

Technical description

Tool system TS250/200 for ABB IRB

M0721-1

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



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ROBOT AND FUNCTIONALITY GUIDE

Robot model	Functionality and maximum load	No. of air channels and electric signals	Article number
IRB6700-200/2,60 (Lower line)	Swivel tool changing, 250 kg	6 air, 18 signals	TS151-602 (section 2.4.1)
	Swivel, 250 kg	8 air, 18 signals	TS151-604 (section 2.4.3)
	CiRo Basic, 200 kg	-	TS151-610 (section 2.5.1)
	CiRo Complete, 200 kg	8 air, 12 signals	TS151-611 (section 2.5.2)
IRB6700-155/2,85 (Lower line)	Swivel tool changing, 250 kg	6 air, 18 signals	TS151L-602 (section 2.4.1)
	Swivel, 250 kg	8 air, 18 signals	TS151L-604 (section 2.4.3)
	CiRo Basic, 200 kg	-	TS151L-610 (section 2.5.1)
	CiRo Complete, 200 kg	8 air, 12 signals	TS151L-611 (section 2.5.2)
IRB6700-235/2,65 & 205/2,80 (Higher line)	Swivel tool changing, 250 kg	6 air, 18 signals	TS152-602 (section 2.4.1)
	Swivel, 250 kg	8 air, 18 signals	TS152-604 (section 2.4.3)
	CiRo Basic, 200 kg	-	TS152-610 (section 2.5.1)
	CiRo Complete, 200 kg	8 air, 12 signals	TS152-611 (section 2.5.2)
IRB6700-150/3,20 & 175/3,05 (Higher line)	Swivel tool changing, 250 kg	6 air, 18 signals	TS152L-602 (section 2.4.1)
	Swivel, 250 kg	8 air, 18 signals	TS152L-604 (section 2.4.3)
	CiRo Basic, 200 kg	-	TS152L-610 (section 2.5.1)
	CiRo Complete, 200 kg	8 air, 12 signals	TS152L-611 (section 2.5.2)
IRB6700-300/2,70 (Power line)	Swivel tool changing, 250 kg	6 air, 18 signals	TS153-602 (section 2.4.1)
	Swivel, 250 kg	8 air, 18 signals	TS153-604 (section 2.4.3)
	CiRo Basic, 200 kg	-	TS153-610 (section 2.5.1)
	CiRo Complete, 200 kg	8 air, 12 signals	TS153-611 (section 2.5.2)
IRB6700-245/3,00 (Power line)	Swivel tool changing, 250 kg	6 air, 18 signals	TS153L-602 (section 2.4.1)
	Swivel, 250 kg	8 air, 18 signals	TS153L-604 (section 2.4.3)
	CiRo Basic, 200 kg	-	TS153L-610 (section 2.5.1)
	CiRo Complete, 200 kg	8 air, 12 signals	TS153L-611 (section 2.5.2)

1. INTRODUCTION

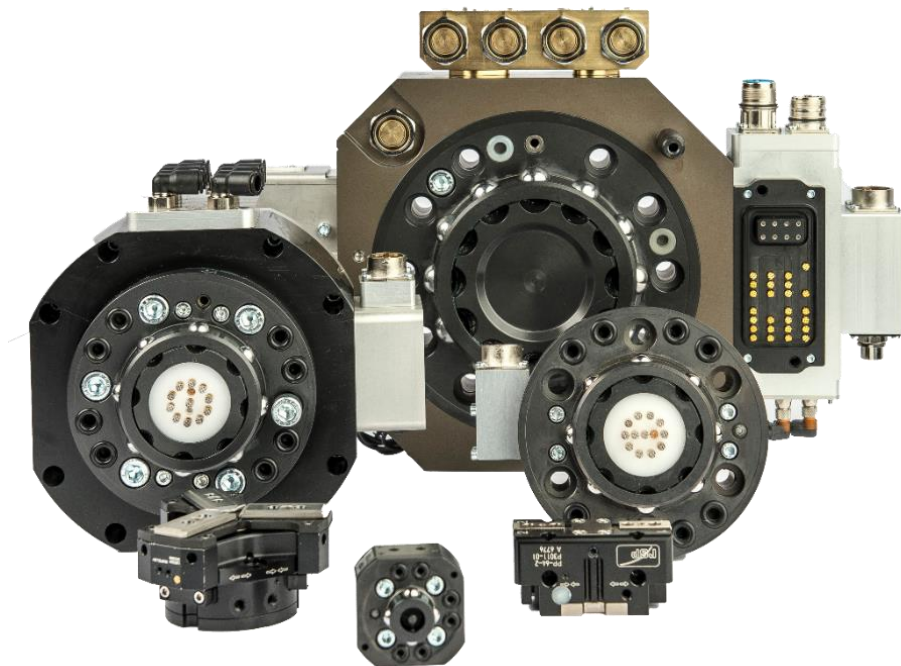
Robot System Products is a front-rank provider of peripheral products for high performance robot applications. We provide complete system solutions for your robot installations, aiming to improve your productivity with the most reliable and cost-effective tooling on the market. Continuously we explore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

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

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

Robot System Products' tool changers are constructed to maximize the flexibility and reliability of your robot fleet. Through our patented locking device TrueConnect™ robustness and high safety are combined with low weight and compactness. With our swivels compressed air, water, electrical and data signals as well as weld and servo power are transferred to your tools with robot motion capabilities fully maintained. Our swivel tool changers unite the TrueConnect™ mechanism with our swivel technology, combining the best out of the two technologies. With RSP's cost-effective CiRo, cables and hoses can be freely selected with high robot flexibility maintained, and space requirements reduced. Our integrated tool systems are delivered as complete plug-and-play solutions designed for quick and simple installation.

Robot System Products' product lines are available for all major robot brands and come with complete documentation. 3D-models for simulation are available for download at: www.rsp.eu.com.



1.1 Safety

1.1.1 General

The integrator installing the tool system must follow the safety demands stated in standards and provisions applicable in the country where the tool system is to be installed. The products are all prepared for CE-certification.

The user of the Robot System Products tool system is responsible that law and directives applicable in respective countries, with regards to safety, are followed. The user is also responsible to guarantee that all safety devices are installed correctly.



WARNING!

Never carry out service work on a robot that has not been taken out of operation. See safety information for the robot.



WARNING!

Only perform work on tools attached to the swivel, swivel tool changer or CiRo if the air pressure is safely switched off.



WARNING!

Be aware that the swivel, swivel tool changer, tool attachment and CiRo are heavy and may cause personal injury and equipment damage if dropped.



NOTE!

A swivel tool changer shall always be in locked position, also when empty, to avoid unexpected locking if air pressure is lost.



WARNING!

Electric signals and power must be disconnected/switched off when docking the tool attachment to the swivel tool changer. This is to prevent sparking between signal pins and tool attachment.

1.1.2 Explanation of warnings

The warnings in this document are specific to the products in this manual. It is expected that the user also pay attention to certain notifications from the robot manufacturer and/or the manufacturers of other components used in the installation.



WARNING!

The warning sign will make you aware that a situation could result in potential serious injury or damage to equipment.



NOTE!

The note sign will alert you about something important to consider.

1.2 Description of tool system TS250/200

Tool systems from Robot System Products are complete plug-and-play solutions designed for quick and easy installation. With our tool systems, compressed air and electrical signals are supplied to the tool with a minimum of limitations on the robot's working range. An RSP tool system is based on a swivel, a swivel tool changer (STC) or a CiRo and includes hose package, valve unit and a complete set of cables, hoses and connectors for signals and air – all delivered as a ready-mounted package. CiRo Basic is, however, delivered with adaptation kit and hose package only (valve units, connections, cabling and air hoses shall be selected separately).

RSP tool systems simplify and reduce required design time, as the components all are matched, and the media supply is already fully adapted to the specific robot and its functions. When using a swivel or STC based tool system compressed air and electric signals are made available directly at the tool without limiting axis 6 rotation or the robot's working range. For CiRo based tool systems the axis 6 rotation will be limited to $\pm 250^\circ$. Using RSP tool systems there are no need of considering loose, hanging cables and hoses during programming, concentration can be given to the tool path.

3D-models are available in RobotStudio and STEP-format.

1.2.1 Swivels, swivel tool changers and CiRo

RSP's tool changer technology enables robots to switch between multiple tools. Our swivel tool changers integrate the advantages of swivels and tool changers into a single unit. The principle behind the patented locking device TrueConnect™ is that load is distributed uniformly through pressing locking balls into spherical grooves, the play is a minimum and the position repeatability is practically absolute throughout the lifespan.

With a swivel tool changer, the air supply to the tool is shut off automatically during tool change, no on/off-program instructions are required. As the solution is fully integrated with the robot, the reliability is improved, and the operational life extended as compared with traditional solutions. In addition, the system can with ease be reconfigured with changing requirements, or when additional functions are needed.

With a CiRo, cables and hoses can be connected to tools or tool changers similarly to robots with internal dressing. The robots working range and ability to move freely, independent of transferred media, is maximised. For the tool system CiRo Complete hoses and cables for air, signals and power are included. For CiRo Basic they shall be selected separately according to the requirements of the application. With CiRo the axis 6 can rotate up to 500 degrees, only limited by the flexibility of hoses and cables.



2. TOOL SYSTEM SPECIFICATIONS

An RSP tool system includes all components for implementing swivel tool changers, swivels and CiRo's on specified robots. All tool systems are complete (with the exception of CiRo Basic) and includes valve unit, cabling, hoses, fittings as well as all screws, nuts and washers needed. It is delivered as a single unit ready for direct mounting on the robot. Tool systems equipped with tool changing capability should be complemented with tool attachments.

2.1 Tool system overview, swivel-based

A swivel based TS250/200 tool system consists of the following components:

- (1) A swivel for direct mounting of tools, with electrical connections, or alternatively, a swivel with integrated tool changer (STC) combined with tool attachments with electrical connections.
- (2) An adaptation kit which prohibits the swivel or STC to rotate in relation to the robot and, when applicable, as well includes an adaptation plate for the bolt circle of the robot.
- (3) A hose package to be mounted on the upper arm between the swivel or STC and the valve unit. All screws, bolts, and mounting plates needed are included.
- (4) Air hoses connecting the swivel or STC with the valve unit.
- (5) A signal cable between swivel or STC and the connection box on the valve unit.
- (6) A valve unit integrating air and electrical connections into one compact unit. The integrated tool changing function closes the air supply to the tool during tool change.
- (7) A signal cable connecting the valve unit with the application interface of the robot.
- (8) Air supply hose connecting the valve unit with the application interface of the robot.



Item	Description	Article number
1	Swivel tool changer STC250-6E	P6306
	Swivel S250-8E	P6304
2	Adaptation kit for IRB 6700-200/2,60 & 155/2,85	P6492
	Adaptation kit for IRB 6700-235/2,65 & 205/2,81	P6490A
	Adaptation kit for IRB 6700-300/2,70 & 245/3,00	P4406

3	Hose package for IRB 6700-200/2,60 & 300/2,70	P2147-1
	Hose package for IRB 6700-235/2,65 & 205/2,80	P2147-1
	Hose package for IRB 6700-155/2,85 & 245/3,00	P2147-2
	Hose package for IRB 6700-150/3,20 & 175/3,05	P2147-2
4	Air hose kit	P2050-16
5	Upper arm cable	P8442-40
6	Valve units large for tool changing with four valves	P0041A
	Valve units large for swivel and CiRo with four valves	P0042A
7	Robot cable for IRB 6700	P8184-7
8	Air supply hose including coupling	A0214-301

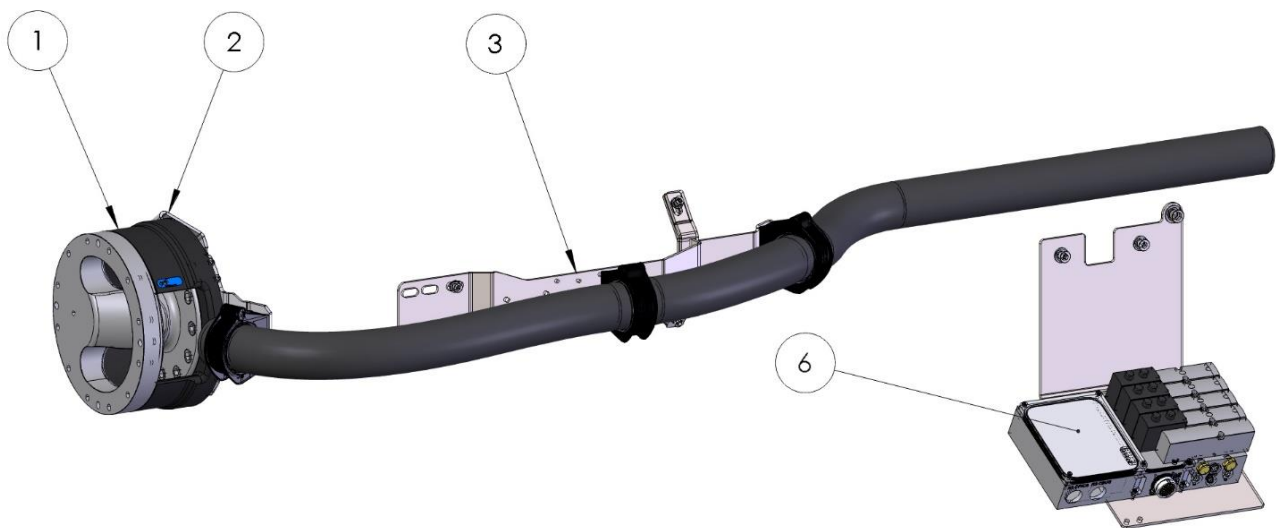


NOTE! For spare parts and wear parts see manuals and technical description of each component.

2.2 Tool system overview, CiRo-based

A complete CiRo based TS250/200 tool system consists of the following components (for CiRo Basic only items 1-3 are included):

- (1) A CiRo for mounting of tools, direct or using tool adapter kit (optional).
- (2) An adaptation kit which prohibits the CiRo to rotate in relation to the robot.
- (3) A hose package to be mounted on the upper arm between the CiRo and the valve unit.
All screws, bolts, and mounting plates needed are included.
- (4) Air hoses connecting the tool, mounted on the CiRo, with the valve unit.
- (5) Signal cables connecting the tool, mounted on the CiRo, and the valve unit.
- (6) A valve unit integrating air and electrical connections into one compact unit.
- (7) A signal cable connecting the valve unit with the application interface of the robot.
- (8) Air supply hose connecting the valve unit with the application interface of the robot.



Item	Description	Article number
1	CiRo XL1	P5151
2	Adaptation kit for IRB 6700-200/2,60 & 155/2,85 Adaptation kit for IRB 6700-235/2,65, 205/2,80, 150/3,20 & 175/3,05 Adaptation kit for IRB 6700-300/2,70 & 245/3,00	P5504 P5502 P5505
3	Hose package for IRB 6700-200/2,60, 235/2,65, 205/2,80 & 300/2,70 Hose package for IRB 6700-150/3,20 & 175/3,05 Hose package for IRB 6700-155/2,85 & 245/3,00	P2164-1 P2164-2 P2164-3
4	Air hose kit	P2050-11
5	Upper arm cable	P8436-50
6	Valve unit	P0042A
7	Robot cable for IRB 6700	P8184-7
8	Air supply hose	A0214-301

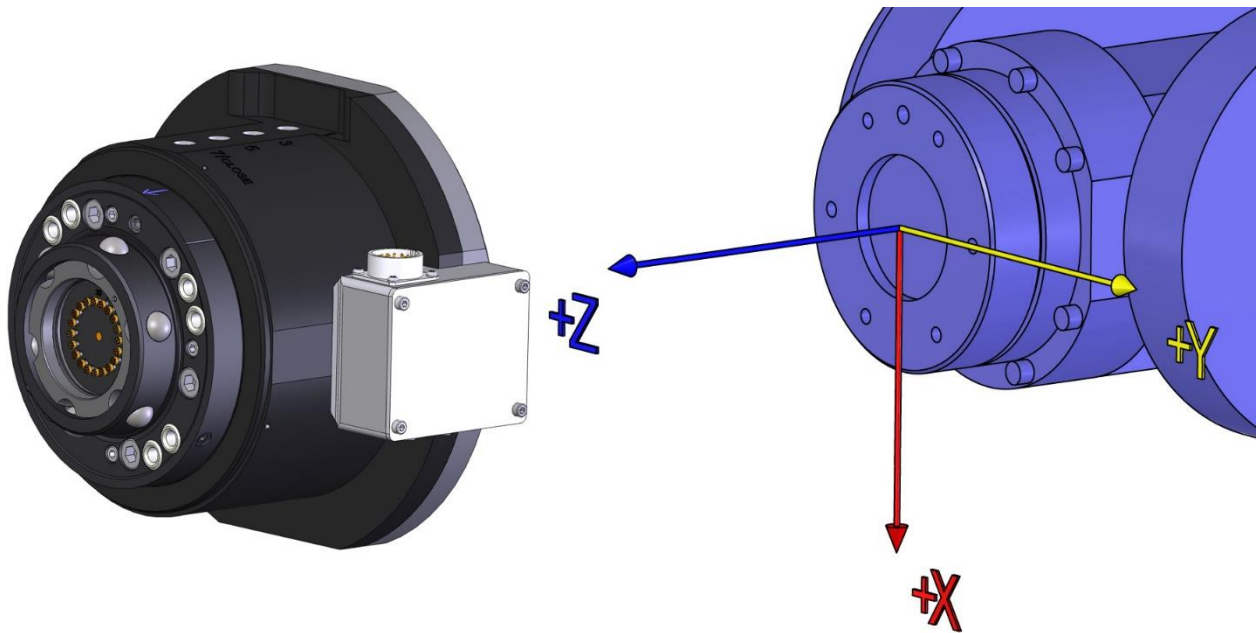


NOTE! For spare parts and wear parts see the manuals and technical description of each component.

2.3 Technical definitions

2.3.1 Coordinate system

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



NOTE!

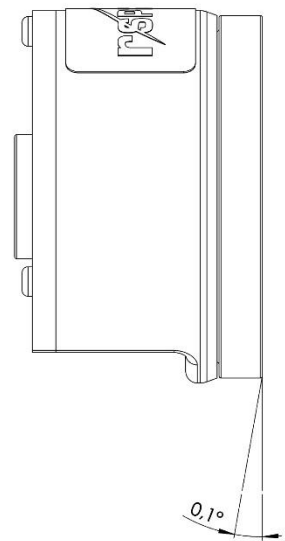
For swivels, swivel tool changers and CiRo:s the origo is situated on the surface in the centre of the robot mounting flange.

2.3.2 Deflection angle



NOTE!

Deflection load_{xy} (0,1°) corresponds the torque applied to obtain an deflection around the x/y-axes of 0,1°



2.4 Swivel based tool system configurations

2.4.1 Swivel tool changing with 6 air channels and 18 electric signals.

Articles: TS151-602, TS152-602 and TS153-602



This tool system is used when tool changing capability, six pneumatic channels and 18 electric signals are required. It consists of a swivel tool changer, adaptation kit, hose package, valve unit and cabling. The valve unit contains three directional (bi-stable 5/2) valves and one tool change (2x3/2-NO/NC) valve. The hose package totally contains eight air hoses. Suitable tool attachments (P6418, P6431 and P6473) are described in sections 3.1.2, 3.1.3 and 3.1.4.

Robot model	Article number	Pneumatic diagram	Circuit diagram
ABB IRB 6700-200/2,60	TS151-602	Section 3.1.8	E0251-022 (section 2.4.2)
ABB IRB 6700-155/2,85	TS151L-602	Section 3.1.8	E0251-022 (section 2.4.2)
ABB IRB 6700-235/2,65 & 205/2,80	TS152-602	Section 3.1.8	E0251-022 (section 2.4.2)
ABB IRB 6700-150/3,20 & 175/3,05	TS152L-602	Section 3.1.8	E0251-022 (section 2.4.2)
ABB IRB 6700-300/2,70	TS153-602	Section 3.1.8	E0251-022 (section 2.4.2)
ABB IRB 6700-245/3,00	TS153L-602	Section 3.1.8	E0251-022 (section 2.4.2)

Components

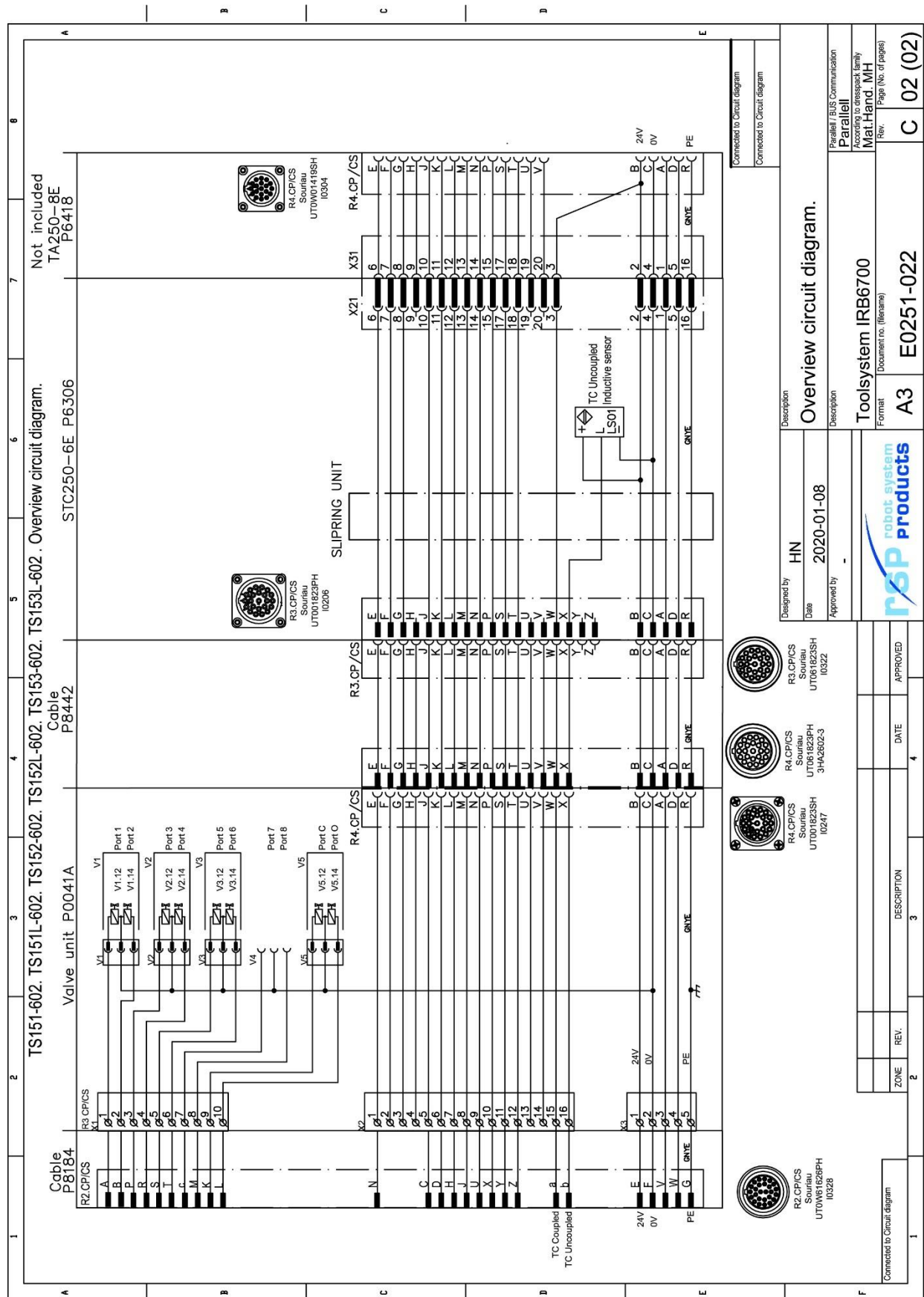
Article number	STC (1)	Adapt. kit (2)	Hose p. (3)	Air hoses (4)	Upper cable (5)	Valve unit (6)	Robot cable (7)	Air supply hose (8)
TS151-602	P6306	P6492	P2147-1	P2050-16	P8442-40	P0041A	P8184-10	A0214-301
TS151L-602	P6306	P6492	P2147-2	P2050-16	P8442-40	P0041A	P8184-10	A0214-301
TS152-602	P6306	P6490A	P2147-1	P2050-16	P8442-40	P0041A	P8184-10	A0214-301
TS152L-602	P6306	P6490A	P2147-2	P2050-16	P8442-40	P0041A	P8184-10	A0214-301
TS153-602	P6306	P4406	P2147-1	P2050-16	P8442-40	P0041A	P8184-10	A0214-301
TS153L-602	P6306	P4406	P2147-2	P2050-16	P8442-40	P0041A	P8184-10	A0214-301



NOTE! The swivel tool changers are delivered with eight push-in couplings (I0327) each.

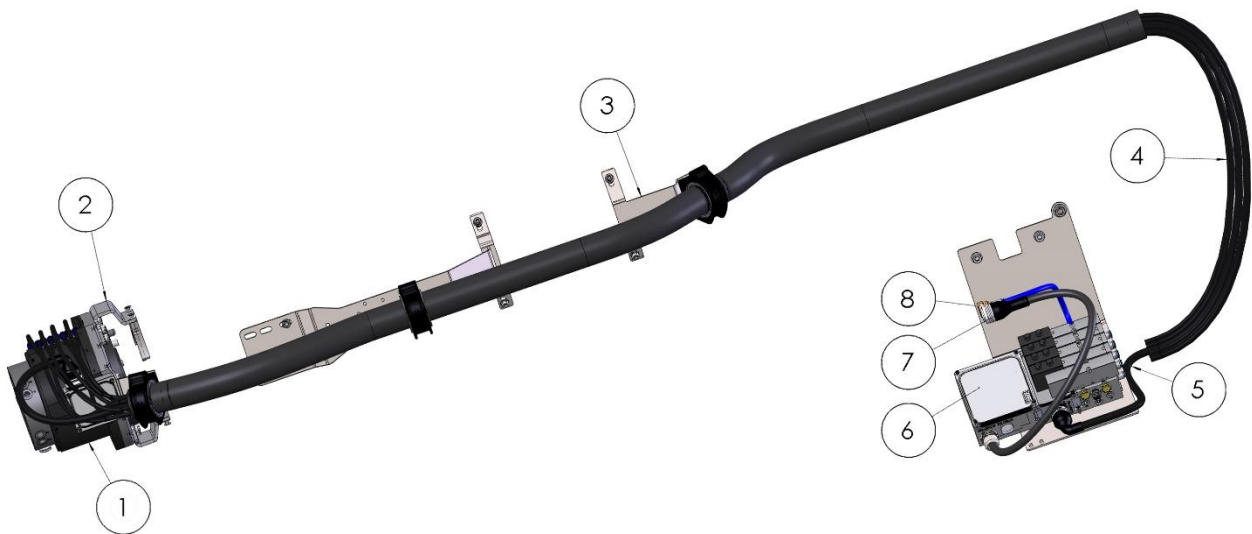


NOTE! Suitable tool attachments (P6418, P6431 and P6473) are described in sections 3.1.2, 3.1.3 and 3.1.4.



2.4.3 Swivel with 8 air channels and 18 electric signals.

Articles: TS151-604, TS152-604 and TS153-604



This tool system is used when eight pneumatic channels and 18 electric signals are required. It consists of a swivel, adaptation kit, hose package, valve unit and cabling. The valve unit contains four directional bi-stable 5/2 valves and the hose package totally contains eight air hoses.

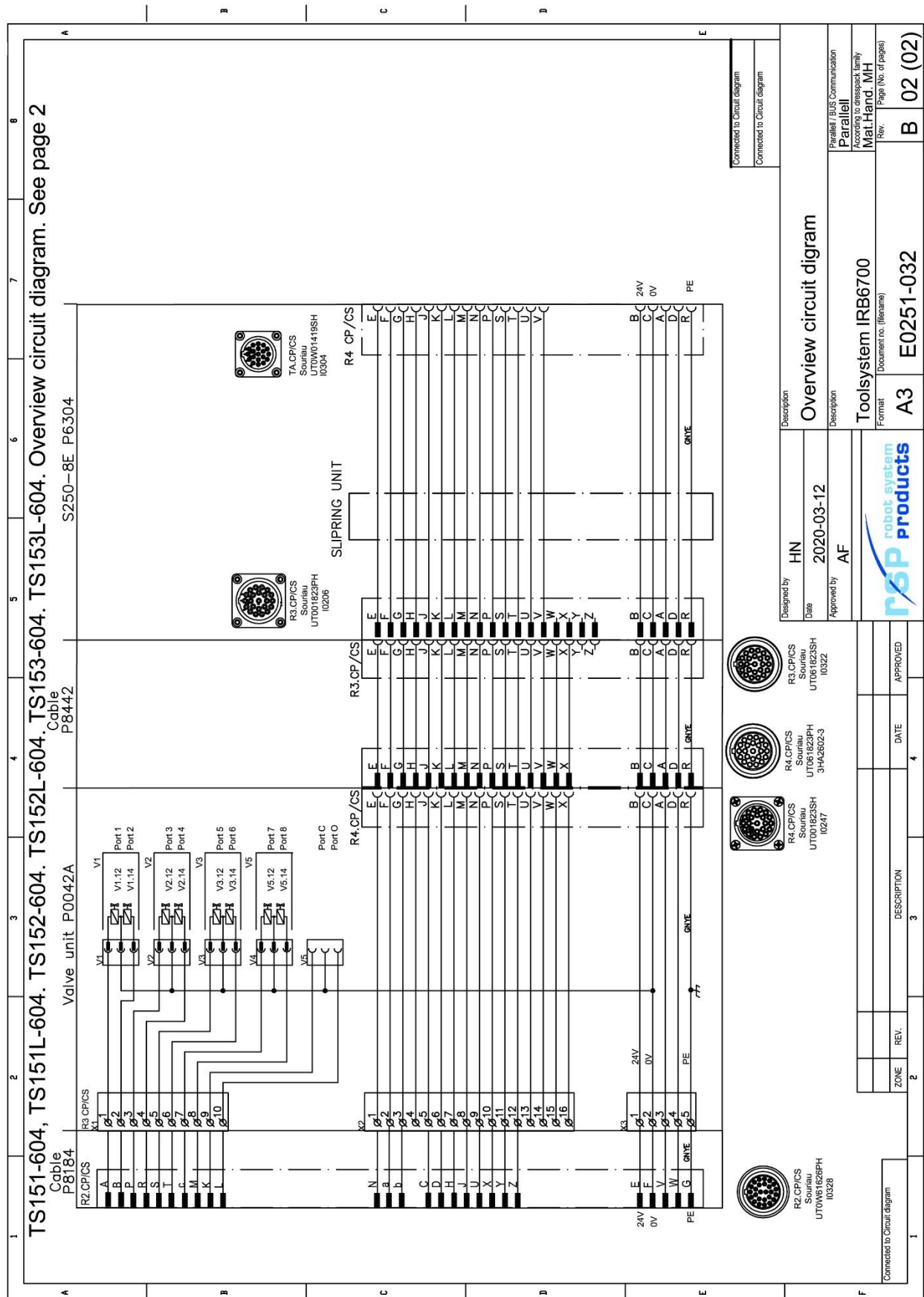
Robot model	Article number	Pneumatic diagram	Circuit diagram
ABB IRB 6700-200/2,60	TS151-604	Section 3.2.3	E0251-032 (section 2.4.4)
ABB IRB 6700-155/2,85	TS151L-604	Section 3.2.3	E0251-032 (section 2.4.4)
ABB IRB 6700-235/2,65 & 205/2,80	TS152-604	Section 3.2.3	E0251-032 (section 2.4.4)
ABB IRB 6700-150/3,20 & 175/3,05	TS152L-604	Section 3.2.3	E0251-032 (section 2.4.4)
ABB IRB 6700-300/2,70	TS153-604	Section 3.2.3	E0251-032 (section 2.4.4)
ABB IRB 6700-245/3,00	TS153L-604	Section 3.2.3	E0251-032 (section 2.4.4)

Components

Article number	Swivel (1)	Adapt. kit (2)	Hose p. (3)	Air hoses (4)	Upper cable (5)	Valve unit (6)	Robot cable (7)	Air supply hose (8)
TS151-604	P6304	P6492	P2147-1	P2050-16	P8442-40	P0042A	P8184-10	A0214-301
TS151L-604	P6304	P6492	P2147-2	P2050-16	P8442-40	P0042A	P8184-10	A0214-301
TS152-604	P6304	P6490A	P2147-1	P2050-16	P8442-40	P0042A	P8184-10	A0214-301
TS152L-604	P6304	P6490A	P2147-2	P2050-16	P8442-40	P0042A	P8184-10	A0214-301
TS153-604	P6304	P4406	P2147-1	P2050-16	P8442-40	P0042A	P8184-10	A0214-301
TS153L-604	P6304	P4406	P2147-2	P2050-16	P8442-40	P0042A	P8184-10	A0214-301

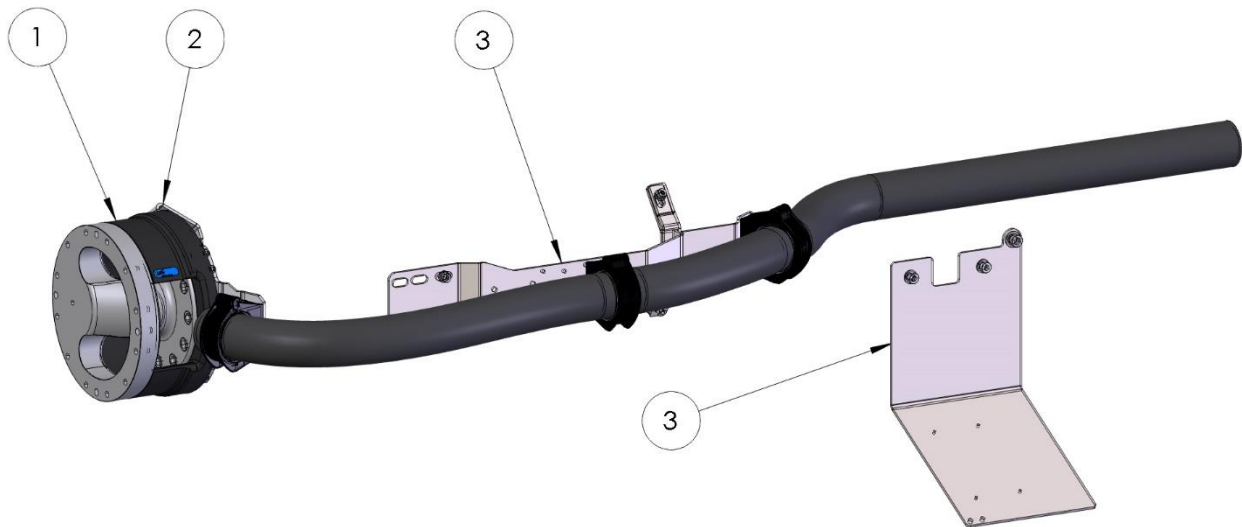


NOTE! The swivels are delivered with eight push-in couplings (I0327) each.



2.5 CiRo based tool system configurations

2.5.1 CiRo Basic. Articles: TS151-610, TS152-610 and TS153-610



This tool system is used when valve units, connections, cabling and hoses are separately supplied and consists of CiRo, adaptation kit and hose package.

Robot model	Article number	Pneumatic diagram	Circuit diagram
ABB IRB 6700-200/2,60	TS151-610	-	-
ABB IRB 6700-155/2,85	TS151L-610	-	-
ABB IRB 6700-235/2,65 & 205/2,80	TS152-610	-	-
ABB IRB 6700-150/3,20 & 175/3,05	TS152L-610	-	-
ABB IRB 6700-300/2,70	TS153-610	-	-
ABB IRB 6700-245/3,00	TS153L-610	-	-

Components

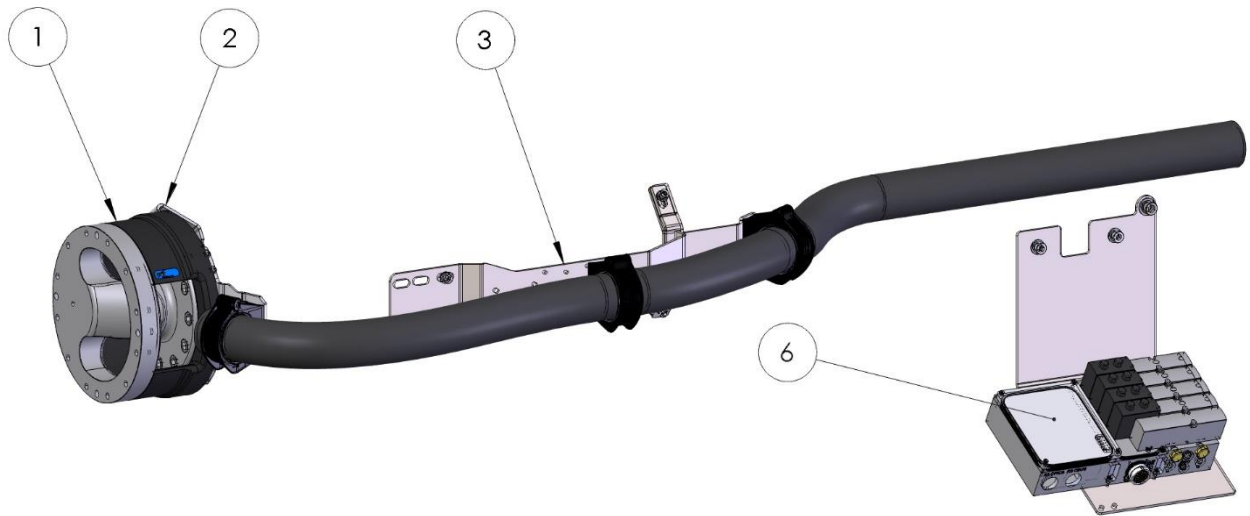
Article number	CiRo (1)	Adaptation kit (2)	Hose package (3)
TS151-610	P5151	P5504	P2164-1
TS151L-610	P5151	P5504	P2164-3
TS152-610	P5151	P5502	P2164-1
TS152L-610	P5151	P5502	P2164-2
TS153-610	P5151	P5505	P2164-1
TS153L-610	P5151	P5505	P2164-3



NOTE! Hoses and cables should be specifically designed for applications with high torsional and bending stresses. Cables and air hoses are available from Robot System Products.

2.5.2 CiRo Complete with 8 air channels and 12 electric signals.

Articles: TS151-611, TS152-611, TS153-611



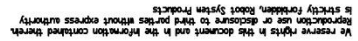
This tool system is used when eight pneumatic channels and twelve electric signals are required. It consists of a CiRo, adaptation kit, hose package, valve units, connectors, cabling and hoses. The valve unit contains four bi-stable 5/2 valves.

Robot model	Article number	Pneumatic diagram	Circuit diagram
ABB IRB 6700-200/2,60	TS151-611	Pne0251-025 (section 2.5.4)	E0251-025 (section 2.5.3)
ABB IRB 6700-155/2,85	TS151L-611		
ABB IRB 6700-235/2,65 & 205/2,80	TS152-611		
ABB IRB 6700-150/3,20 & 175/3,05	TS152L-611		
ABB IRB 6700-300/2,70	TS153-611		
ABB IRB 6700-245/3,00	TS153L-611		

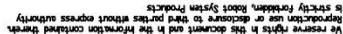
Components

Article number	CiRo (1)	Adapt. kit (2)	Hose p. (3)	Air hoses (4)	Upper cable (5)	Valve (6)	Robot cable (7)	Air supply hose (8)
TS151-611	P5151	P5504	P2164-1	P2050-11	P8436-50	P0042A	P8184-7	A0214-301
TS151L-611	P5151	P5504	P2164-3	P2050-11	P8436-50	P0042A	P8184-7	A0214-301
TS152-611	P5151	P5502	P2164-1	P2050-11	P8436-50	P0042A	P8184-7	A0214-301
TS152L-611	P5151	P5502	P2164-2	P2050-11	P8436-50	P0042A	P8184-7	A0214-301
TS153-611	P5151	P5505	P2164-1	P2050-11	P8436-50	P0042A	P8184-7	A0214-301
TS153L-611	P5151	P5505	P2164-3	P2050-11	P8436-50	P0042A	P8184-7	A0214-301

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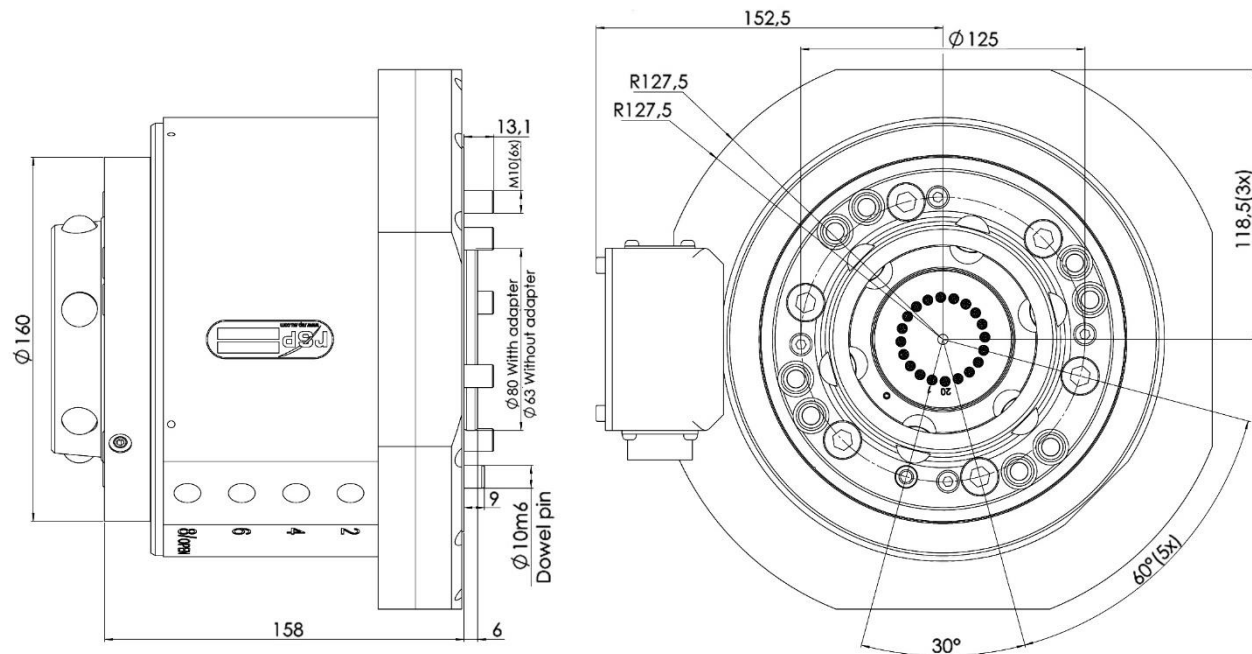
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3. SPECIFICATIONS OF PARTS AND OPTIONS

3.1 Swivel tool changer and tool attachments

3.1.1 Swivel tool changer STC250-6E. Article no: P6306

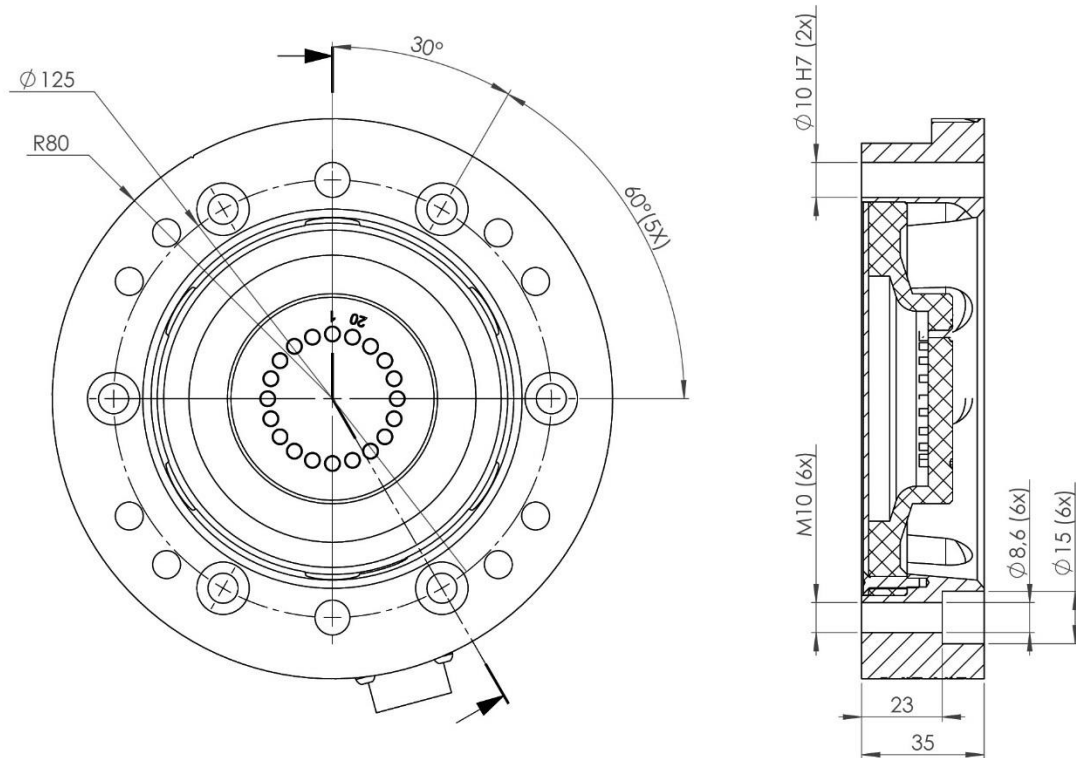


Swivel tool changer STC250-6E transfers 6 pneumatic channels and 16 electrical signals to the tool attachment. To be used together with P6418, P6431 or P6473.

Technical data

Working temperature		+10°C–+50°C
Bolt pattern		ISO 9409-1 125-6-M10
Maximum tool load	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Weight and centre of gravity (Z)		
P6306		13.9 kg / 85 mm
P6306 with P6418/ P6431		16.7 kg / 100 mm
P6306 with P6473		17.6 kg / 105 mm
Rotational torque		80 Nm
Air channels	Pneumatic diagram	See section 3.1.8
	User channels, robot side Dedicated channels, G 1/8"	6 x G 1/4" (1600 l/min, max 10 bar) Open TC marked Open, Close TC marked Close (6-10 bar)
Air quality		Oil-clean and waterless filtered air, with max 5µm particle content
Electrical signals	Circuit diagram	E0196-004 (section 2.1.5)
	Total signals	17 x (2A, 60V) + PE
	Dedicated signals	24V, 0V, TC Coupled, TC Uncoupled
	Connection, robot side	Souriau 23P (UT001823PH)

3.1.2 Tool attachment TA250-8E Souriau. Article: P6418



Tool attachment TA 250-8E transfers 8 pneumatic channels and 17 electrical signals to the tool. To be used together with P6306.

Technical data

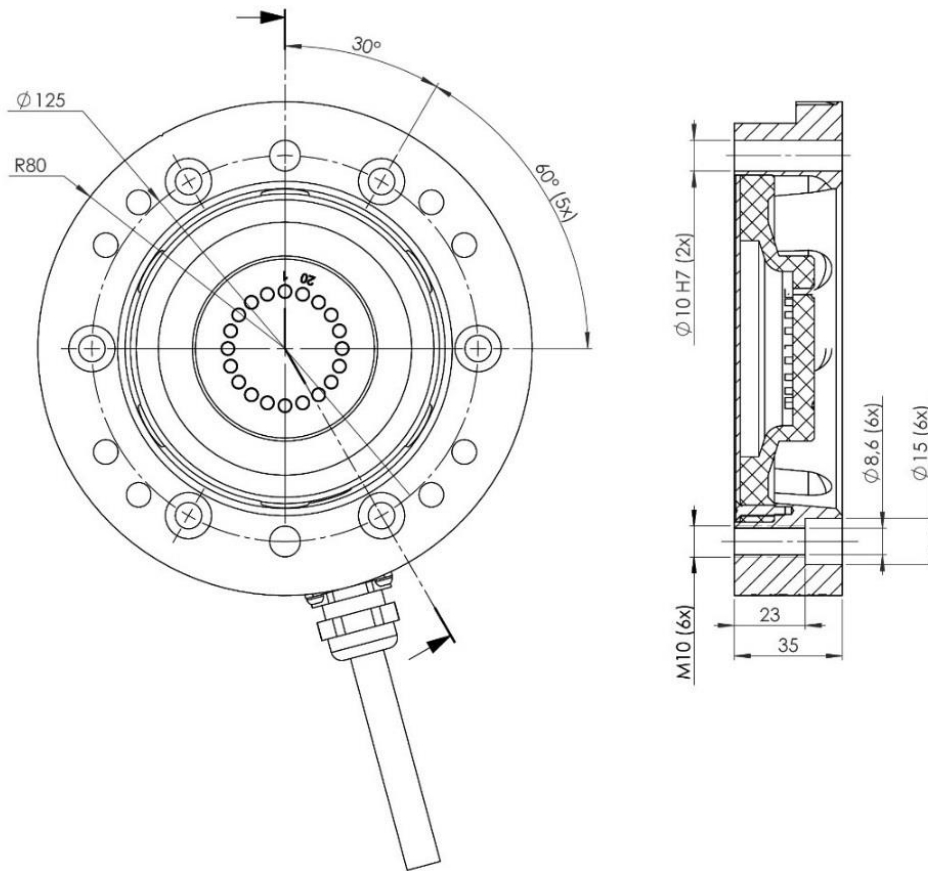
Working temperature		+10°C–+50°C
Bolt pattern		ISO9409-1-125-6-M10
Weight		2.7 kg
Maximum tool load (M10-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Maximum tool load (M8-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±750 Nm
Air channels	Connection, tool side	8 x G 1/4"
Electrical signals	Circuit diagram	E0196-002 (section 3.1.6)
	Total signals	17 + PE
	Dedicated signals	24 V, 0V, TC Coupled
	Connection, tool side	Compact Souriau 19S (UT0W01419SH)
Connection kits (optional)	P8007 (connector)	Souriau 19P (straight)
	P8105-20 (cable kit)	Souriau 19P, 2-meter cable, open end



NOTE!

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

3.1.3 Tool attachment TA250-8E. Article: P6431



Tool attachment TA 250-8E transfers 8 pneumatic channels and 17 electrical signals to the tool. To be used together with P6306.

Technical data

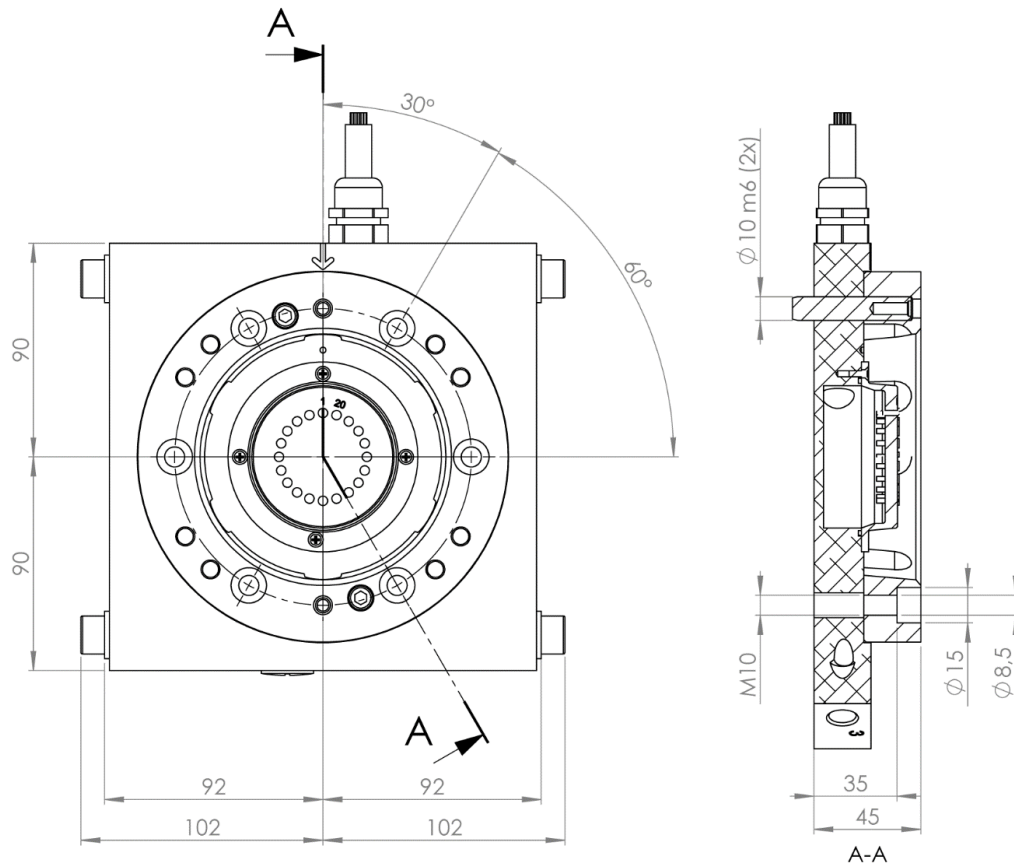
Working temperature		+10°C–+50°C
Bolt pattern		ISO9409-1-125-6-M10
Weight		2.8 kg
Maximum tool load (M10-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Maximum tool load (M8-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±750 Nm
Air channels	Connection, tool side	8 x G 1/4"
Electrical signals	Circuit diagram	E0196-009 (see section 3.1.7)
	Total signals	17 + PE
	Dedicated signals	24 V, 0V, TC Coupled
	Connection, tool side	1.0 m cable (20x0.5mm²) with free end



NOTE!

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

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



Square Tool Attachment TA 250-8E transfers 8 pneumatic channels and 17 electrical signals to the tool and gives together with option P6472 a stable tool stand for easy tool changing. To be used together with P6306.

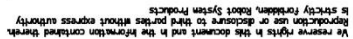
Technical data

Working temperature		+10°C--50°C
Bolt pattern		ISO9409-1-125-6-M10
Weight		3.7 kg
Maximum tool load (M10-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±1 250 Nm
Maximum tool load (M8-screws)	Fz (static)	±2 500 N
	Mx/My (dynamic)	±2 000 Nm
	Mz (dynamic)	±750 Nm
Air channels	Connection, tool side	8 x G 1/4"
Electrical signals	Circuit diagram	E0196-009 (see section 3.1.7)
	Total signals	17 + PE
	Dedicated signals	24 V, 0V, TC Coupled
	Connection, tool side	1.0 m cable (20x0.5mm²) with free end

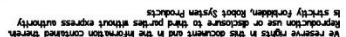


NOTE! Tools can be mounted to the tool attachment using six M10-screws, alternatively the tool attachment can be mounted to the tool using six M8-screws.

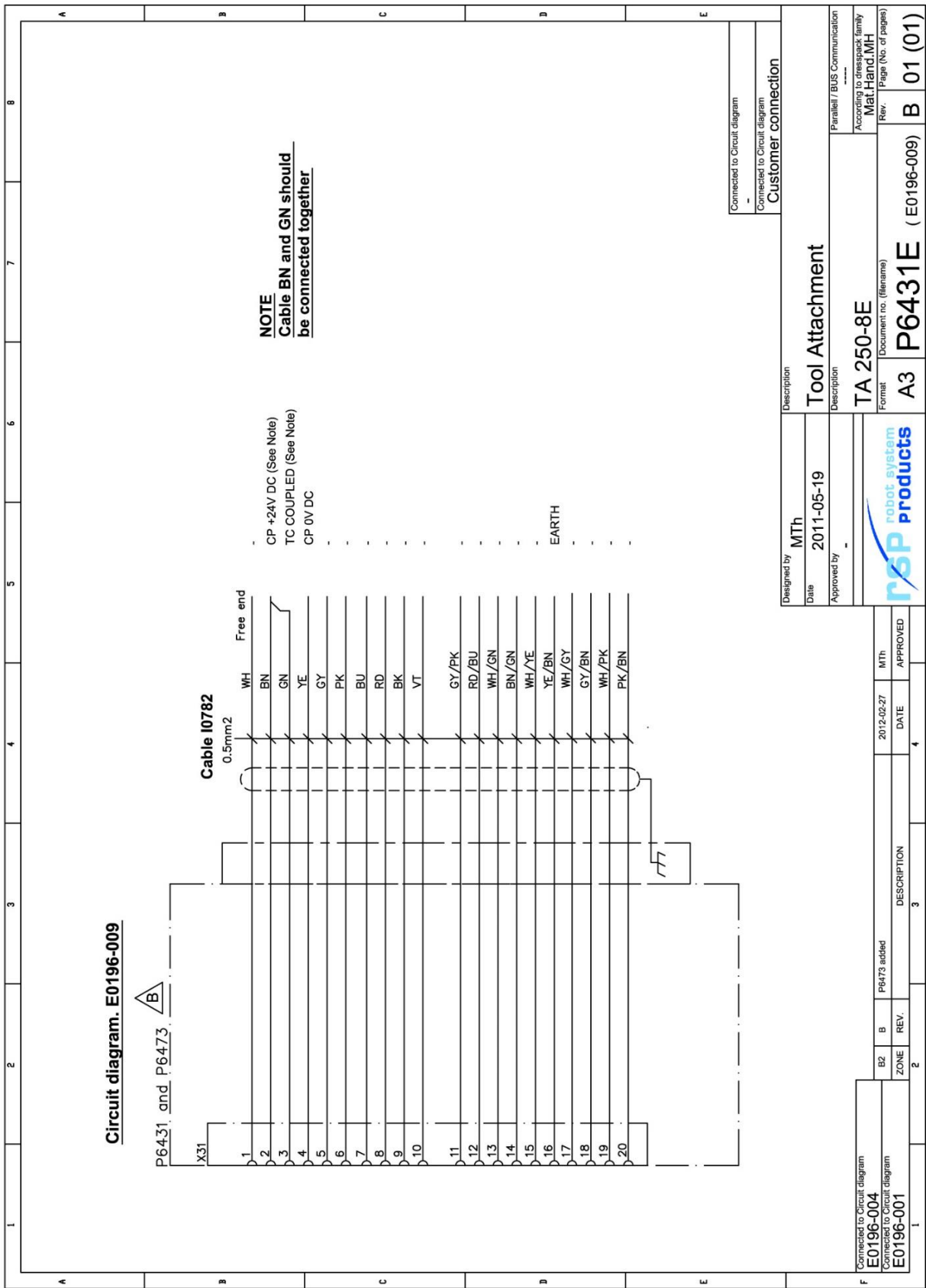
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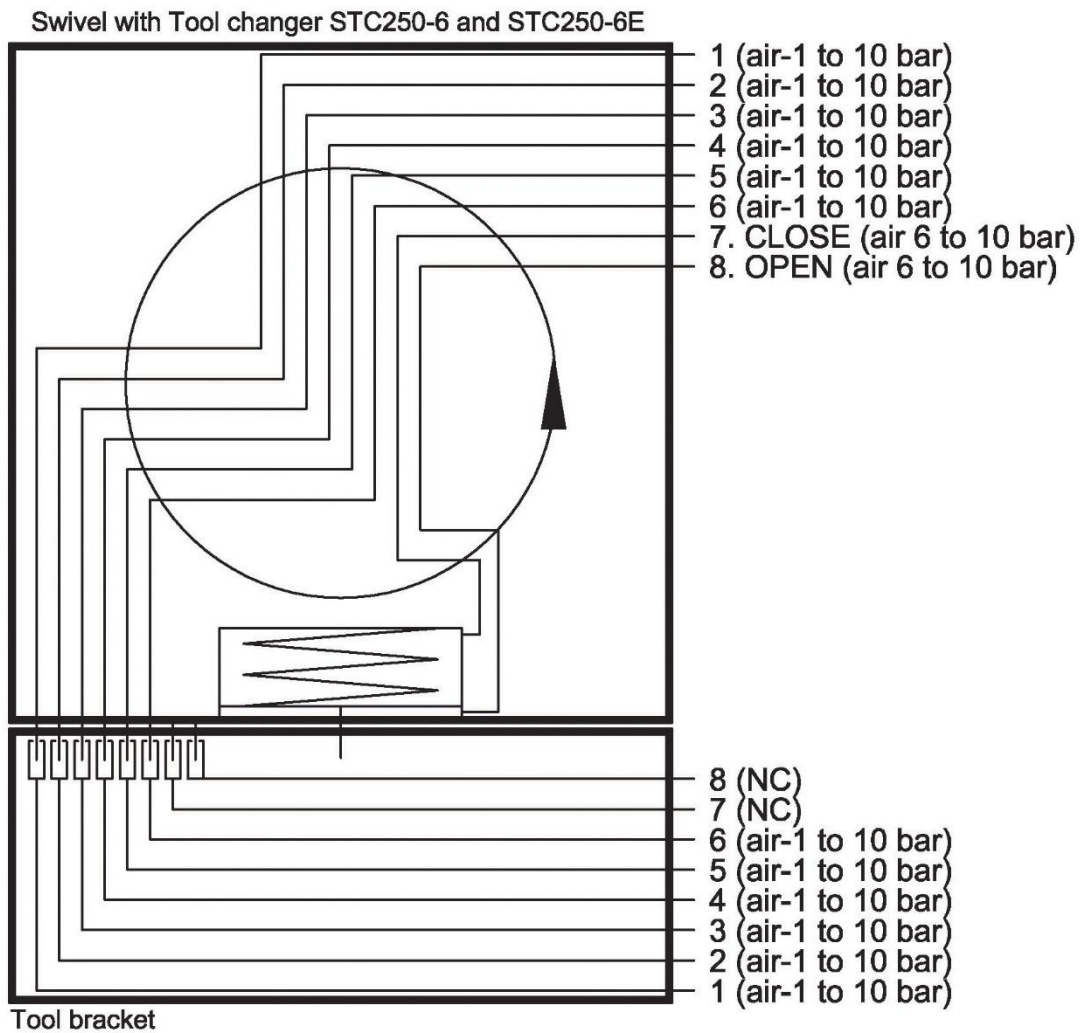
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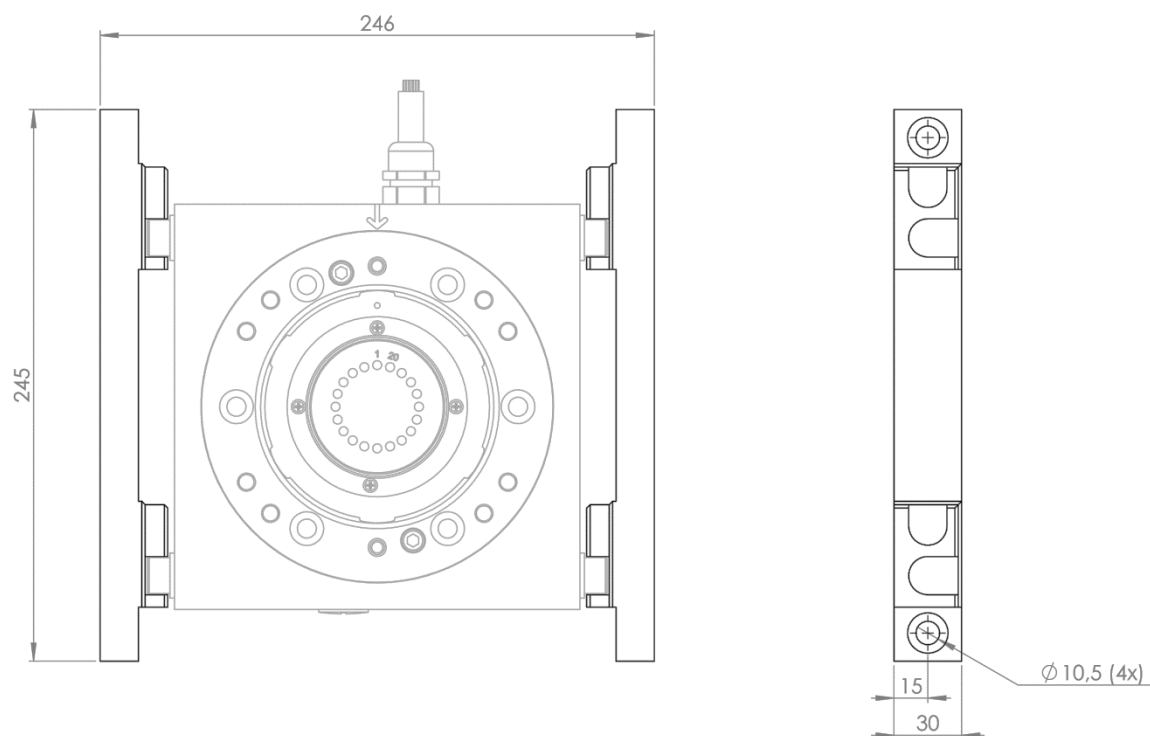
3.1.7 Circuit diagram E0196-009 for P6431 and P6473



3.1.8 Pneumatic diagram for STC250-6E with TA250-8E



3.1.9 Option tool stand kit. Article: P6472



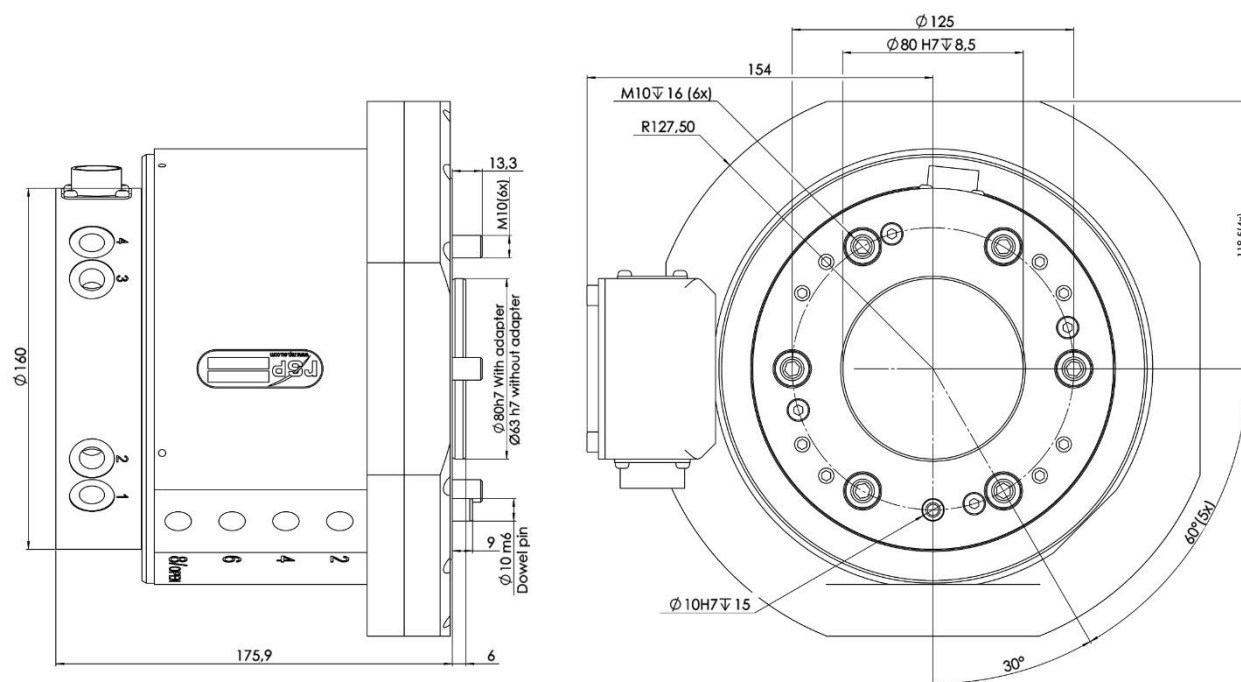
This tool stand kit, mounted on a stand, gives in combination with square tool attachments P6474 or P6473 a robust tool stand for easy tool changing.

Technical data

Weight	1.2 kg
Maximum load	250 kg

3.2 Swivel

3.2.1 Swivel S250-8E. Article: P6304

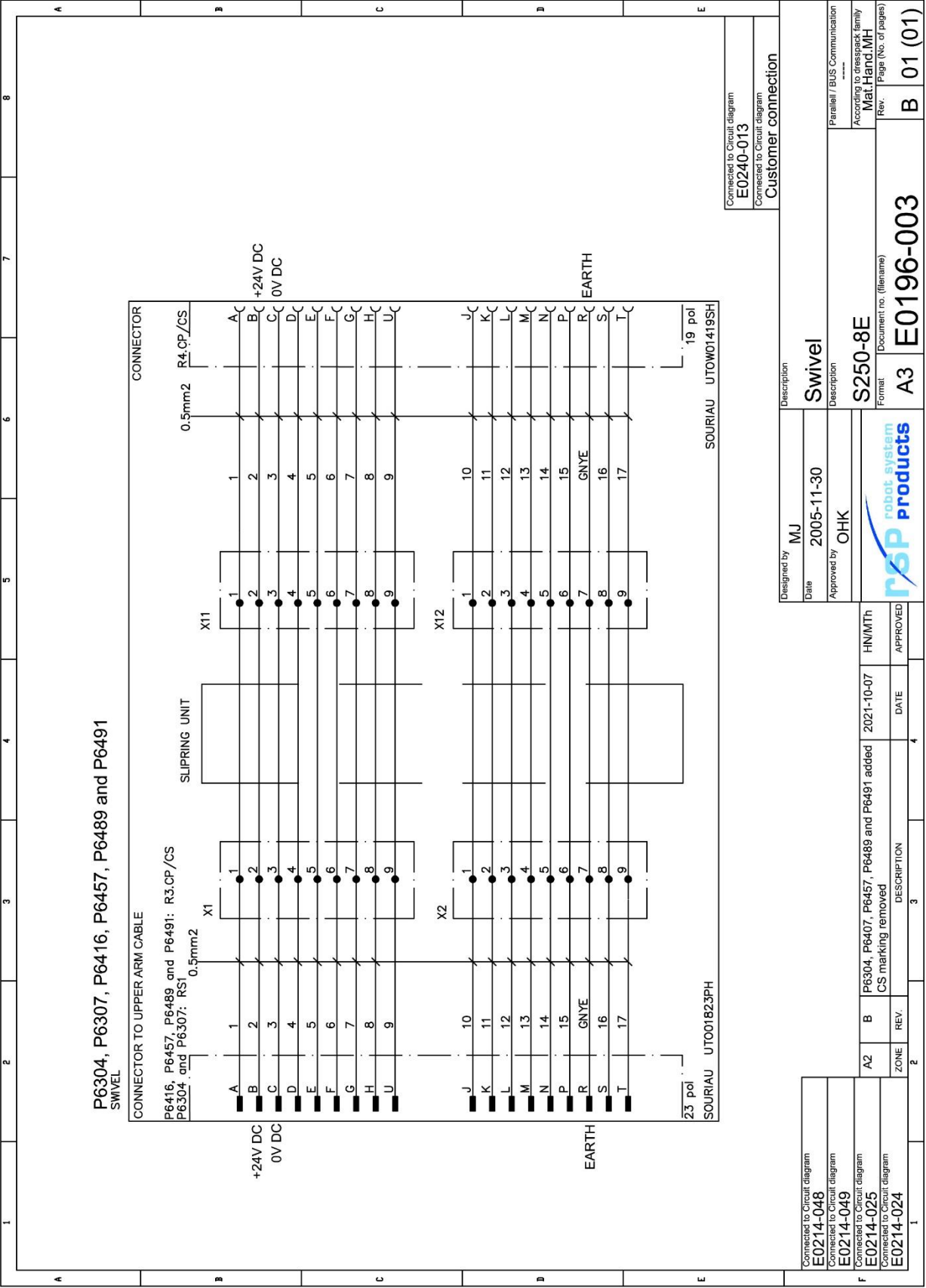


Swivel S250-8E transfers 8 pneumatic channels and 17 electrical signals to the tool.

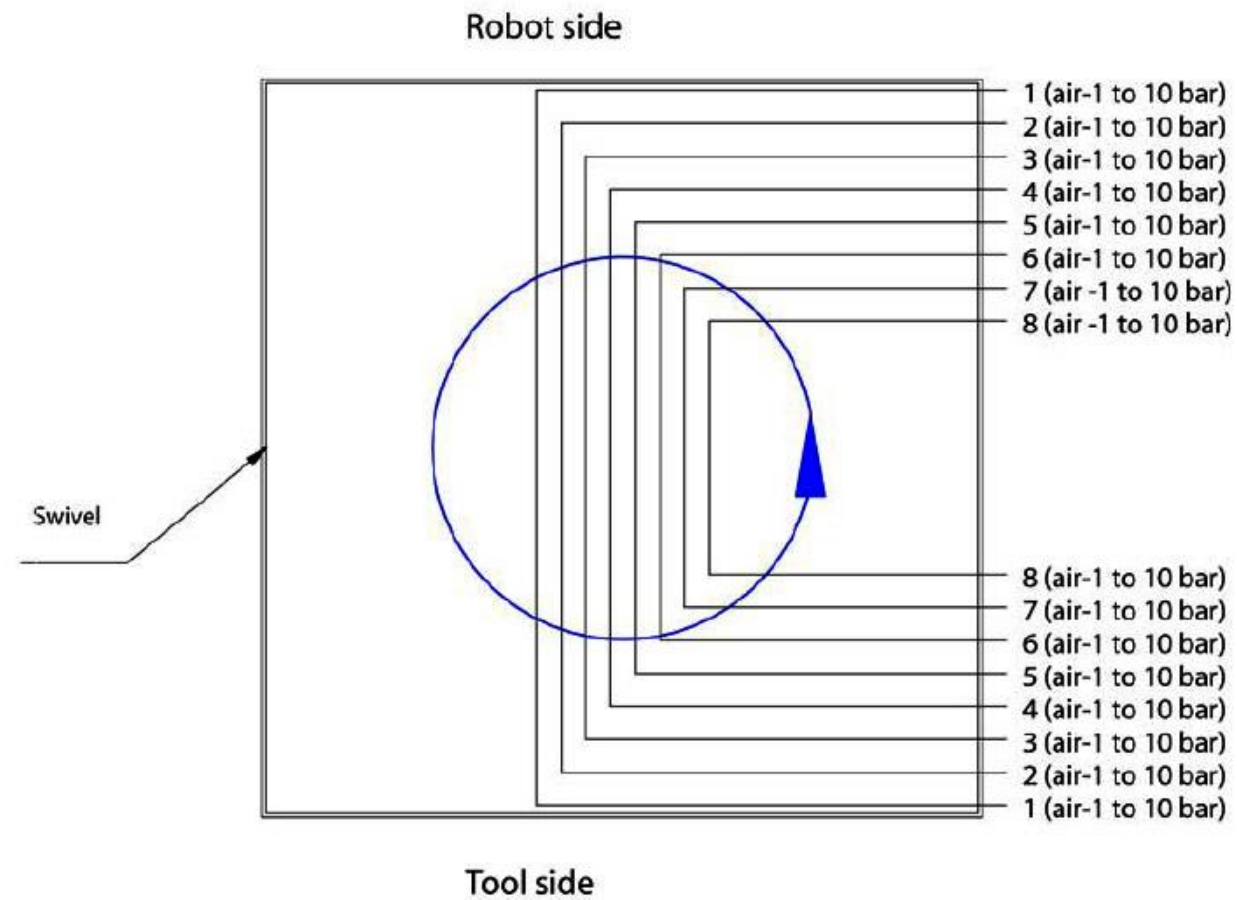
Technical data

Working temperature		+10°C–+50°C
Bolt pattern		ISO 9409-1-125-6-M10
Maximum tool load	Fz (static)	± 2500 N
	Mx/My (dynamic)	± 2000 Nm
	Mz (dynamic)	± 1250 N
Weight and centre of gravity (Z-direction)		11.5 kg / 74 mm
Rotational torque		80 Nm
Air channels	Pneumatic diagram	See section 3.2.3
	Connection, robot side	8 x G ¼" (1600 l/min, max 10 bar)
	Air quality	Oil-clean and waterless filtered air, with max 25µm particle content
	Connections, tool side	8 x G ¼"
Electrical signals	Circuit diagram	E0196-003 (see section 3.2.1)
	Connection, robot side	Souriau 23P (UTO01823PH)
	Total signals	17 x (2A, 60V)
	Dedicated signals	24V, 0V
Connection kits (optional)	Connection, tool side	Compact Souriau 19S (UTOW01419SH)
	P8105-20 (cable kit, tool side)	Compact Souriau 19P, 2-meter cable, open end
	P8007 (connector, tool side)	Compact Souriau 19P, (straight)
	P8007-1 (connector, tool side)	Compact Souriau 19P, (angled)

3.2.2 Circuit diagram E0196-003 for P6304

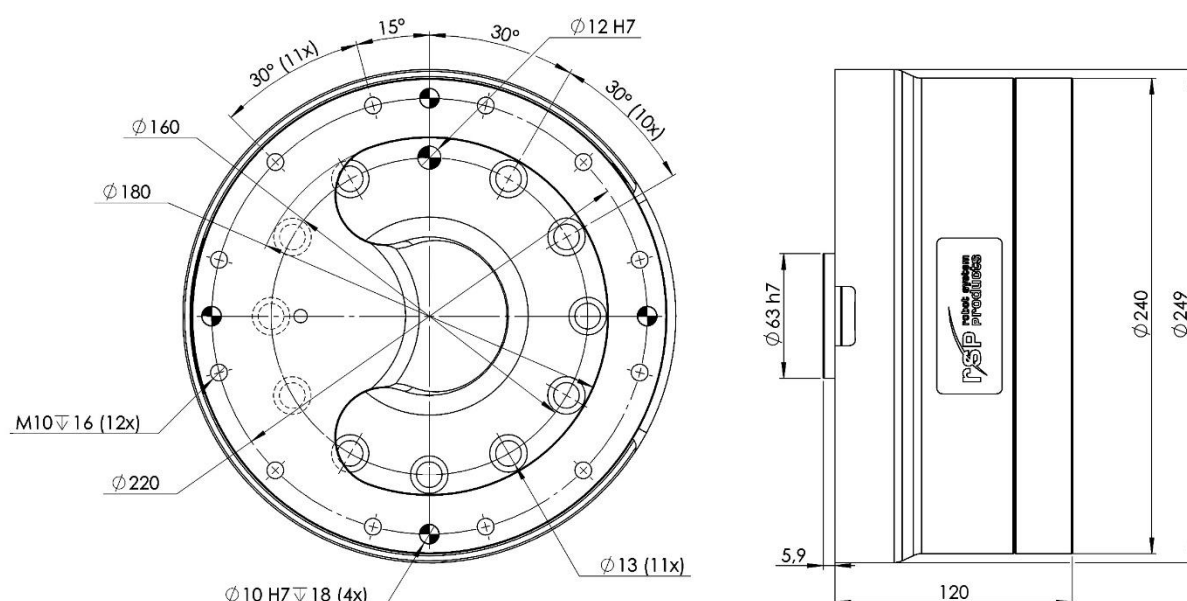


3.2.3 Pneumatic diagram for S250-8E



3.3 CiRo

3.3.1 CiRo XL1. Article: P5151



CiRo XL1 supports and holds cables and hoses allowing rotation of 6th axis. To be used on robots with ISO 9409-1 160-11-M12 together with robot adaptation kit (section 3.4).

Technical data

Working temperature		+10°C–+50°C
Bolt pattern	Robot side	ISO 9409-1 160-11-M12
	Tool side	220-12-M10
Maximum tool load	Fz (static)	± 2000 N
	Mx/My (dynamic)	± 2200 Nm
	Mz (dynamic)	± 2000 Nm
Weight and centre of gravity (Z-direction)		17.5 kg / 62 mm
Deflection load_{xy} (0,1°)		1200 Nm (section 2.3.2)
Hoses and cables	Maximum rotation	± 250°
	Maximum bundle size	9 x Ø8 mm

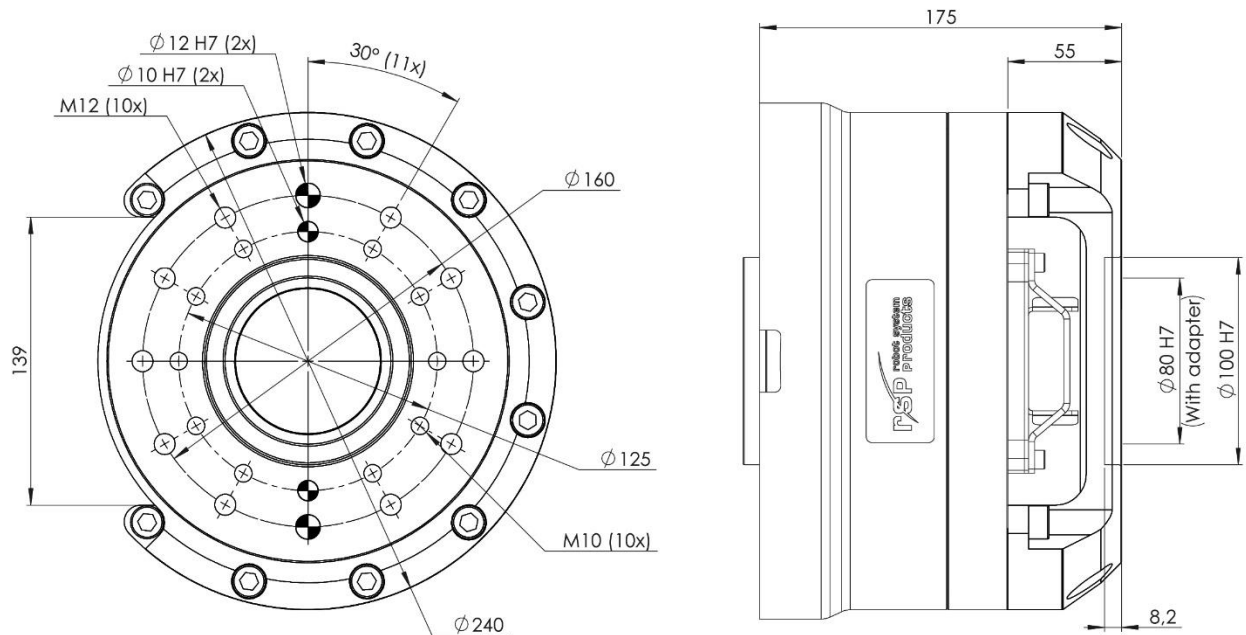


NOTE! Hoses and cables should be specifically designed for applications with high torsional and bending stresses. Cables and air hoses are available from Robot System Products.



NOTE! A tool adapter kit P5501 (section 3.3.2) is designated for mounting on CiRo XL1.

3.3.2 Option tool adapter kit for CiRo XL. Article: P5501



The tool adapter kit P5501 shall be mounted on CiRo XL1 and is used for mounting of tool or tool changer with bolt pattern ISO 9409-1 125-10-M10 or ISO 9409-1 160-10-M12.

Technical data

Working temperature		+10°C–+50°C
Bolt pattern	CiRo side	220-10-M10
	Tool side	ISO 9409-1 125-10-M10 ISO 9409-1 160-10-M12
Maximum tool load (see NOTE!)	Fz (static)	± 2000 N
	Mx/My (dynamic)	± 2000 Nm
	Mz (dynamic)	± 2000 Nm
Weight and centre of gravity (Z-direction)		20.4 kg / 74 mm

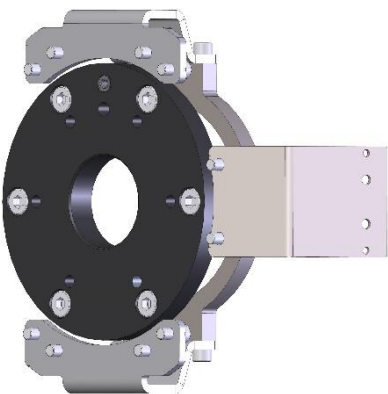
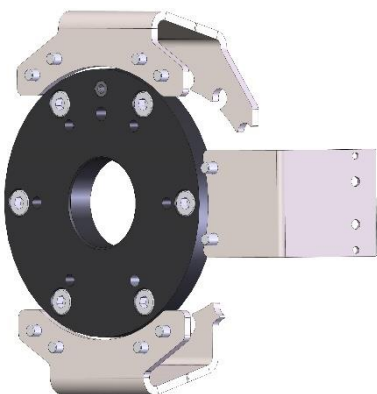
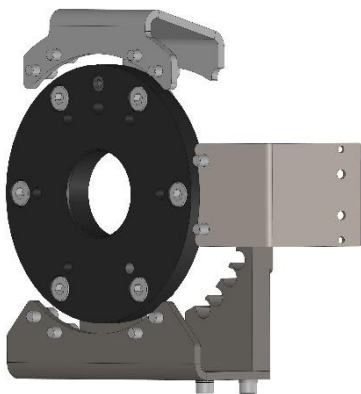
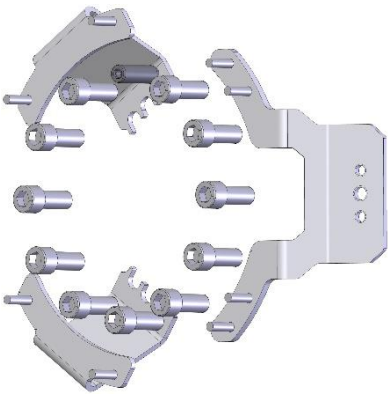
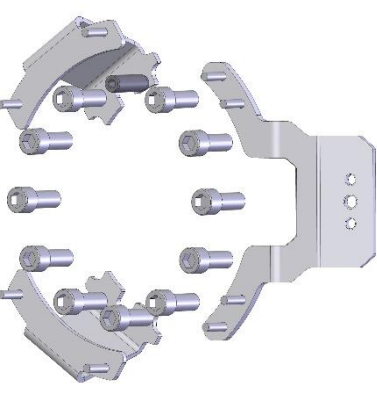
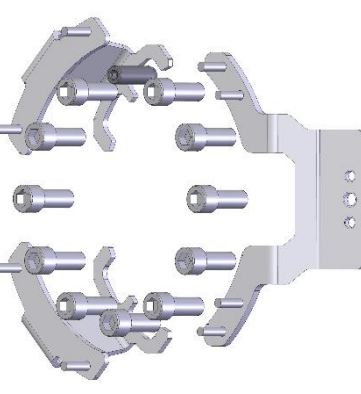


NOTE! Maximum tool load, weight and centre of gravity is stated for the tool adapter kit (P5501) mounted on the CiRo XL1 (P5151).

3.4 Robot adaptation kits

A rotation stop is a mandatory part of the robot adaptation kit and prohibits the swivel tool changer, swivel or CiRo to rotate in relation to the robot. Rotation stops are robot specific.

The flanges of the robot – and the robot side of the swivel, swivel tool changer or CiRo – have fastening holes in accordance with ISO 9409-1. In addition, dependent on robot model, adaptation plates for other bolt circles may be needed. Such adaptation plates are delivered as an integrated part of the robot adaptation kit.

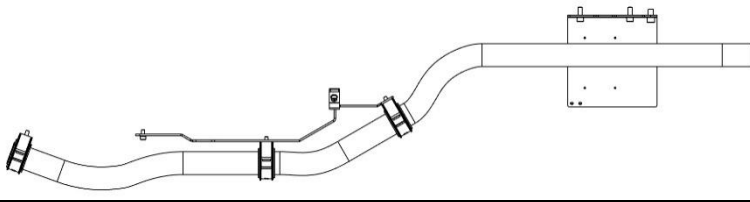
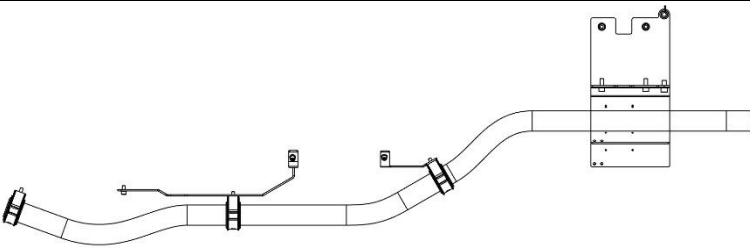
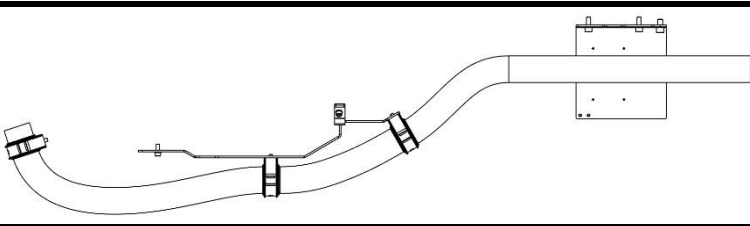
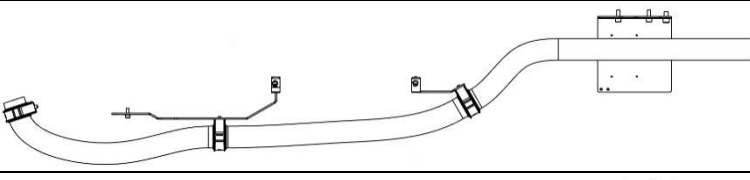
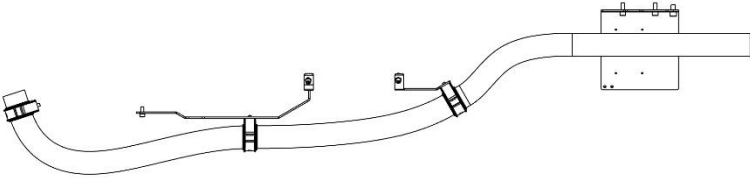
Article number		
P6492	P6490A	P4406
		
P5504	P5502	P5505
		

Technical data

Article number	Description	Weight	Adapter plate thickness
P6492	For Swivel and STC on IRB 6700	4.4 kg	16 mm
P6490A	For Swivel and STC on IRB 6700	5.1 kg	16 mm
P4406	For Swivel and STC on IRB 6700	6.1 kg	16 mm
P5504	For CiRo on IRB 6700	1.4 kg	-
P5502	For CiRo on IRB 6700	1.4 kg	-
P5505	For CiRo on IRB 6700	1.3 kg	-

3.5 Hose packages and air hoses

Hose packages are mounted along the robot's upper arm and is based on a hose for keeping cable slack out of the way and protecting hoses for transfer of air and cables for electrical signals. All hoses for air supply are included. The protective hose is a wear part.

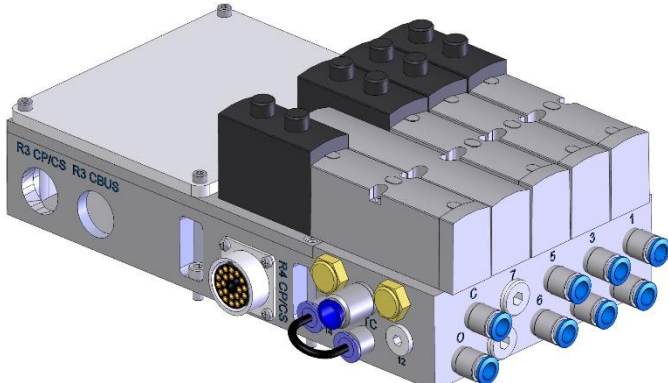
Article number	Description	
P2147-1	Complete hose package for Swivel and STC on IRB 6700-200/2,60, 300/2,70, 235/2,65 & 205/2,80	
P2147-2	Complete hose package for Swivel and STC on IRB 6700-155/2,85, 245/3,00, 150/3,20 & 175/3,05	
P2164-1	Complete hose package for CiRo on IRB 6700-200/2,60, 235/2,65, 205/2,80 & 300/2,70	
P2164-2	Complete hose package for CiRo on IRB 6700-150/3,20 & 175/3,05.	
P2164-3	Complete hose package for CiRo on IRB 6700-155/2,85 & 245/3,00	

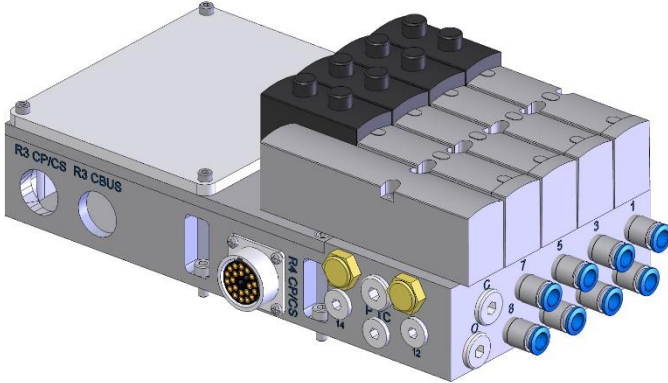
Technical data

Article	Total weight and length	Protective hose (inner/outer diameter)	Air hoses (for swivel, STC or tools)
P2147-1	6.7 kg, 1.9 m	47/54.5 mm	P2050-16
P2147-2	6.9 kg, 2.1 m	47/54.5 mm	P2050-16
P2164-1	7.4 kg, 2.1 m	52.8/66.2 mm	P2050-11
P2164-2	7.4 kg, 2.6 m	52.8/66.2 mm	P2050-11
P2164-3	7.4 kg, 2.5 m	52.8/66.2 mm	P2050-11

3.6 Valve units large. Articles: P0041A, P0042A

A valve unit integrates air and electrical connections into one single compact unit which controls air supply. Valve units shall be mounted on the mounting plate at axis 3 at the rear part of the upper arm. A cable connects the valve unit to the robot application interface of the robot.

Article number	P0041A
Description	Valve unit for STC with 6 air channels
	

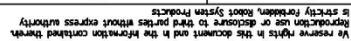
Article number	P0042A
Description	Valve unit for swivel and CiRo with 8 air channels
	

Valve units for swivels and CiRo consists of four electrically controlled bi-stable 5/2 valves. For swivels with tool changer function the valve unit consists of three electrically controlled bi-stable 5/2 valves, and one of dedicated for the tool change function. When the tool change valve is activated the other three valves are deactivated – this means that the air supply thereby is automatically turned off during tool change, which is simplifying the programming since no special program instructions are required for turning the air supply on or off.

Technical data

Article number	Description	Tool change valves	Directional valves	Outlet air channels	Circuit diagram	Max air flow
P0041A	Valve unit for tool changing	1	3	6	E0214-106E-1 (section 3.6.1)	1100 l/min per channel
P0042A	Valve unit with four valves	-	4	8	E0214-106E-1 (section 3.6.1)	1100 l/min per channel

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3.7 Upper arm cables. Articles: P8442-40 and P8436-50

The upper arm cable connects the STC, swivel or CiRo and the connection box on the valve unit and is mounted through the protective hose.

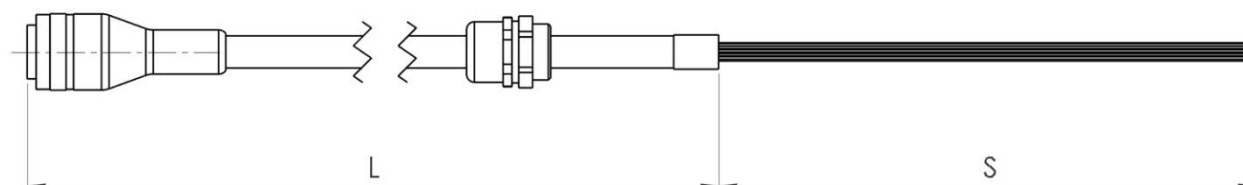
Article number	Length	Number of signals	Connection, valve	Connection, robot side
P8442-40	4.0 m	18	Souriau 23P (UT061823PH)	Souriau 23S (UT061823SH)
P8436-50	5.0 m	12	Souriau 23P (UT061823PH)	Cable, open end



NOTE! The open-ended cable P8436 includes an extra length of one meter free cable for connections to the tools.

3.8 Robot cable. Article: P8184

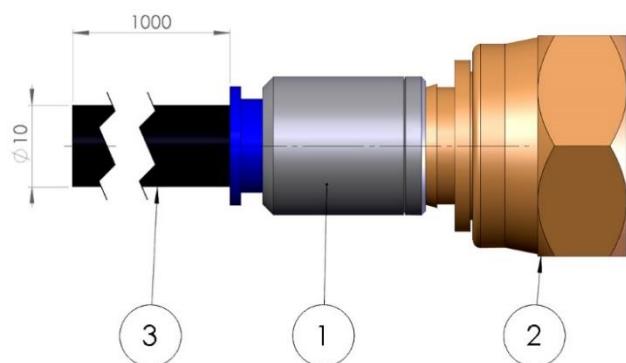
The robot cable connects the connection box on the valve with the application interface of the robot.



Article number	Robot	Connection to robot	Cable length (L)	Stripping length (S)
P8184-7	ABB IRB 6700	Souriau 26P (UT0W61626PH)	0.7 m	0.24 m

3.9 Air supply hose. Article: A0214-301

The air supply hose connects the valve unit air with the air supply on the robot.



Article number	Hose coupling (1)	Nipple (2)	Air hose length / diameter (3)
A0214-301	I0170	P0213-001	1.0 m / 10 mm

4. ROBOT PROGRAMMING DATA

Data to be used primarily for off-line robot programming.

Robot model (article no. prefix)	Functionality (article no. suffix)	Weight (see Note! below)	Centre of gravity (Z-direction)	Extension from robot flange
IRB6700 Lower line (TS151, TS151L)	STC (-602)	22.0 kg	87 mm	209 mm
	Swivel (-604)	17.0 kg	61 mm	192 mm
	CiRo (-610/611)	18.8 kg / 21,7 kg	56 mm / 69 mm	120 mm / 175 mm
IRB6700 Higher line (TS152, TS152L)	STC (-602)	21.9 kg	89 mm	209 mm
	Swivel (-604)	16.8 kg	62 mm	192 mm
	CiRo (-610/611)	18.8 kg / 21,7 kg	56 mm / 69 mm	120 mm / 175 mm
IRB6700 Power line (TS153, TS153L)	STC (-602)	22.8 kg	83 mm	209 mm
	Swivel (-604)	17.7 kg	57 mm	192 mm
	CiRo (-610/611)	18.8 kg / 21,7 kg	56 mm / 69 mm	120 mm / 175 mm



NOTE! Weight, centre of gravity and total extension from robot flange, including respective adaptation kit. For STC also tool attachments (P6418/P6431) are included in the data. Data for CiRo is given without and with tool adapter.

5. DISPOSAL AND RECYCLING

Taking care of spent equipment

Used equipment must be taken care of in an environmentally friendly way.

When disposed of, a major share of the material, or its energy content, can be recycled. The quantities possible to recycle vary depending on technical resources and practises in respective country. Non-recyclable components shall be handed over to an authorized environmental waste treatment facility for destruction or disposal.

Electronics

Electronic equipment shall be sent to an authorized recycling company or sorted into different component materials and treated as such.

Metals

Metals can, in general, be melted down, recycled and used in new products. They shall be sorted according to type and surface coating and handed over to an authorized recycling facility.

Metal components of steel and aluminium are substantial in size and easy to identify. Copper and brass are primarily used in transmission of electric power and in water/air modules. Brass may include small alloy of lead. Silver or gold plating of contact surfaces may occur.

Plastics

Thermoplastics can, in general, be re-heated and recycled without any major loss of quality. They shall be handed over to an authorized recycling facility. POM occurs in swivel housings, etc. PTFE in some sealings.

Rubber

Rubber shall be handed over to an authorized environmental waste treatment facility either for recycling, disposal or destruction. Rubber occurs in O-rings.

Other material

All other material shall be sorted and handed to an authorized environmental waste treatment facility in accordance with national legislation.

