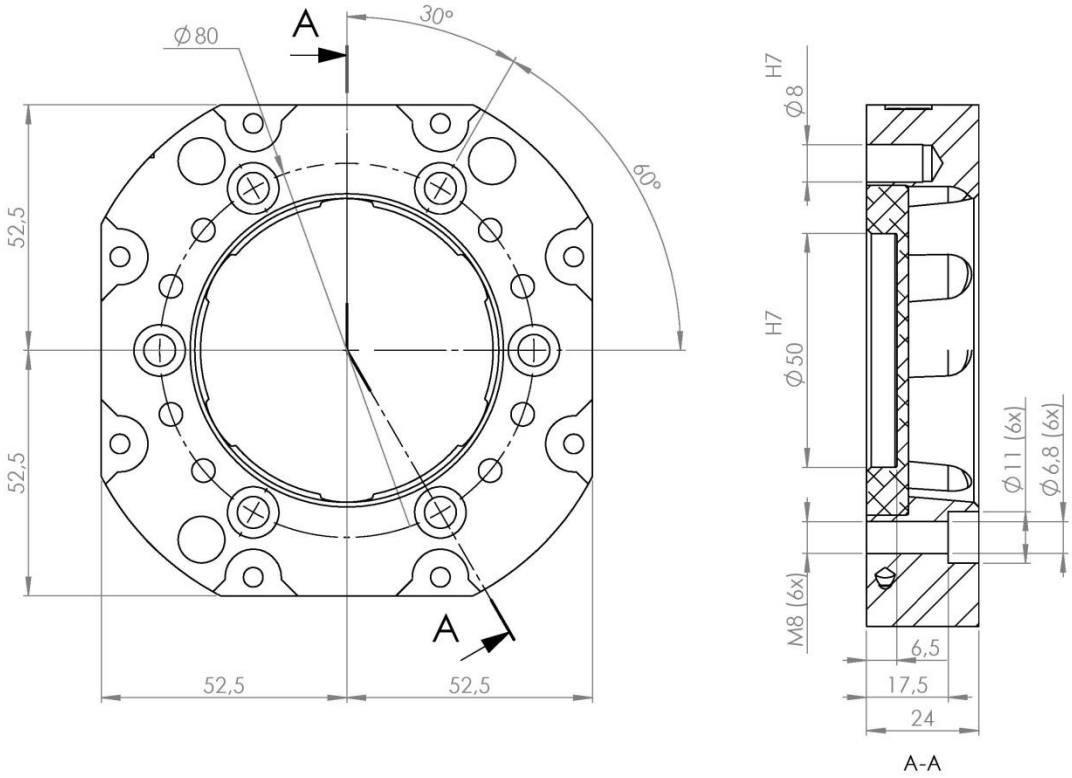


The tool changer TC60-8 transfers 8 pneumatic channels and 17 electrical signals to the tool attachment, has inlets for Open TC and Close TC and 1 for TC Opened/Closed sensors. To be used together with tool attachment P1302 with signal module P1312 (17 x signals) mounted at the corresponding position.

Technical data

Working temperature		+10°C−+50°C
Bolt pattern		ISO 9409-1 80-6-M8
Weight and centre of gravity (Z)		
P1337		2.6 kg / 37 mm
P1337 with P1302+1312		3.6 kg / 50 mm
Maximum tool load	Fz (static)	±600 N
	Mx/My (dynamic)	±600 Nm
	Mz (dynamic)	±500 Nm
Air channels	Pneumatic diagram	See section 2.10
	User channels, robot side	8 x Ø6 mm (Push-in fitting, Festo QSM-M7-6-I), 150 l/min, max 10 bar
	Dedicated channels, Ø6 mm	Open TC marked O (6-10 bar) Close TC marked C (6-10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content
Electrical Interface	Circuit diagram	E0182-047 (section 2.11)
	Connection, robot side	I1154 (Mini-snap 19 pole)
	Total signals	17 x (1A, 30V)
	Dedicated signals	TC Opened, TC Closed
Connection kit (optional)	P8176-16	I1155 (Mini-snap 19 pole female)–Souriau 19P (UT061823PH04), total length 1.6 m.

2.5 Tool attachment, TA60-8. Article: P1302



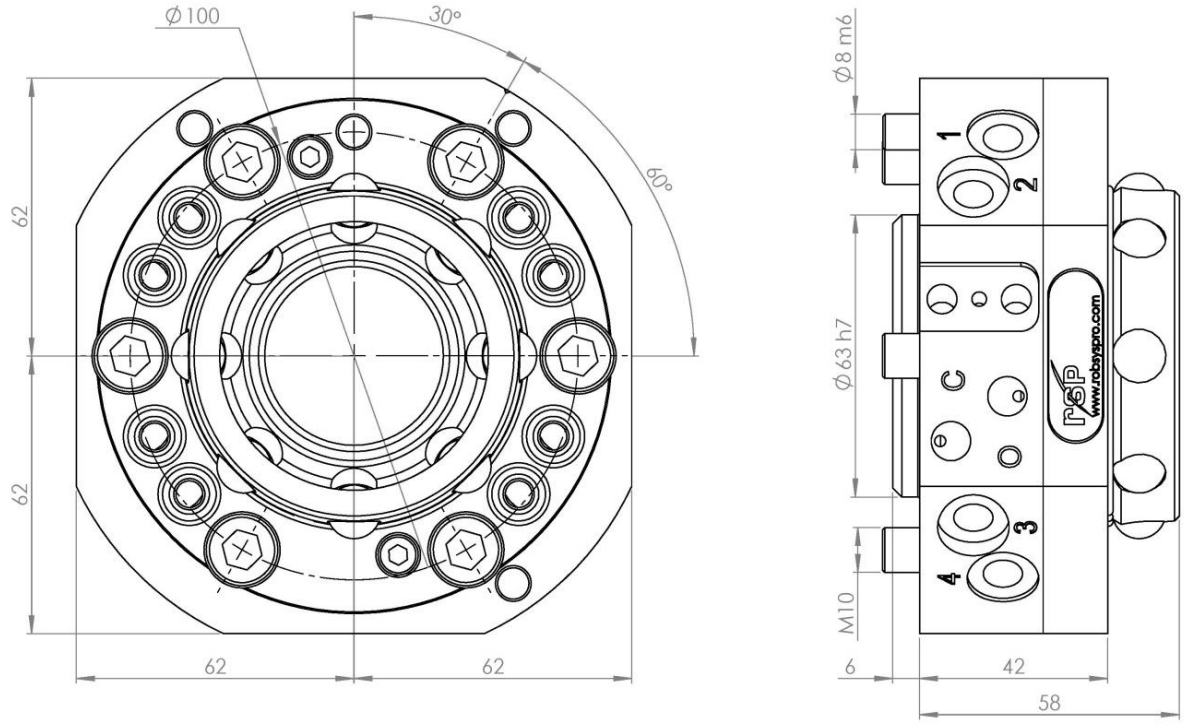
The tool attachment TA60-8 transfers 8 pneumatic channels to the tool and has 4 positions for options. To be used together with tool changer P1301A, P1336 and P1337.

Technical data

Working temperature		+10°C−+50°C
Bolt pattern		ISO 9409-1 80-6-M8
Weight		1.0 kg
Maximum tool load (M8-screws)	Fz (static)	±600 N
	Mx/My (dynamic)	±600 Nm
	Mz (dynamic)	±500 Nm
Maximum tool load (M6-screws)	Fz (static)	±600 N
	Mx/My (dynamic)	±600 Nm
	Mz (dynamic)	±250 Nm
Air channels	Pneumatic diagram	See section 2.10
	Connections, tool side	8 X G 1/8”

NOTE! Tools can be mounted to the tool attachment using six M8-screws, alternatively the tool attachment can be mounted to the tool using six M6-screws.

2.6 Tool changer TC120-8. Article: P1401

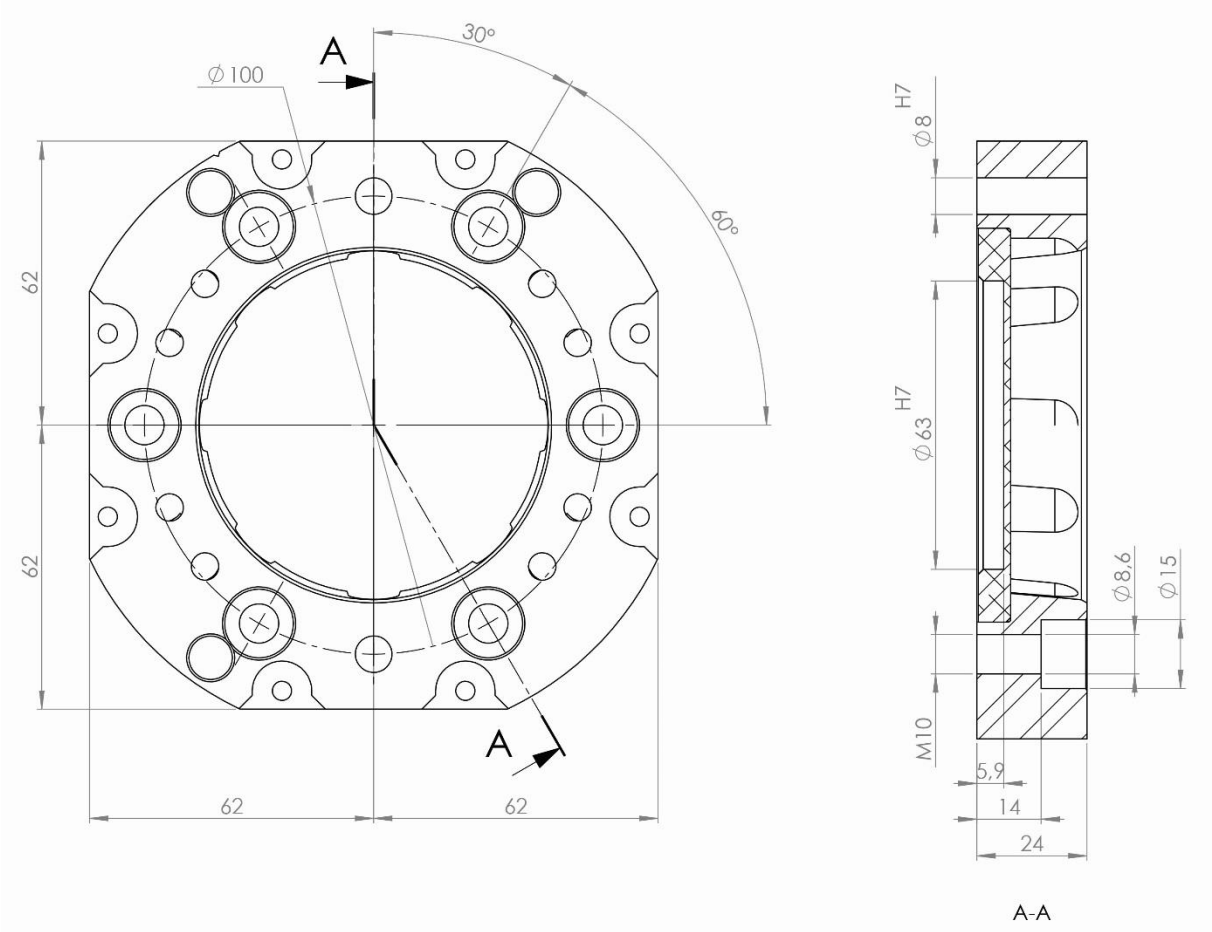


The tool changer TC120-8 transfers 8 pneumatic channels to the tool attachment, has inlets for Open TC and Close TC, 3 positions for options and 1 for TC Opened/Closed sensors. To be used together with tool attachment P1402.

Technical data

Working temperature		+10°C−+50°C
Bolt pattern		ISO 9409-1 100-6-M10
Weight and centre of gravity (Z)		
P1401		2.7 kg / 28 mm
P1401 with P1402		4.0 kg / 37 mm
Maximum tool load	Fz (static)	±1000 N
	Mx/My (dynamic)	±1000 Nm
	Mz (dynamic)	±1000 Nm
Air channels	Pneumatic diagram	See section 2.10
	User channels, robot side	8 X G 1/8” (400 l/min, max 10 bar)
	Dedicated channels, G 1/8”	Open TC marked O (6-10 bar) Close TC marked C (6-10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

2.7 Tool attachment, TA120-8. Article: P1402



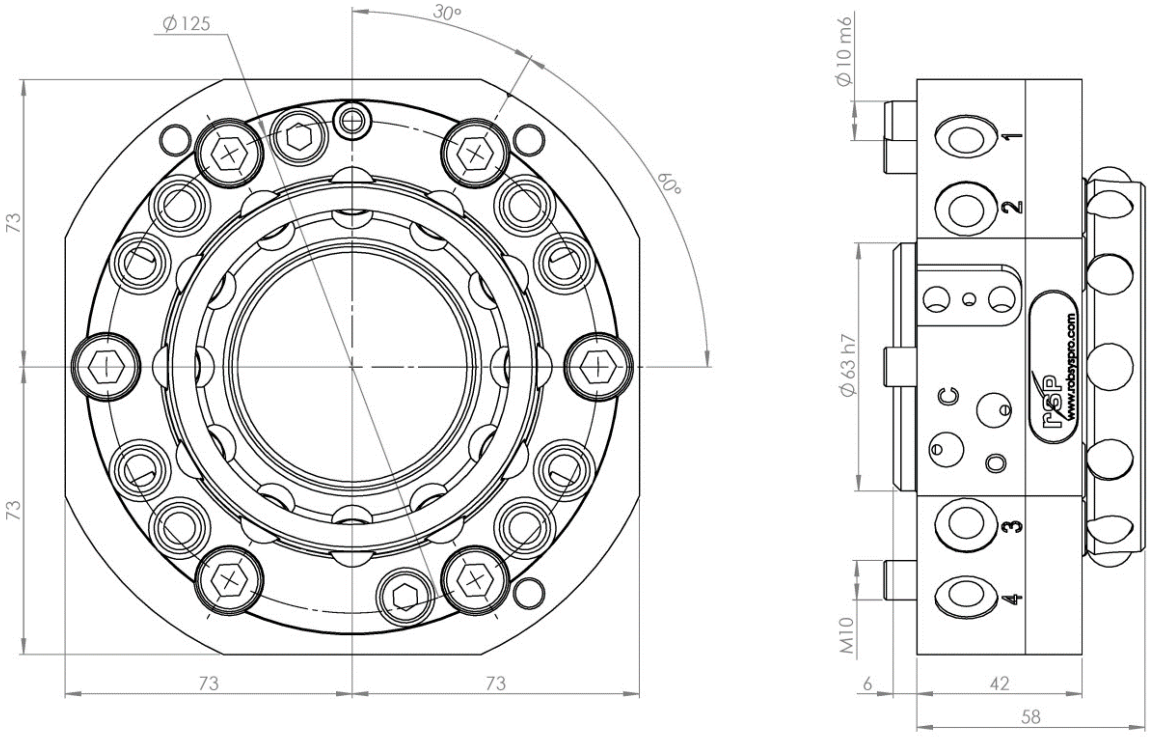
The tool attachment TA120-8 transfers 8 pneumatic channels to the tool and has 4 positions for options. To be used together with tool changer P1401.

Technical data

Working temperature		+10°C−+50°C
Bolt pattern		ISO 9409-1 100-6-M10
Weight		1.3 kg
Maximum tool load (M10-screws)	Fz (static)	±1000 N
	Mx/My (dynamic)	±1000 Nm
	Mz (dynamic)	±1000 Nm
Maximum tool load (M8-screws)	Fz (static)	±1000 N
	Mx/My (dynamic)	±1000 Nm
	Mz (dynamic)	±600 Nm
Air channels	Pneumatic diagram	See section 2.10
	Connections, tool side	8 X G 1/8”

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.

2.8 Tool changer TC180-8. Article: P1801

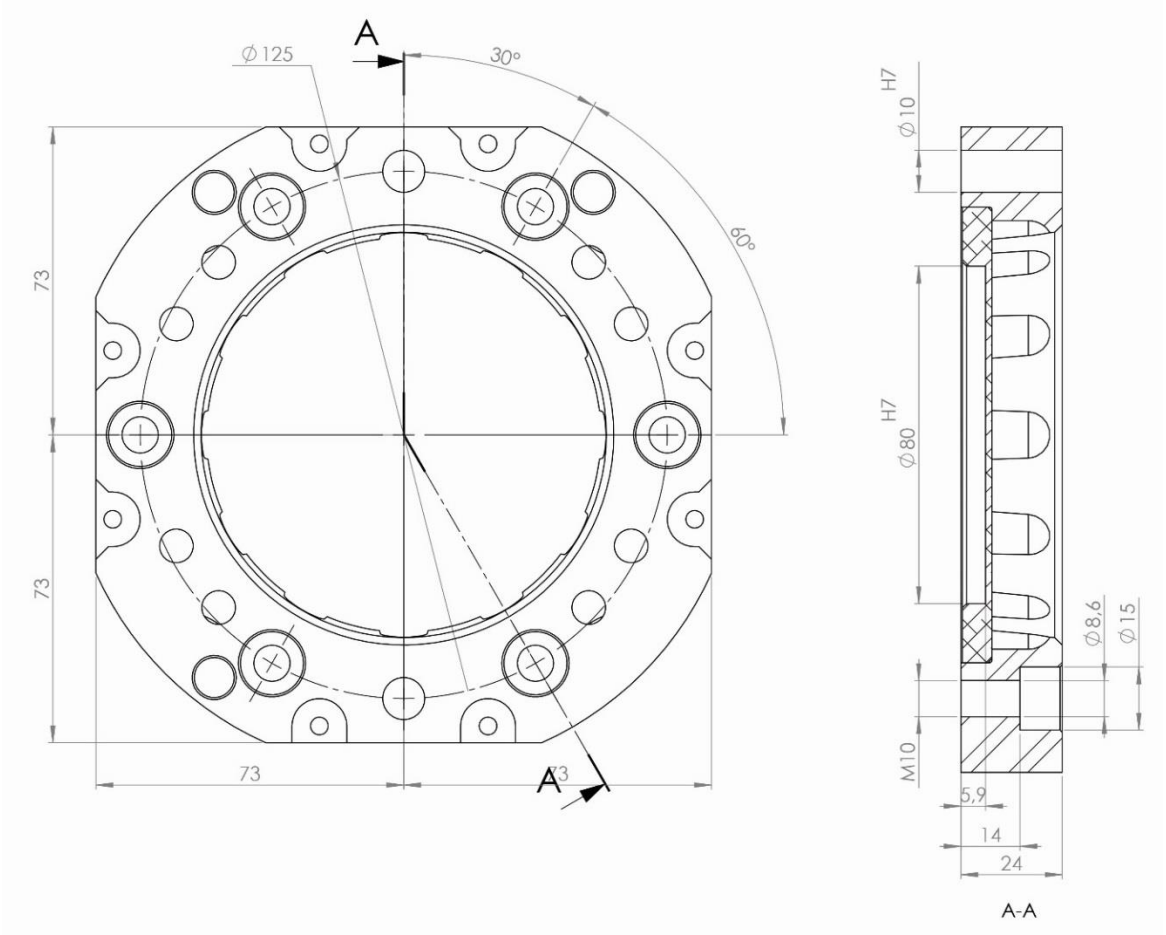


The tool changer TC180-8 transfers 8 pneumatic channels to the tool attachment, has inlets for Open TC and Close TC, 3 positions for options and 1 for TC Opened/Closed sensors. To be used together with tool attachment P1802.

Technical data

Working temperature		+10°C−+50°C
Bolt pattern		ISO 9409-1 125-6-M10
Weight and centre of gravity (Z)		
P1801		3.6 kg / 28 mm
P1801 with P1802		5.4 kg / 37 mm
Maximum tool load	Fz (static)	±1800 N
	Mx/My (dynamic)	±1800 Nm
	Mz (dynamic)	±1250 Nm
Air channels	Pneumatic diagram	See section 2.10
	User channels, robot side	8 X G 1/8” (400 l/min, max 10 bar)
	Dedicated channels, G 1/8”	Open TC marked O (6-10 bar) Close TC marked C (6-10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content

2.9 Tool attachment, TA180-8. Article: P1802



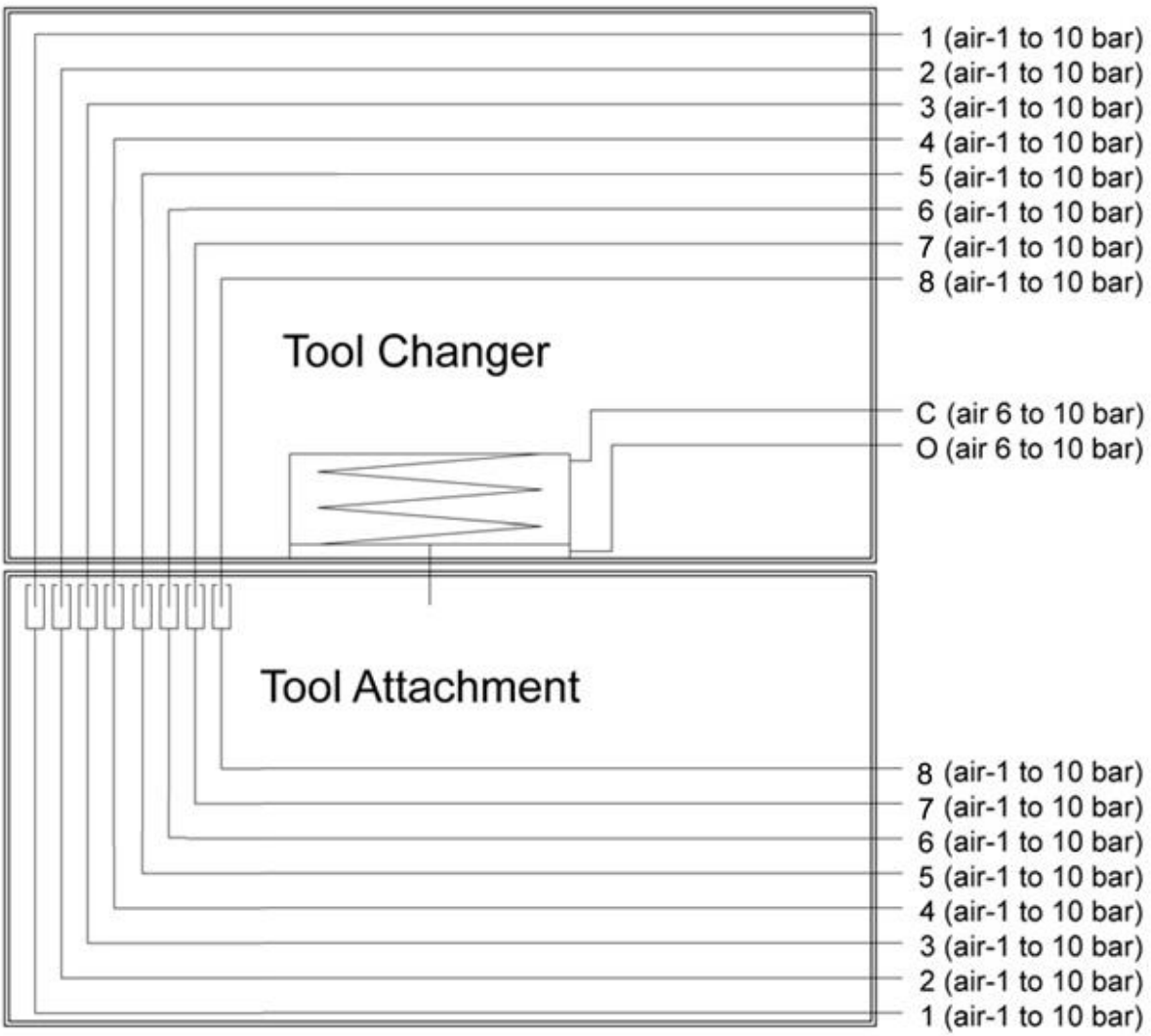
The tool attachment TA180-8 transfers 8 pneumatic channels to the tool and has 4 positions for options. To be used together with tool changer P1801.

Technical data

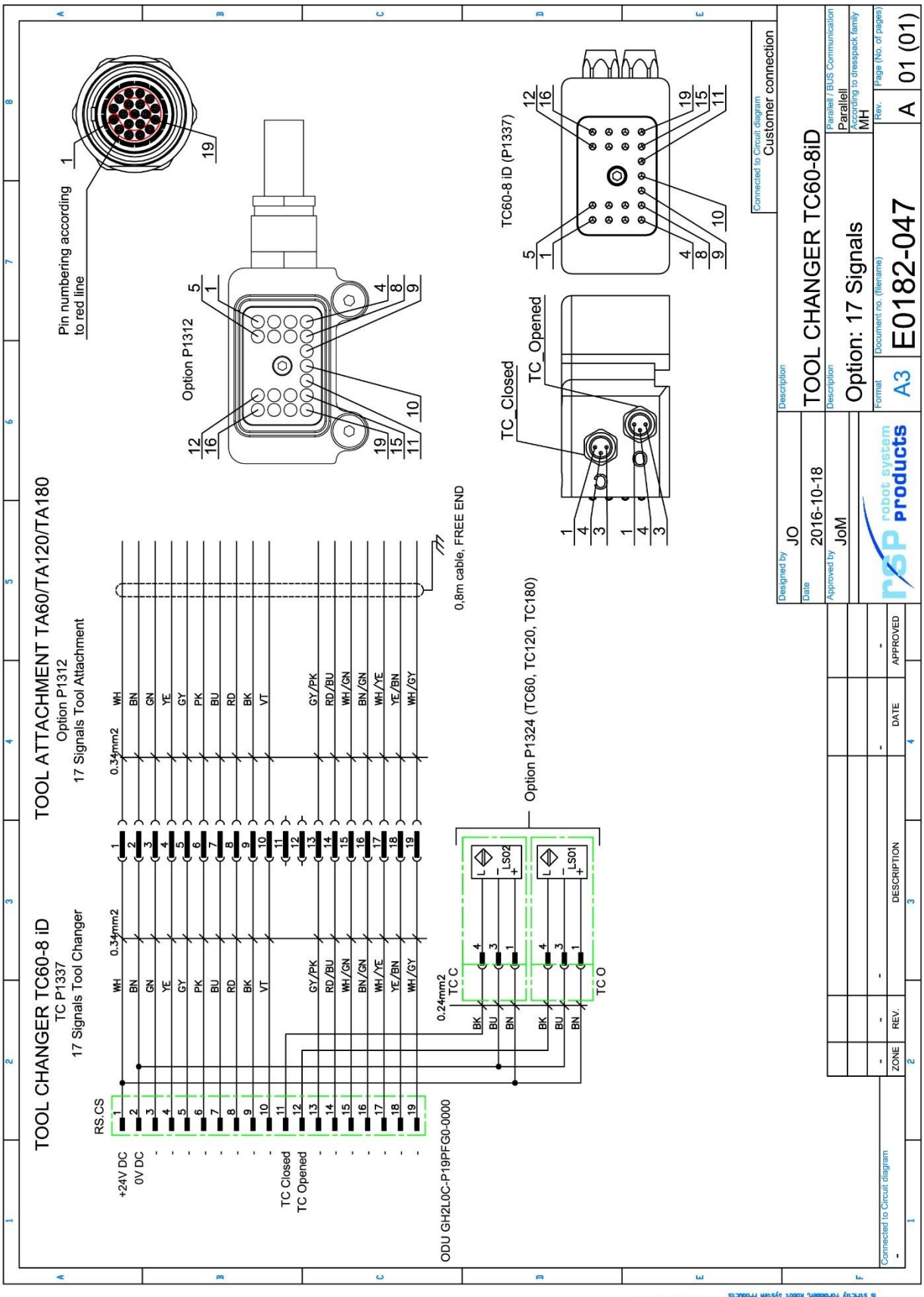
Working temperature		+10°C−+50°C
Bolt pattern		ISO 9409-1 125-6-M10
Weight		1.8 kg
Maximum tool load (M10-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1800 N ±1800 Nm ±1250 Nm
Maximum tool load (M8-screws)	Fz (static) Mx/My (dynamic) Mz (dynamic)	±1800 N ±1800 Nm ±750 Nm
Air channels	Pneumatic diagram Connections, tool side	See section 2.10 8 X G 1/8”

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.

2.10 Pneumatic diagram for TC60, TC120 and TC180



2.11 Circuit diagram E0182-047 for P1337



2.12 Technical notes

2.12.1 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.

2.12.2 Sparking

WARNING! Electrical and power signals must be switched off when docking and undocking the tool attachment. This is to prevent sparking between signal pins and tool attachment.

2.12.3 Robot Adaptation Kits

The flange of the tool changers has fastening holes in accordance with ISO 9409. Adaptation plates, to be mounted between the tool changer and the robot flange. are available for other bolt circles. The order numbers are customer specific, depending on robot.

2.12.4 Tool Stand

NOTE!
To guarantee reliability and a long service-life for the 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!

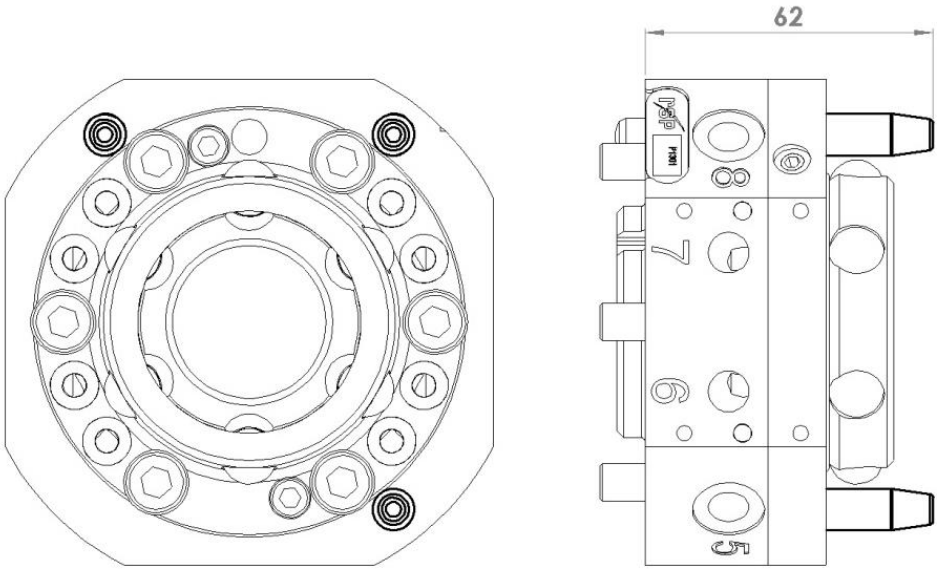
See sections 3.50 to 3.54 for suitable tool stand equipment.

2.12.5 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.

3 MODULES AND OPTIONS

3.1 Guide pins. Article: P1314



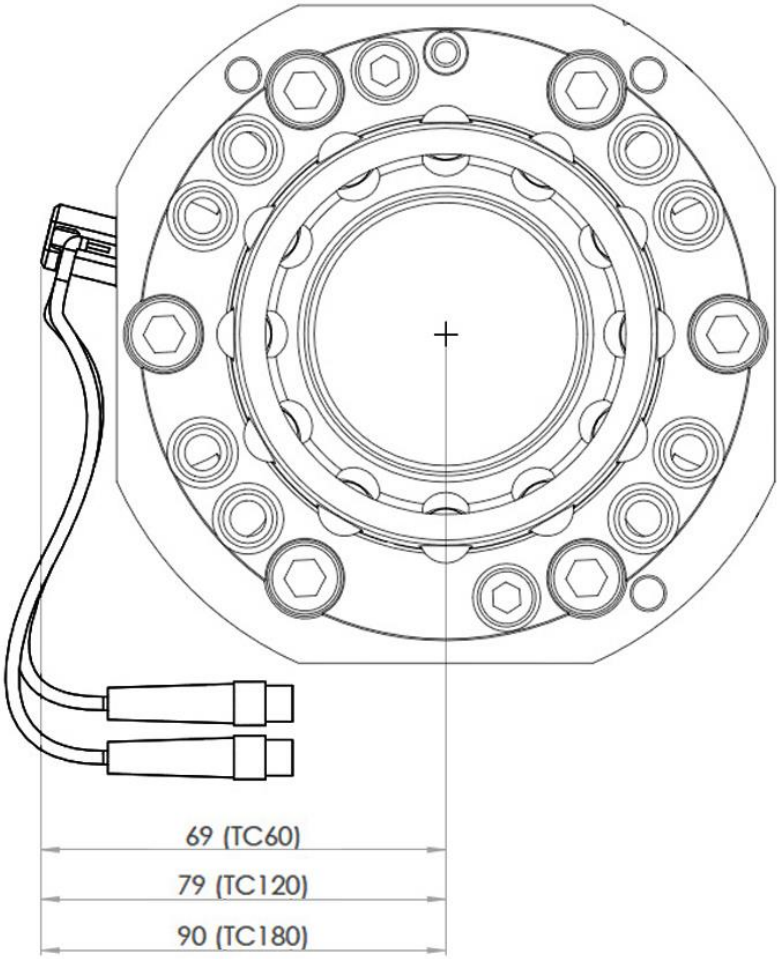
Includes 3 guide pins to be used in order to improve alignment with tool attachment during docking, extending lifetime for not spring-loaded signal pins. To be mounted on tool changers P1301A, P1336, P1337, P1401 or P1801.

NOTE! Recommended when using options P1354, P1356, P1368, P1375, P3316, P1307, P3312 and P1322.

Technical data

Weight	0.05 kg

3.2 Magnetic sensors for TC Opened/TC Closed. Article: P1324



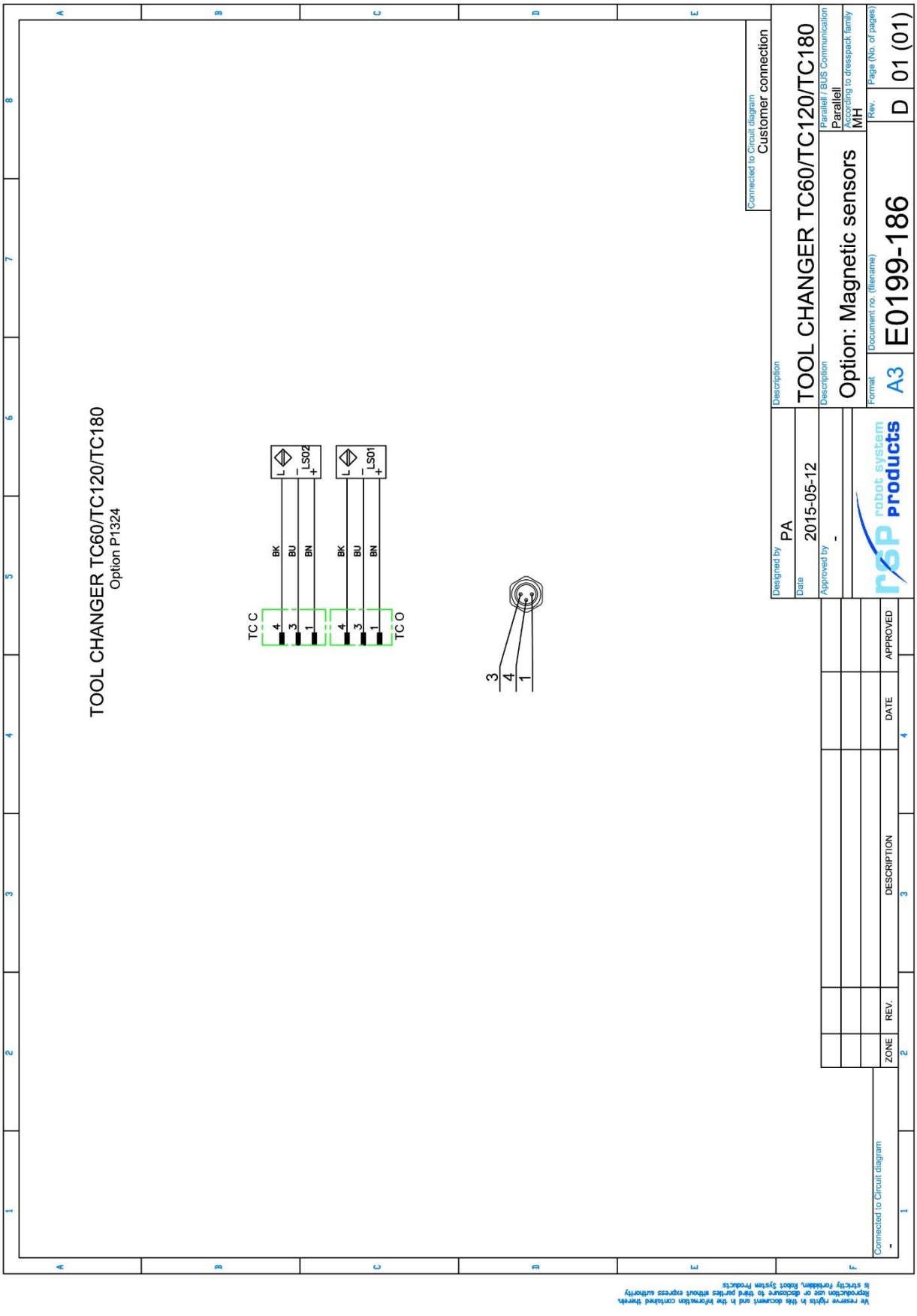
One magnetic sensor which gives +24V signal “TC Opened” when tool changer is unlocked and one magnetic sensor which gives +24V signal “TC Closed” when tool changer is locked. To be mounted at one dedicated position on the tool changer.

NOTE! Magnetic sensors P1324 requires option P1371, P1311, P1338 or P1344 on the tool changer side.

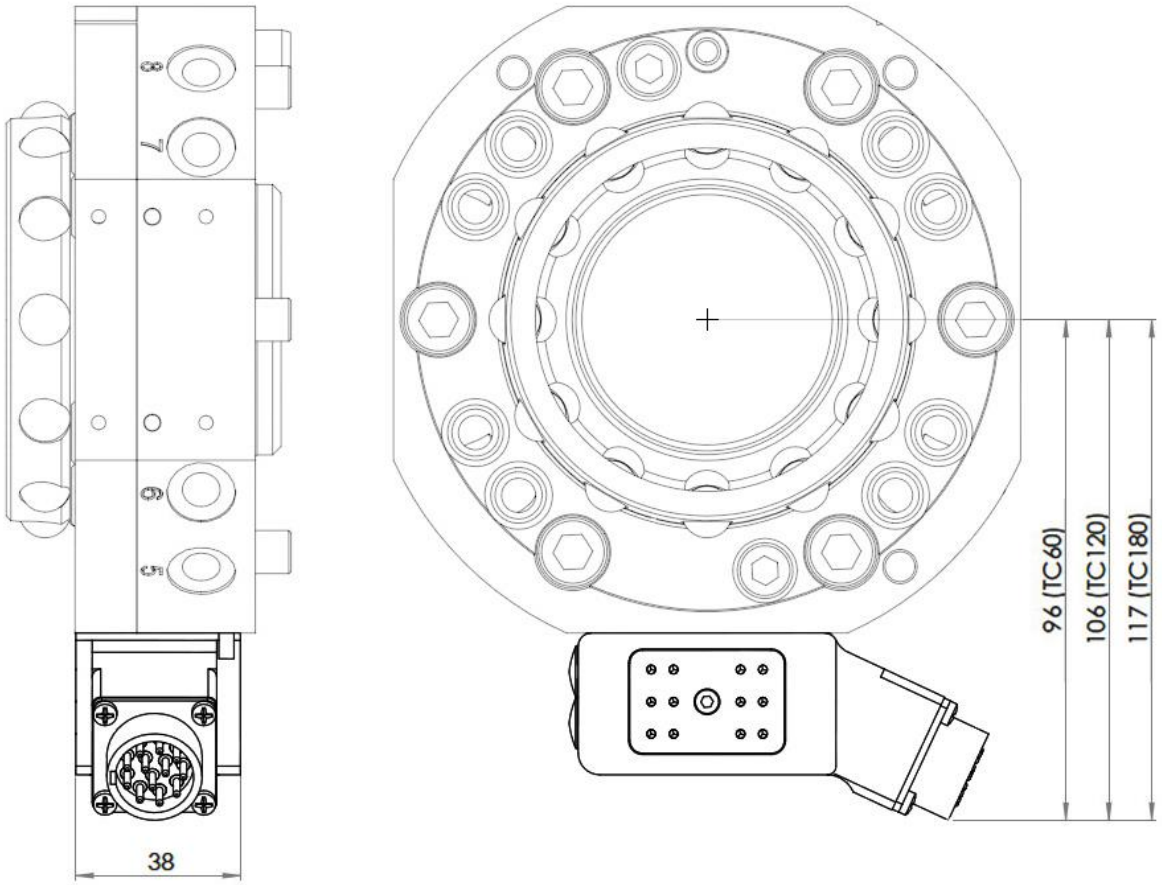
Technical data

Weight		0.15 kg
Electrical Interface	Circuit diagram	E0199-186 (section 3.2.1)
	M8 3P, A-coded	24V, 0V, TC Opened
	M8 3P, A-coded	24V, 0V, TC Closed

3.2.1 Circuit diagram E0199-186 for P1324



3.3 Signal module 12 x signals, robot side. Article: P1305

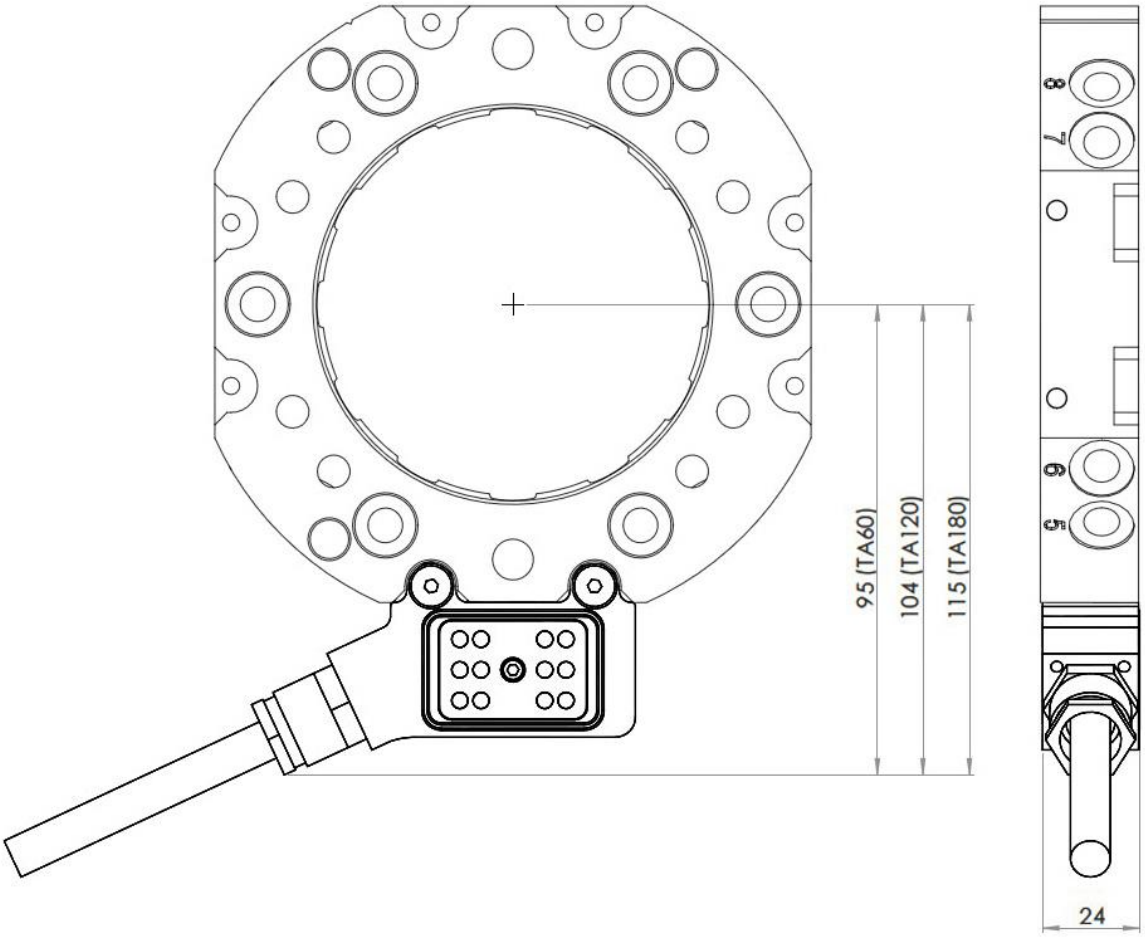


Signal module P1305 transfers 12 electrical signals to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer. To be used together with module P1306 attached to the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-001 (section 3.4.1)
	Connection, robot side	Souriau 12P (UT001412PH)
	Total signals available at tool	12 x (1A, 60V)
Connection kits and cables (optional)	P8006	Souriau 12S (straight, 0.52–1.5 mm^2)
	P8006-1	Souriau 12S, (angled, 0.32–0.52 mm^2)
	P8006-2	Souriau 12S, (angled, 0.52–1.5 mm^2)
	P8116-30/ P8116-60	Souriau 12S with 3,0/6.0 m cable, open end

3.4 Signal module 12 x signals, tool side. Article: P1306

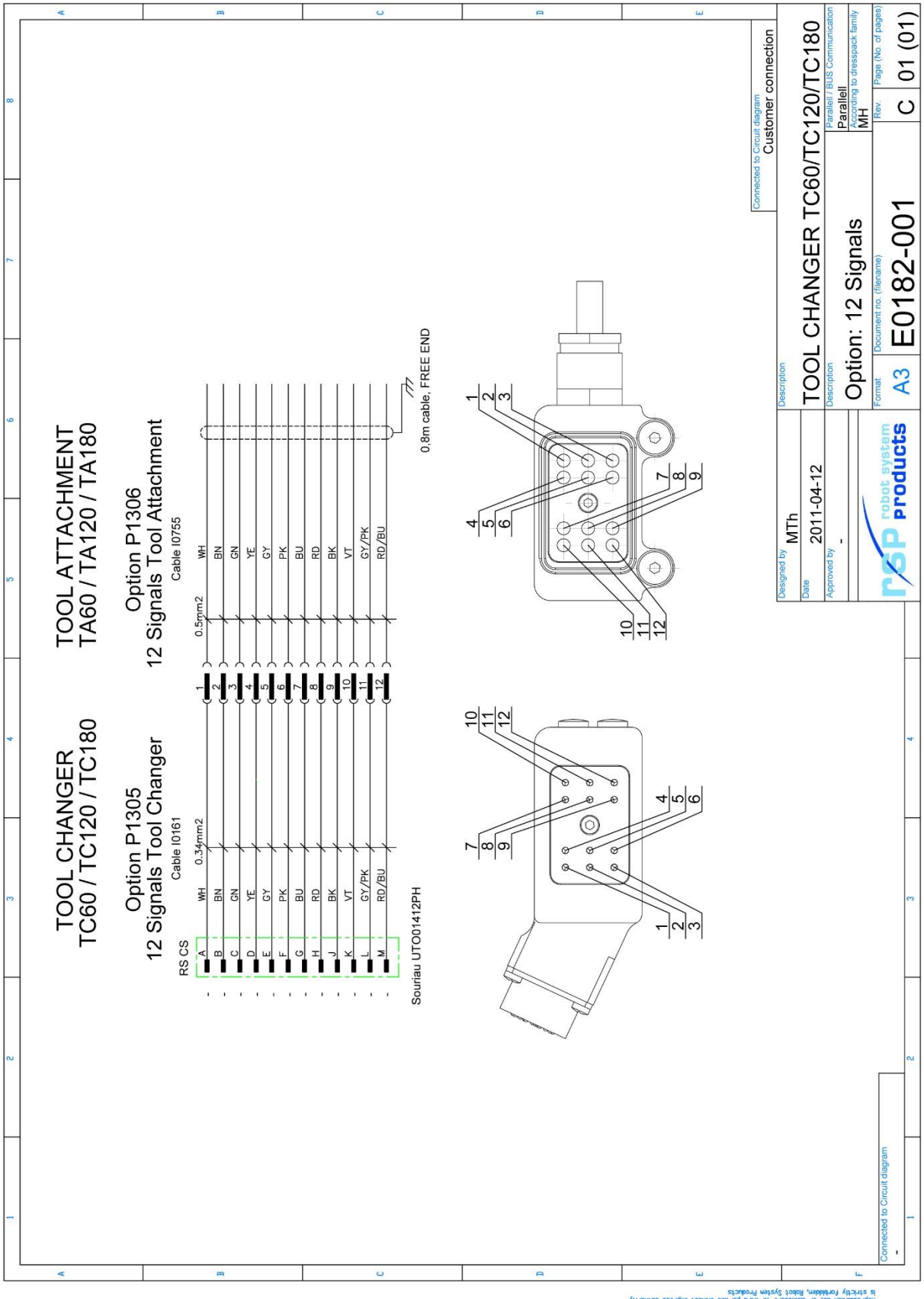


Signal module P1306 transfers 12 signals to the tool. To be mounted on the tool attachment and used together with module P1305 attached to the tool changer.

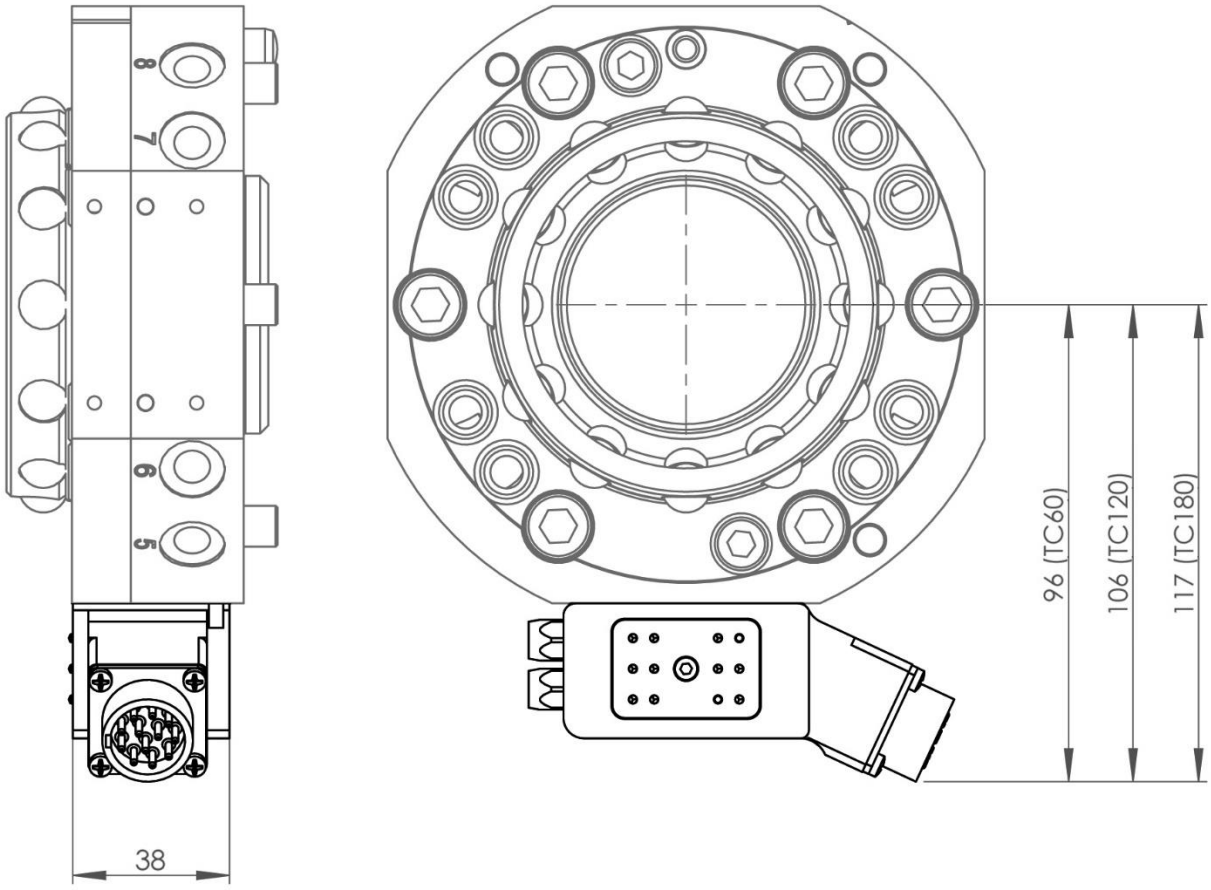
Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-001 (section 3.4.1)
	Connection, tool side	1 m cable (0.5 mm²), open end

3.4.1 Circuit diagram E0182-001 for P1305 and P1306



3.5 Signal module 12 x signals (for TC Opened/Closed sensors), robot side. Article: P1371

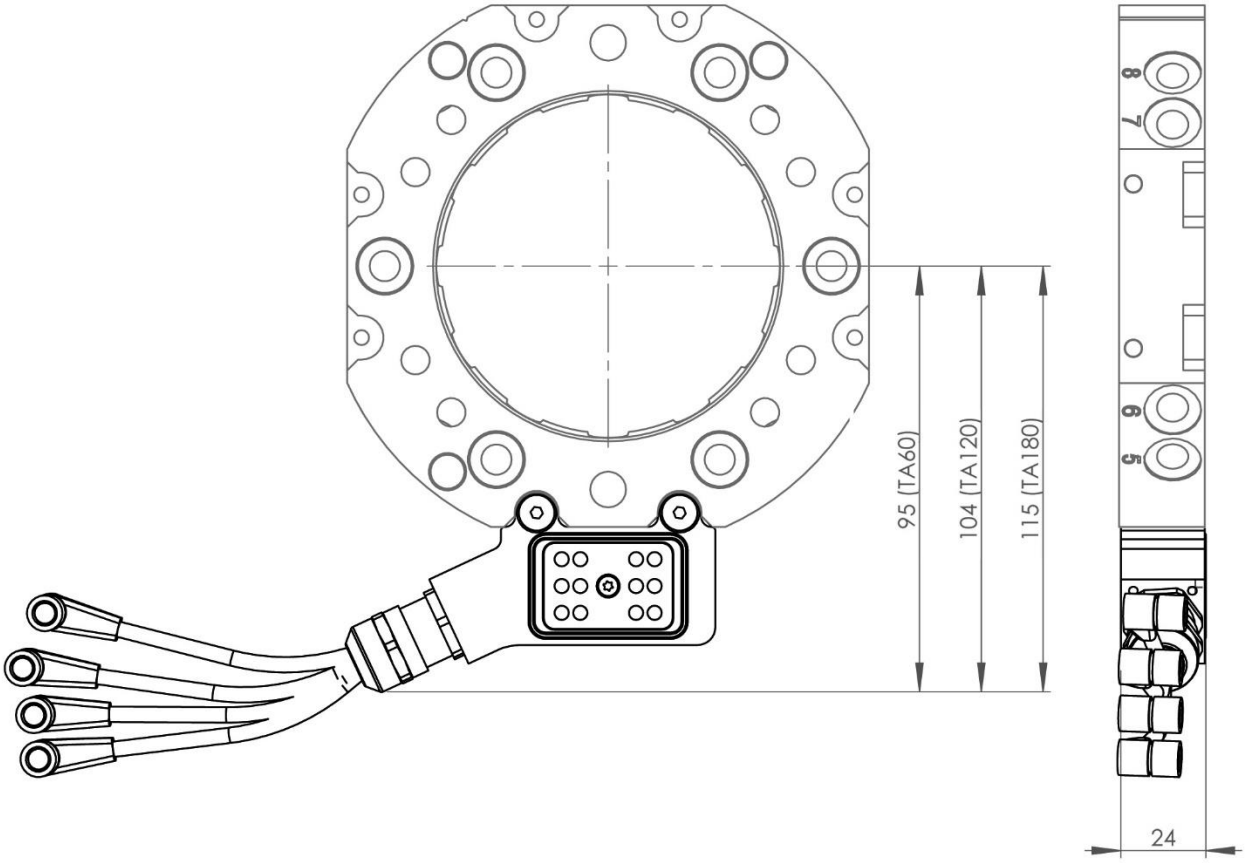


Signal module P1371 transfers 10 electrical signals to the tool attachment through spring loaded signal pins. To be mounted at one dedicated position on the tool changer and used together with module P1370 attached to the tool attachment. On the housing 2 separate M8-contacts are mounted for connection of TC Opened/Closed sensors P1324.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-092 (section 3.6.1)
	Connection, robot side	Souriau 12P (UT001412PH)
	Total signals	12 x (1A, 24V)
	Dedicated signals	TC Opened, TC Closed
	Signals available at tool	8 + 24V, 0V
Sensor Interface	M8 3S, A-coded	24V, 0V, TC Opened
	M8 3S, A-coded	24V, 0V, TC Closed
Connection kits and cables (optional)	P8006	Souriau 12S (straight, 0.52–1.5 mm^2)
	P8006-1	Souriau 12S, (angled, 0.32–0.52 mm^2)
	P8006-2	Souriau 12S, (angled, 0.52–1.5 mm^2)
	P8116-30/ P8116-60	Souriau 12S with 3,0/6.0 m cable, open end

3.6 Signal module 12 x signals (4 x M8), tool side. Article: P1370

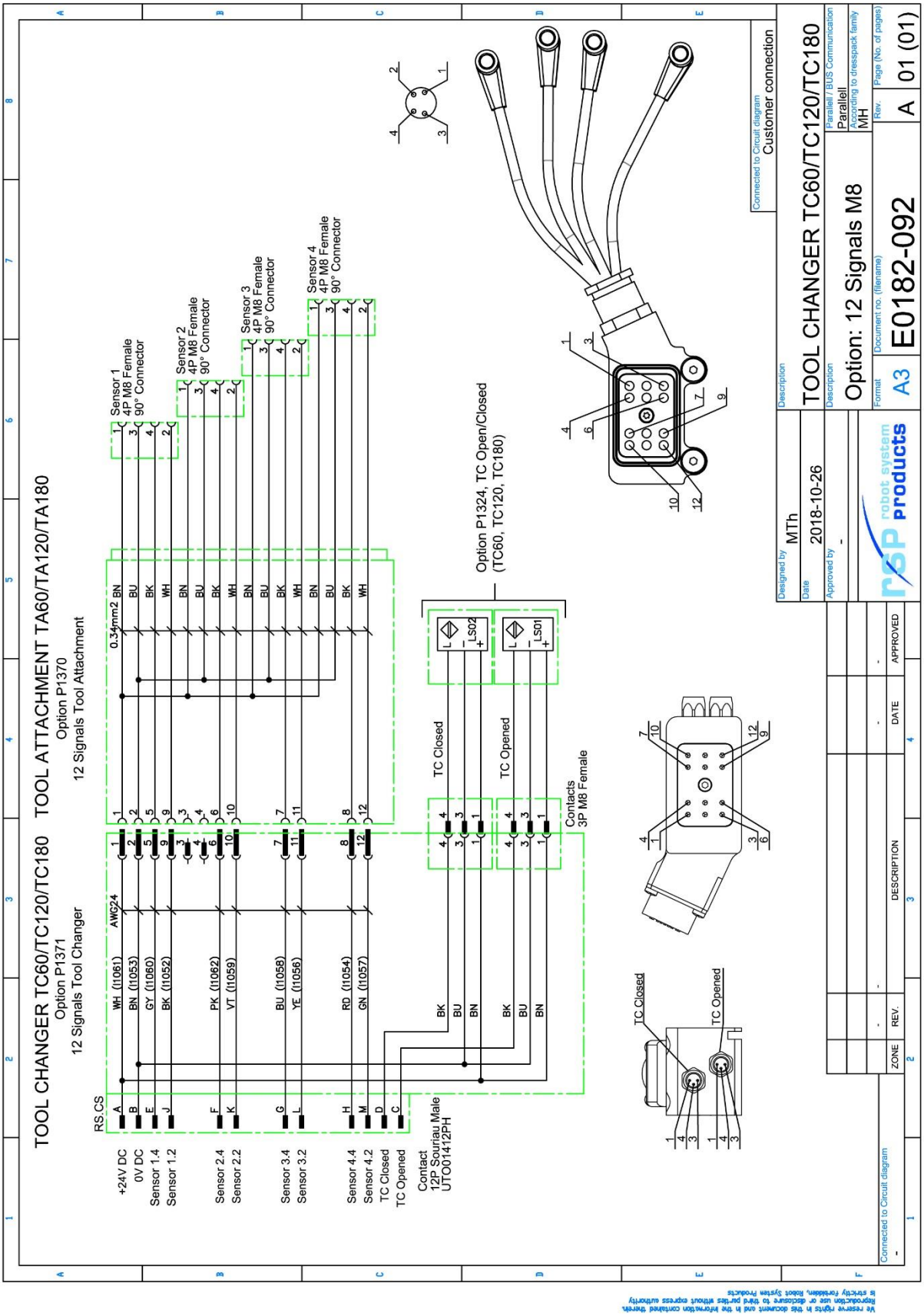


Signal module P1370 transfers 10 signals to the tool. To be mounted on the tool attachment and used together with module P1371 attached to the tool changer.

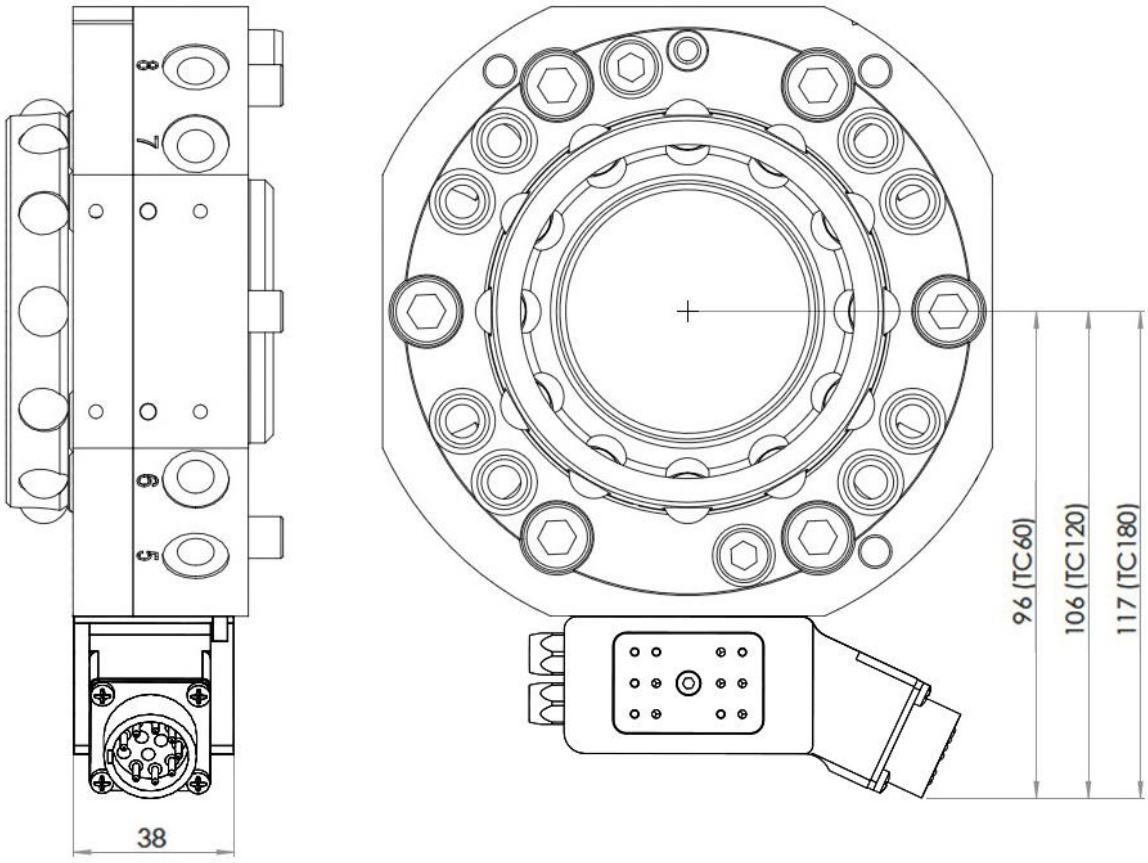
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-092 (section 3.6.1)
	Connections, tool side	4 x M8 4S A-coded (0.2 m cable)

3.6.1 Circuit diagram E0182-092 for P1371 and P1370



3.7 Signal module 8 x signals (for TC Opened/Closed sensors), robot side. Article: P1344

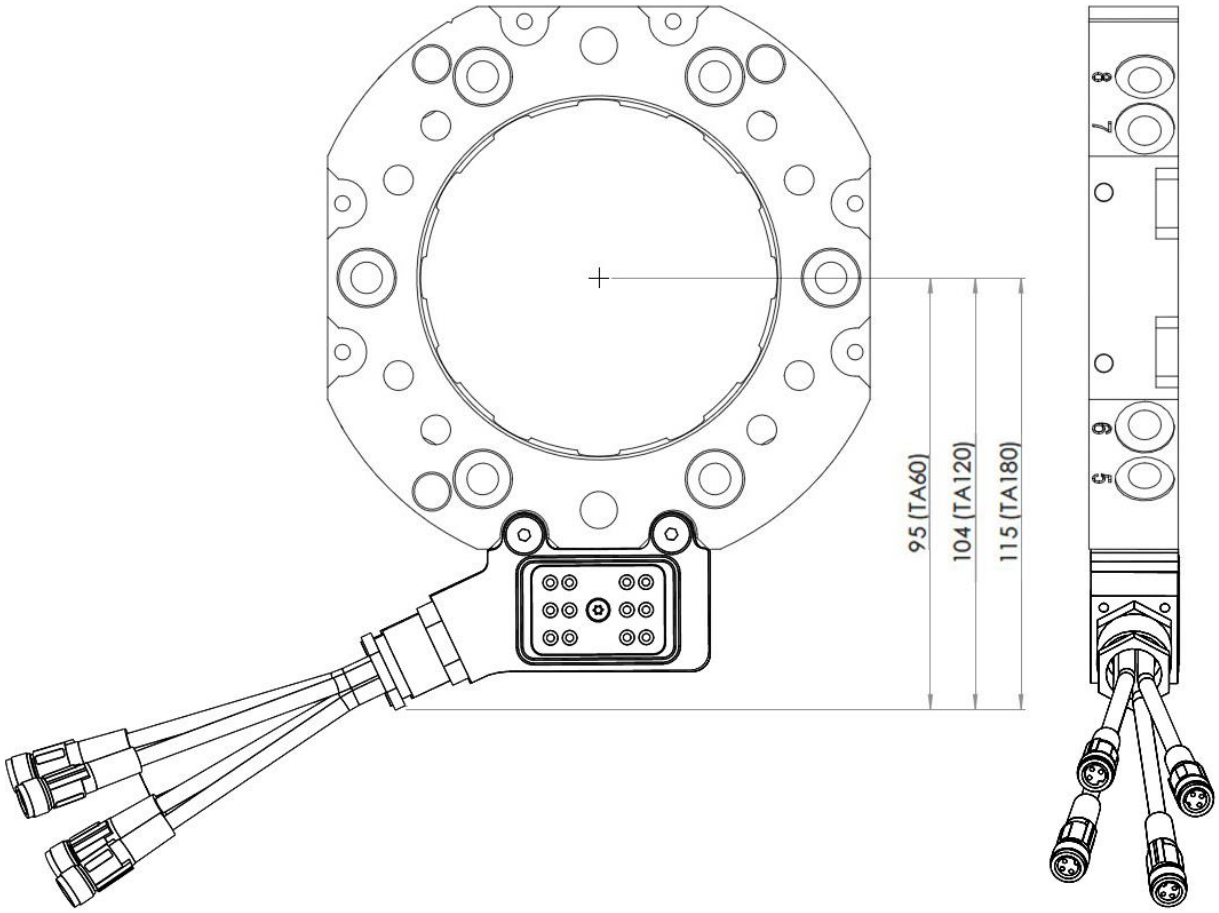


Signal module P1344 transfers 6 electrical signals to the tool attachment through spring loaded signal pins. To be mounted at one dedicated position on the tool changer and used together with module P1345 attached to the tool attachment. On the housing 2 separate M8-contacts are mounted for connection of TC Opened/Closed sensors P1324.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-059 (section 3.8.1)
	Connection, robot side	Souriau 12P (UT001412PH)
	Total signals	8 x (1A, 60V)
	Dedicated signals	TC Opened, TC Closed
	Signals available at tool	4 + 24V, 0V
Sensor Interface	M8 3S, A-coded	24V, 0V, TC Opened
	M8 3S, A-coded	24V, 0V, TC Closed
Connection kits and cables (optional)	P8006	Souriau 12S (straight, 0.52–1.5 mm^2)
	P8006-1	Souriau 12S, (angled, 0.32–0.52 mm^2)
	P8006-2	Souriau 12S, (angled, 0.52–1.5 mm^2)
	P8116-30/ P8116-60	Souriau 12S with 3,0/6.0 m cable, open end

3.8 Signal module 8 x signals, tool side. Article: P1345

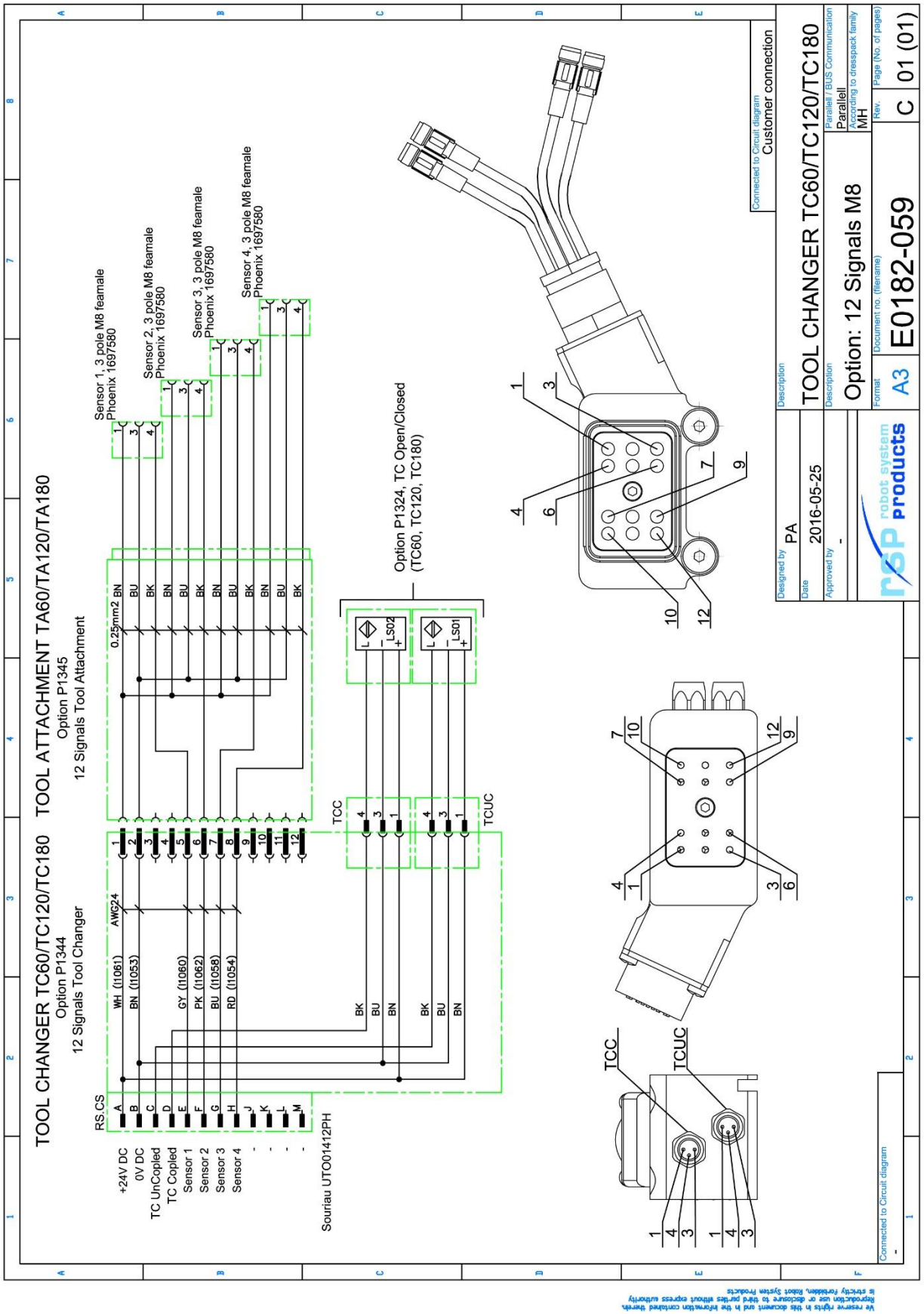


Signal module P1345 transfers 6 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1344 attached to the tool changer.

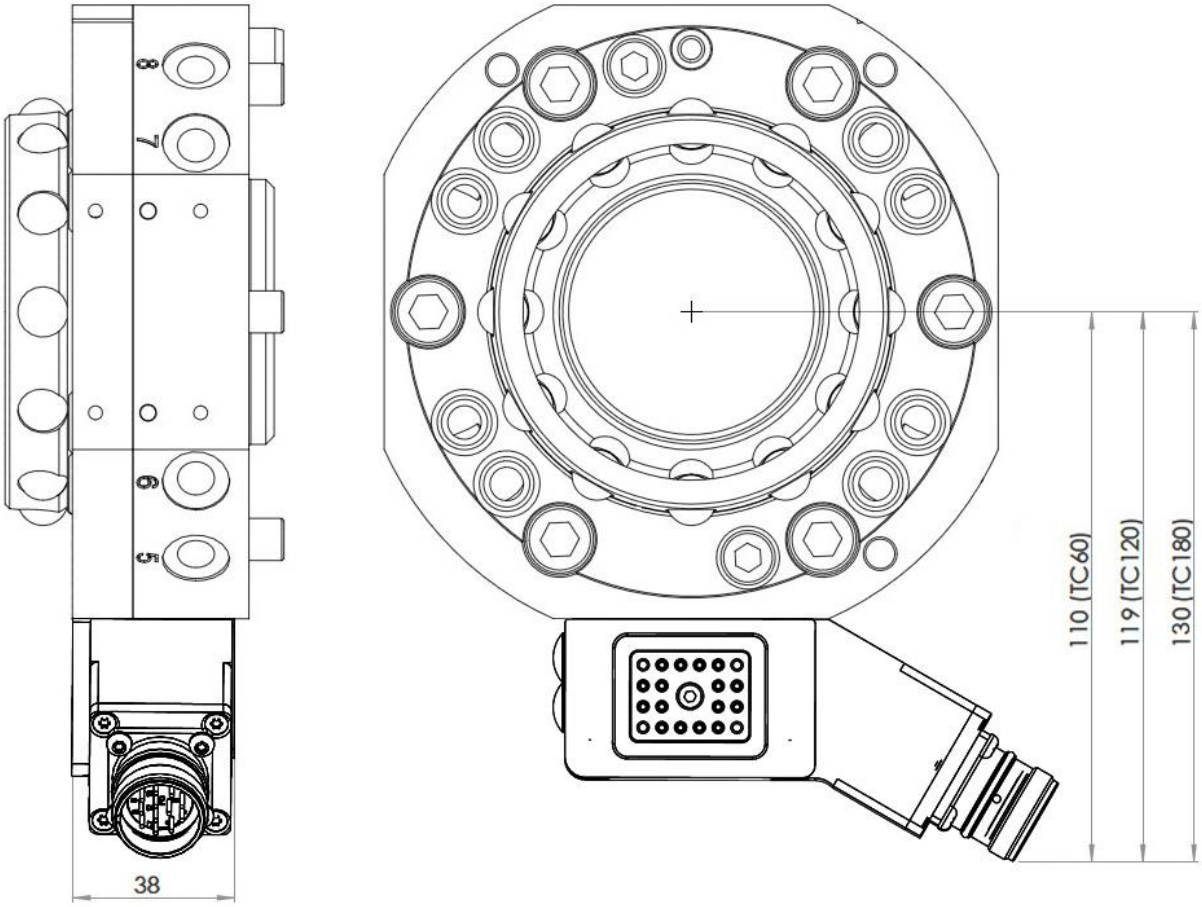
Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-059 (section 3.8.1)
	Connection, tool side	4 x M8 3S, 0.2 m cable

3.8.1 Circuit diagram E0182-059 for P1344 and P1345



3.9 Signal module 12 x signals (M23), robot side. Article: P1354



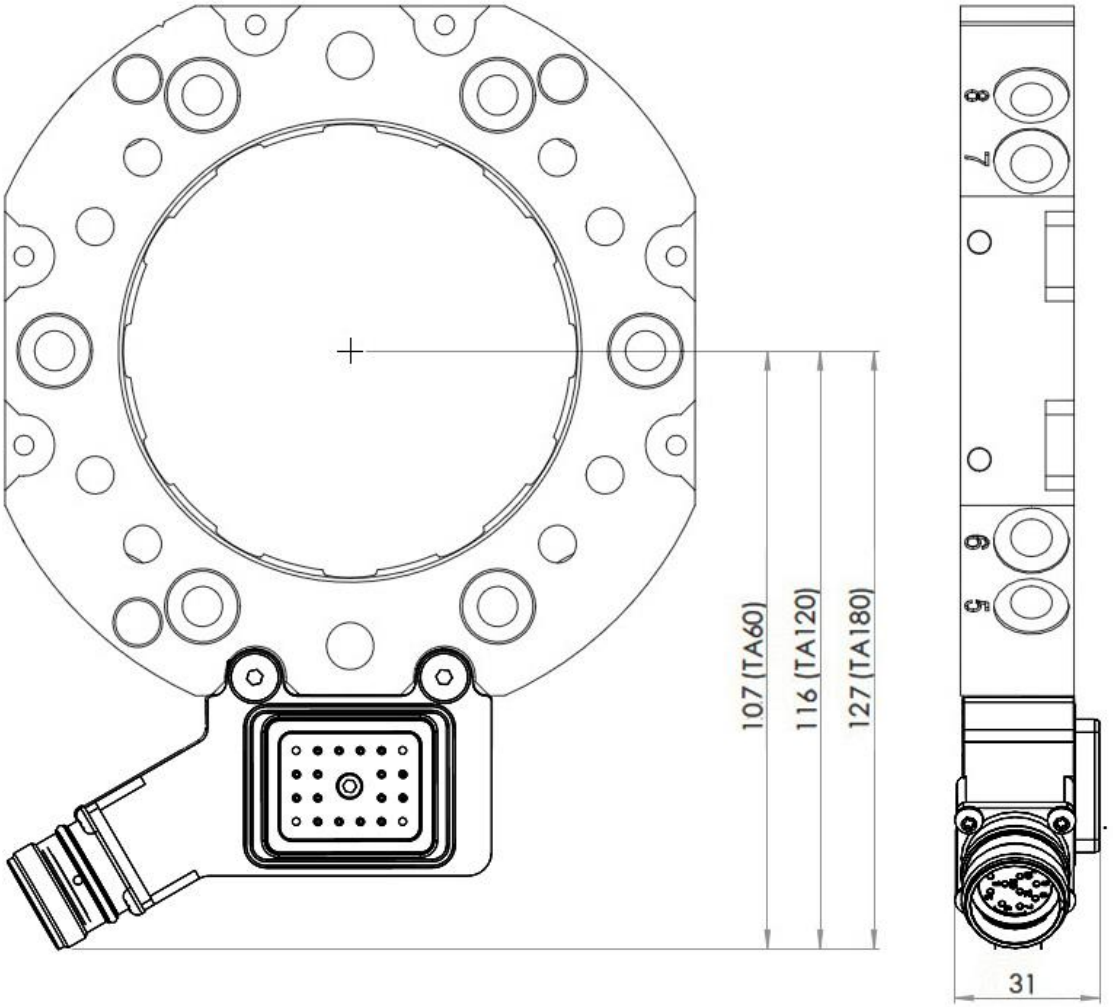
Signal module P1354 transfers 12 electrical signals to the tool attachment. Can be mounted at three different positions on the tool changer. To be used together with module P1355 attached to the tool attachment.

NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1354 and P1355.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-073 (section 3.10.1)
	Connection, robot side	M23 12P (Phoenix 1592574, insert 1597635)
	Total signals available at tool	12 x (2A, 60V) + PE

3.10 Signal module 12 x signals (M23), tool side. Article: P1355

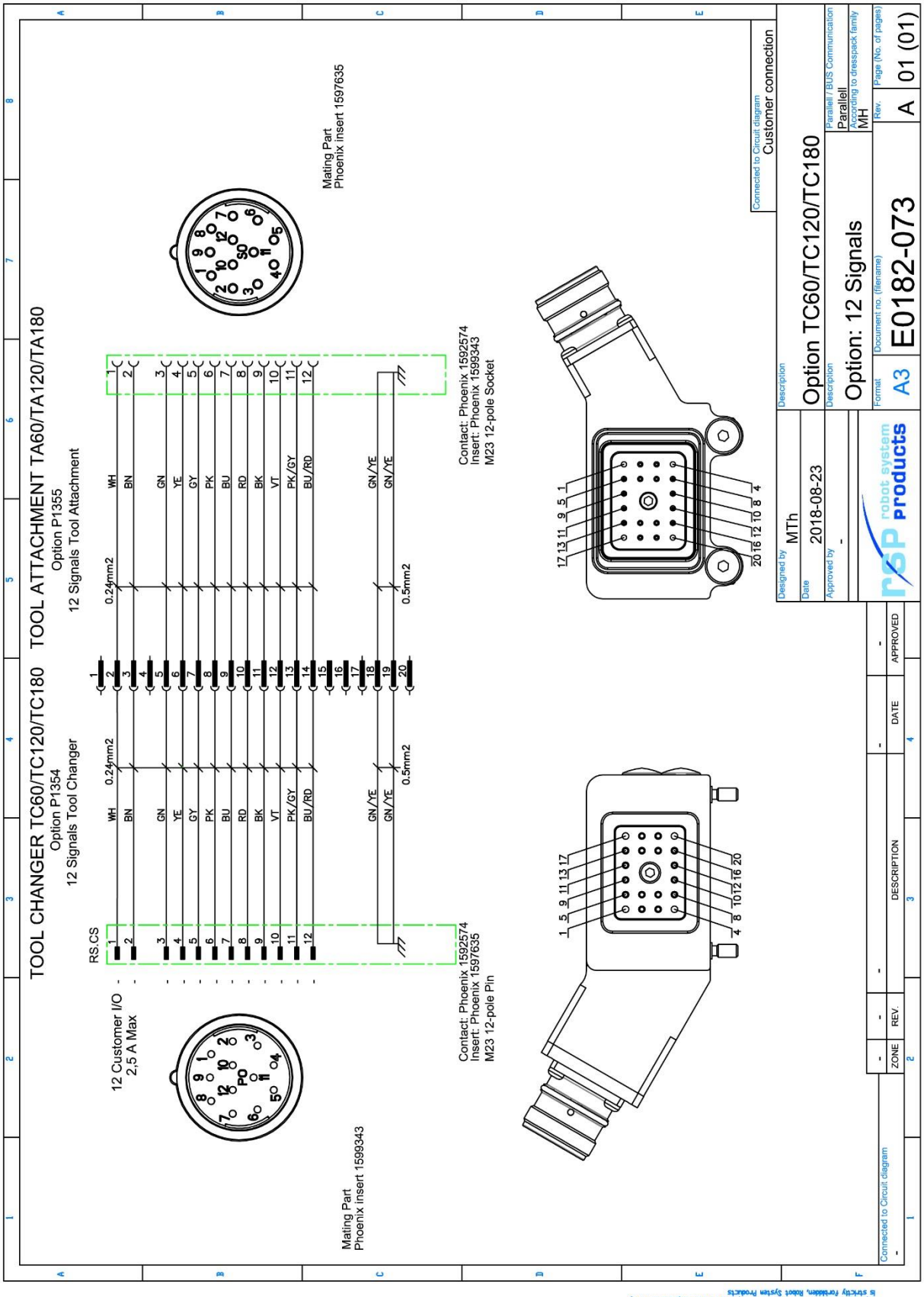


Signal module P1355 transfers 12 signals to the tool. To be mounted on the tool attachment and used together with module P1354 attached to the tool changer.

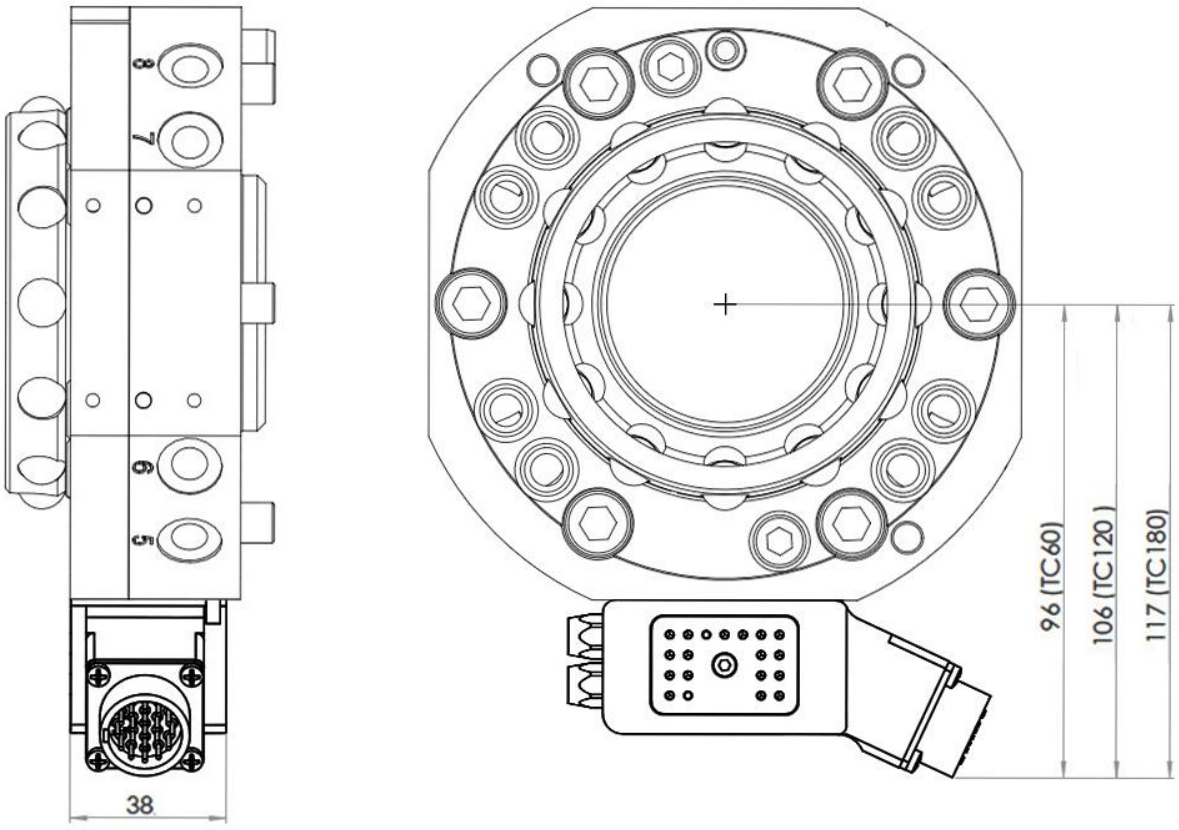
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-073 (section 3.10.1)
	Connection, tool side	M23 12S (Phoenix 1592574, insert 1599343)

3.10.1 Circuit diagram E0182-073 for P1354 and P1355



3.11 Signal module 17 x signals (for TC Opened/Closed sensors), robot side. Article: P1311

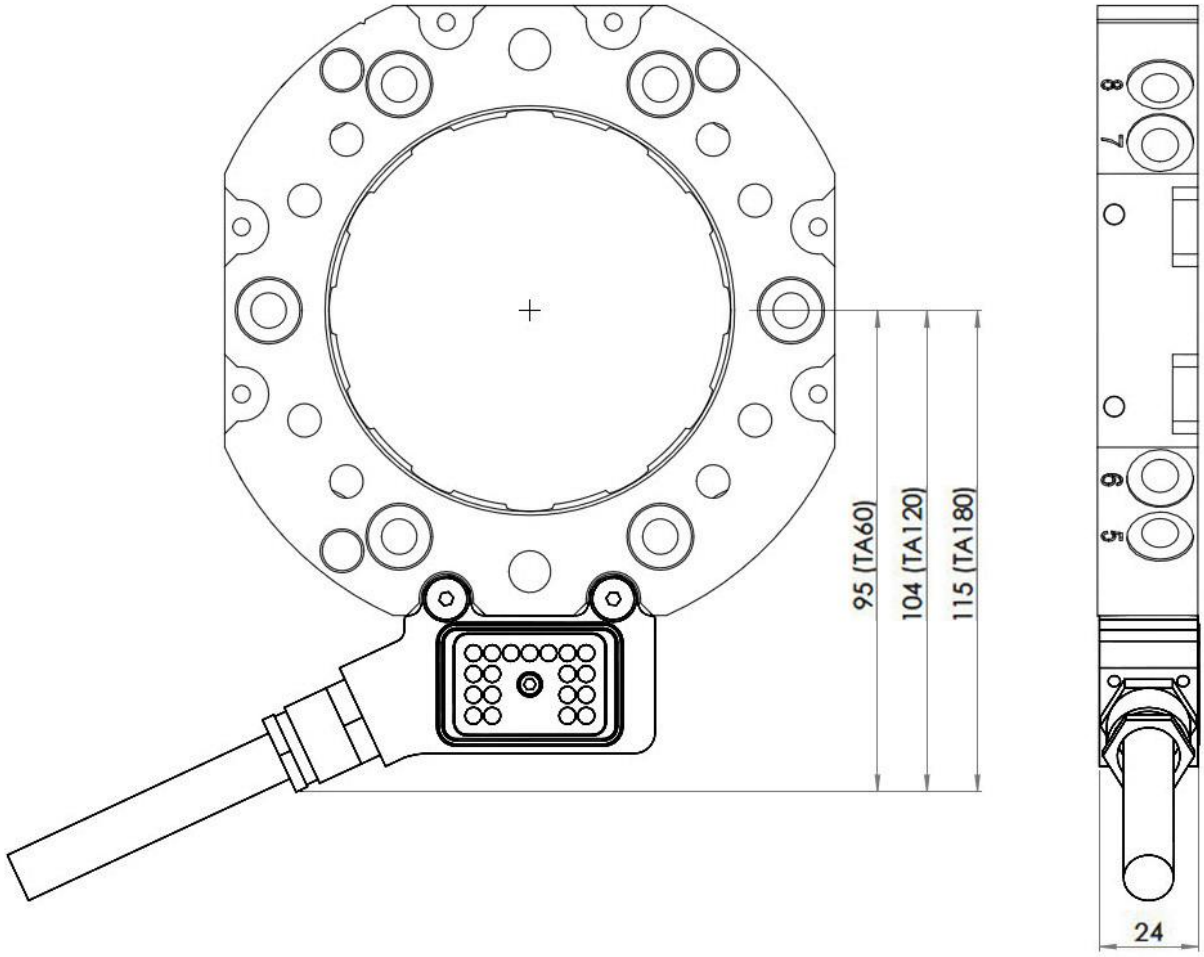


Signal module P1311 transfers 17 electrical signals to the tool attachment through spring loaded signal pins. To be mounted at one dedicated position on the tool changer and used together with modules P1312 or P1332 attached to the tool attachment. On the housing 2 separate M8-contacts are mounted for connection of TC Opened/Closed sensors P1324.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-002 (section 3.12.1) and E0182-041 (section 3.13.1)
	Connection, robot side	Compact Souriau 19P (UT0W01419PH)
	Total signals	19 x (1A, 30V)
	Dedicated signals	TC Opened, TC Closed
	Signals available at tool	15 + 24V, 0V
Sensor Interface	M8 3S, A-coded	24V, 0V, TC Opened
	M8 3S, A-coded	24V, 0V, TC Closed
Connection kits and cables (optional)	P8008	Compact Souriau 19S (straight, 0.5–1.0 mm^2)
	P8008-1	Compact Souriau 19S (angled, 0.5–1.0 mm^2)
	P8149-30/ P8149-60	Compact Souriau 19S with 3.0/6.0 m cable, open end.

3.12 Signal module 17 x signals, tool side. Article: P1312

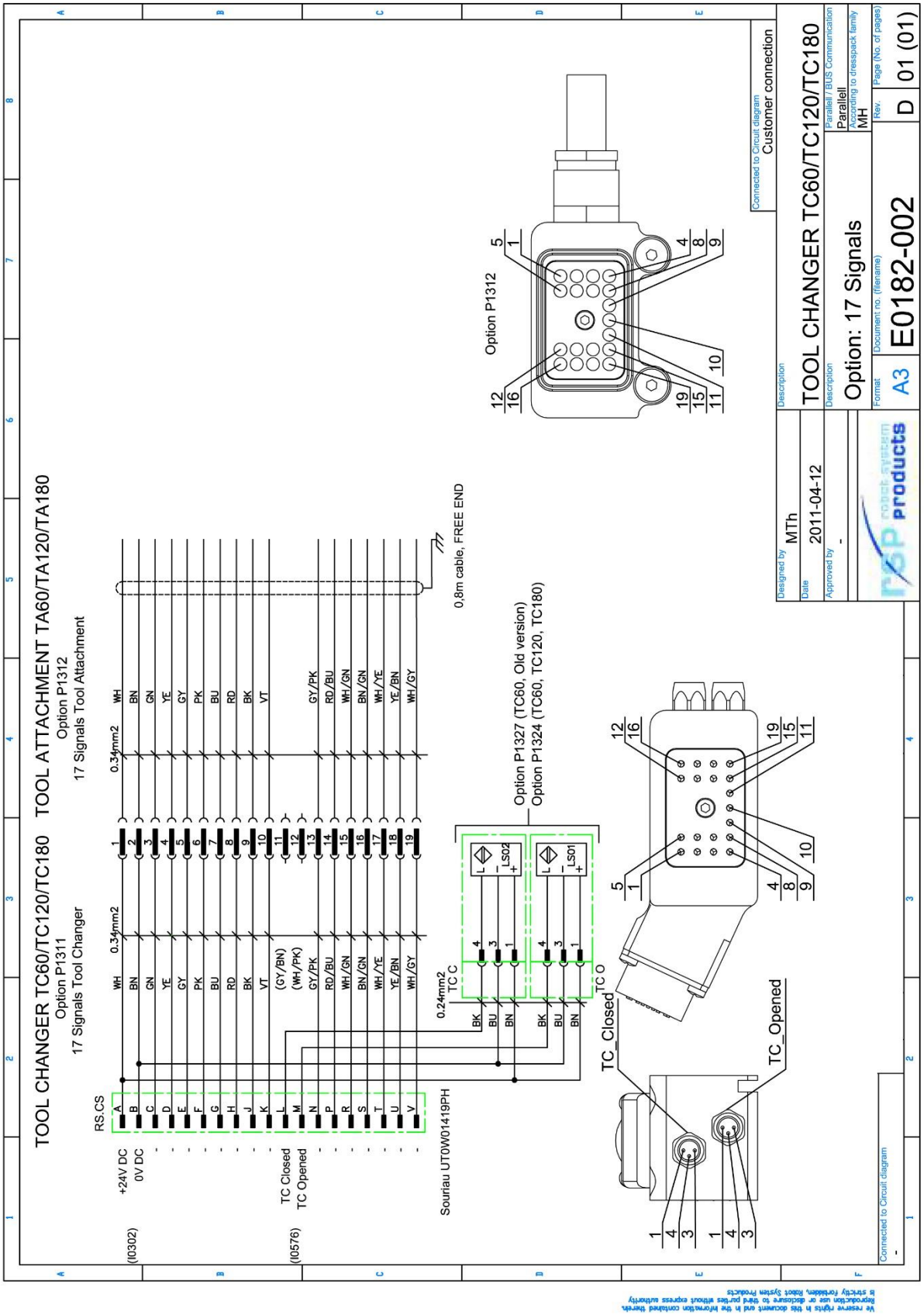


Signal module P1312 transfers 17 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1311 attached to the tool changer.

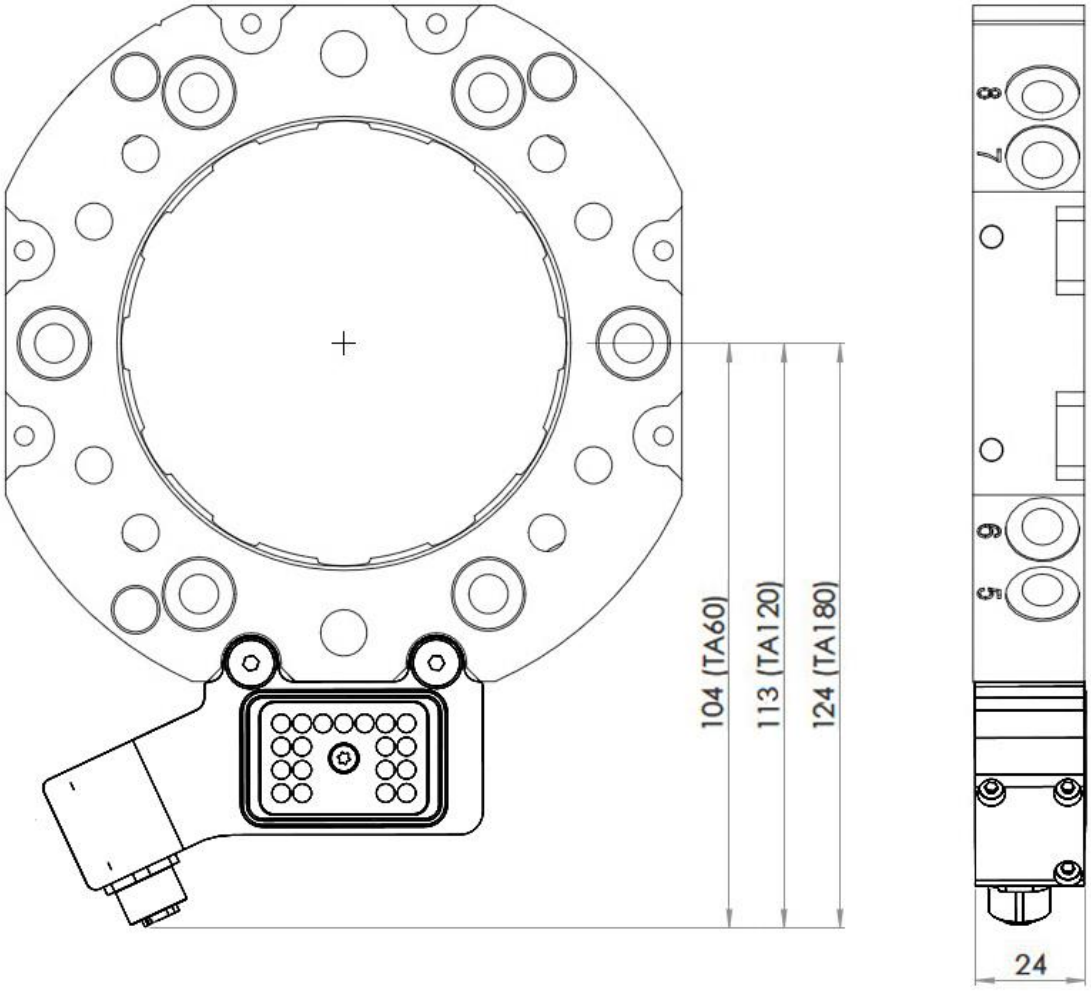
Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-002 (section 3.12.1)
	Connection, tool side	1m cable (17x0.34 mm^2), open end

3.12.1 Circuit diagram E0182-002 for P1311 and P1312



3.13 Signal module 17 x signals, tool side. Article: P1332

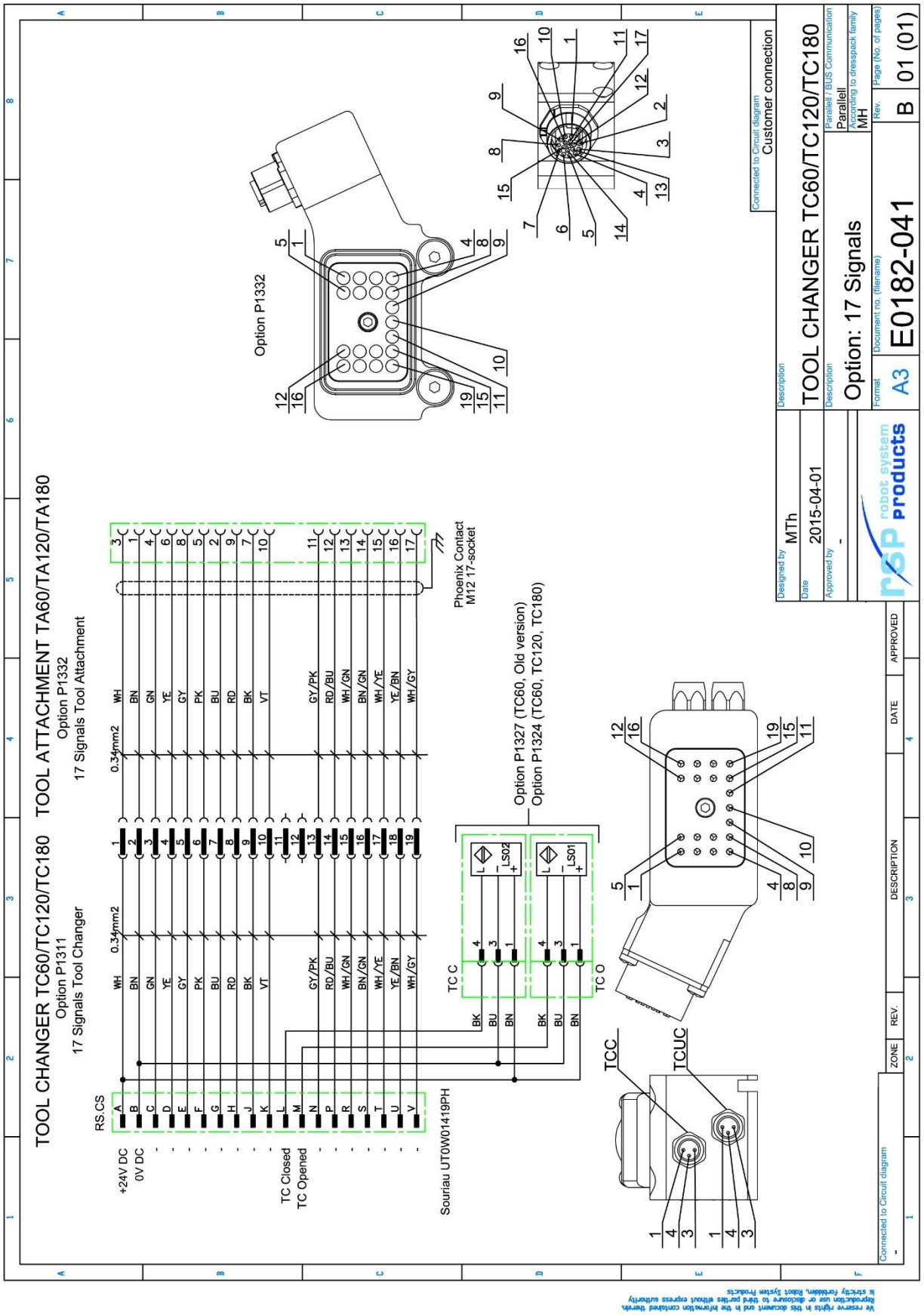


Signal module P1332 transfers 17 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1311 attached to the tool changer.

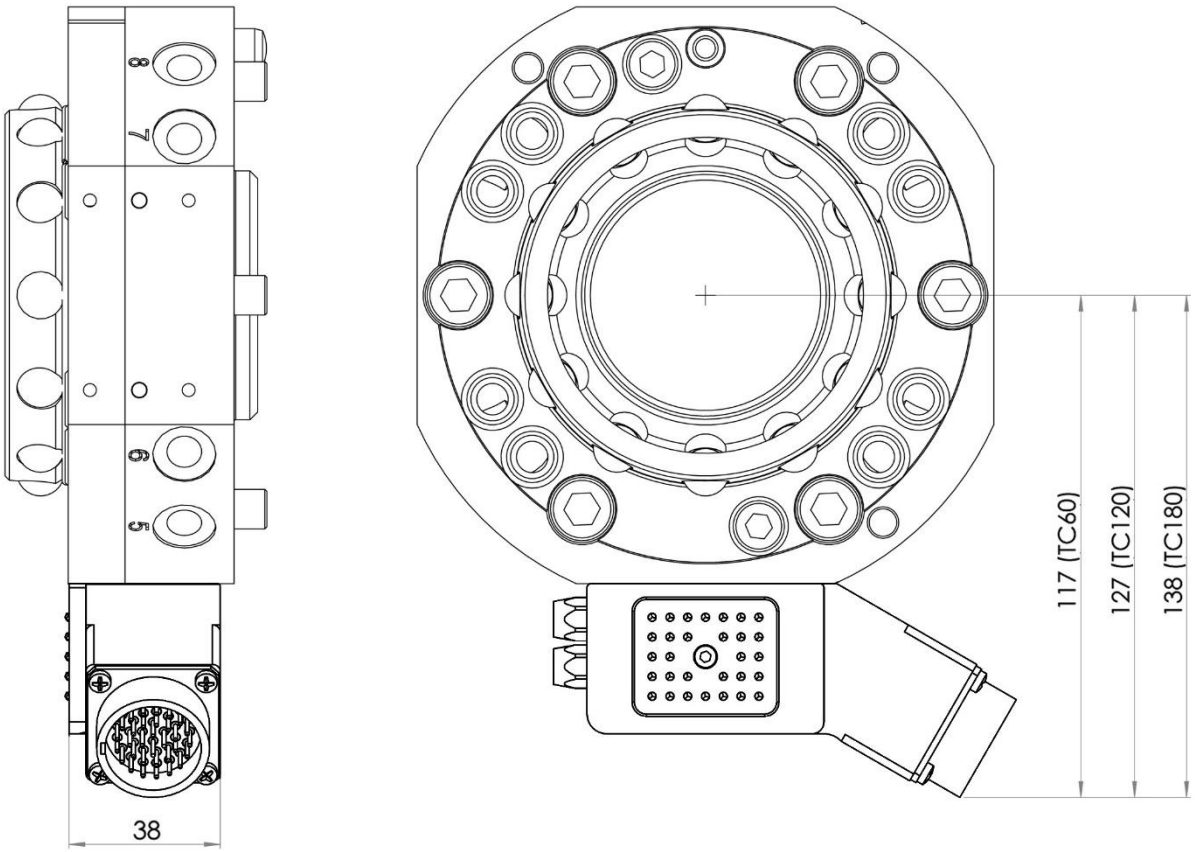
Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-041 (section 3.13.1)
	Connection, tool side	M12 17S (Phoenix 1556294)

3.13.1 Circuit diagram E0182-041 for P1311 and P1332



3.14 Signal module 30 x signals (for TC Opened/Closed sensors), robot side. Article: P1338

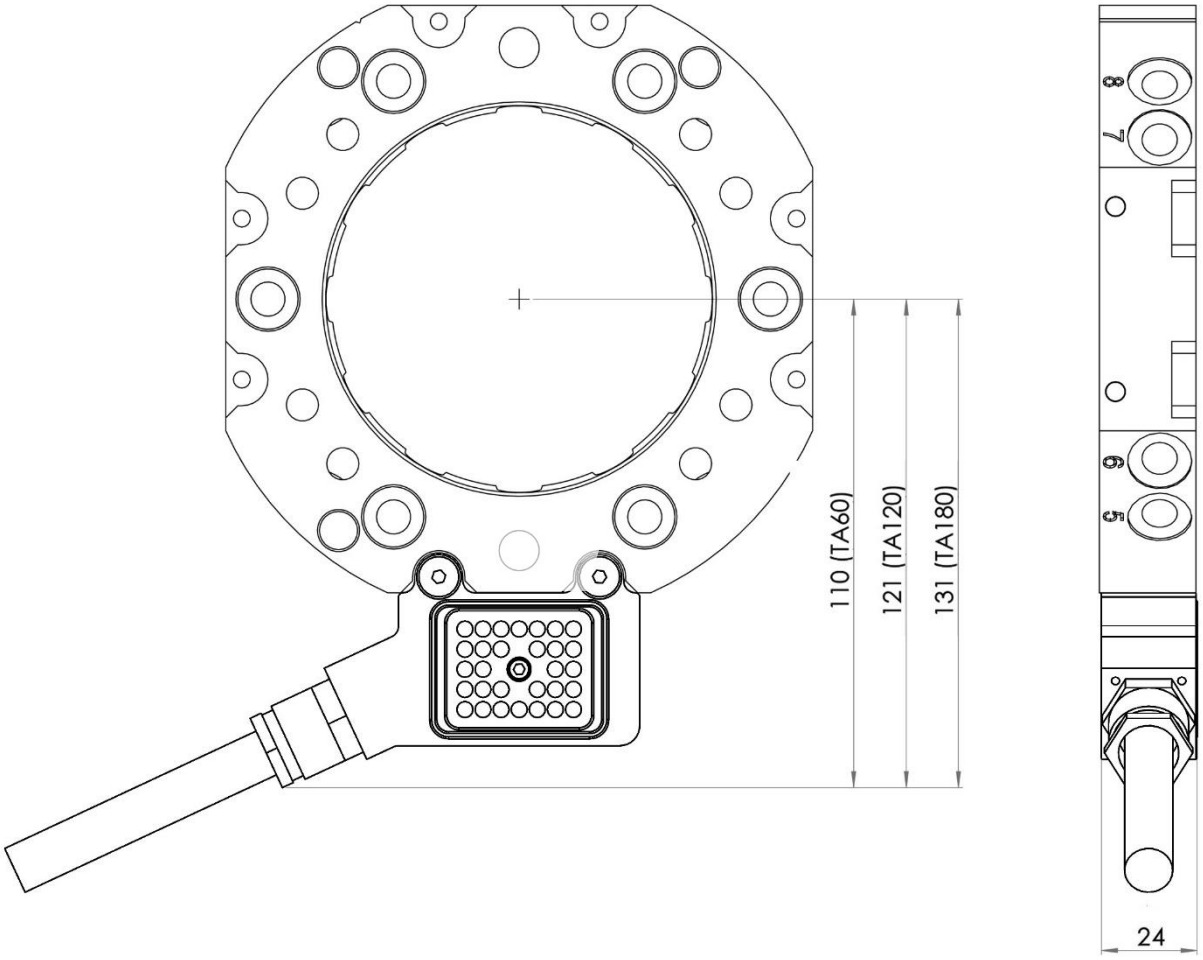


Signal module P1338 transfers 30 electrical signals to the tool attachment through spring loaded signal pins. To be mounted at one dedicated position on the tool changer and used together with modules P1339 or P1378 attached to the tool attachment. On the housing 2 separate M8-contacts are mounted for connection of TC Opened/Closed sensors P1324.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-048 (section 3.15.1)
	Connection, robot side	Compact Souriau 32P (UT0W01832PH6)
	Total signals	32 x (1A, 30V)
	Dedicated signals	TC Opened, TC Closed
	Signals available at tool	28 + 24V, 0V
Sensor Interface	M8 3S, A-coded	24V, 0V, TC Opened
	M8 3S, A-coded	24V, 0V, TC Closed
Connection kits and cables (optional)	P8018	Compact Souriau 32S (straight, 0.5–1.0 mm^2)
	P8018-1	Compact Souriau 32S (angled, 0.5–1.0 mm^2)
	P8199-30/ P8199-50	Compact Souriau 32S with 3.0/5.0 m cable, open end.

3.15 Signal module 30 x signals, tool side. Article: P1339

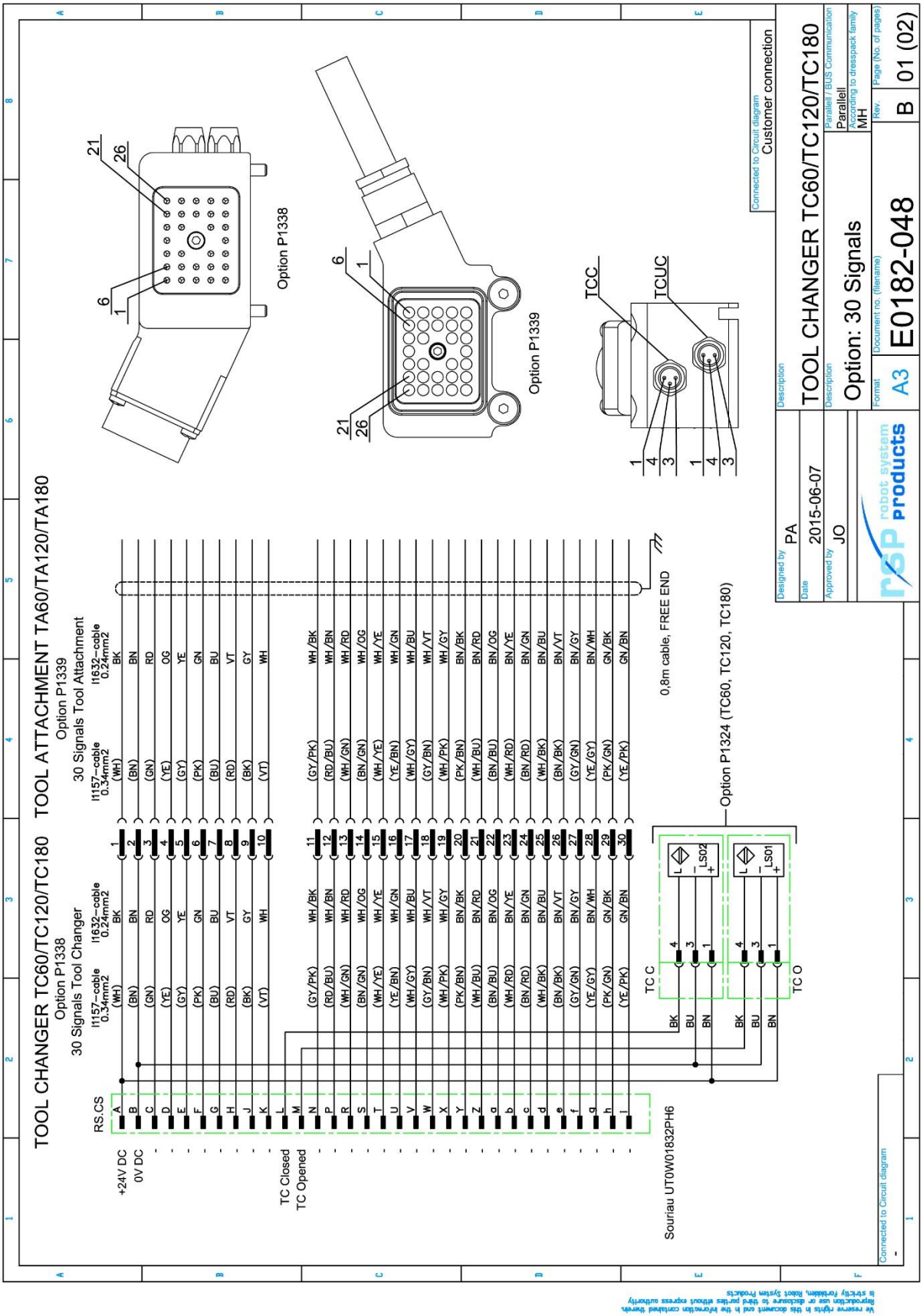


Signal module P1339 transfers 30 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1338 attached to the tool changer.

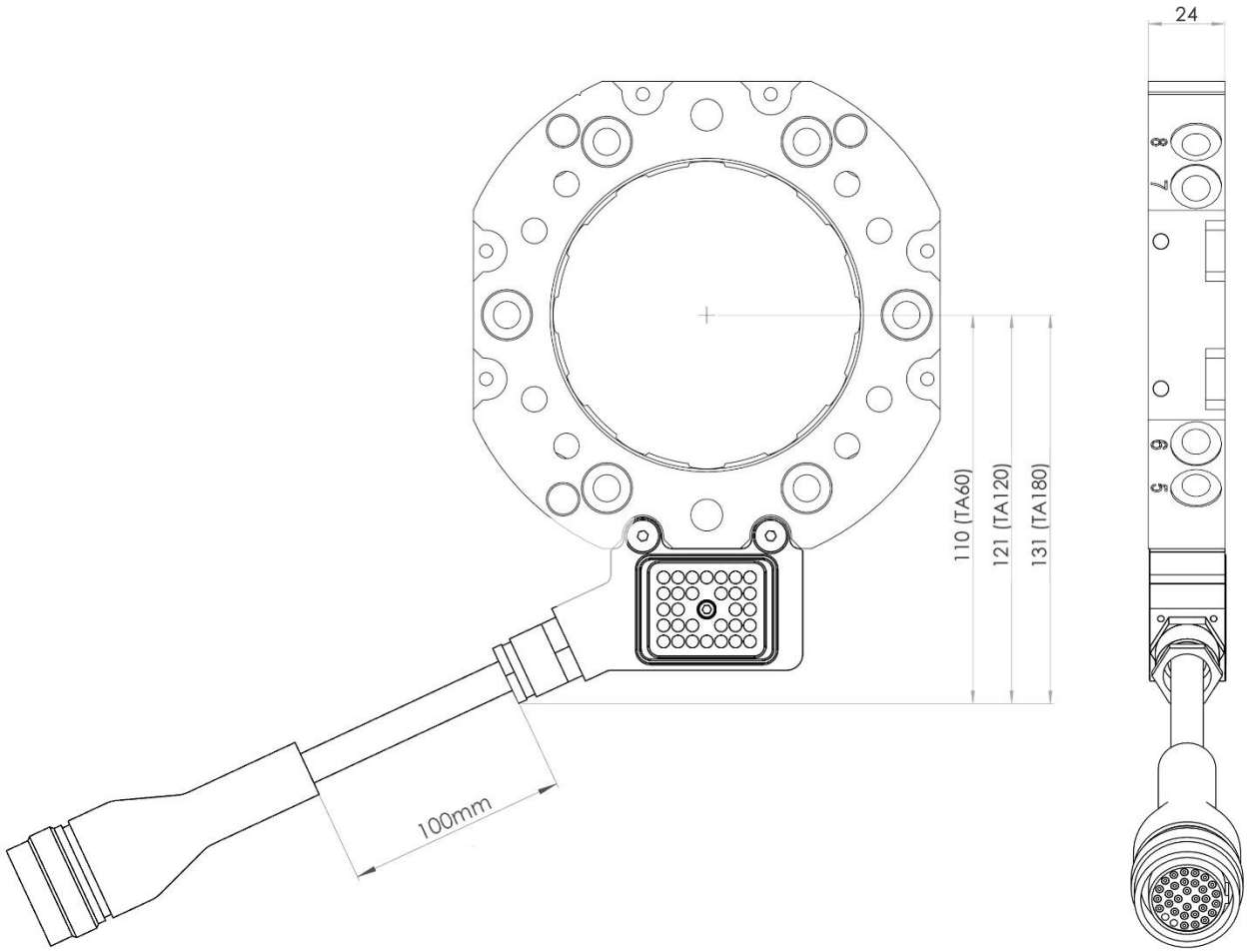
Technical data

Weight		0.15 kg
Electrical Interface	Circuit diagram	E0182-048 (section 3.15.1)
	Connection, tool side	1.0 m cable (0.24 mm^2), open end

3.15.1 Circuit diagram E0182-048 for P1338 and P1339



3.16 Signal module 30 x signals, tool side. Article: P1378

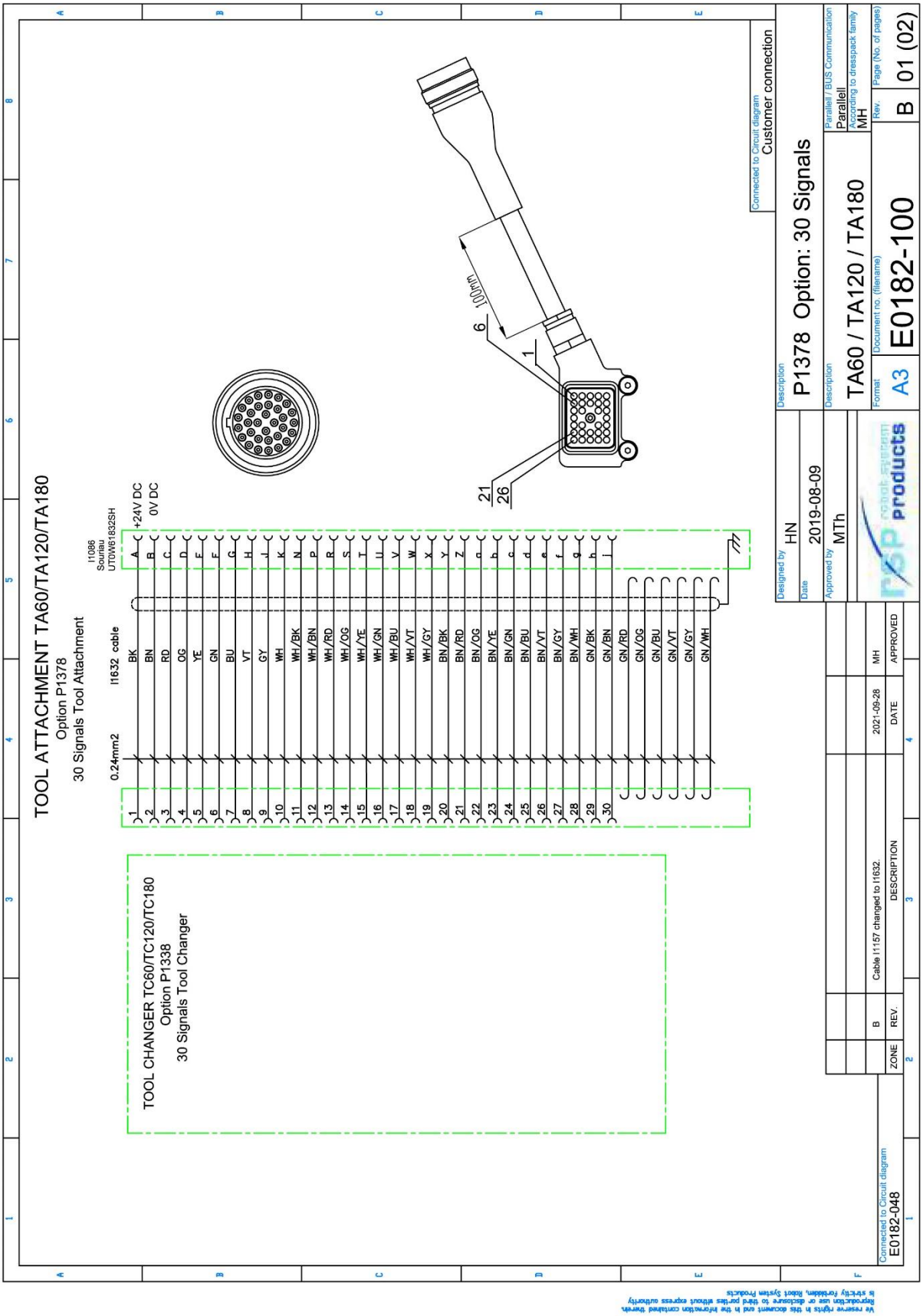


Signal module P1378 transfers 30 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1338 attached to the tool changer.

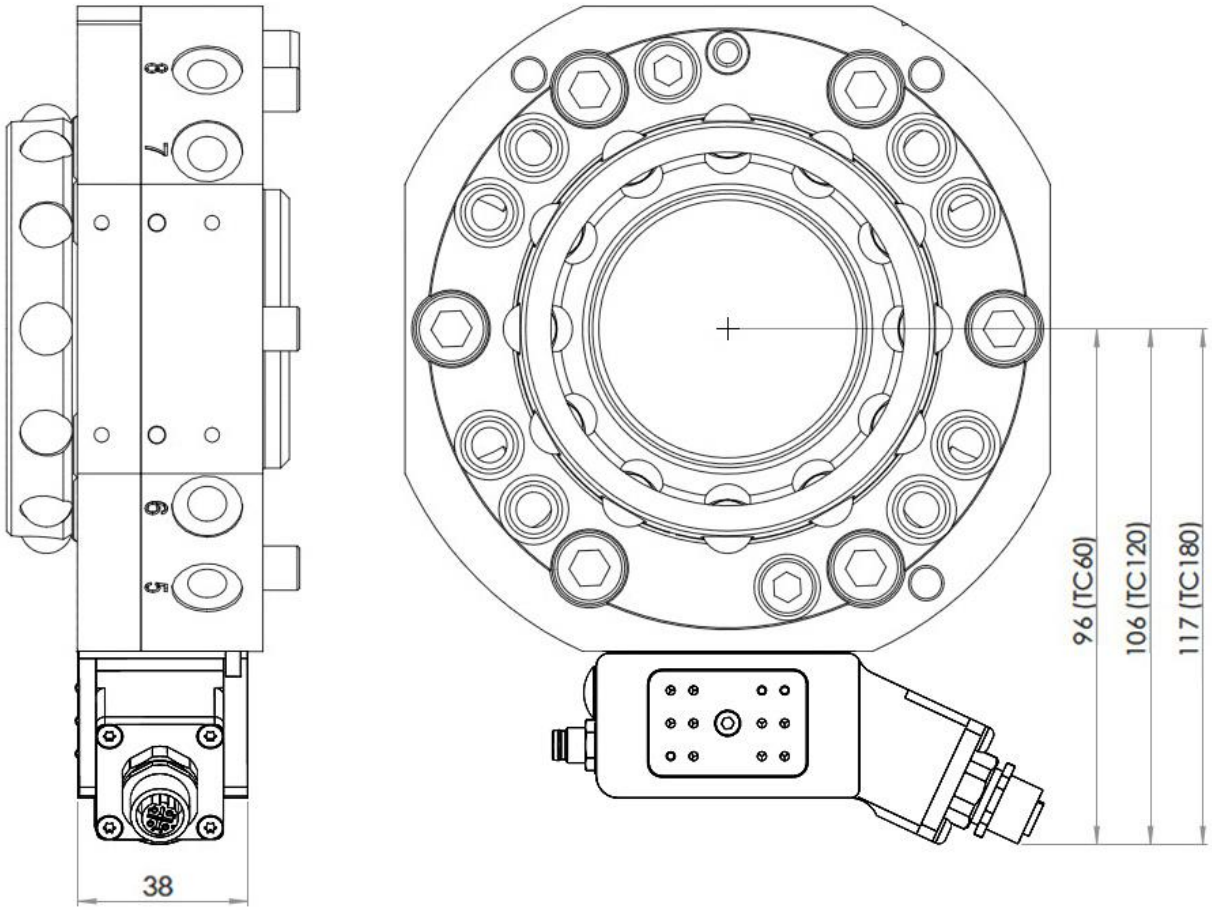
Technical data

Weight		0.15 kg
Electrical Interface	Circuit diagram	E0182-100 (section 3.16.1)
	Connection, tool side	0.1 m cable (36xAWG24), Compact Souriau 32S (UT0W61832SWH)

3.16.1 Circuit diagram E0182-100 for P1378



3.17 Signal module 4 signals + Profinet, robot side. Article: P1399

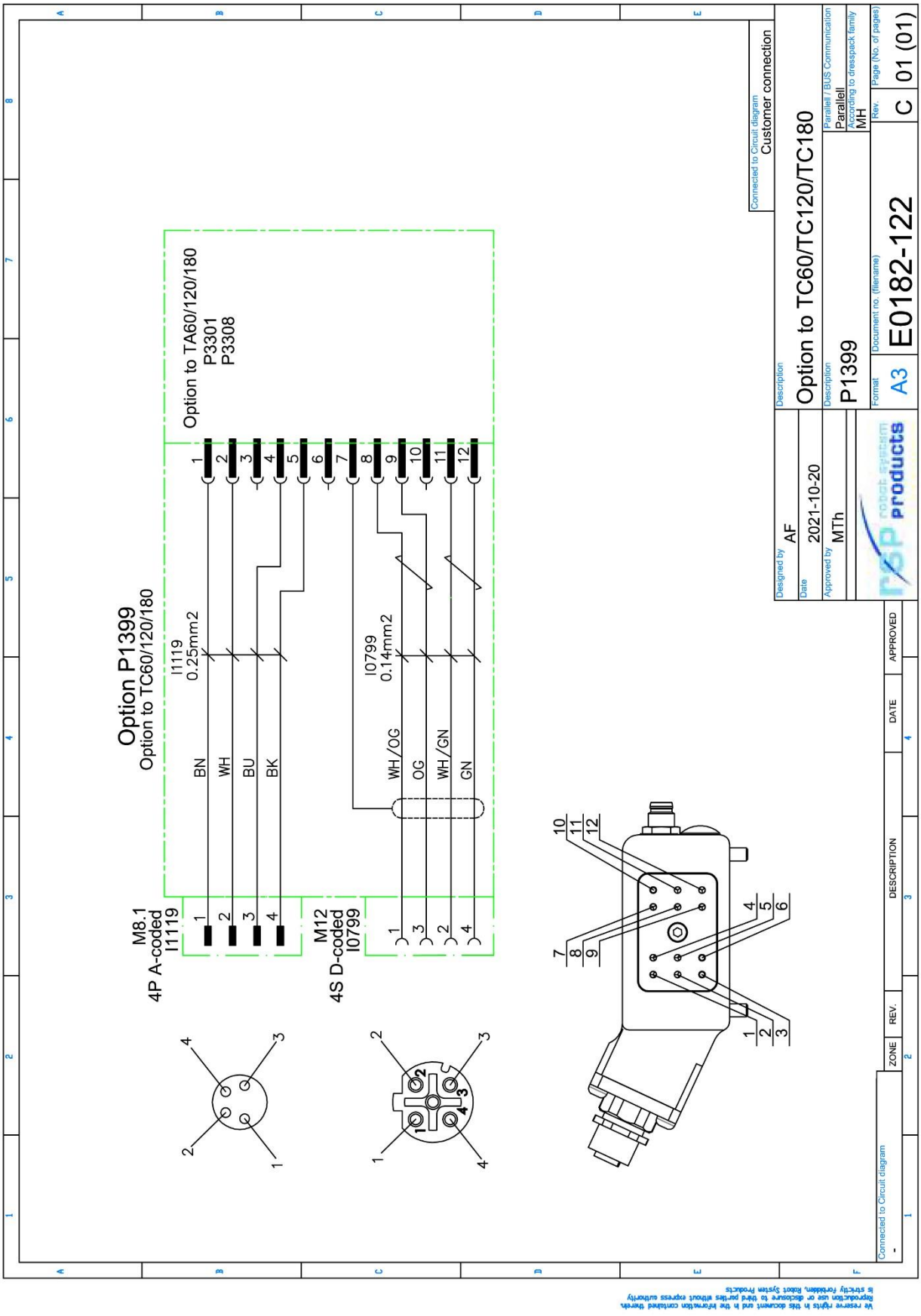


Signal module P1399 transfers 4 electrical and 4 fieldbus signals to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer and used together with modules P3301, P3308 or P3315 attached to the tool attachment.

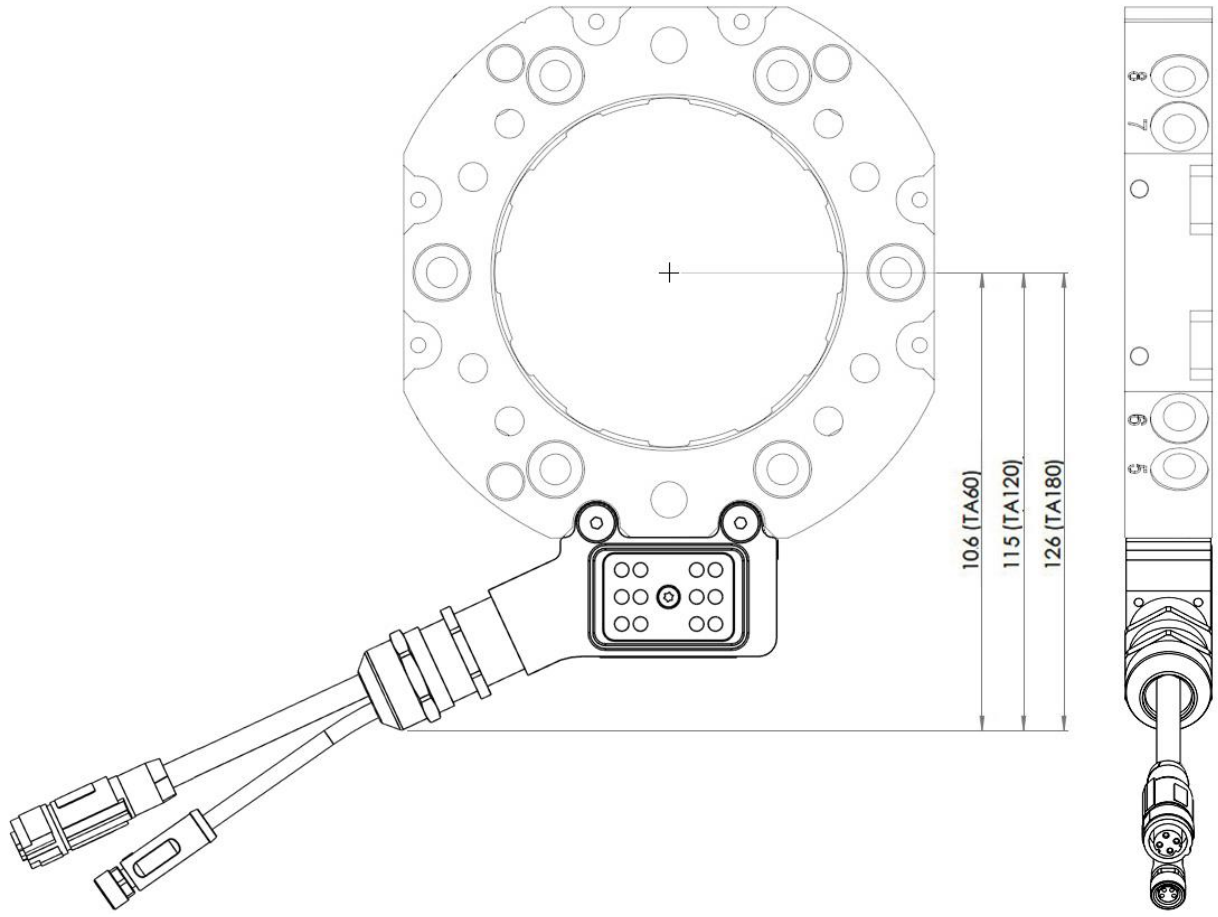
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-122 (section 3.17.1)
	Connection, robot side	M8 4P A-coded
	Signals	4 x (1A, 60V)
Bus Interface	Connection, robot side	M12 4S D-coded
	Bus available at tool	4 x Profinet (100 Mbit/s)

3.17.1 Circuit diagram E0182-122 for P1399



3.18 Signal module 4 signals + Profinet (M12 4S), tool side. Article: P3301

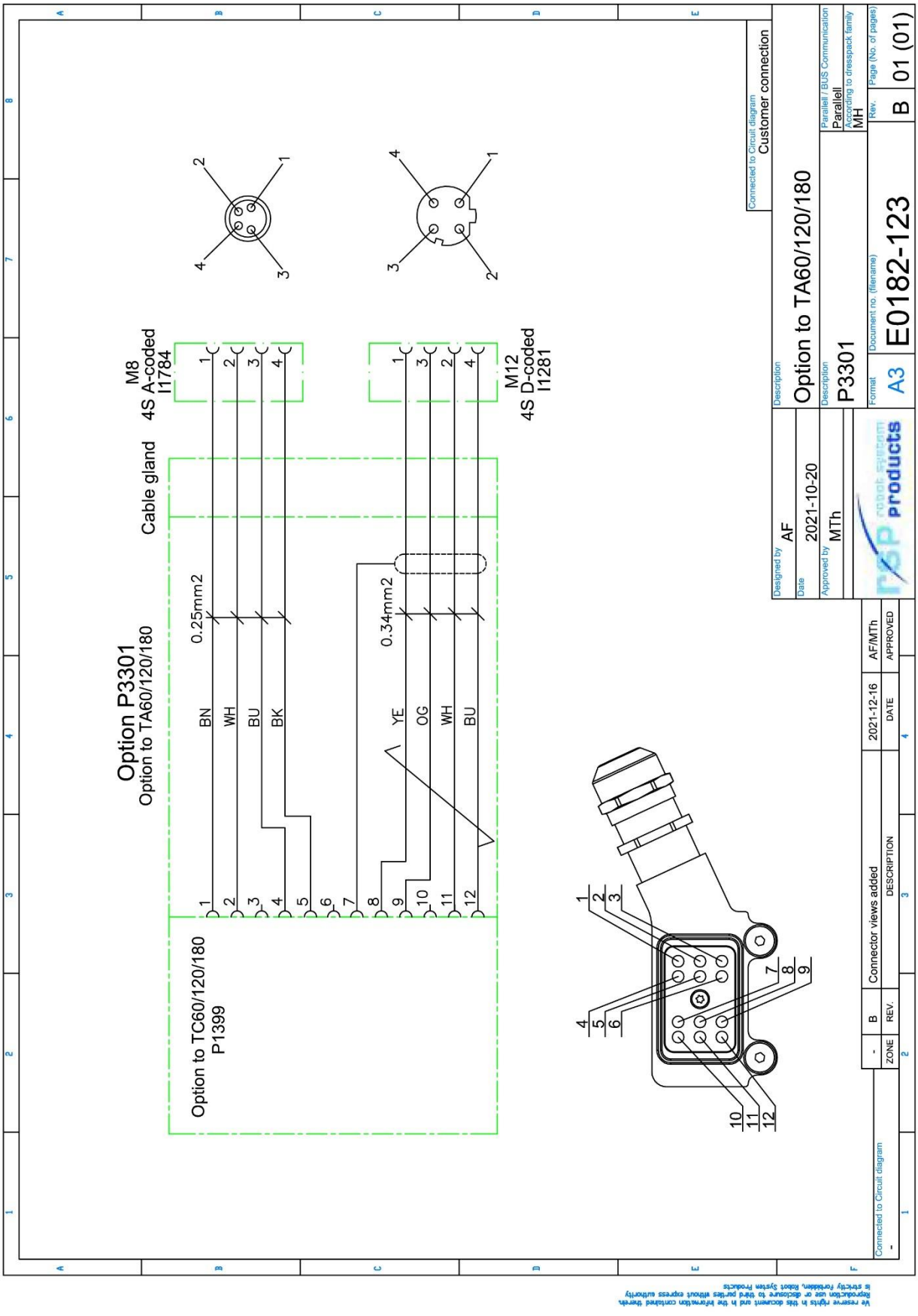


Signal module P3301 transfers 4 electrical and 4 fieldbus signals to the tool. To be mounted on the tool attachment and used together with module P1399 attached to the tool changer.

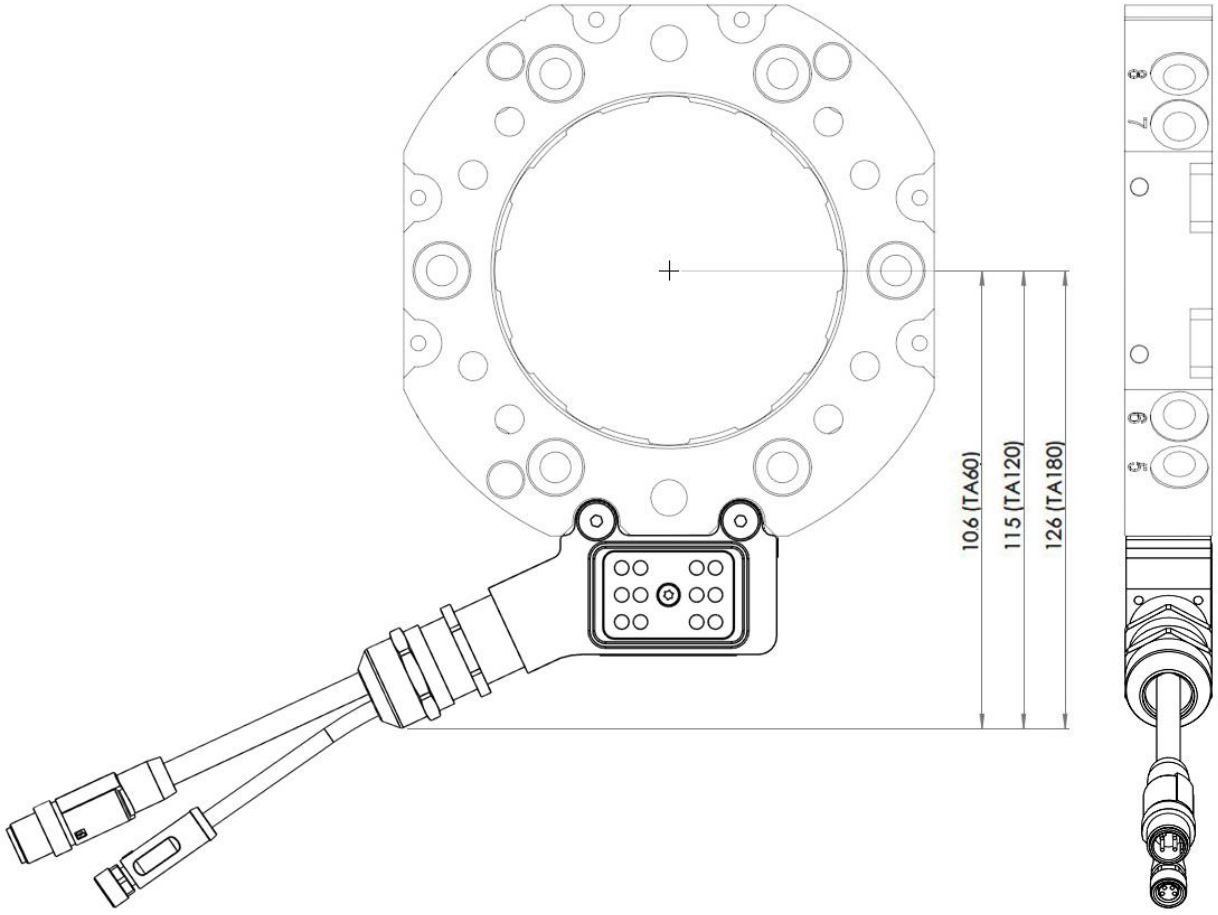
Technical data

Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-123 (section 3.18.1)
	Connections, tool side	M8 4S A-coded M12 4S D-coded

3.18.1 Circuit diagram E0182-123 for P3301



3.19 Signal module 4 signals + Profinet (M12 4P), tool side. Article: P3308

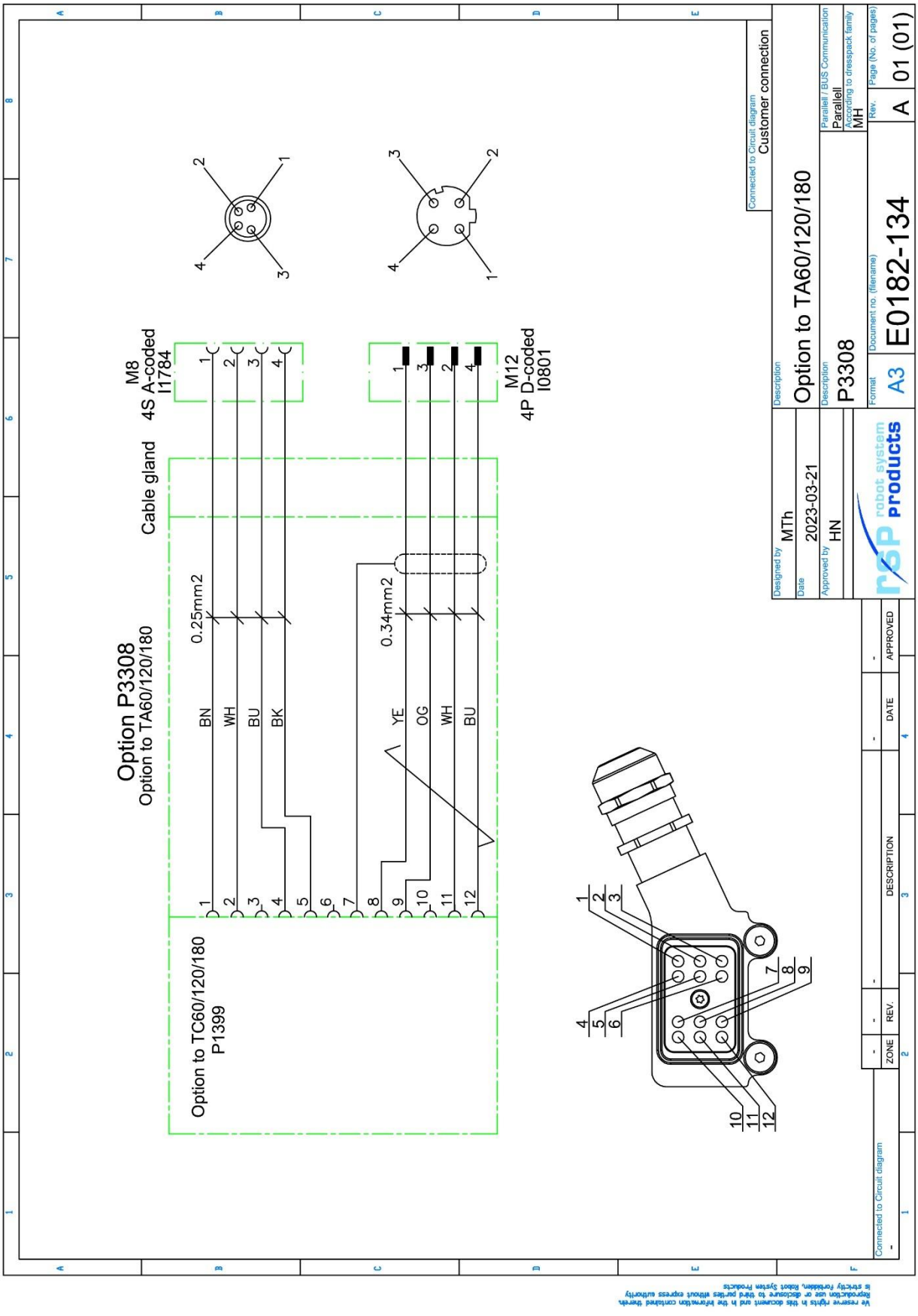


Signal module P3308 transfers 4 electrical and 4 fieldbus signals to the tool. To be mounted on the tool attachment and used together with module P1399 attached to the tool changer.

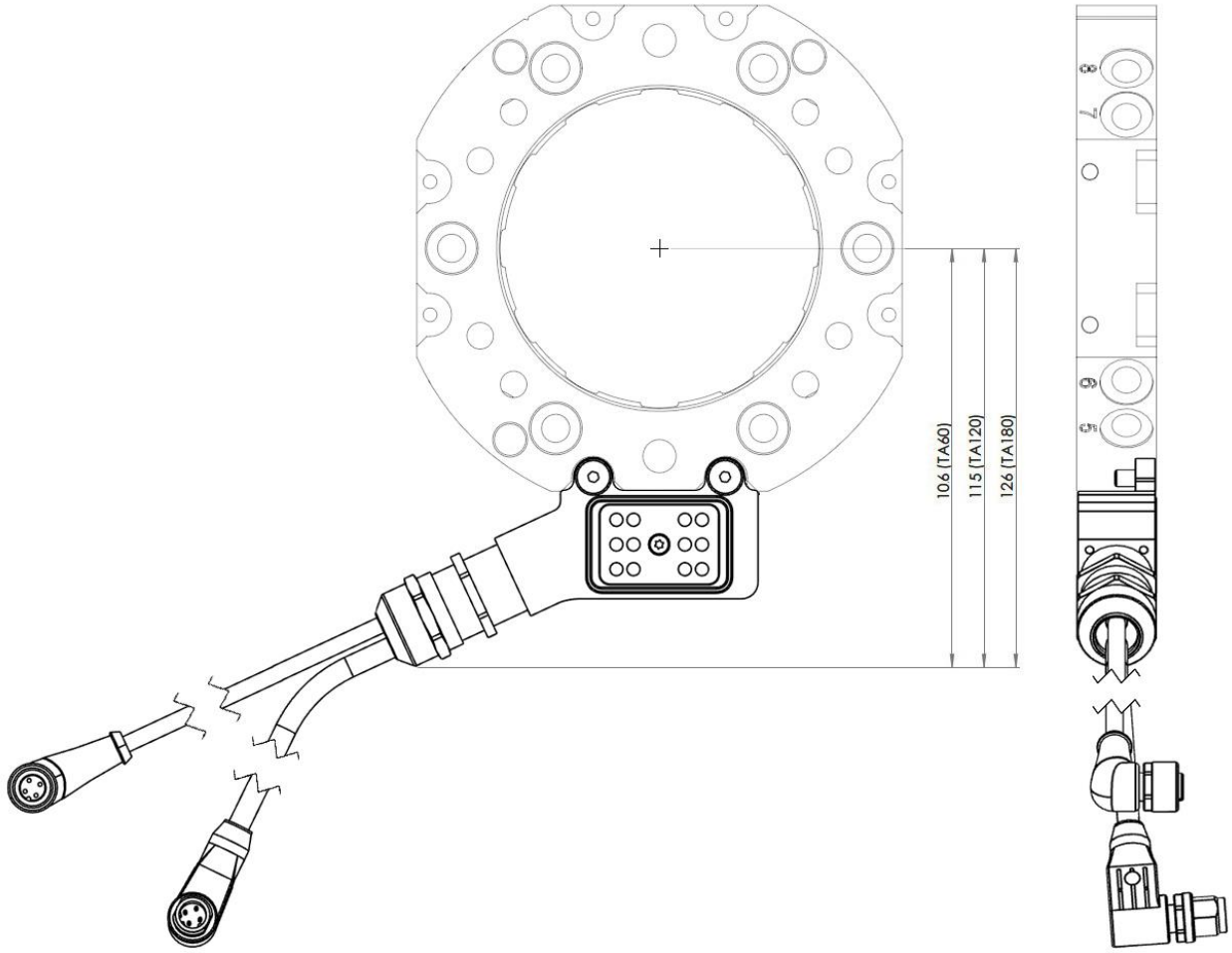
Technical data

Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-134 (section 3.19.1)
	Connections, tool side	M8 4S A-coded M12 4P D-coded

3.19.1 Circuit diagram E0182-134 for P3308



3.20 Signal module 4 signals (M12 4S) + Profinet (M12 4S), tool side. Article: P3315

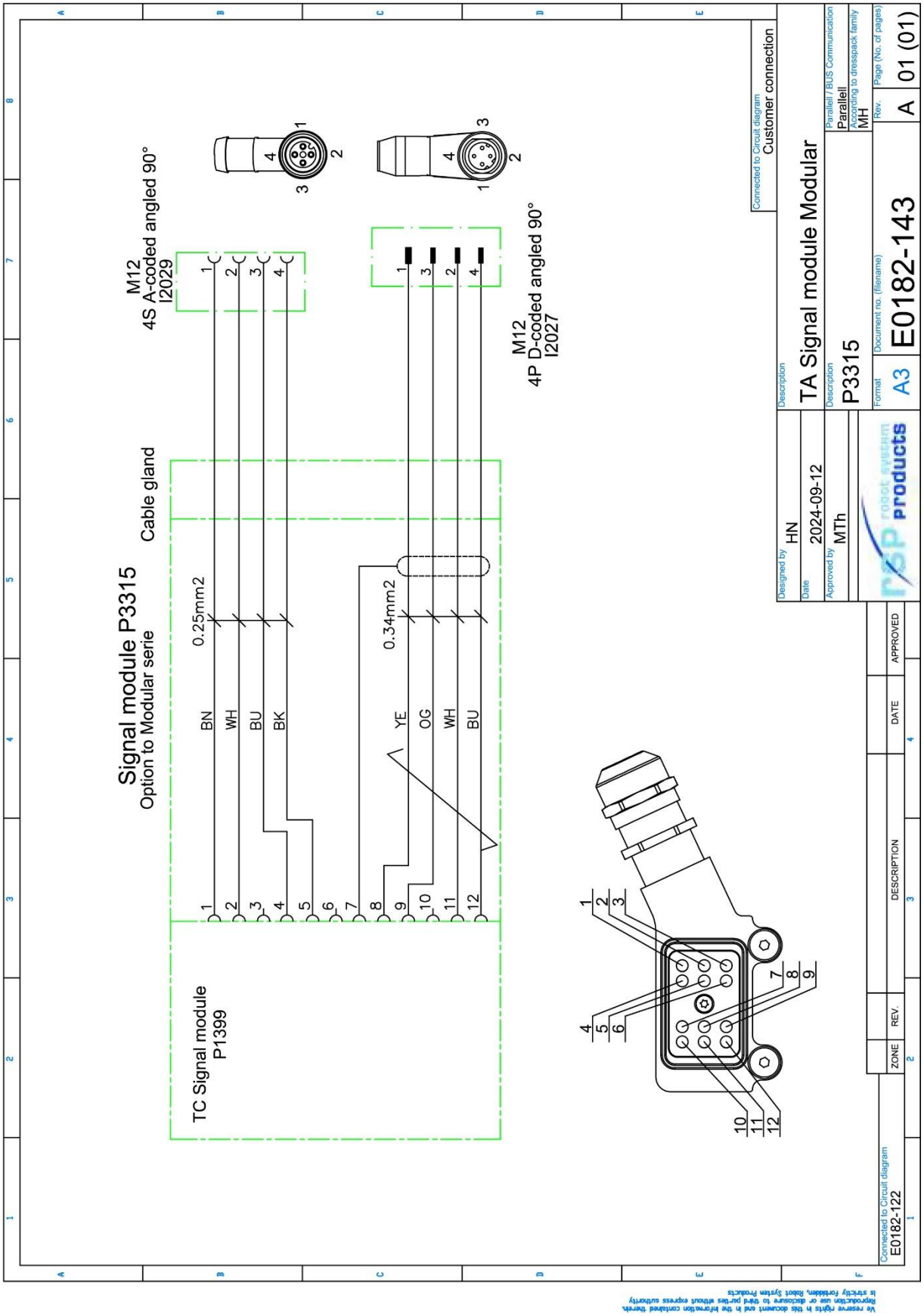


Signal module P3315 transfers 4 electrical and 4 fieldbus signals to the tool. To be mounted on the tool attachment and used together with module P1399 attached to the tool changer.

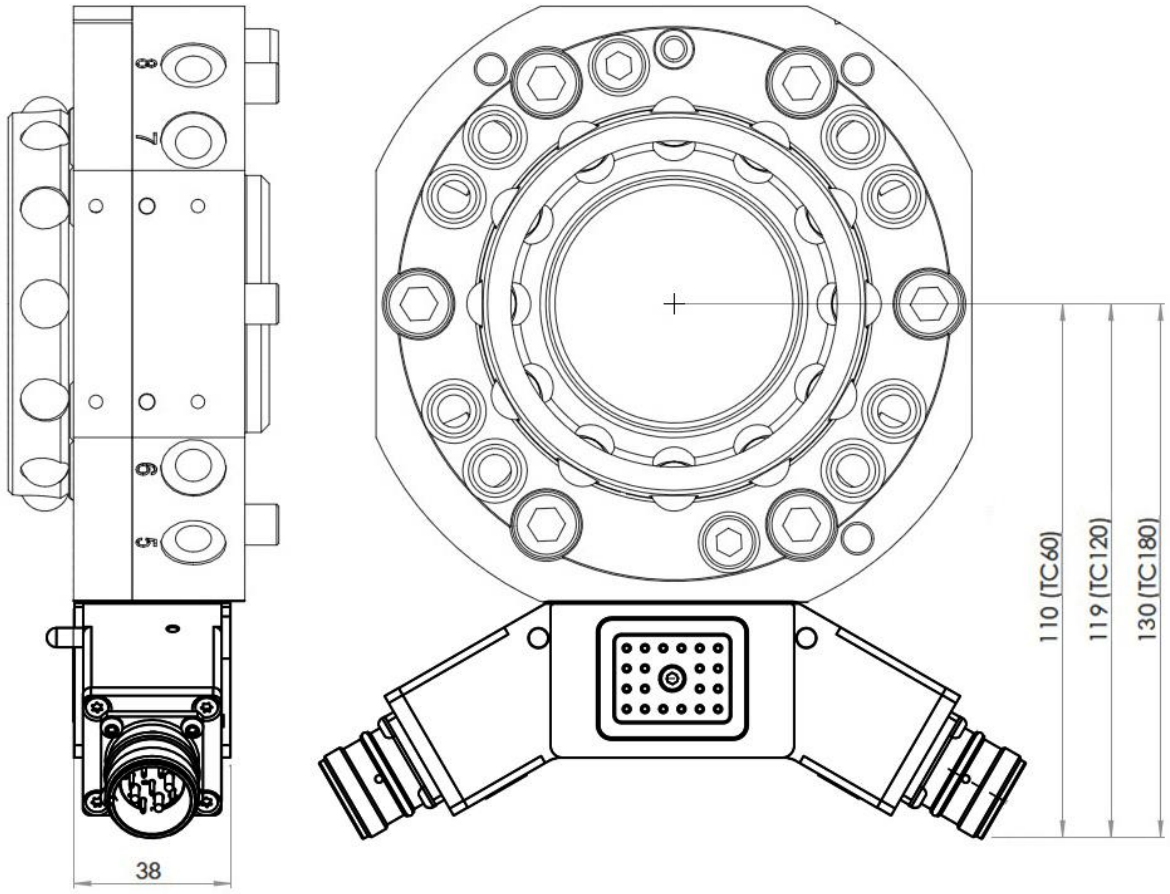
Technical data

Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-143 (section 3.20.1)
	Connections, tool side	M12 4S A-coded M12 4S D-coded

3.20.1 Circuit diagram E0182-143 for P3315



3.21 Signal module 2 X 9 signals, robot side. Article: P1356



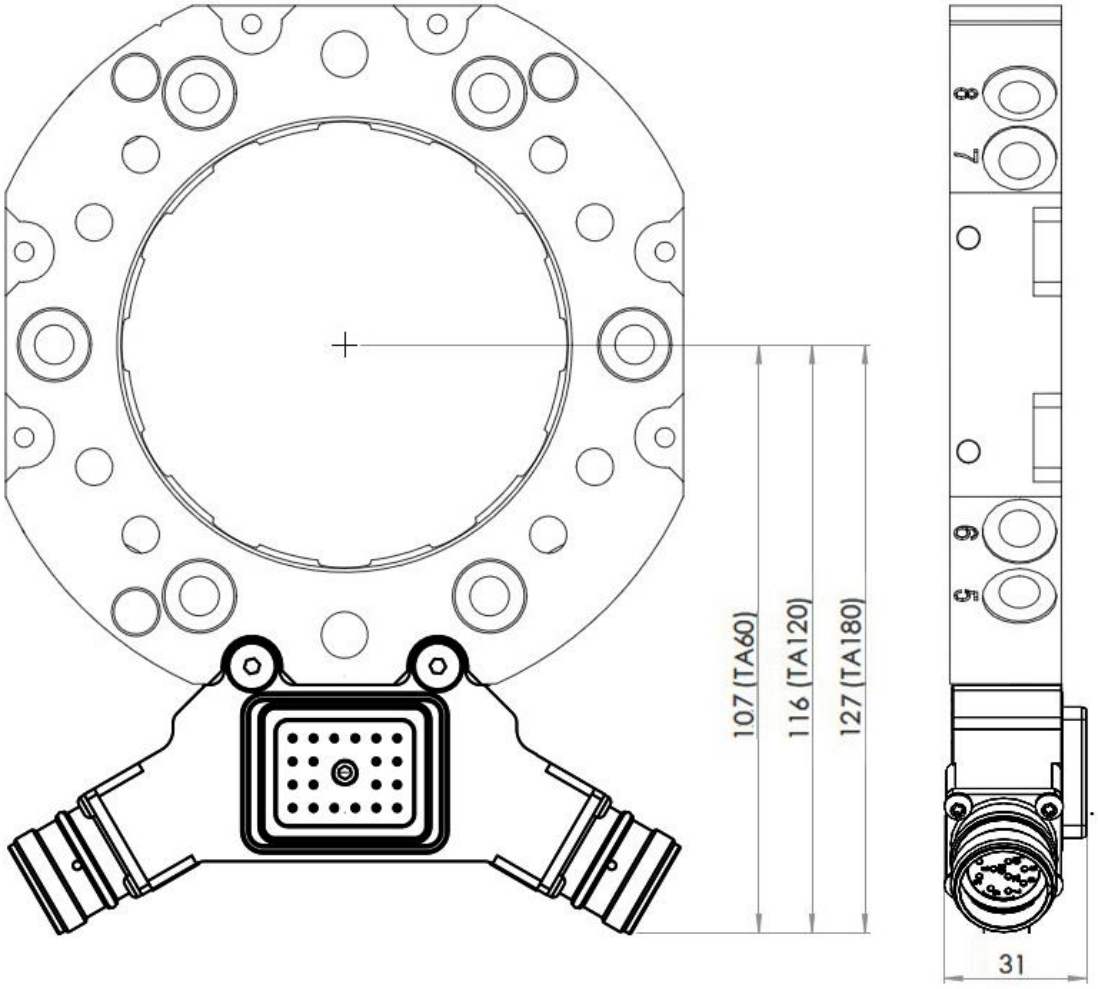
Signal module P1356 transfers 18 electrical signals to the tool attachment. To be used together with modules P1357 or P1374 attached to the tool attachment.

NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1356 with P1357 or P1374.

Technical data

Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-071 (section 3.22.1)
	Connection, robot side	2 X M23 9P (Phoenix 1592574, insert 1603538)
	Total signals available at tool	2 x 9 x (2.5A/8A, 60V) + PE)

3.22 Signal module 2 X 9 signals, tool side. Article: P1357

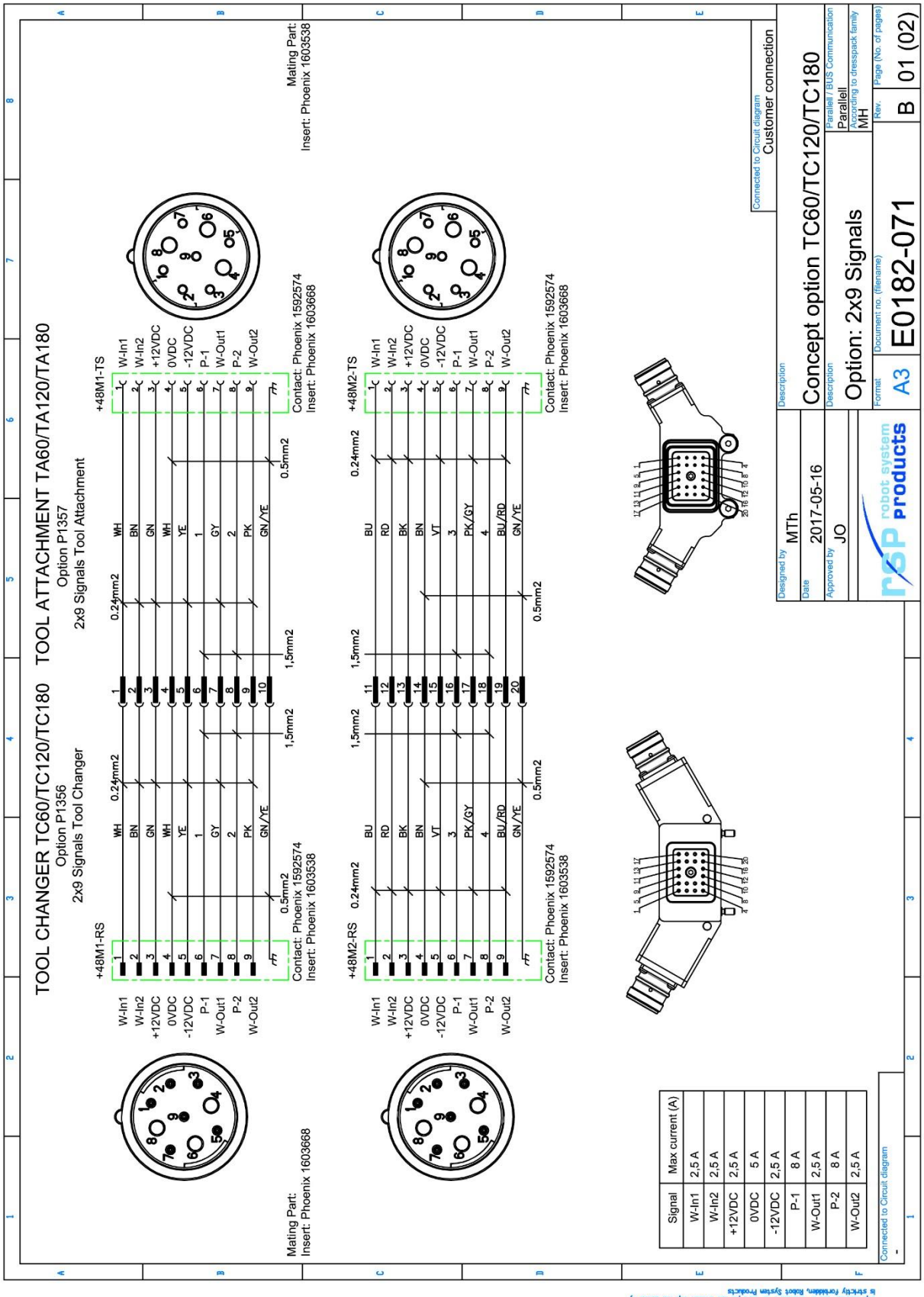


Signal module P1357 transfers 18 signals to the tool. To be mounted on the tool attachment and used together with module P1356 attached to the tool changer.

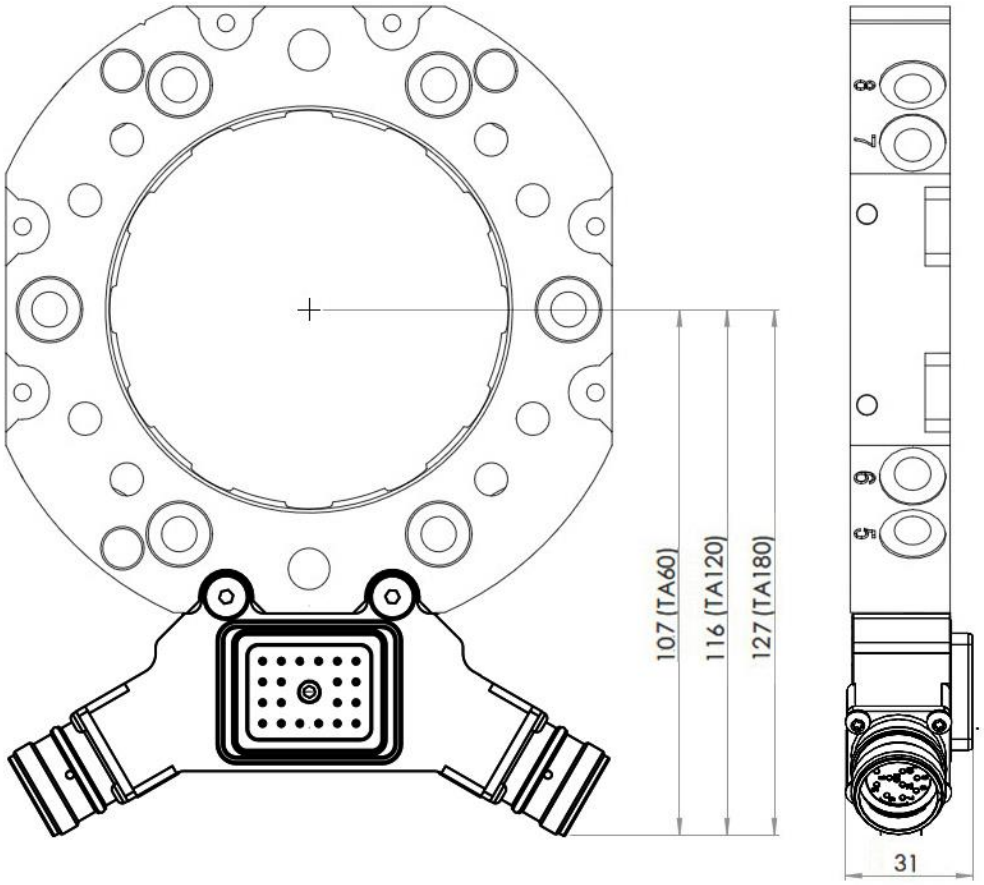
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-071 (section 3.22.1)
	Connection, tool side	2 x M23 9S (Phoenix 1592574, insert 1603668)

3.22.1 Circuit diagram E0182-071 for P1356 and P1357



3.23 Signal module 2 X 9 signals, tool side. Article: P1374

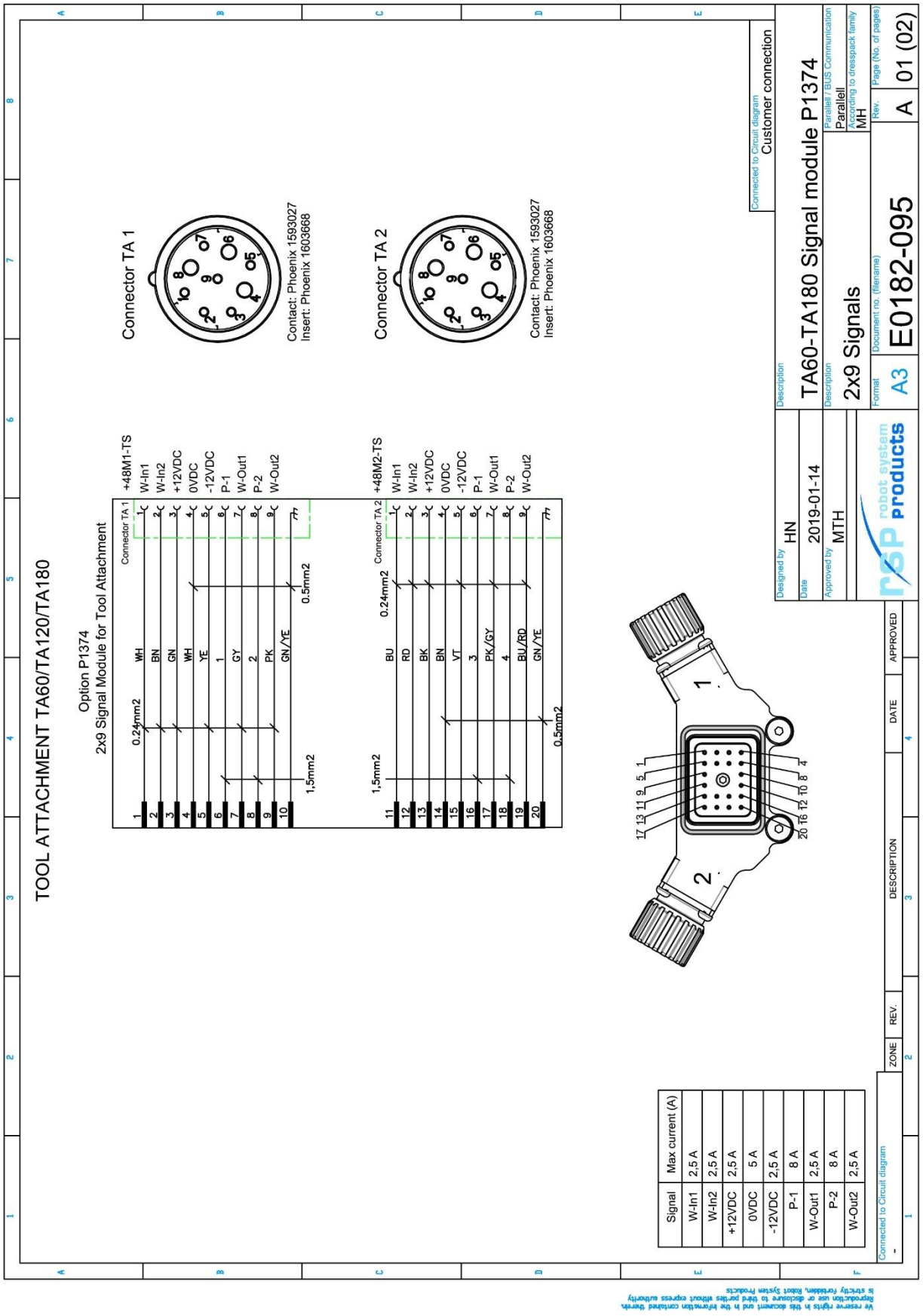


Signal module P1374 transfers 18 signals to the tool. To be mounted on the tool attachment and used together with module P1356 attached to the tool changer.

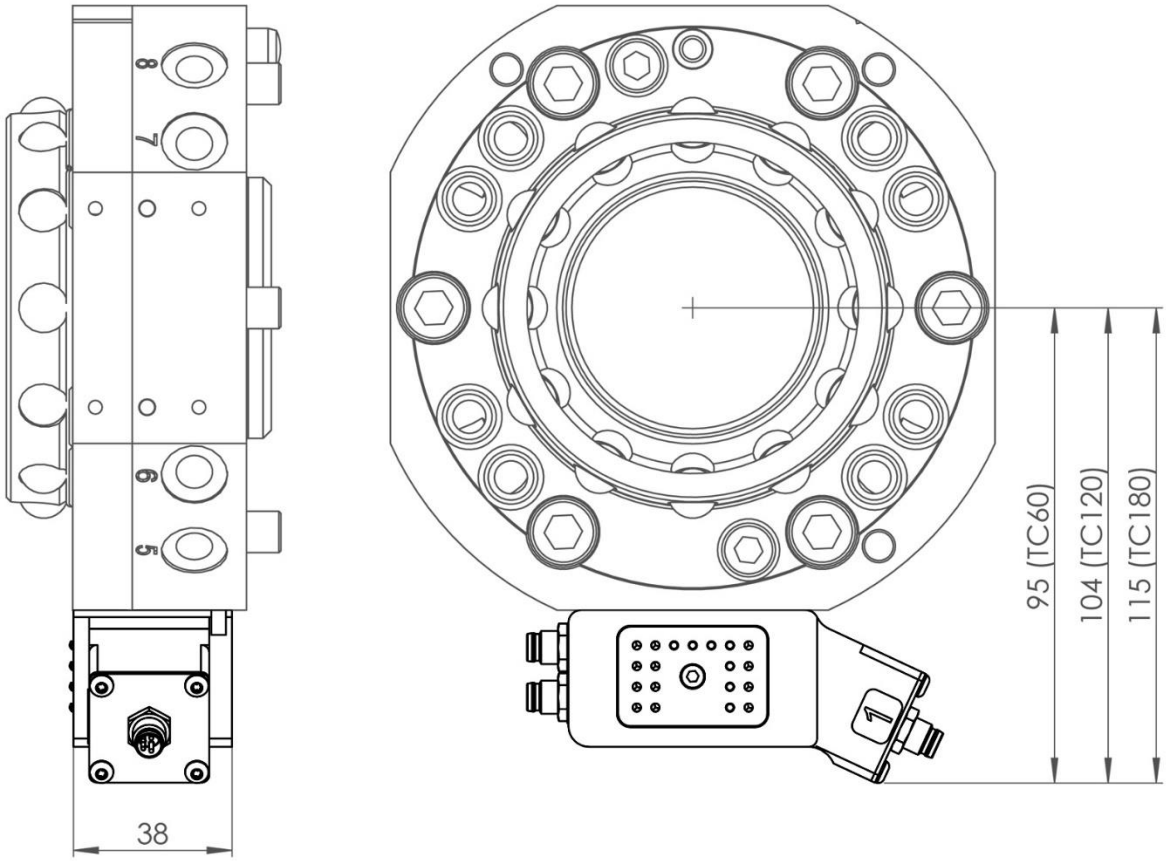
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-095 (section 3.23.1)
	Connection, tool side	2 x M23 9S (Phoenix 1593027, insert 1603668)

3.23.1 Circuit diagram E0182-095 for P1374



3.24 Signal module 3xM8, robot side. Article: P1381

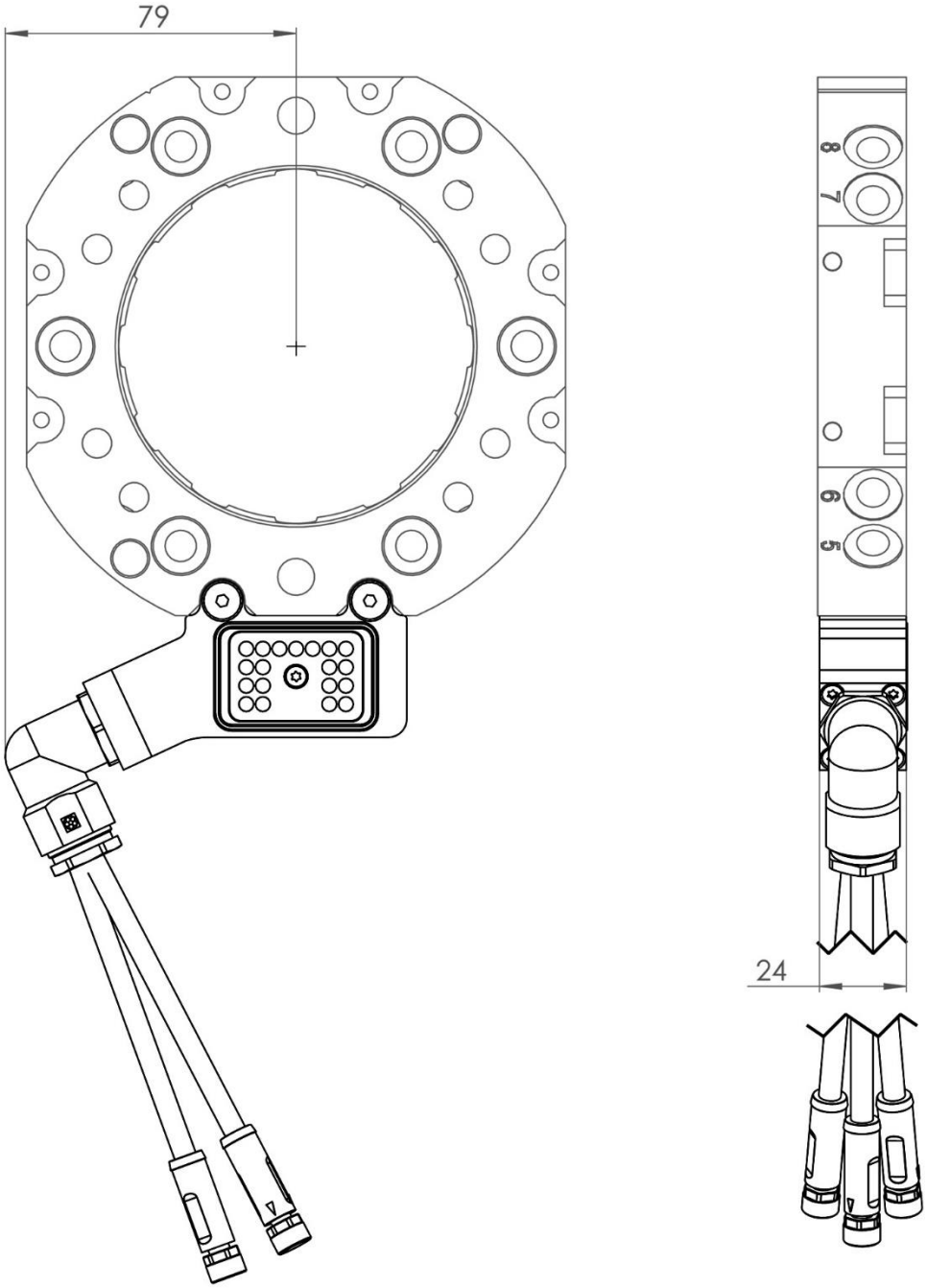


Signal module P1381 transfers 12 electrical signals to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer. To be used together with module P1382 attached to the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-102 (section 3.25.1)
	Connection, robot side	3 X M8 4P A-coded (Lumberg RSMF 4/0.5 M)
	Total signals available at tool	3 x (4 x 1A, 60V)

3.25 Signal module 3xM8, tool side. Article: P1382

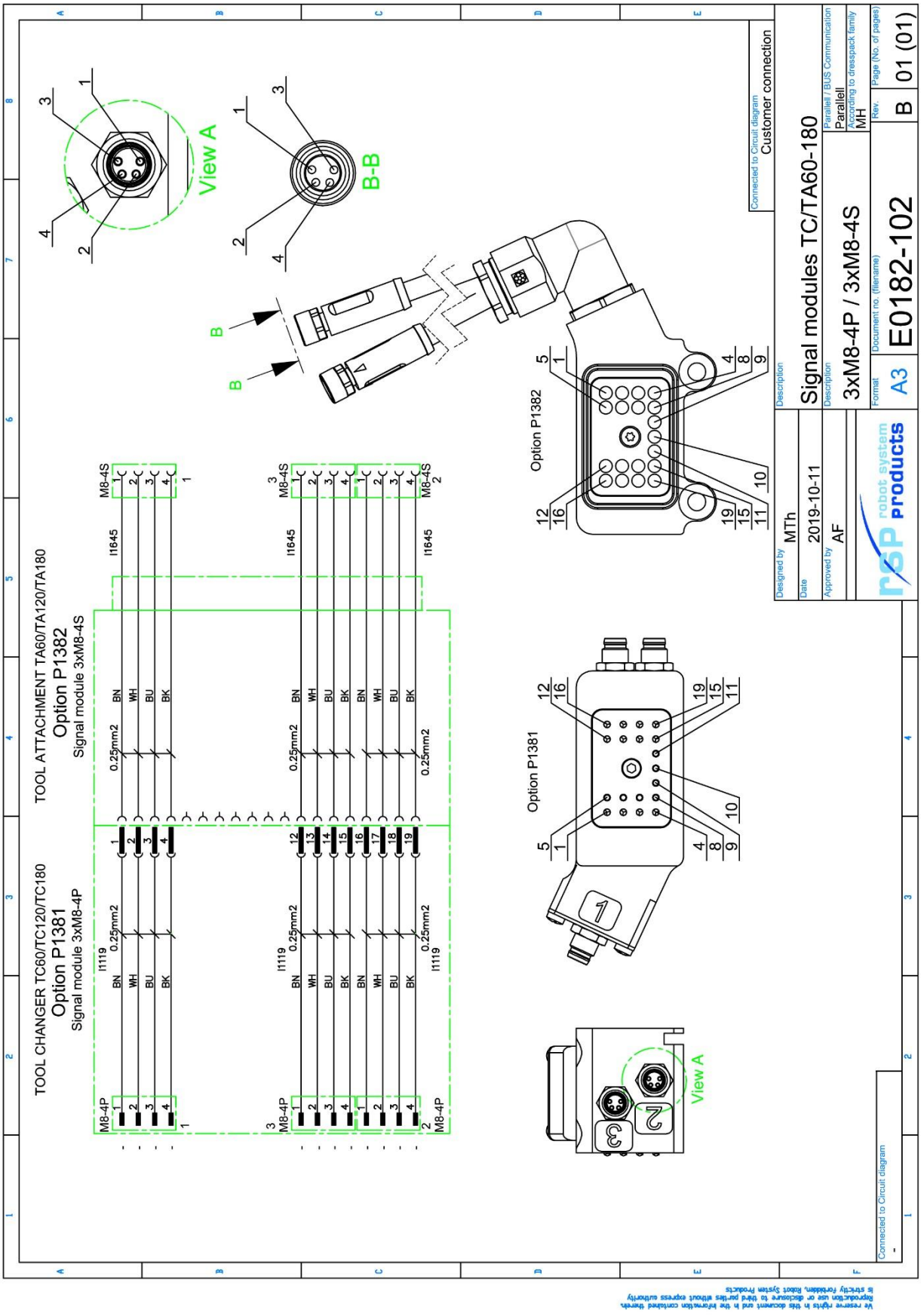


Signal module P1382 transfers 12 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1381 attached to the tool changer.

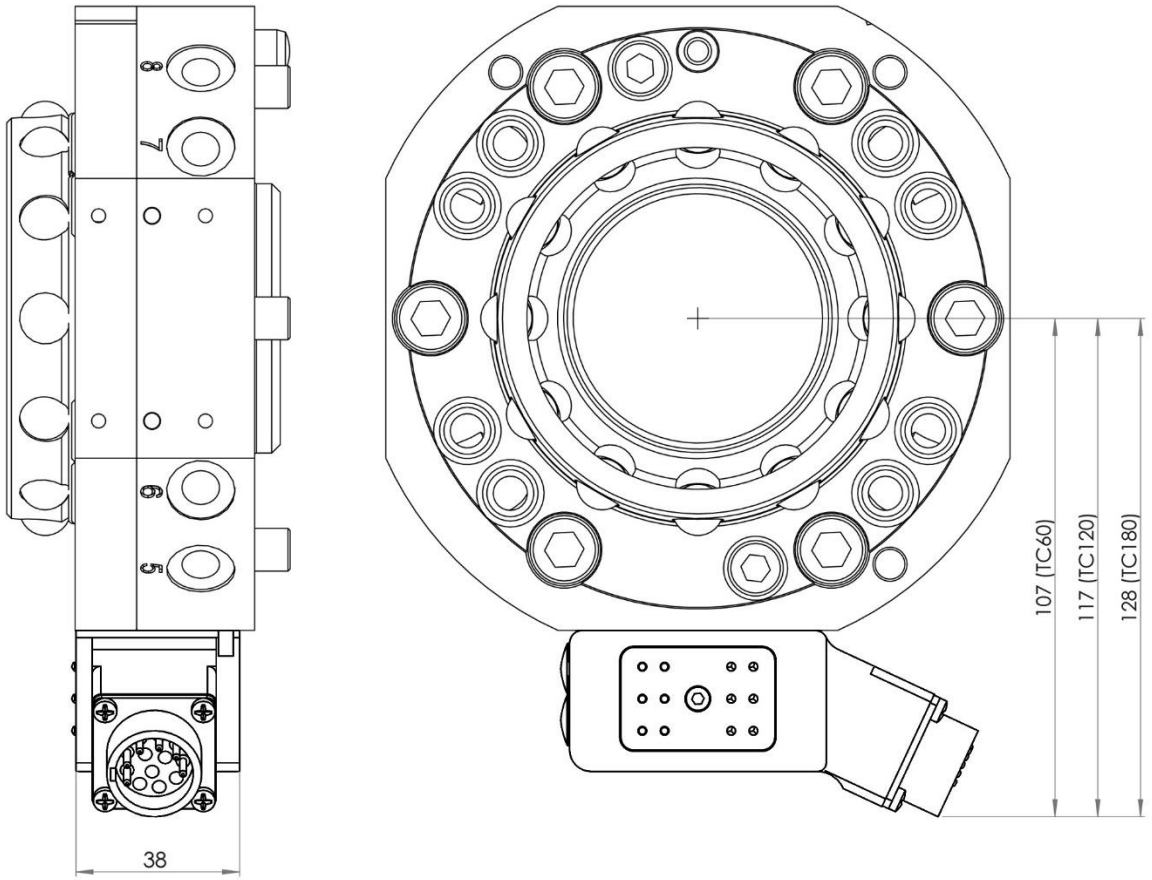
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-102 (section 3.25.1)
	Connection, tool side	3 X 0.3 m cable with M8 4S (Murrelektronik 7000-08061-6210050)

3.25.1 Circuit diagram E0182-102 for P1381 and P1382



3.26 Bus module DeviceNet, robot side. Article: P1328

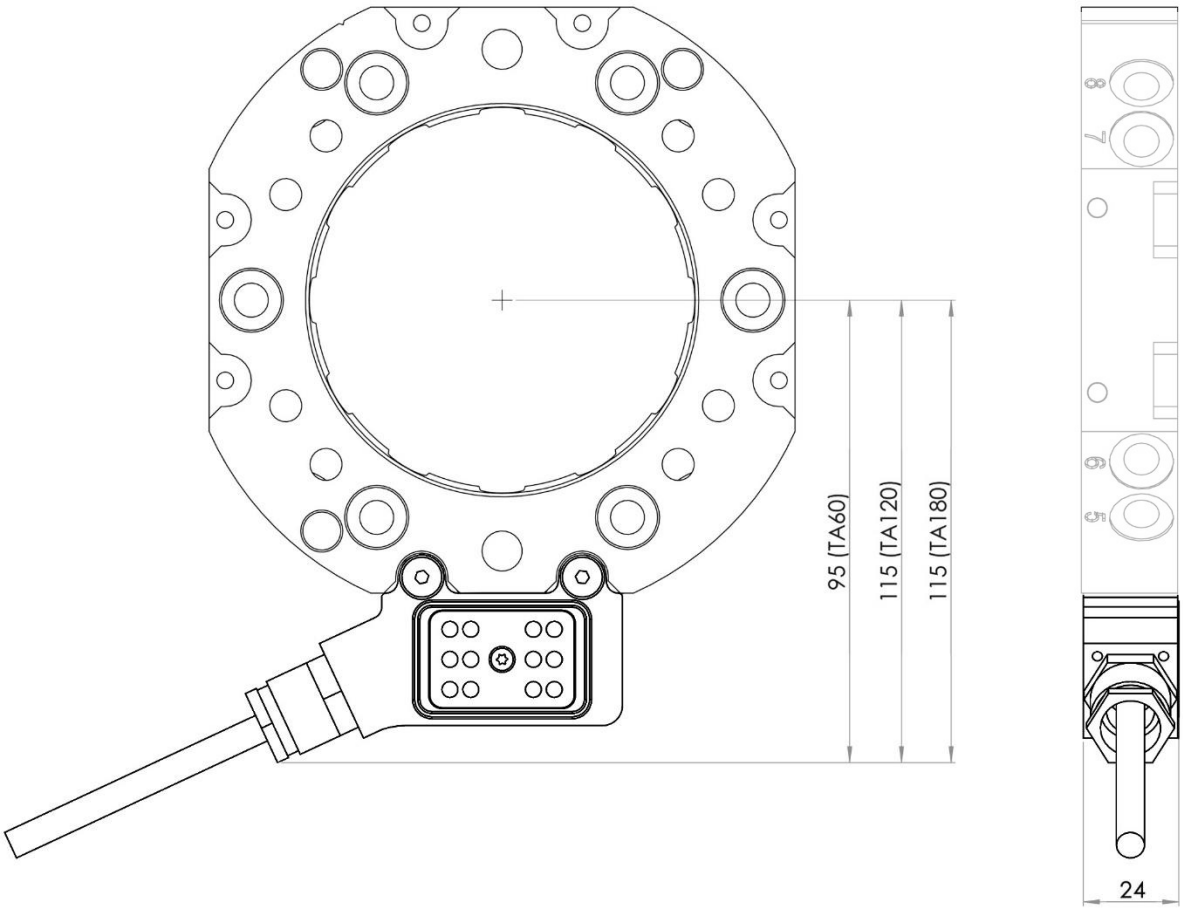


Bus module P1328 transfers 6 fieldbus signals (twister pairs) to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P1329 attached to the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-005 (section 3.27.1)
	Connection, robot side	Souriau 12P (UT001412PH)
	Bus available at tool	6 x InterBus / DeviceNet

3.27 Bus module DeviceNet, tool side. Article: P1329

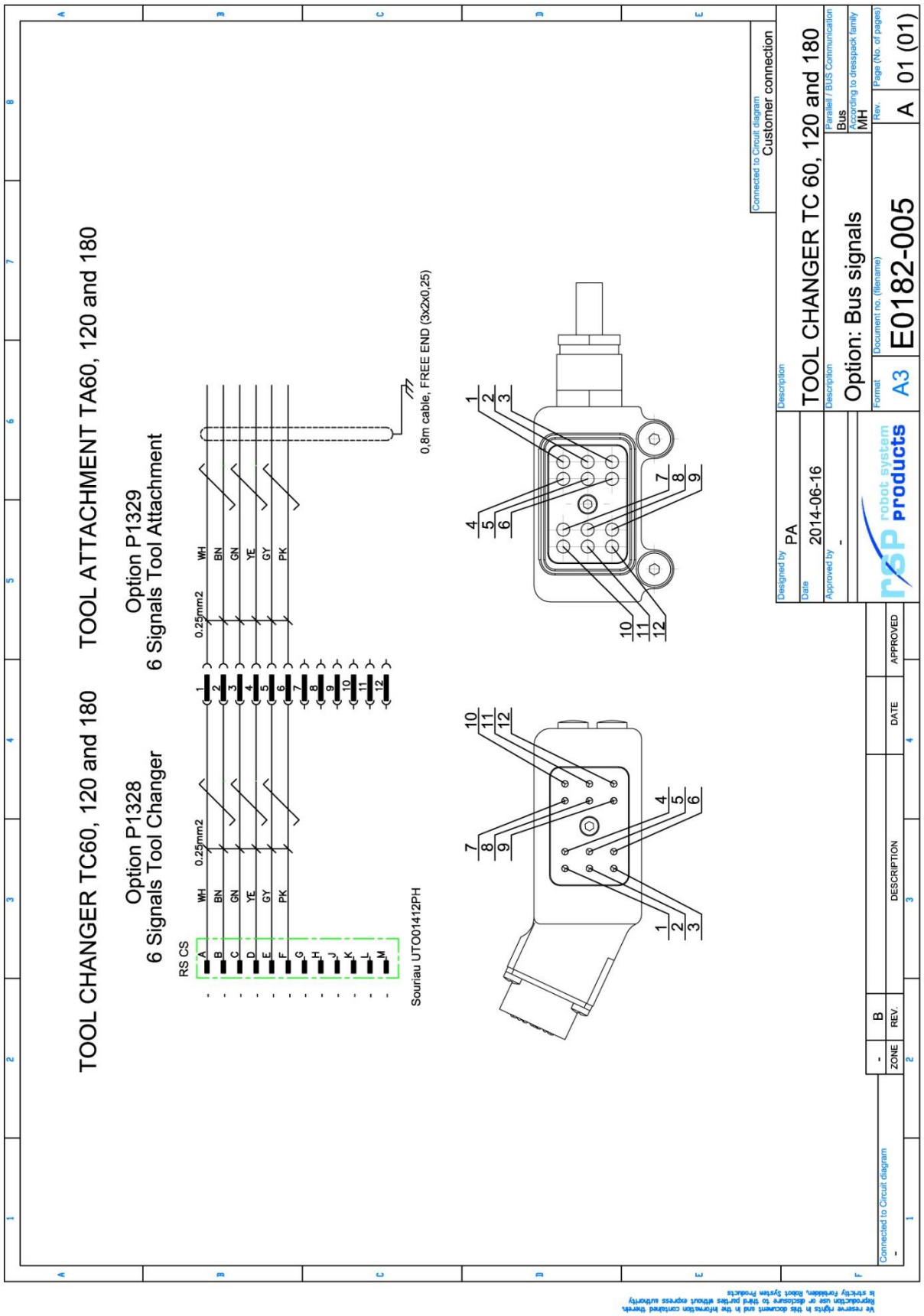


Bus module P1329 transfers 6 fieldbus signals (twister pairs) to the tool. To be mounted on the tool attachment and used together with module P1328 attached to the tool changer.

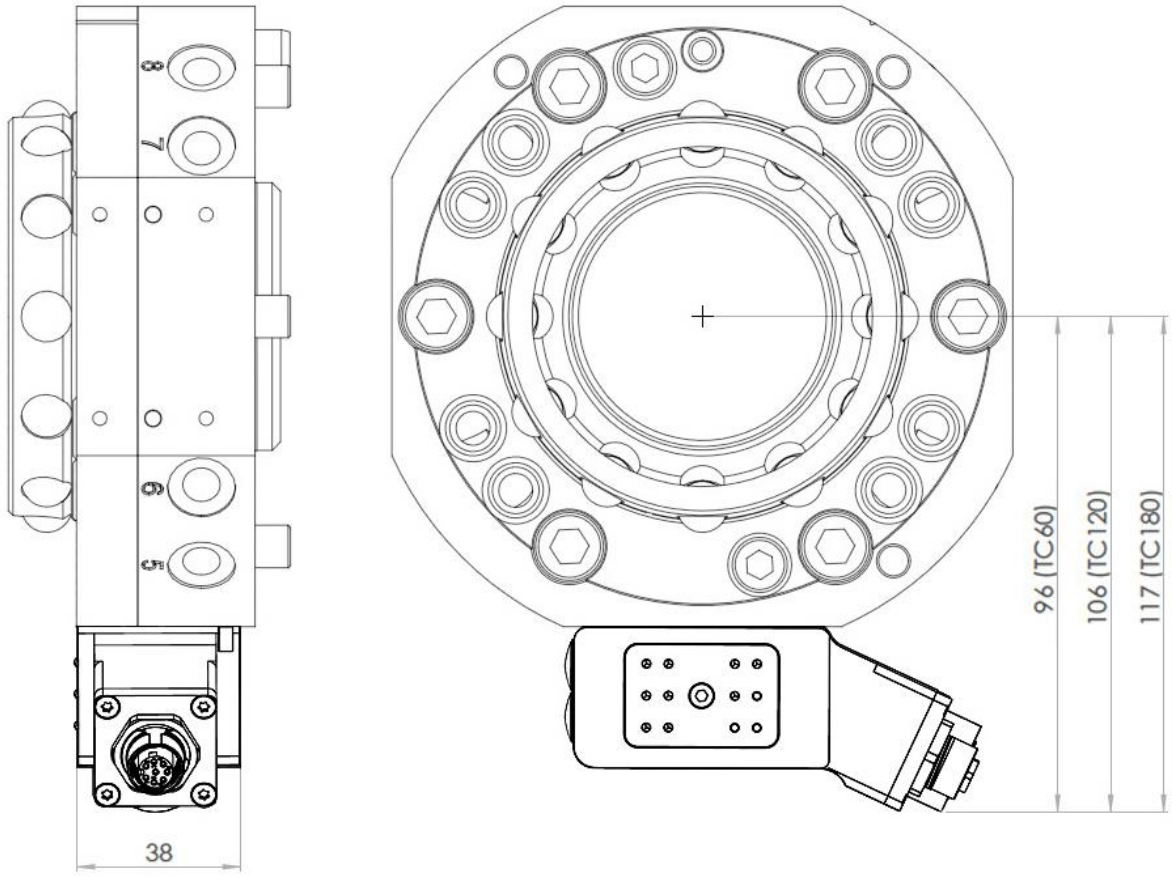
Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-005 (section 3.27.1)
	Connection, tool side	1.0 m cable (3x2x0.25 mm^2), open end

3.27.1 Circuit diagram E0182-005 for P1328 and P1329



3.28 Bus module Ethernet IP, robot side. Article: P1340

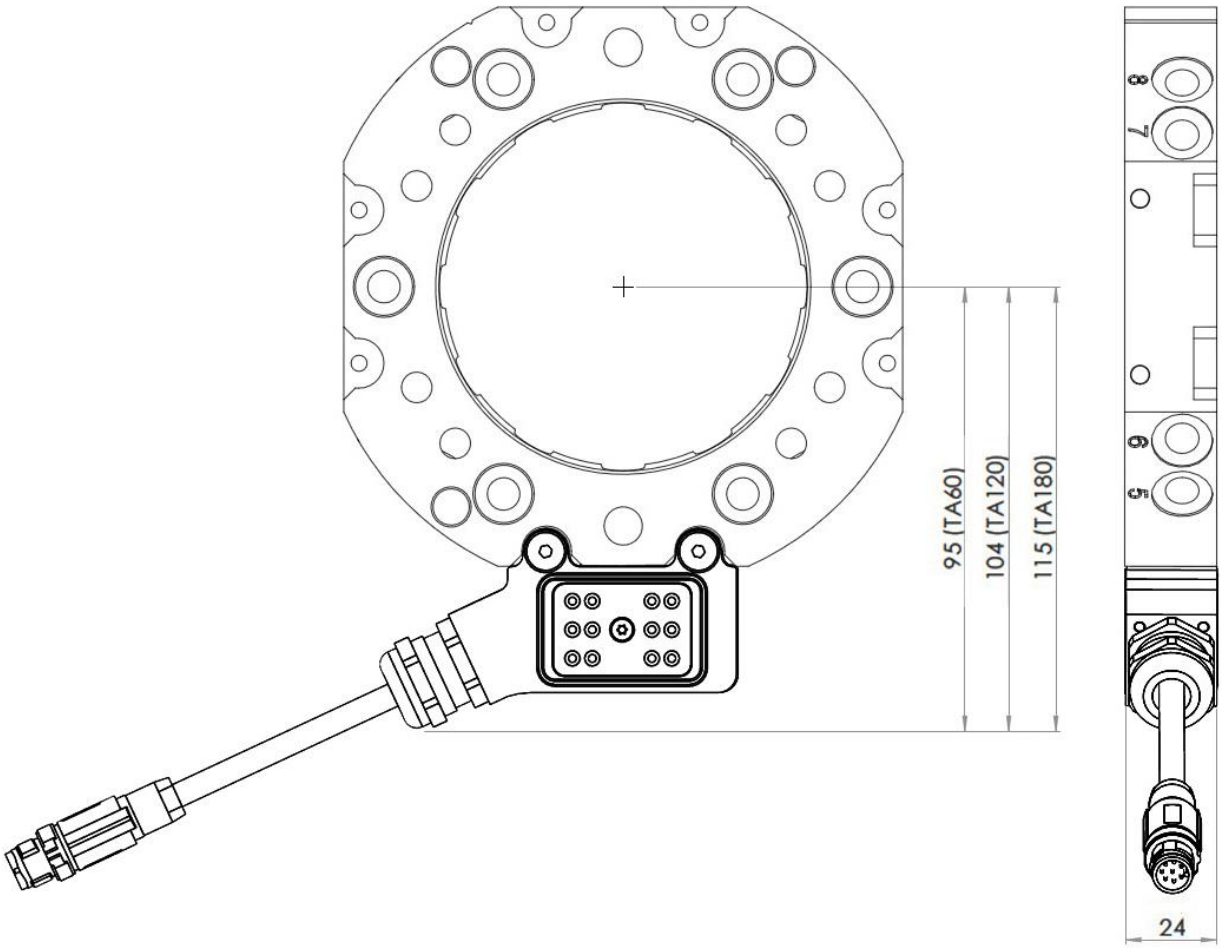


Bus module P1340 transfers 8 Ethernet signals (4 pairs) to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer. To be used together with module P1341 attached to the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-055 (section 3.29.1)
	Connection, robot side	M12 8S A-coded, (Phoenix 1407877)
	Bus available at tool	8 x Ethernet (1 Gbit/s)

3.29 Bus module Ethernet IP, tool side. Article: P1341

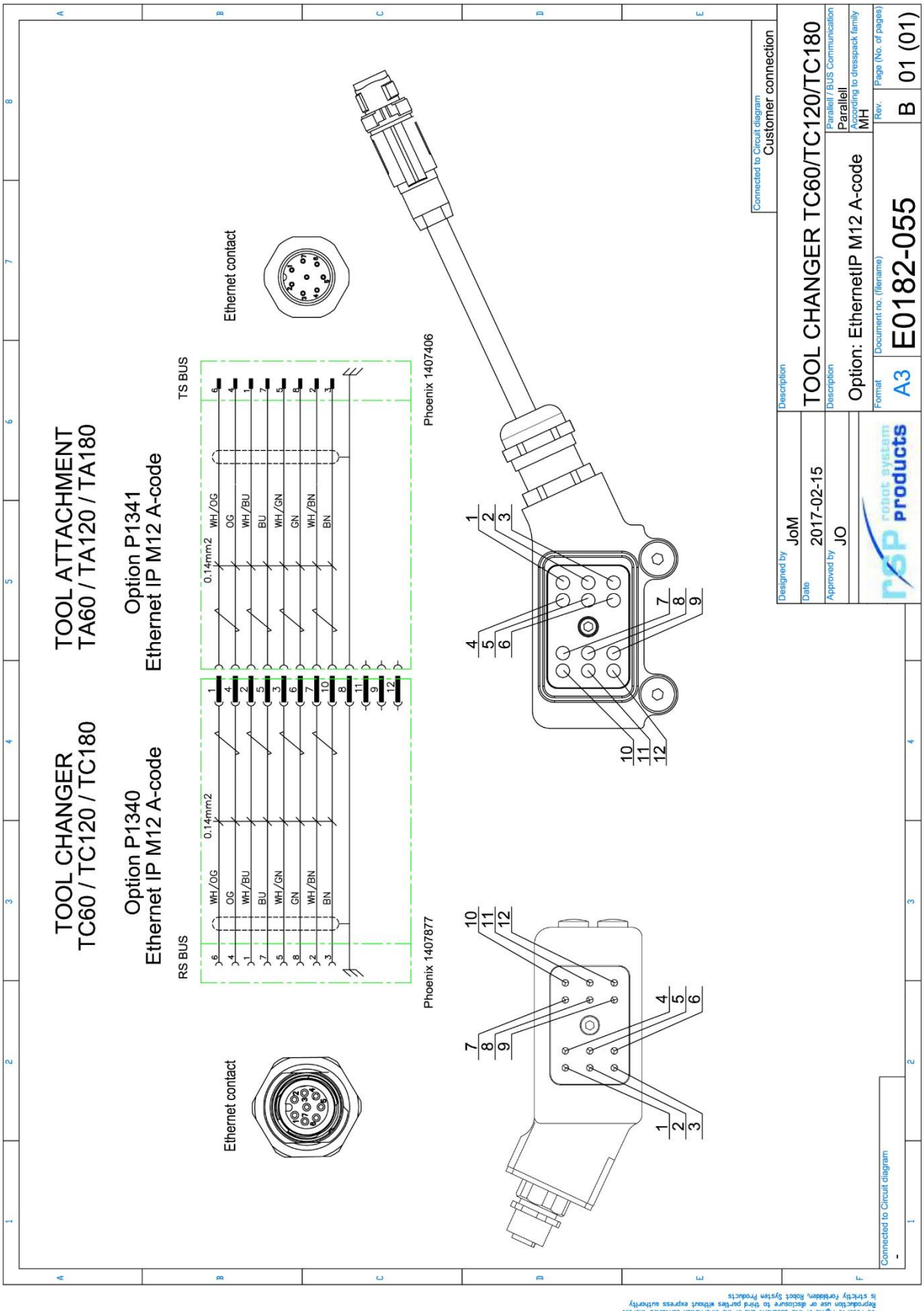


Bus module P1341 transfers 8 Ethernet signals (4 pairs) to the tool. To be mounted on the tool attachment and used together with module P1340 attached to the tool changer.

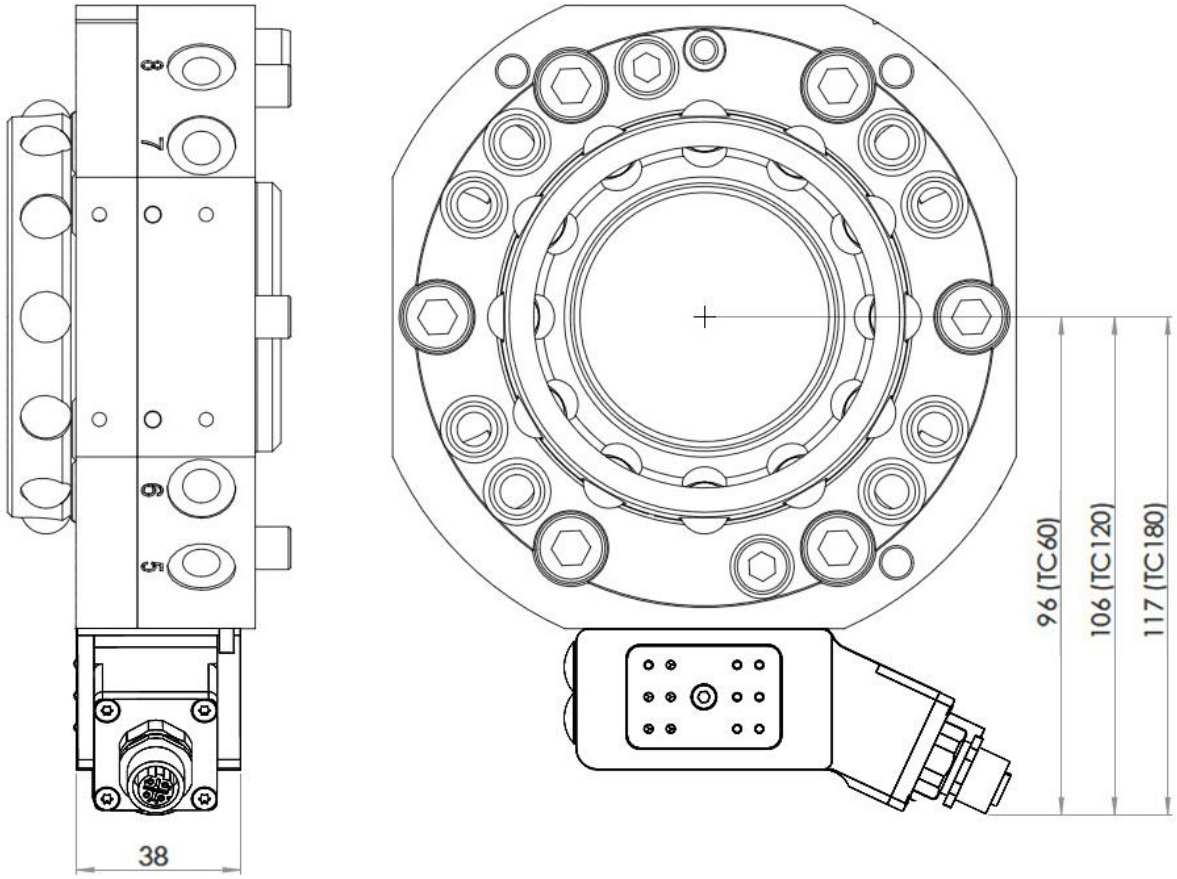
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-055 (section 3.29.1)
	Connection, tool side	1 m cable with M12 8P A-coded (Phoenix 1407406)

3.29.1 Circuit diagram E0182-055 for P1340 and P1341



3.30 Bus module Profinet (M12), robot side. Article: P1346

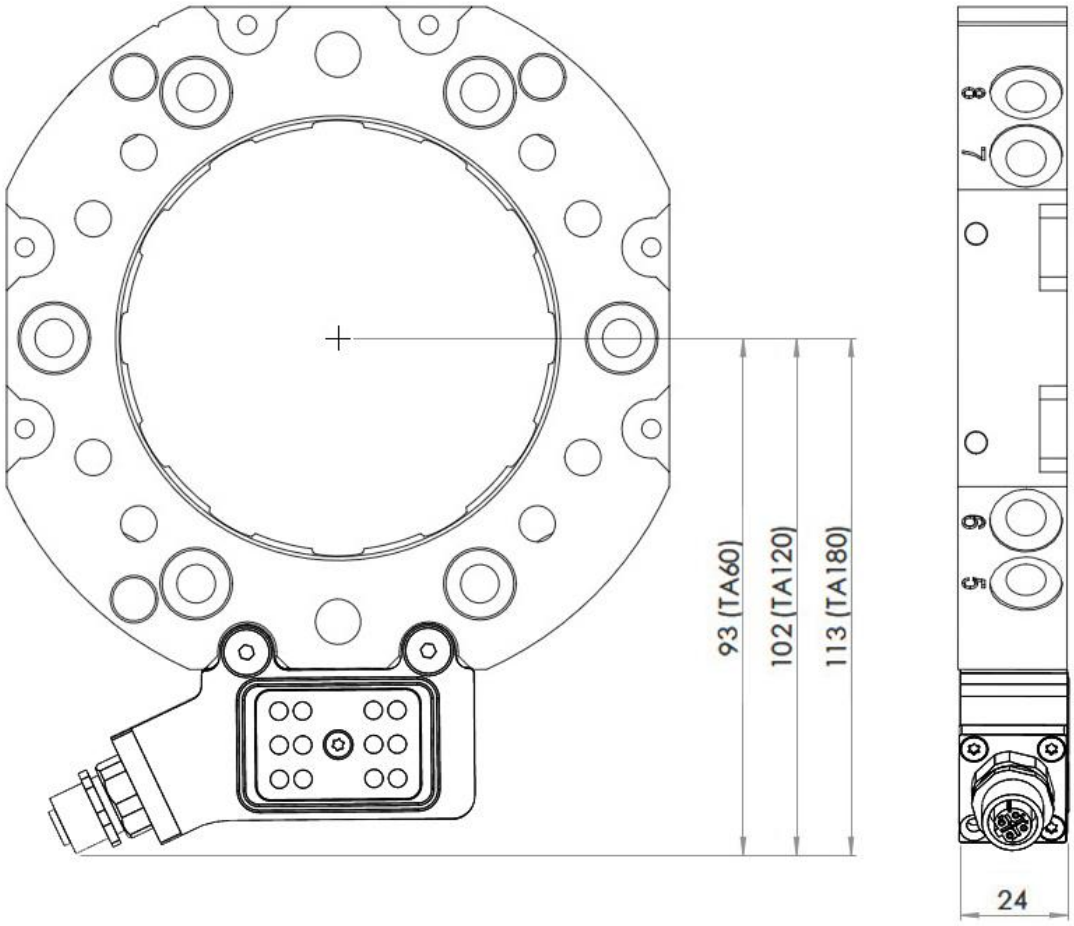


Bus module P1346 transfers 4 Profinet signals (2 pairs) to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer. To be used together with module P1347 attached to the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-063 (section 3.31.1)
	Connection, robot side	M12 4S D-coded (Phoenix 1528484)
	Bus available at tool	4 x Profinet (100 Mbit/s)

3.31 Bus module Profinet (M12), tool side. Article: P1347

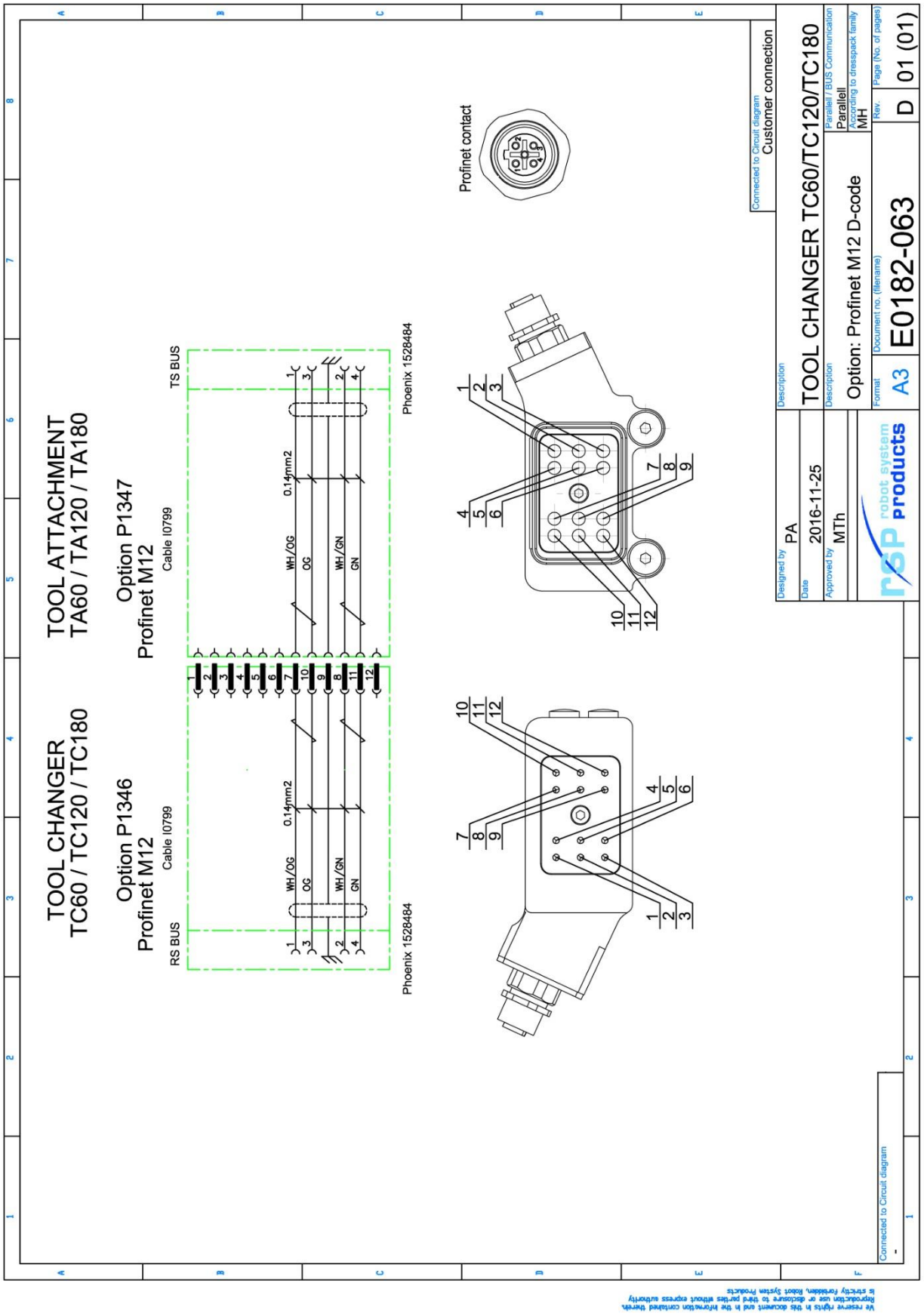


Bus module P1347 transfers 4 Profinet signals (2 pairs) to the tool. To be mounted on the tool attachment and used together with module P1346 attached to the tool changer.

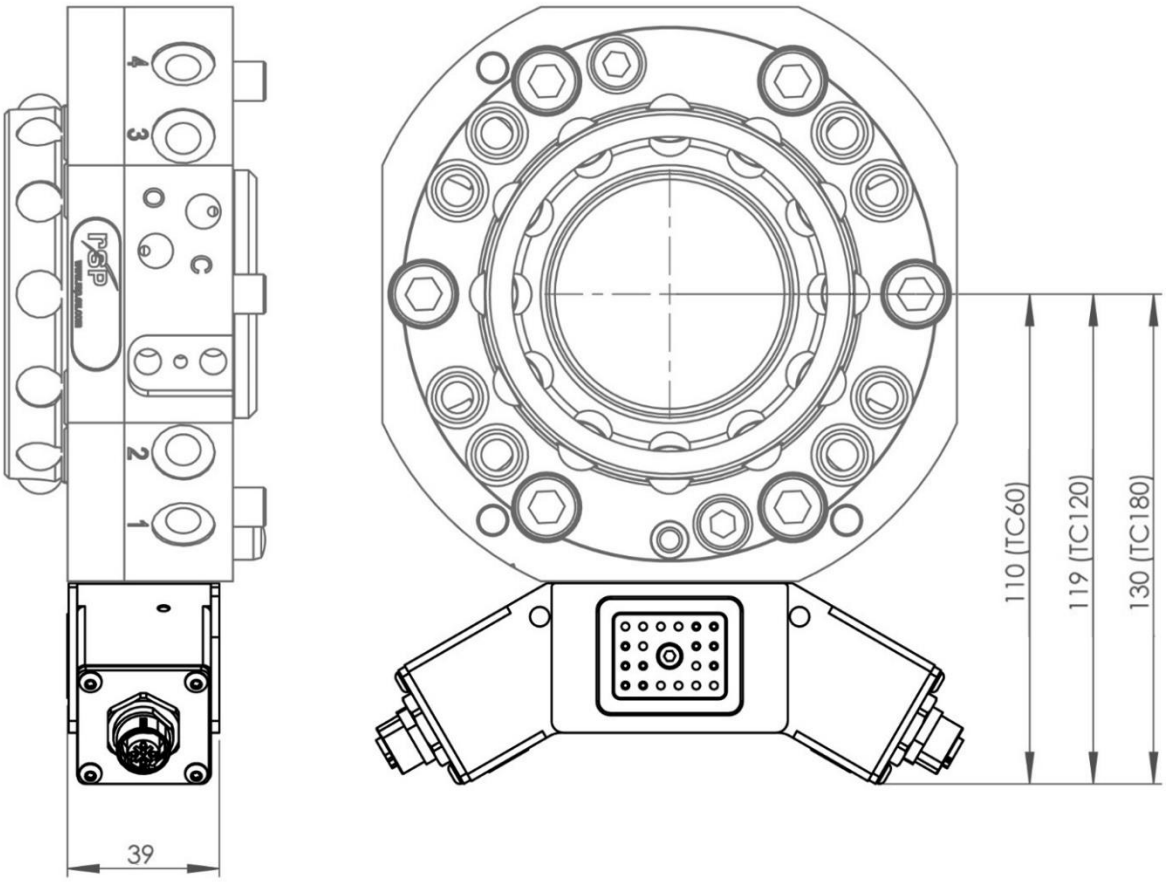
Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-063 (section 3.31.1)
	Connection, tool side	M12 4S D-coded (Phoenix 1528484)

3.31.1 Circuit diagram E0182-063 for P1346 and P1347



3.32 Bus module 2 X M12 D-coded, robot side. Article: P1368



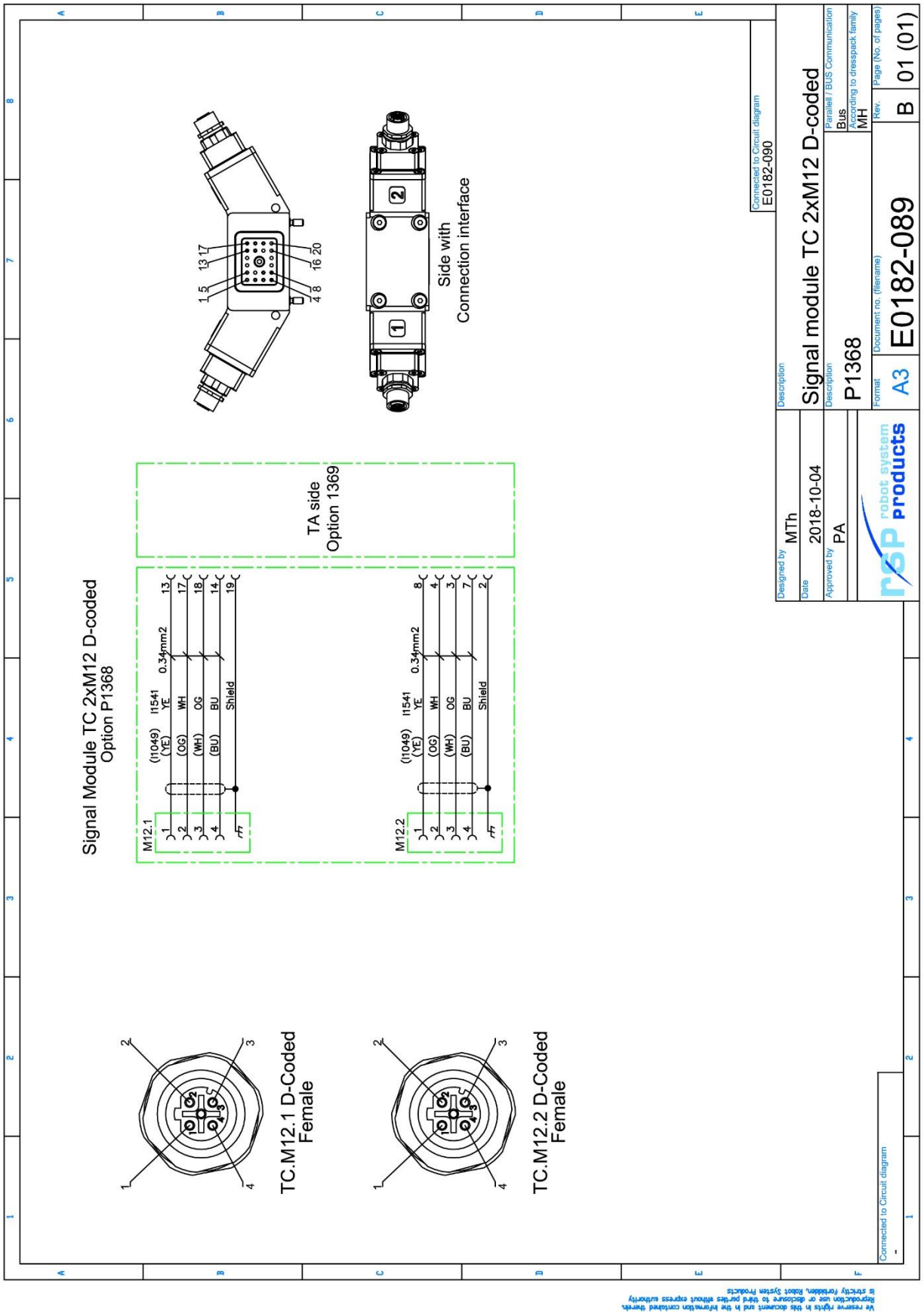
Bus module P1368 transfers 8 fieldbus signals (4 pairs) to the tool attachment. To be used together with module P1369 attached to the tool attachment.

NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1368 and P1369.

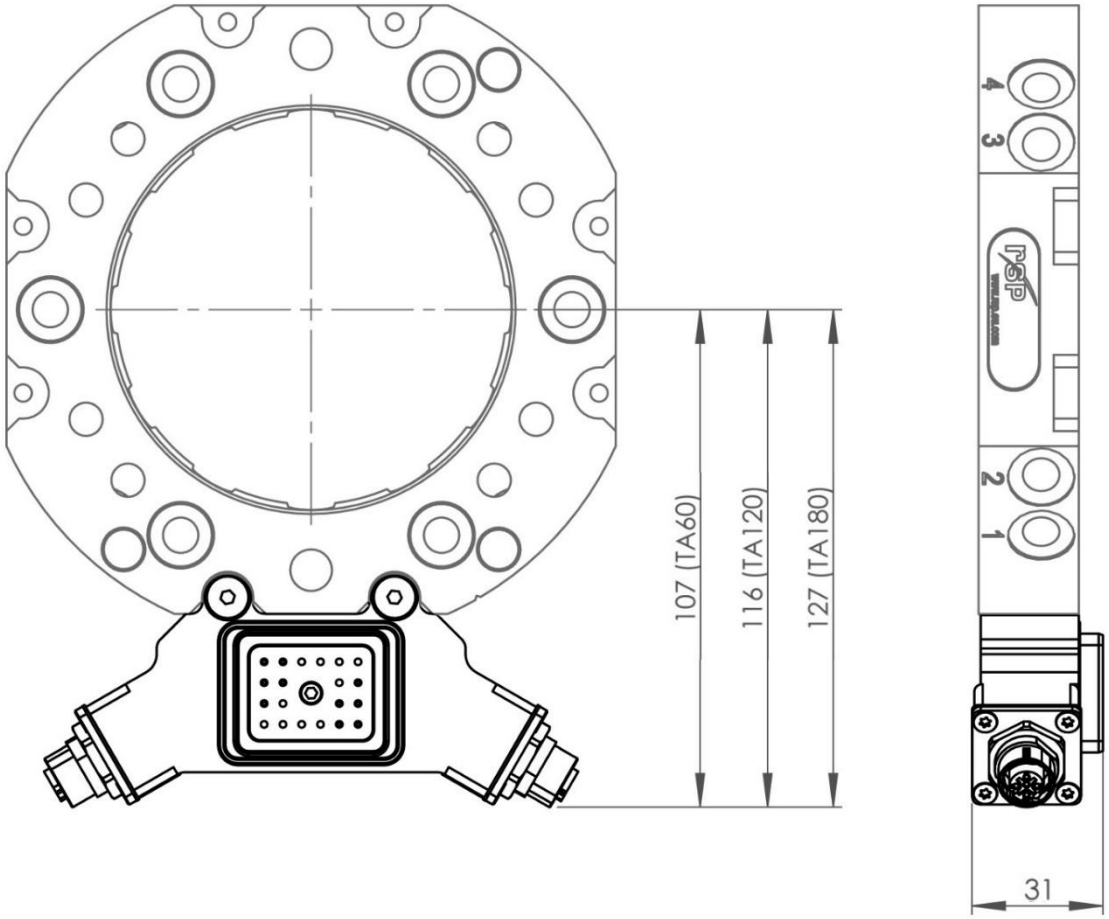
Technical data

Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-089 (section 3.32.1)
	Connection, robot side	2 X M12 4S, D-coded (Phoenix 1437766)
	Bus available at tool	8 x fieldbus signals (100 Mbit/s)

3.32.1 Circuit diagram E0182-089 for P1368



3.33 Bus module 2 X M12 D-coded, tool side. Article: P1369

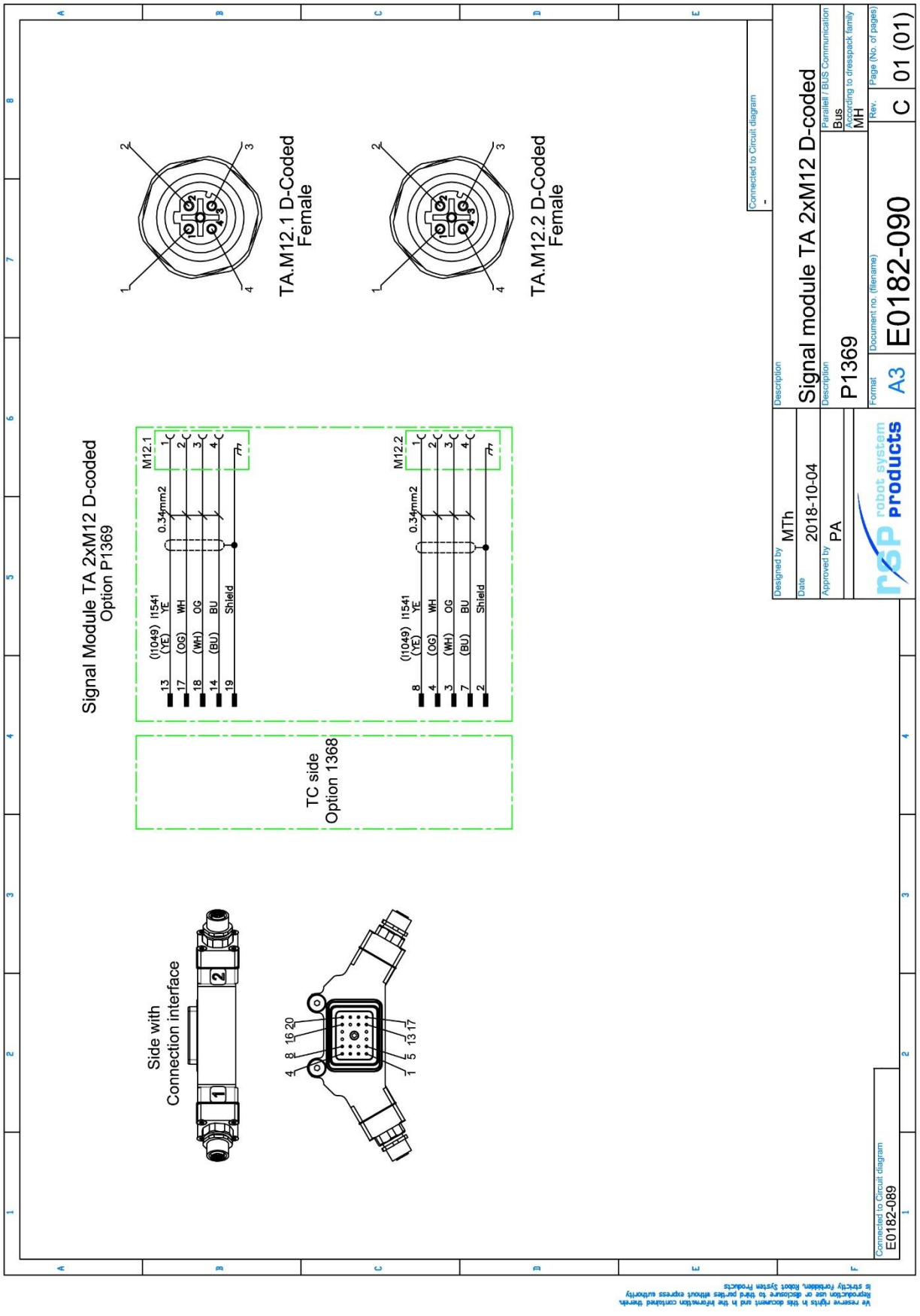


Bus module P1369 transfers 8 fieldbus signals (4 pairs) to the tool. To be mounted on the tool attachment and used together with module P1368 attached to the tool changer.

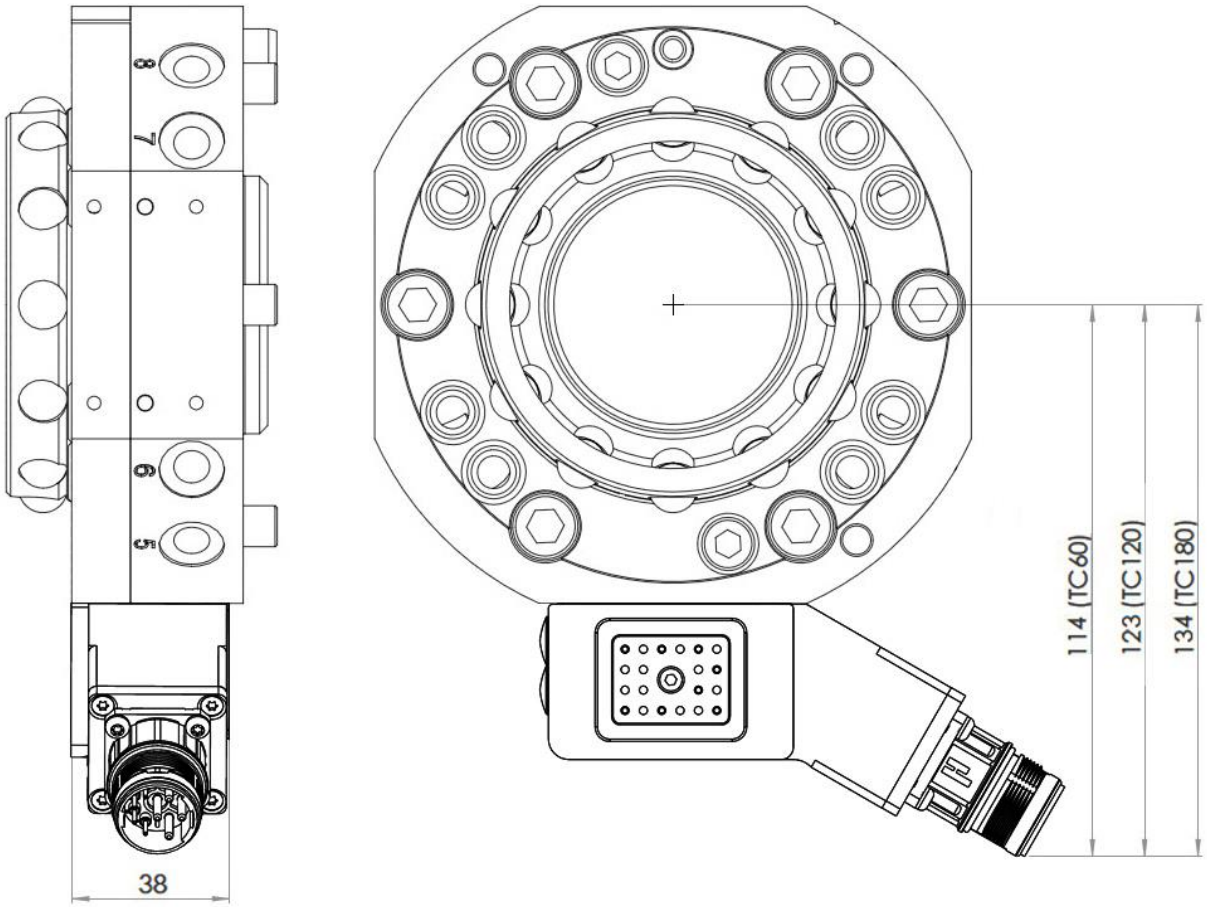
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-090 (section 3.33.1)
	Connection, tool side	2 X M12, D-coded, 4 sockets (Phoenix 1437766)

3.33.1 Circuit diagram E0182-090 for P1369



3.34 Power and signal module 8 x signals, robot side. Article: P1375



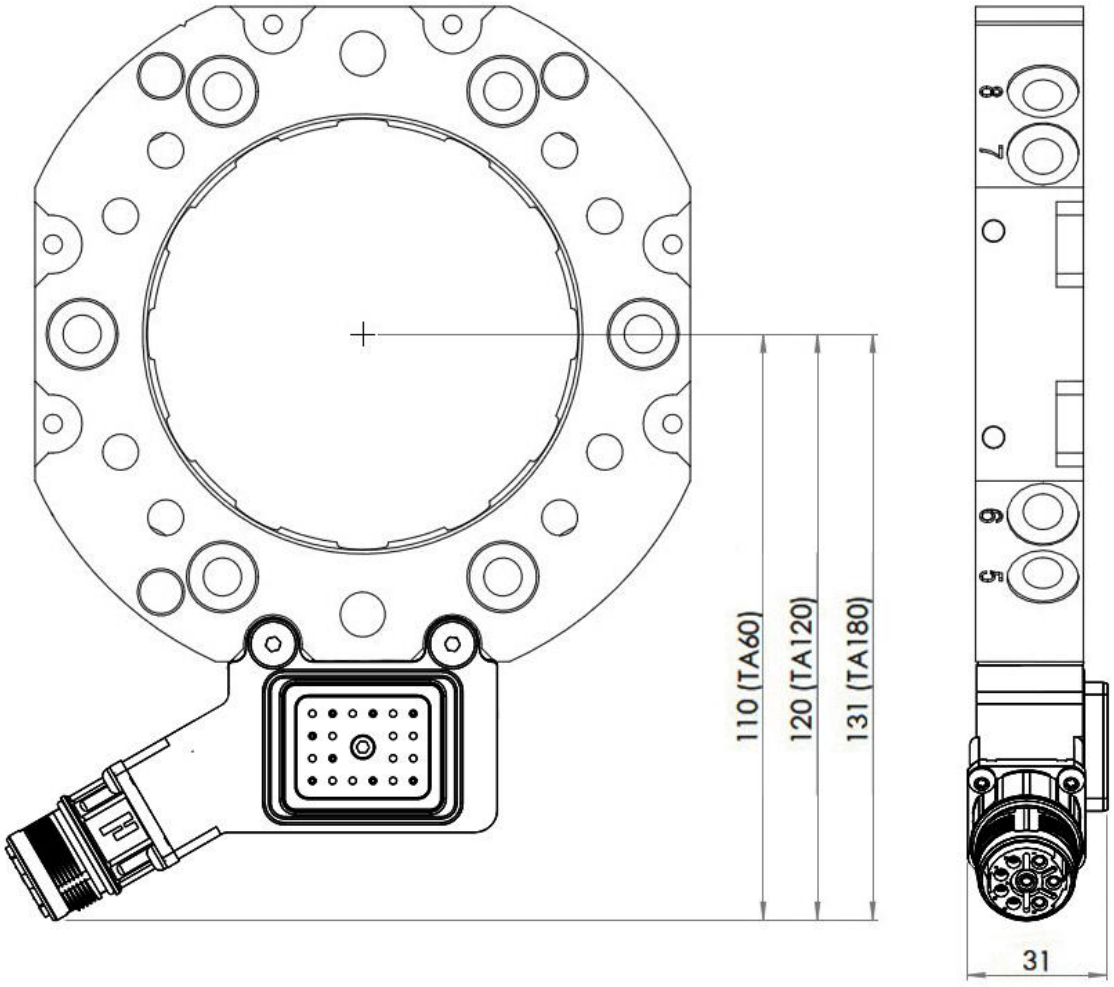
Transfers 4 electrical signals and 3 power signals to the tool attachment. To be used together with module P1376 attached to the tool attachment.

NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1375 and P1376.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-096 (section 3.35.1)
	Connection, robot side	M23 8P, male thread (Hummel 7601 000 000, insert 7084 943 121)
	Total signals	7 + PE
	Signals available at tool	4 x (5A, 300V) and 3 x (15A, 600V)
Connection kits and cables (optional)	P8030	M23 8S, female thread (straight, 4 x 0.14–1.0 mm^2 +4 x 0.75–2.5 mm^2)
	P8030-1	M23 8S, female thread (angled, 4 x 0.14–1.0 mm^2 +4 x 0.75–2.5 mm^2)
	P1388-20/ P1388-50	M23 8S with 2,0/5.0 m cable, open end

3.35 Power and signal module 8 x signals, tool side. Article: P1376

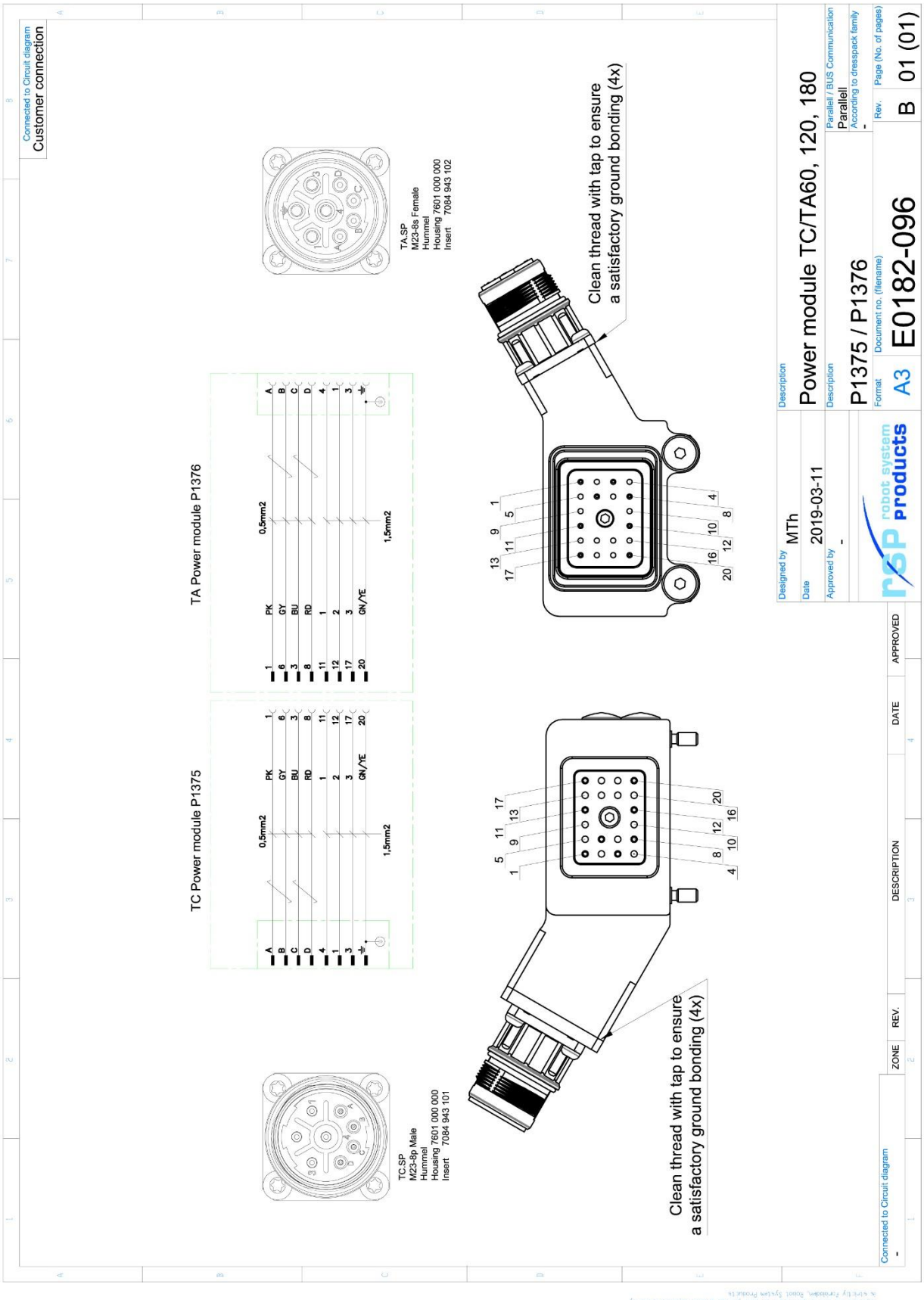


Power and signal module P1376 transfers 4 electrical signals and 3 power signals to the tool. To be mounted on the tool attachment and used together with module P1375 attached to the tool changer.

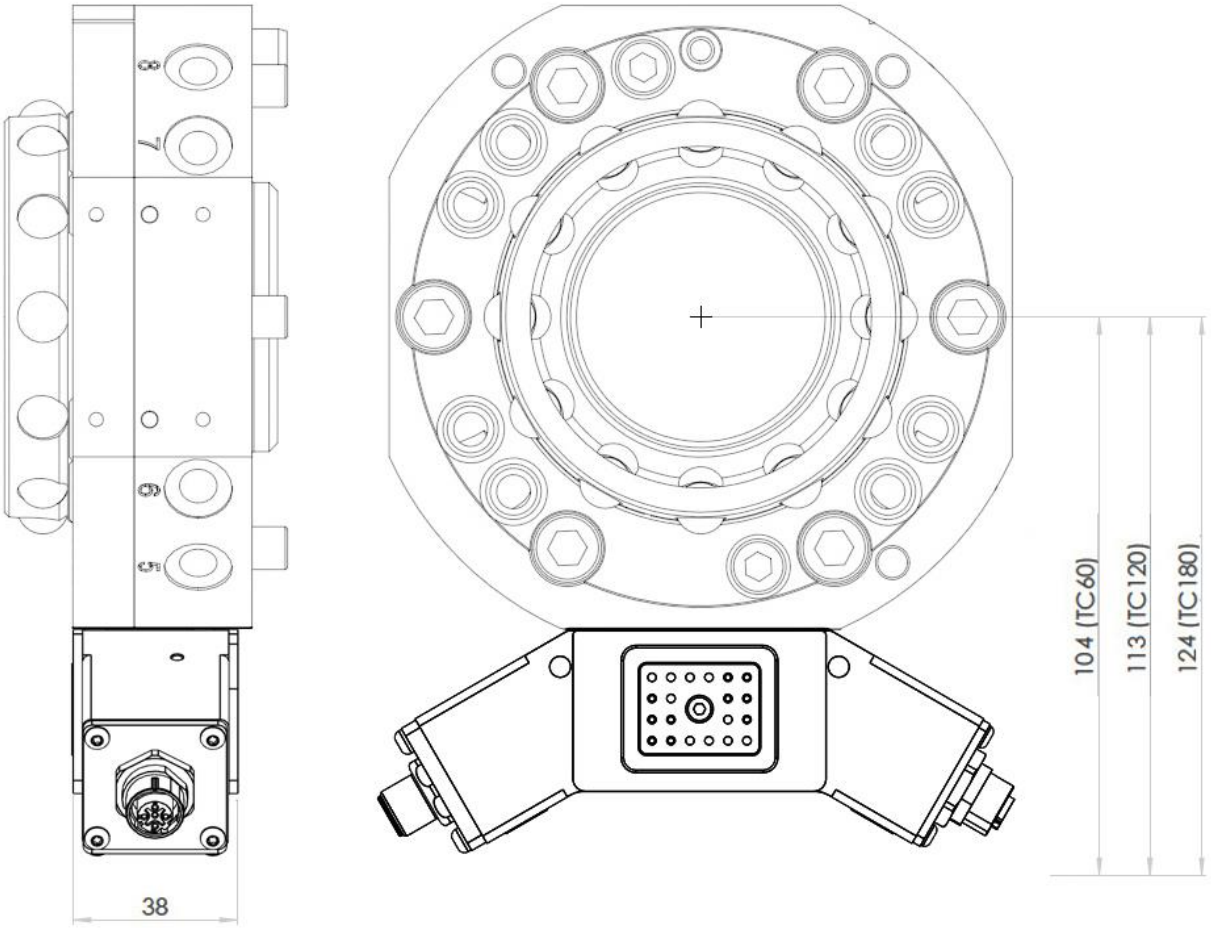
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-096 (section 3.35.1) M23 8S, male thread (Hummel 7601 000 000, insert 7084 943 122)
Connection kits and cables (optional)	P8033	M23 8P, female thread (straight, 4 x 0.14–1.0 mm^2 +4 x 0.75–2.5 mm^2)
	P1387-20/ P1387-50	M23 8P with 2,0/5.0 m cable, open end

3.35.1 Circuit diagram E0182-096 for P1375 and P1376



3.36 Power and signal module 2 X 4 signals, robot side. Article: P3316



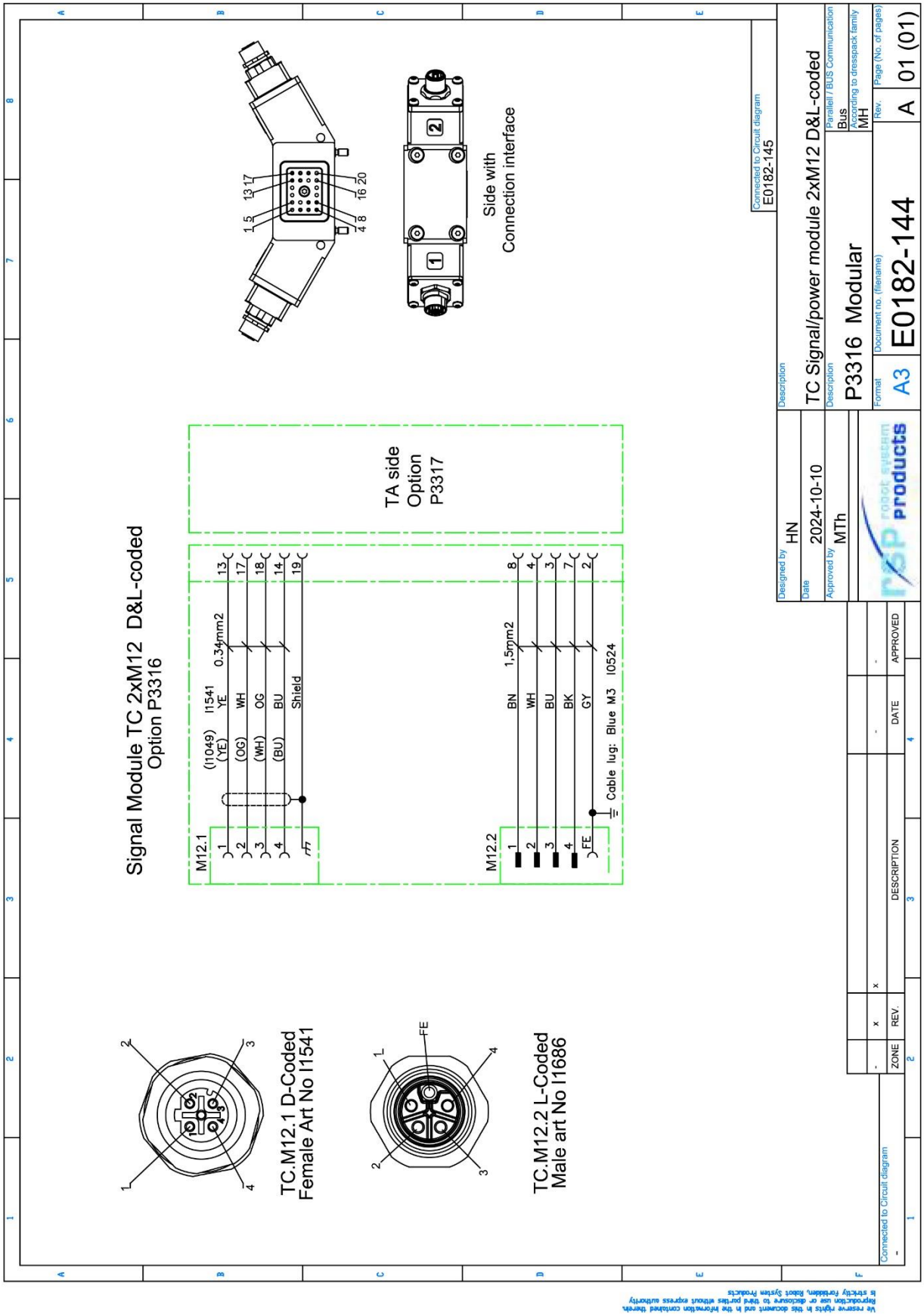
Power and signal module P3316 transfers 4 Profinet signals and 4 power signals to the tool attachment. To be used together with module P3317 attached to the tool attachment.

NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P3316 and P3317.

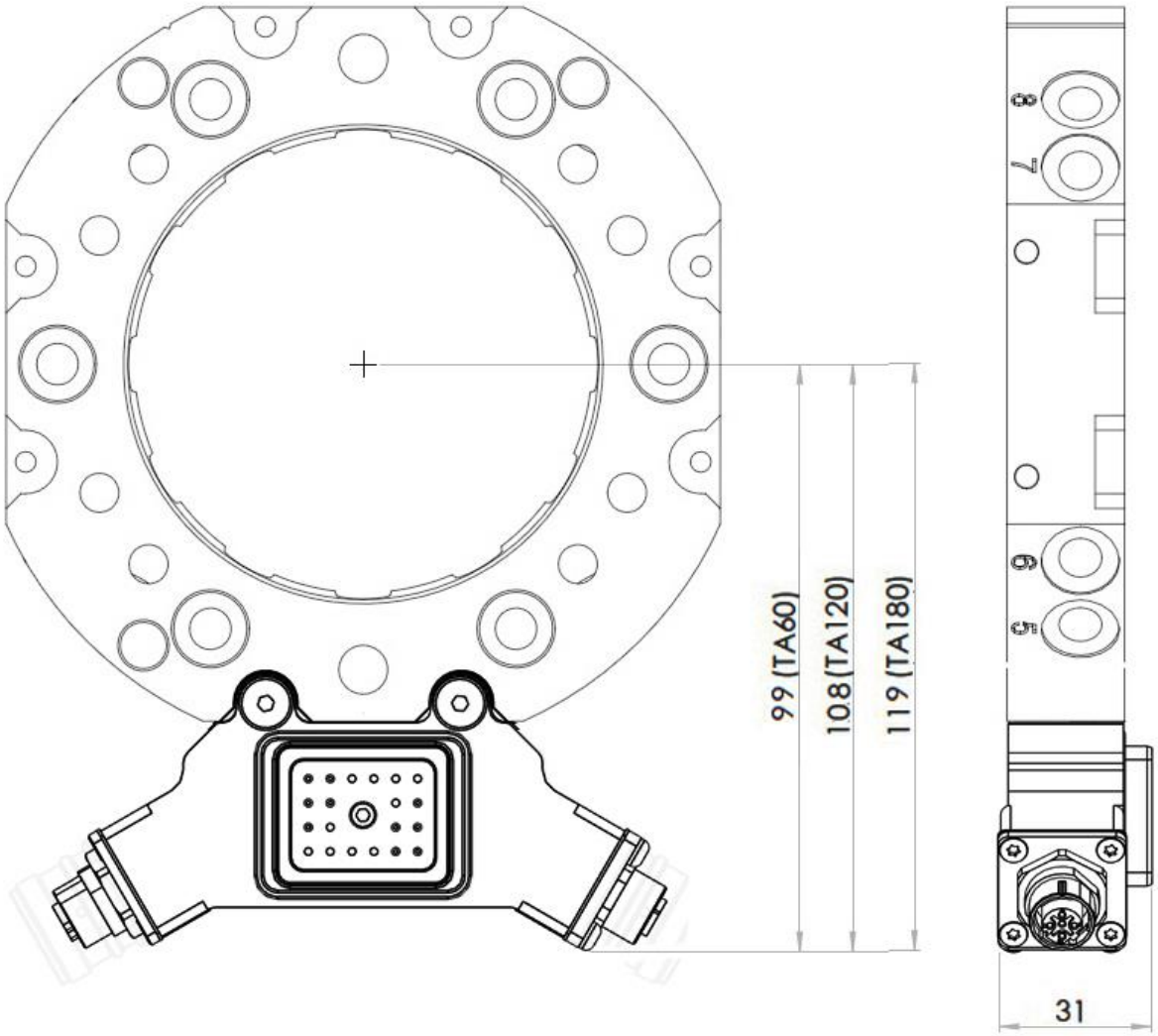
Technical data

Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-144 (section 3.36.1)
	Connection, robot side	M12 4S D-coded (Phoenix 1437766), M12 5P male, L-coded (Harting 21035961505)
	Total signals available at tool	4 x fieldbus signals (100 Mbit/s) + 4 x (15A, 60V) + FE

3.36.1 Circuit diagram E0182-144 for P3316



3.37 Power and signal module 2 X 4 signals, tool side. Article: P3317

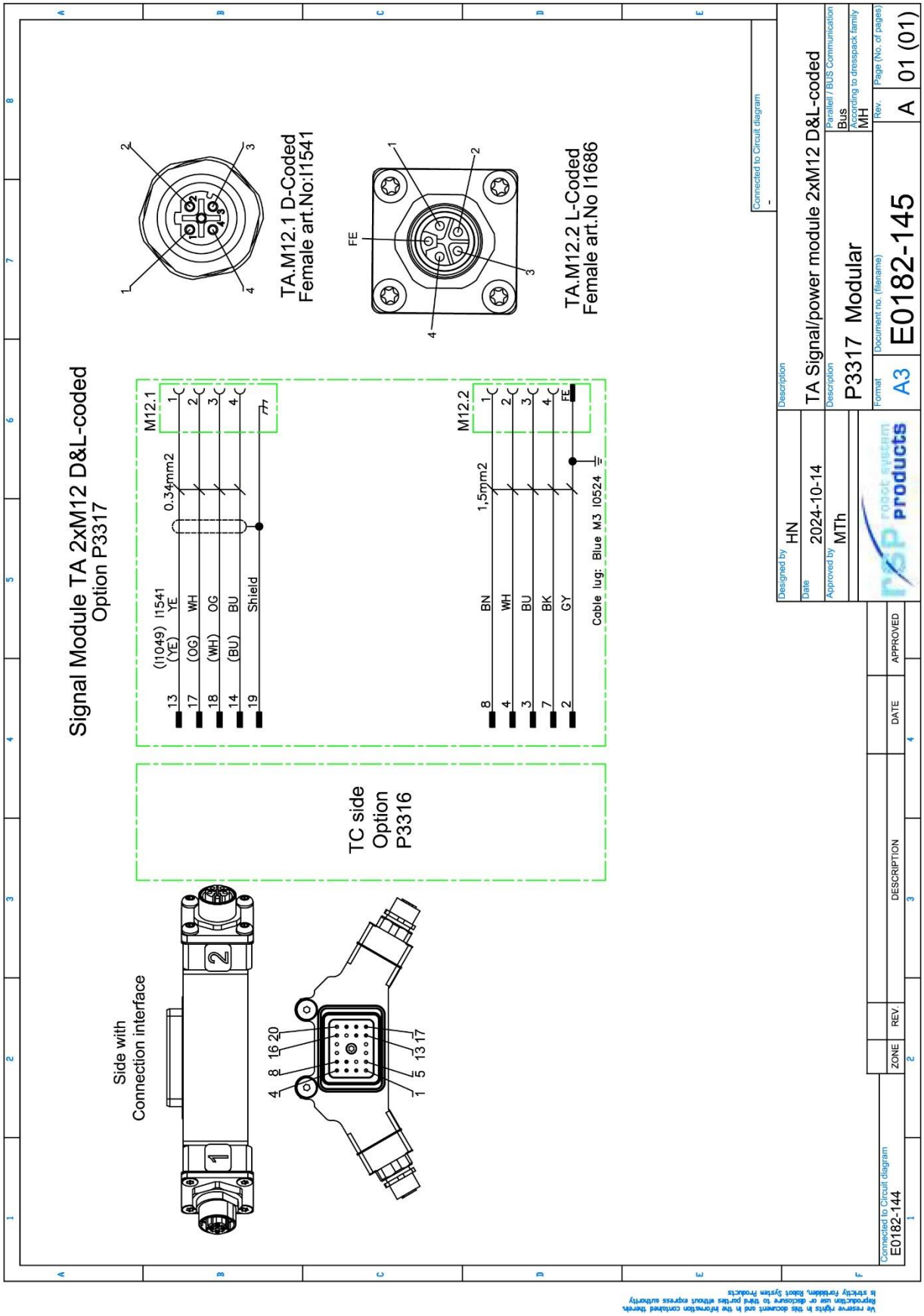


Power and signal module P3317 transfers 4 Profinet signals and 4 power signals to the tool. To be mounted on the tool attachment and used together with module P3316 attached to the tool changer.

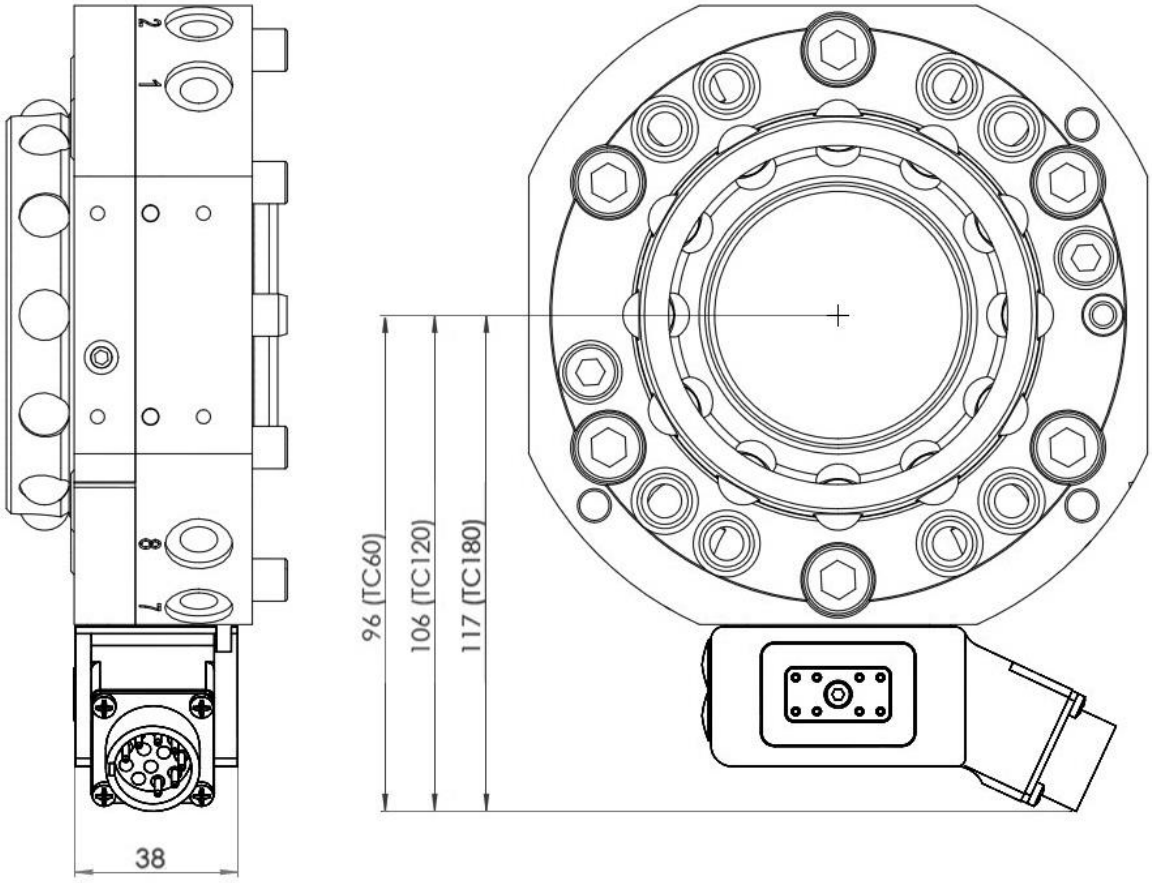
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-145 (section 3.37.1)
	Connection, tool side	M12 4S D-coded (Phoenix 1437766), M12 5P male, L-coded (Harting 21035961505)

3.37.1 Circuit diagram E0182-145 for P3317



3.38 Power module 8 x power, robot side. Article: P1307



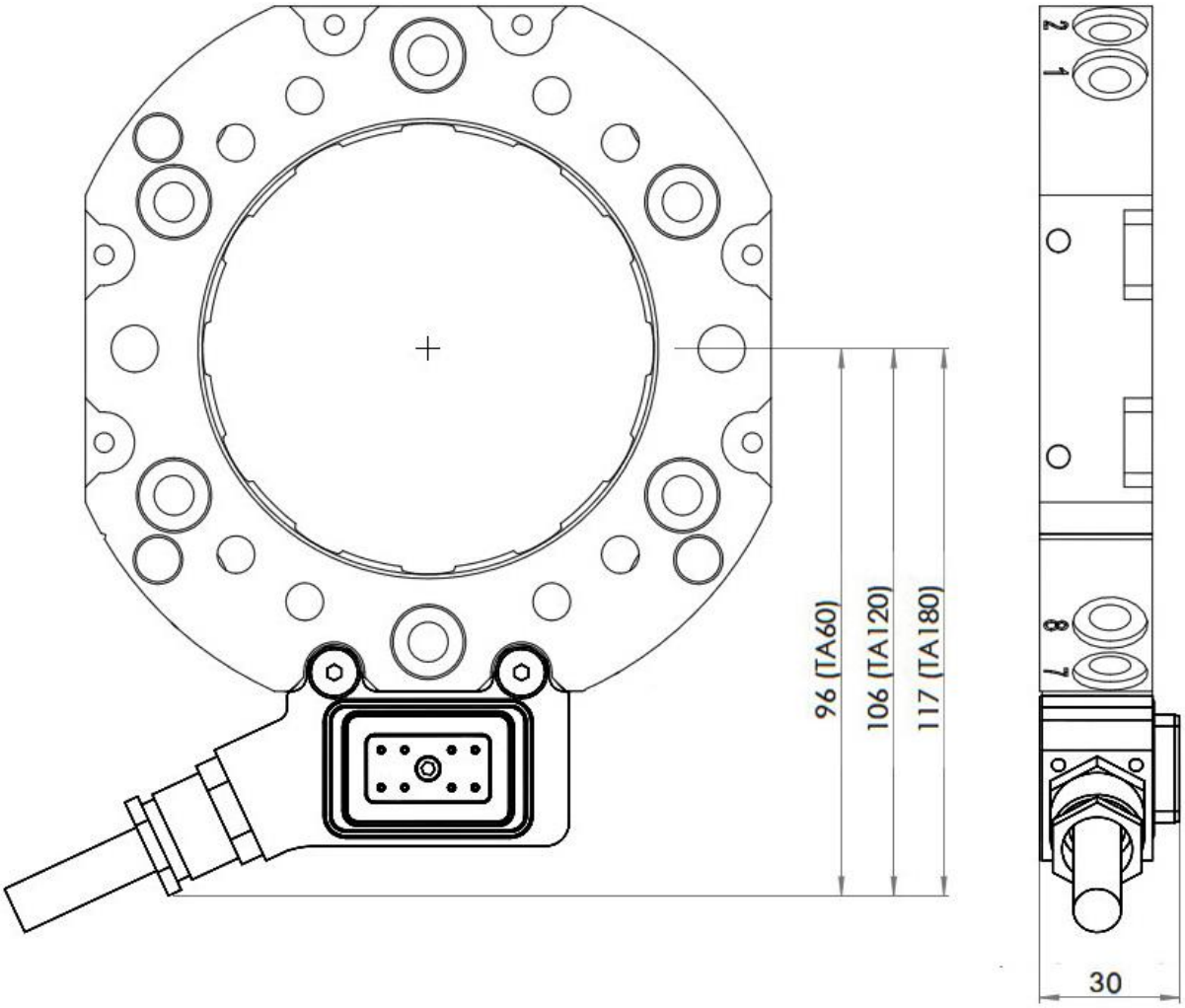
Power module P1307 transfers 8 power signals to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P1308 attached to the tool attachment.

NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1307 and P1308.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-003 (section 3.39.1)
	Connection, robot side	Souriau 12P (UT001412PH)
	Total signals	7 + PE
	Signals available at tool	4 x (5A, 150V), 3 x (10A, 150V)
Connection kits and cables (optional)	P8006	Souriau 12S (straight, 0.52–1.5 mm^2)
	P8006-1	Souriau 12S, (angled, 0.32–0.52 mm^2)
	P8006-2	Souriau 12S, (angled, 0.52–1.5 mm^2)
	P8134-30/ P8134-50	Souriau 12S with 3,0/5.0 m cable, open end

3.39 Power module 8 x power, tool side. Article: P1308

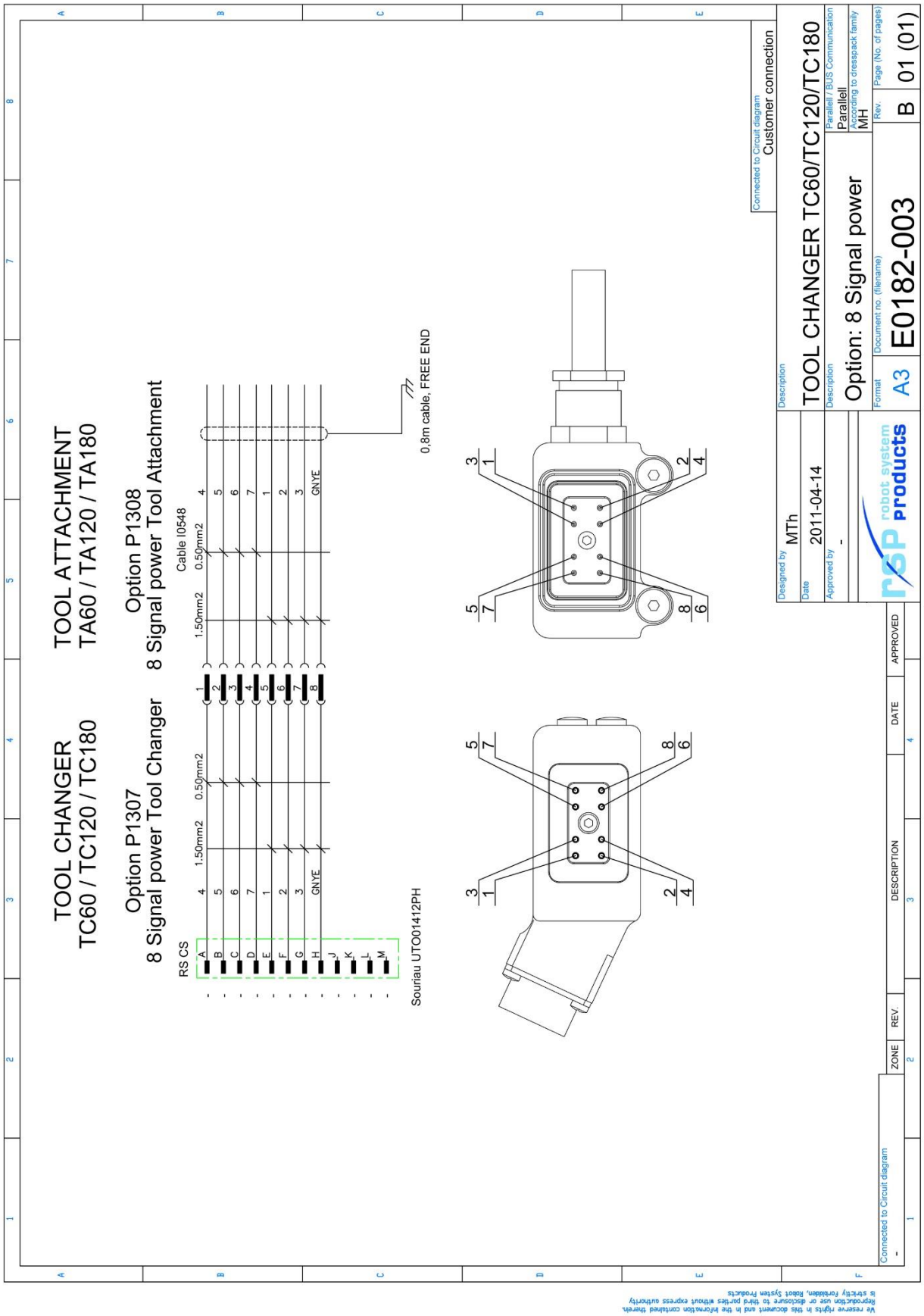


Power module P1308 transfers 8 power signals to the tool. To be mounted on the tool attachment and used together with module P1307 attached to the tool changer.

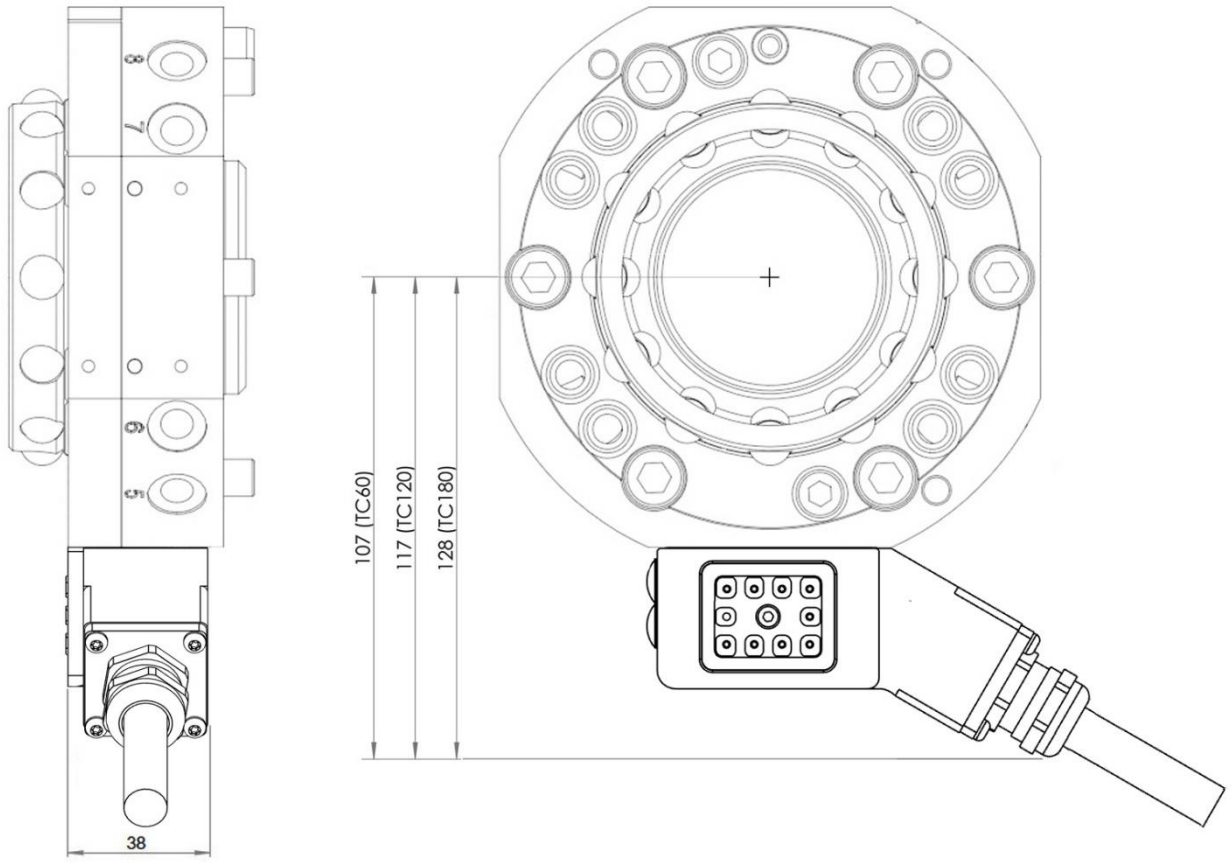
Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-003 (section 3.39.1)
	Connection, tool side	1.0 meter cable, open end

3.39.1 Circuit diagram E0182-003 for P1307 and P1308



3.40 Power module 8 x power, robot side. Article: P3312



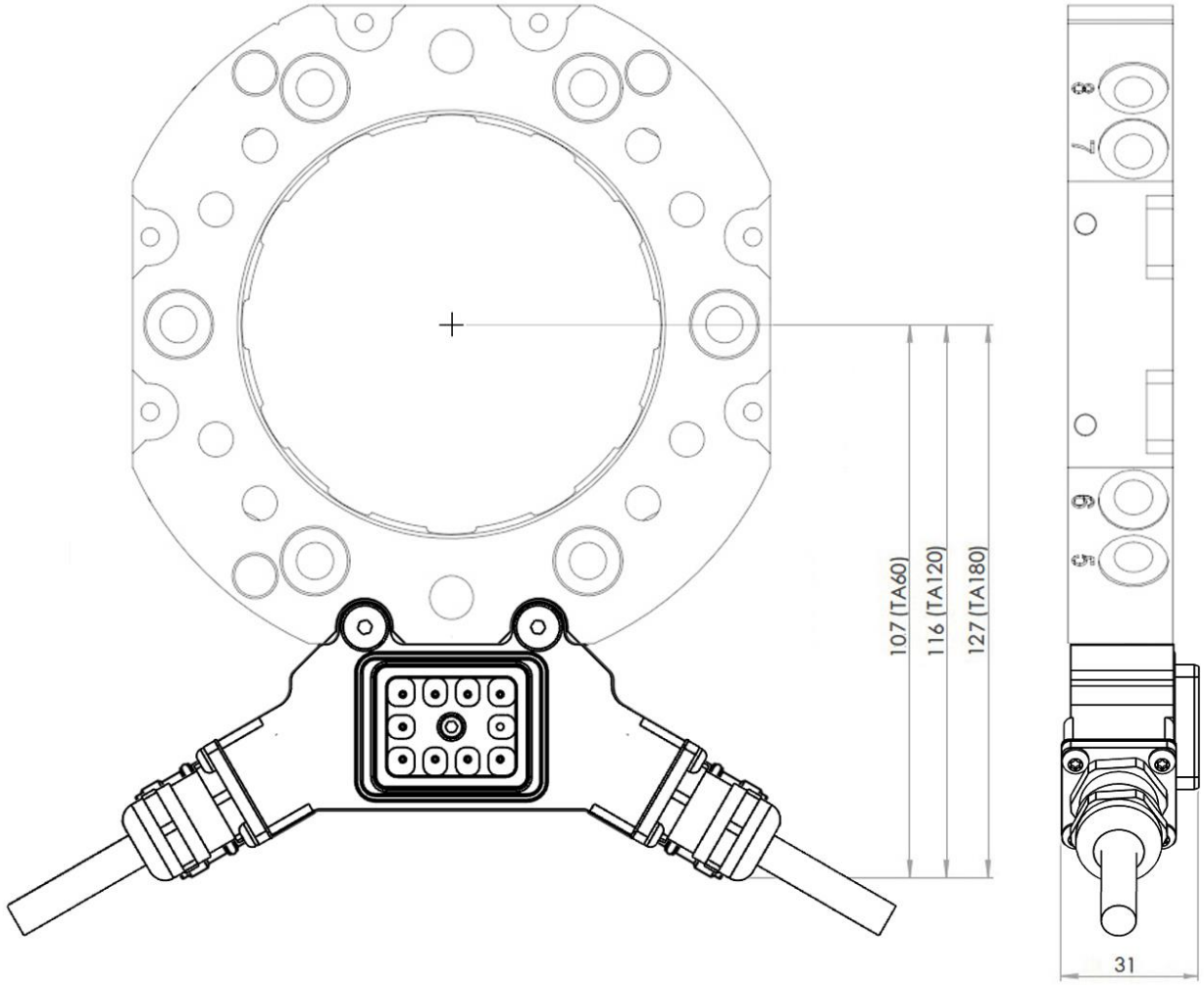
Power module P3312 transfers 8 power signals to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P3313 attached to the tool attachment. Available with three cable lengths.

NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P3312 and P3313.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-138 (section 3.41.1)
	Total signals	8 + PE
	Signals available at tool	4 x (15A, 300/500 VAC)
	Connection, robot side	Cable gland with cable, open end
		P3312-30: 3 meter cable
		P3312-80: 8 meter cable
		P3312-100: 10 meter cable

3.41 Power module 8 x power, tool side. Article: P3313

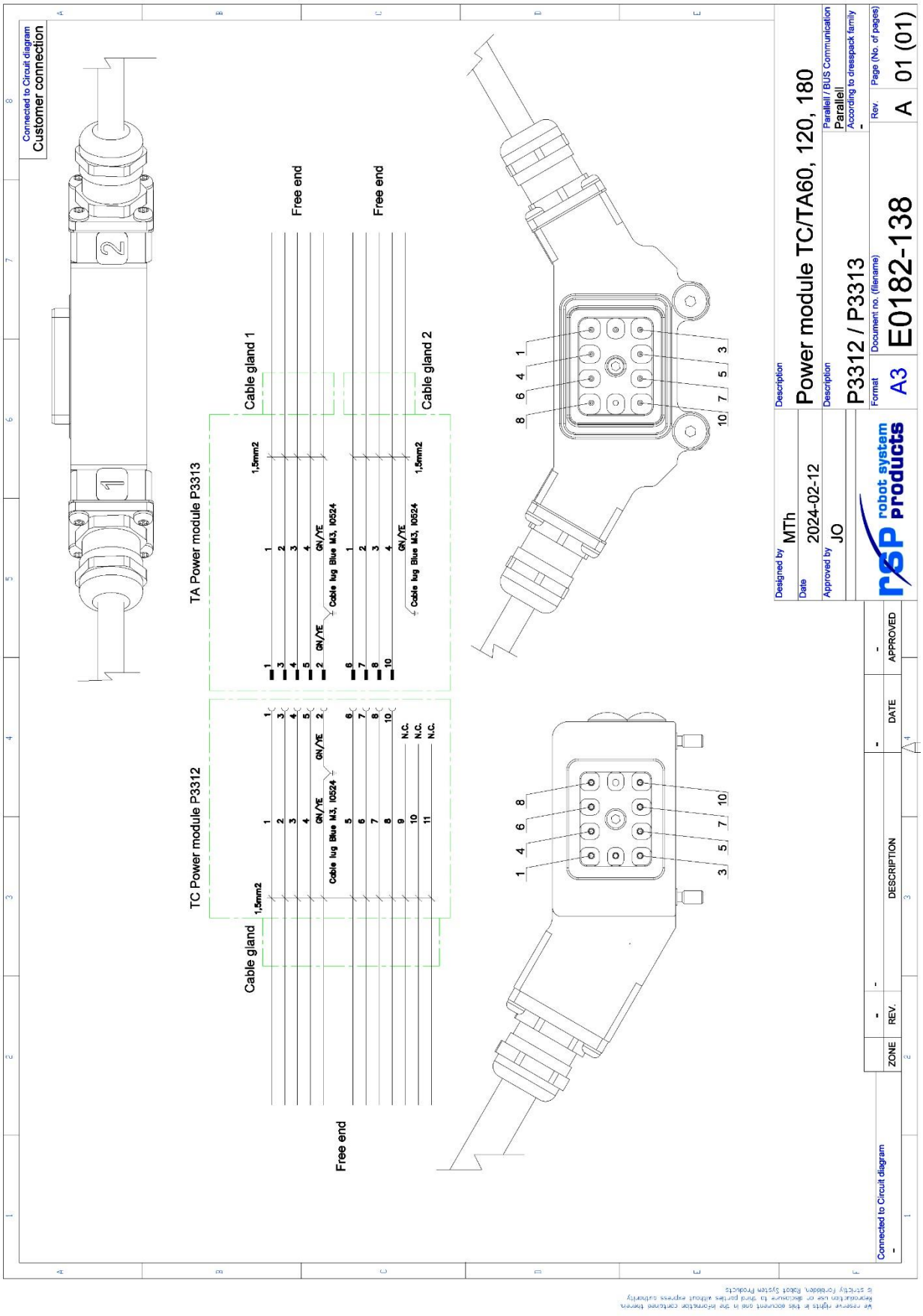


Power module P3313 transfers 8 power signals to the tool. To be mounted on the tool attachment and used together with module P3312 attached to the tool changer. Available with two cable lengths.

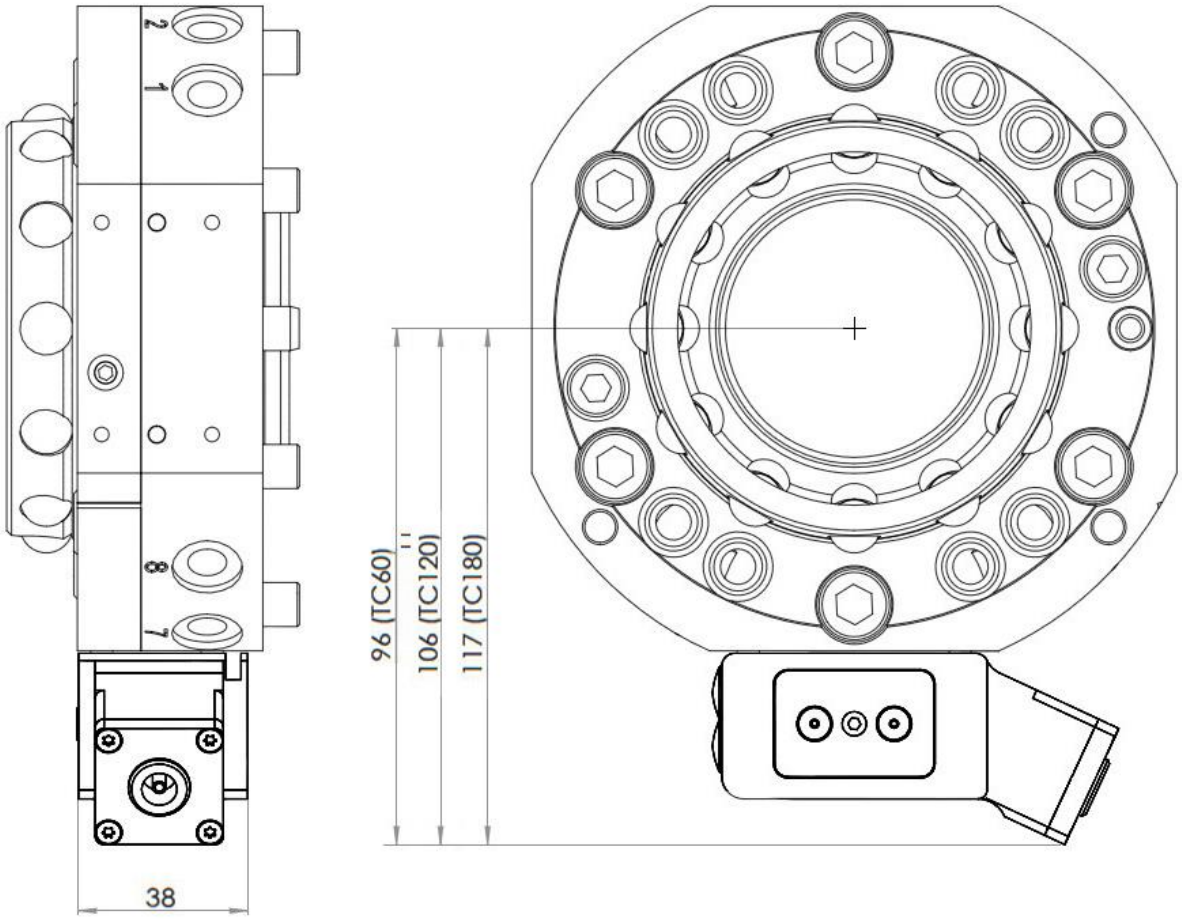
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-138 (section 3.41.1)
	Connection, tool side	2 Cable glands with cables, open end
		P3313-10: 1 meter cable
		P3313-80: 8 meter cable

3.41.1 Circuit diagram E0182-138 for P3312 and P3313



3.42 High voltage module, robot side. Article: P1322



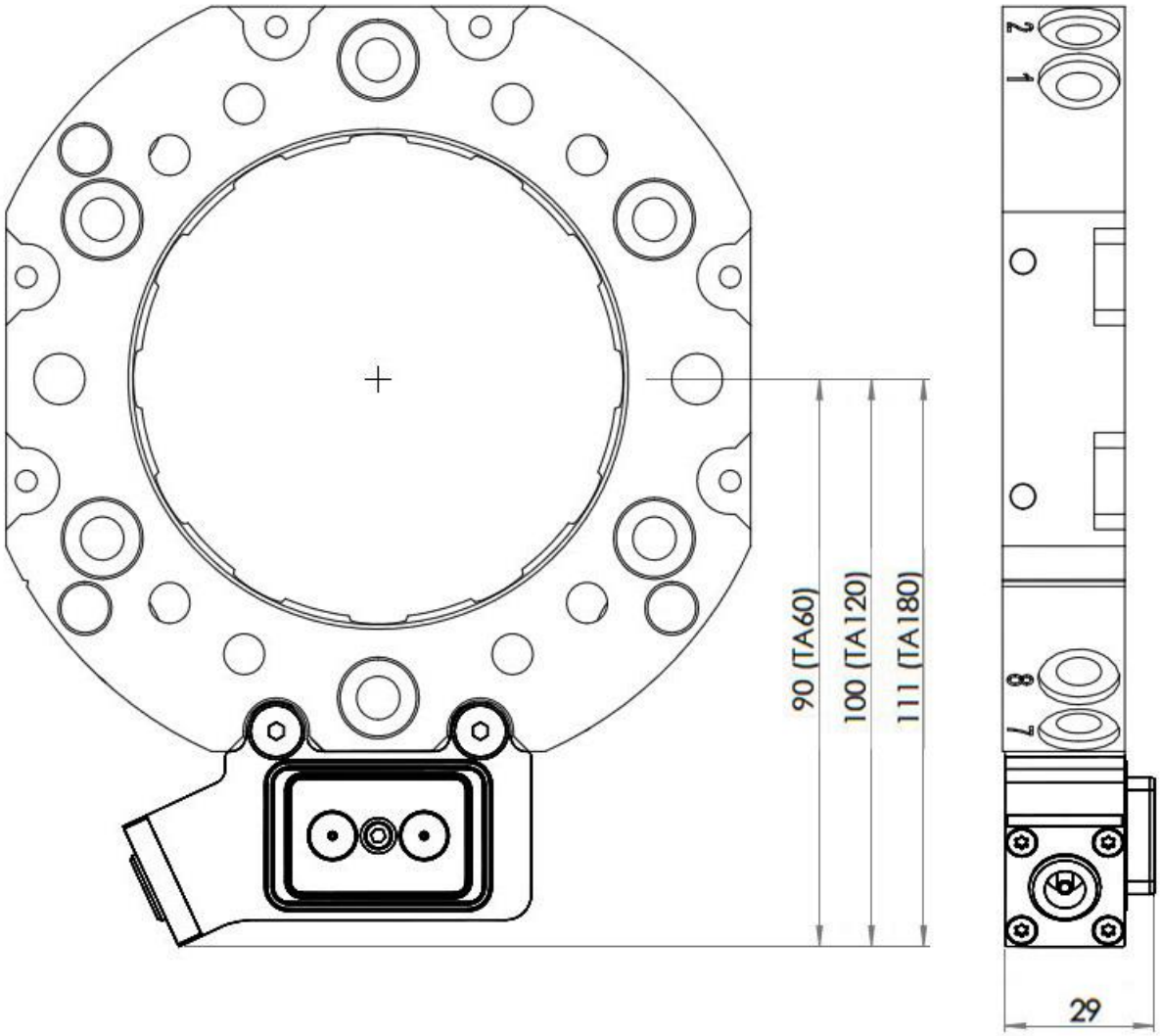
High voltage module P1322 transfers 1 high voltage power signals to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P1323 attached to the tool attachment.

NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1322 and P1323.

Technical data

Weight		0.15 kg
Electrical Interface	Circuit diagram	E0182-026 (section 3.43.1)
	Connection, robot side	Lemo ERA.1S.250.CTL
	Signals available at tool	1 x 12A (1000V AC or 1400V DC)

3.43 High voltage module, tool side. Article: P1323

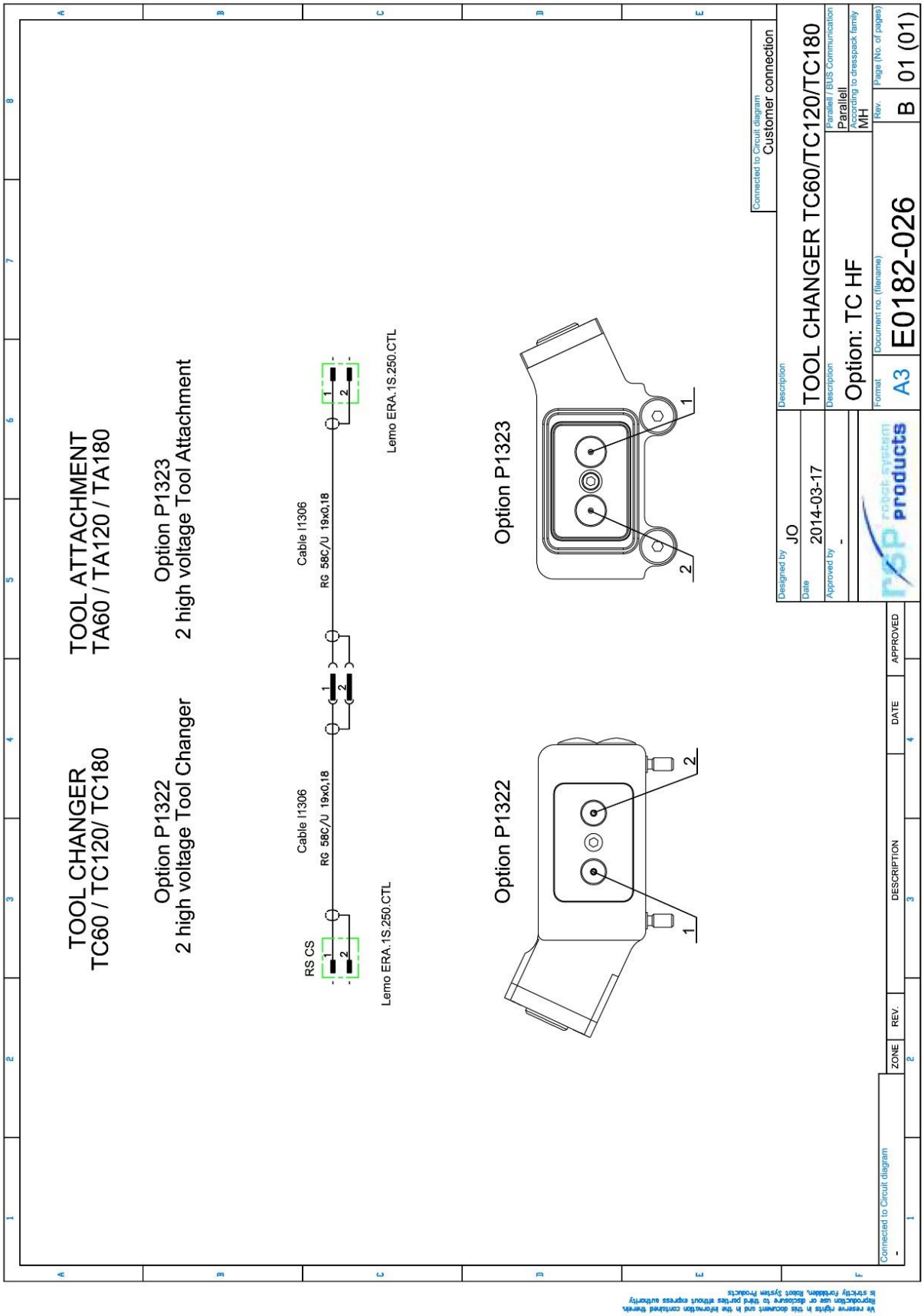


High voltage module P1323 transfers 1 high voltage power signals to the tool. To be mounted on the tool attachment and used together with module P1322 attached to the tool changer

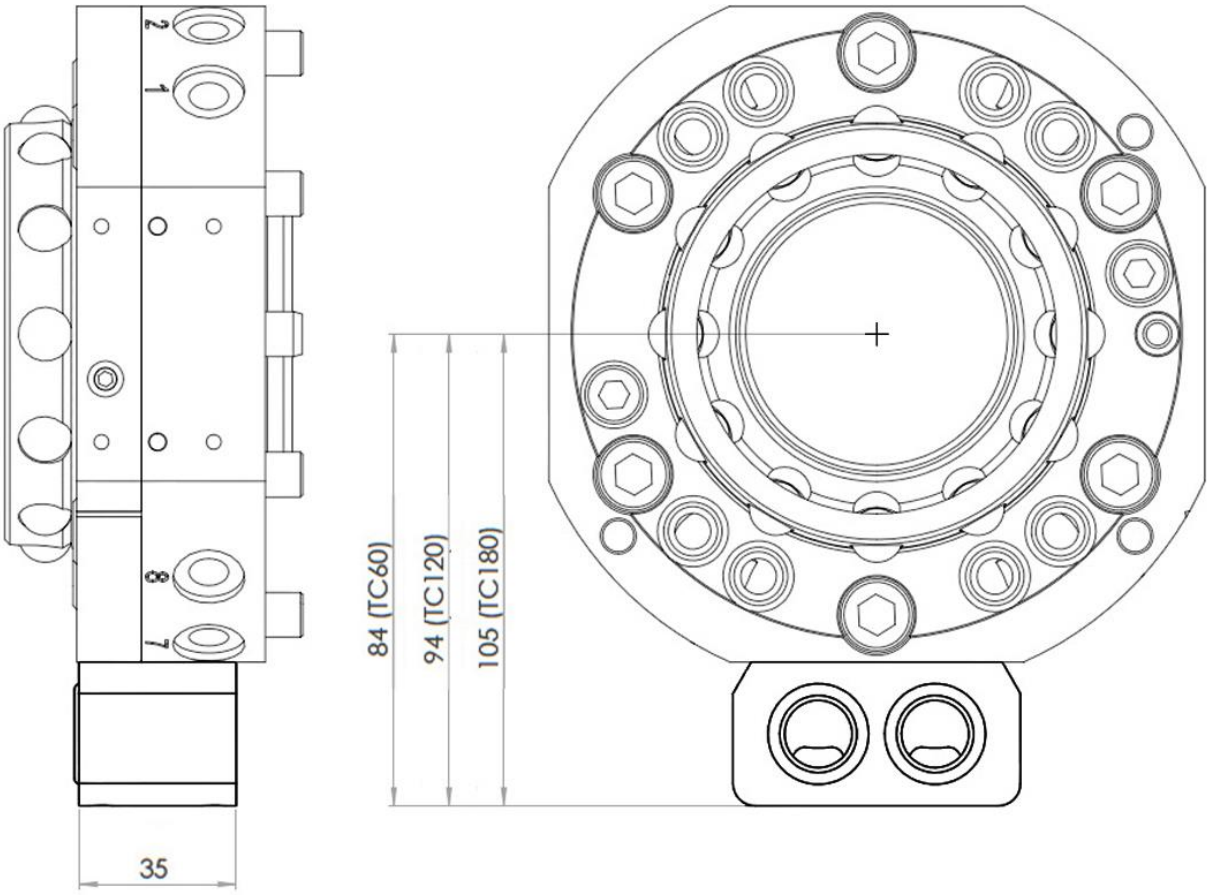
Technical data

Weight		0.15 kg
Electrical Interface	Circuit diagram	E0182-026 (section 3.43.1)
	Connection, tool side	Lemo ERA.1S.250.CTL

3.43.1 Circuit diagram E0182-026 for P1322 and P1323



3.44 Air module, 2 channels, robot side. Article: P1325

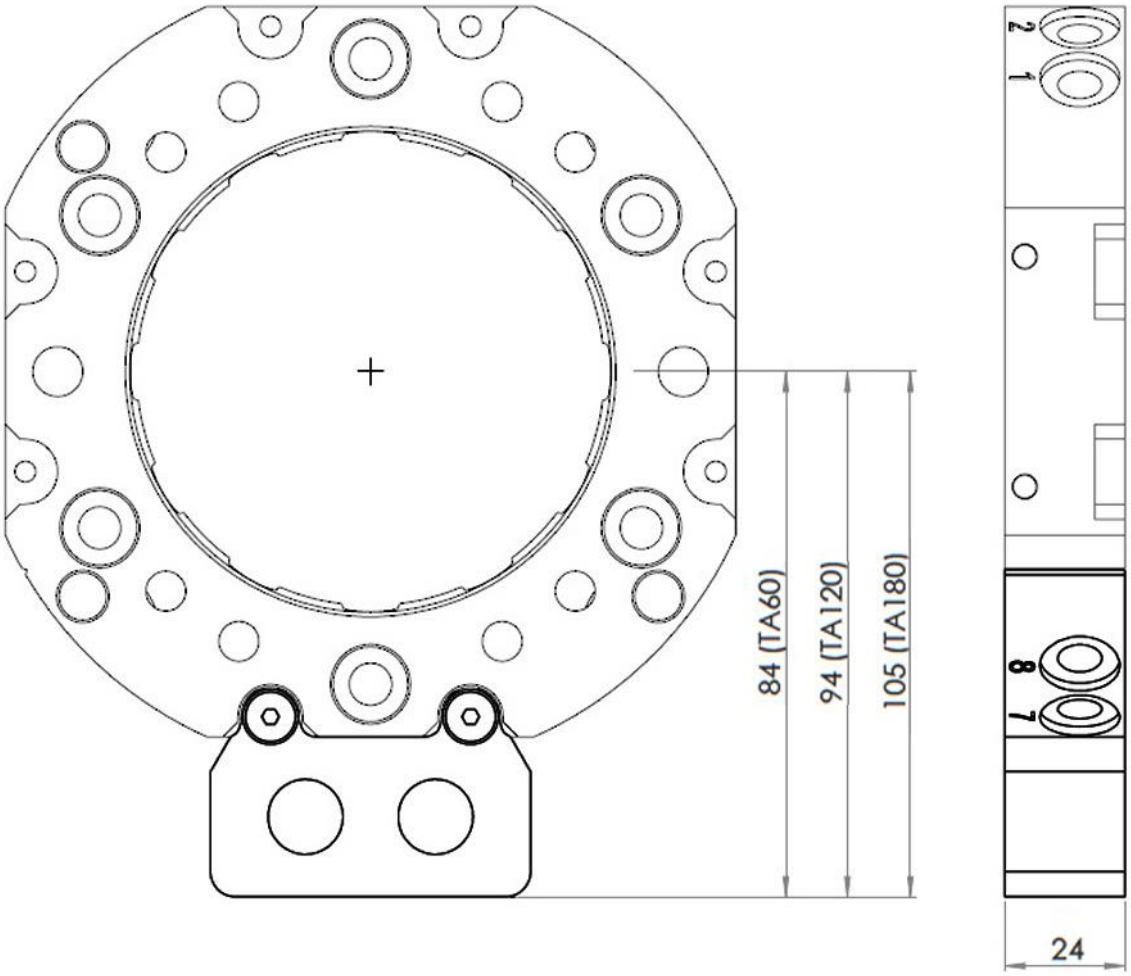


Air module P1325 transfers 2 pneumatic channels to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P1326 mounted on the tool attachment.

Technical data

Weight		0.15 kg
Air channels	User channels, robot side Air quality	2 X G 3/8” (2000 l/min, max 10 bar) Max 25µm particle content

3.45 Air module, 2 channels, tool side. Article: P1326

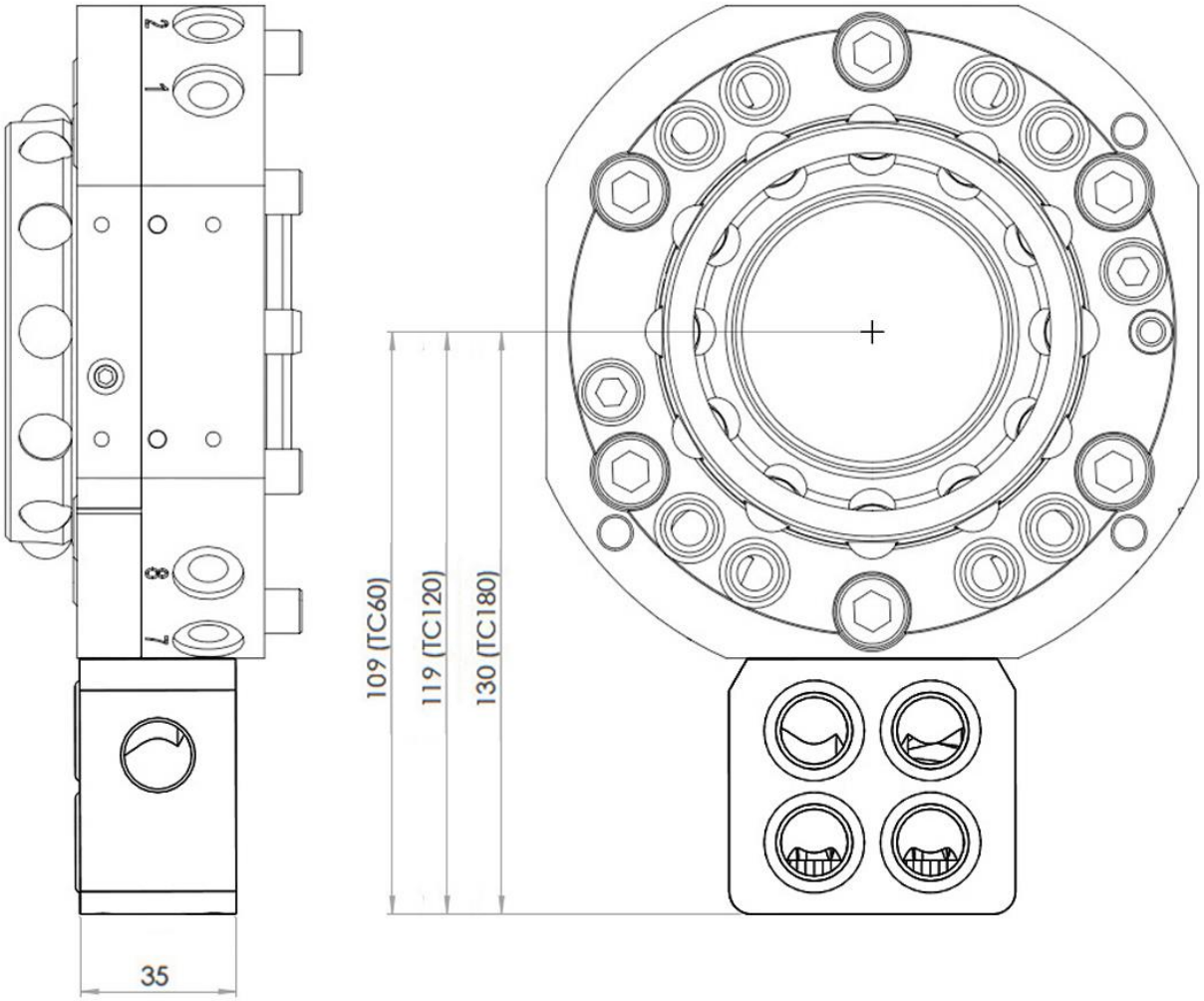


Air module P1326 transfers 2 pneumatic channels to the tool. To be mounted on the tool attachment and used together with module P1325 mounted on the tool changer.

Technical data

Weight		0.1 kg
Air channels	Connections, tool side	2 X G 3/8”

3.46 Air module, 4 channels, robot side. Article: P1325-4

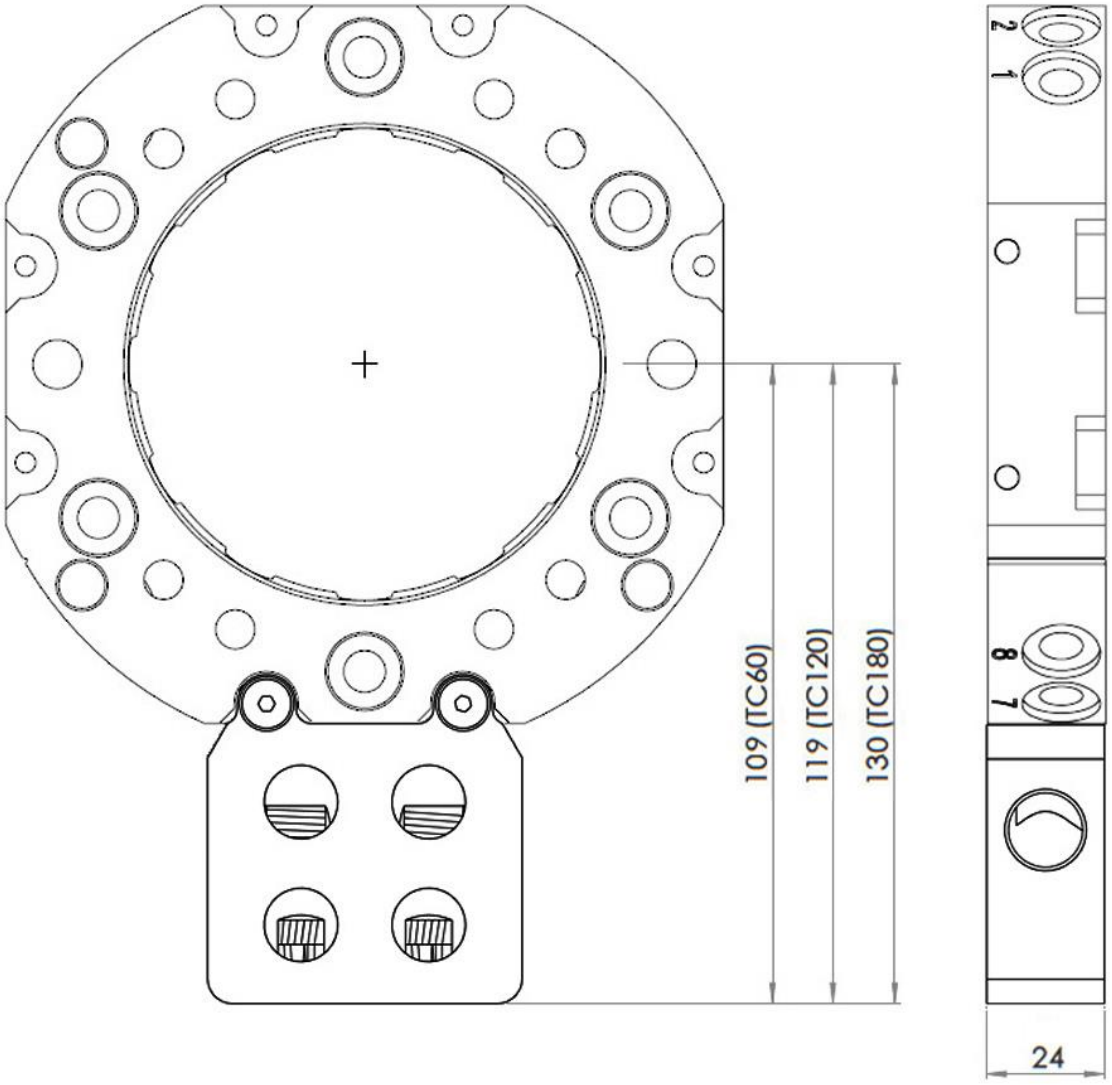


Air module P1325-4 transfers 4 pneumatic channels to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P1326-4 mounted on the tool attachment.

Technical data

Weight		0.2 kg
Air channels	User channels, robot side	4 X G 3/8” (2000 l/min, max 10 bar)
	Air quality	Max 25µm particle content

3.47 Air module, 4 channels, tool side. Article: P1326-4

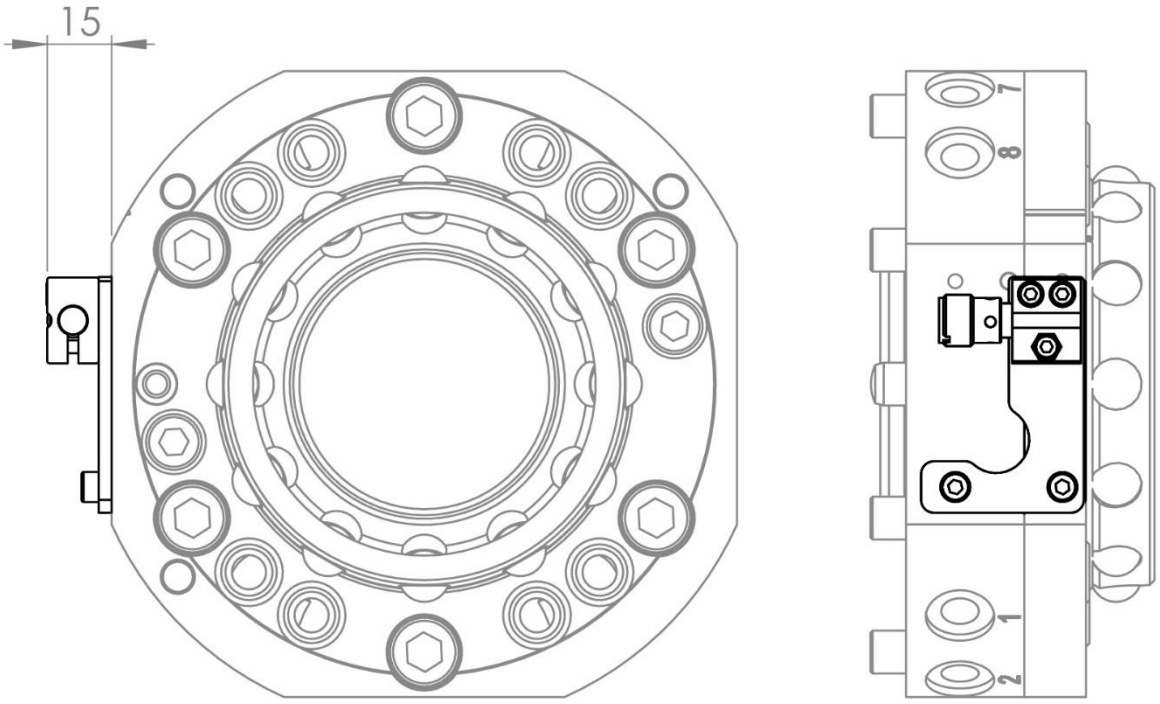


Air module P1326-4 transfers 4 pneumatic channels to the tool. To be mounted on the tool attachment and used together with module P1325-4 mounted on the tool changer.

Technical data

Weight		0.1 kg
Air channels	Connections, tool side	4 X G 3/8”

3.48 TA present sensor. Article: P1383

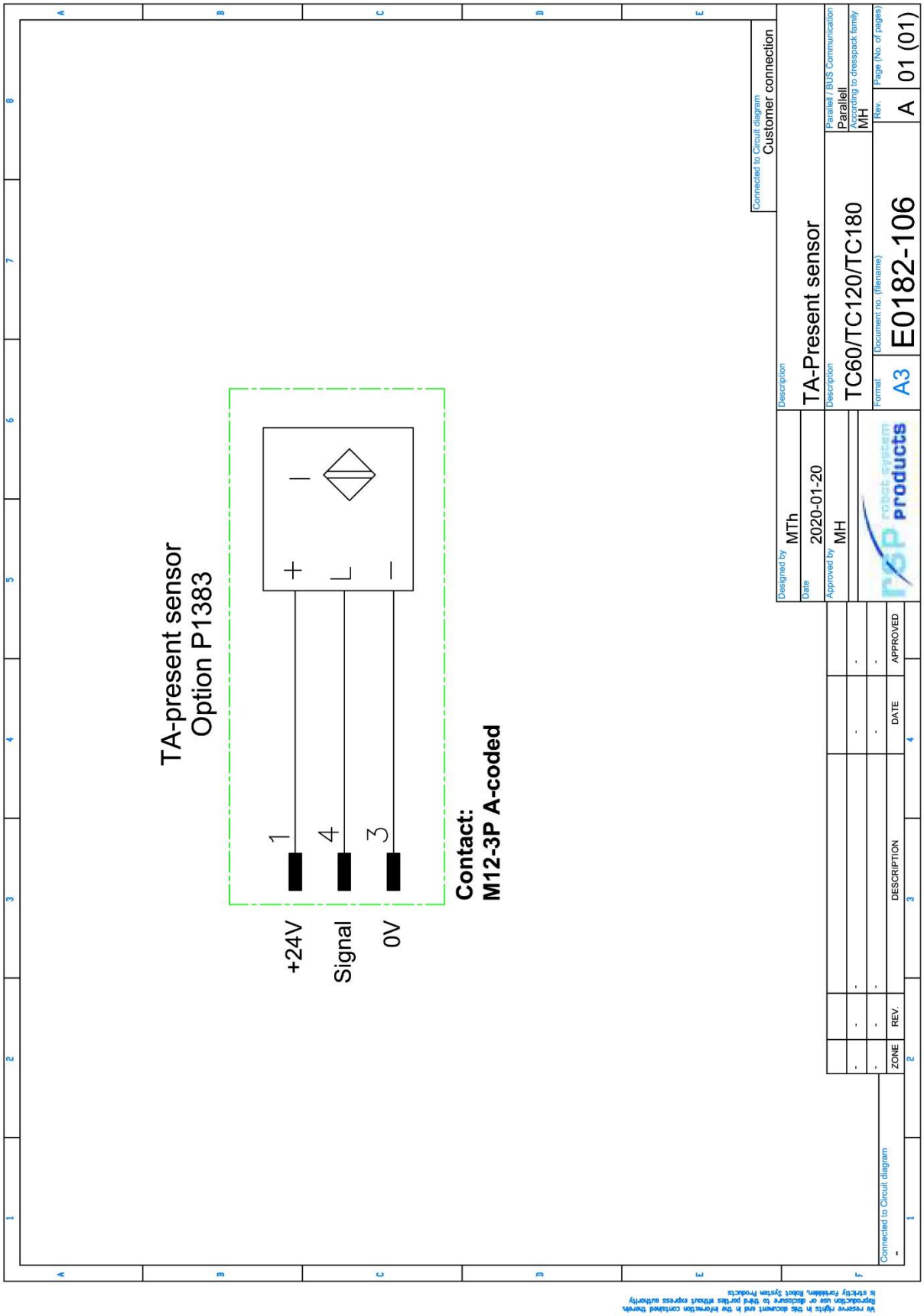


Inductive sensor, P1383, that gives +24V signal ”TA present” when tool attachment is present at tool changer. To be mounted at the tool changer and used together with TA present plate P1359.

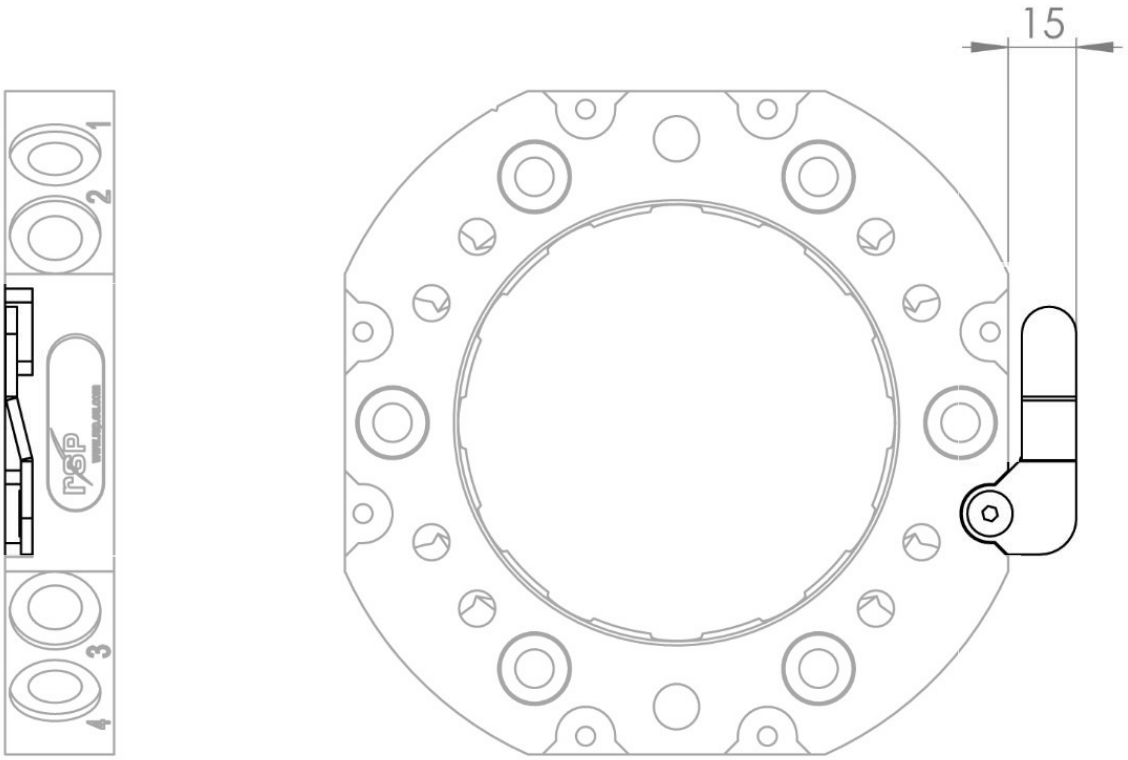
Technical data

Weight		0.04 kg
Electrical signals	Circuit diagram	E0182-106 (section 3.48.1)
	M12 3P, A-coded	24V, 0V, TA present

3.48.1 Circuit diagram for P1383



3.49 TA present plate. Article: P1359

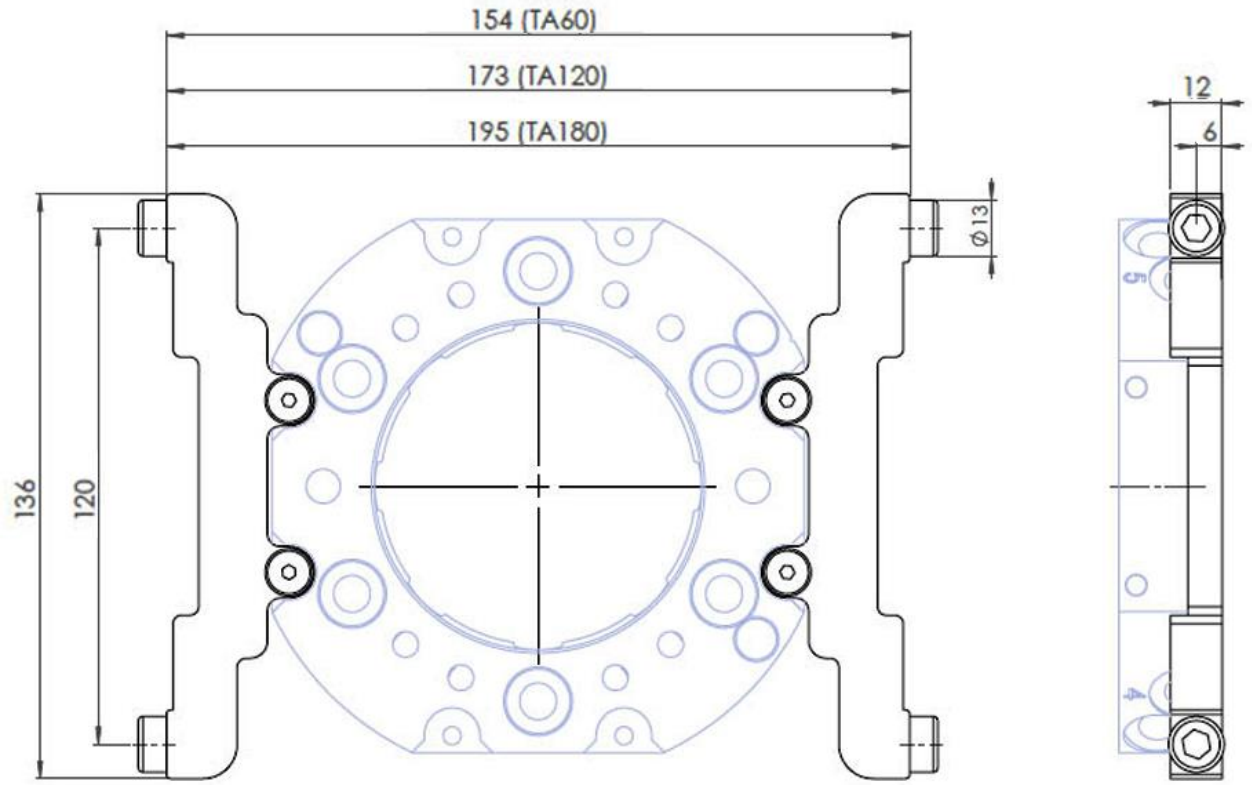


Passive sensor plate to be used together with TA present sensor P1383 mounted on tool changer.

Technical data

Weight	0.02 kg

3.50 Parking bracket kit. Article: P1313

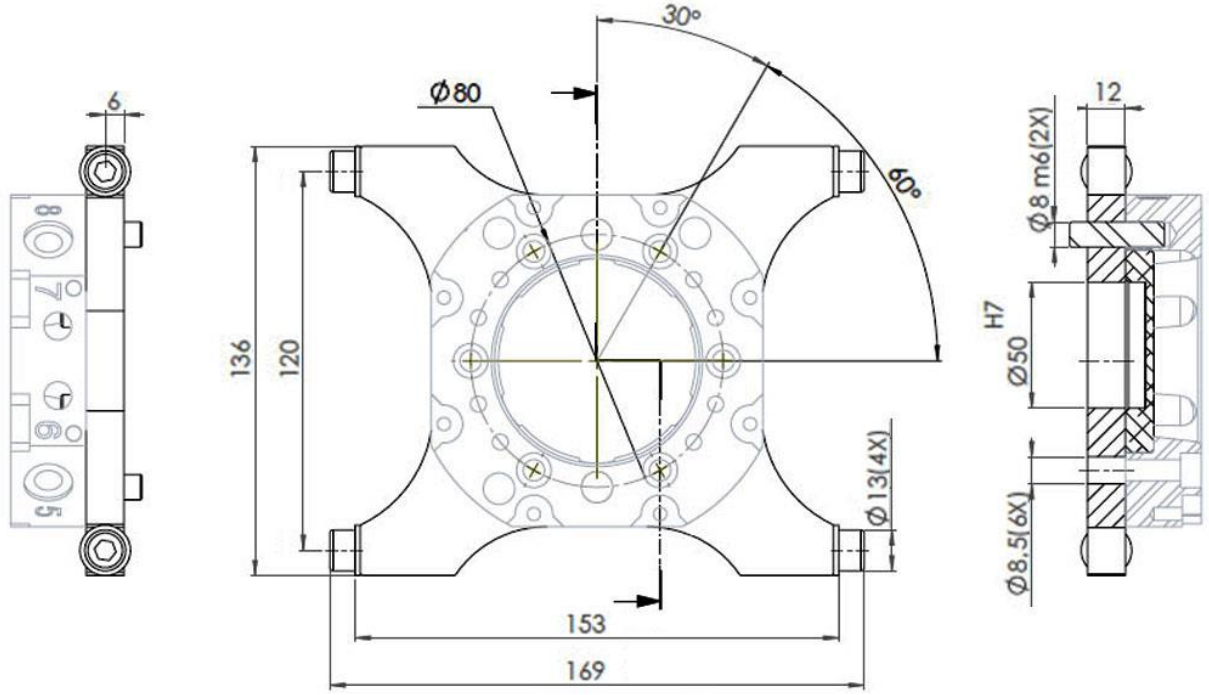


The parking bracket kit P1313 can be mounted on tool attachment TA60, TA120 or TA180 and gives together with tool stand kit P0423 a stable tool stand for easy tool changing. Can be mounted at two dedicated positions on the tool attachment.

Technical data

Weight		0.4 kg
Maximum load	Fz (static)	500 N
	Mx/My (dynamic)	300 Nm
	Mz (dynamic)	300 Nm

3.51 Parking bracket plate for TA60. Article: P1331



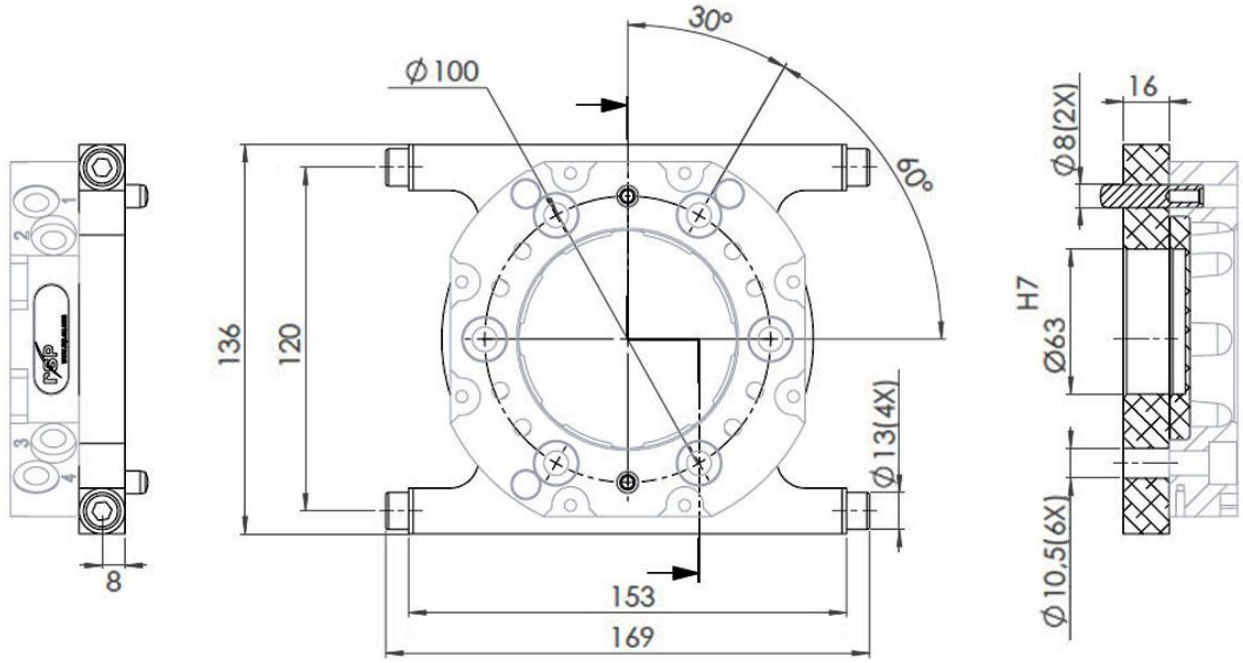
The parking bracket plate P1331 shall be mounted on tool attachment P1302 (TA60-8) and gives together with tool stand kit P0423 a stable tool stand for easy tool changing. Can be mounted at two different positions on the tool attachment.

NOTE!
Only for mounting on tool attachment TA60.

Technical data

Weight		0.2 kg
Bolt pattern		ISO 9409-1 80-6-M8
Maximum load	Fz (static)	600 N

3.52 Parking bracket plate for TA120. Article: P1405



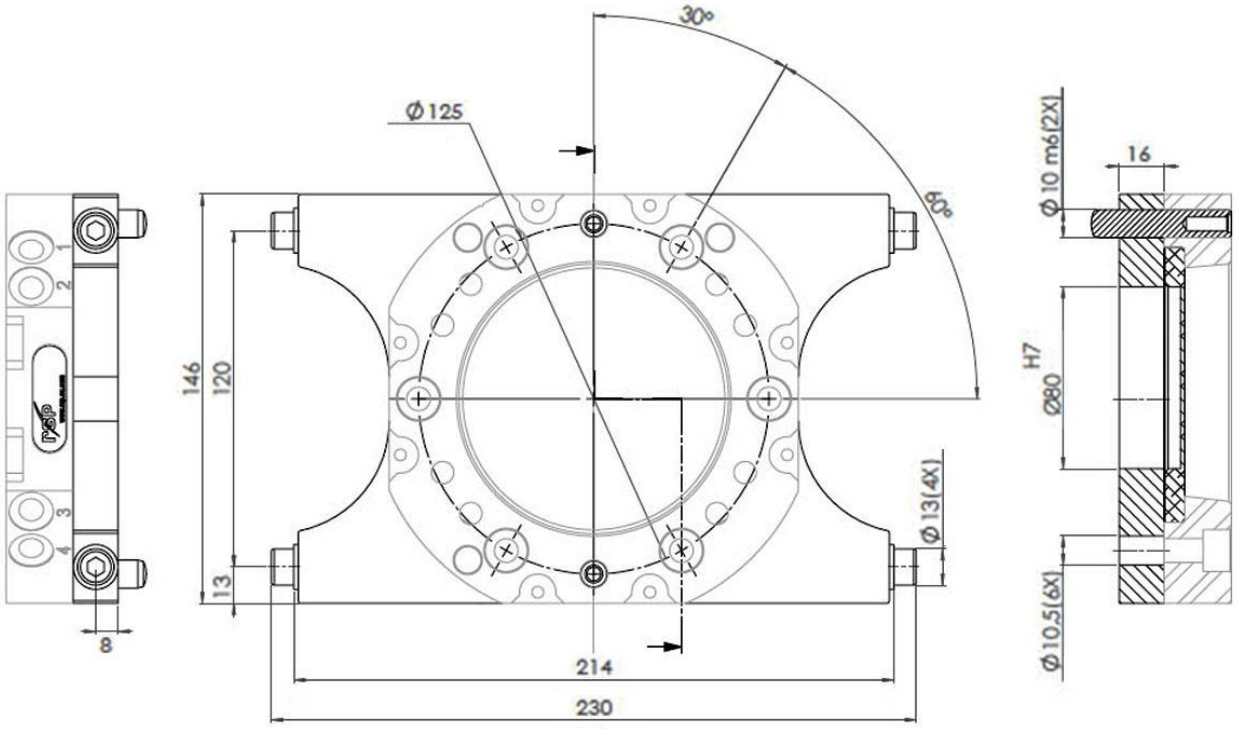
The parking bracket plate P1405 shall be mounted on tool attachment P1402 (TA120-8) and gives together with tool stand kit P0423 a stable tool stand for easy tool changing. Can be mounted at two different positions on the tool attachment.

NOTE!
Only for mounting on tool attachment TA120.

Technical data

Weight		0.7 kg
Bolt pattern		ISO 9409-1 100-6-M10
Maximum load	Fz (static)	1200 N

3.53 Parking bracket plate for TA180. Article: P1805



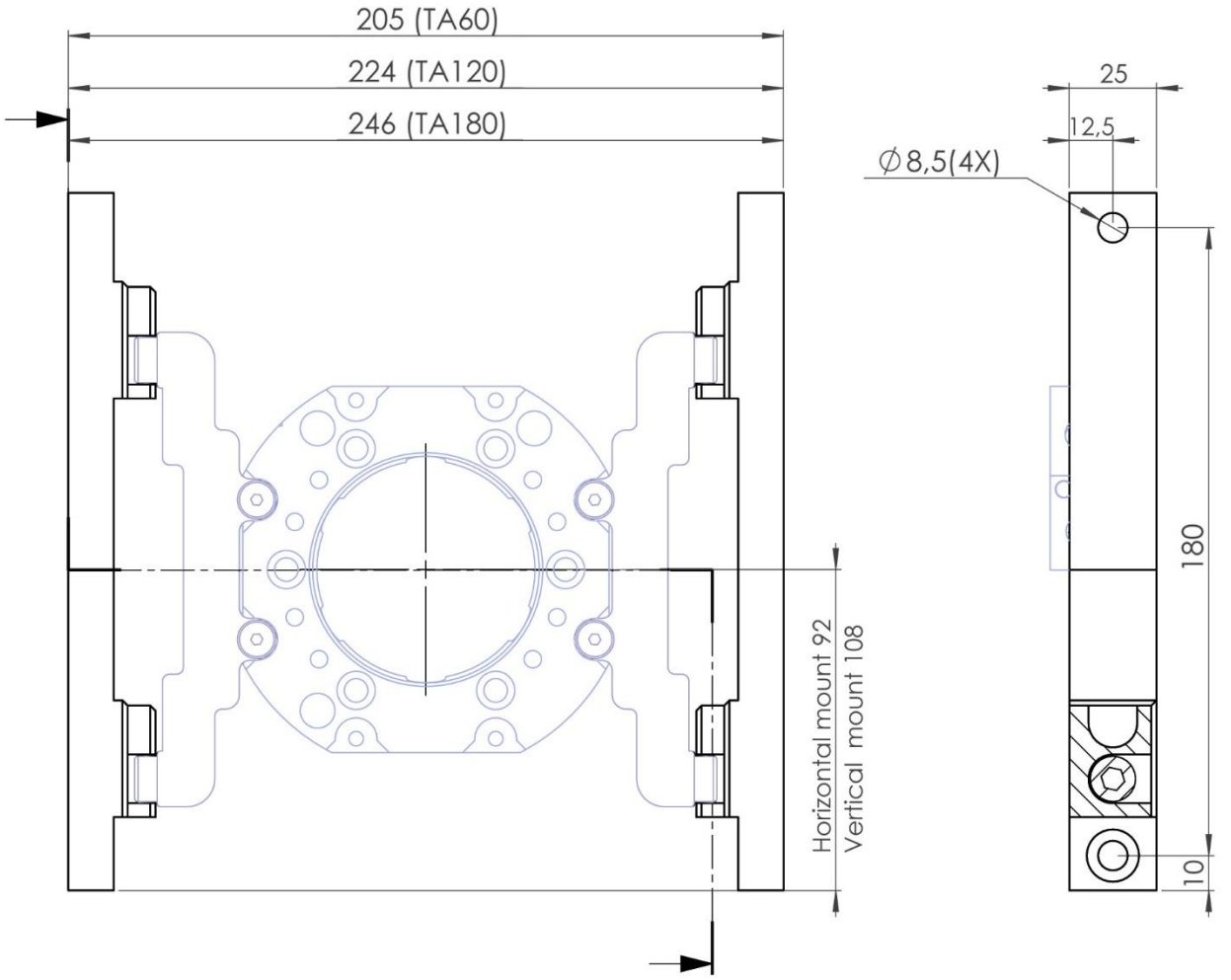
The parking bracket plate P1805 shall be mounted on tool attachment P1802 (TA180-8) and gives together with tool stand kit P0423 a stable tool stand for easy tool changing. Can be mounted at two different positions on the tool attachment.

NOTE!
Only for mounting on tool attachment TA180.

Technical data

Weight		1.8 kg
Bolt pattern		ISO 9409-1 125-6-M10
Maximum load	Fz (static)	1800 N

3.54 Tool stand kit. Article: P0423



This tool stand kit P0423, mounted on a stand, gives together with options P1313 (TA60, TA120, TA180), P1331 (TA60), P1405 (TA120) or P1805 (TA180) a stable tool stand for easy tool changing.

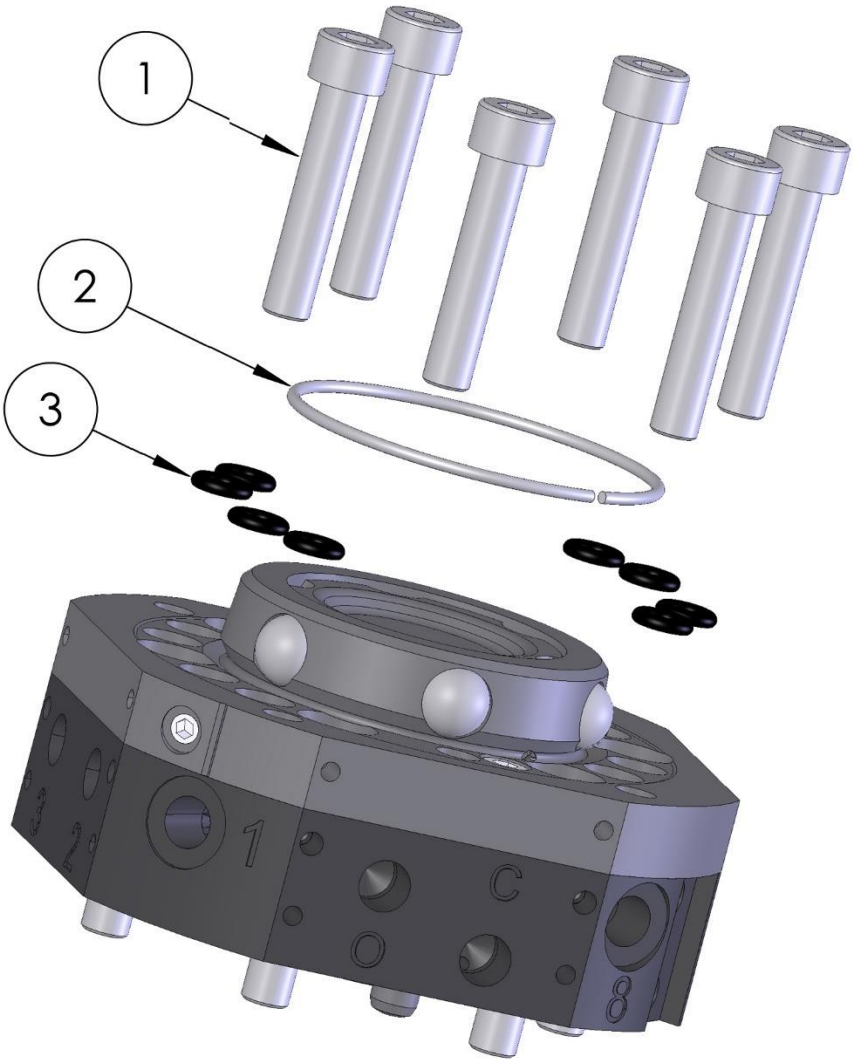
Technical data

Weight		0.7 kg
Maximum load	Fz (static)	1800 N

4 SPARE PARTS

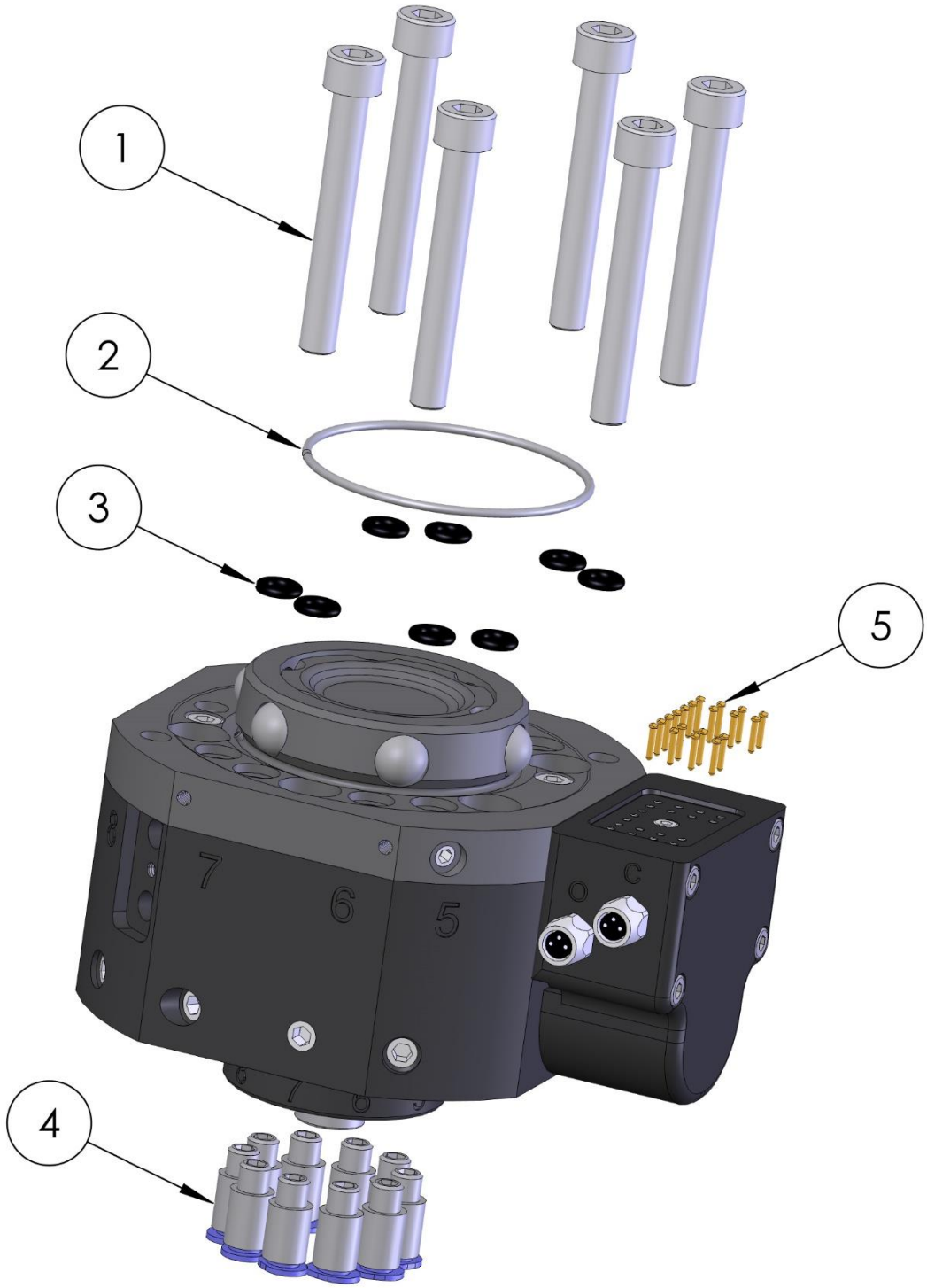
4.1 Tool changer

4.1.1 Part list for tool changer TC60, P1301A



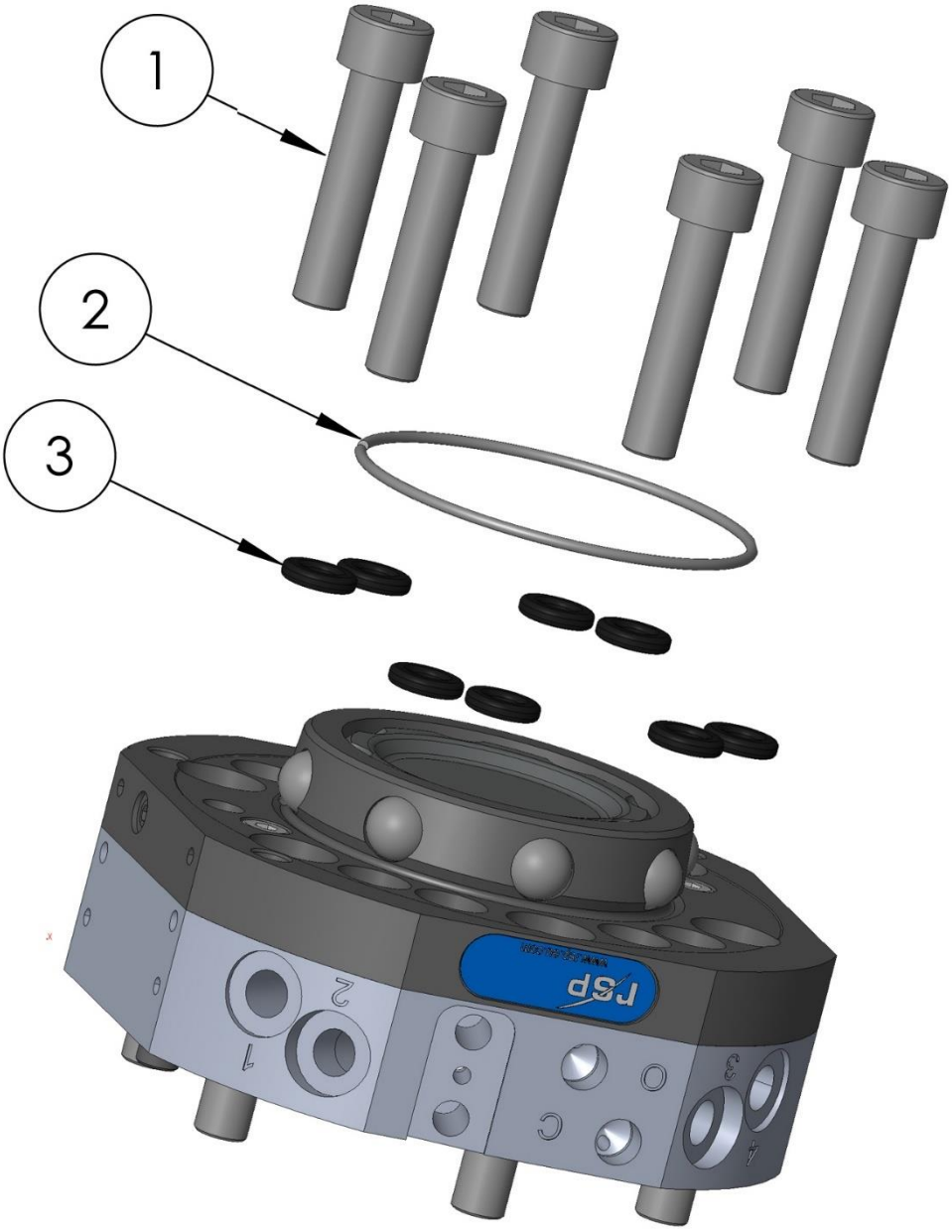
Item	Description	Part number	Wear part	Pcs
1	Screw, M8x40	21212519-459		6
2	Locking ring	I0758		1
3	Air sealing	I0760	X	8

4.1.2 Part list for tool changer TC60 ID, P1336 and P1337



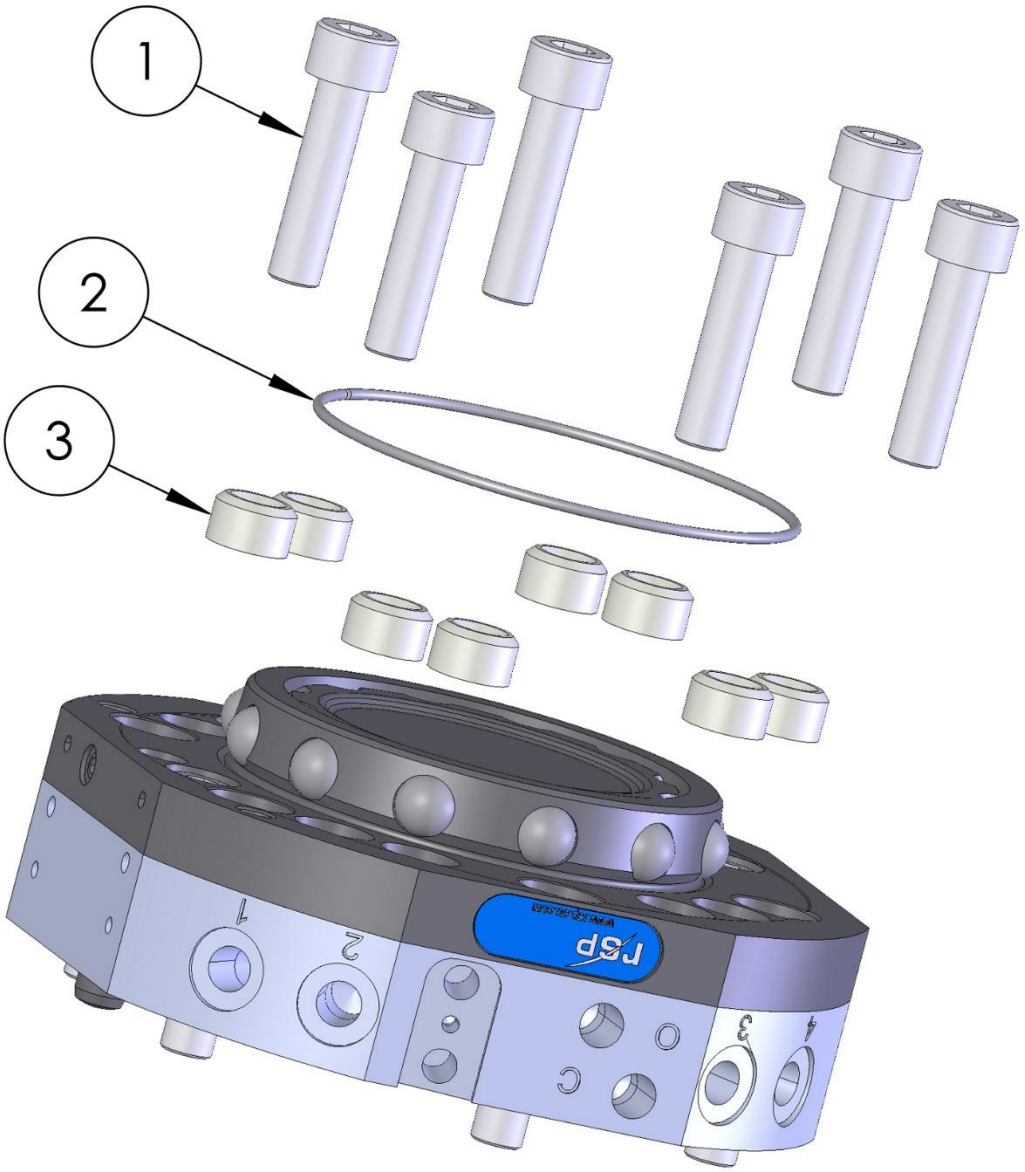
Item	Description	Part number	Wear part	Pcs
1	Screw, MC6S 8x60	21212519-463		6
2	Locking ring	I0758		1
3	Air sealing	I0760	X	8
4	Tube fittings	I0178		10
5	Spring loaded signal pin (P1337)	I0154	X	19

4.1.3 Part list for tool changer TC 120, P1401



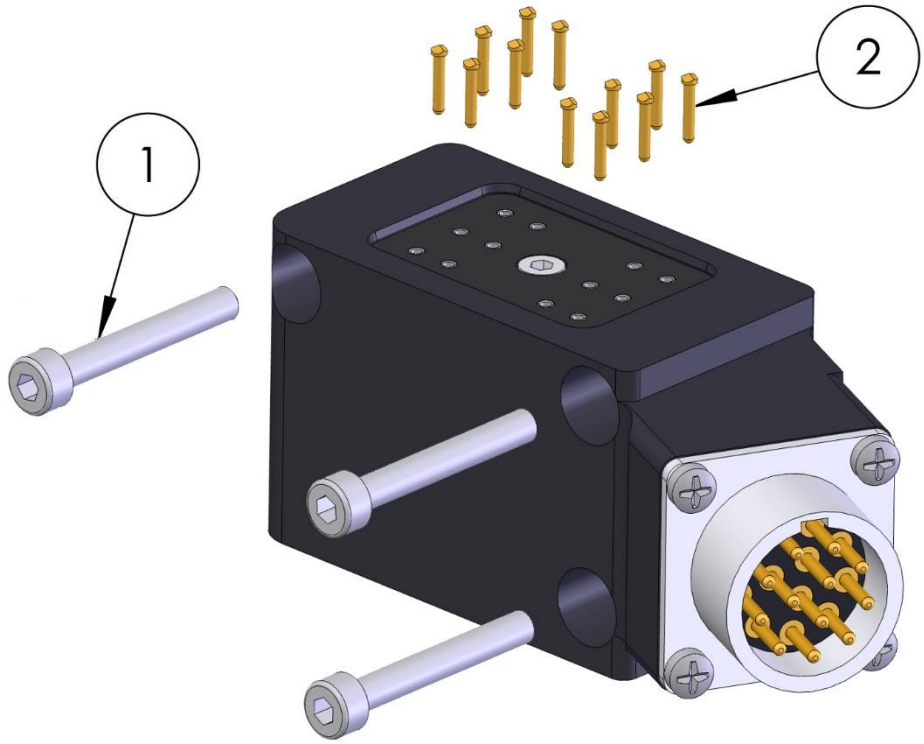
Item	Description	Part number	Wear part	Pcs
1	Screw, M10x45	9ADA183-54		6
2	Locking ring	I1037		1
3	Air sealing	I0230	X	8

4.1.4 Part list for tool changer TC180, P1801



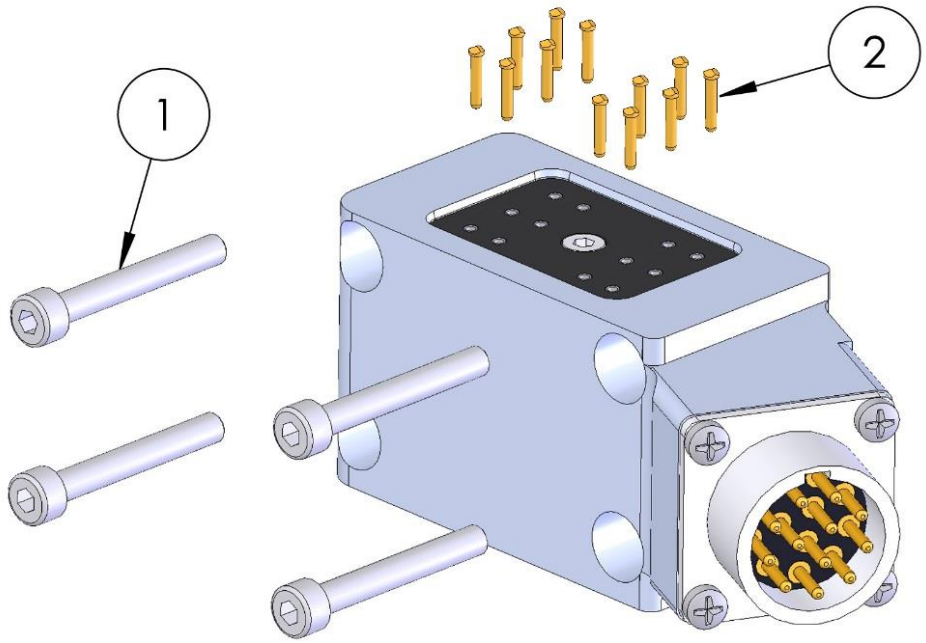
Item	Description	Part number	Wear part	Pcs
1	Screw, M10x40	21212519-499		6
2	Locking ring	I1093		1
3	Air sealing	63550006-462	X	8

4.1.5 Part list for signal modules P1305, P1371, P1311, P1338, P1344, P1328, P1340 and P1346



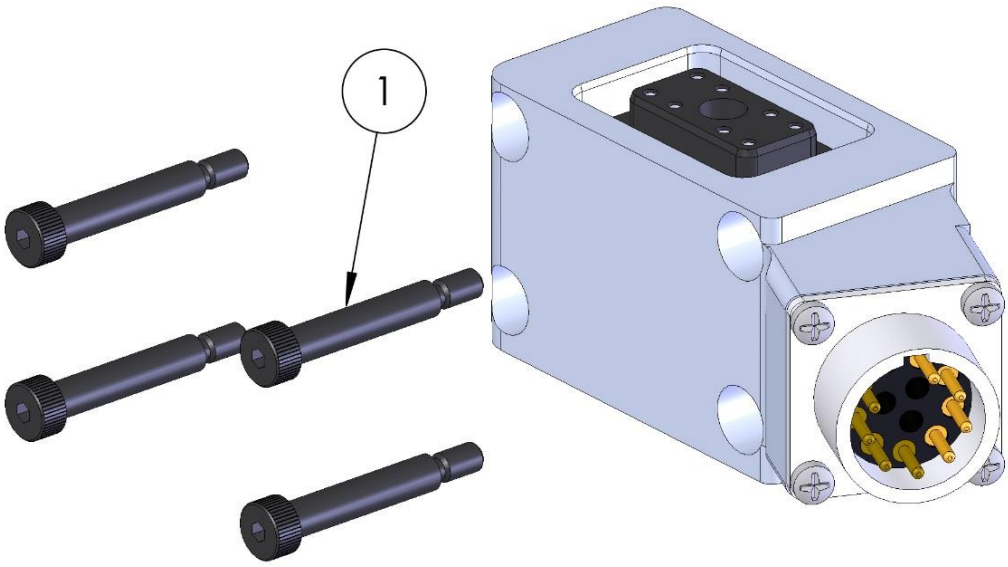
Item	Description	Part number	Wear part	Pcs
1	Fastening screw, M4x30	21212519-299		3
1	Fastening screw, M4x35 (P1338 only)	21212519-301		3
2	Spring loaded signal pin (P1305)	I0154	X	12
2	Spring loaded signal pin (P1371)	I0154	X	10
2	Spring loaded signal pin (P1311)	I0154	X	17
2	Spring loaded signal pin (P1338)	I0154	X	30
2	Spring loaded signal pin (P1344 and P1328)	I0154	X	6
2	Spring loaded signal pin (P1340)	I0154	X	9
2	Spring loaded signal pin (P1346)	I0154	X	5

4.1.6 Part list for signal modules P1399 and P1381



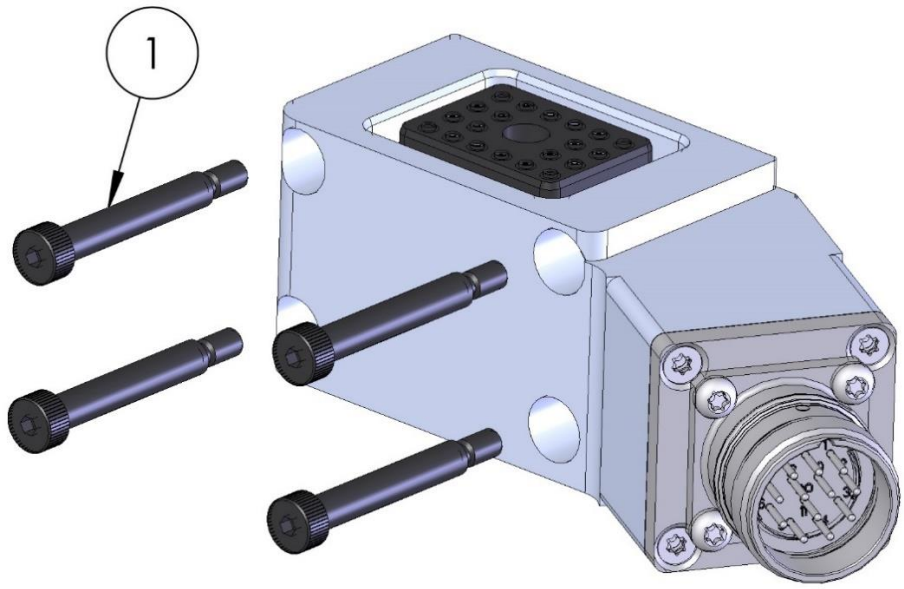
Item	Description	Part number	Wear part	Pcs
1	Fastening screw, M4x30	21212519-299		4
2	Spring loaded signal pin (P1399)	I0154	X	9
2	Spring loaded signal pin (P1381)	I0154	X	12

4.1.7 Part list for signal modules P1307 and P1322



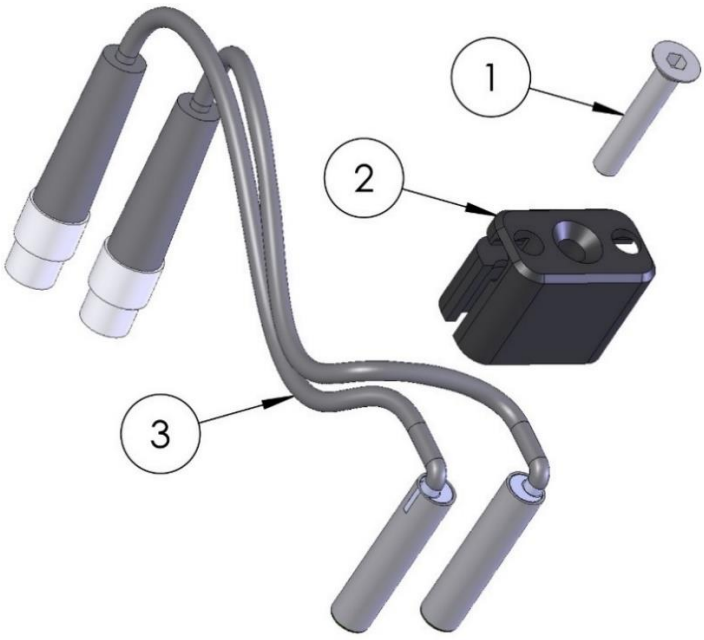
Item	Description	Part number	Wear part	Pcs
1	Shoulder screws (P1307)	H 5X25 (M4)		3
1	Shoulder screws (P1322)	H 5X25 (M4)		4

4.1.8 Part list for signal modules P1354, P1356, P1368, P1375, P3312 and P3316



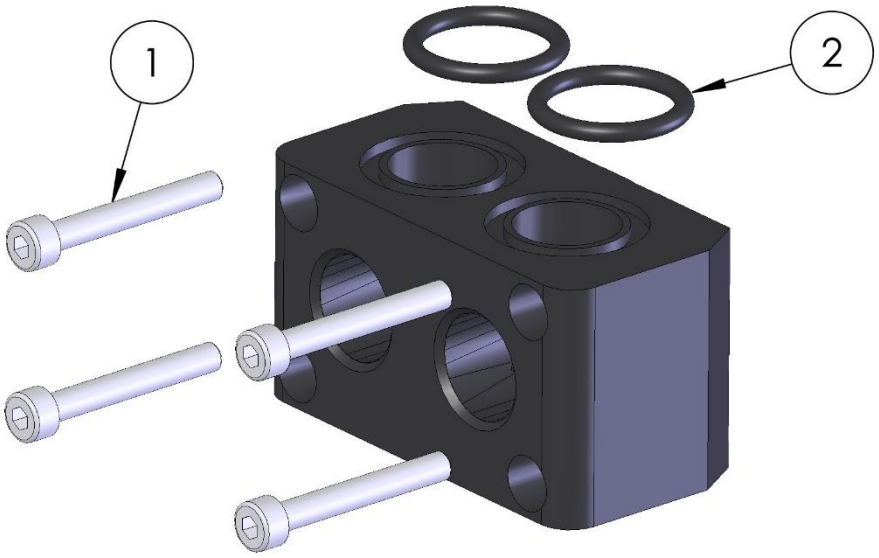
Item	Description	Part number	Wear part	Pcs
1	Shoulder screws (P1354 and P1375)	H 5x30 (M4)		3
1	Shoulder screws (P1356, P1368, P3312 and P3316)	H 5x30 (M4)		4

4.1.9 Part list for TC Opened/Closed sensors, P1324



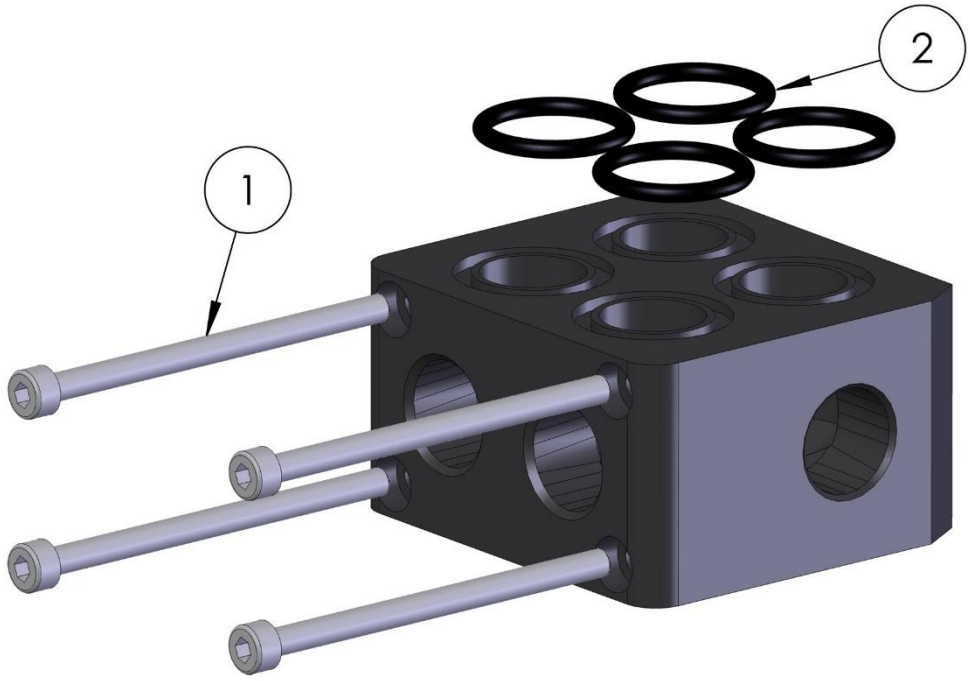
Item	Description	Part number	Wear part	Pcs
1	Fastening screw, M4x25	MF6S 4x25		1
2	Sensor bracket	P0199-162		1
3	Magnet sensor	I1144		2

4.1.10 Part list for air module, P1325



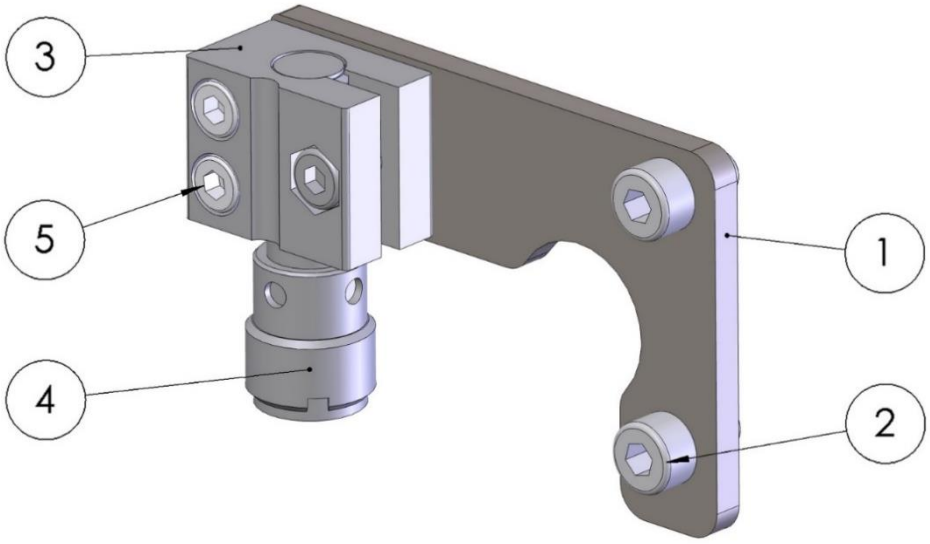
Item	Description	Part number	Wear part	Pcs
1	Fastening screw, M4x30	21212519-299		4
2	O-ring	I0115	X	2

4.1.11 Part list for air module, P1325-4



Item	Description	Part number	Wear part	Pcs
1	Fastening screw, M4x60	9ADA183-080		4
2	O-ring	I0115	X	4

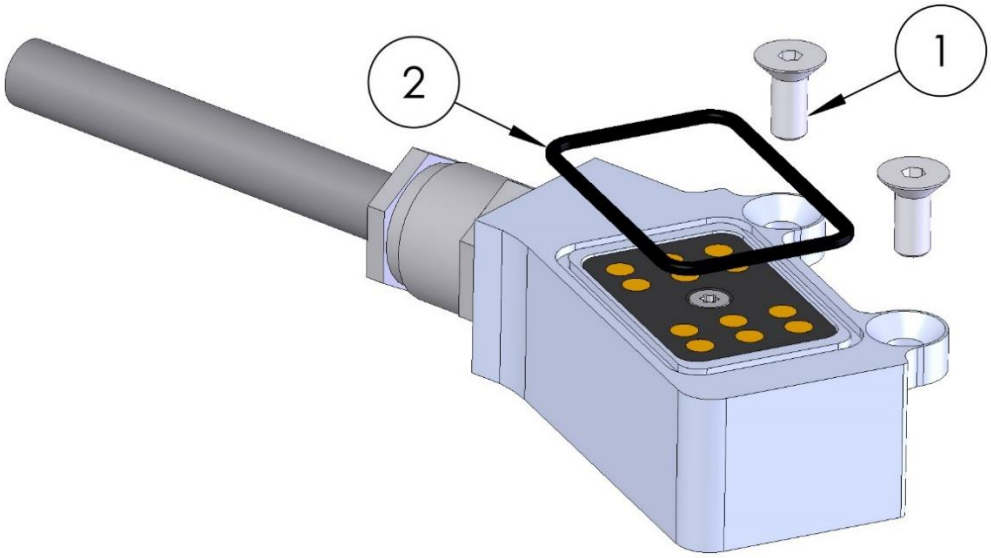
4.1.12 Part list for TA present sensor, P1383



Item	Description	Part number	Wear part	Pcs
1	TA present sensor bracket	P0199-240		1
2	Screw, M4x8	21212519-287		2
3	Sensor clamp, Ø8 mm	I1345		1
4	Inductive sensor, Ø8 mm	I1344		1
5	Screw, M3x12	21212519-226		2

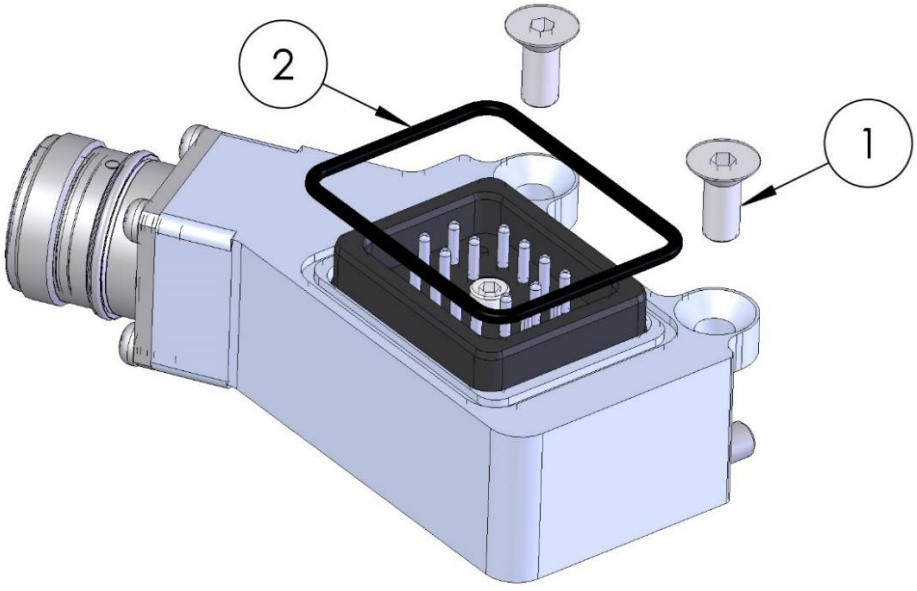
4.2 Tool attachment

4.2.1 Part list for signal modules P1306, P1370, P1312, P1332, P1345, P3301, P3308, P3315, P1382, P1329, P1341, P1347, P1323 and P1308



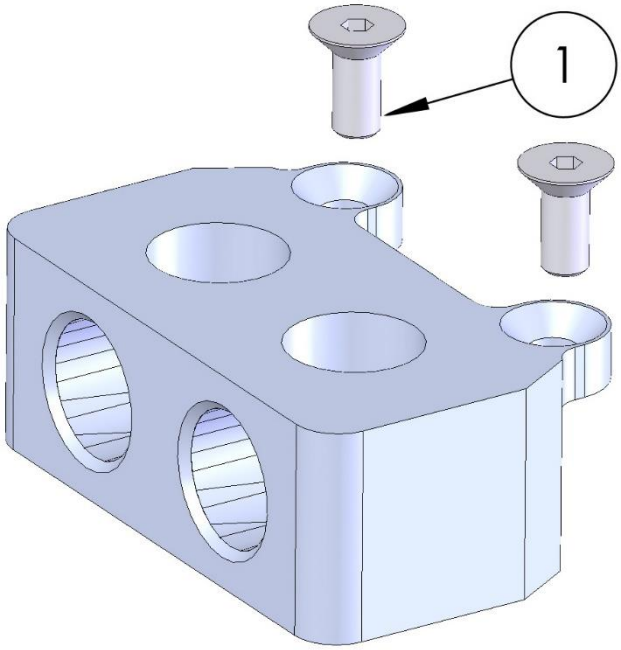
Item	Description	Part number	Wear part	Pcs
1	Fastening screw.M5x12	21212711-327		2
2	O-ring	I1469	X	1

4.2.2 Part list for signal modules P1355, P1339, P1357, P1369, P1376, P3313 and P3317



Item	Description	Part number	Wear part	Pcs
1	Fastening screw.M5x12	21212711-327		2
2	O-ring	I1468	X	1

4.2.4 Part list for air module P1326 and P1326-4



Item	Description	Part number	Wear part	Pcs
1	Fastening screw.M5x12	21212711-327		2