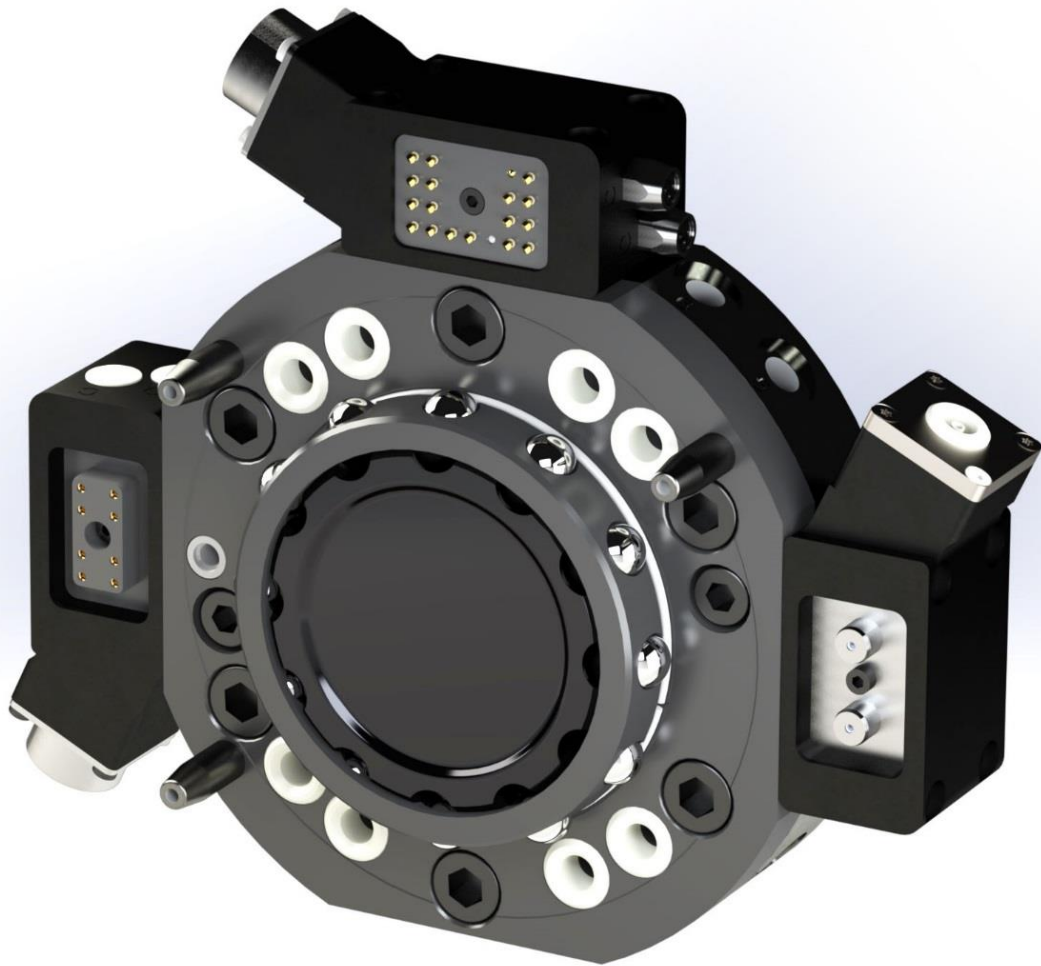


Technical Description

Options for TC60, TC120, TC180

M0641-1

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



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1 INTRODUCTION

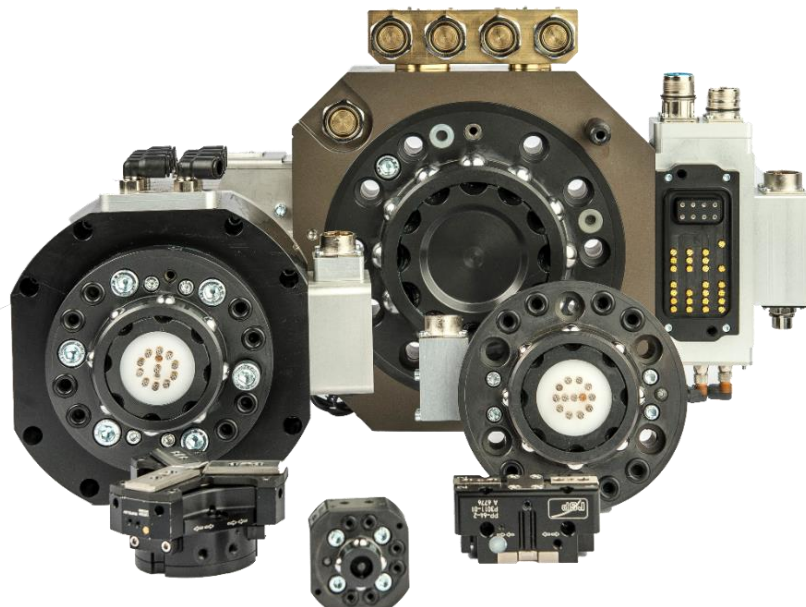
Robot System Products is a front-rank provider of peripheral products for high performance robot applications. We provide complete system solutions for your robot installations, aiming to improve your productivity with the most reliable and cost-effective tooling on the market. Continuously we explore 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
- CoboShift
- 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. The automatic and manual CoboShift tool changers are dedicated for collaborative robots. 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: robotssystemproducts.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 *Product Description*, (M0641-1) contains product information, drawings, technical data, electrical and pneumatic diagrams and lists of spare parts for modules to tool changers of the Modular series, primarily TC60, TC120 and TC 180 – some can also be used on TC20 with an adapter. The tool changers and tool attachments are described in *Product Description M0640-1*. In the document *Installation and Maintenance M0627-1* mounting, installation and replacement of equipment is described together with procedures for inspection, cleaning and lubrication 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.

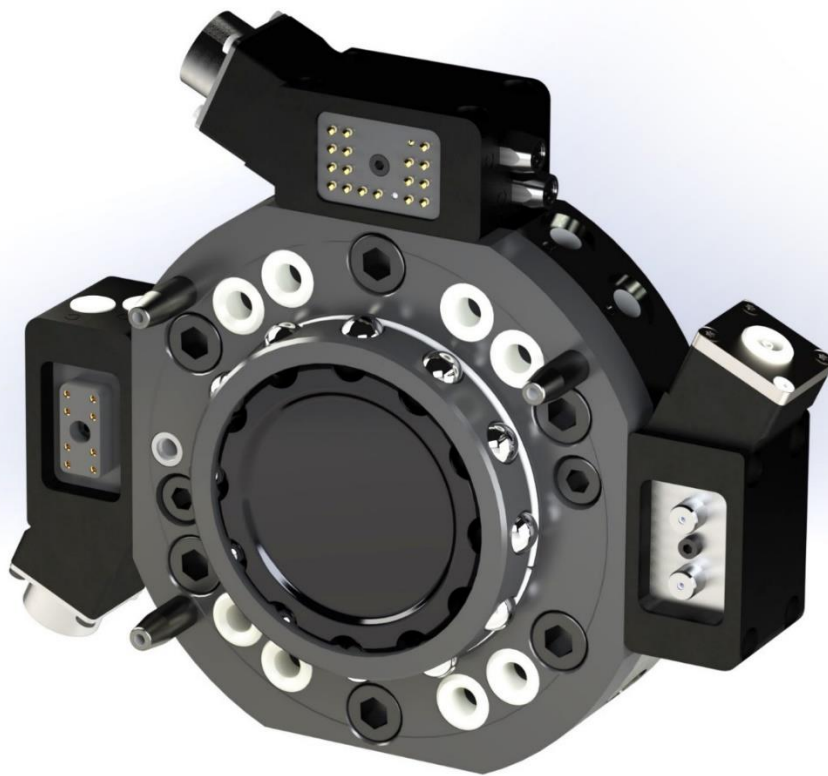
Article	Note
External valve units	Mounted at the rear of the upper arm. Shuts off the air automatically during tool changing.
Cable and Hose Package	Complete packages for most robots on the market ready to be mounted without any modifications.
Tool parking systems	RSP tool parking systems give rigid 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 tool changers TC60-8, TC120-8 and TC180-8 are designed for maximum flexibility and use in a broad spectra of applications. This document presents sensors and modules for transfer of electric signals, power, data and compressed air, to be mounted on these tool changers and tool attachments of the RSP product family Modular. The sensors and modules can be combined in different configurations and ordered ready mounted or as options for retrofitting. In addition, the small signal modules and the air modules for two channels can be mounted on TC20-4 using an adaptation kit (*Technical Description M0117-1*).

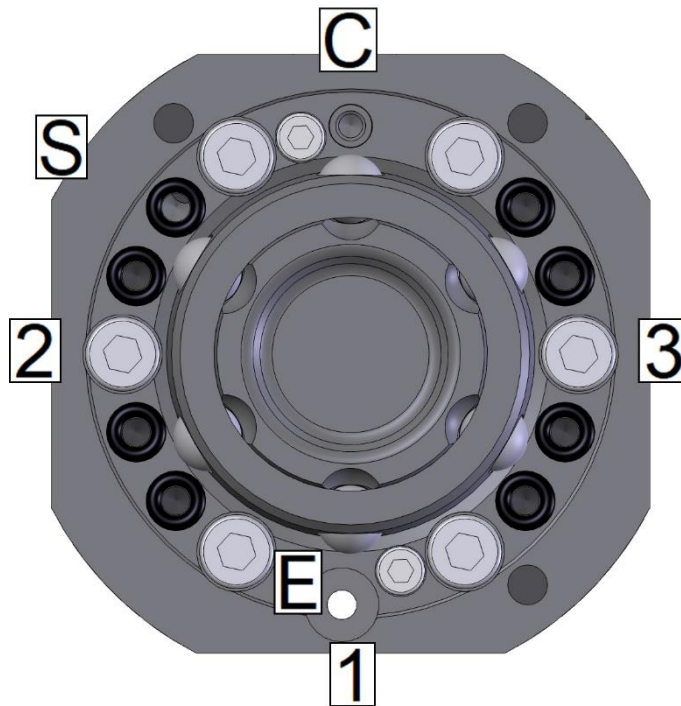
Three guide pins can be mounted, as an option, in order to align the tool attachment with the tool changer before electrical interfaces are connected to each other during docking, which significantly extends the lifetime for not spring-mounted signal pins.

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



TC60-8 with some different options mounted.

2.1 Placement of options on tool changer TC60



For tool changer TC60-8 (P1301A) options are placed as follows:

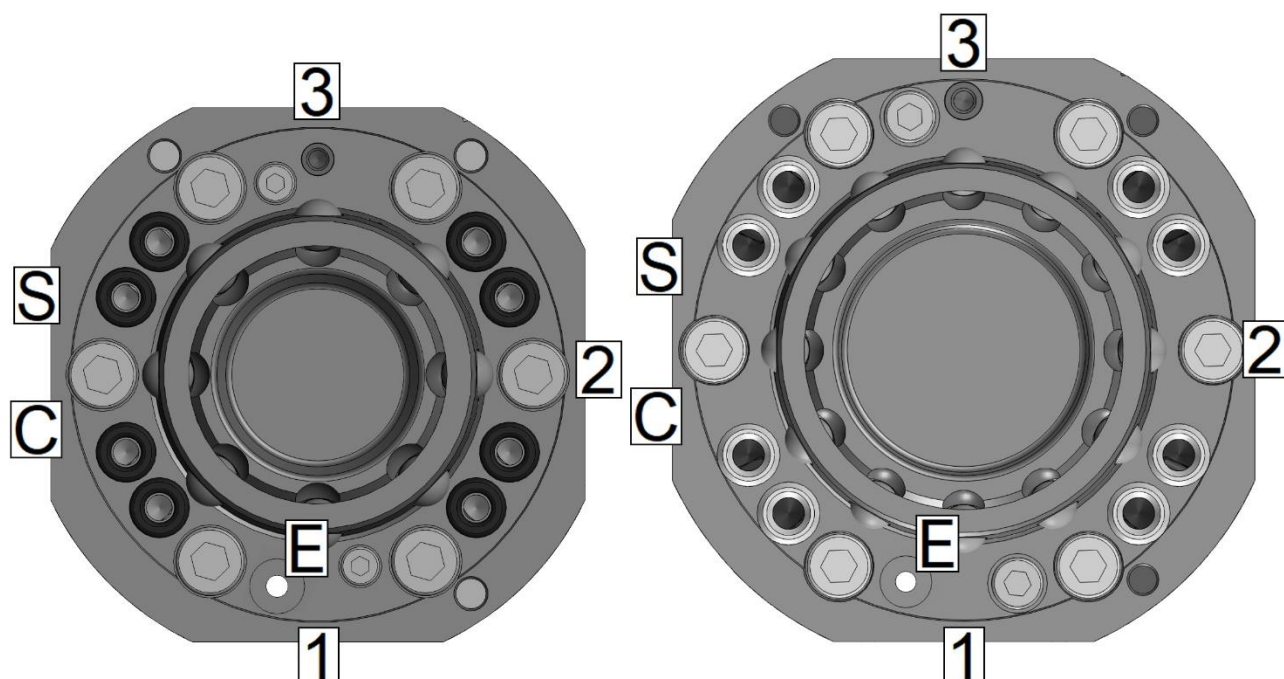
	Position				
	1	2 and 3	S	C	E
Small signal modules	1 module	1 module or 2 air connections each	TC magnetic sensor P1324 only	Air connections for Open TC and Close TC only	TA present sensor P3327 only
Large modules	1 module	1 module or 2 air connections each			
Large 2X modules	1 module	1 module or 2 air connections each			
Air modules	1 module	1 module each			

- Position 1 is the primary location for mounting of modules.
- The side mounted TA present sensor P1383 can be mounted in the same positions as small signal modules,
- Signal modules (P1371, P1344, P1311, P1389, P3328 and P1338), with connections to the TC magnetic sensor opened/closed (P1324), shall be mounted in position 2.
- When two Large 2X modules are used they should be mounted in positions 2 and 3. No more than two Large 2X modules can be mounted on a single TC60 tool changer.
- Connections for pneumatic air are located on the sides and corners of the tool changer and are marked individually. On positions 2 and 3 two air connections each can be mounted instead of modules.



NOTE! There may be additional restrictions on mounting positions depending on size and form of modules and configuration of cables, hoses and connections.

2.2 Placement of options on tool changers TC120/TC180



For tool changers TC120-8 (P1401) and TC180-8 (P1801) options are placed as follows:

	Position			
	1, 2 and 3	S	C	E
Small signal modules	1 module each	TC magnetic sensor P1324 only	Air connections for Open TC and Close TC only	TA present sensor P3327 only
Large modules	1 module each			
Large 2X modules	1 module each			
Air modules	1 module each			

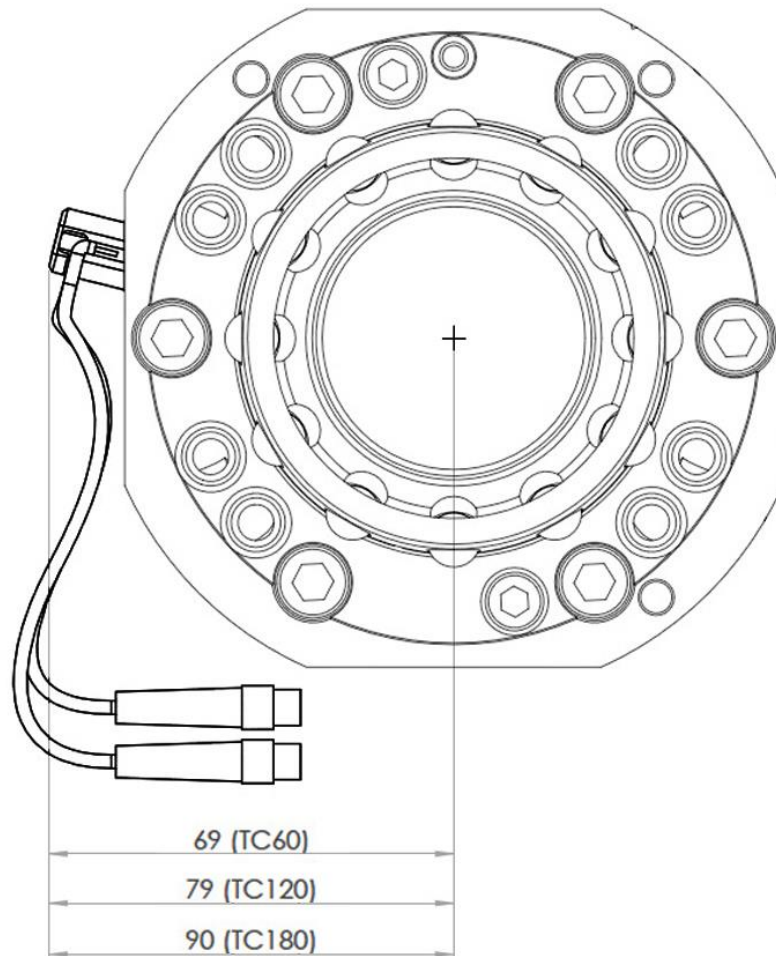
- Position 1 is the primary location for mounting of modules.
- The side mounted TA present sensor P1383 can be mounted in the same positions as signal modules.
- Signal modules (P1371, P1344, P1311, P1389, P3328 and P1338) with connections to the TC magnetic sensor opened/closed (P1324) shall be mounted in position 1.
- When two Large 2X modules are mounted positions 1 and 3 should be used.
- Connections for pneumatic air are located in the corners of the tool changer and are marked individually.



NOTE! There may be additional restrictions on mounting positions depending on size and form of modules and configuration of cables, hoses and connections.

3 VALVES AND SENSORS

3.1 TC magnetic sensor opened/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.

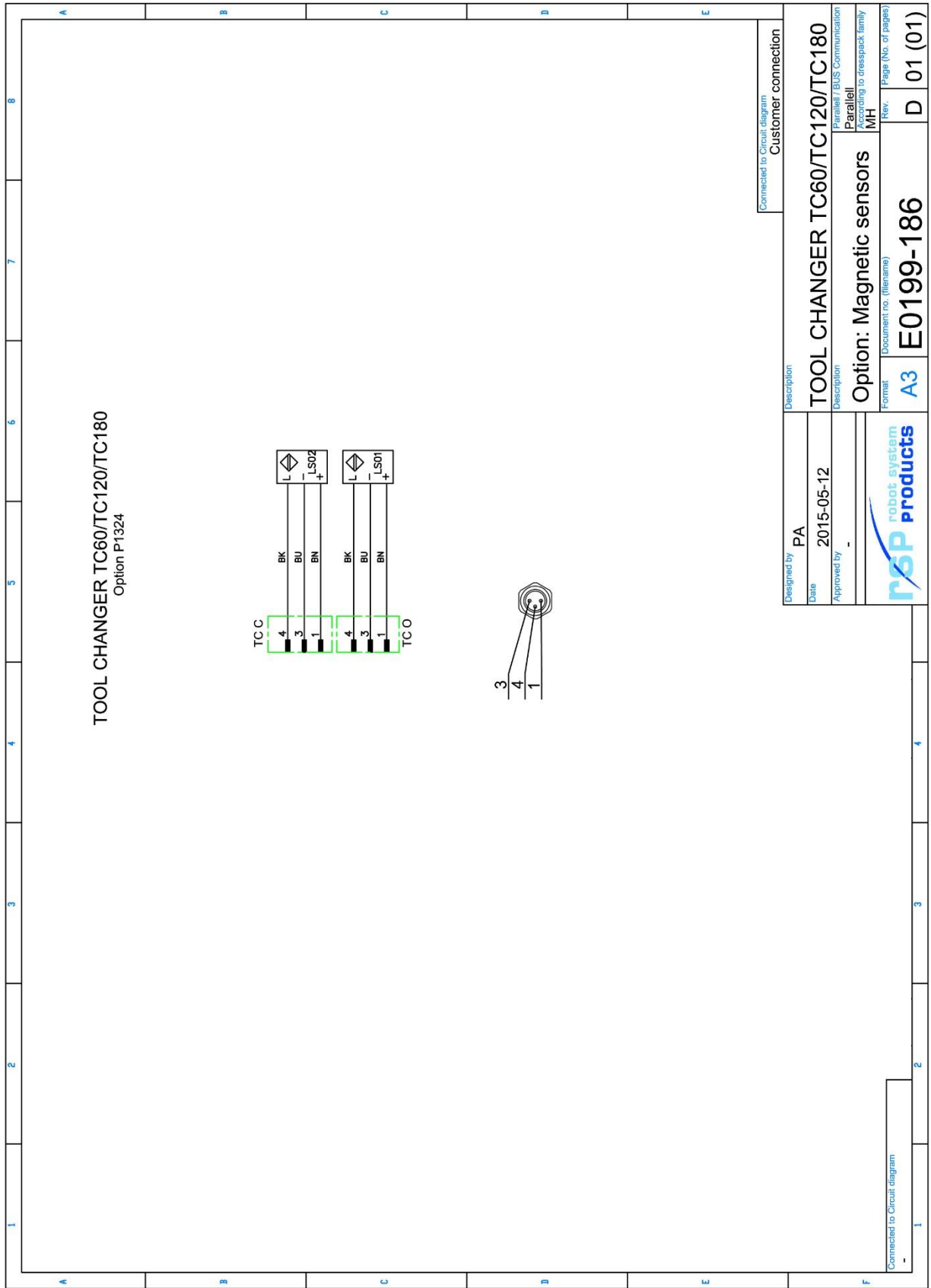


NOTE! Magnetic sensor P1324 requires option P1371, P1344, P1311, P1389, P3328 or P1338 on the tool changer side.

Technical data

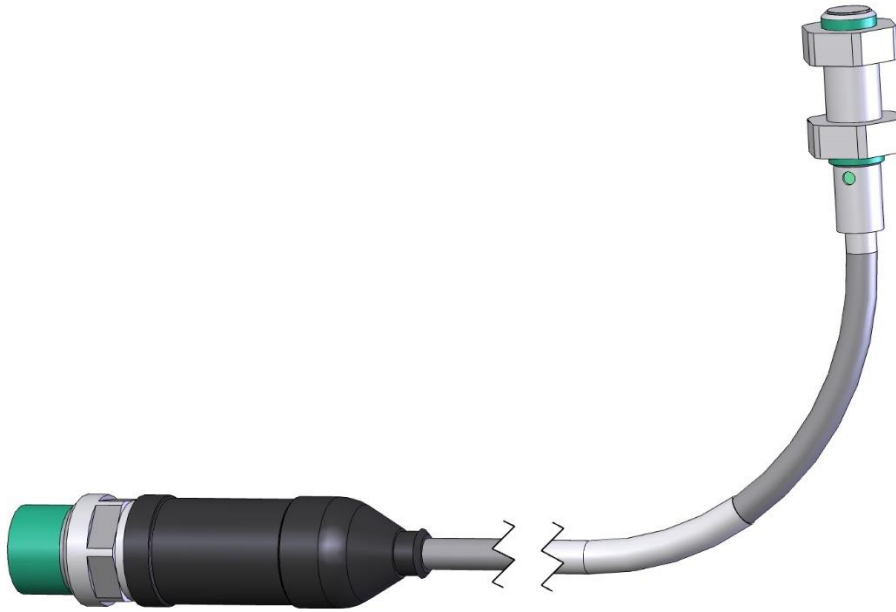
Weight		0.15 kg
Electrical Interface	Circuit diagram M8 3P, A-coded M8 3P, A-coded	E0199-186 (section 3.1.1) 24V, 0V, TC Opened 24V, 0V, TC Closed

3.1.1 Circuit diagram E0199-186 for P1324



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3.2 TA present sensor M8-3P. Articles: P3327-1 and P3327-2



An integrated inductive TA present sensor, P3327-1/P3327-2, which gives +24V signal “TA present” when tool attachment is present at tool changer.

P3327-1 shall be mounted at position **E** on tool changers TC120 (P1401) and TC180 (P1801), while P3327-2 shall be mounted at position **E** on tool changers TC60 (P1301A).

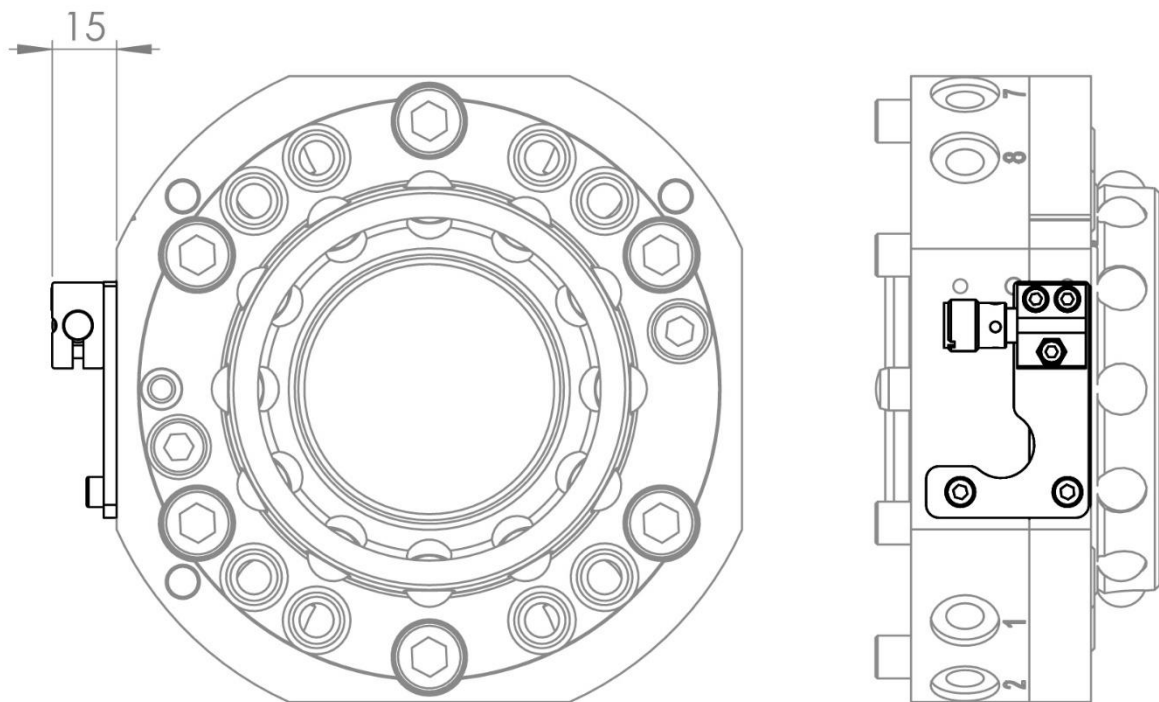


NOTE! The TA present sensor P3327-1 and P3327-2 requires signal module P3328 on the tool changer side.

Technical data

Weight		0.05 kg
Electrical Interface	Circuit diagram M8 3P, A-coded	E0182-163 (section 5.4.1) 24V, 0V, TA present

3.3 TA present sensor (side mounted). Article: P1383

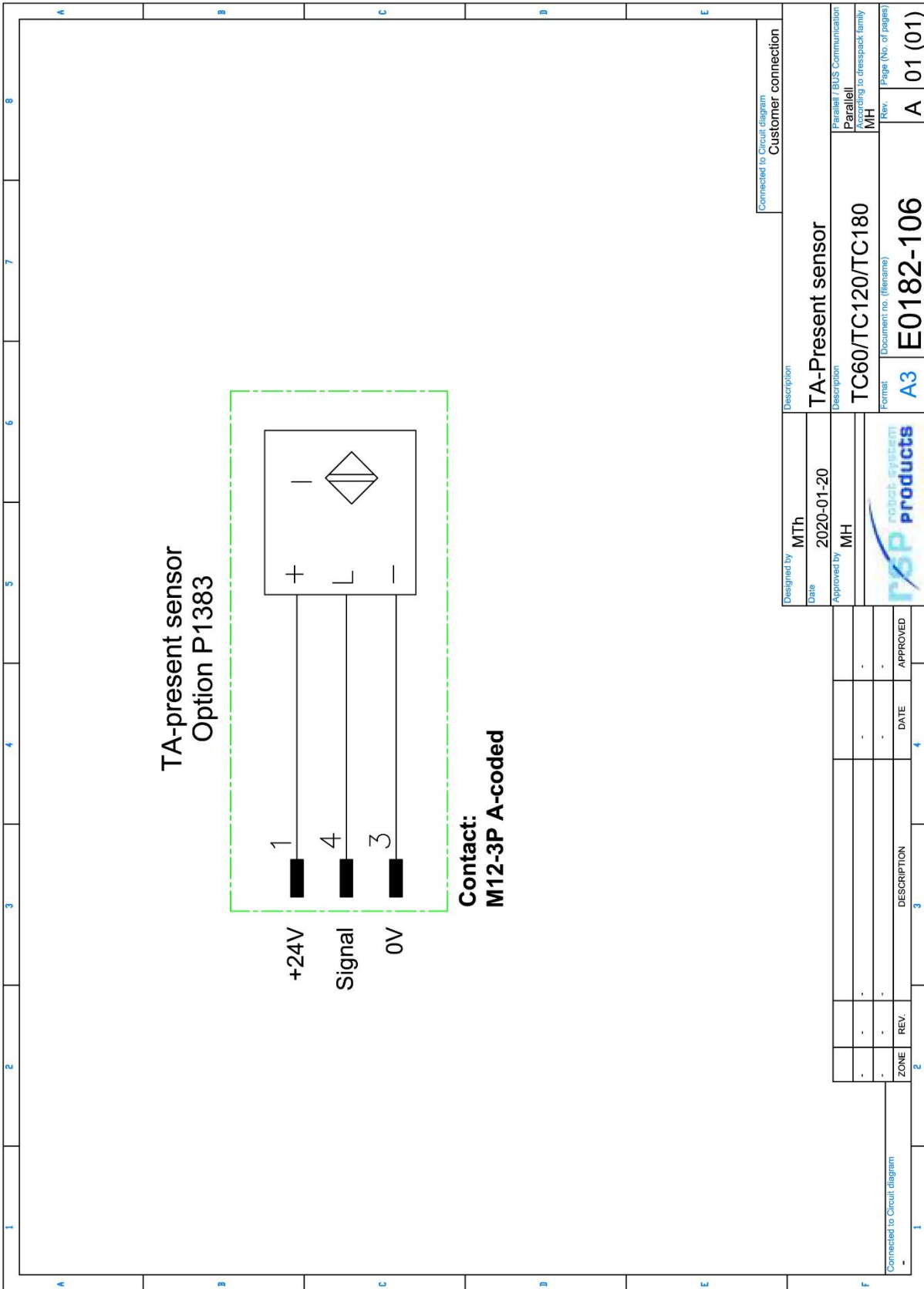


A side mounted TA present sensor, P1383 which gives +24V signal "TA present" when tool attachment is present at tool changer. To be mounted at the tool changer and used together with TA present plate P1359 mounted on the tool attachment.

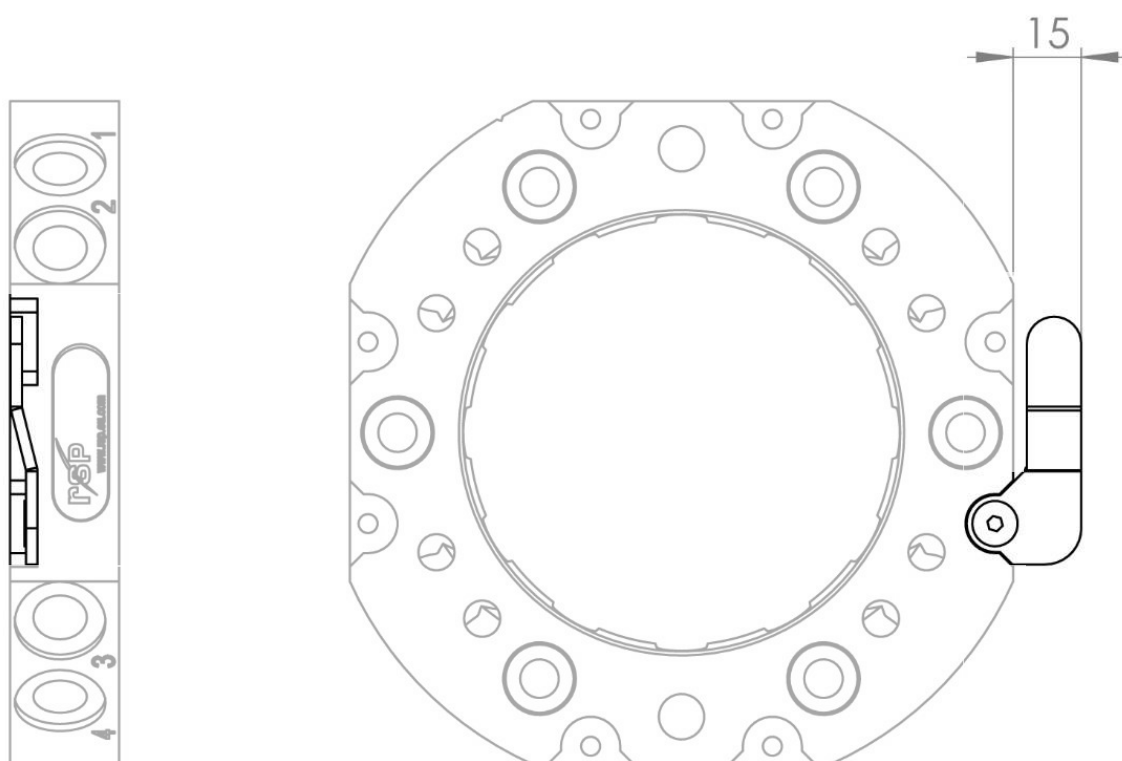
Technical data

Weight		0.04 kg
Electrical signals	Circuit diagram	E0182-106 (section 3.3.1)
	M12 3P, A-coded	24V, 0V, TA present

3.3.1 Circuit diagram E0182-106 for P1383



3.4 TA present sensor plate. Article: P1359



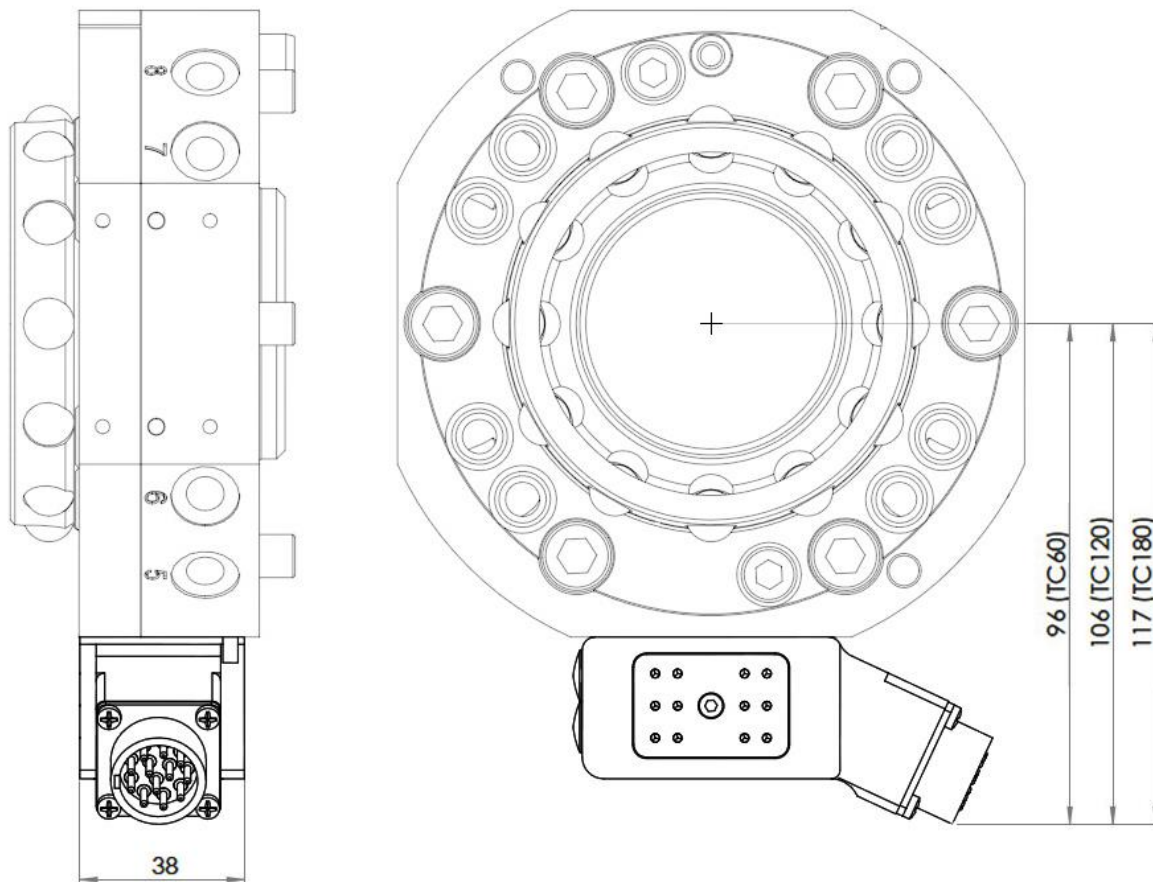
A passive sensor plate, P1359, to be used together with the TA present sensor P1383 mounted on the tool changer.

Technical data

Weight	0.02 kg
---------------	---------

4 SMALL SIGNAL MODULES

4.1 Signal module 12 x signals (Souriau), robot side. Article: P1305

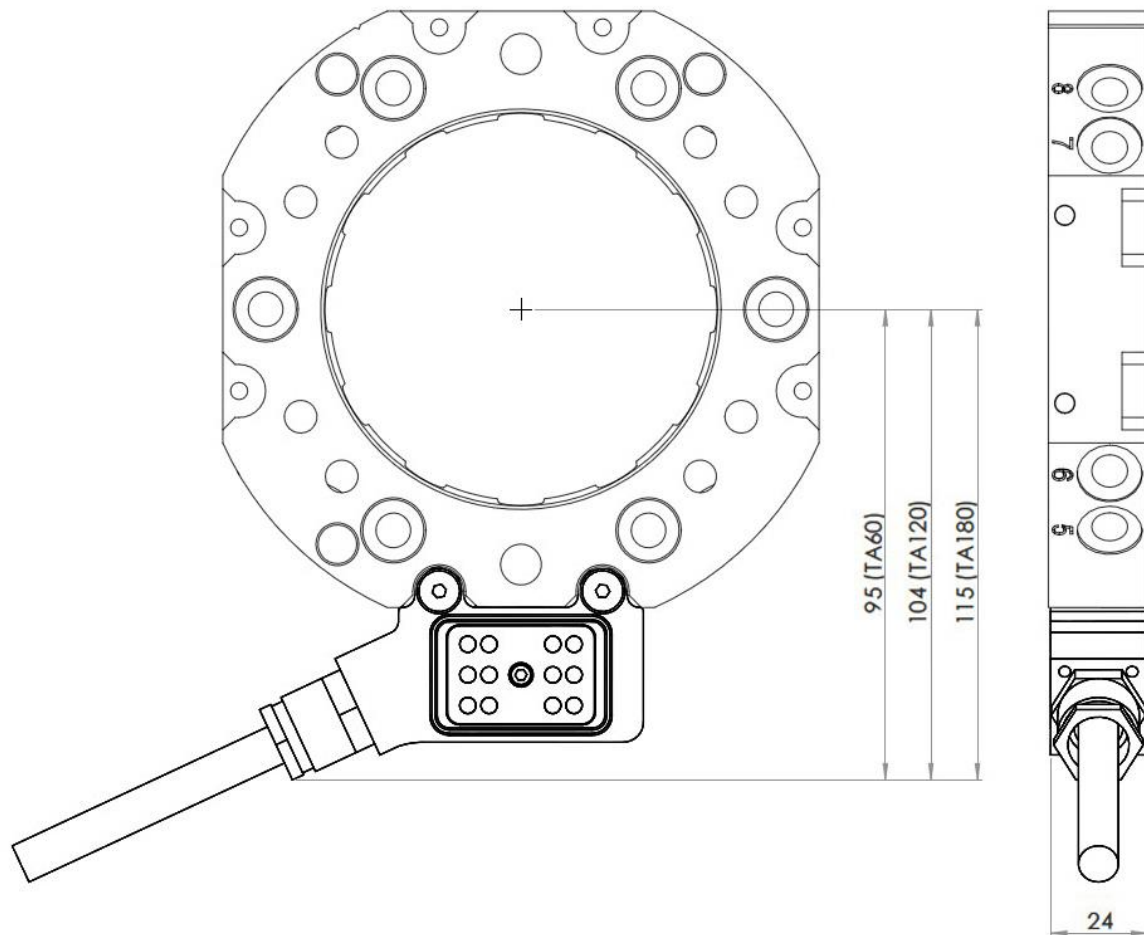


Signal module P1305 transfers 12 electrical signals to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer. To be used together with module P1306 mounted at the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, robot side Total signals available at tool	E0182-001 (section 4.2,1) Souriau 12P (UT001412PH) 12 x (1A, 60V)
Connection kits and cables (optional)	P8006 P8006-1 P8006-2 P8116-30/ P8116-60	Souriau 12S (straight, 0.52–1.5 mm ²) Souriau 12S, (angled, 0.32–0.52 mm ²) Souriau 12S, (angled, 0.52–1.5 mm ²) Souriau 12S with 3,0/6.0 m cable, open end

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

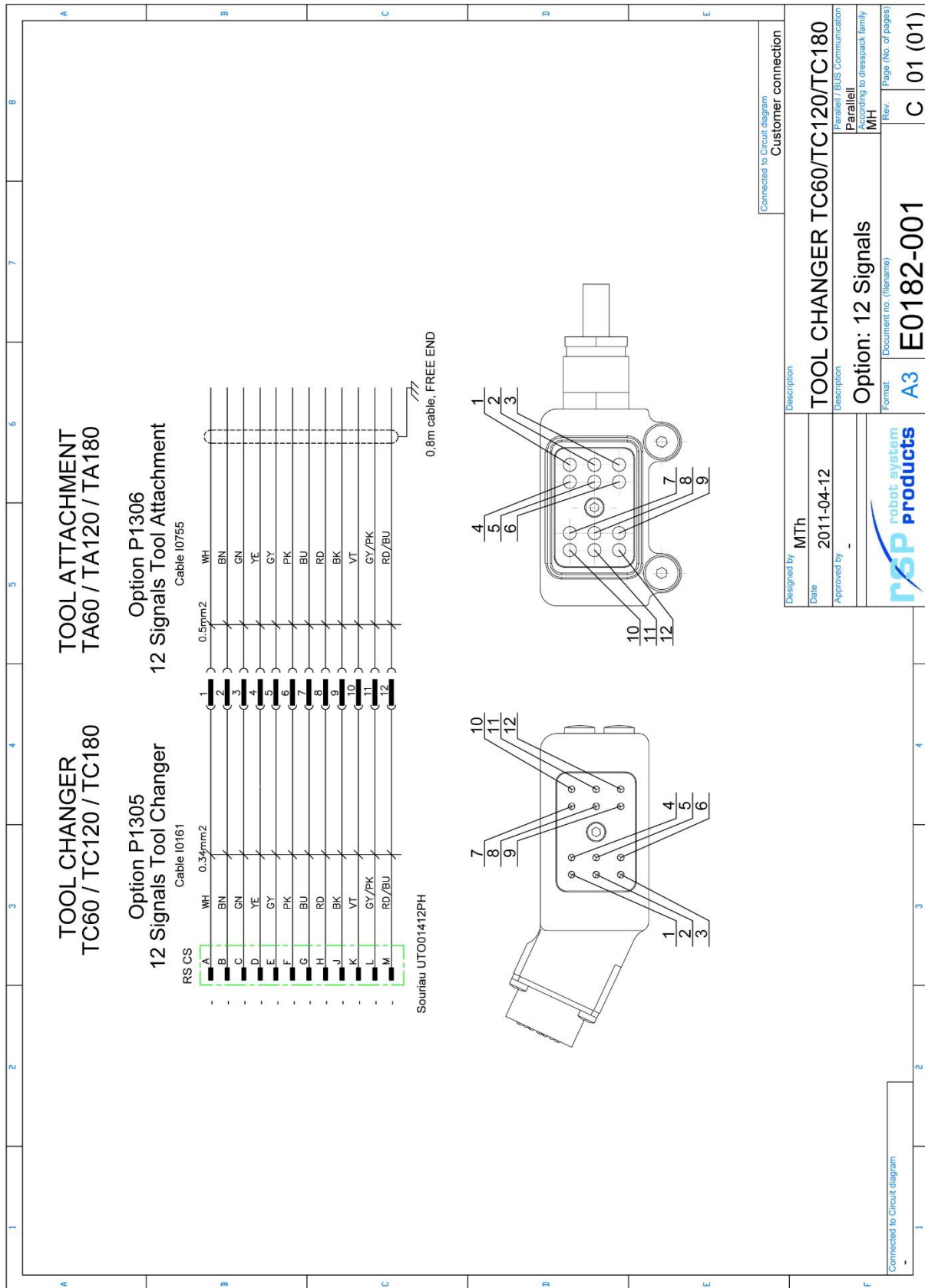


Signal module P1306 transfers 12 signals to the tool. To be mounted on the tool attachment and used together with module P1305 mounted at the tool changer.

Technical data

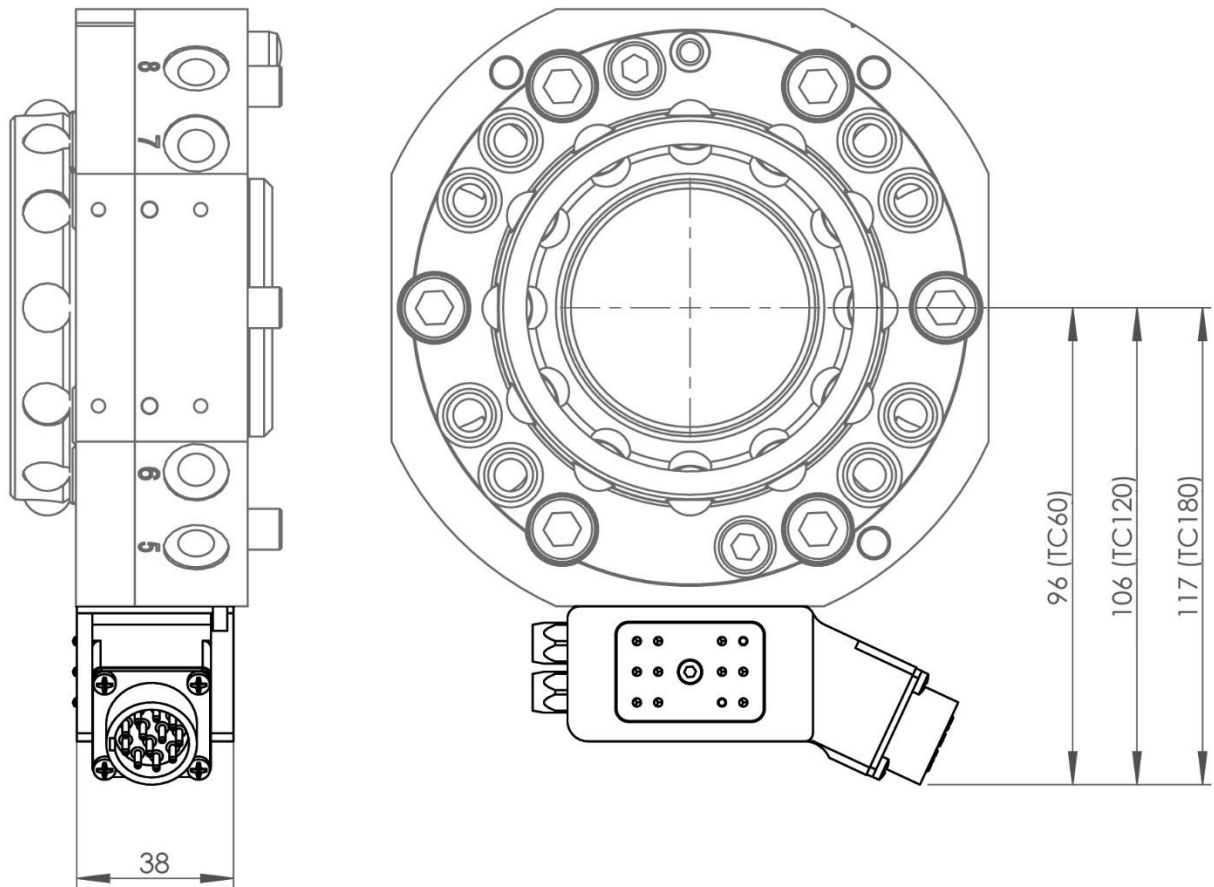
Weight		0.1 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-001 (section 4.2,1) 1 m cable (0.5 mm ²), open end

4.2.1 Circuit diagram E0182-001 for P1305 and P1306



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4.3 Signal module 10 x signals (for TC opened/closed sensor), robot side. Article: P1371

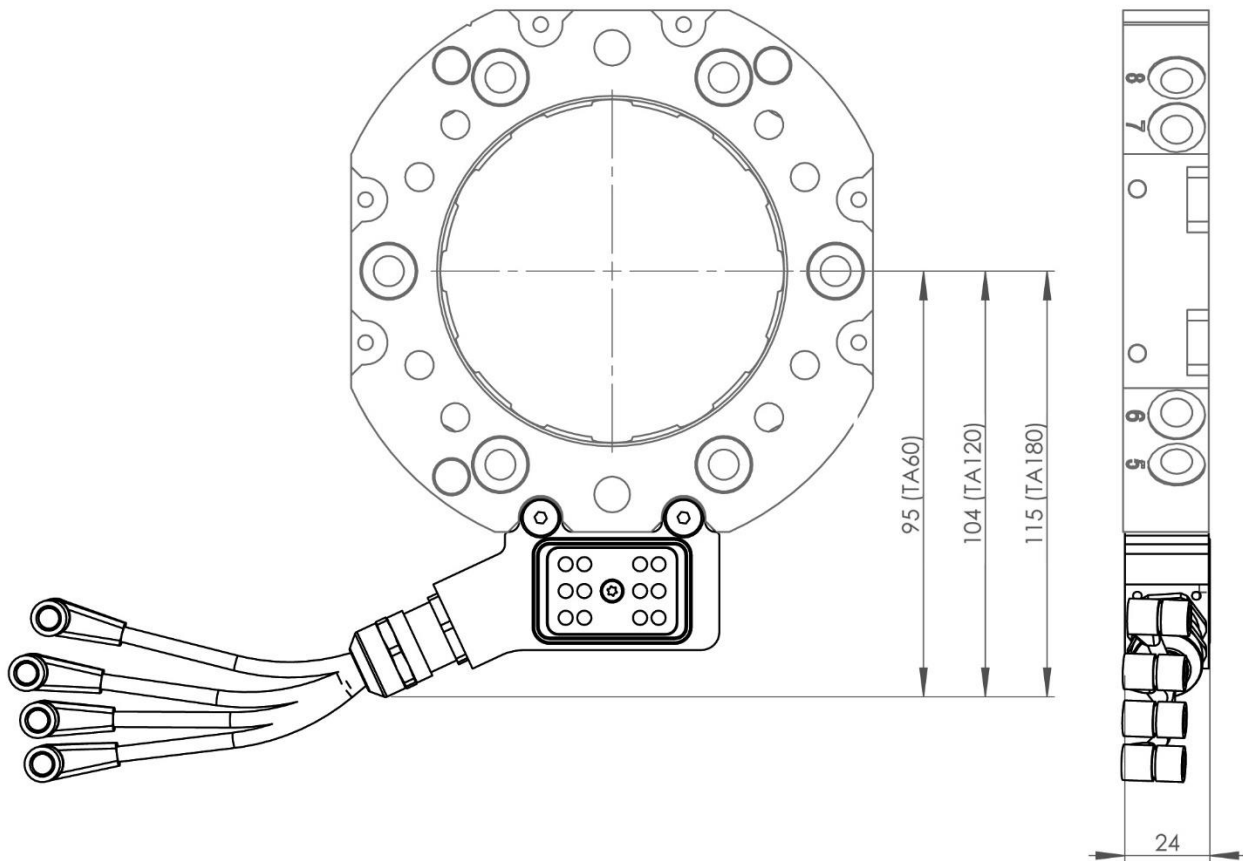


Signal module P1371 transfers 10 electrical signals to the tool attachment through spring loaded signal pins. To be mounted at one dedicated position on the tool changer and used together with module P1370 mounted at the tool attachment. On the housing 2 separate M8-contacts are mounted for connection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

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, robot side Total signals Dedicated signals Signals available at tool	E0182-092 (section 4.4.1) Souriau 12P (UT001412PH) 12 x (1A, 24V) TC Opened, TC Closed 8 + 24V, 0V
Sensor Interface	M8 3S, A-coded M8 3S, A-coded	24V, 0V, TC Opened 24V, 0V, TC Closed
Connection kits and cables (optional)	P8006 P8006-1 P8006-2 P8116-30/ P8116-60	Souriau 12S (straight, 0.52–1.5 mm ²) Souriau 12S, (angled, 0.32–0.52 mm ²) Souriau 12S, (angled, 0.52–1.5 mm ²) Souriau 12S with 3,0/6.0 m cable, open end

4.4 Signal module 10 x signals (4xM8), tool side. Article: P1370

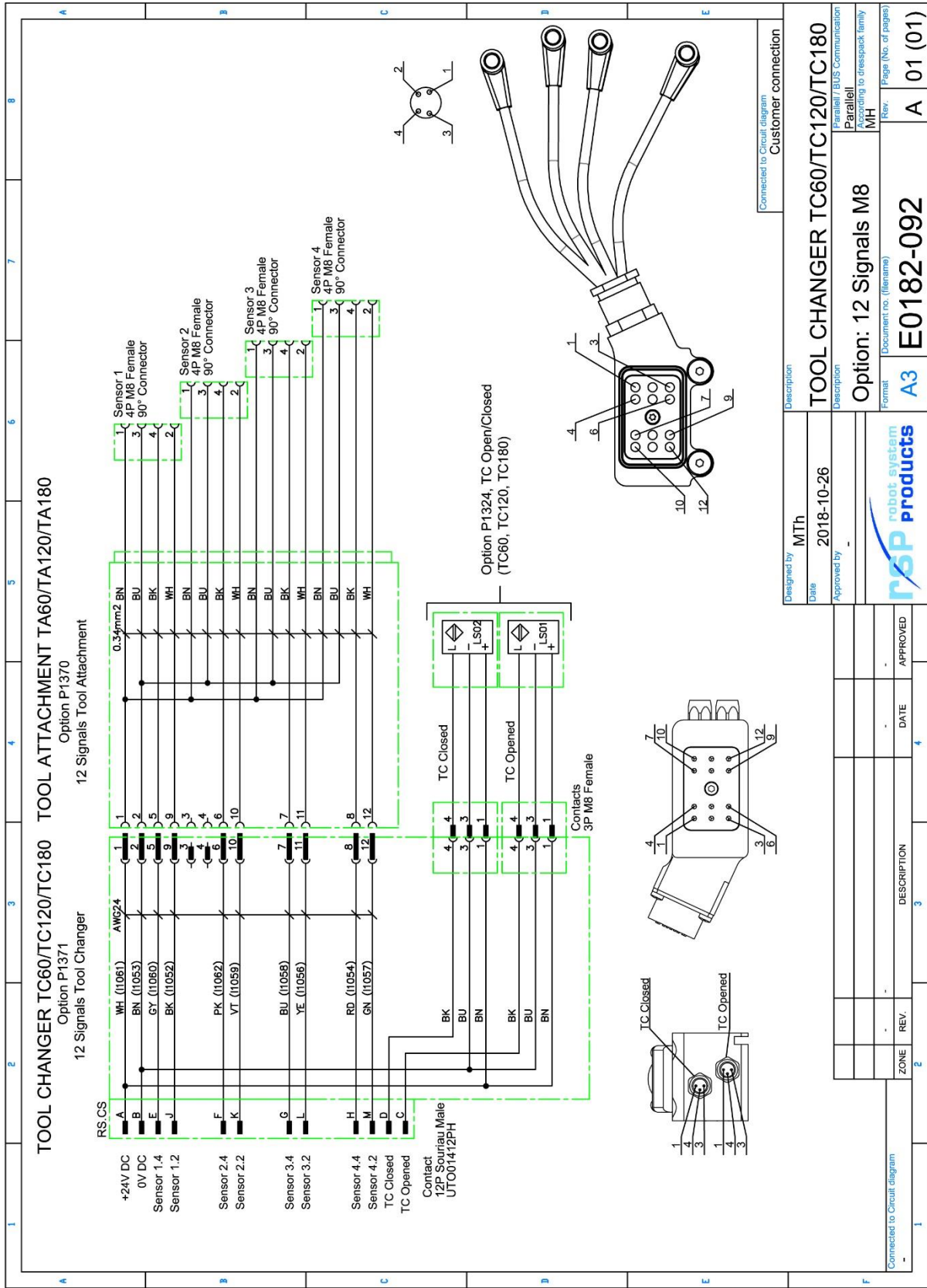


Signal module P1370 transfers 10 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1371 mounted at the tool changer.

Technical data

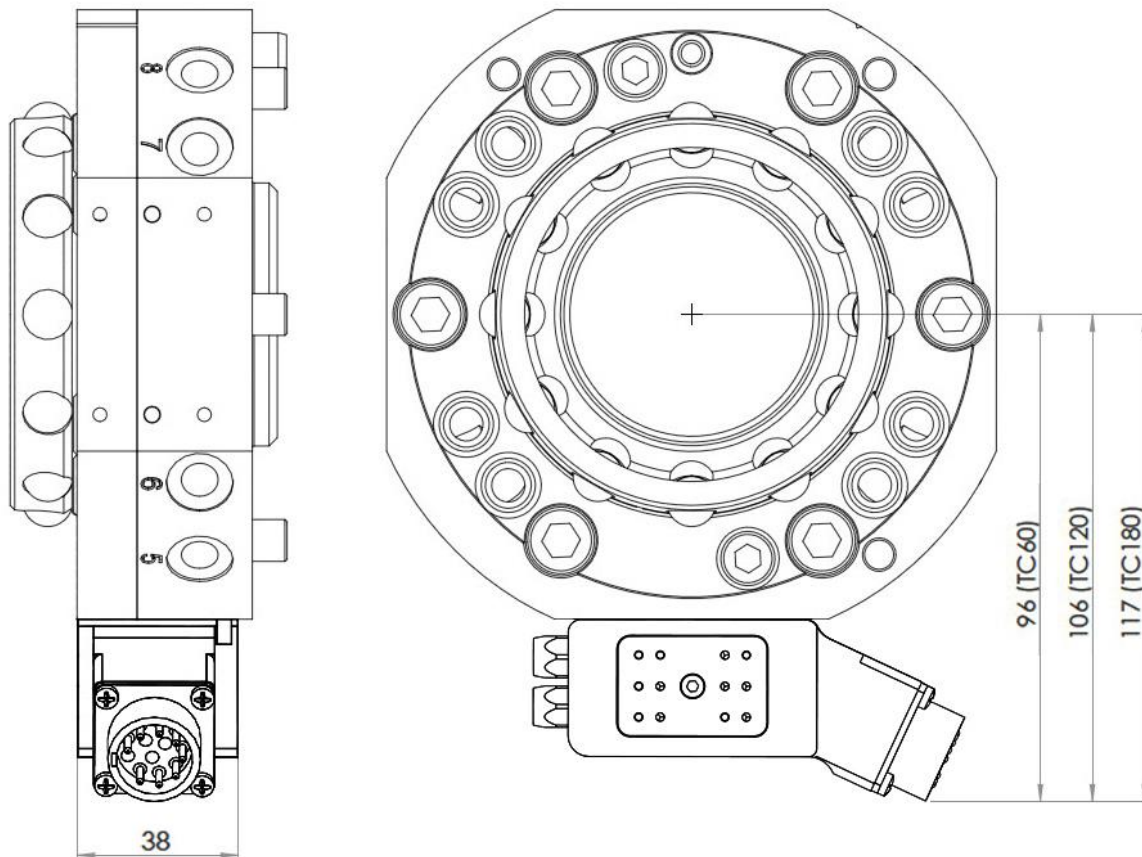
Weight		0.2 kg
Electrical Interface	Circuit diagram Connections, tool side	E0182-092 (section 4.4.1) 4 x M8 4S A-coded (0.2 m cable)

4.4.1 Circuit diagram E0182-092 for P1371 and P1370



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4.5 Signal module 6 x signals (for TC opened/closed sensor), robot side. Article: P1344

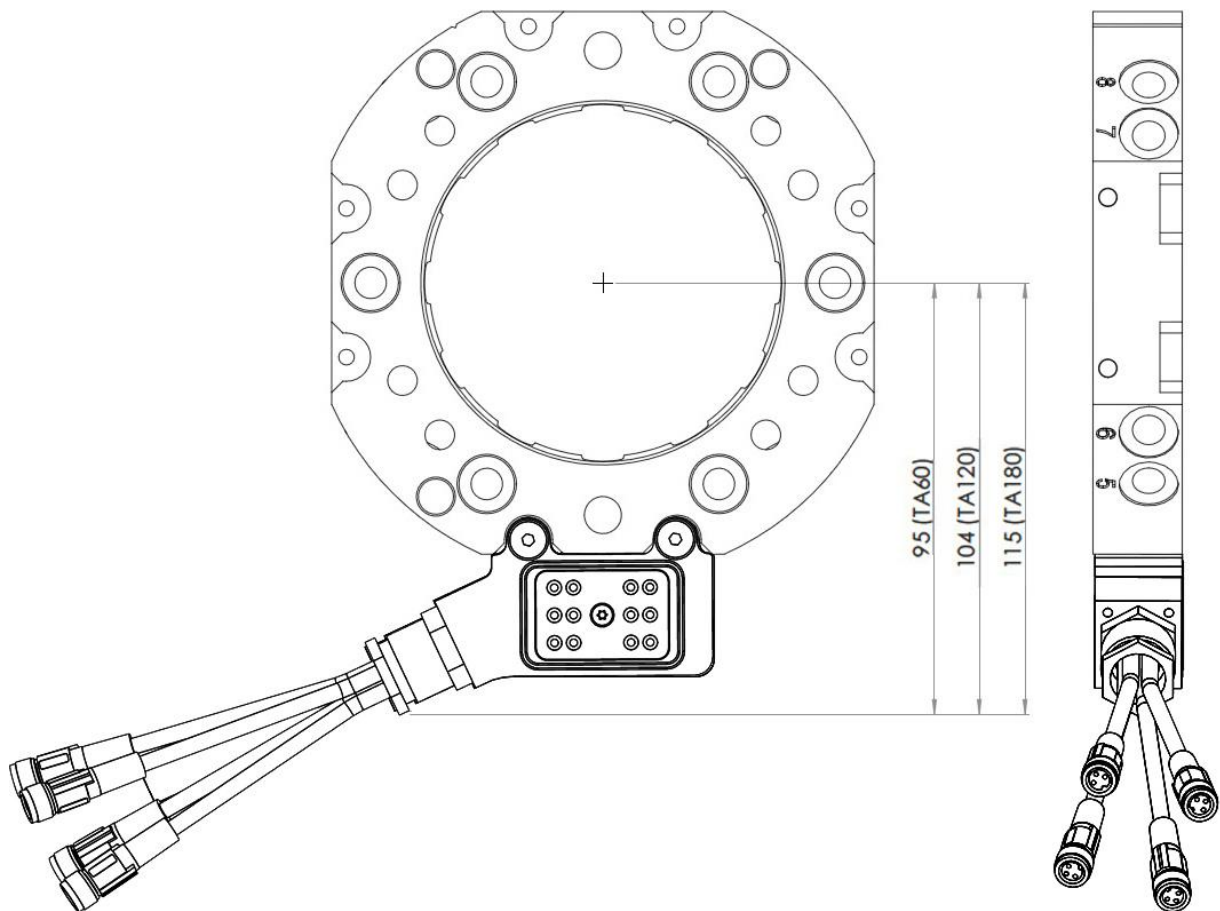


Signal module P1344 transfers 6 electrical signals to the tool attachment through spring loaded signal pins. To be mounted at one dedicated position on the tool changer and used together with module P1345 mounted at the tool attachment. On the housing 2 separate M8-contacts are mounted for connection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

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, robot side Total signals Dedicated signals Signals available at tool	E0182-059 (section 4.6.1) Souriau 12P (UT001412PH) 8 x (1A, 60V) TC Opened, TC Closed 4 + 24V, 0V
Sensor Interface	M8 3S, A-coded M8 3S, A-coded	24V, 0V, TC Opened 24V, 0V, TC Closed
Connection kits and cables (optional)	P8006 P8006-1 P8006-2 P8116-30/ P8116-60	Souriau 12S (straight, 0.52–1.5 mm ²) Souriau 12S, (angled, 0.32–0.52 mm ²) Souriau 12S, (angled, 0.52–1.5 mm ²) Souriau 12S with 3,0/6.0 m cable, open end

4.6 Signal module 6 x signals, tool side. Article: P1345

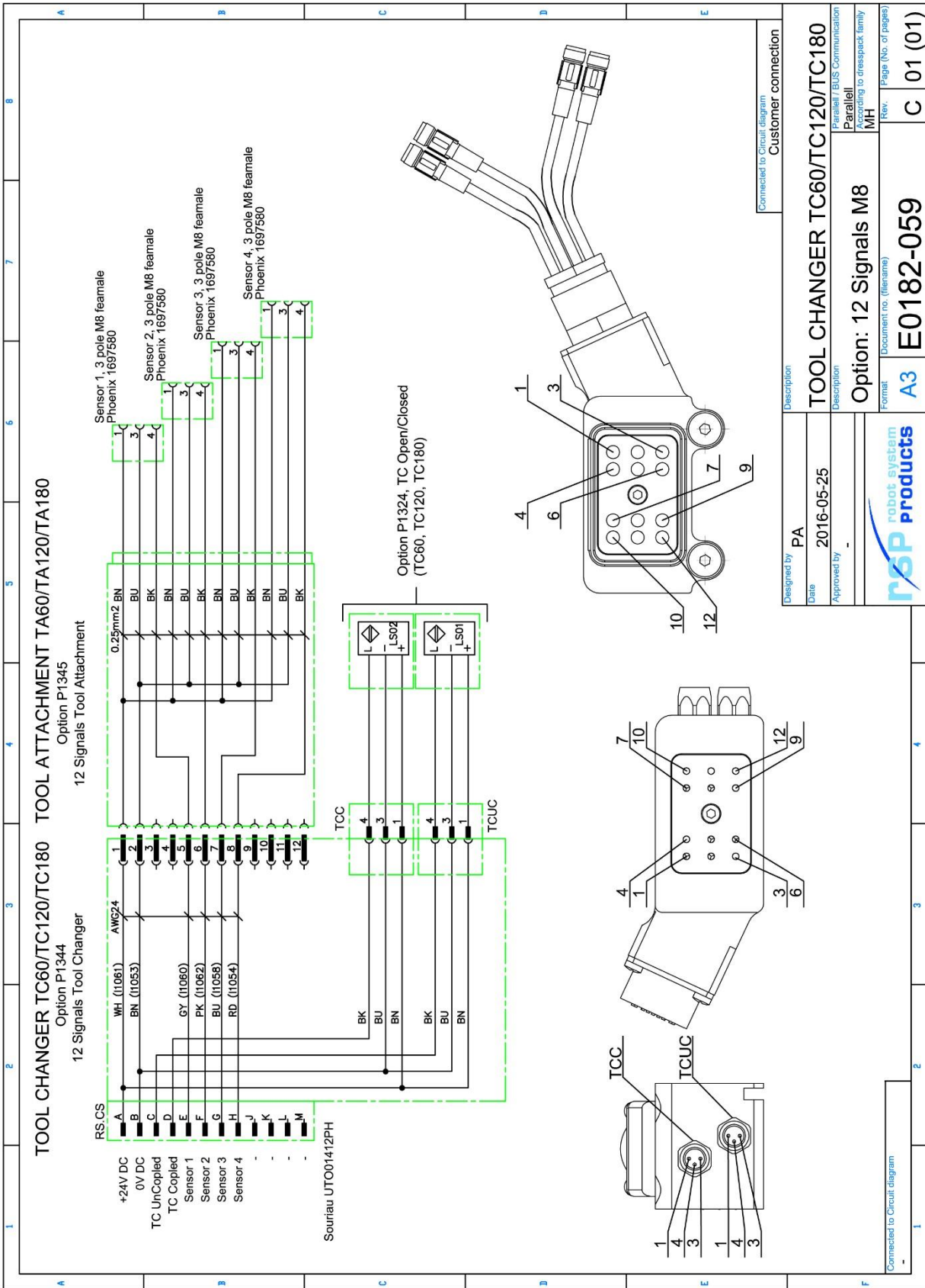


Signal module P1345 transfers 6 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1344 mounted at the tool changer.

Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-059 (section 4.6.1) 4 x M8 3S, 0.2 m cable

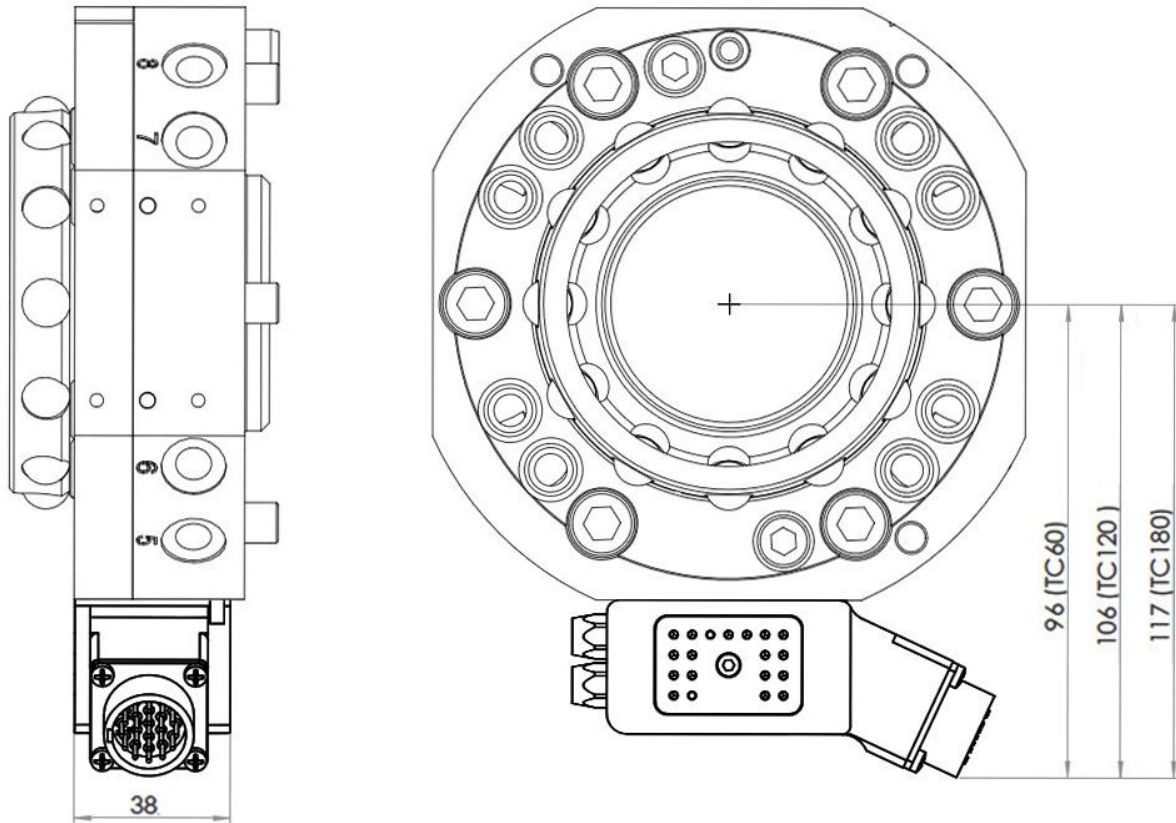
4.6.1 Circuit diagram E0182-059 for P1344 and P1345



Designed by	PA	Description	TOOL CHANGER TC60/TC120/TC180
Date	2016-05-25	Description	Parallel BUS Communication
Approved by	-	Description	Option: 12 Signals M8
r&P robot system products		Format	Document no. (filename)
A3		Rev.	Page (No. of pages)
E0182-059		C 01 (01)	

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4.7 Signal module 17 x signals (for TC opened/closed sensor), robot side. Article: P1311

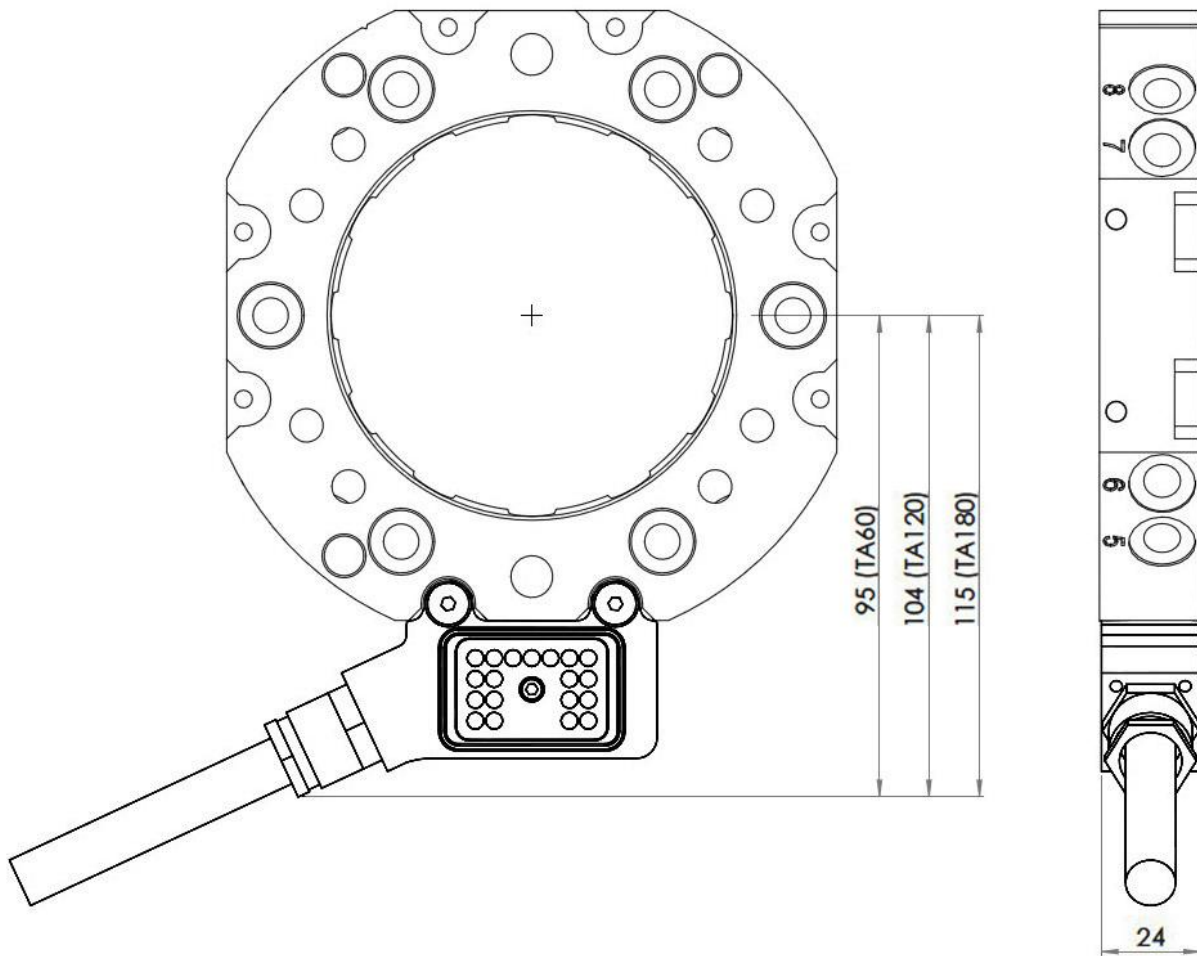


Signal module P1311 transfers 17 electrical signals to the tool attachment through spring loaded signal pins. To be mounted at one dedicated position on the tool changer and used together with modules P1312 or P1332 mounted at the tool attachment. On the housing 2 separate M8-contacts are mounted for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

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-002 (section 4.8.1) and E0182-041 (section 4.9.1)
	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.

4.8 Signal module 17 x signals (open end), tool side. Article: P1312

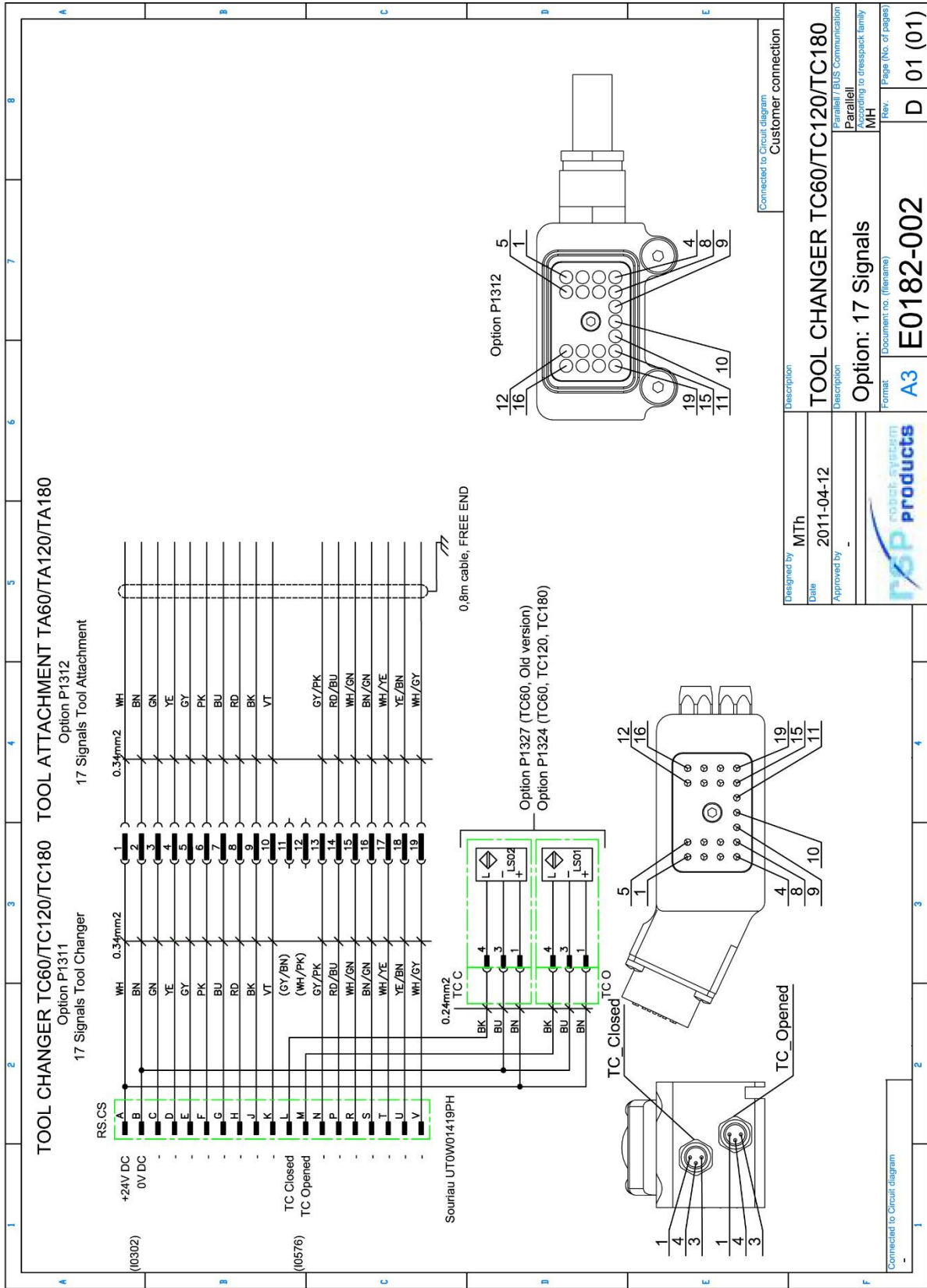


Signal module P1312 transfers 17 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1311 mounted at the tool changer.

Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-002 (section 4.8.1) 1m cable (17x0.34 mm ²), open end

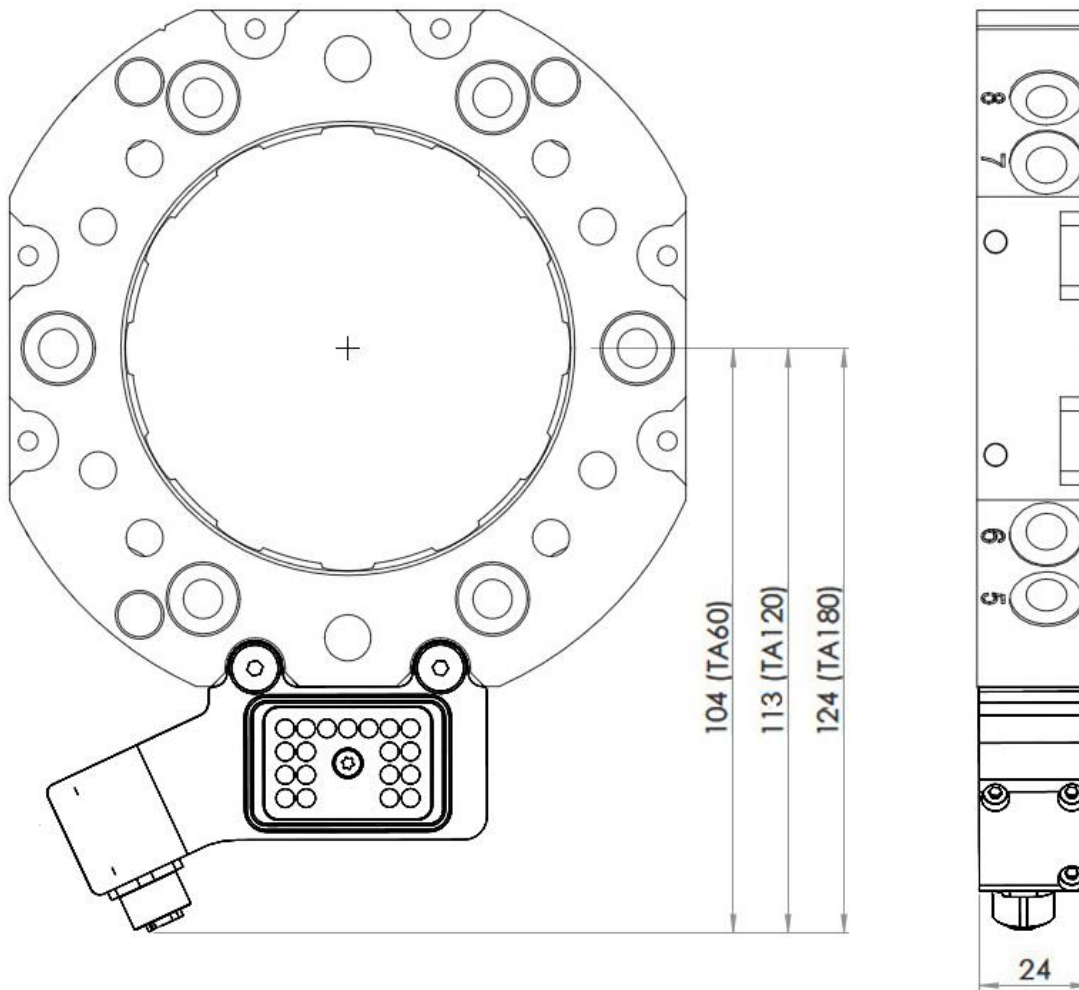
4.8.1 Circuit diagram E0182-002 for P1311 and P1312



Designed by	MTh	Description	TOOL CHANGER TC60/TC120/TC180
Date	2011-04-12	Description	Parallel / BUS Communication
Approved by	-	Description	Option: 17 Signals
		Format	Document no. (filename)
		Format	E0182-002
		Rev.	Page (No. of pages)
		Rev.	D 01 (01)

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4.9 Signal module 17 x signals (M12), tool side. Article: P1332

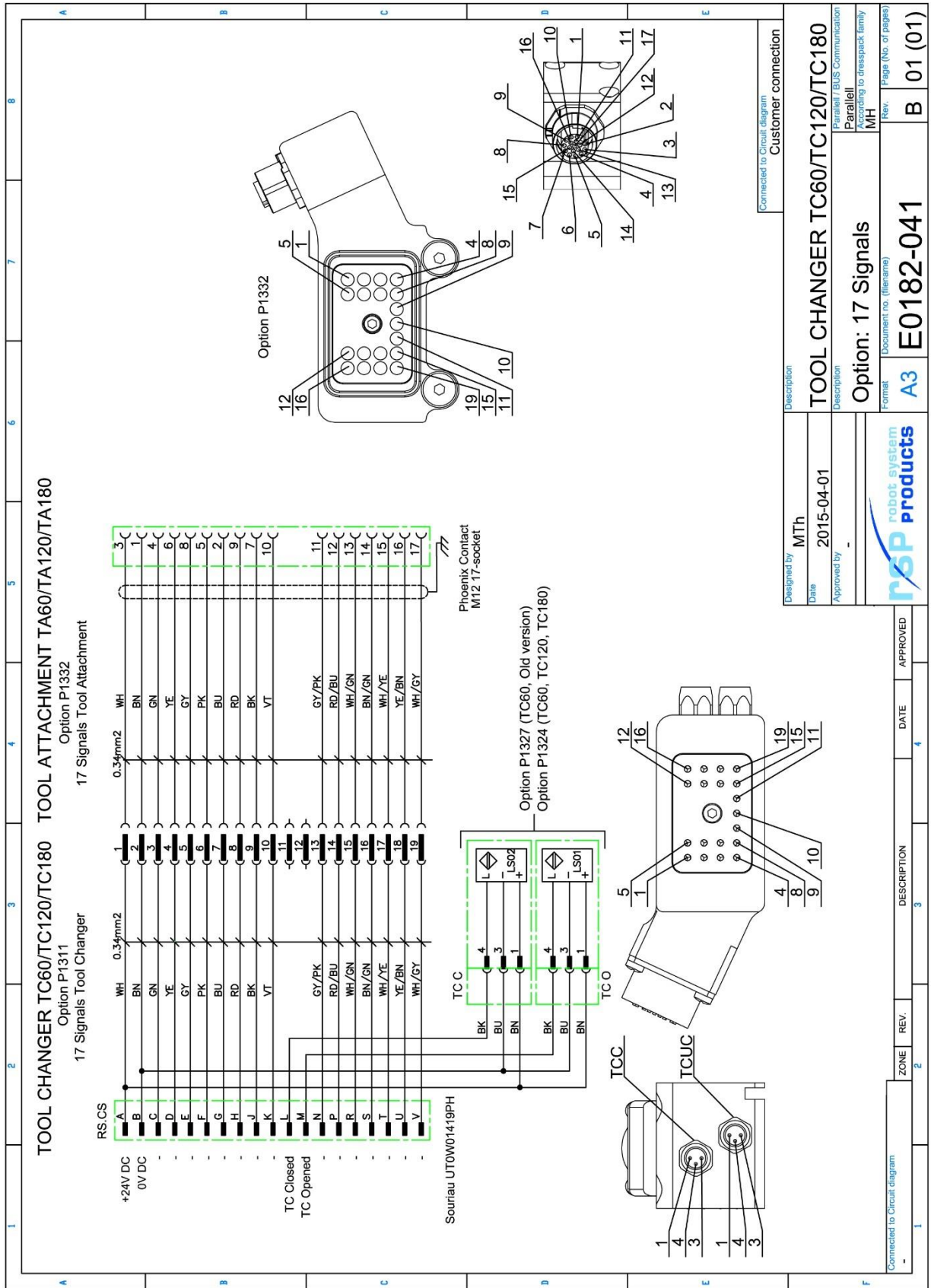


Signal module P1332 transfers 17 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1311 mounted at the tool changer.

Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-041 (section 4.9.1) M12 17S (Phoenix 1556294)

4.9.1 Circuit diagram E0182-041 for P1311 and P1332

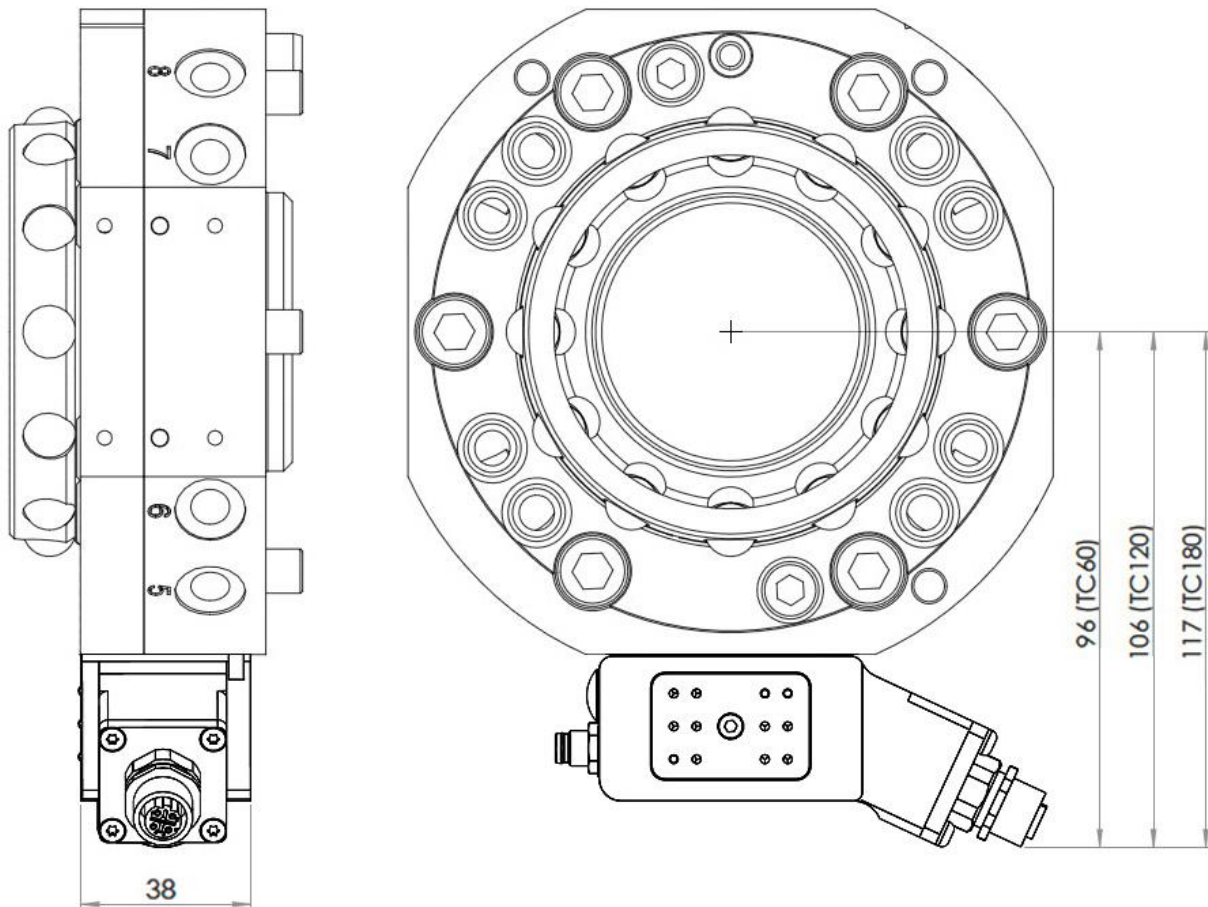


Designed by	MTh
Date	2015-04-01
Approved by	-
Description	TOOL CHANGER TC60/TC120/TC180
Format	Option: 17 Signals
Document no. (filename)	E0182-041
Rev. (No. of pages)	B 01 (01)

robot system products	APPROVED
DATE	1
DESCRIPTION	3
ZONE	2
REV.	

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

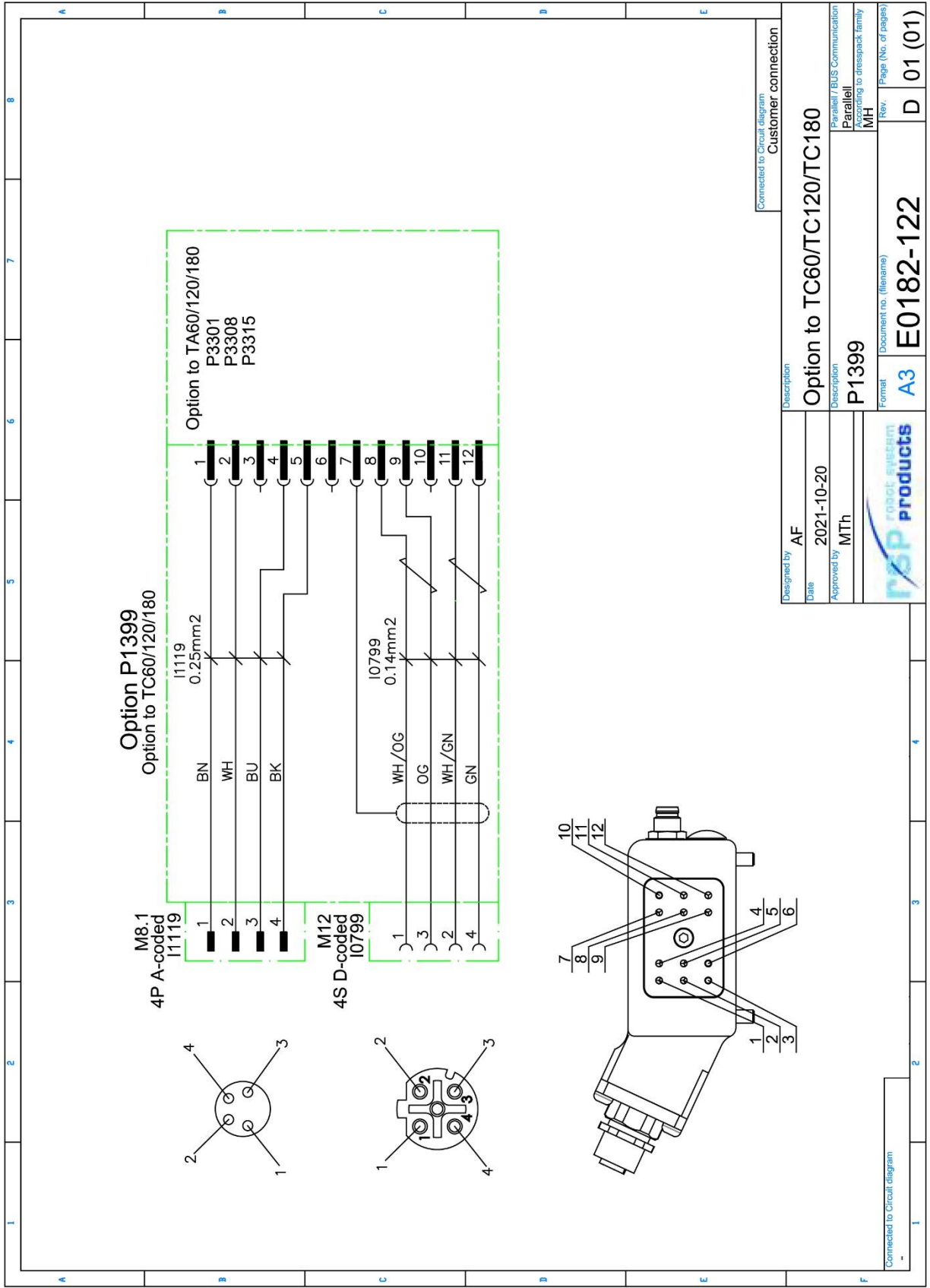


Signal module P1399 transfers 4 electrical and 4 fieldbus signals to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer and used together with modules P3301, P3308 or P3315 mounted at the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-122 (section 4.10.1)
	Connection, robot side	M8 4P A-coded
Bus Interface	Signals	4 x (1A, 60V)
	Connection, robot side	M12 4S D-coded
	Bus available at tool	4 x Profinet (100 Mbit/s)

4.10.1 Circuit diagram E0182-122 for P1399

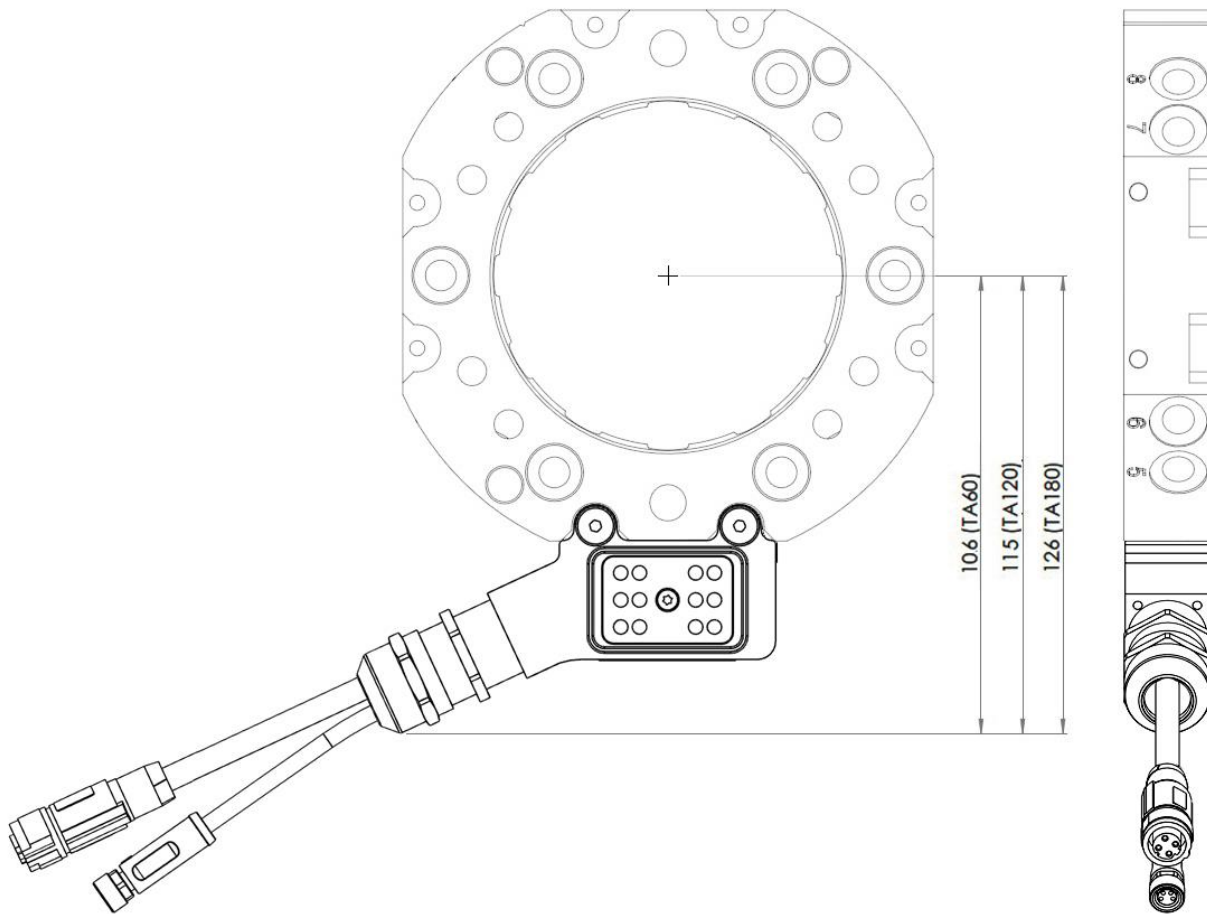


Designed by	AF	Description	Connected to Circuit diagram
Date	2021-10-20	Description	Customer connection
Approved by	MTh	Option to TC60/TC120/TC180	
		P1399	Parallel / BUS Communication
			Parallel
			According to dresspack family
			MH
			Rev. Page (No. of pages)
			D 01 (01)

Connected to Circuit diagram

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**4.11 Signal module 4 x signals (M8 4S) + Profinet (M12 4S), tool side.
Article: P3301**

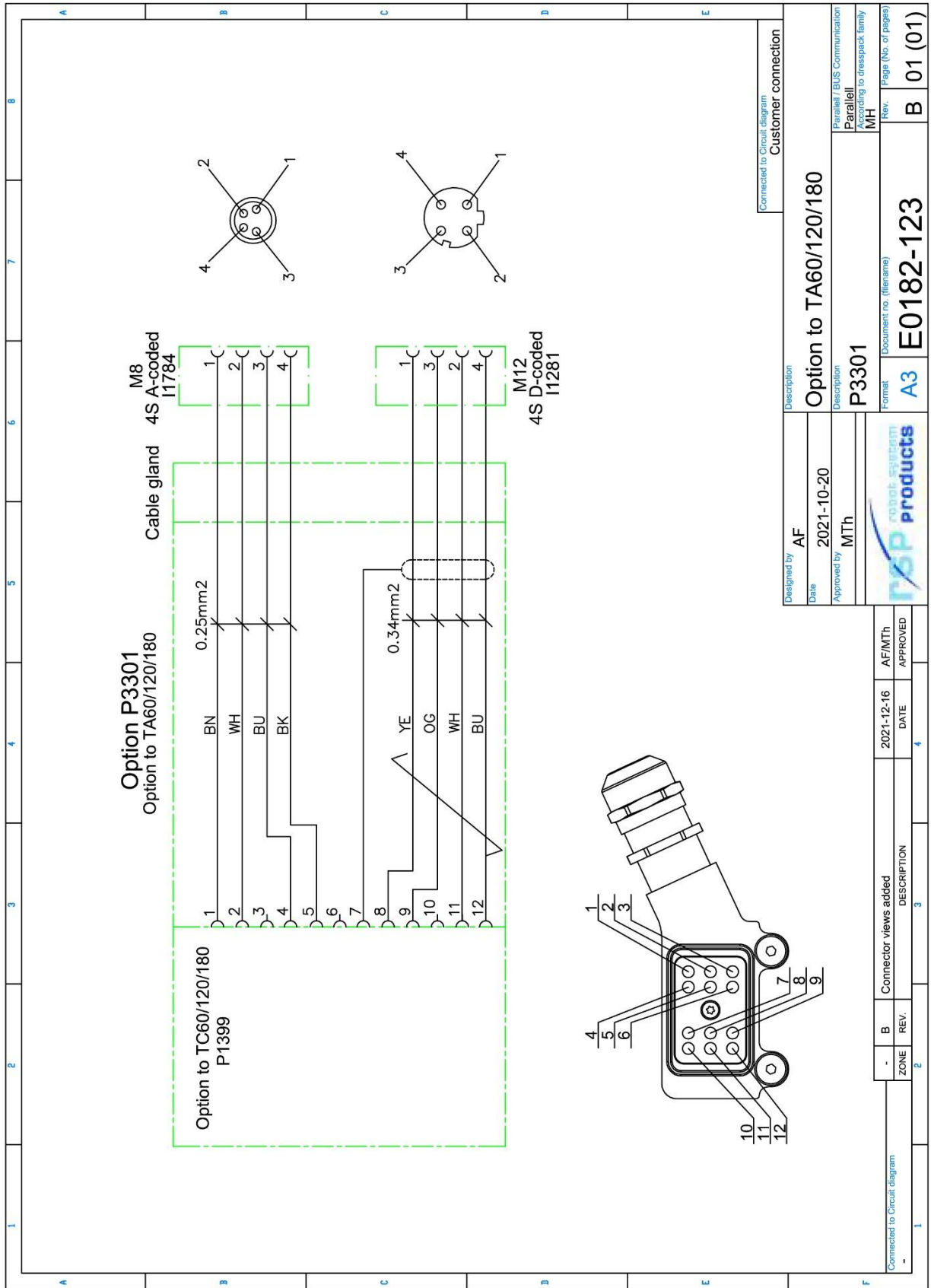


Signal module P3301 transfers 4 electrical and 4 fieldbus signals to the tool. To be mounted on the tool attachment and used together with module P1399 mounted at the tool changer.

Technical data

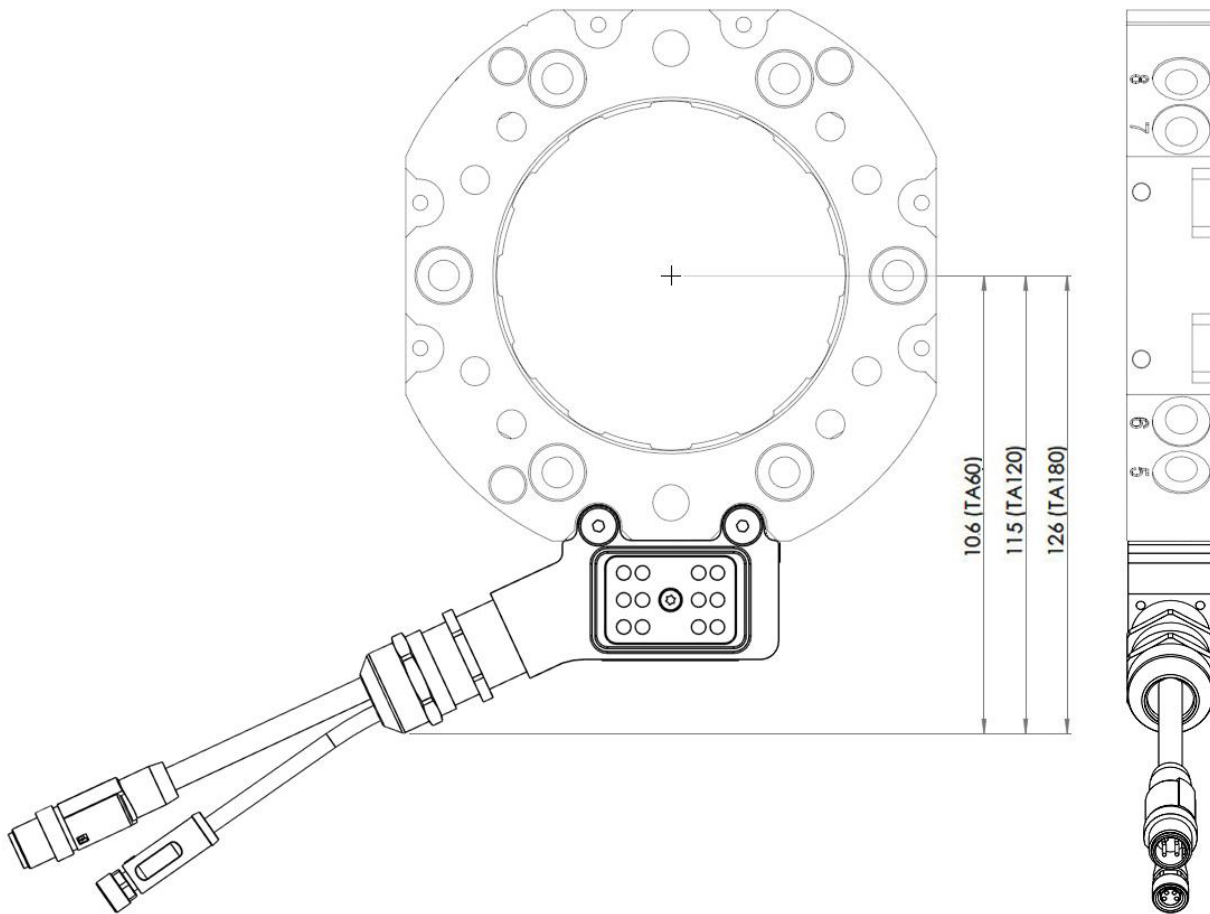
Weight		0.3 kg
Electrical Interface	Circuit diagram Connections, tool side	E0182-123 (section 4.11.1) M8 4S A-coded M12 4S D-coded

4.11.1 Circuit diagram E0182-123 for P3301



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**4.12 Signal module 4 signals (M8 4S) + Profinet (M12 4P), tool side.
Article: P3308**

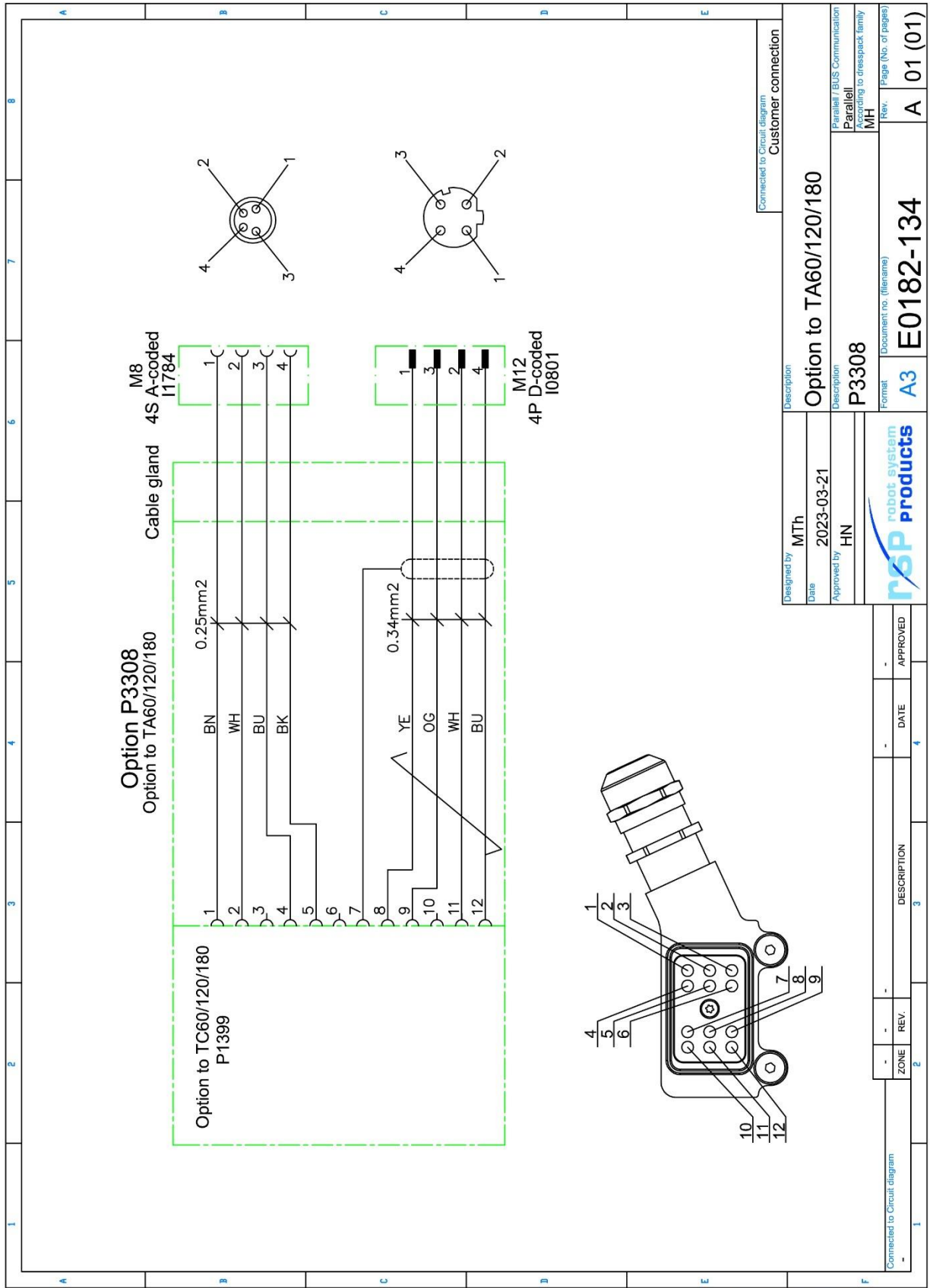


Signal module P3308 transfers 4 electrical and 4 fieldbus signals to the tool. To be mounted on the tool attachment and used together with module P1399 mounted at the tool changer.

Technical data

Weight		0.3 kg
Electrical Interface	Circuit diagram Connections, tool side	E0182-134 (section 4.12.1) M8 4S A-coded M12 4P D-coded

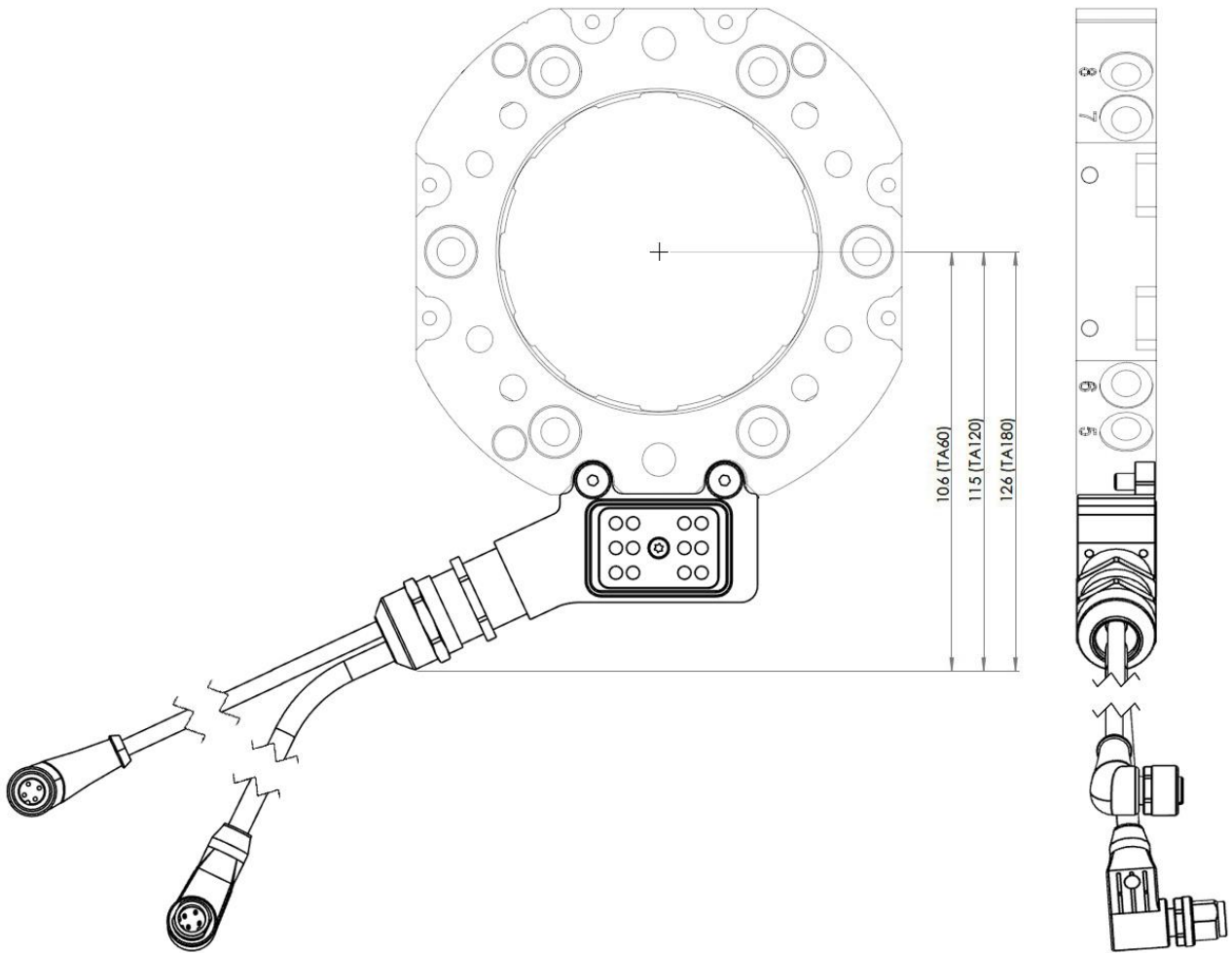
4.12.1 Circuit diagram E0182-134 for P3308



Designed by		MTh	Description		Connected to Circuit diagram
Date		2023-03-21	Option to TA60/120/180		Customer connection
Approved by		HIN	P3308		
Format		A3	Description		
Document no. (filename)		E0182-134	Parallel / BUS Communication		
Rev.		A	According to dresspack family		
Page (No. of pages)		01 (01)	MH		
robot system products					
ZONE	REV.	DATE	DESCRIPTION	APPROVED	
-	-	-	3	4	
Connected to Circuit diagram					

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

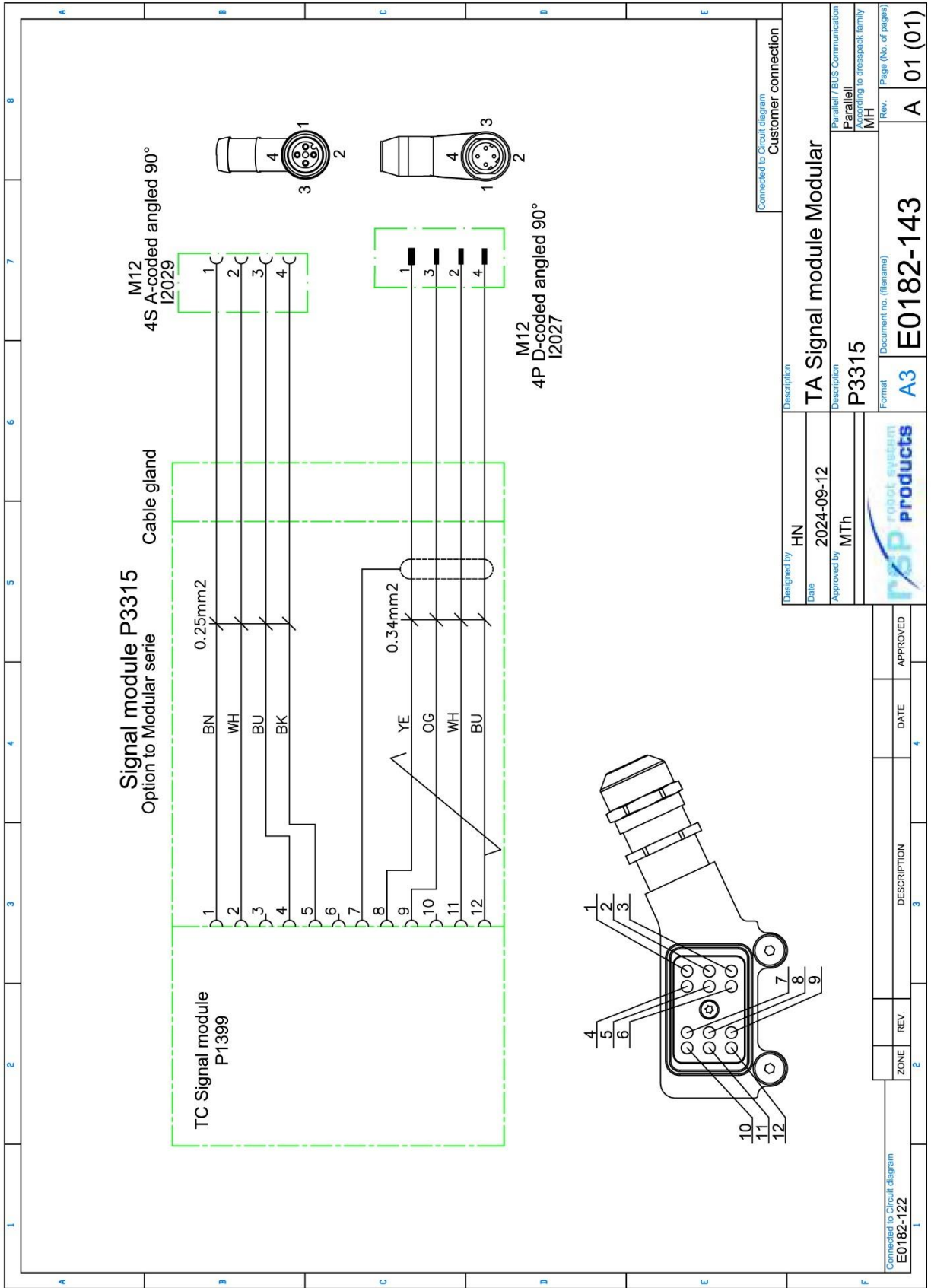


Signal module P3315 transfers 4 electrical and 4 fieldbus signals to the tool. To be mounted on the tool attachment and used together with module P1399 mounted at the tool changer.

Technical data

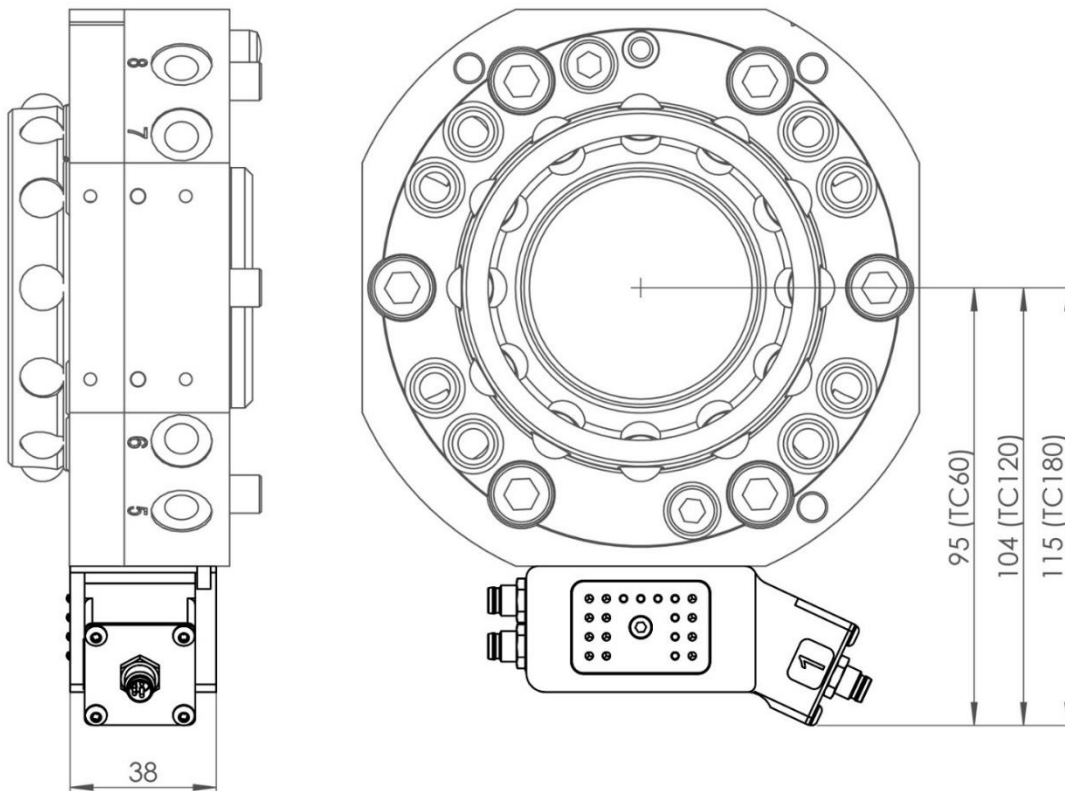
Weight		0.3 kg
Electrical Interface	Circuit diagram Connections, tool side	E0182-143 (section 4.13.1) M12 4S A-coded M12 4S D-coded

4.13.1 Circuit diagram E0182-143 for P3315



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4.14 Signal module 12 x signals (3xM8), robot side. Article: P1381

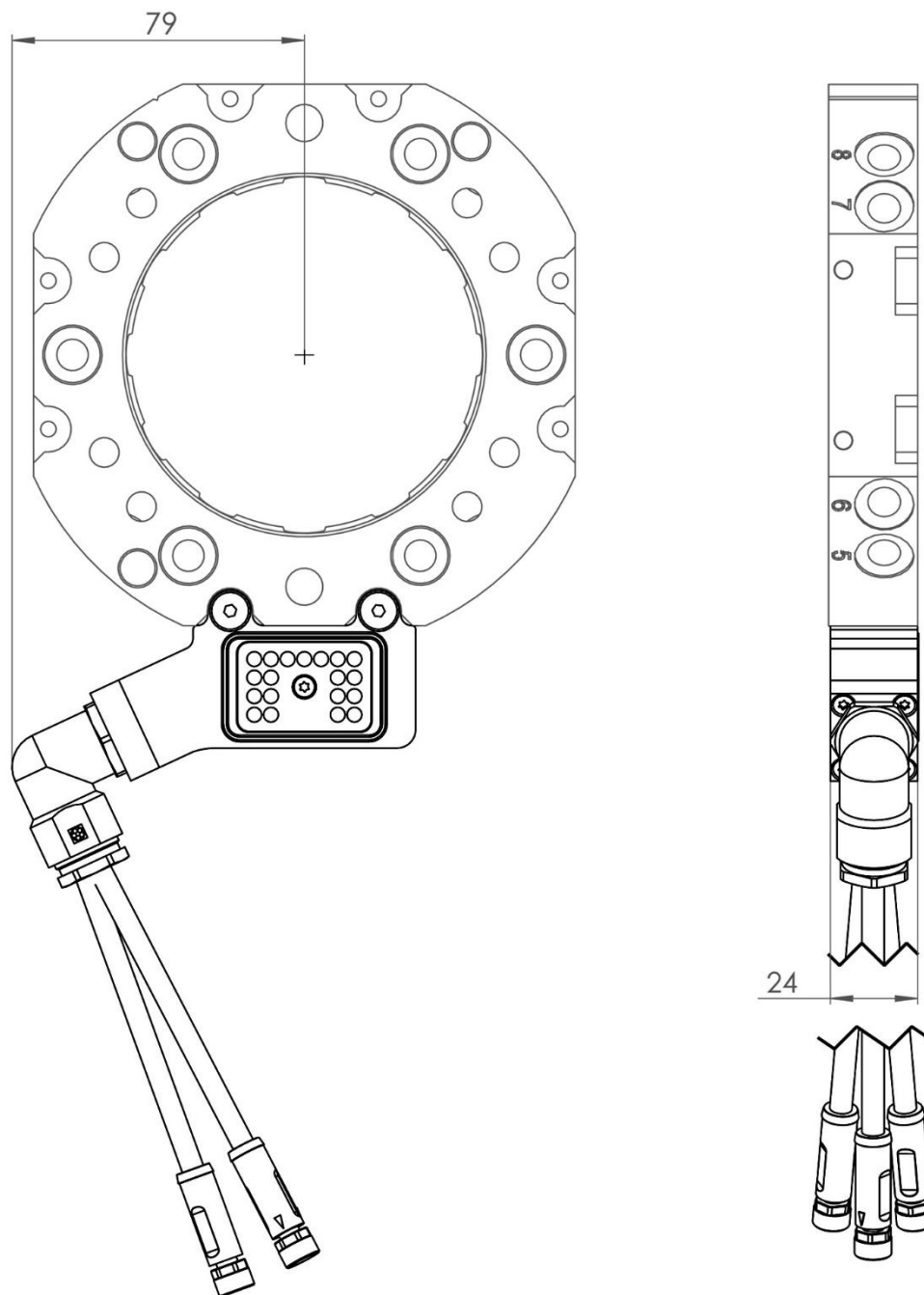


Signal module P1381 transfers 12 electrical signals to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer. To be used together with module P1382 mounted at the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-102 (section 4.15.1)
	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)

4.15 Signal module 12 x signals (3xM8), tool side. Article: P1382

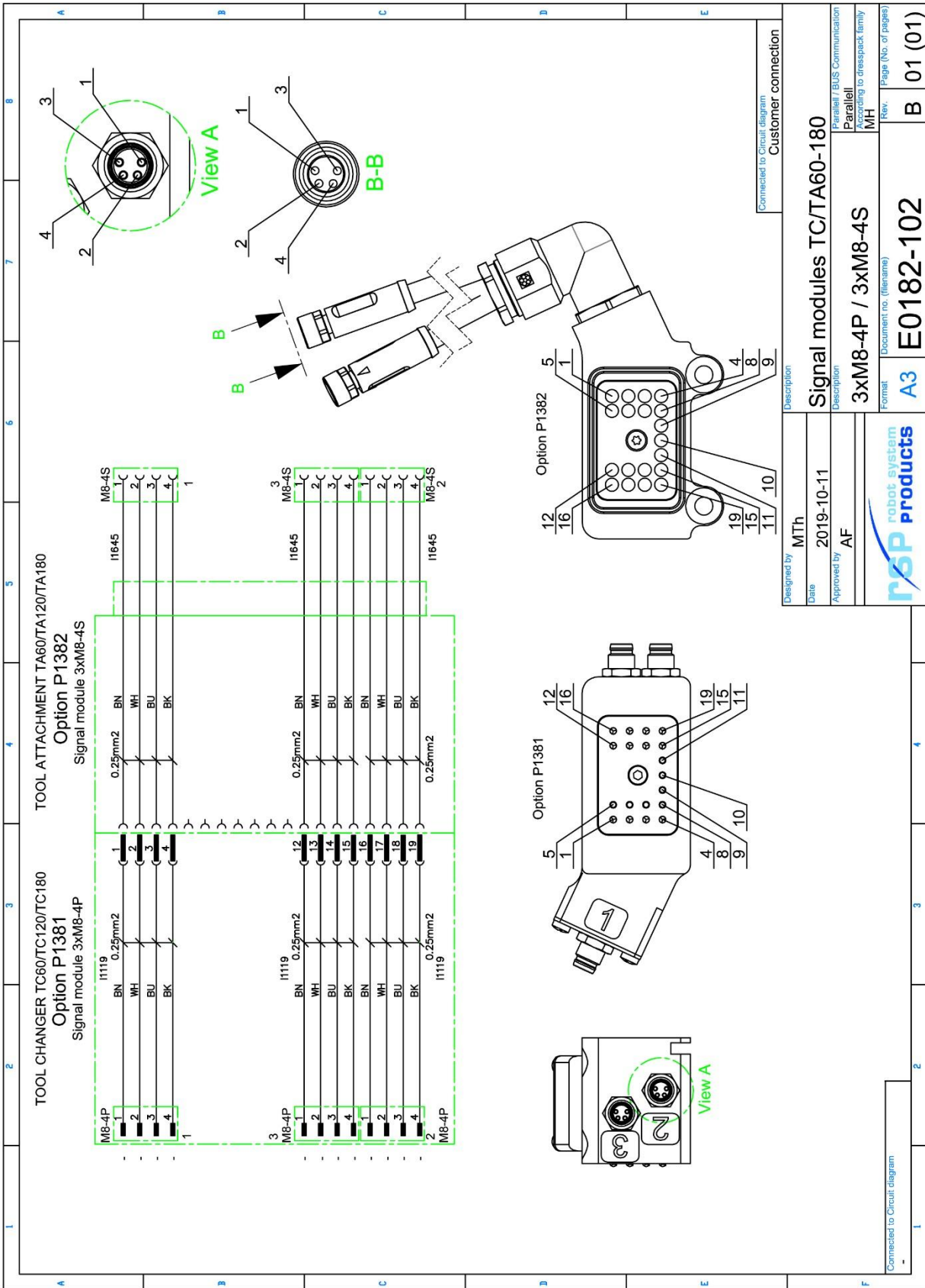


Signal module P1382 transfers 12 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1381 mounted at the tool changer.

Technical data

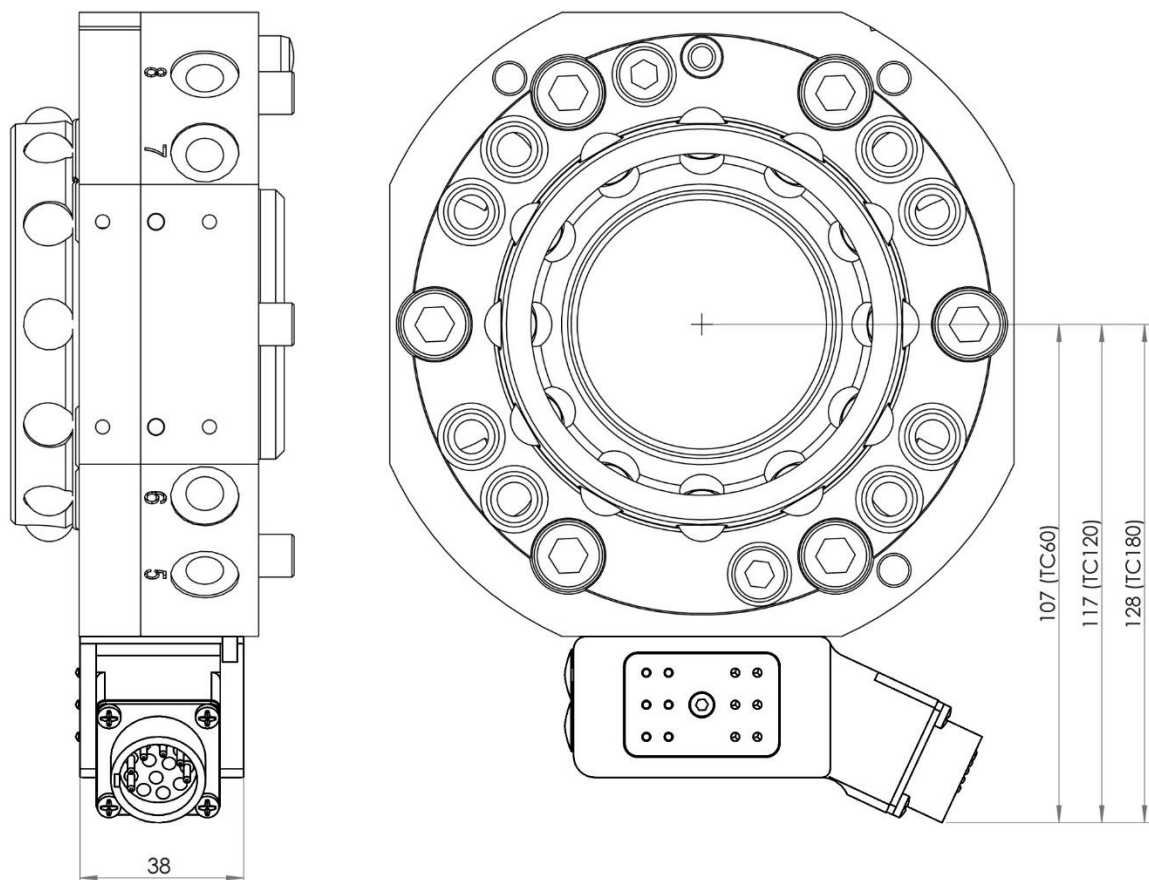
Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-102 (section 4.15.1) 3 X 0.3 m cable with M8 4S (Murrelektronik 7000-08061-6210050)

4.15.1 Circuit diagram E0182-102 for P1381 and P1382



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4.16 Bus module DeviceNet, robot side. Article: P1328

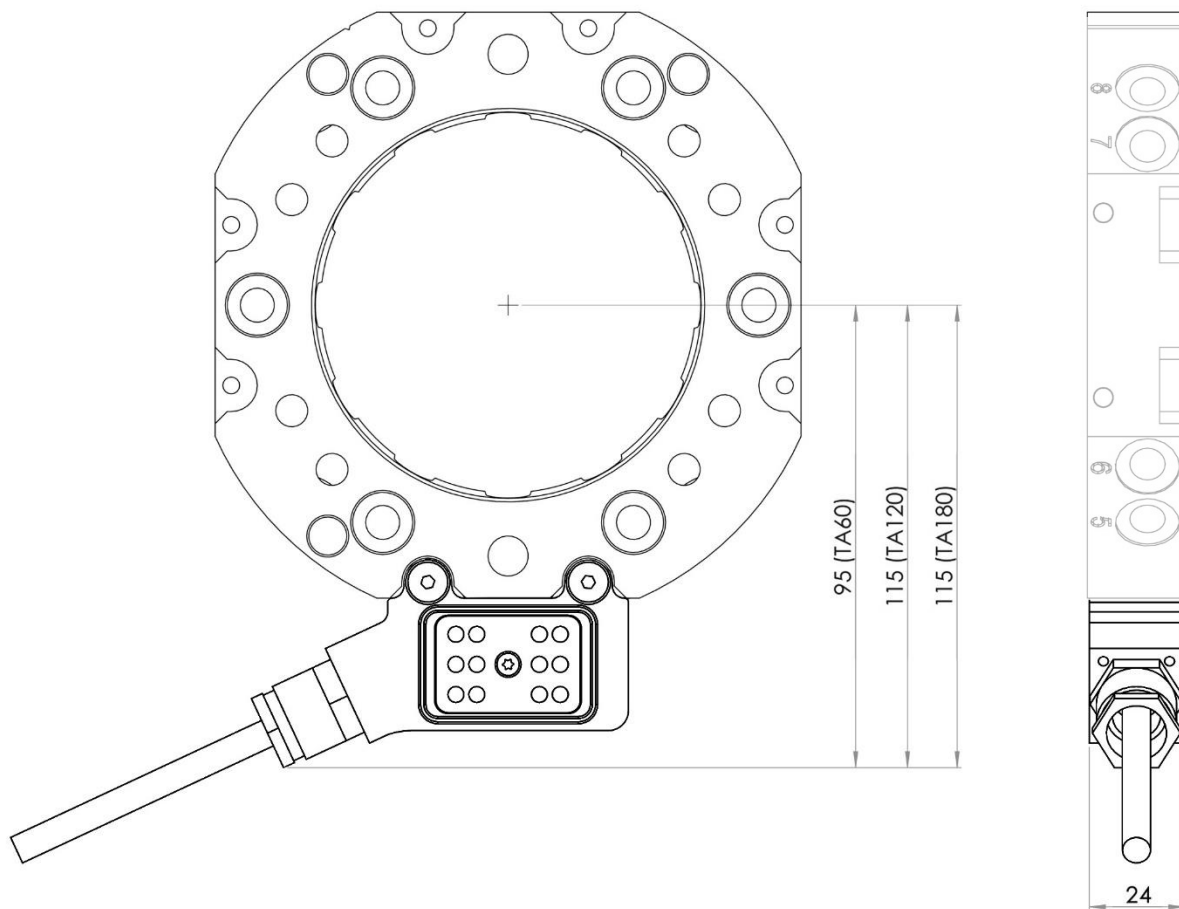


Bus module P1328 transfers 6 fieldbus signals (twister pairs) to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P1329 mounted at the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-005 (section 4.17.1)
	Connection, robot side	Souriau 12P (UT001412PH)
	Bus available at tool	6 x InterBus / DeviceNet

4.17 Bus module DeviceNet, tool side. Article: P1329

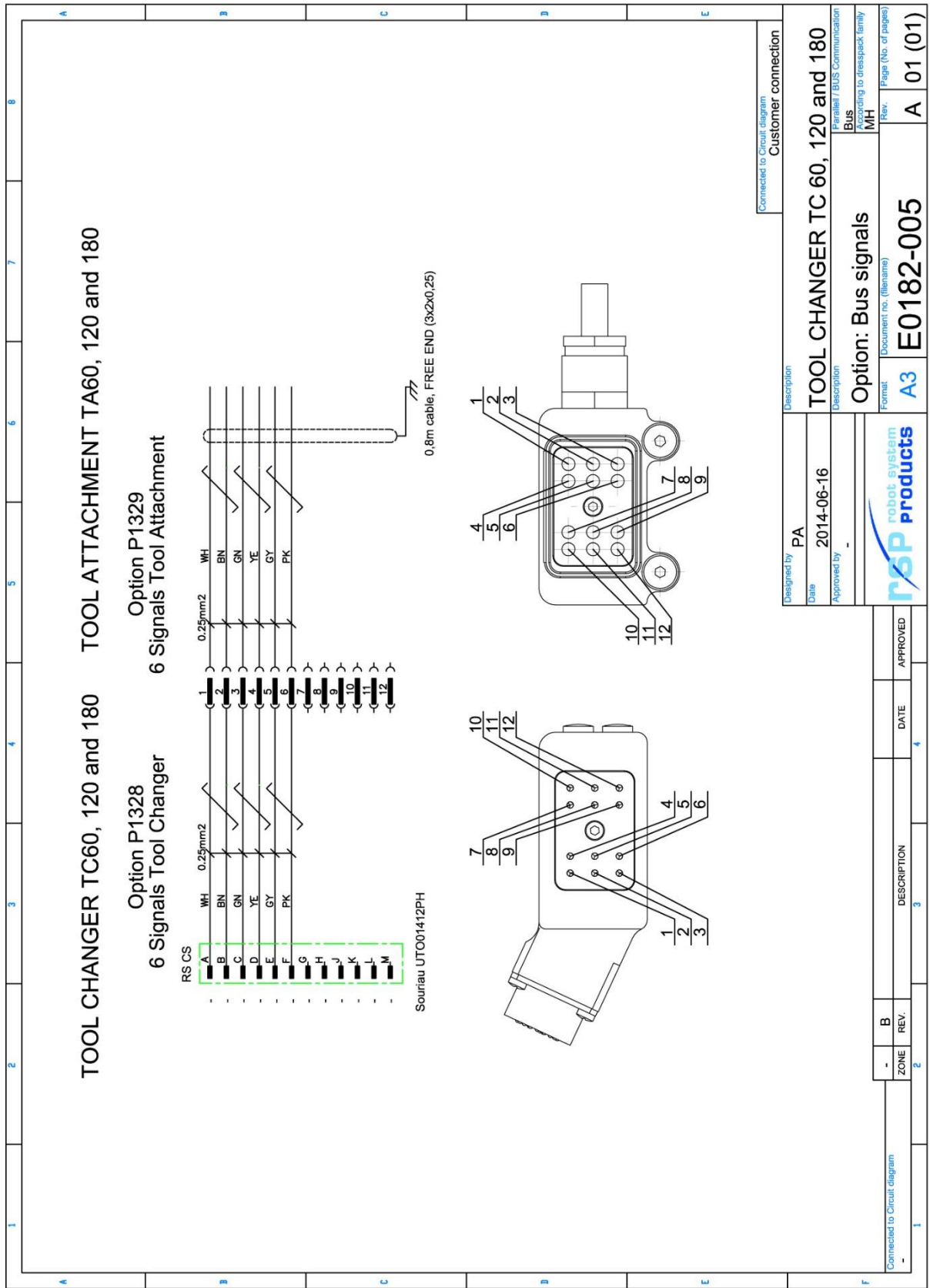


Bus module P1329 transfers 6 fieldbus signals (twister pairs) to the tool. To be mounted on the tool attachment and used together with module P1328 mounted at the tool changer.

Technical data

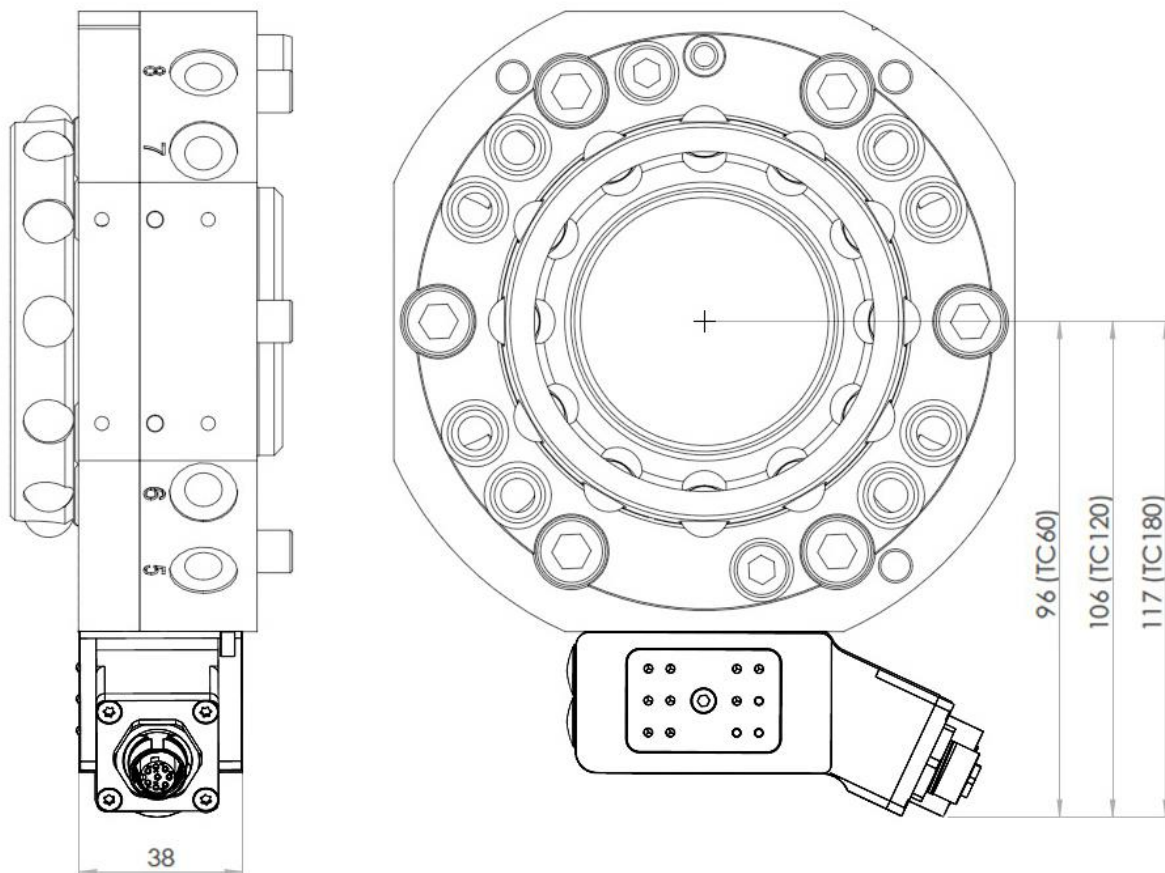
Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-005 (section 4.17.1)
	Connection, tool side	1.0 m cable (3x2x0.25 mm ²), open end

4.17.1 Circuit diagram E0182-005 for P1328 and P1329



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

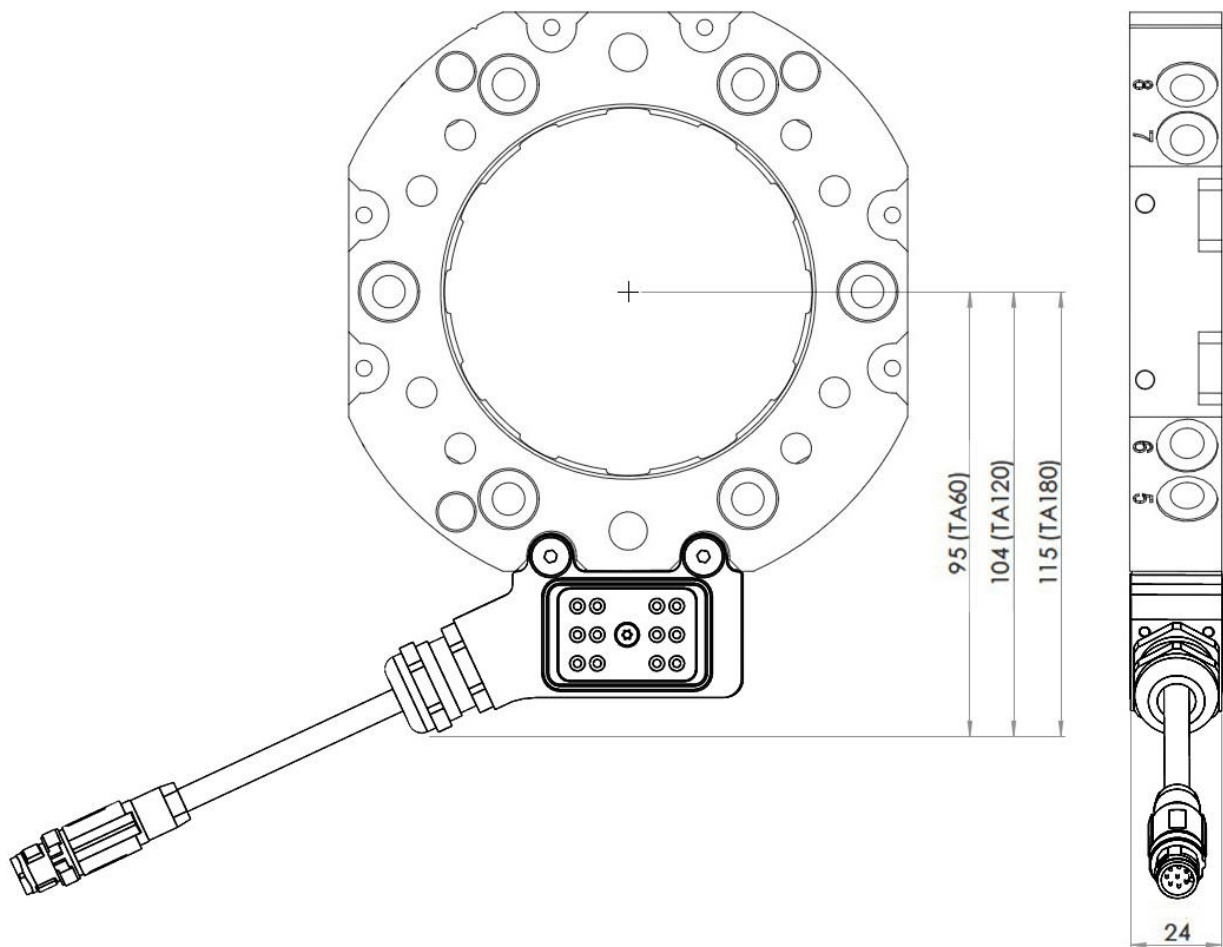


Bus module P1340 transfers 8 Ethernet signals (4 pairs) to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer. To be used together with module P1341 mounted at the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-055 (section 4.19.1)
	Connection, robot side	M12 8S A-coded, (Phoenix 1407877)
	Bus available at tool	8 x Ethernet (1 Gbit/s)

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

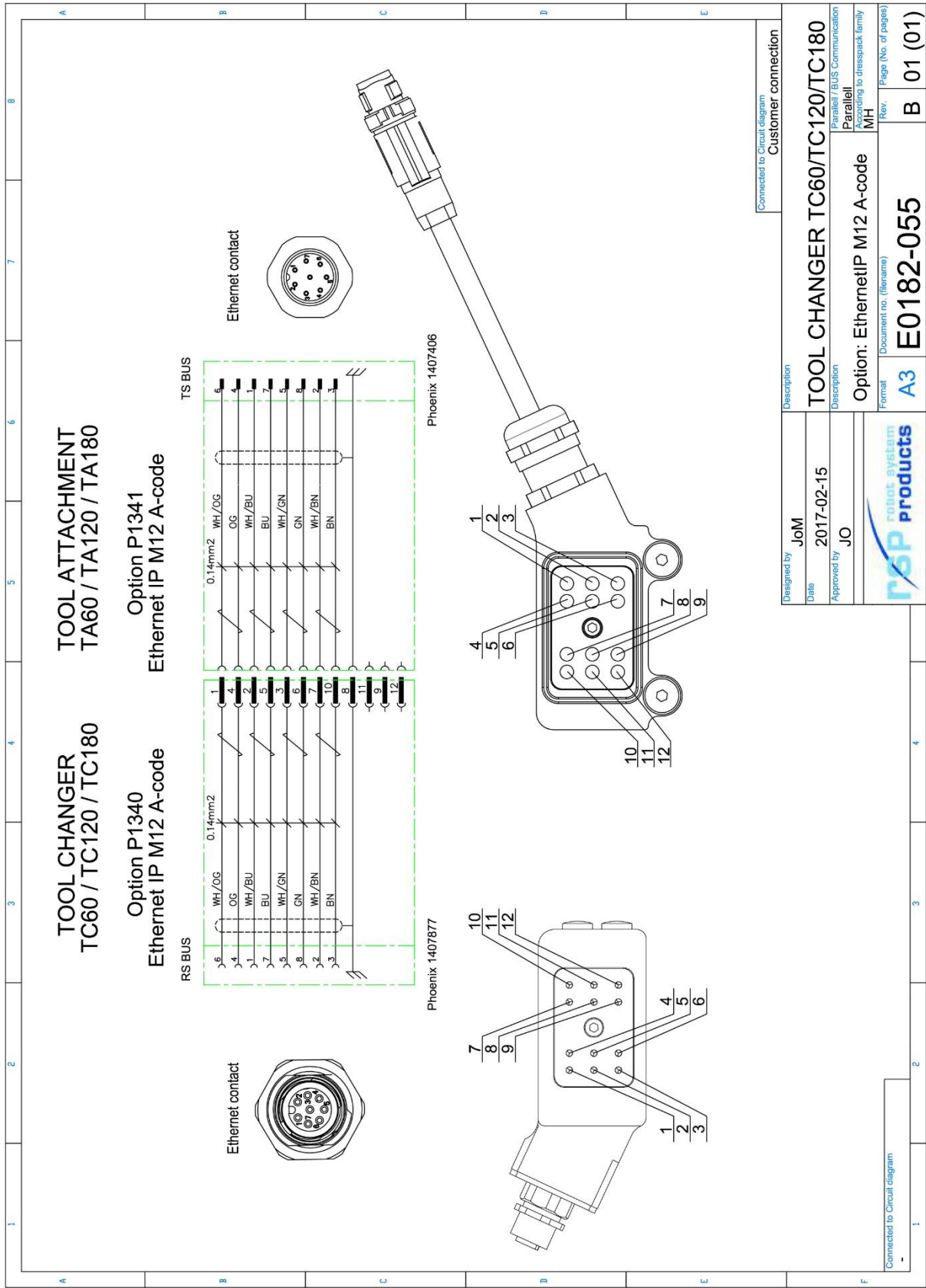


Bus module P1341 transfers 8 Ethernet signals (4 pairs) to the tool. To be mounted on the tool attachment and used together with module P1340 mounted at the tool changer.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-055 (section 4.19.1) 1 m cable with M12 8P A-coded (Phoenix 1407406)

4.19.1 Circuit diagram E0182-055 for P1340 and P1341

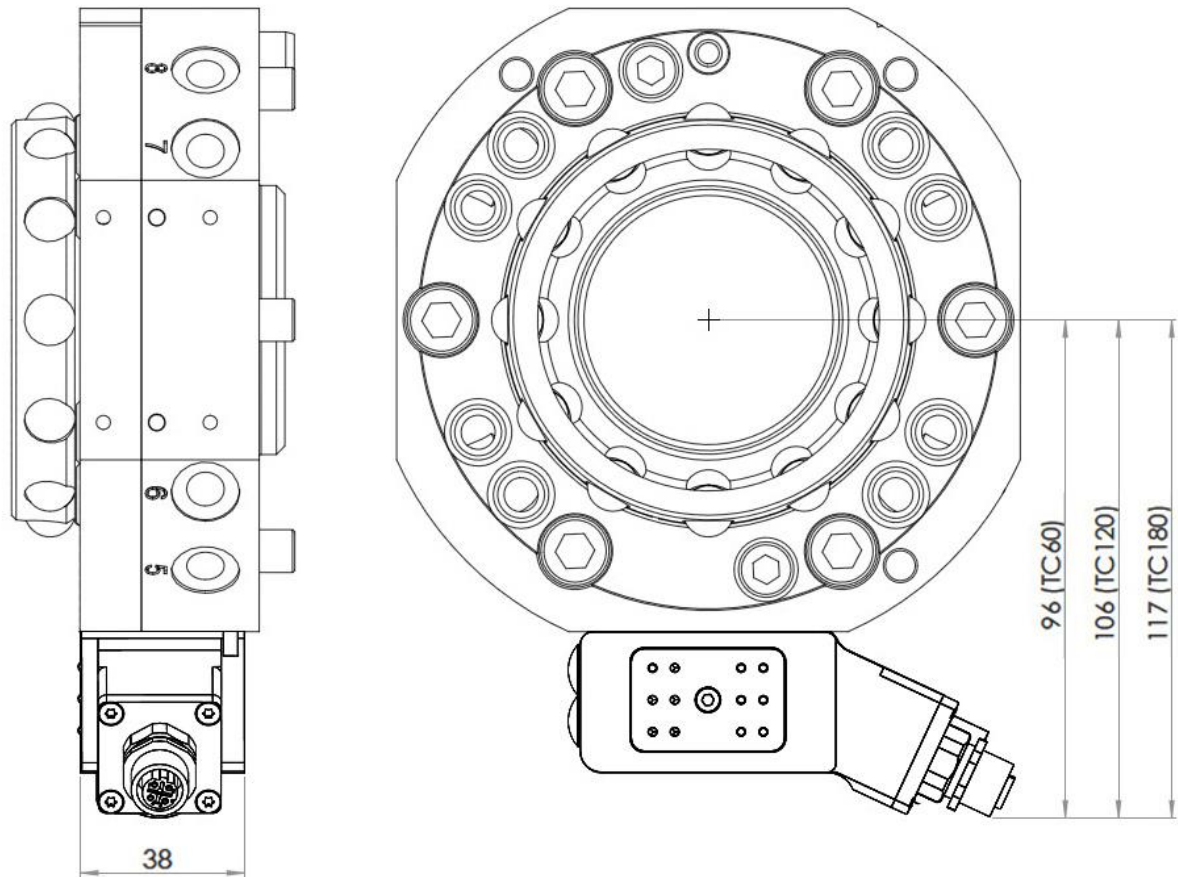


Designed by		JoM	
Date		2017-02-15	
Approved by		JO	
Description		TOOL CHANGER TC60/TC120/TC180	
Description		Parallel / BUS Communication	
Option: EthernetIP M12 A-code		Parallel	
Document no. (filename)		E0182-055	
Format		A3	
Page (No. of pages)		B 01 (01)	

Connected to Circuit diagram: Customer connection

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

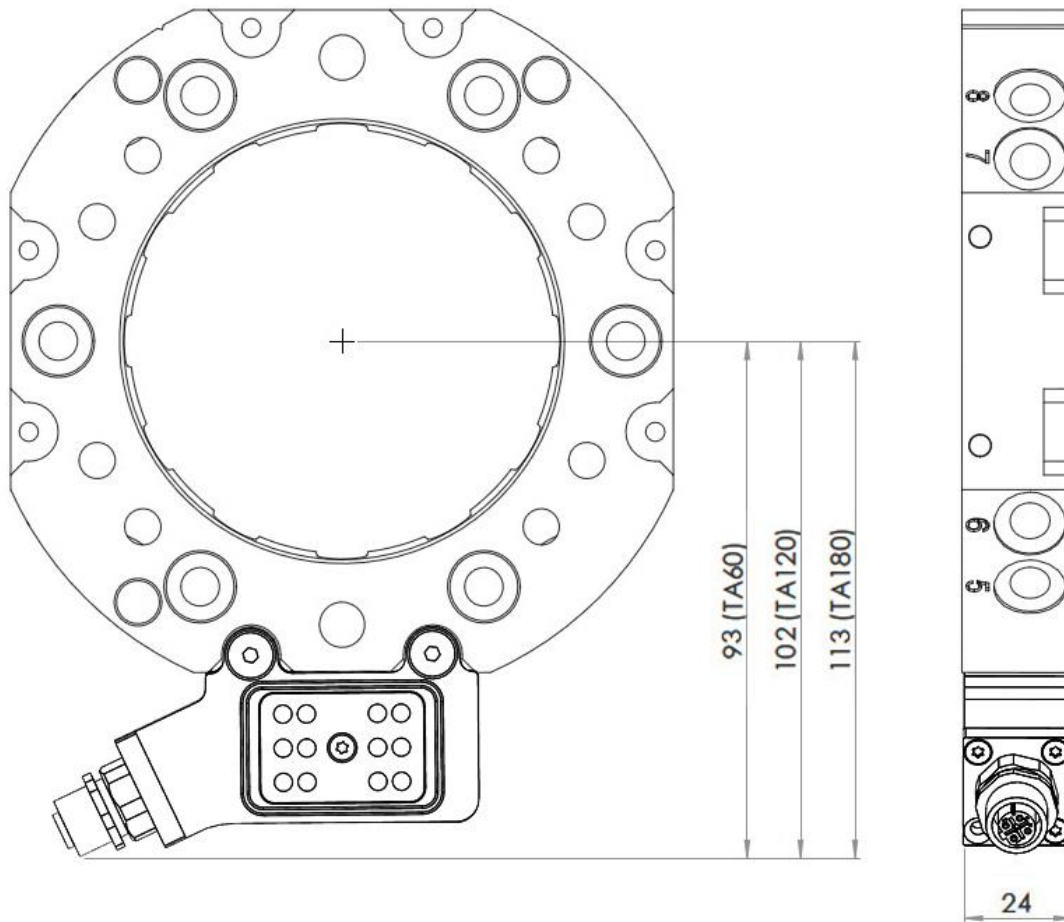


Bus module P1346 transfers 4 Profinet signals (2 pairs) to the tool attachment through spring loaded signal pins. Can be mounted at three different positions on the tool changer. To be used together with module P1347 mounted at the tool attachment.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-063 (section 4.21.1)
	Connection, robot side	M12 4S D-coded (Phoenix 1528484)
	Bus available at tool	4 x Profinet (100 Mbit/s)

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

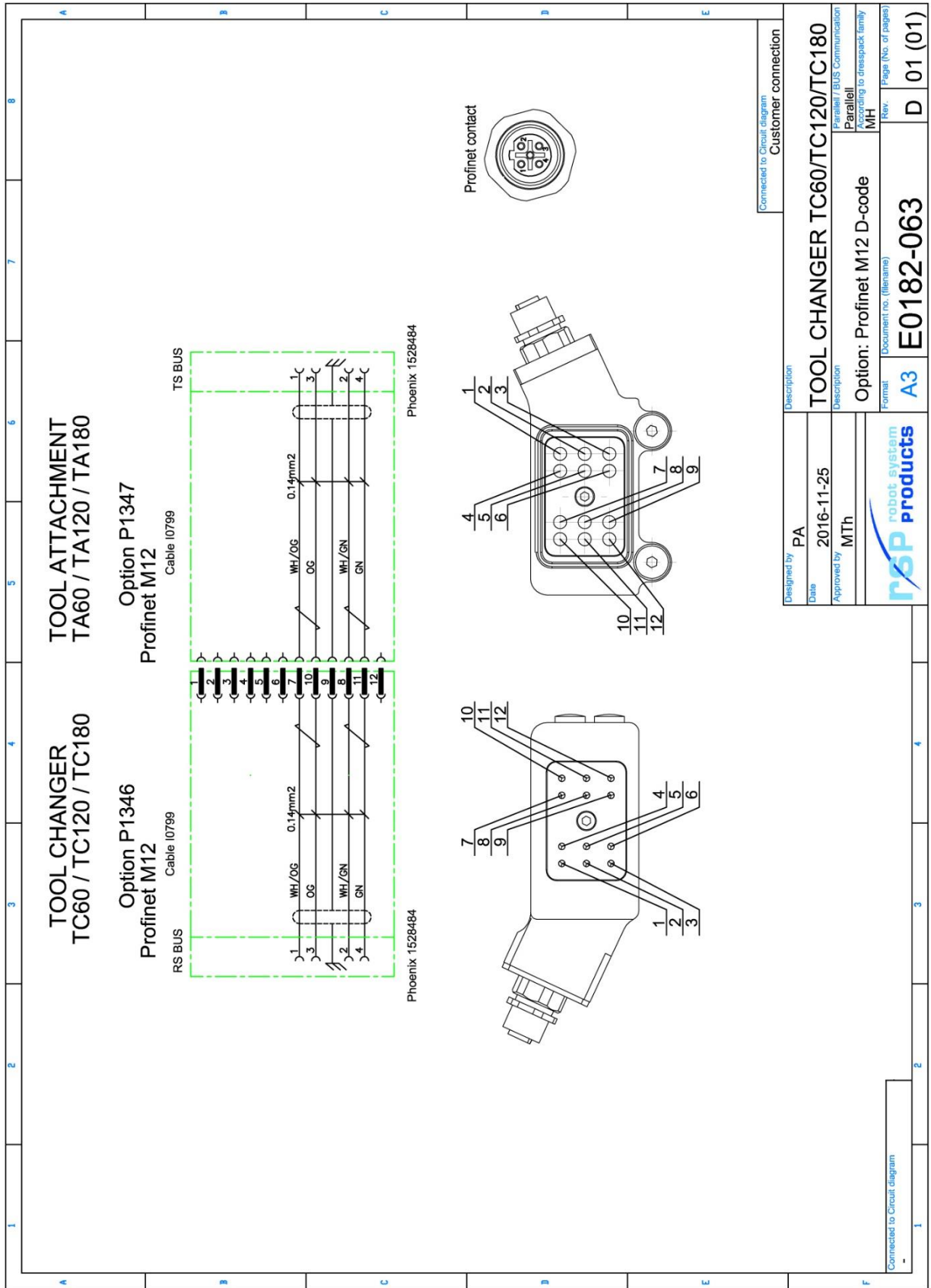


Bus module P1347 transfers 4 Profinet signals (2 pairs) to the tool. To be mounted on the tool attachment and used together with module P1346 mounted at the tool changer.

Technical data

Weight		0.1 kg
Electrical Interface	Circuit diagram	E0182-063 (section 4.21.1)
	Connection, tool side	M12 4S D-coded (Phoenix 1528484)

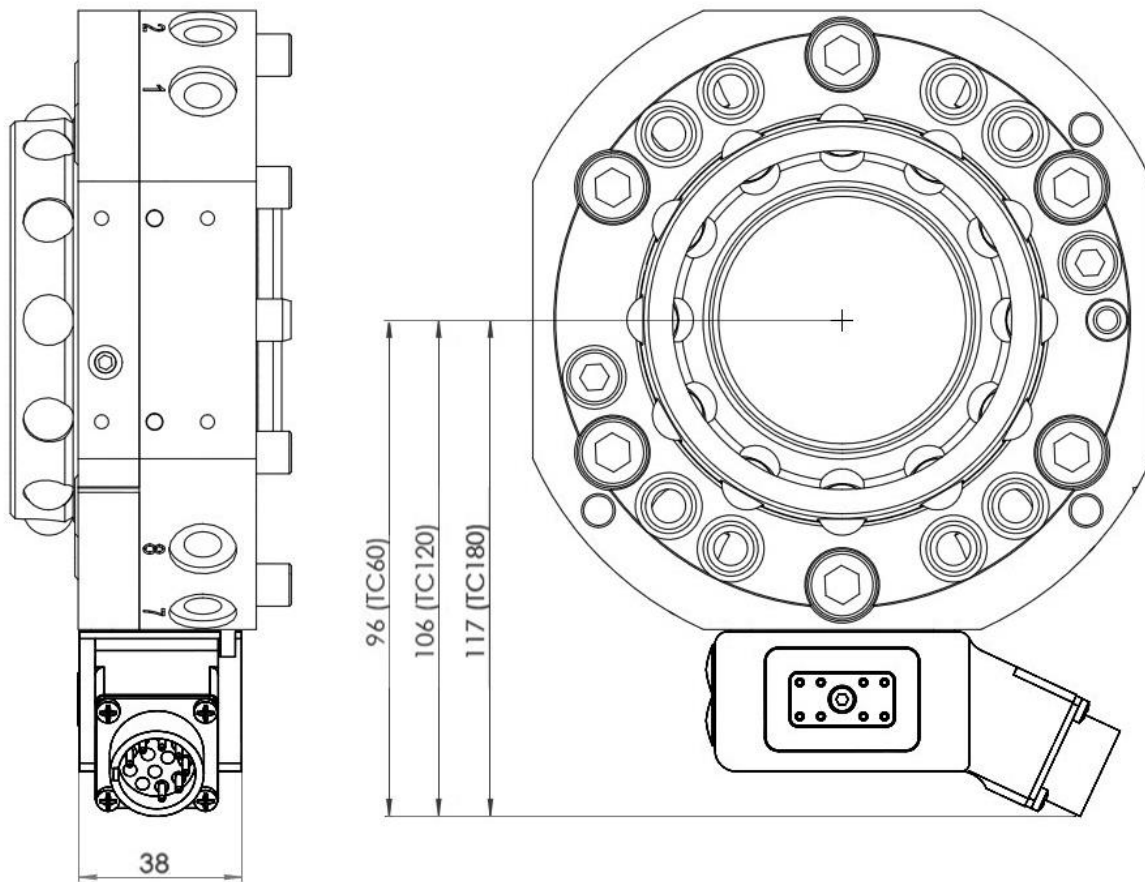
4.21.1 Circuit diagram E0182-063 for P1346 and P1347



Designed by PA		Description	
Date	2016-11-25	TOOL CHANGER TC60/TC120/TC180	
Approved by	MTH	Description	
Option: Profinet M12 D-code		Parallel / BUS Communication	
Format	Document no. (filename)	According to dresspack family	
A3	E0182-063	MH	
Rev. (No. of pages)		Rev.	
D		01 (01)	

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4.22 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 mounted at the tool attachment.

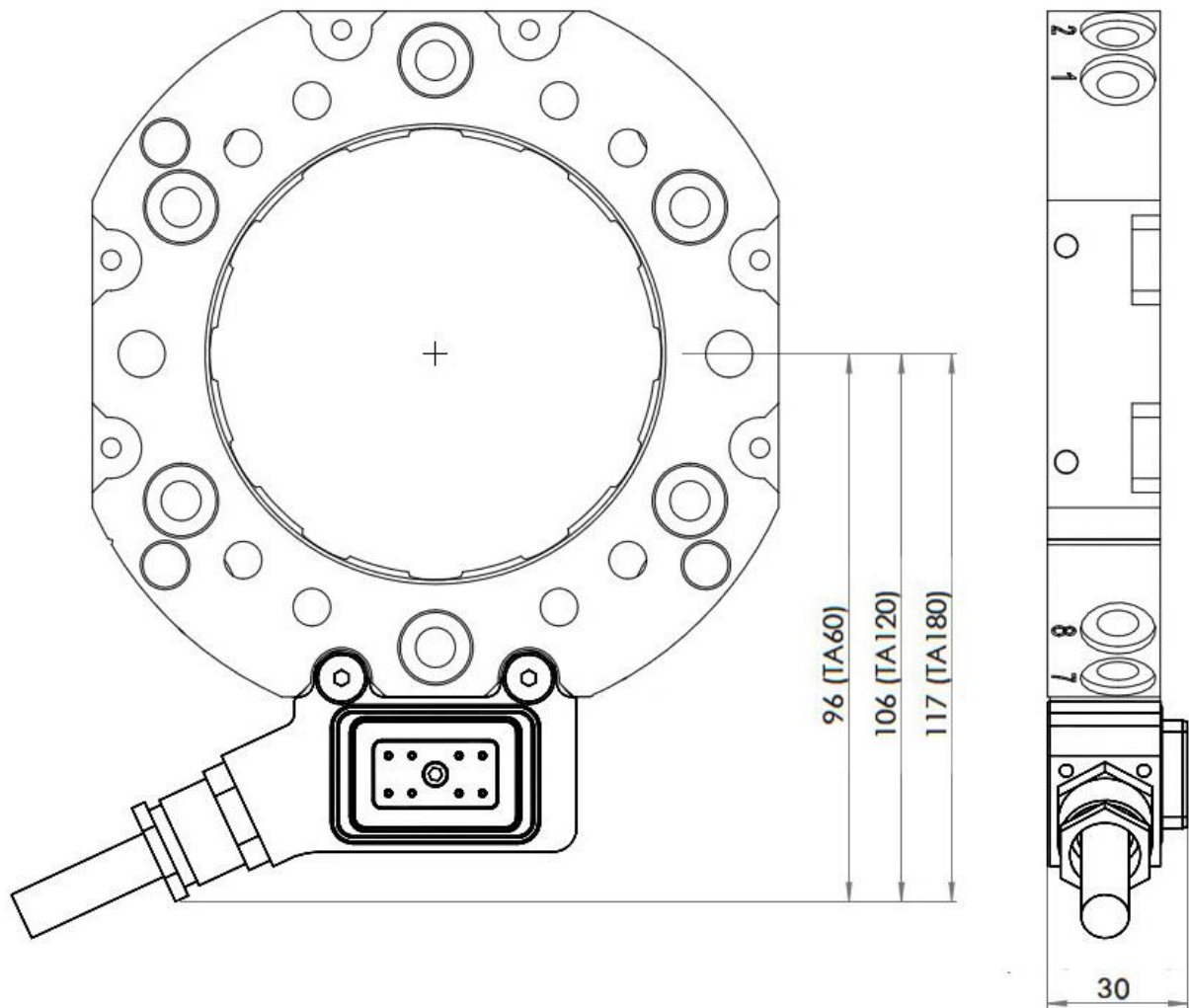


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1307 with P1308.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-003 (section 4.23.1)
	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

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

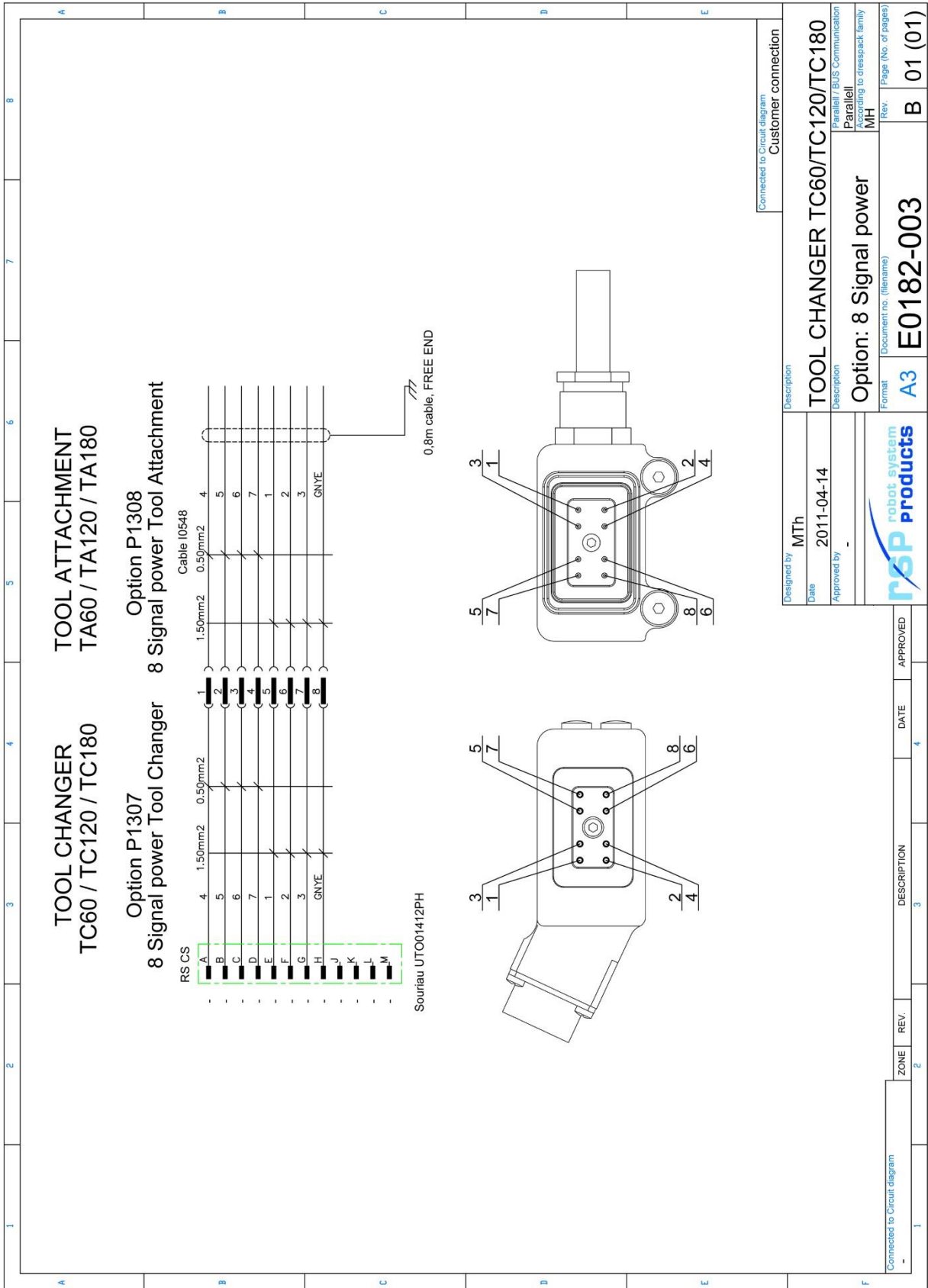


Power module P1308 transfers 8 power signals to the tool. To be mounted on the tool attachment and used together with module P1307 mounted at the tool changer.

Technical data

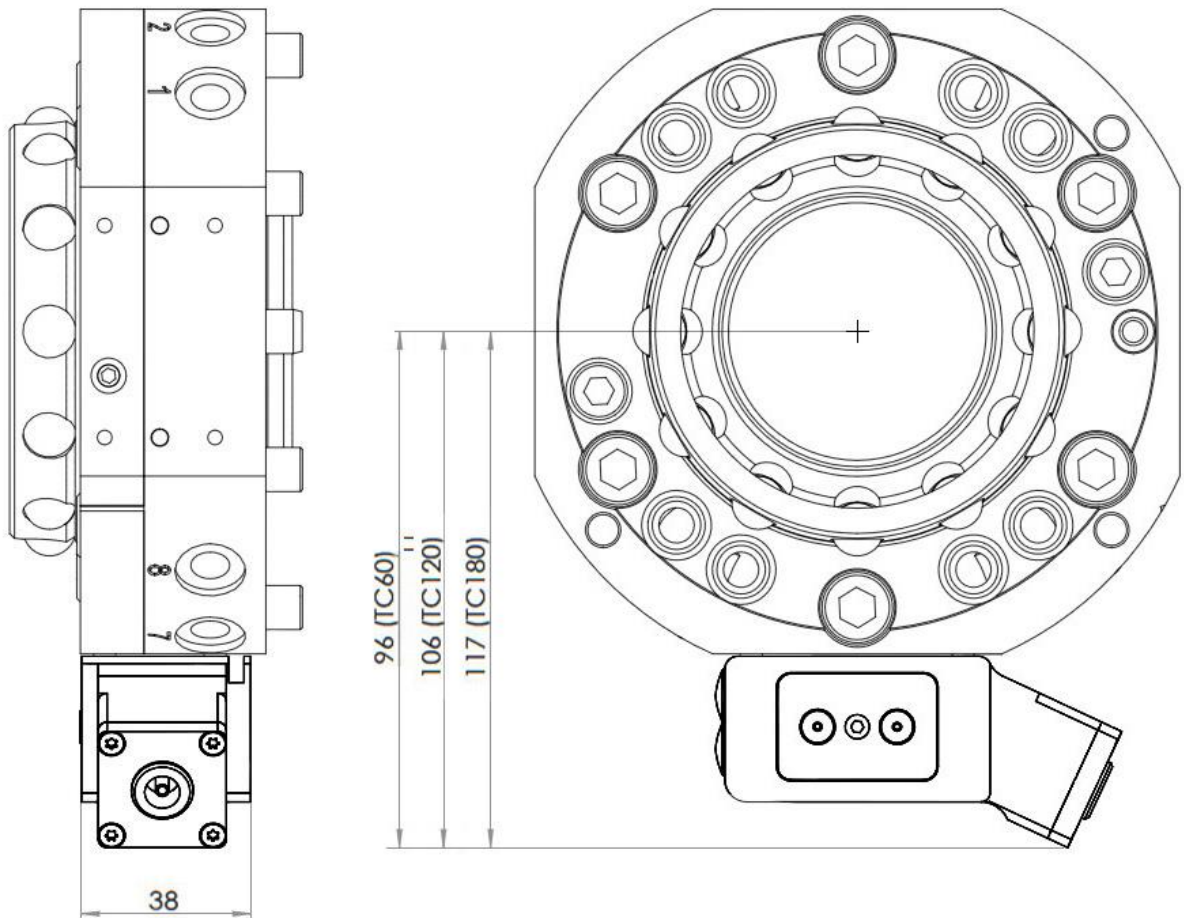
Weight		0.1 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-003 (section 4.23.1) 1.0 meter cable, open end

4.23.1 Circuit diagram E0182-003 for P1307 and P1308



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4.24 High voltage module, robot side. Article: P1322



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

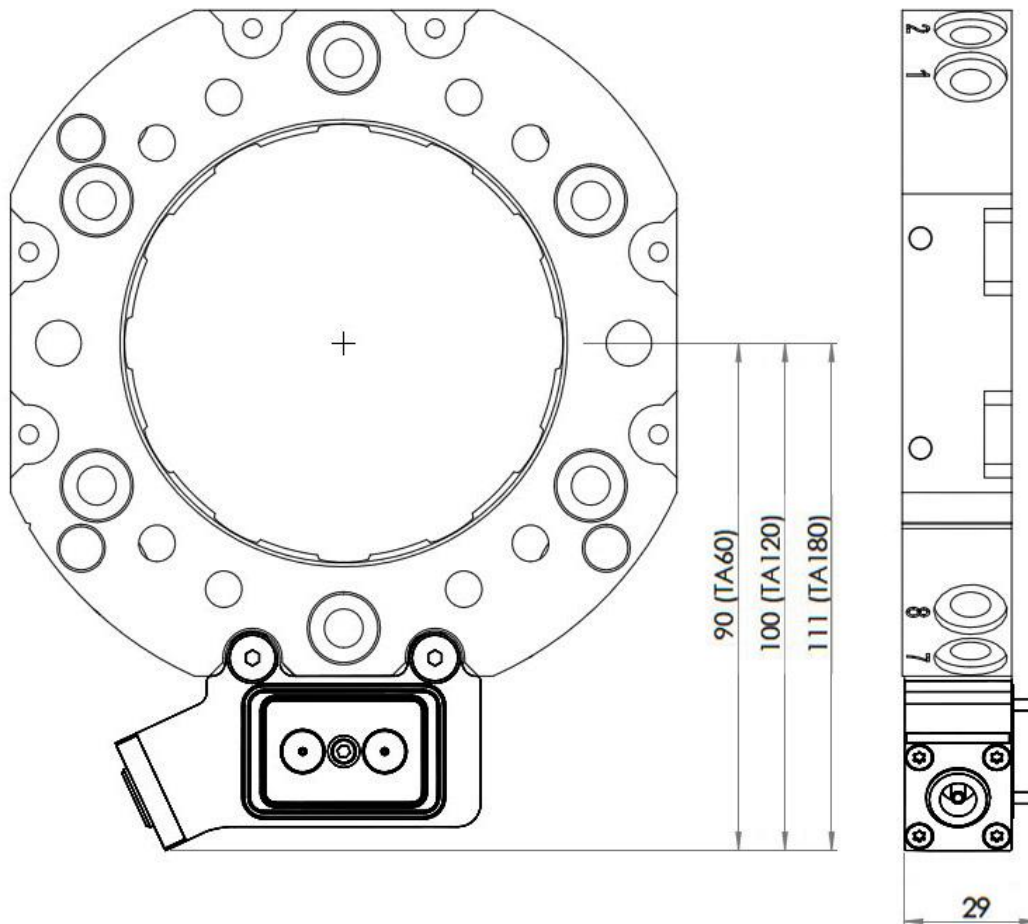


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1322 with P1323.

Technical data

Weight		0.15 kg
Electrical Interface	Circuit diagram	E0182-026 (section 4.25.1)
	Connection, robot side	Lemo ERA.1S.250.CTL
	Signals available at tool	1 x 12A (1000V AC or 1400V DC)

4.25 High voltage module, tool side. Article: P1323

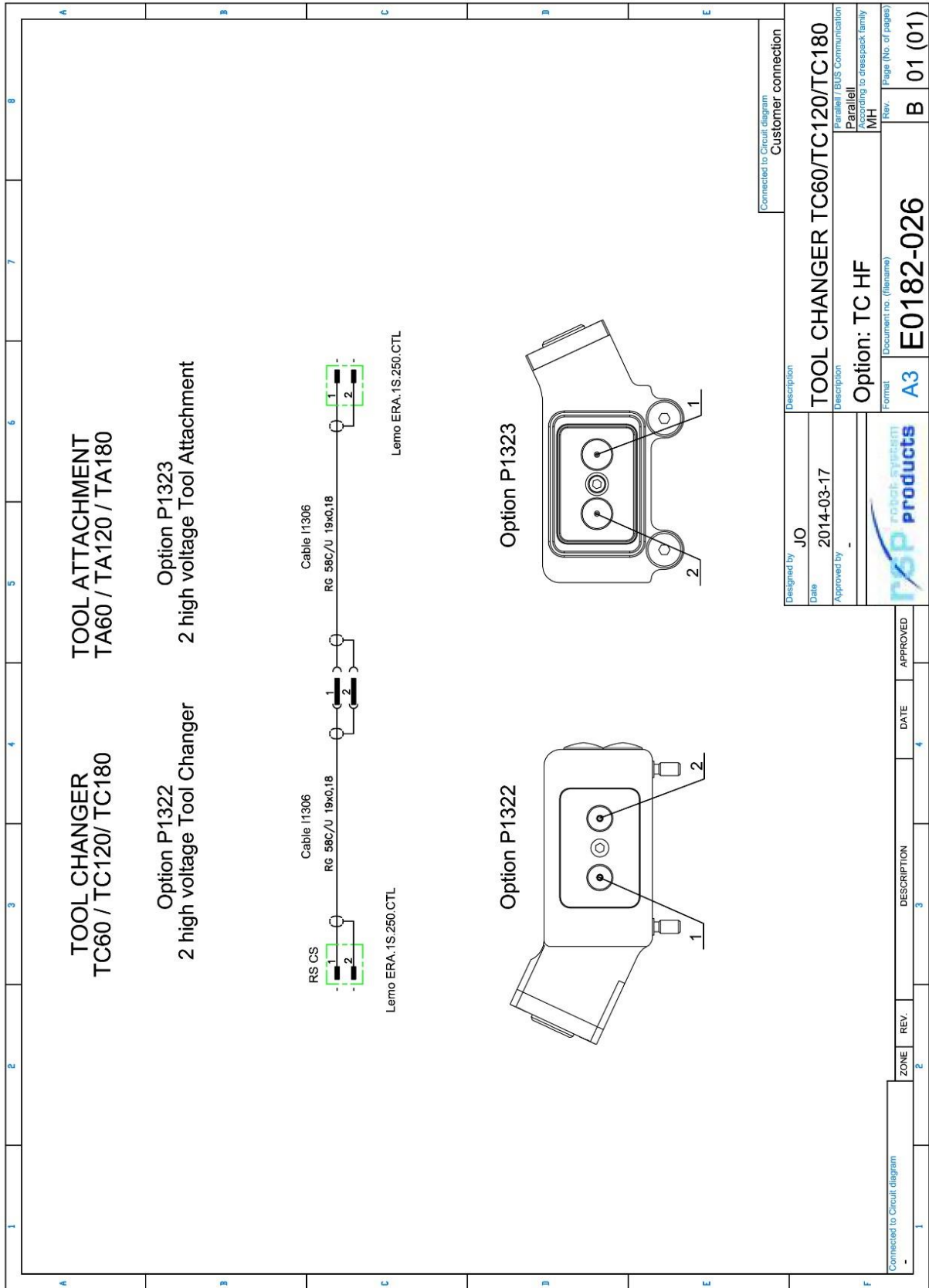


High voltage module P1323 transfers 1 high voltage power signals to the tool. To be mounted on the tool attachment and used together with module P1322 mounted at the tool changer

Technical data

Weight		0.15 kg
Electrical Interface	Circuit diagram	E0182-026 (section 4.25.1)
	Connection, tool side	Lemo ERA.1S.250.CTL

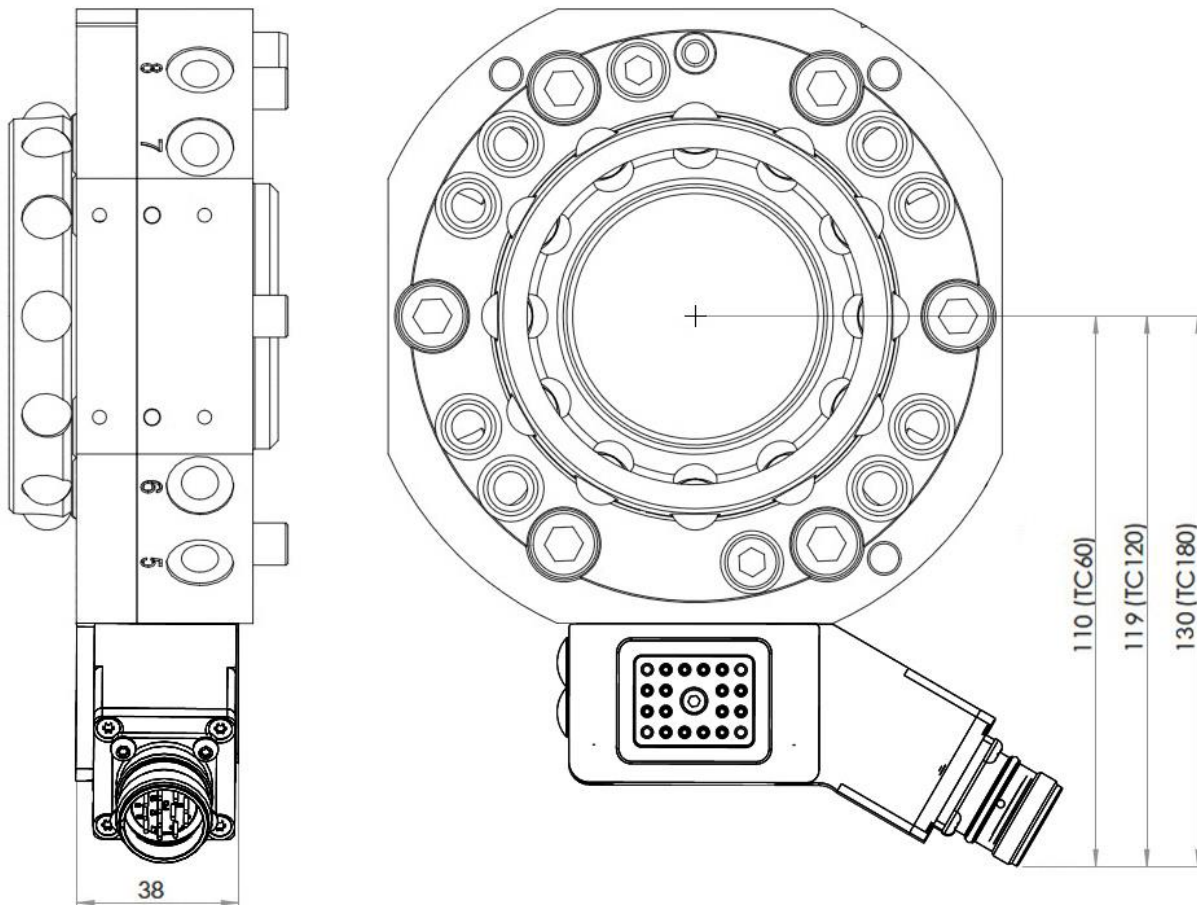
4.25.1 Circuit diagram E0182-026 for P1322 and P1323



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5 LARGE MODULES

5.1 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 mounted at the tool attachment.

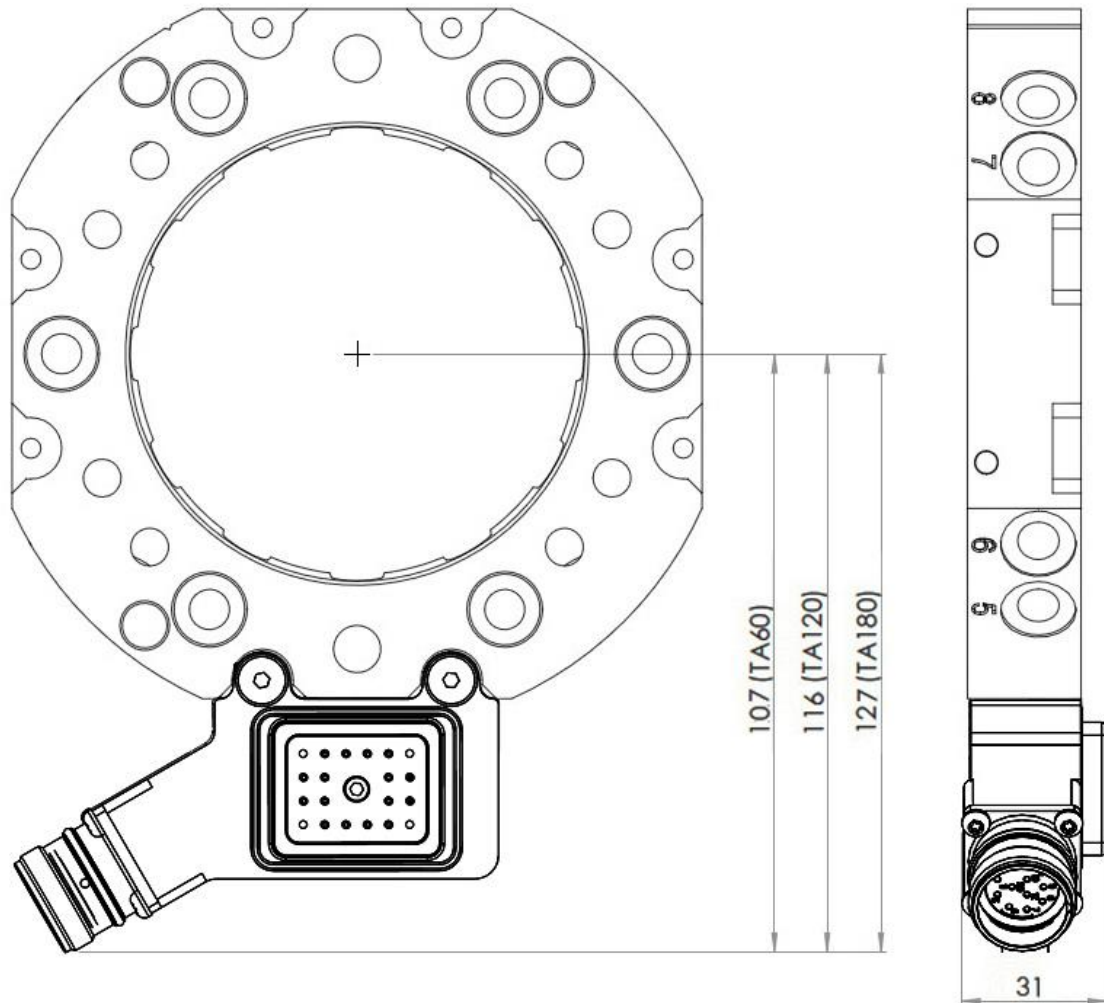


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1354 with P1355.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-073 (section 5.2.1)
	Connection, robot side	M23 12P (Phoenix 1592574, insert 1597635)
	Total signals available at tool	12 x (2A, 60V) + PE

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

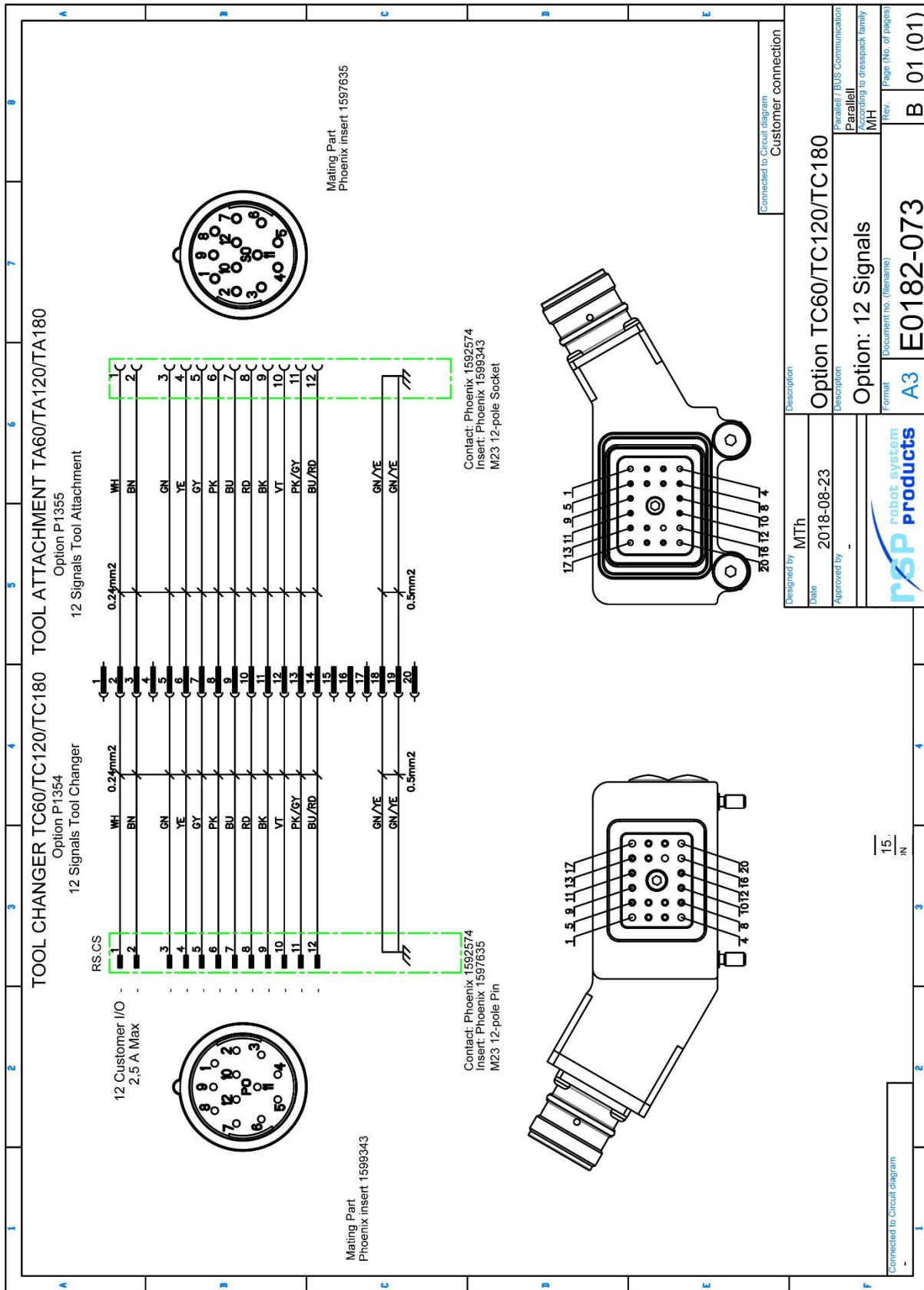


Signal module P1355 transfers 12 signals to the tool. To be mounted on the tool attachment and used together with module P1354 mounted at the tool changer.

Technical data

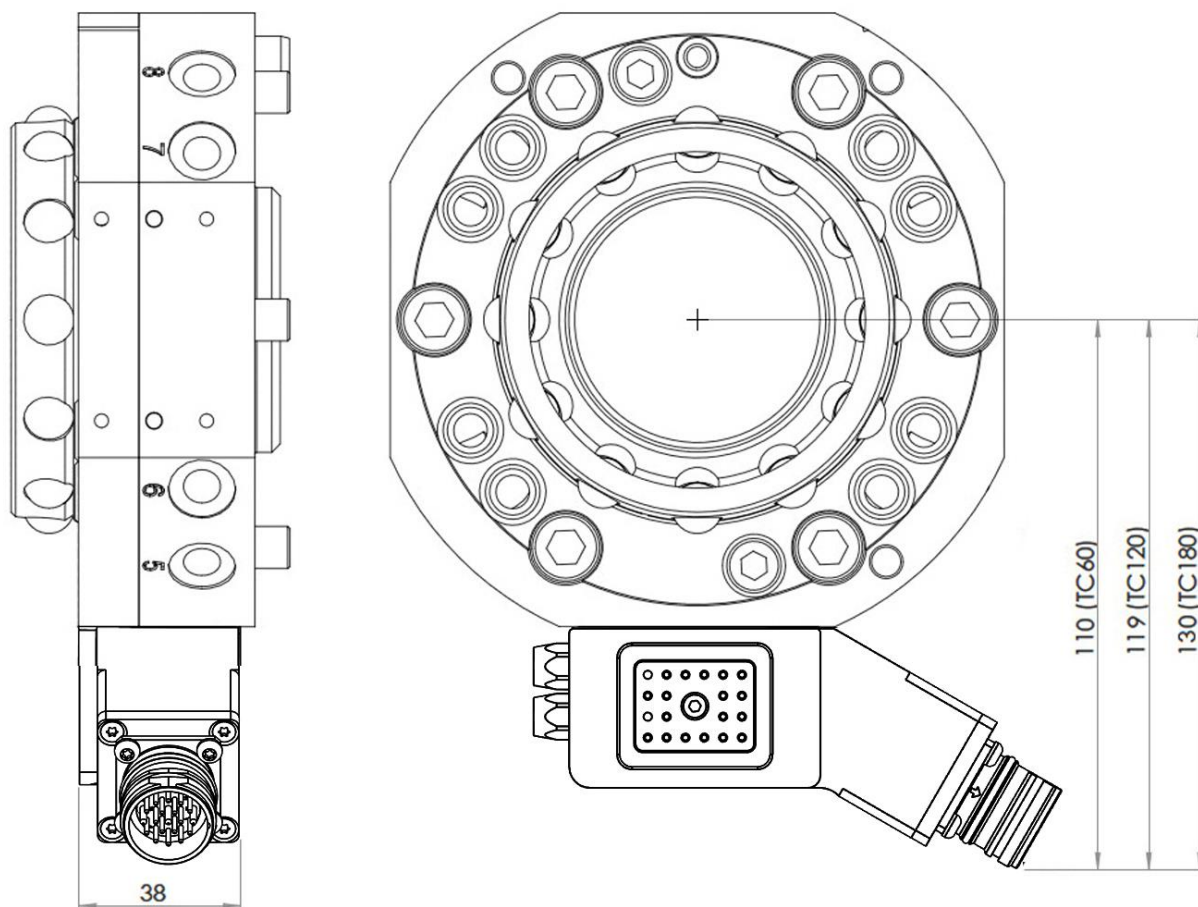
Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-073 (section 5.2.1) M23 12S (Phoenix 1592574, insert 1599343)

5.2.1 Circuit diagram E0182-073 for P1354 and P1355



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5.3 Signal module 17 x signals (for TC opened/closed sensor), robot side. Article: P1389



Signal module P1389 transfers 17 electrical signals to the tool attachment. Can be mounted at three different positions on the tool changer. To be used together with modules P1390 or P3324 mounted at the tool attachment. On the housing 2 separate M8-contacts are mounted for connection of TC magnetic sensor opened/closed P1324.

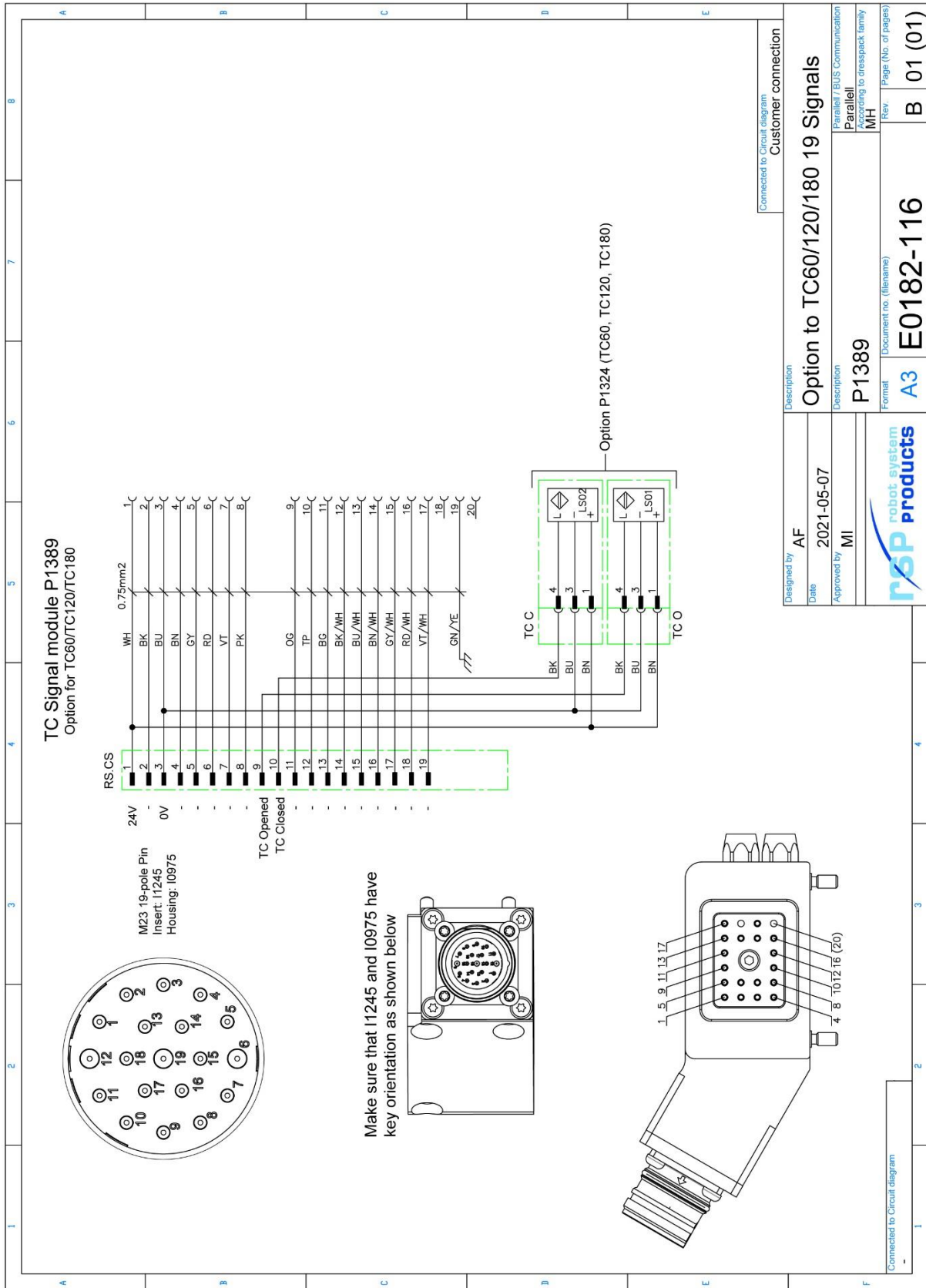


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1389 with P1390 or P3324.

Technical data

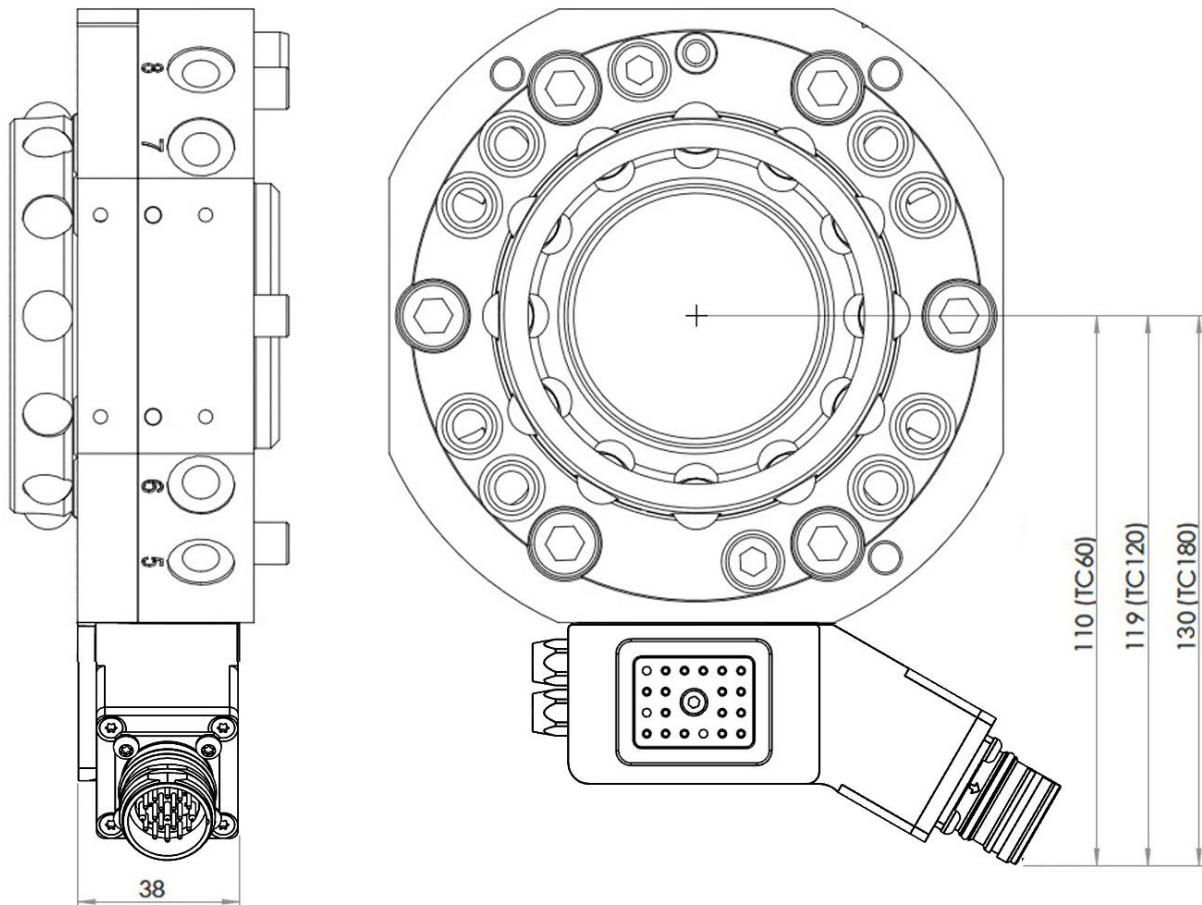
Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-116 (section 5.3.1)
	Connection, robot side Total signals	M23 19P (Hummel 7.410.000.000, insert 7.004.919.101) 19 x (2A, 60V) + PE
Sensor Interface	Dedicated signals	TC Opened, TC Closed
	Signals available at tool	15 + 24V, 0V
Sensor Interface	M8 3S, A-coded	24V, 0V, TC Opened
	M8 3S, A-coded	24V, 0V, TC Closed

5.3.1 Circuit diagram E0182-116 for P1389



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5.4 Signal module 16 x signals (for opened/closed and TA present sensors), robot side. Article: P3328



Signal module P3328 transfers 16 electrical signals to the tool attachment. Can be mounted at three different positions on the tool changer. To be used together with modules P1390 or P3324 mounted at the tool attachment. On the housing 3 separate M8-contacts are mounted for connection of TC magnetic sensor opened/closed P1324 and TA present sensor P3327.

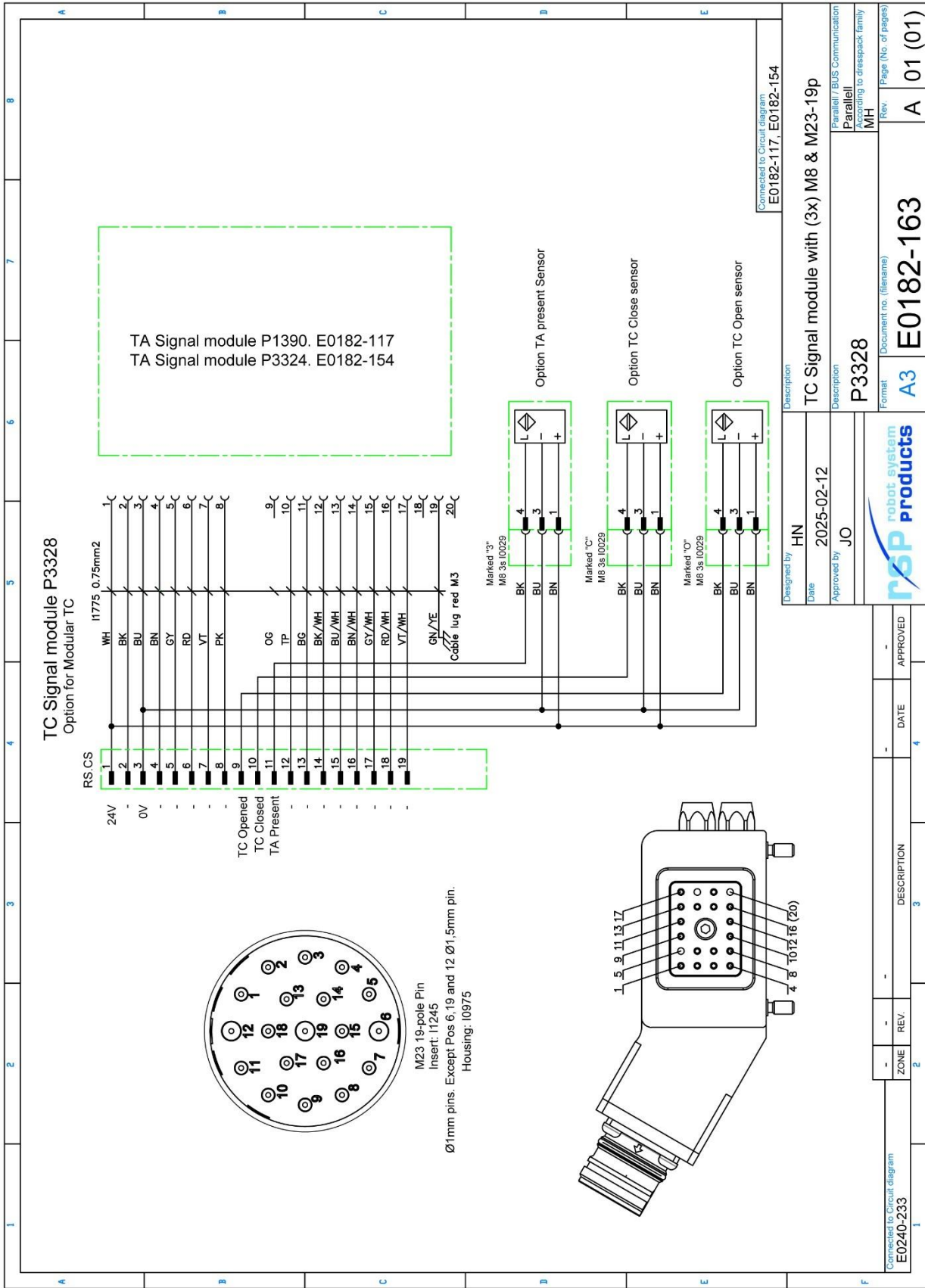


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P3328 with P1390 or P3324.

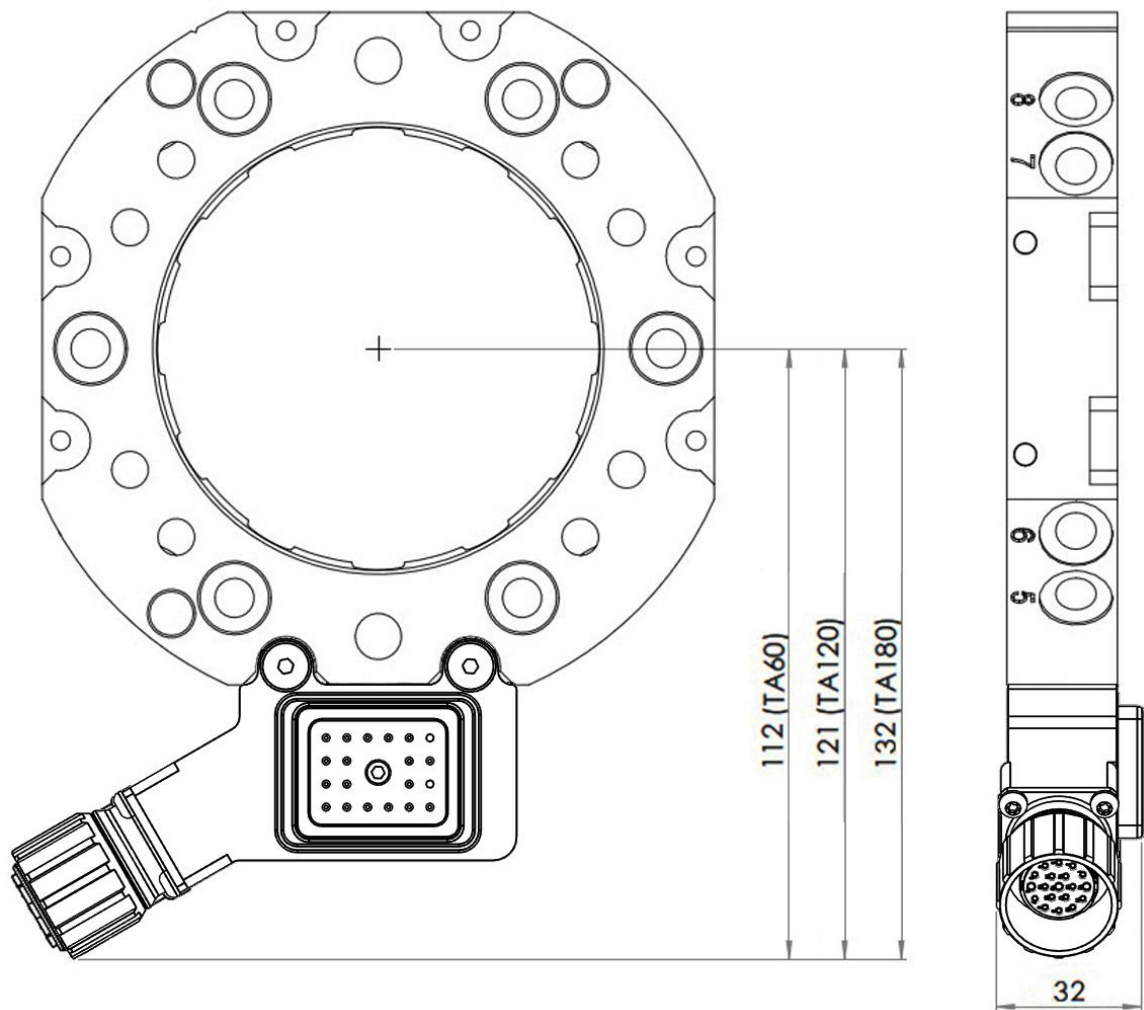
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-163 (section 5.4.1)
	Connection, robot side	M23 19P (Hummel 7.410.000.000, insert 7.004.919.101)
	Total signals	19 x (2A, 60V) + PE
	Dedicated signals	TC Opened, TC Closed, TA present
	Signals available at tool	14 + 24V, 0V
Sensor Interface	M8 3S, A-coded	24V, 0V, TC Opened
	M8 3S, A-coded	24V, 0V, TC Closed
	M8 3S, A-coded	24V, 0V, TA present

5.4.1 Circuit diagram E0182-163 for P3328



5.5 Signal module 17 x signals, tool side. Article: P1390

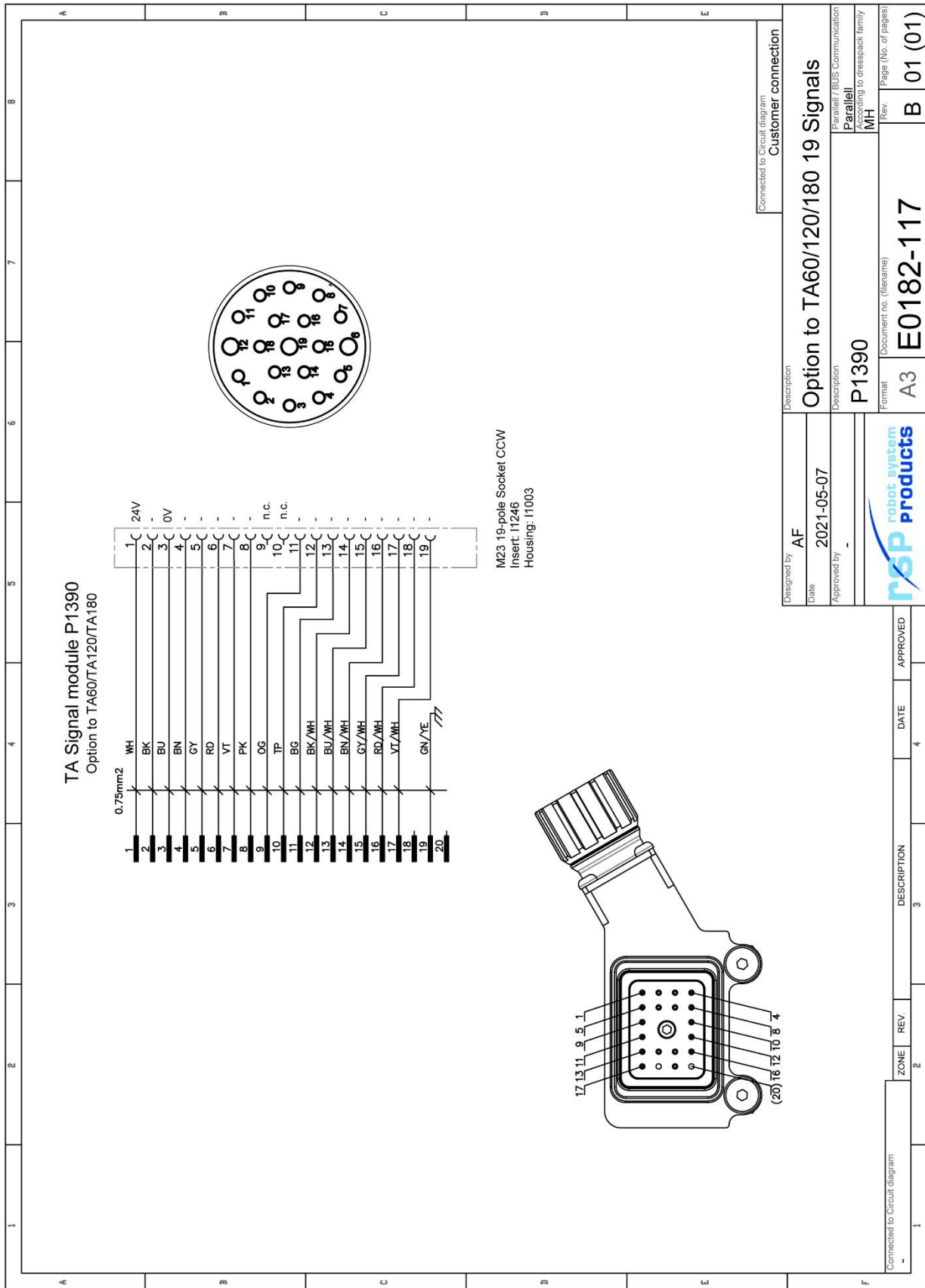


Signal module P1390 transfers 17 signals to the tool. To be mounted on the tool attachment and used together with modules P1389 or P3328 mounted at the tool changer.

Technical data

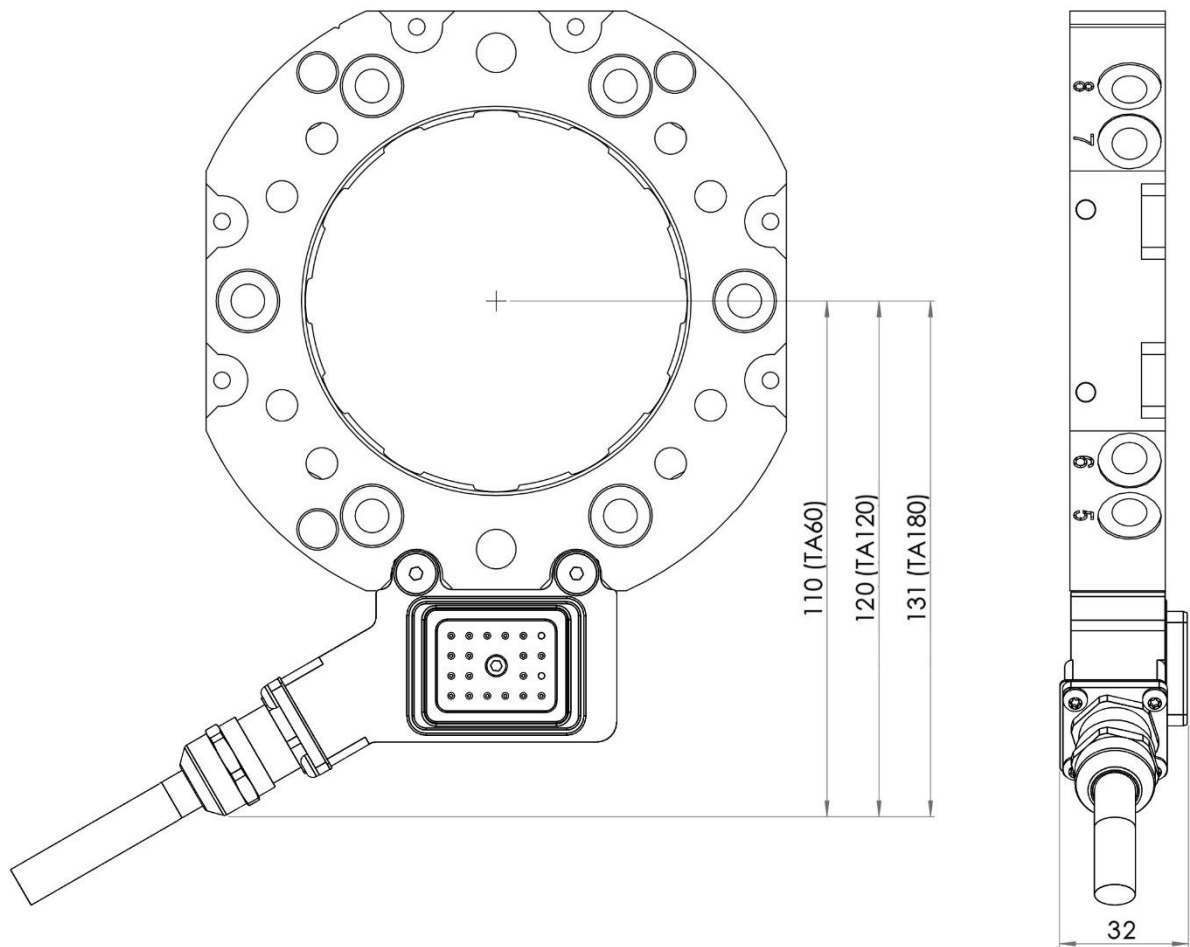
Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-117 (section 5.5.1) M23 19S (Hummel 7.440.000.000, insert 7.004.919.102)

5.5.1 Circuit diagram E0182-117 for P1390



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5.6 Signal module 17 x signals (open end), tool side. Article: P3324

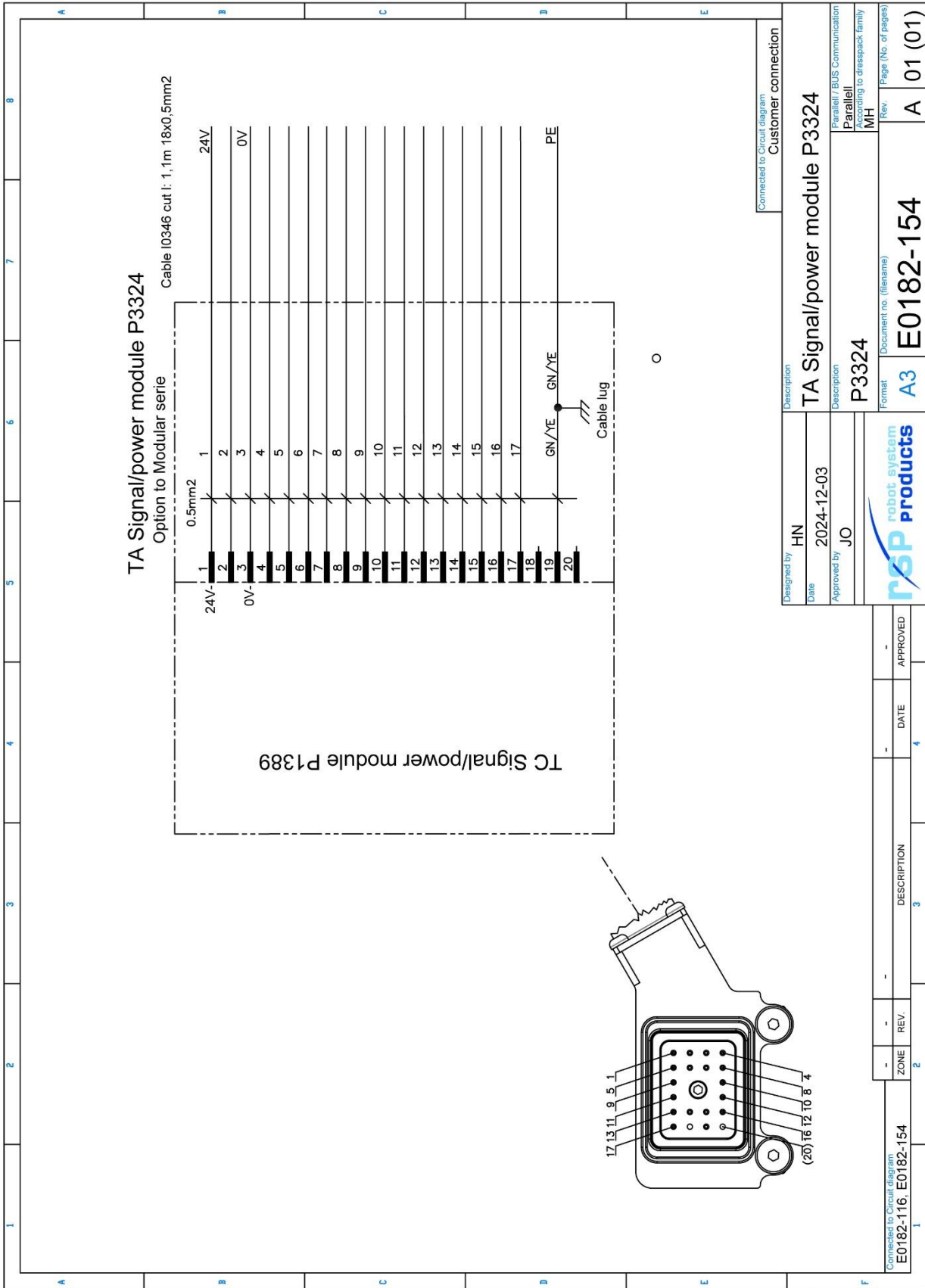


Signal module P3324 transfers 17 signals to the tool. To be mounted on the tool attachment and used together with modules P1389 or P3328 mounted at the tool changer.

Technical data

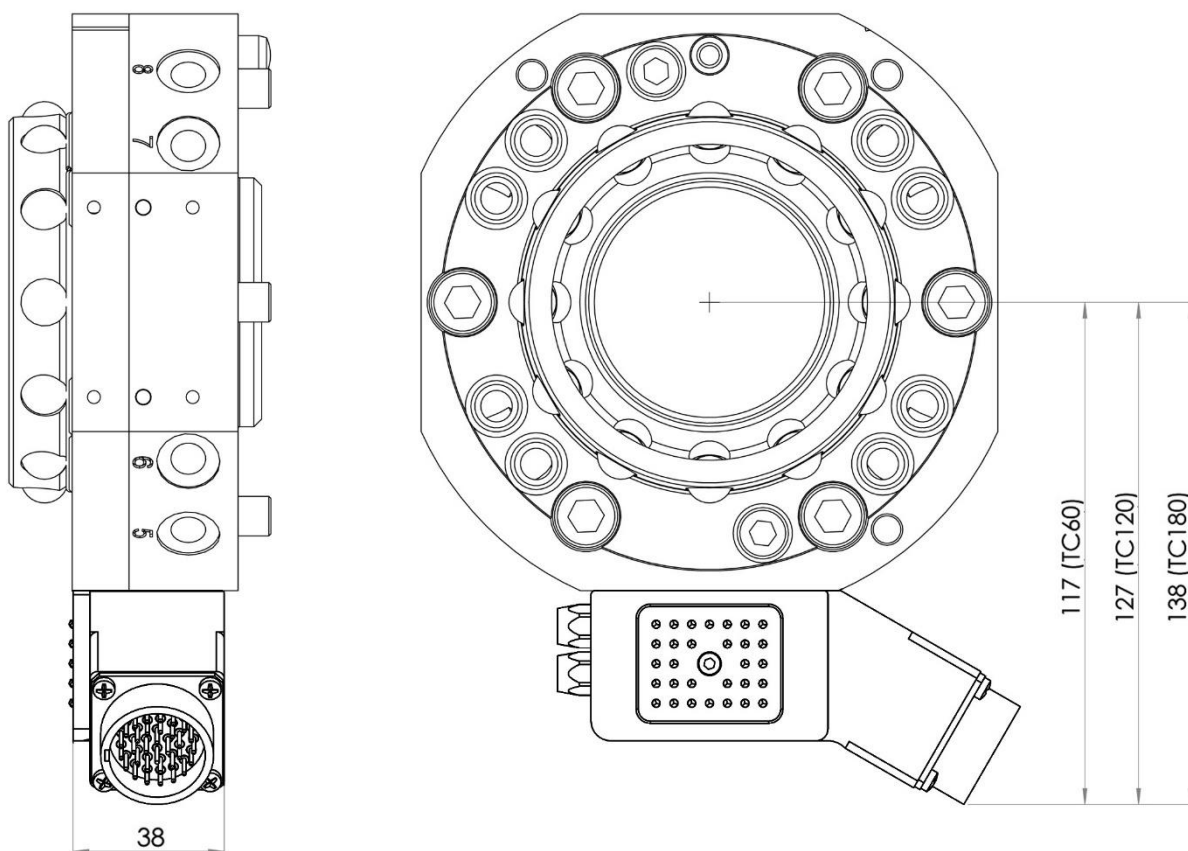
Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-154 (section 5.6.1) 1.1 m cable I0346 (0.5 mm), open end

5.6.1 Circuit diagram E0182-154 for P3324



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5.7 Signal module 30 x signals (for TC opened/closed sensor), robot side. Article: P1338

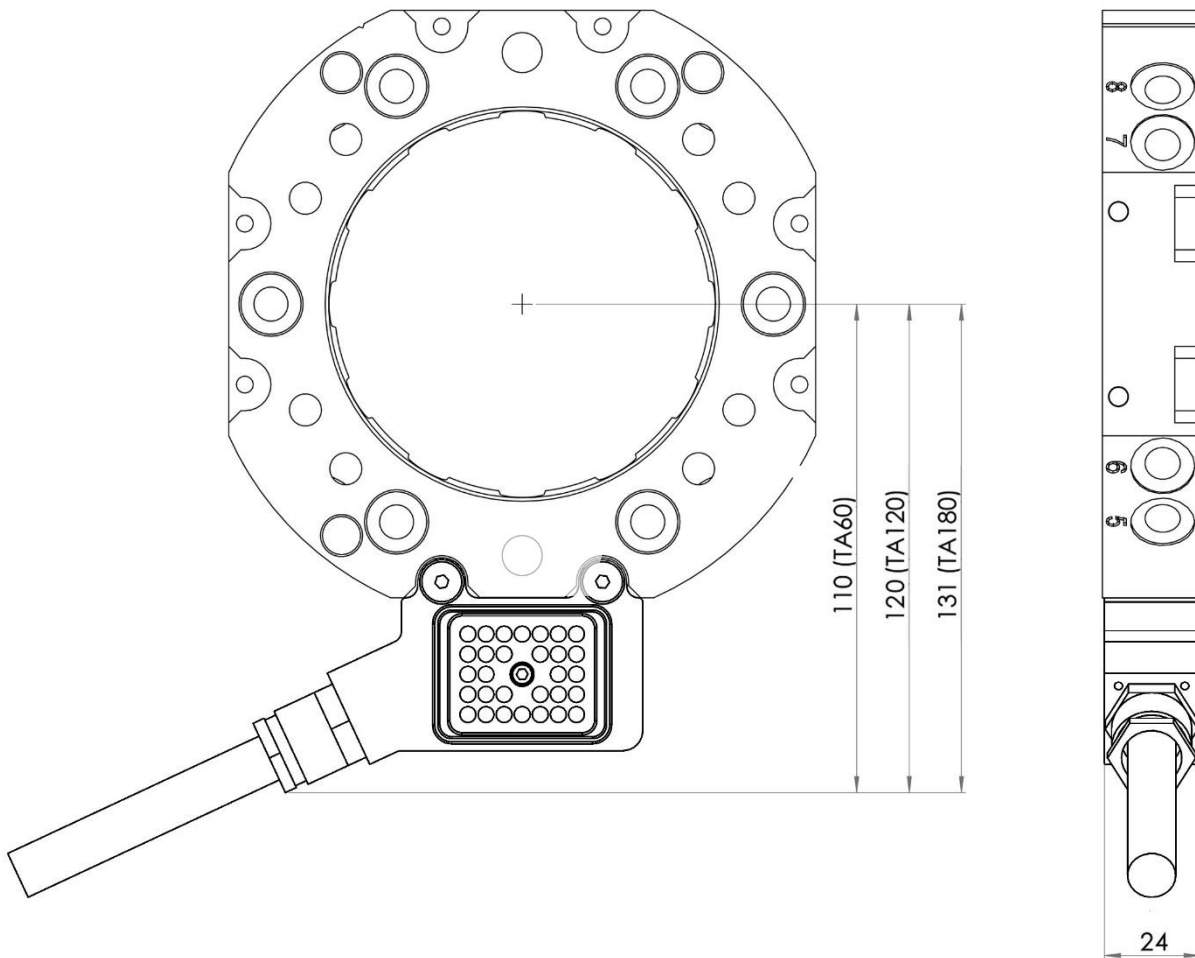


Signal module P1338 transfers 30 electrical signals to the tool attachment through spring loaded signal pins. To be mounted at one dedicated position on the tool changer and used together with modules P1339 or P1378 mounted at the tool attachment. On the housing 2 separate M8-contacts are mounted for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

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, robot side Total signals Dedicated signals Signals available at tool	E0182-048 (section 5.8.1) Compact Souriau 32P (UT0W01832PH6) 32 x (1A, 30V) TC Opened, TC Closed 28 + 24V, 0V
Sensor Interface	M8 3S, A-coded M8 3S, A-coded	24V, 0V, TC Opened 24V, 0V, TC Closed
Connection kits and cables (optional)	P8018 P8018-1 P8199-30/ P8199-50	Compact Souriau 32S (straight, 0.5–1.0 mm ²) Compact Souriau 32S (angled, 0.5–1.0 mm ²) Compact Souriau 32S with 3.0/5.0 m cable, open end.

5.8 Signal module 30 x signals (open end), tool side. Article: P1339

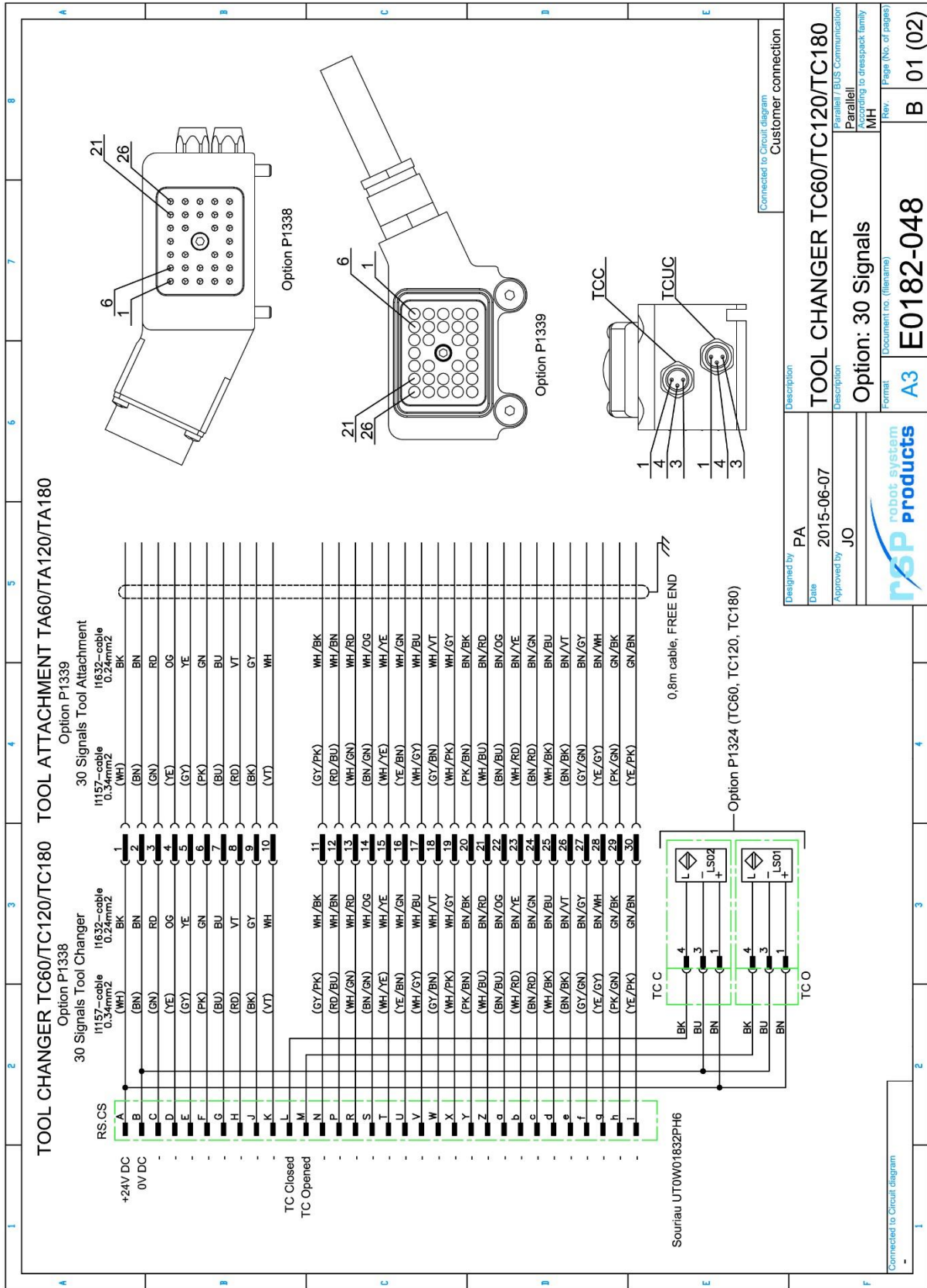


Signal module P1339 transfers 30 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1338 mounted at the tool changer.

Technical data

Weight		0.15 kg
Electrical Interface	Circuit diagram	E0182-048 (section 5.8.1)
	Connection, tool side	1.0 m cable (0.24 mm ²), open end

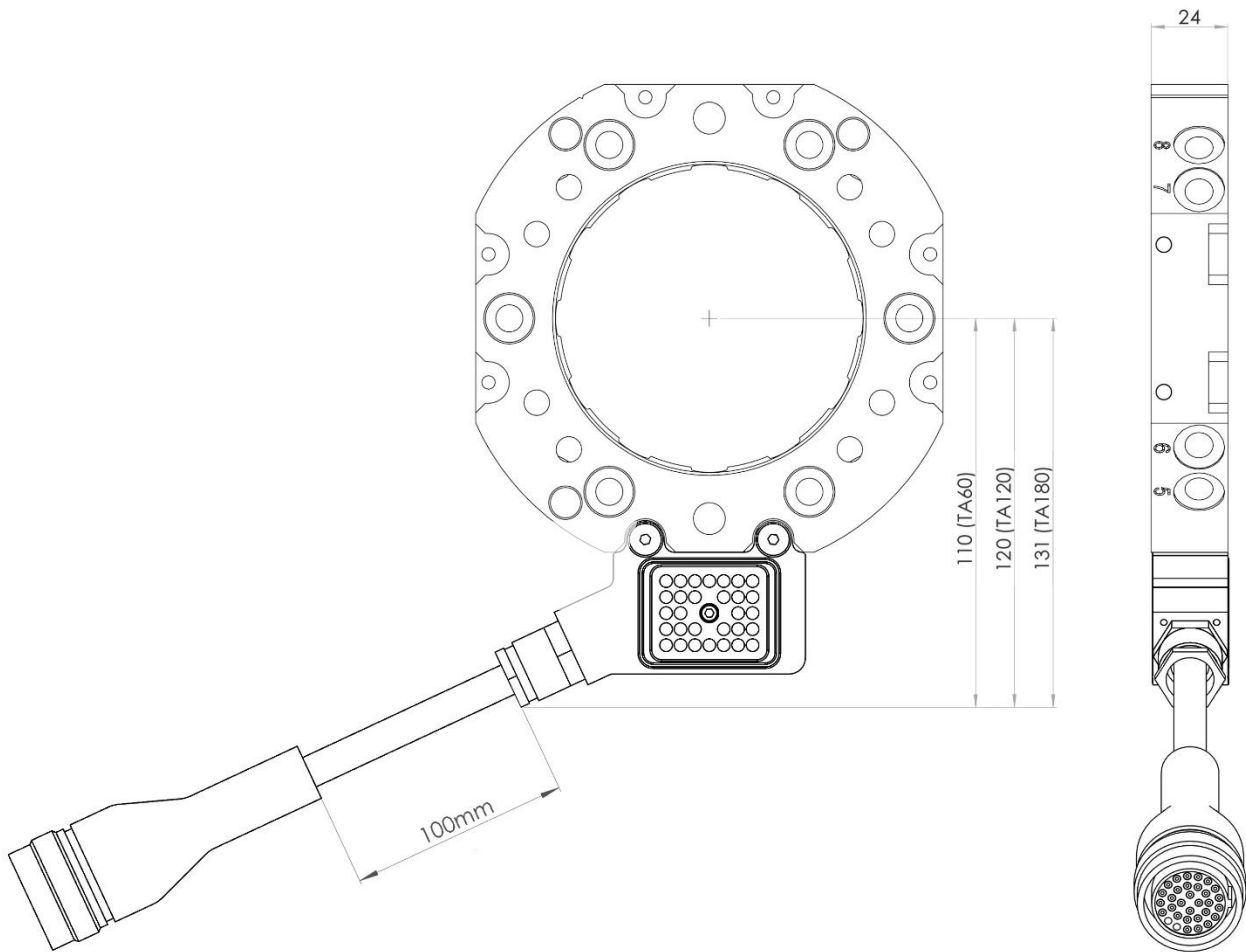
5.8.1 Circuit diagram E0182-048 for P1338 and P1339



Designed by	PA	Description	TOOL CHANGER TC60/TC120/TC180
Date	2015-06-07	Description	Parallel / BUS Communication
Approved by	JO	Format	Option: 30 Signals
		Document no. (filename)	E0182-048
		Rev.	B 01 (02)

robot system products

5.9 Signal module 30 x signals (Souriau), tool side. Article: P1378

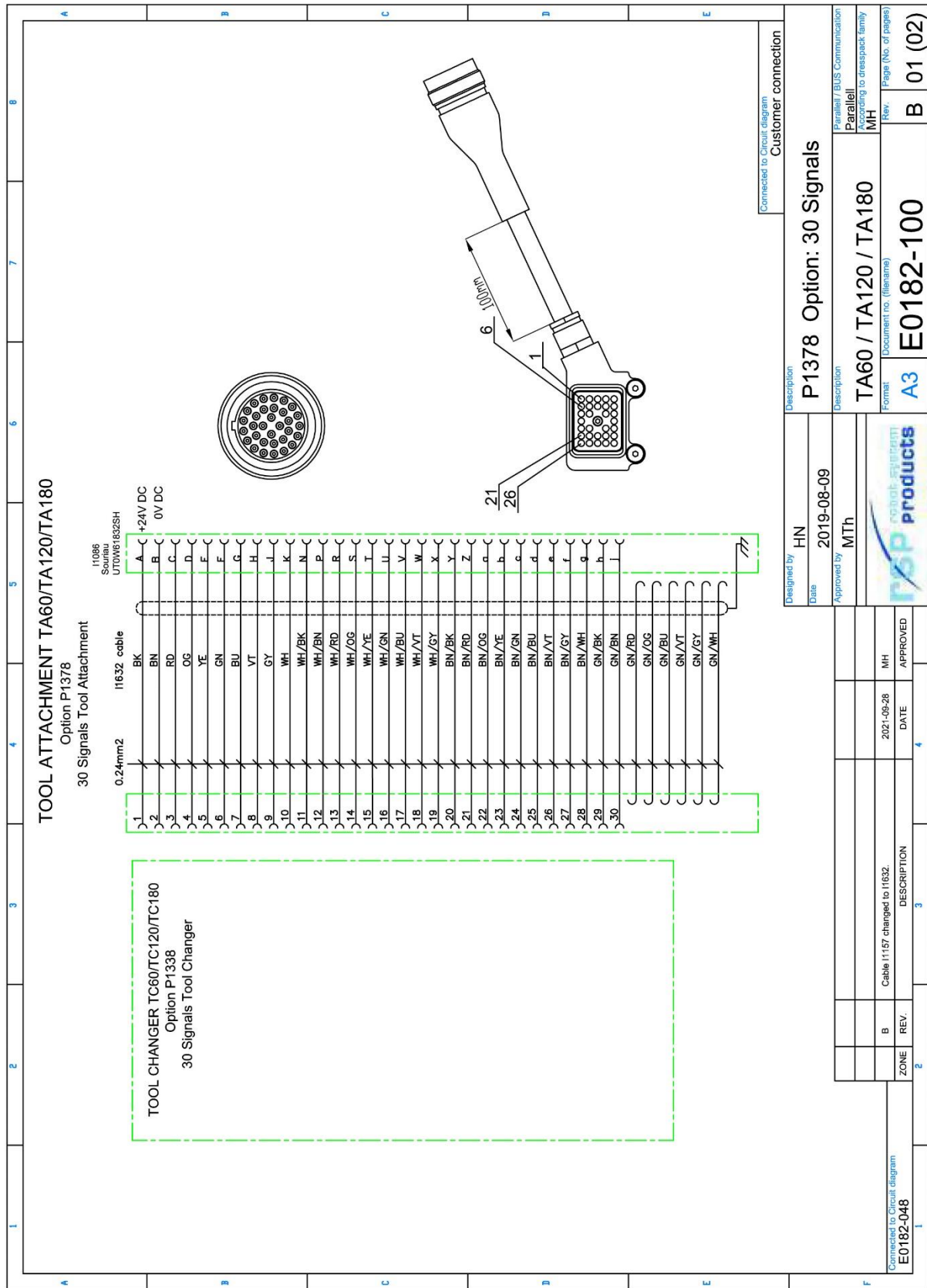


Signal module P1378 transfers 30 electrical signals to the tool. To be mounted on the tool attachment and used together with module P1338 mounted at the tool changer.

Technical data

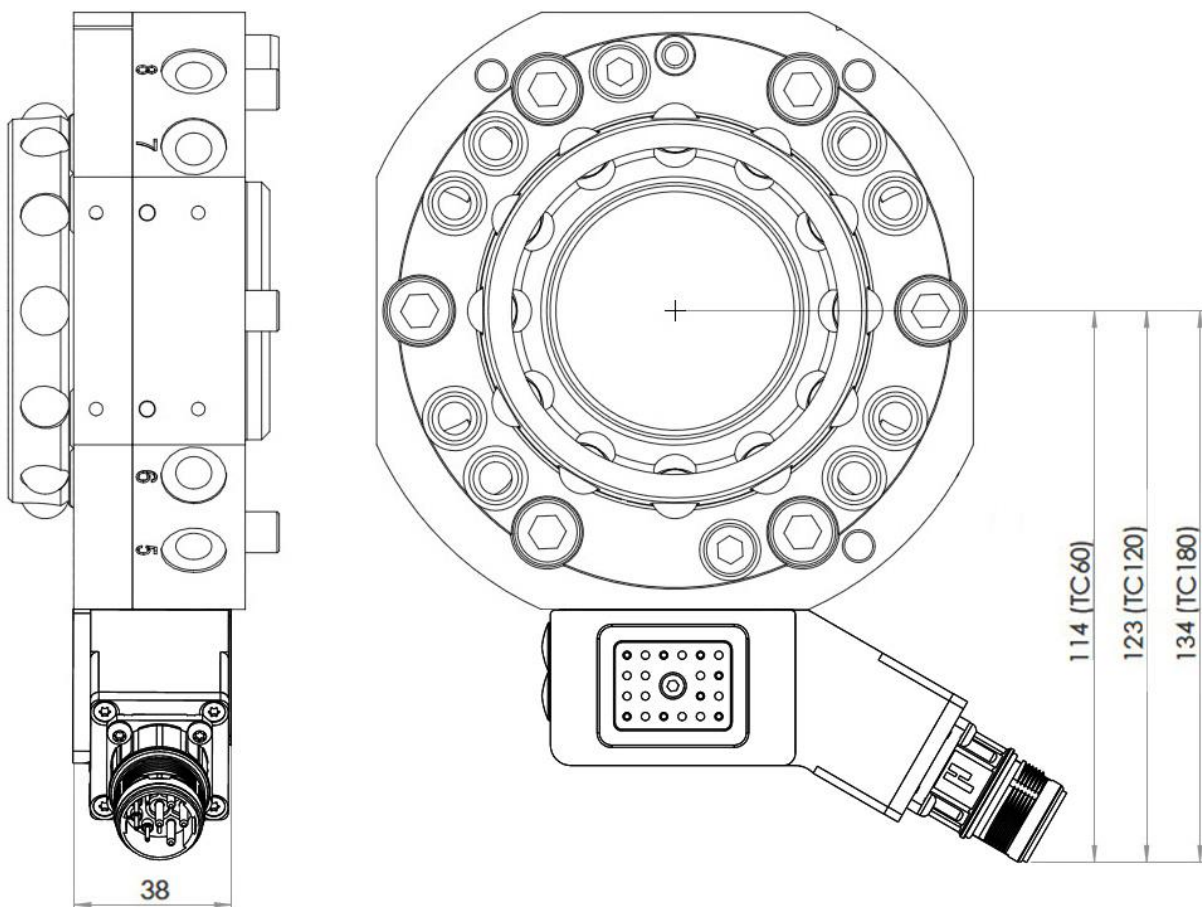
Weight		0.15 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-100 (section 5.9.1) 0.1 m cable (36xAWG24), Compact Souriau 32S (UT0W61832SWH)

5.9.1 Circuit diagram E0182-100 for P1378



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5.10 Power 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 mounted at the tool attachment.

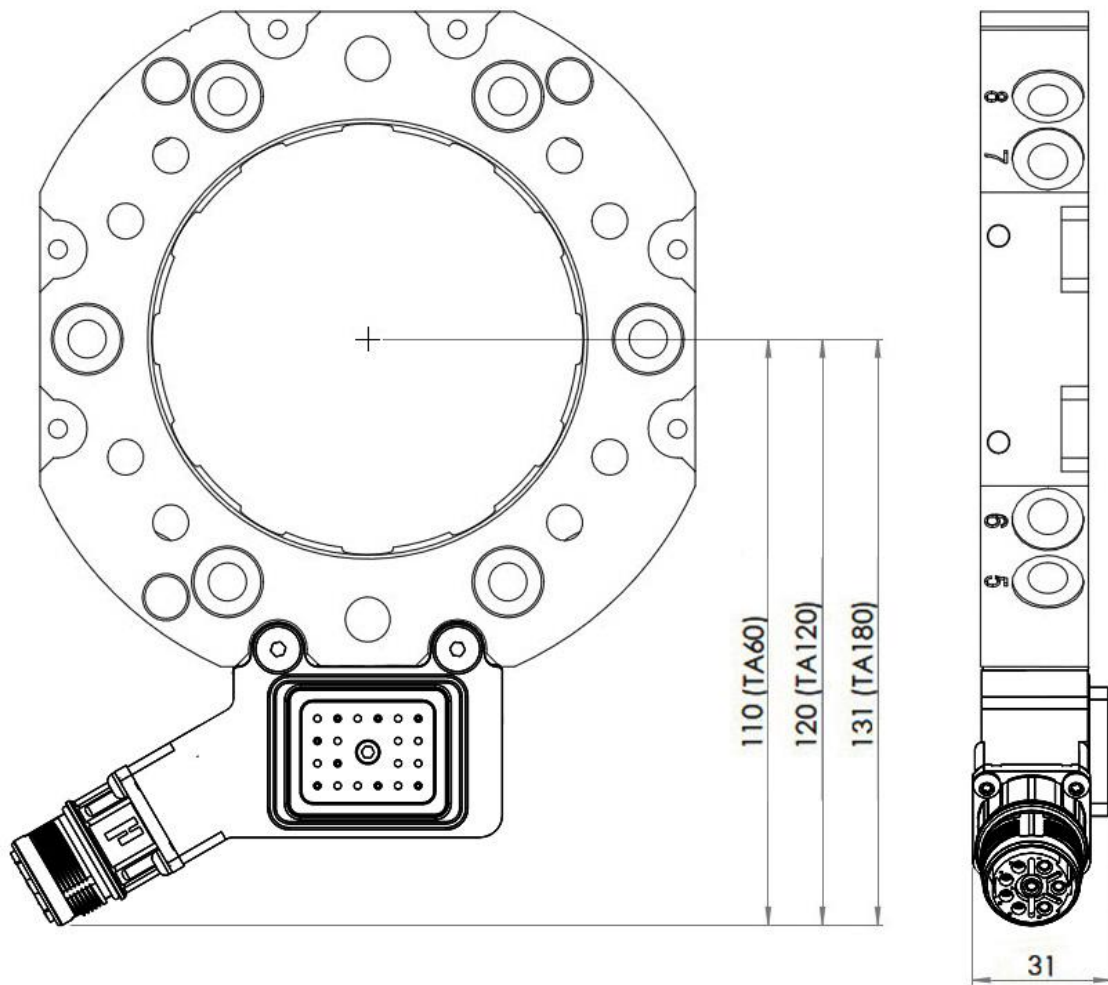


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1375 with P1376.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-096 (section 5.11.1)
	Connection, robot side	M23 8P, male thread (Hummel 7.601.000.000, insert 7.084.943.121)
	Total signals	8
	Signals available at tool	4 x (5A, 300V) and 3 x (15A, 600V) + PE
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

5.11 Power module 8 x signals, tool side. Article: P1376

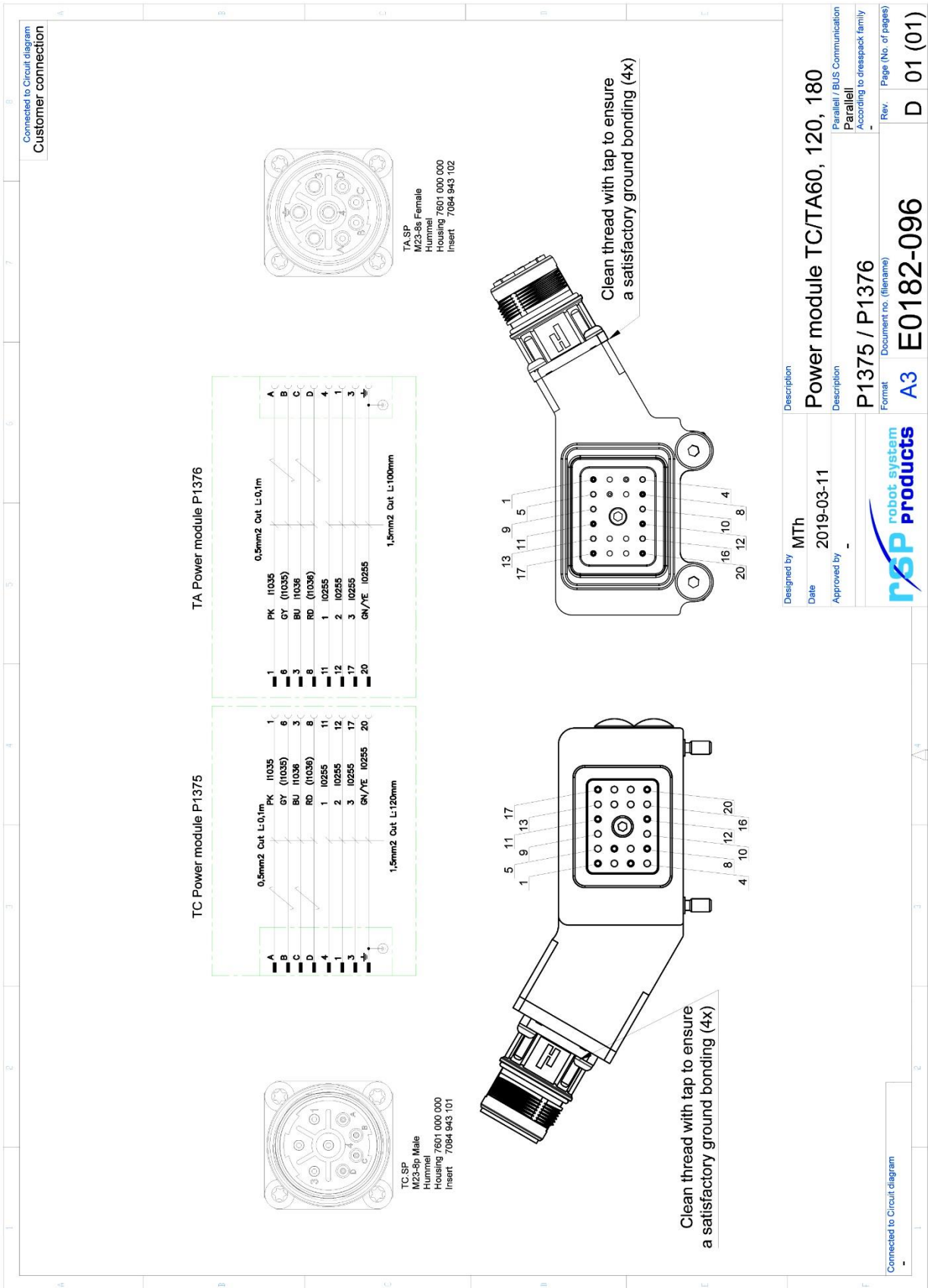


Power and signal module P1376 transfers 4 electrical signals and 3 power signals to the tool. To be mounted on the tool attachment and used together with module P1375 mounted at the tool changer.

Technical data

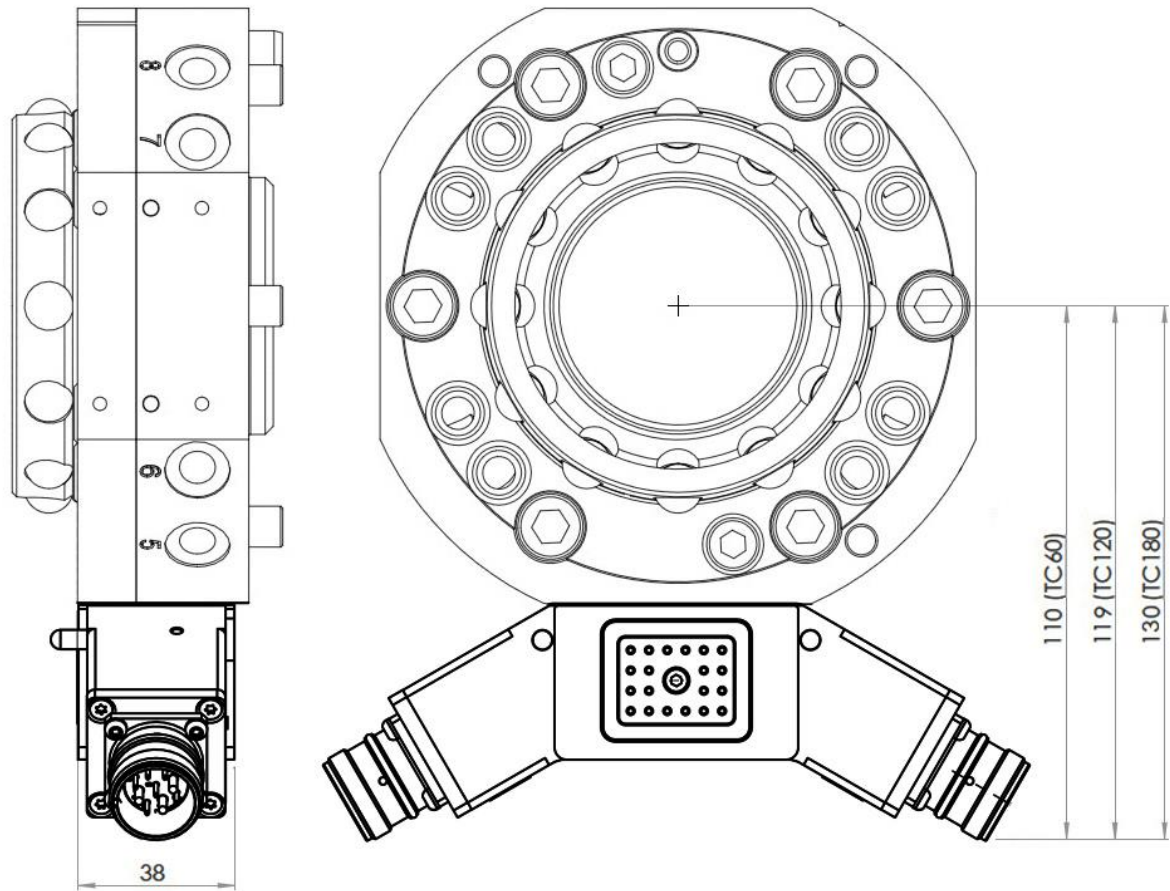
Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-096 (section 5.11.1) M23 8S, male thread (Hummel 7.601.000.000, insert 7.084.943.122)
Connection kits and cables (optional)	P8033	M23 8P, female thread (straight, 4 x 0.14–1.0 mm ² + 4 x 0.75–2.5 mm ²)
	P1387-20/ P1387-50	M23 8P with 2,0/5.0 m cable, open end

5.11.1 Circuit diagram E0182-096 for P1375 and P1376



6 LARGE 2X MODULES

6.1 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 mounted at the tool attachment.

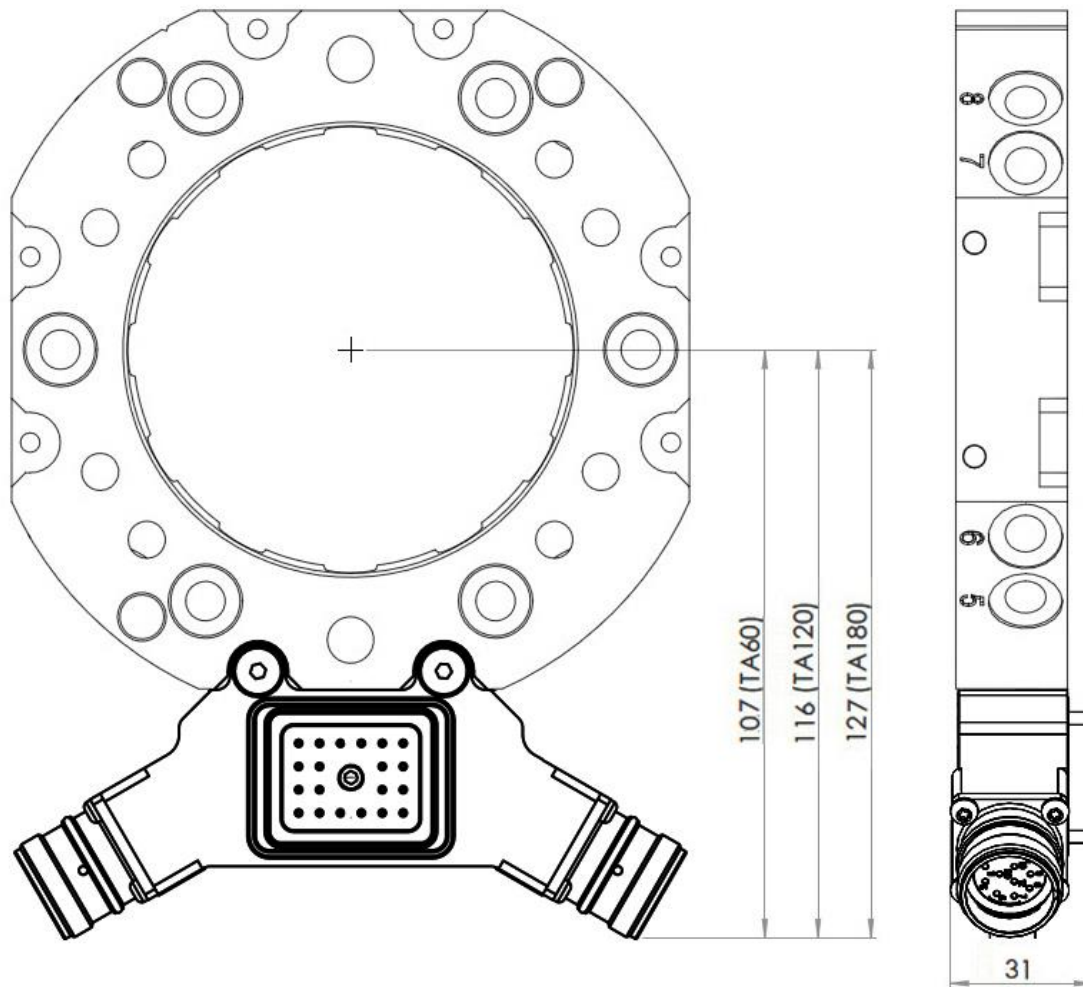


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1356 with P1357 or P1374.

Technical data

Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-071 (section 6.2.1)
	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)

6.2 Signal module 2 X 9 signals (male thread), tool side. Article: P1357

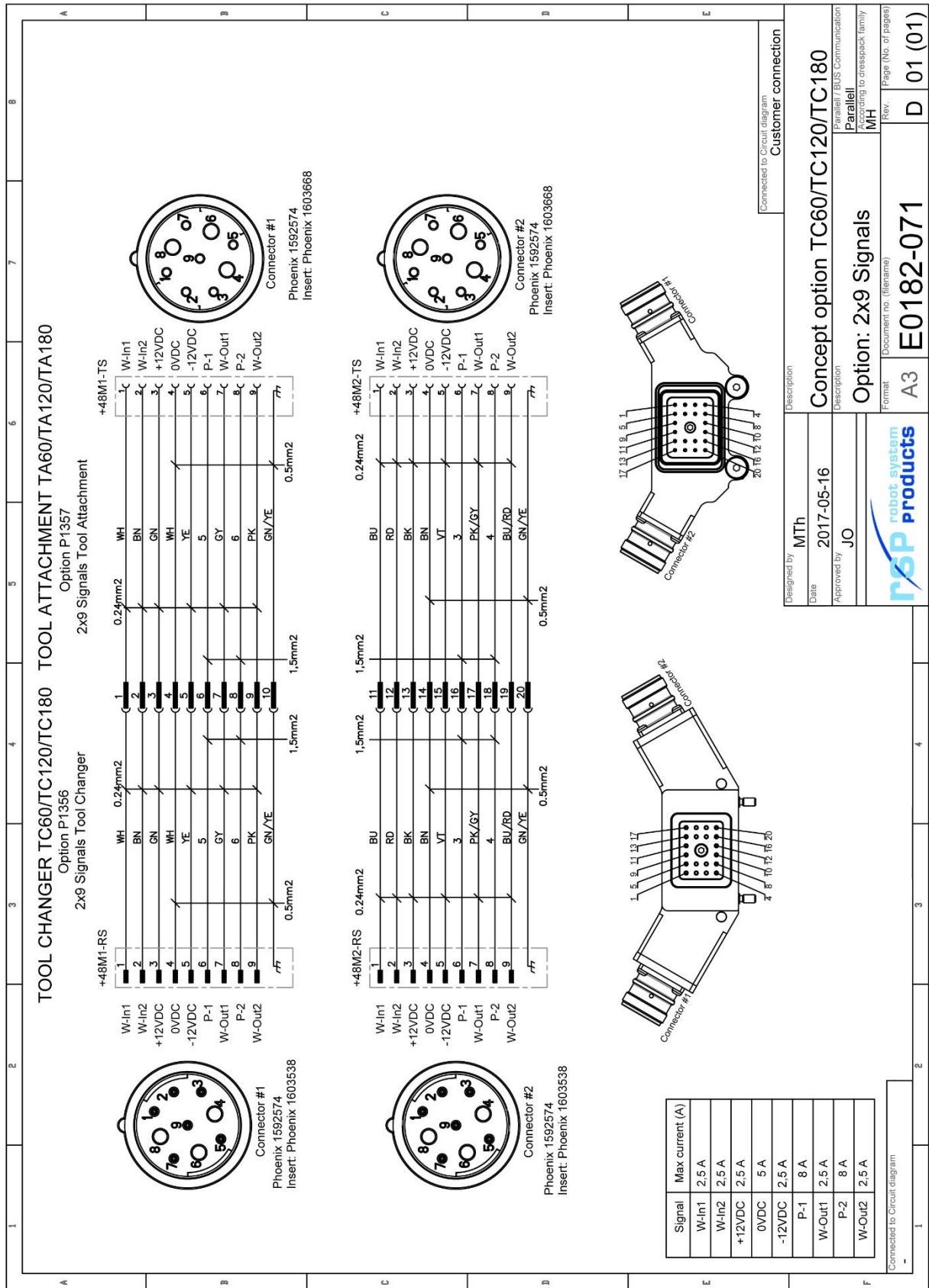


Signal module P1357 transfers 18 signals to the tool. To be mounted on the tool attachment and used together with module P1356 mounted at the tool changer.

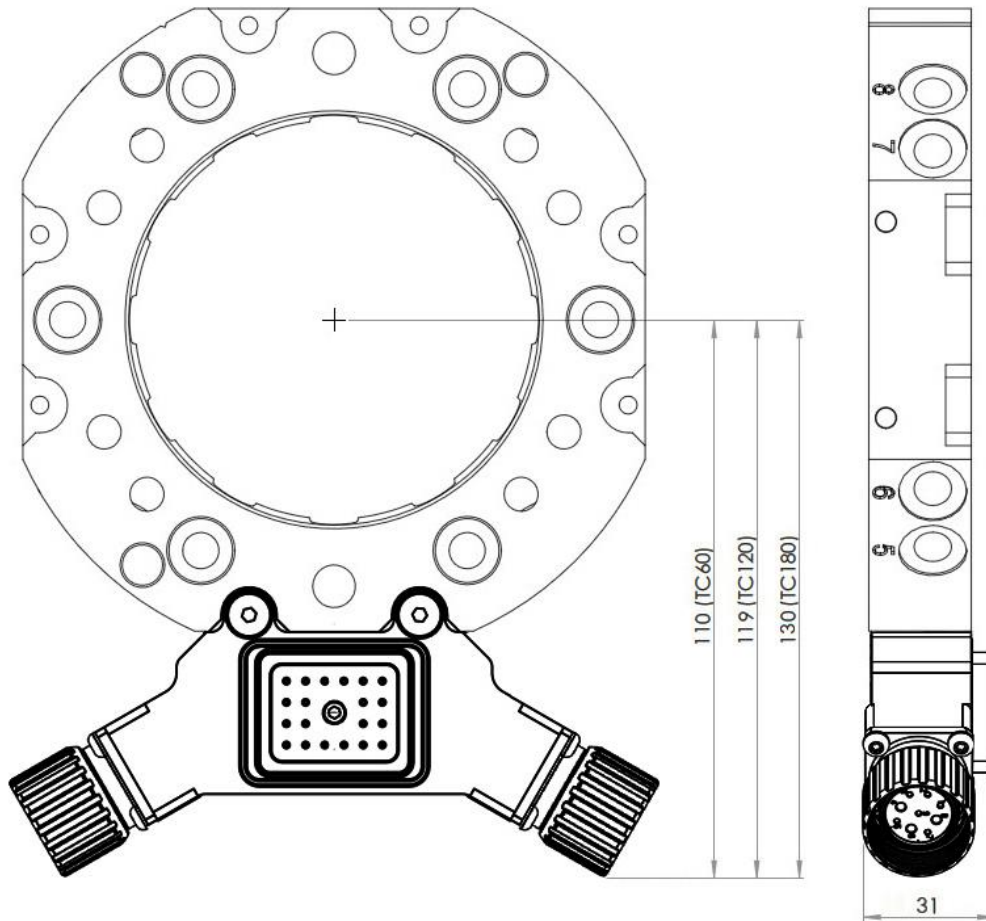
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-071 (section 6.2.1) 2 x M23 9S (Phoenix 1592574, insert 1603668)

6.2.1 Circuit diagram E0182-071 for P1356 and P1357



**6.3 Signal module 2 X 9 signals (female thread), tool side.
Article: P1374**

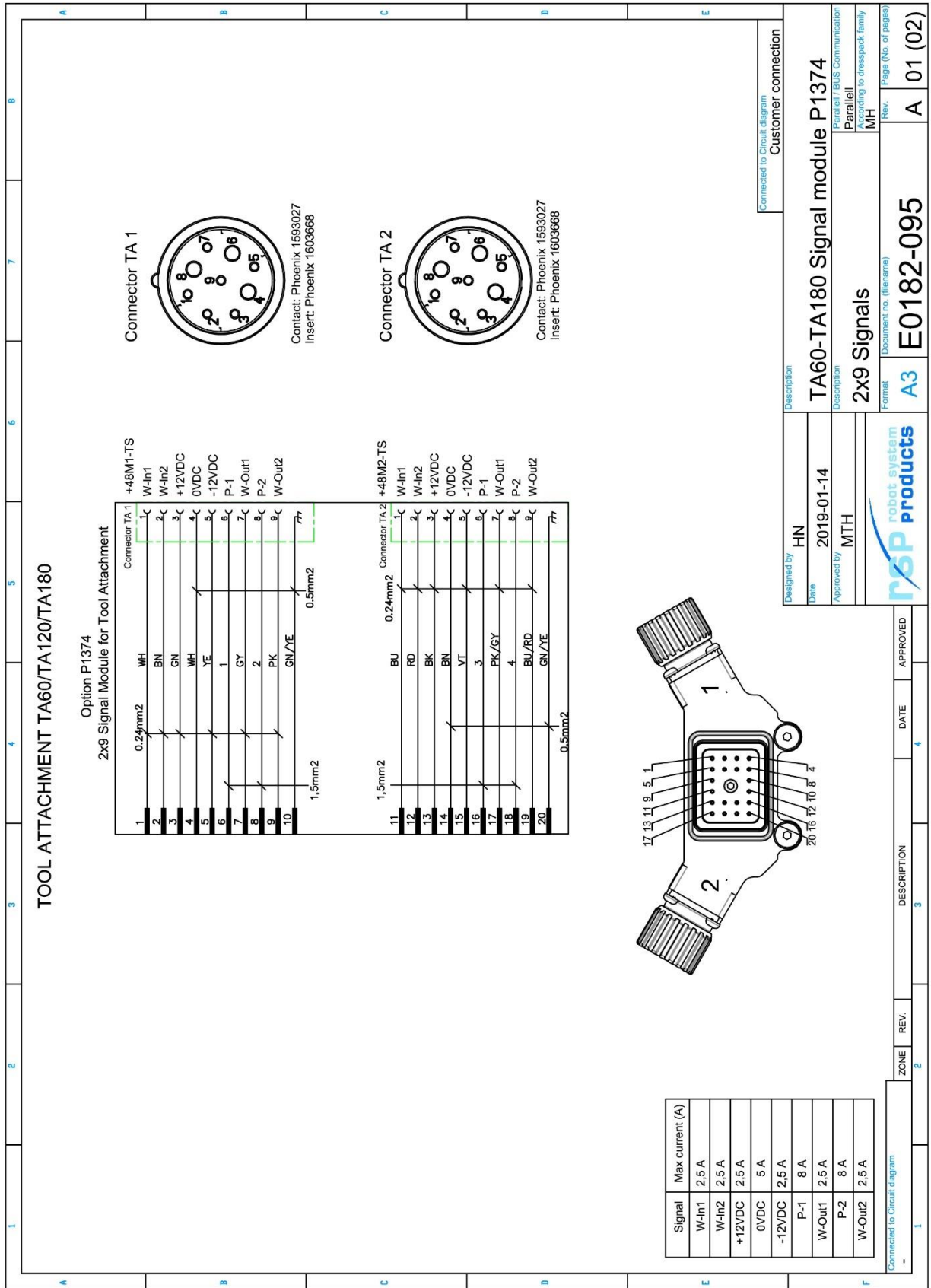


Signal module P1374 transfers 18 signals to the tool. To be mounted on the tool attachment and used together with module P1356 mounted at the tool changer.

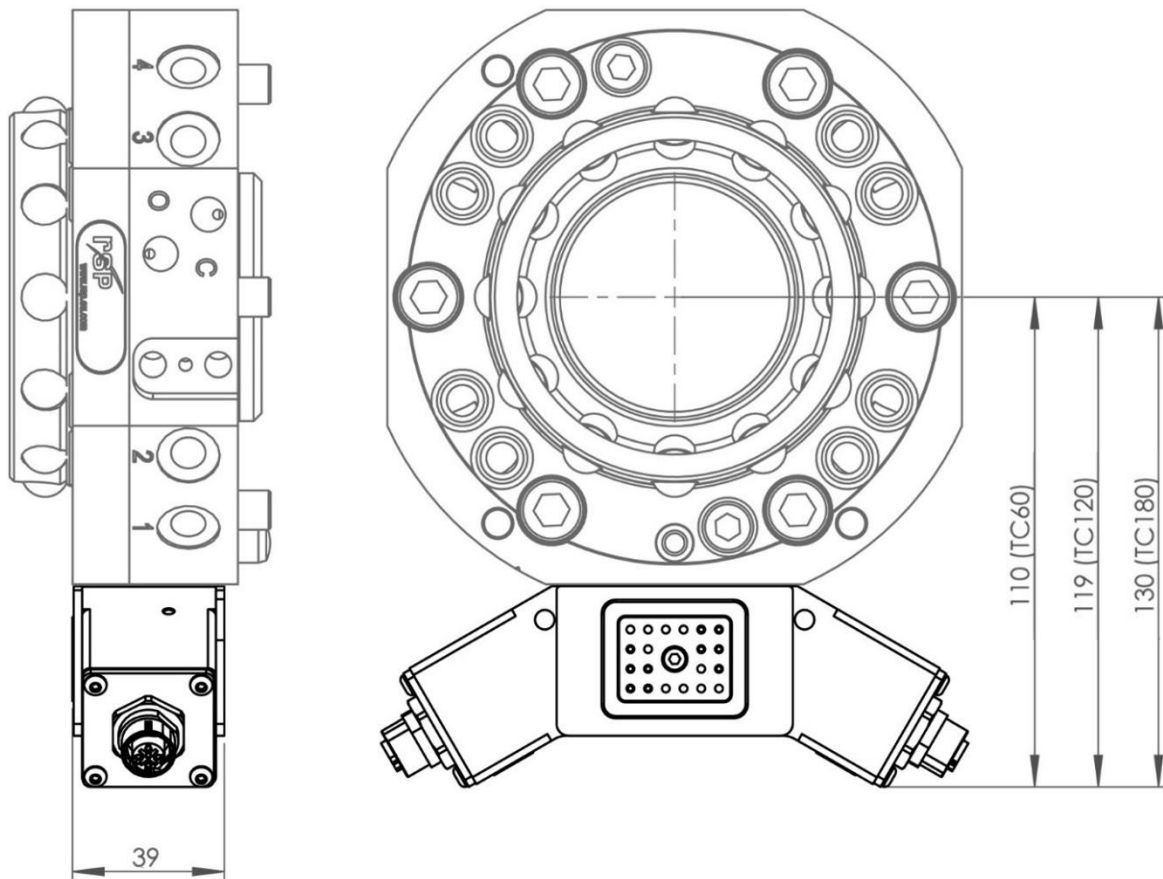
Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-095 (section 6.3.1) 2 x M23 9S (Phoenix 1593027, insert 1603668)

6.3.1 Circuit diagram E0182-095 for P1374



6.4 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 mounted at the tool attachment.

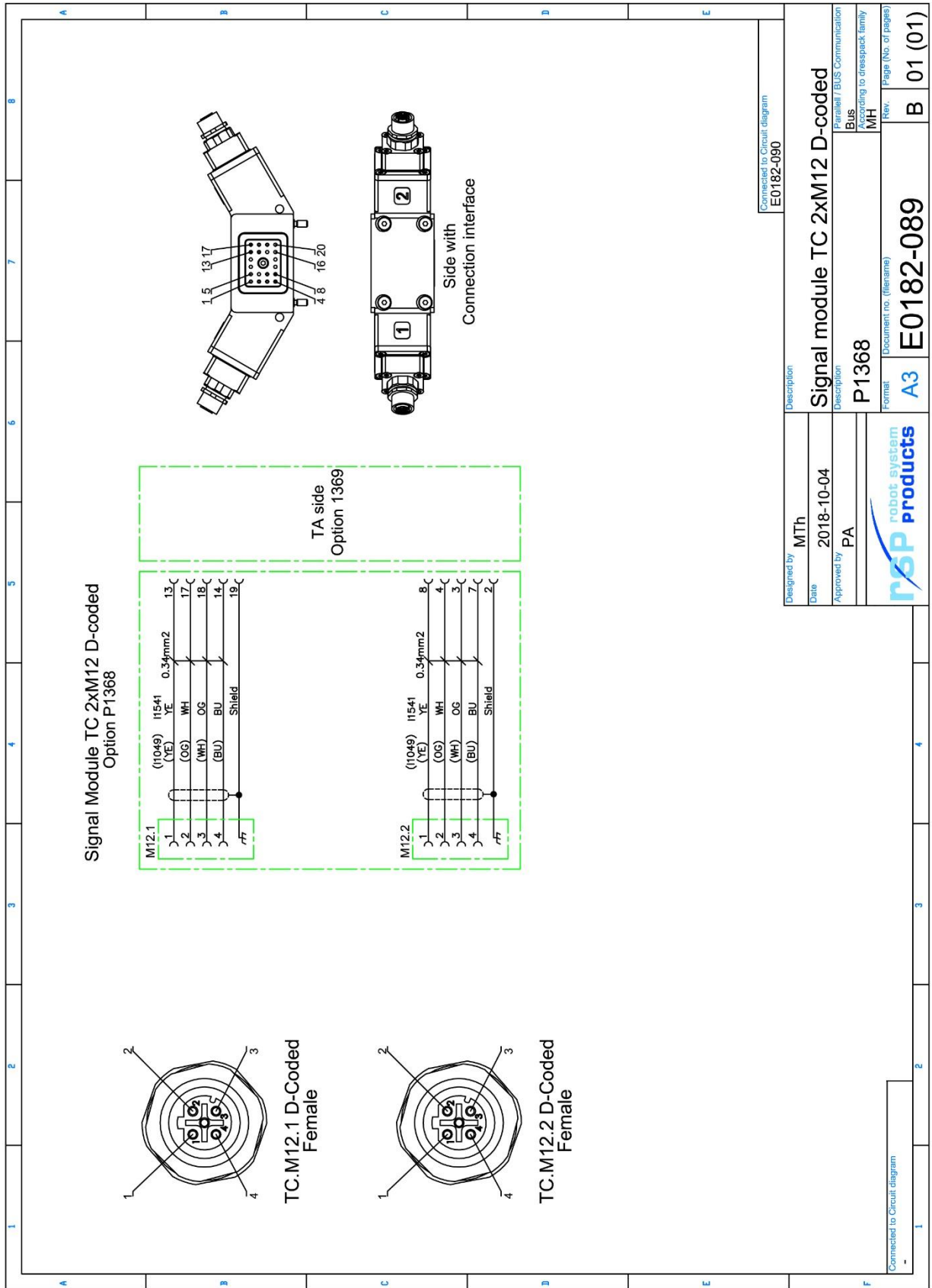


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P1368 with P1369.

Technical data

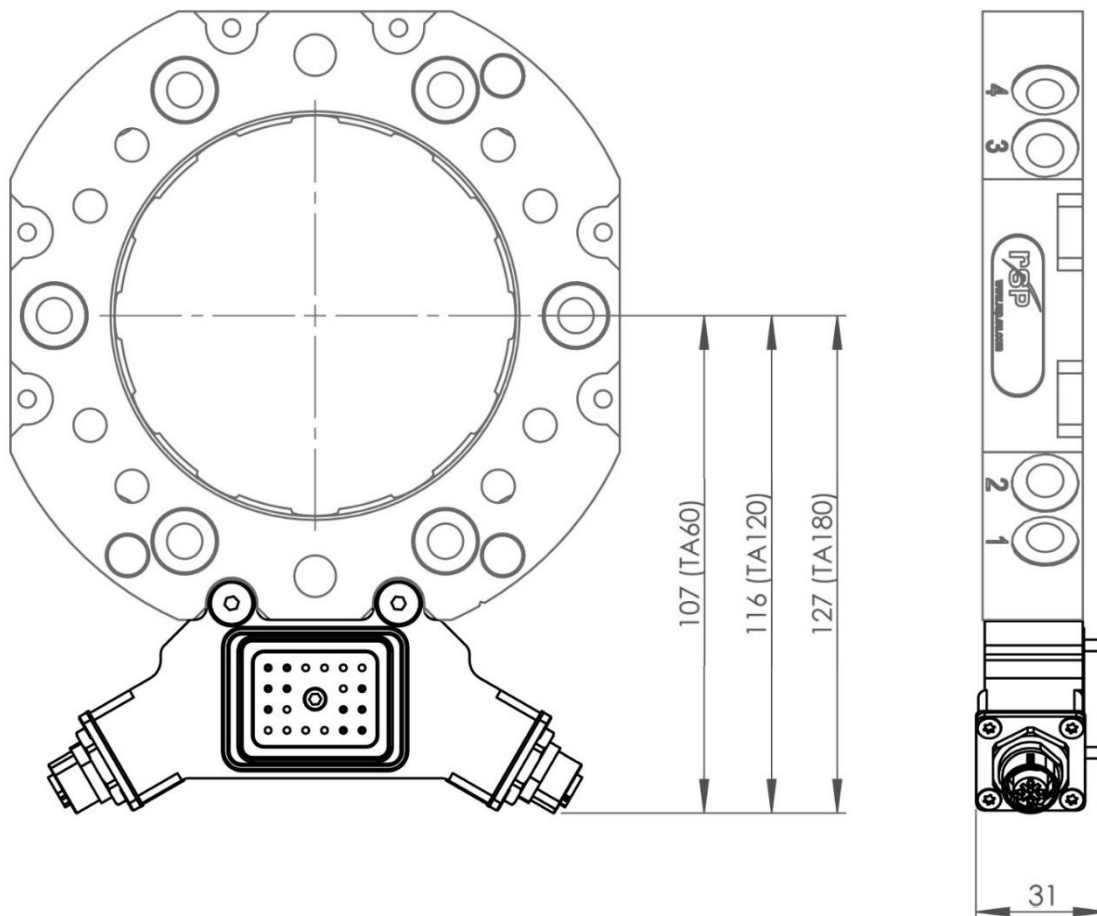
Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-089 (section 6.4.1)
	Connection, robot side	2 X M12 4S D-coded (Phoenix 1437766)
	Bus available at tool	8 x fieldbus signals (100 Mbit/s)

6.4.1 Circuit diagram E0182-089 for P1368



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6.5 Bus module 2 X M12 (D-coded), tool side. Article: P1369

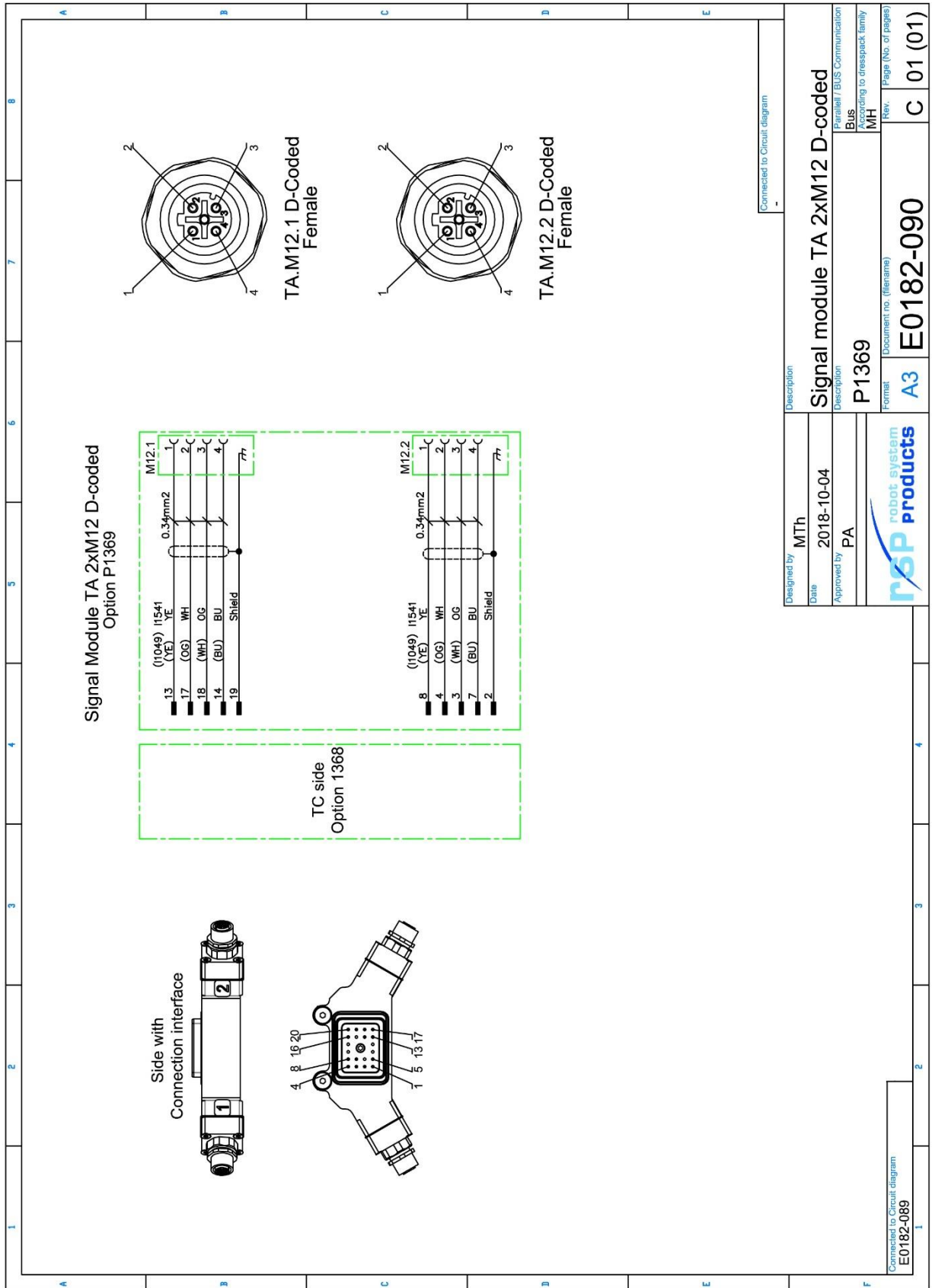


Bus module P1369 transfers 8 fieldbus signals (4 pairs) to the tool. To be mounted on the tool attachment and used together with module P1368 mounted at the tool changer.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-090 (section 6.5.1)
	Connection, tool side	2 X M12 4S D-coded (Phoenix 1437766)

6.5.1 Circuit diagram E0182-090 for P1369

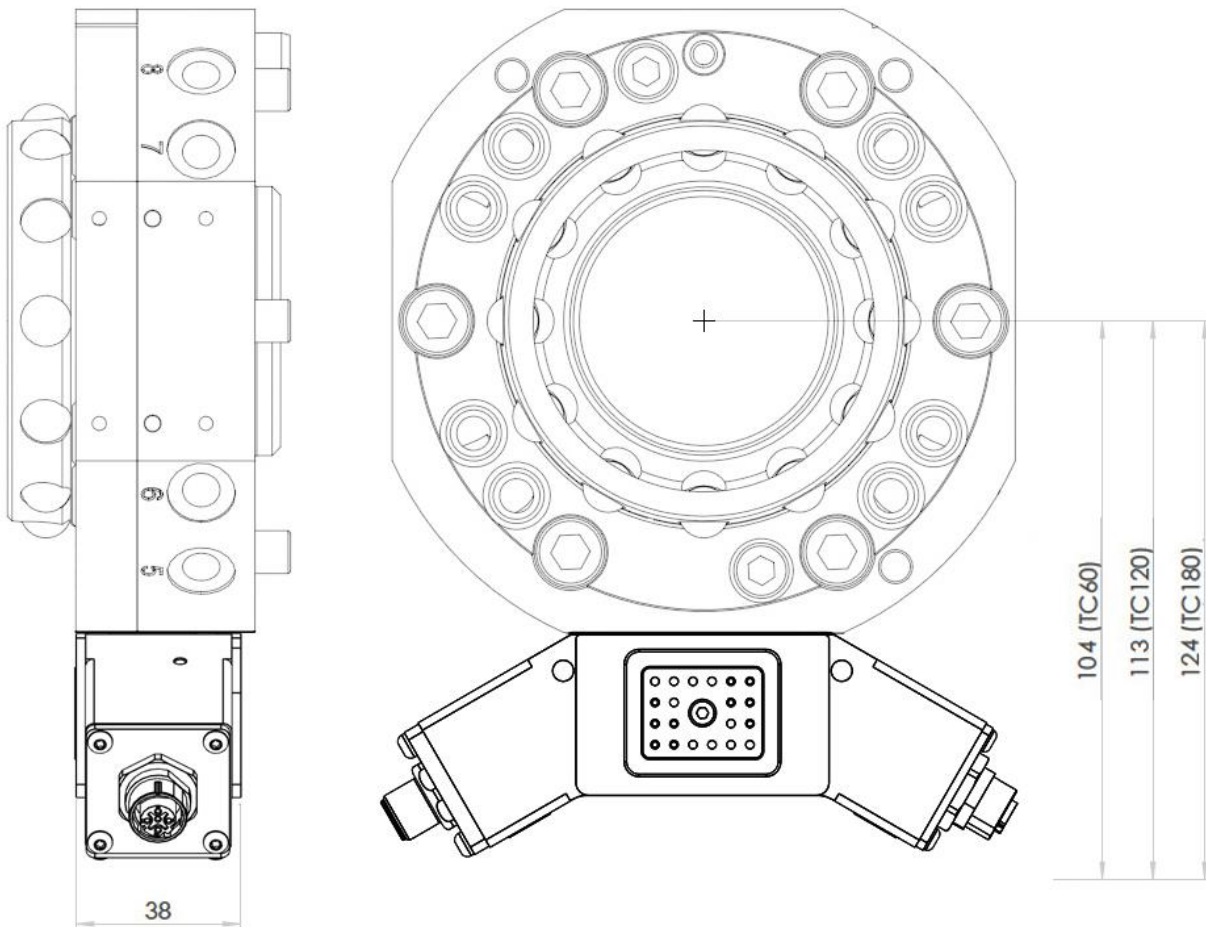


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Designed by	MTh	Description	Connected to Circuit diagram
Date	2018-10-04	Signal module TA 2xM12 D-coded	
Approved by	PA	Parallel / BUS Communication	
		BUS	
		According to dresspack family	
		MH	
		Rev.	Page (No. of pages)
		A3	C 01 (01)
Document no. (filename)		E0182-090	



**6.6 Power and signal module M12 D-coded + M12 L-coded, 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 mounted at the tool attachment.

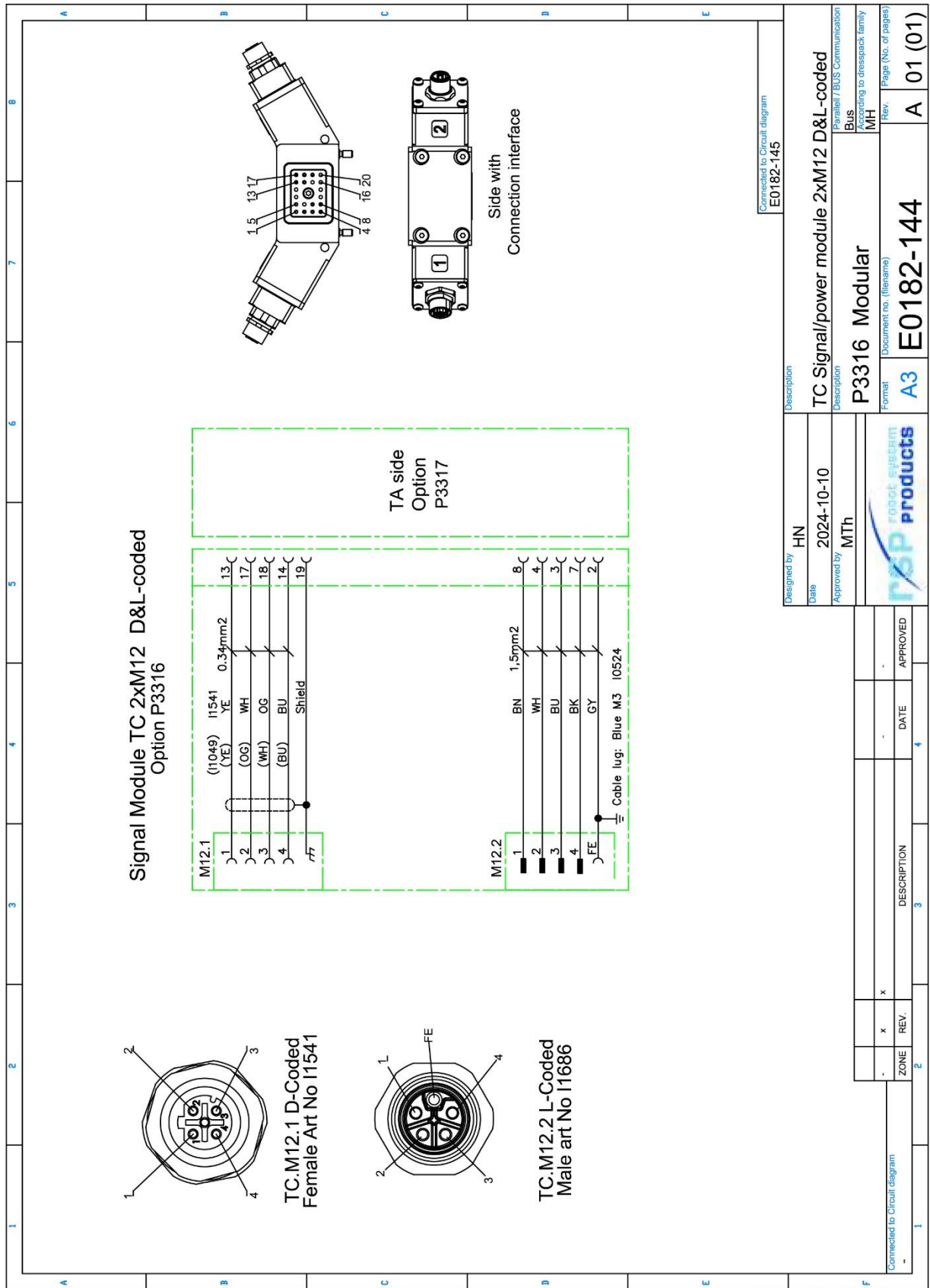


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P3316 with P3317.

Technical data

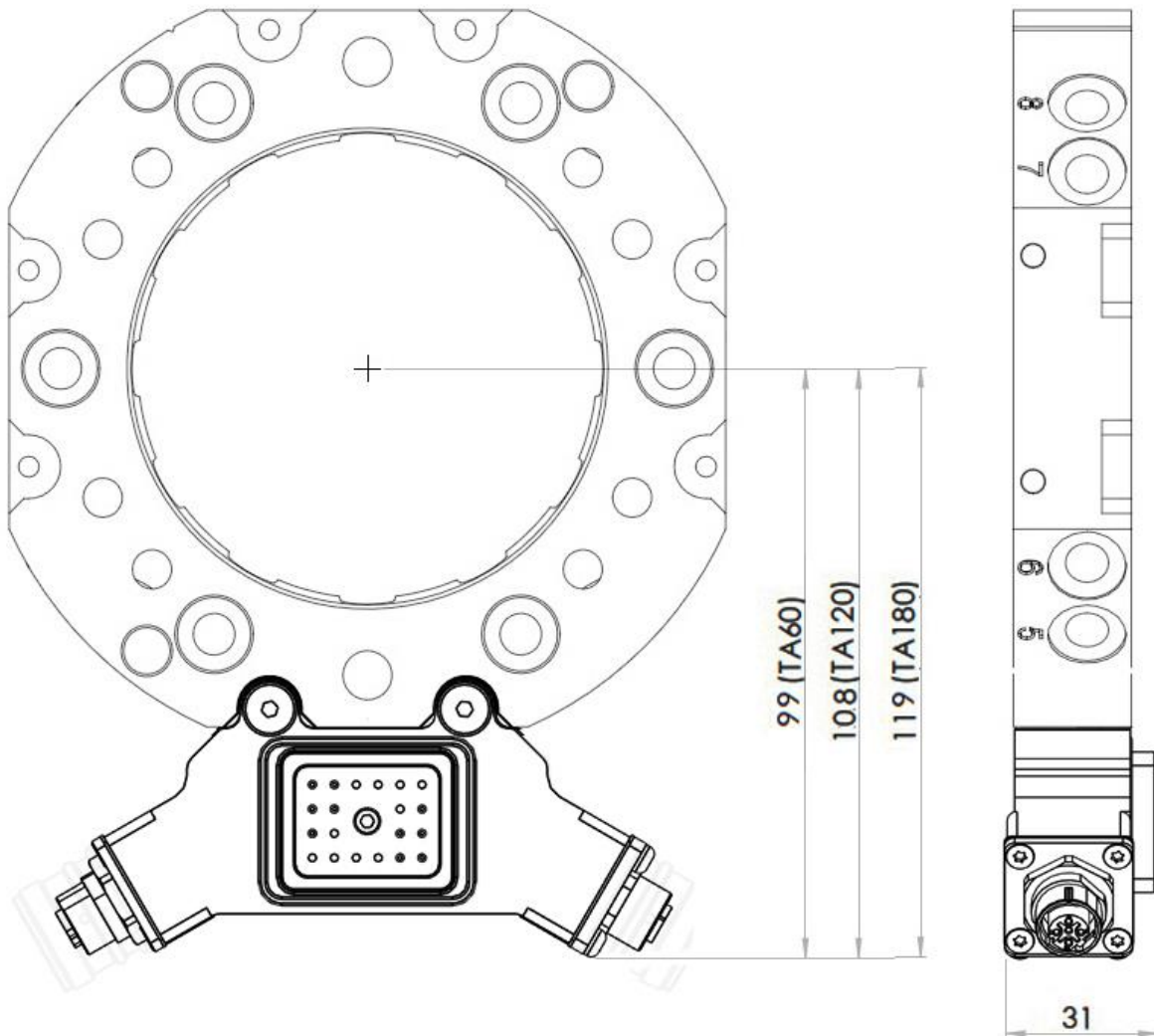
Weight		0.3 kg
Electrical Interface	Circuit diagram	E0182-144 (section 6.6.1)
	Connection, robot side	M12 4S D-coded (Phoenix 1437766) M12 5P L-coded (Harting 21035961505)
	Total signals available at tool	4 x fieldbus signals (100 Mbit/s) + 4 x (15A, 60V) + FE

6.6.1 Circuit diagram E0182-144 for P3316



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**6.7 Power and signal module M12 D-coded + M12 L-coded, tool side.
Article: P3317**

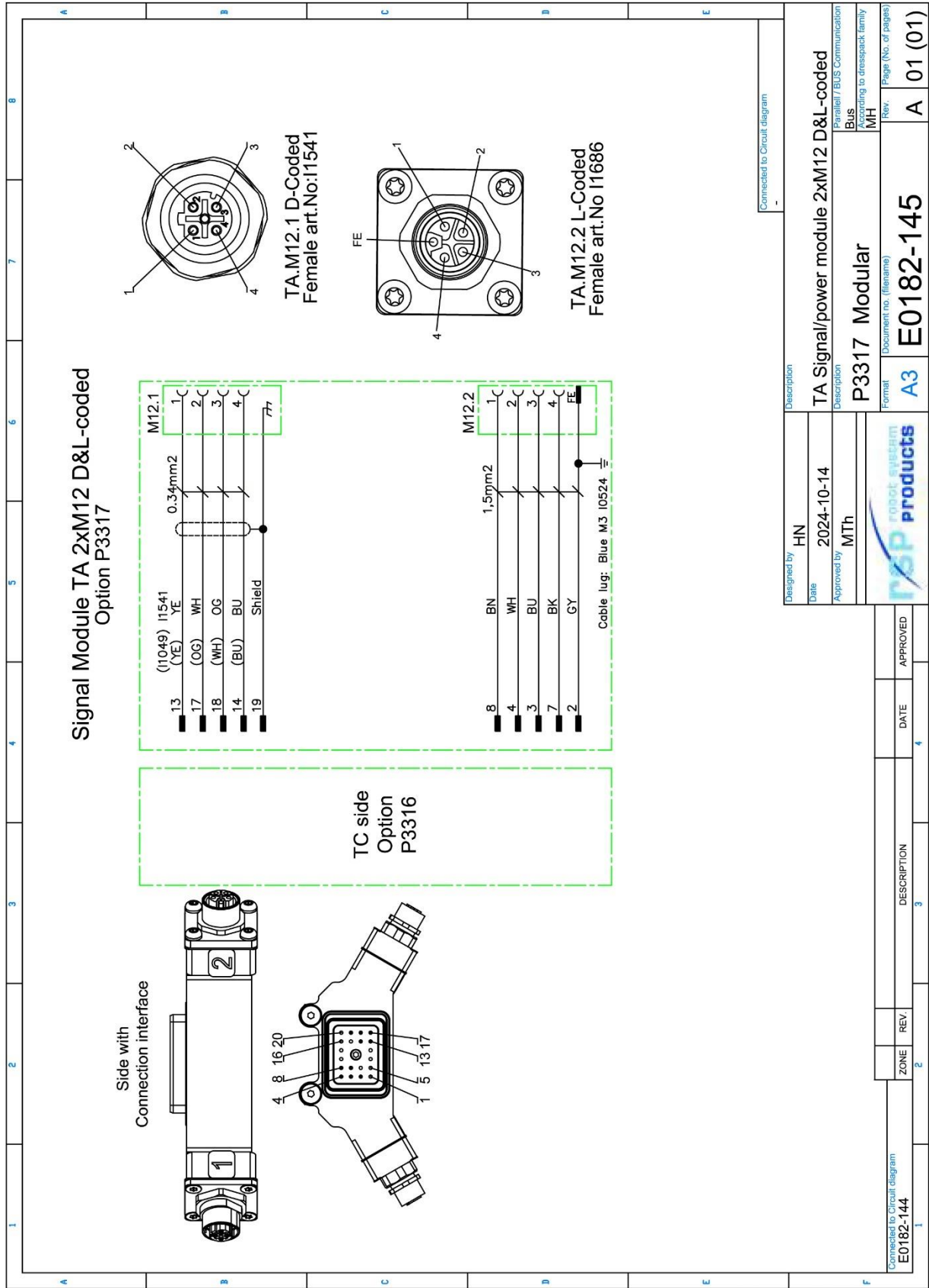


Power and signal module P3317 transfers 4 Profinet signals and 4 power signals to the tool. To be mounted on the tool attachment and used together with module P3316 mounted at the tool changer.

Technical data

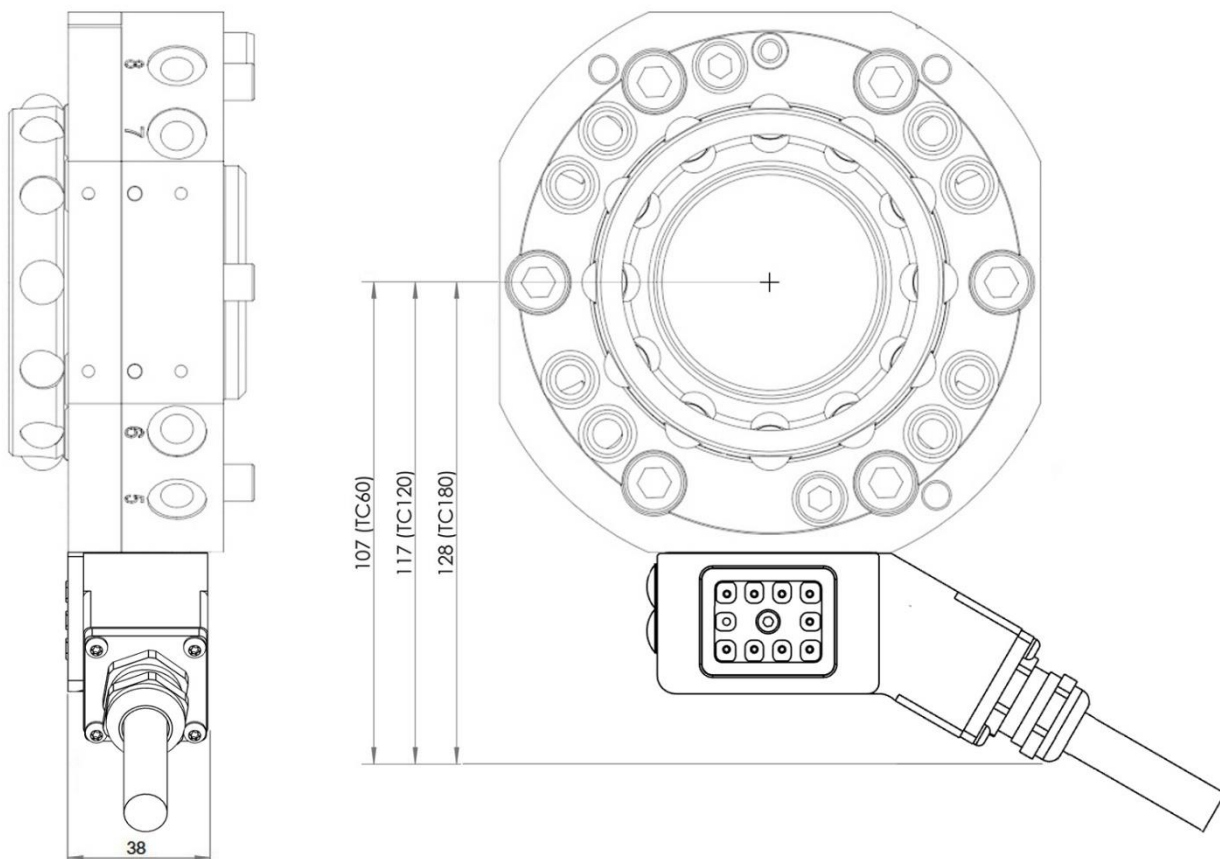
Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-145 (section 6.7.1) M12 4S D-coded (Phoenix 1437766), M12 5P L-coded (Harting 21035961505)

6.7.1 Circuit diagram E0182-145 for P3317



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6.8 Power module 8 x power (open end), 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 mounted at the tool attachment. Available with three cable lengths.

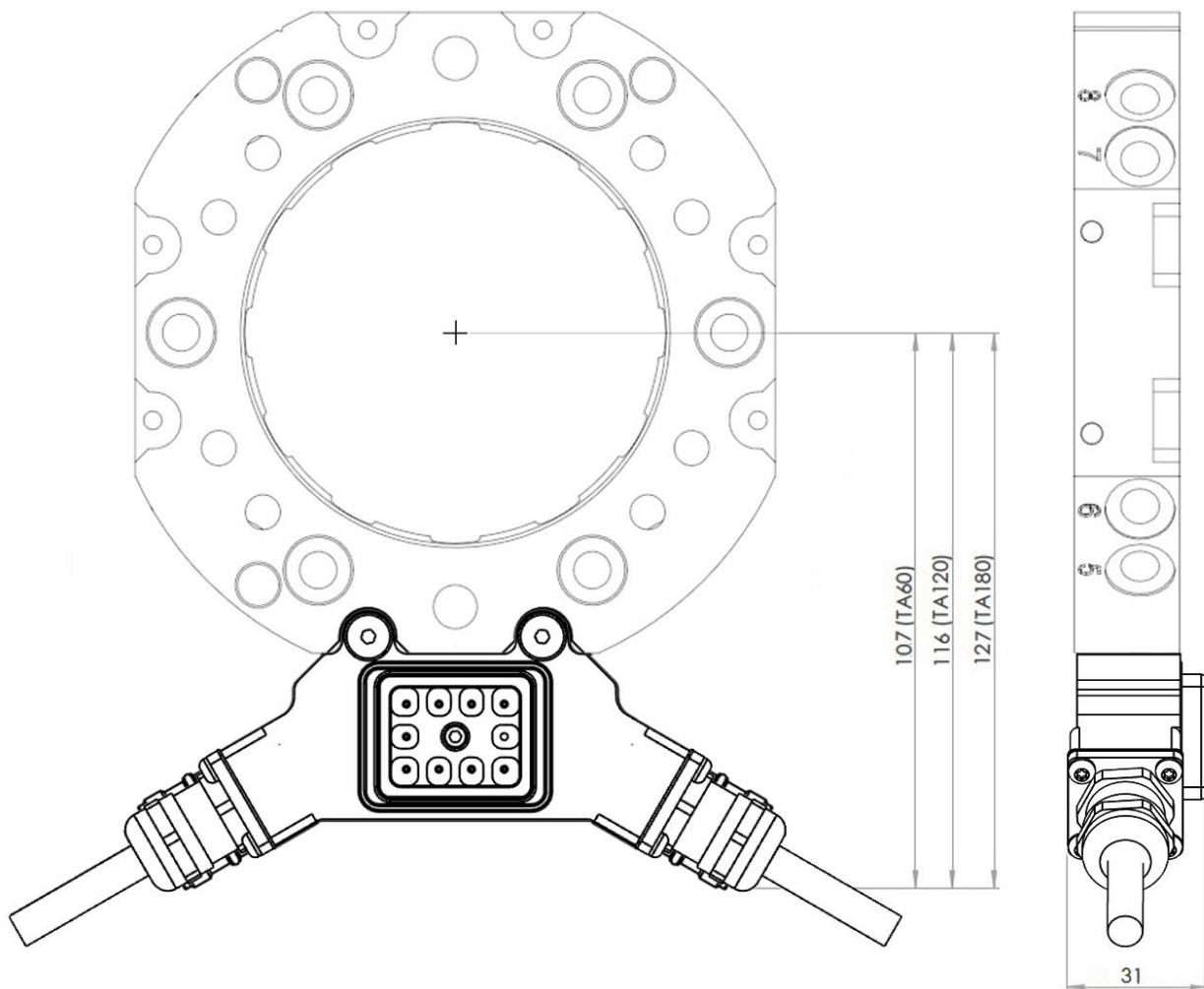


NOTE! Guide pins, option P1314, are recommended for improved alignment when docking P3312 with P3313.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram	E0182-138 (section 6.9.1)
	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

6.9 Power module 8 x power (2 x open end), tool side. Article: P3313

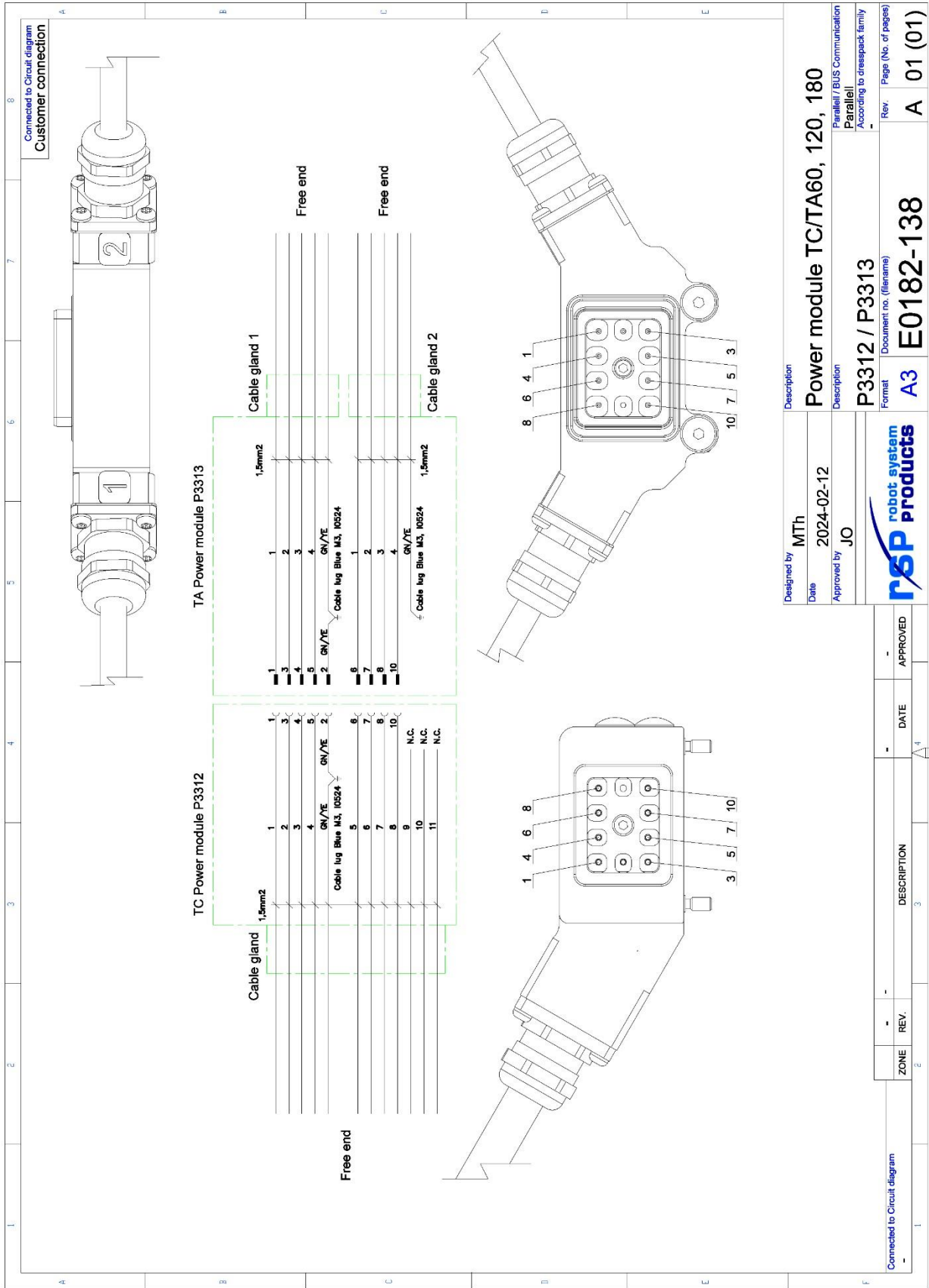


Power module P3313 transfers 8 power signals to the tool. To be mounted on the tool attachment and used together with module P3312 mounted at the tool changer. Available with two cable lengths.

Technical data

Weight		0.2 kg
Electrical Interface	Circuit diagram Connection, tool side	E0182-138 (section 6.9.1) 2 Cable glands with cables, open end P3313-10: 1 meter cable P3313-80: 8 meter cable

6.9.1 Circuit diagram E0182-138 for P3312 and P3313



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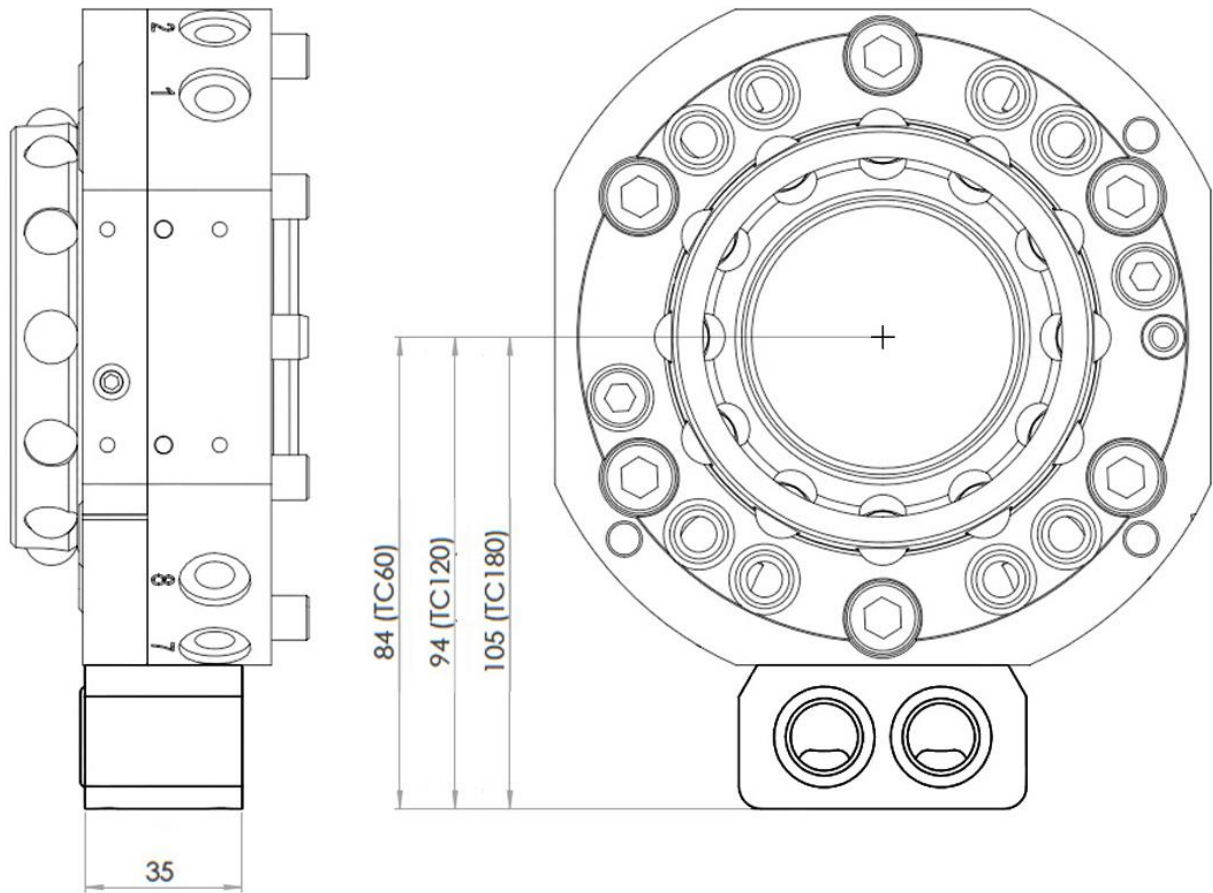
Designed by	MTh
Date	2024-02-12
Approved by	JO
Description	Power module TC/TA60, 120, 180
Description	Parallel / BUS Communication
Description	Parallel
Description	According to dresspack family
Format	P3312 / P3313
Document no. (filename)	E0182-138
Rev	A
Page (No. of pages)	01 (01)



ZONE	REV.	DATE	APPROVED
-	-	-	-

7 AIR MODULES

7.1 Air module, 2 x 3/8", robot side. Article: P1325

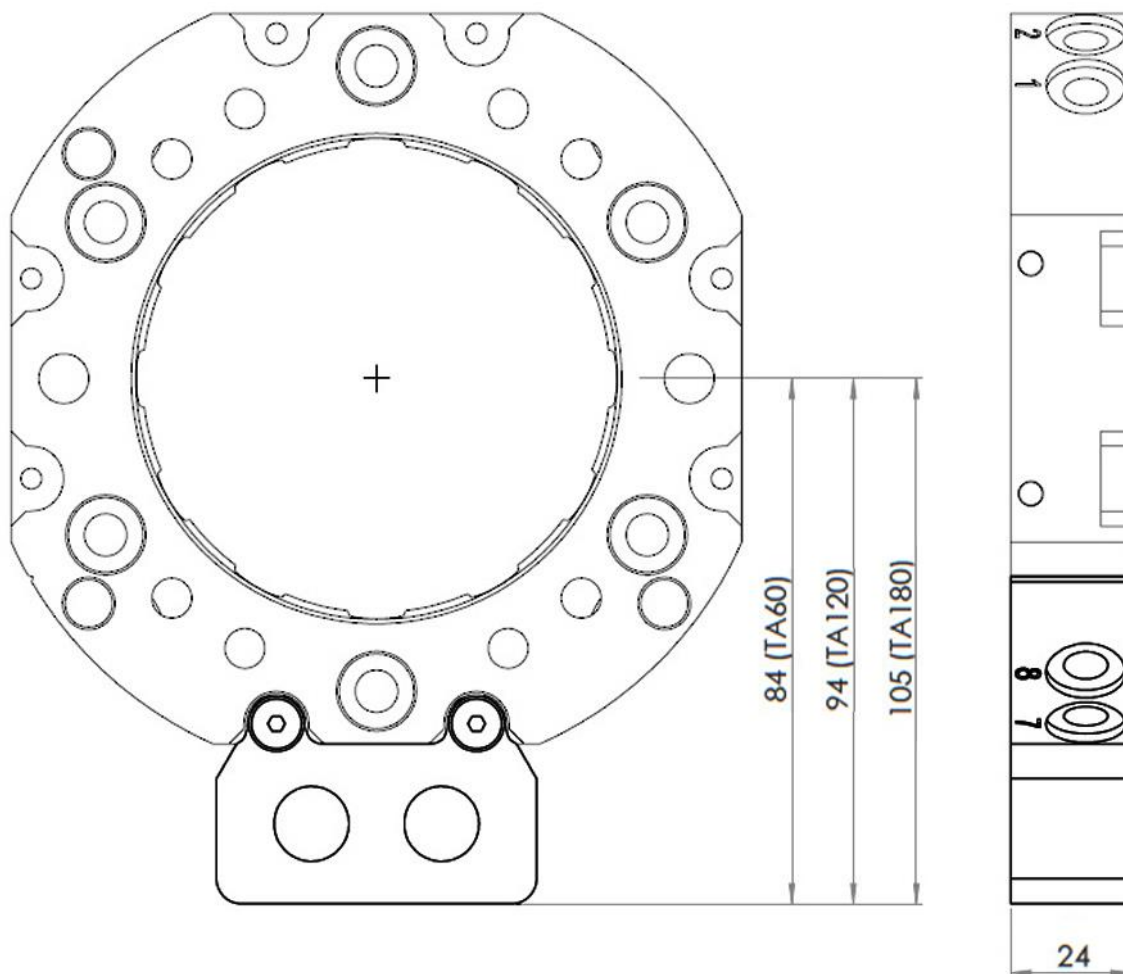


Air module P1325 transfers 2 pneumatic channels to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P1326 mounted on the tool attachment.

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

7.2 Air module, 2 x 3/8", tool side. Article: P1326

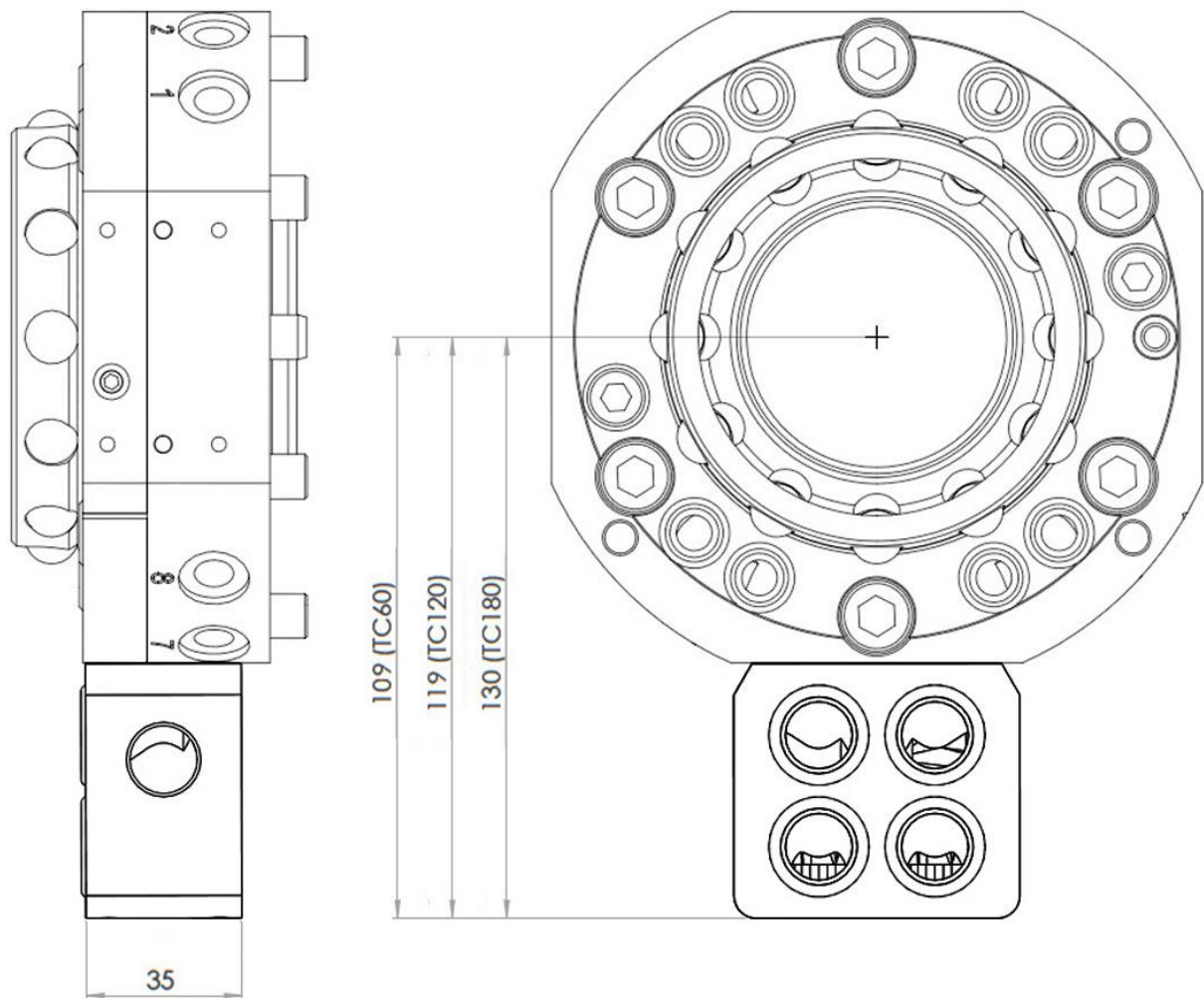


Air module P1326 transfers 2 pneumatic channels to the tool. To be mounted on the tool attachment and used together with module P1325 mounted on the tool changer.

Technical data

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

7.3 Air module, 4 x 3/8", robot side. Article: P1325-4

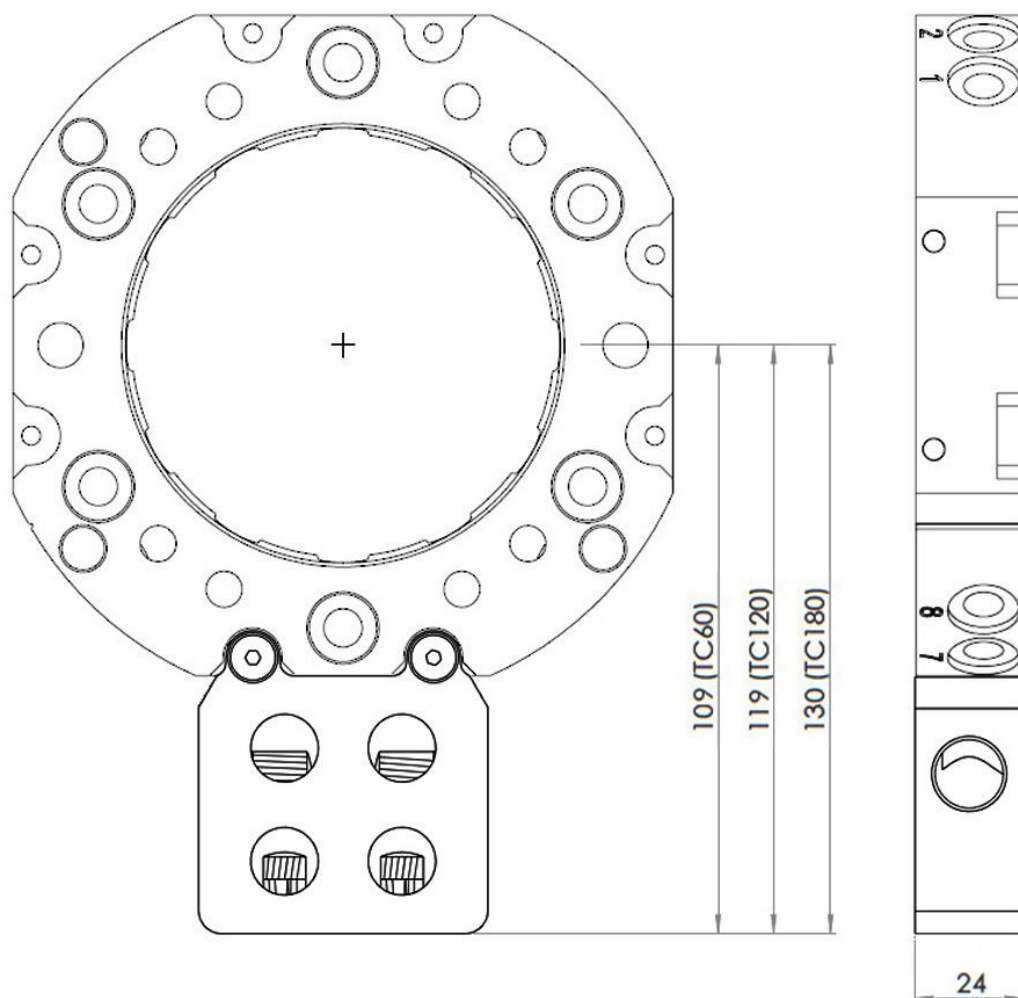


Air module P1325-4 transfers 4 pneumatic channels to the tool attachment. Can be mounted at 3 different positions on the tool changer. To be used together with module P1326-4 mounted on the tool attachment.

Technical data

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

7.4 Air module, 4 x 3/8", tool side. Article: P1326-4



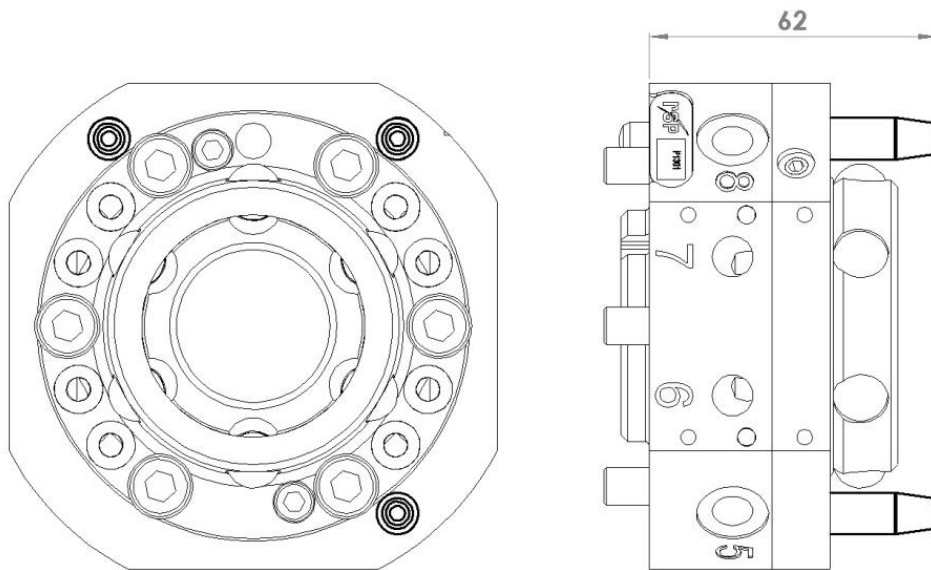
Air module P1326-4 transfers 4 pneumatic channels to the tool. To be mounted on the tool attachment and used together with module P1325-4 mounted on the tool changer.

Technical data

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

8 DOCKING AND PARKING MODULES

8.1 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.

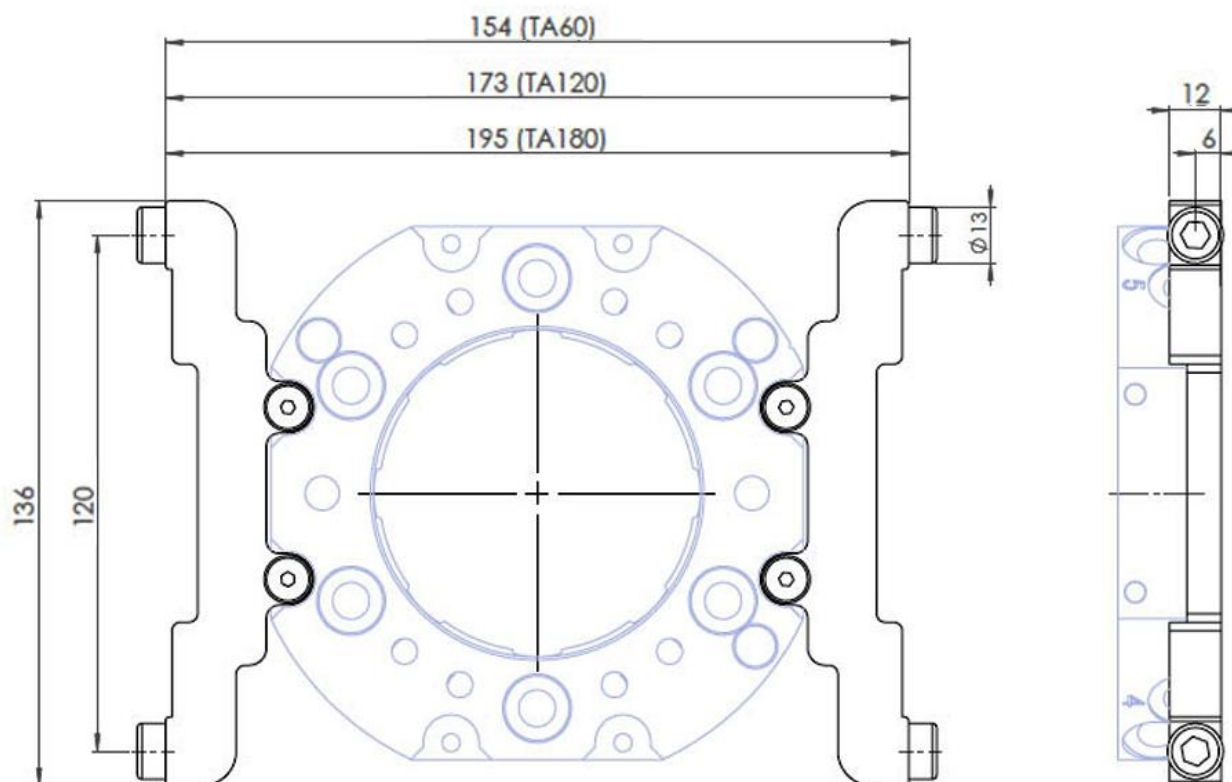


NOTE! Recommended when using options P1354, P1356, P1368, P1375, P3316, P1307, P3312 and P1322.

Technical data

Weight	0.05 kg
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8.2 Parking bracket kit for TA60/TA120/TA180. Article: P1313

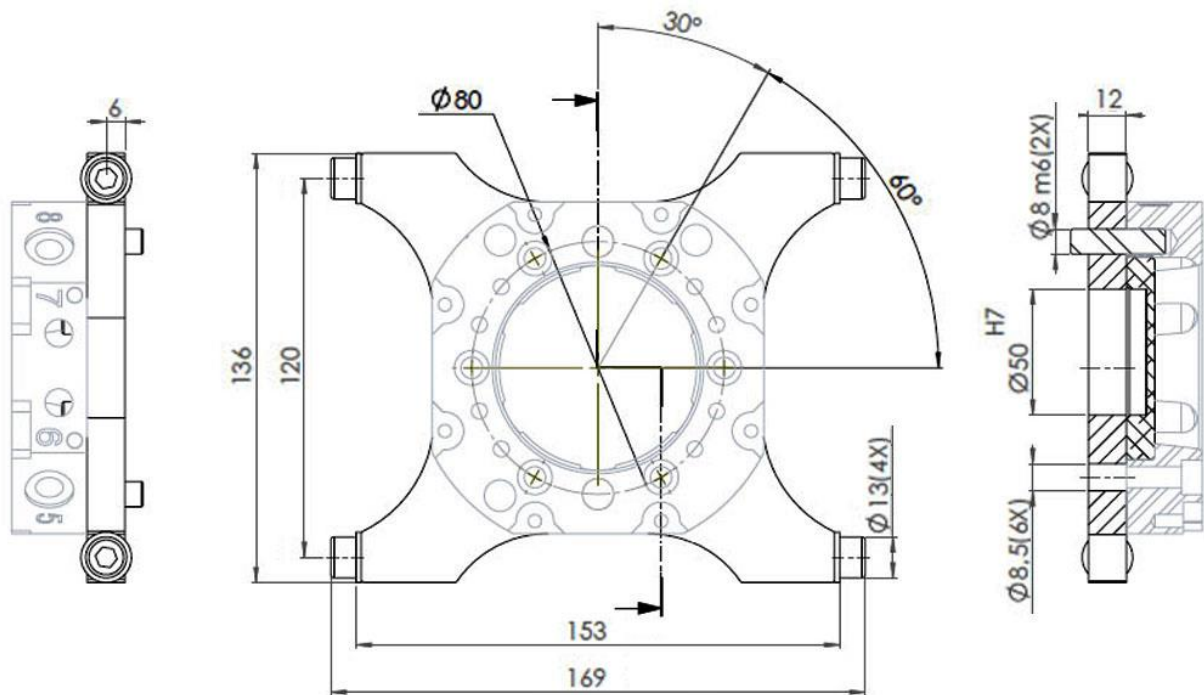


The parking bracket kit P1313 can be mounted on tool attachment TA60, TA120 or TA180 and gives together with tool stand kit P0423 a stable tool stand for easy tool changing. Can be mounted at two dedicated positions on the tool attachment.

Technical data

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

8.3 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.

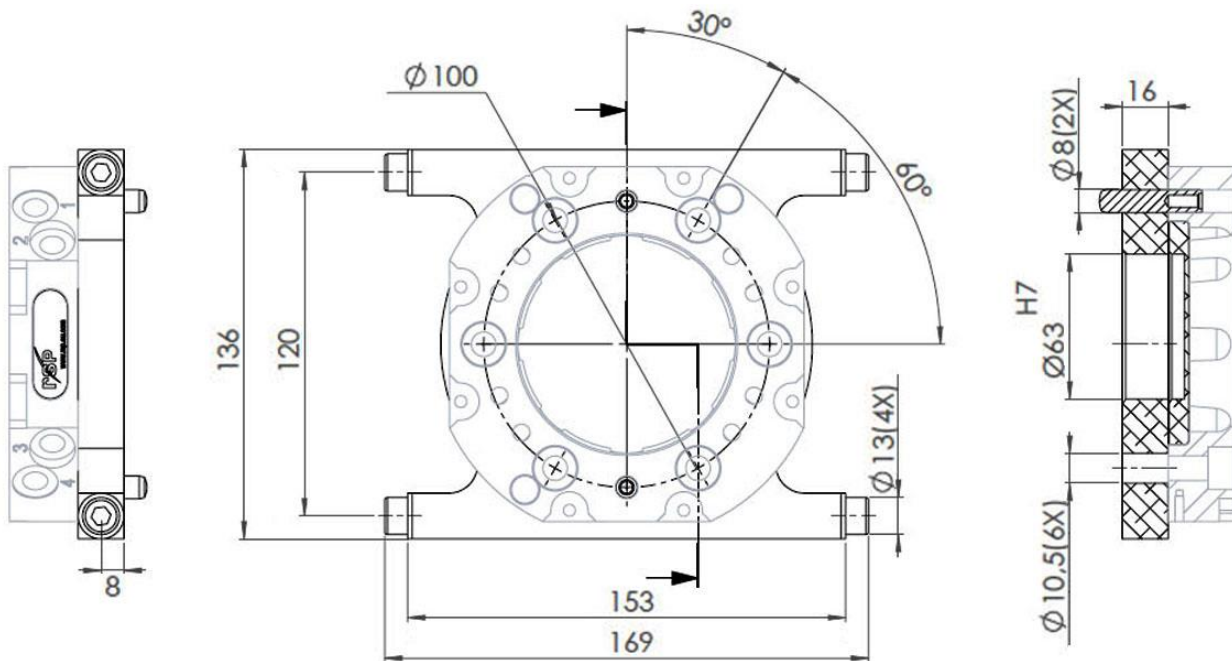


NOTE!
Only for mounting on tool attachment TA60.

Technical data

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

8.4 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.

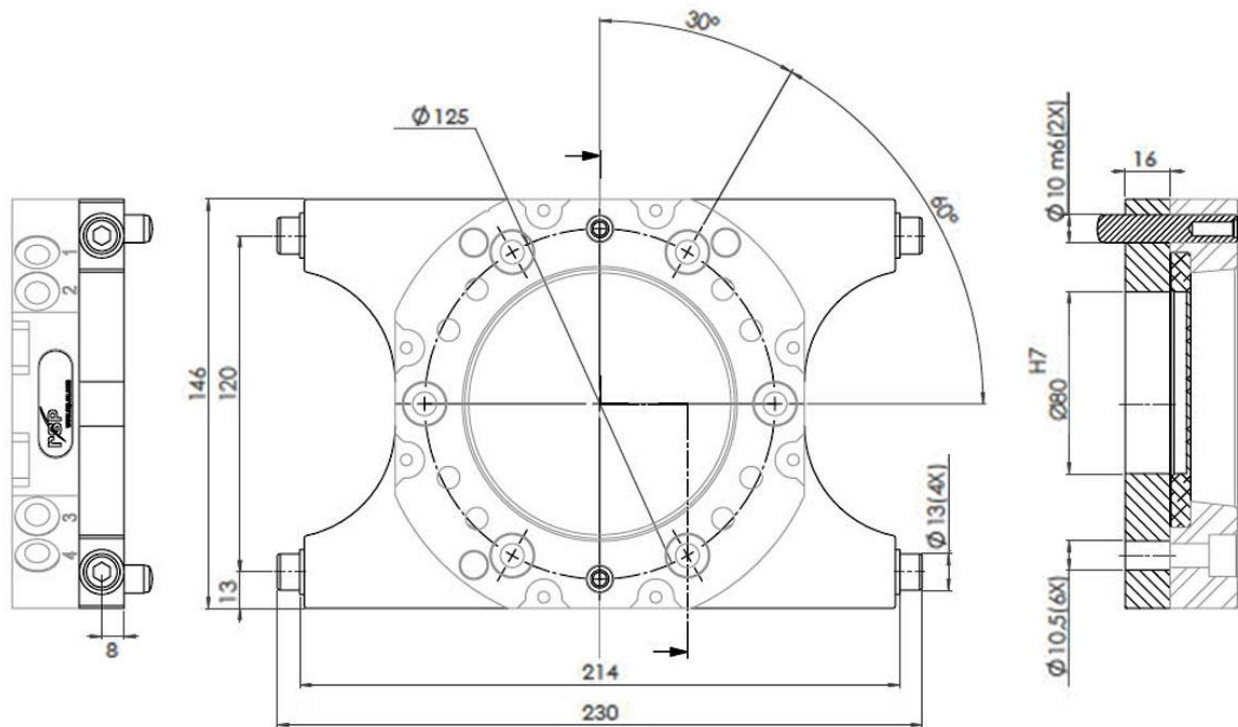


NOTE!
Only for mounting on tool attachment TA120.

Technical data

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

8.5 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.



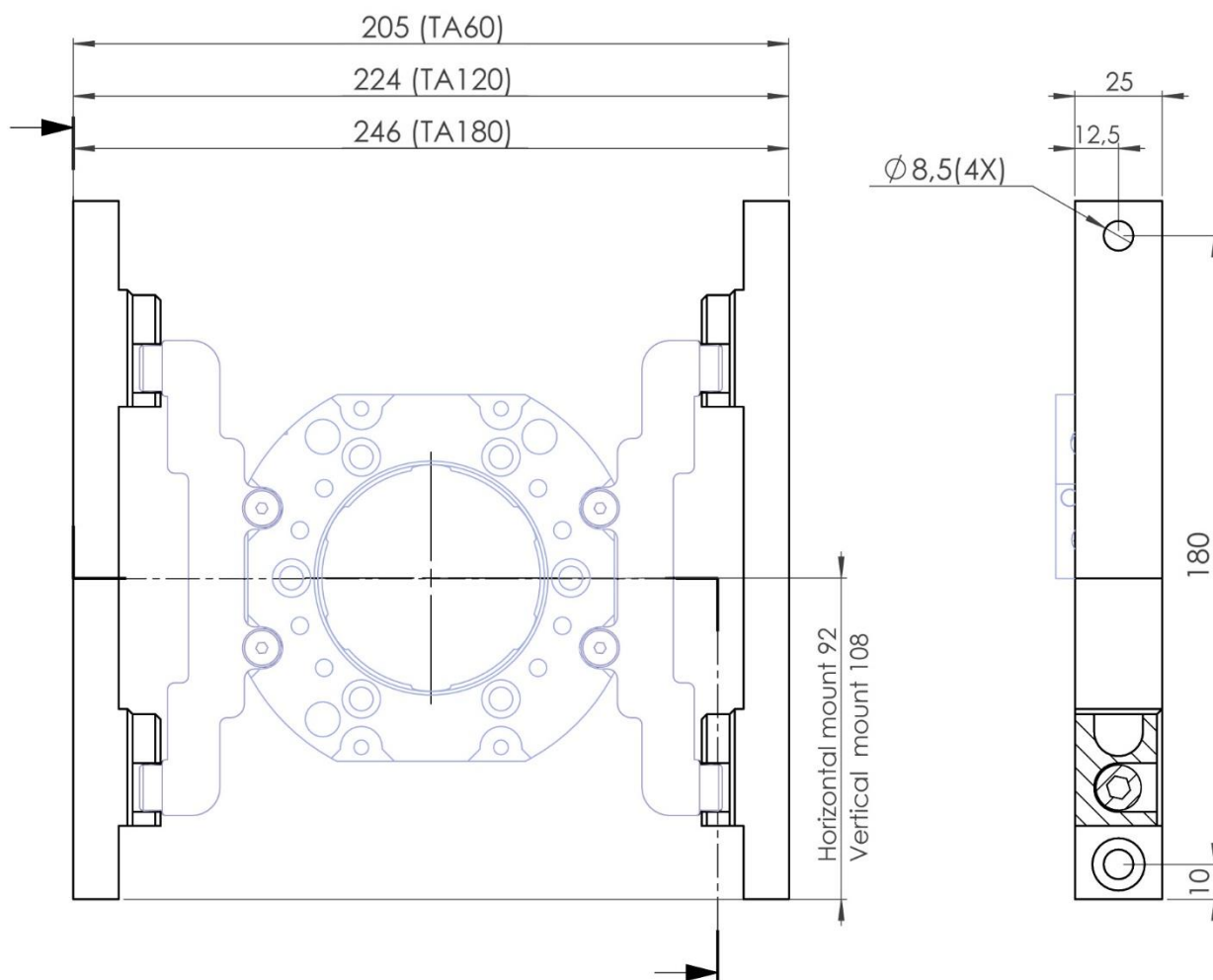
NOTE!

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

8.6 Tool parking 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.

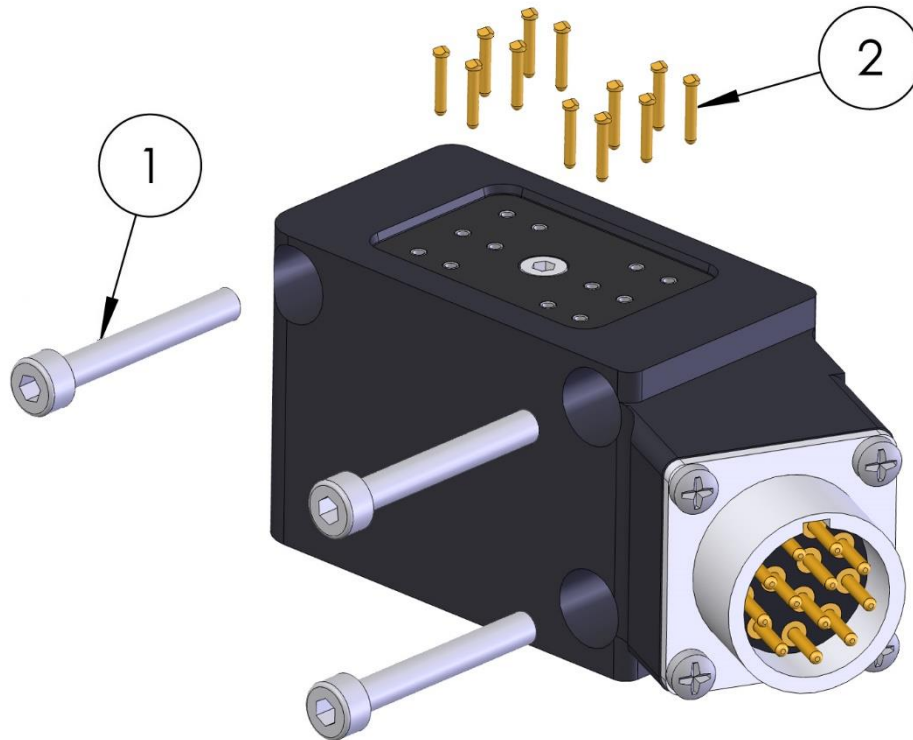
Technical data

Weight		0.7 kg
Maximum load	Fz (static)	1800 N

9 SPARE PARTS

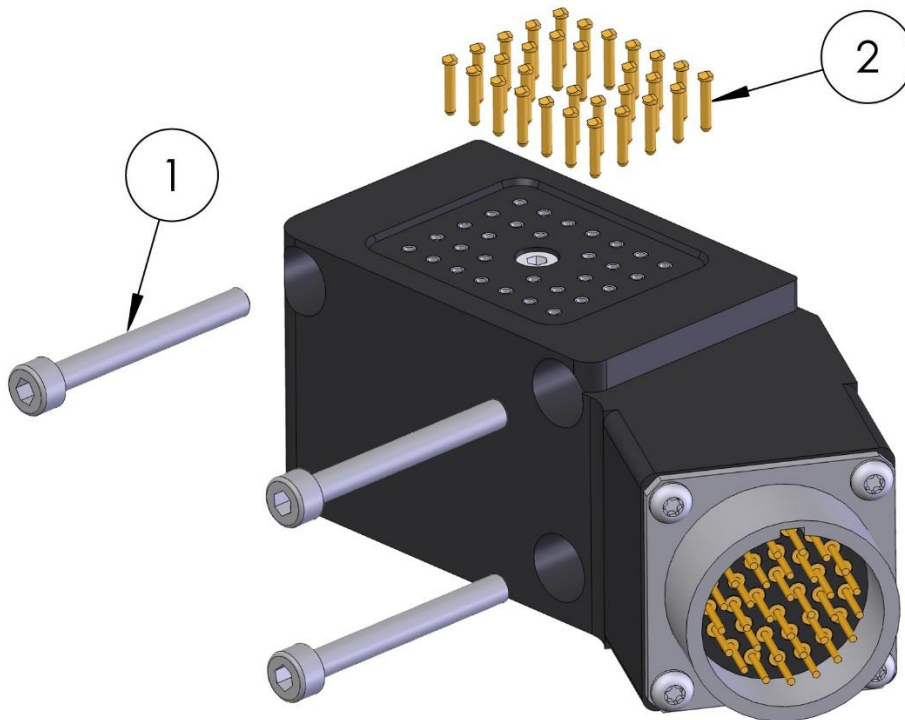
9.1 Tool changer side

9.1.1 Part list for signal modules P1305, P1371, P1344, P1311, P1399, P1381, P1328, P1340, and P1346



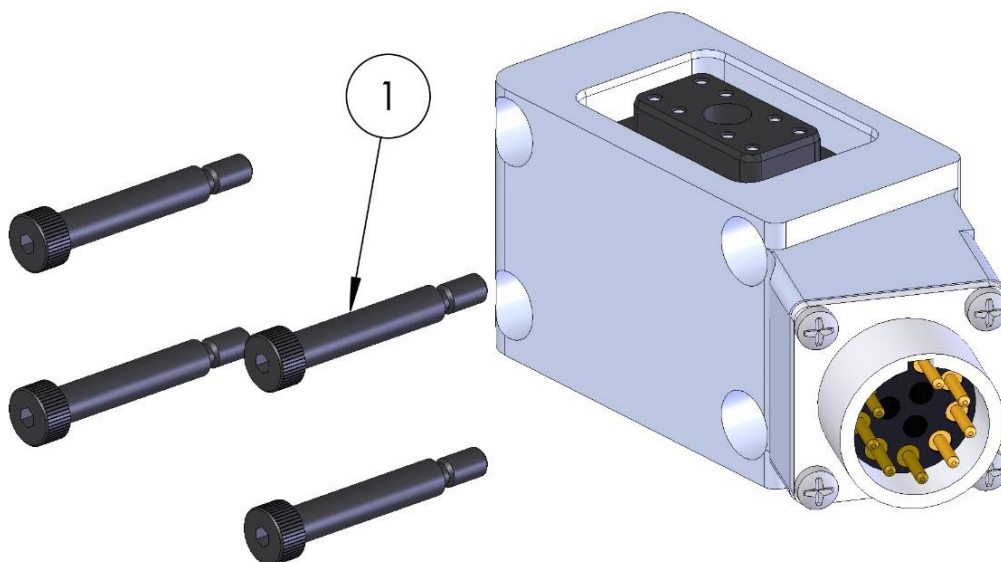
Item	Description	Part number	Wear part	Pcs
1	Fastening screws, M4x30	21212519-299		3
2	Spring loaded signal pins (P1305 and P1381)	I0154	X	12
2	Spring loaded signal pins (P1344 and P1328)	I0154	X	6
2	Spring loaded signal pins (P1371)	I0154	X	10
2	Spring loaded signal pins (P1311)	I0154	X	17
2	Spring loaded signal pins (P1399 and P1340)	I0154	X	9
2	Spring loaded signal pins (P1346)	I0154	X	5

9.1.2 Part list for signal modules P1338



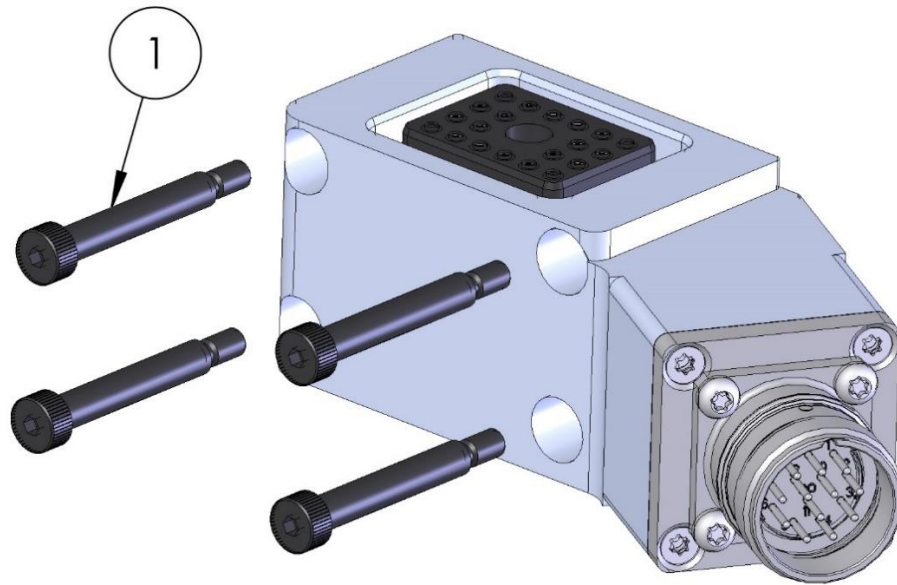
Item	Description	Part number	Wear part	Pcs
1	Fastening screws, M4x35	21212519-301		3
2	Spring loaded signal pin	I0154	X	30

9.1.3 Part list for signal modules P1307 and P1322



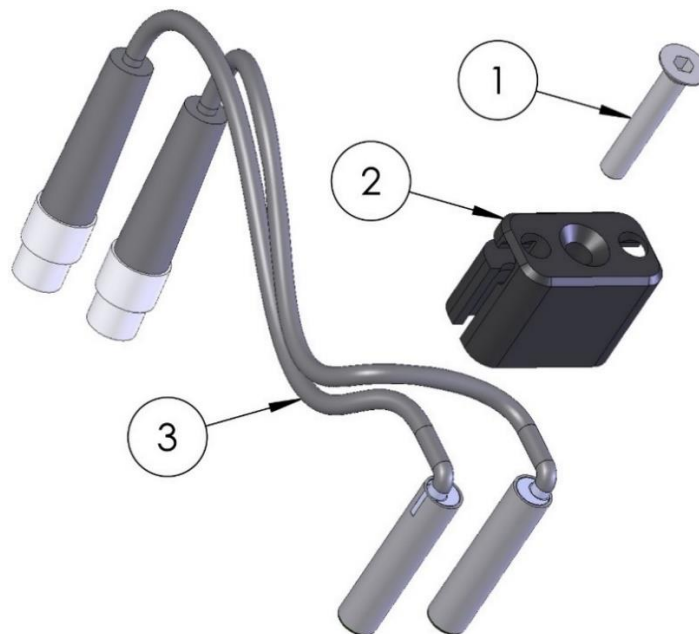
Item	Description	Part number	Wear part	Pcs
1	Shoulder screws (P1307)	H 5X25 (M4)		3
1	Shoulder screws (P1322)	H 5X25 (M4)		4

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



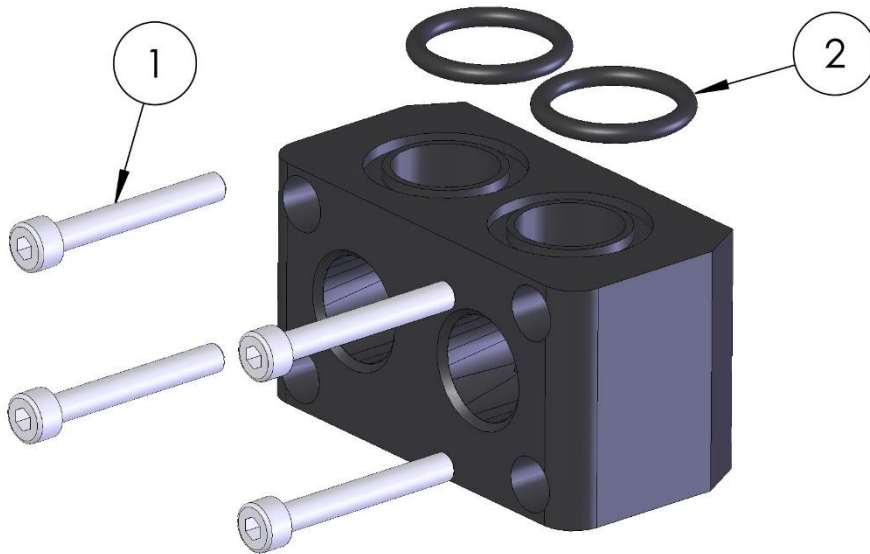
Item	Description	Part number	Wear part	Pcs
1	Shoulder screws (P1354 and P1375)	H 5x30 (M4)		3
1	Shoulder screws (P1356, P1368, P3312 and P3316)	H 5x30 (M4)		4

9.1.5 Part list for TC magnetic sensor opened/closed, P1324



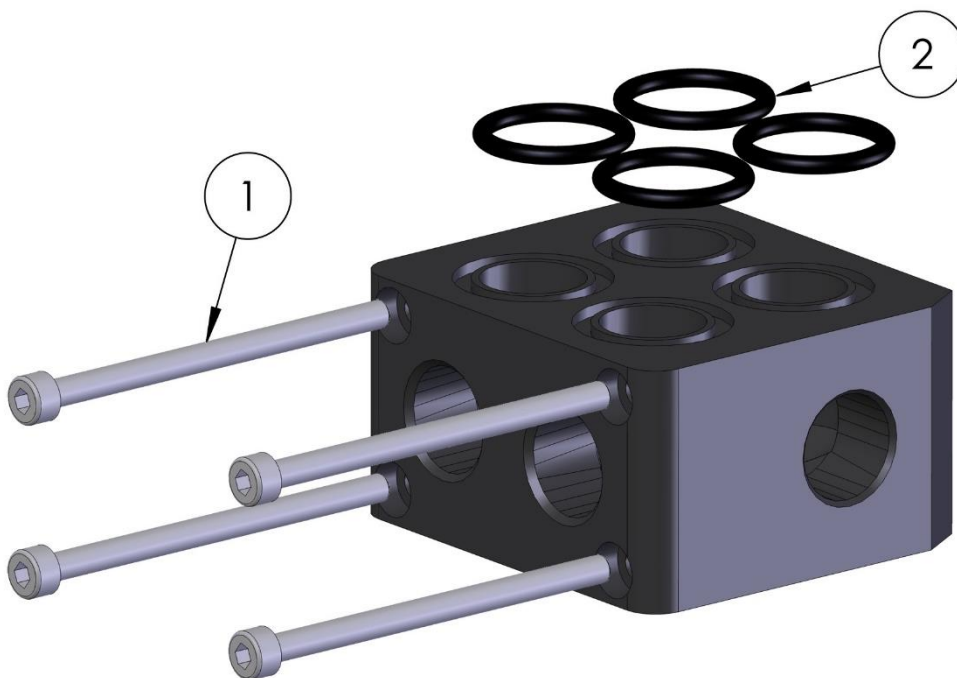
Item	Description	Part number	Wear part	Pcs
1	Fastening screw, M4x25	MF6S 4x25		1
2	Sensor bracket	P0199-162		1
3	Magnet sensor	I1144		2

9.1.6 Part list for air module, P1325



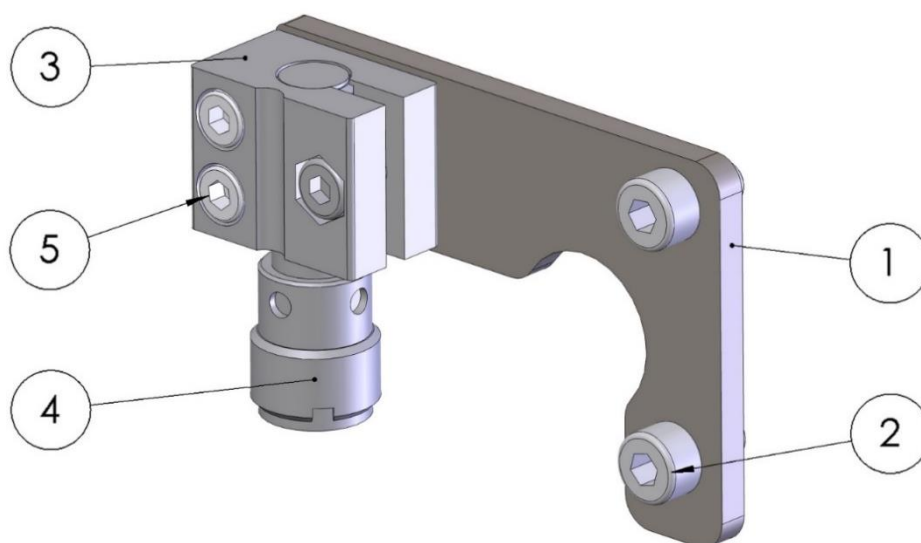
Item	Description	Part number	Wear part	Pcs
1	Fastening screws, M4x30	21212519-299		4
2	Air sealing	I0115	X	2

9.1.7 Part list for air module, P1325-4



Item	Description	Part number	Wear part	Pcs
1	Fastening screws, M4x60	9ADA183-080		4
2	Air sealing	I0115	X	4

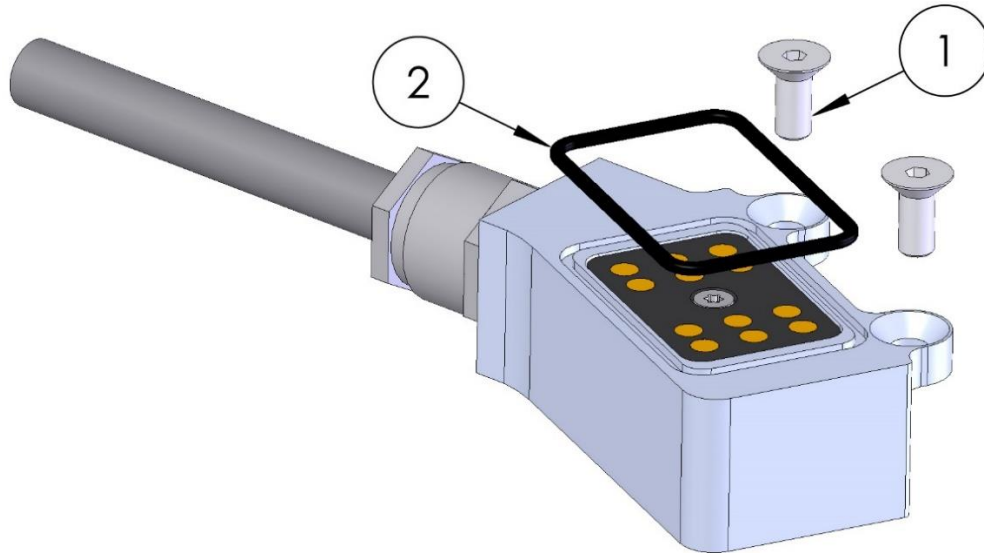
9.1.8 Part list for TA present sensor, P1383



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

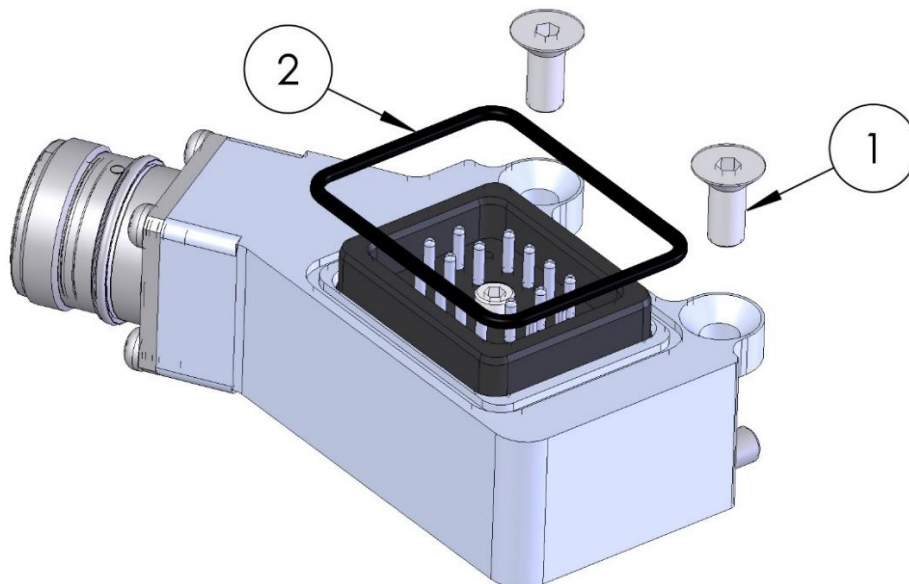
9.2 Tool attachment side

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



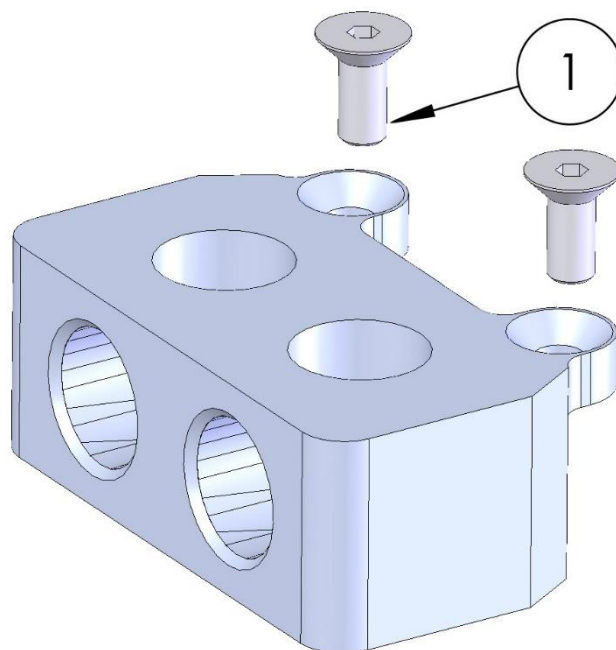
Item	Description	Part number	Wear part	Pcs
1	Fastening screws.M5x12	21212711-327		2
2	O-ring	11469	X	1

9.2.2 Part list for signal modules P1355, P1390. P3324, P1339, P1378, P1376, P1357, P1374, P1369, P3317 and P3313



Item	Description	Part number	Wear part	Pcs
1	Fastening screws.M5x12	21212711-327		2
2	O-ring	11468	X	1

9.2.3 Part list for air module P1326 and P1326-4



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

