MOUNTING INSTRUCTIONS AND OPERATING MANUAL

KIT-UR-V

REVISIONS

DATE	REVISION	MAIN CHANGES
2017/10/17	Edition A	First release
2018/10/26	Edition B	Dedicated URCap release
2018/11/29	Edition C	Replace suction cups with larger ones (ϕ 42mm)

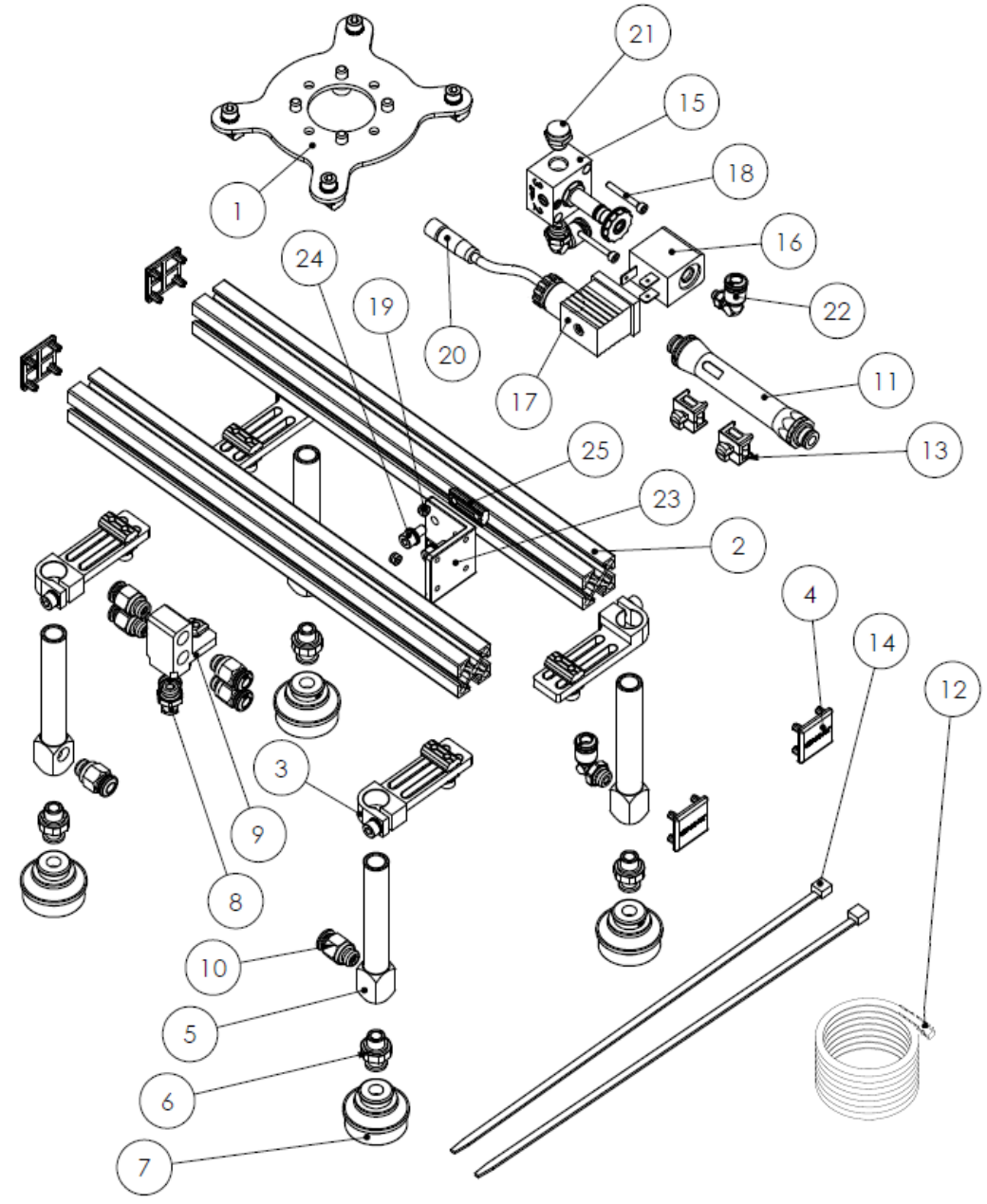
DOCUMENT LAYOUT

- Description
- Exploded view drawing of the final assembly
- Itemized list of assembly's components
- System's main data
- Solenoid valve's details
- Electrical connection to robot tool flange
- Assembly procedure
- Configuration options
- Mechanical connection to robot tool flange
- Software: URCap
- Cautions
- Ordinary maintenance
- CE marking reference
- Overall dimensions

DESCRIPTION

The KIT-UR-V is an End Of the Arm Tool (EOAT) for pick & place which exploits the vacuum technique and it is specifically designed for UR3/UR5/UR10/UR16e collaborative robots by Universal Robot. This kit can be used in combination with any collaborative robot that provides a limited power supply capability at the wrist.

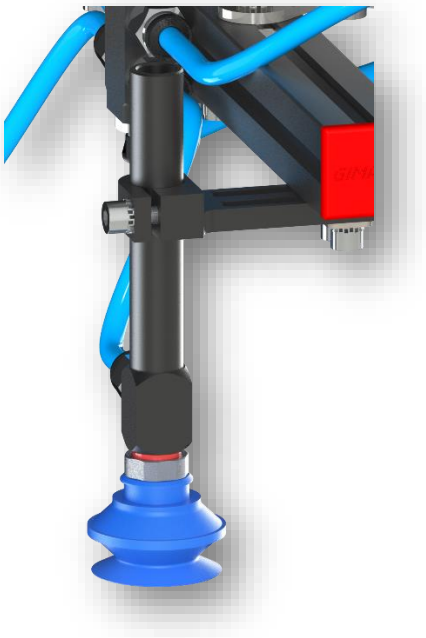
EXPLODED VIEW DRAWING OF THE FINAL ASSEMBLY



ITEMIZED LIST OF ASSEMBLY'S COMPONENTS

Position	Description	Q.ty	Code	Edition
1	Mounting bracket UR rectangular	1	MFI-A372	A
2	Extruded 25x25 L=300	0.6m	EMB-2525	C
3	Kit angular connection ϕ14 (L=40)	4	MFI-A05	D
4	Plug for profile	4	MFI-034	A
5	Kit leg for vacuum cup 1/8 – 1/8 ϕ14x80	4	MFI-A72	B
6	Nipple for vacuum cups male	4	AV0118M16	A
7	Vacuum cup ϕ42	4	V0242H04	D
8	Swivelling elbow male adaptor ϕ6 G1/8	4	RG.5511600013-01	-
9	Kit side manifold block (single channel) G1/8	1	MFI-A68	C
10	Straight male adaptor ϕ6 G1/8	6	RG.5002000N03-01	-
11	PINline vacuum generator MINI SI, 6-6 mm	1	PV.0122025	-
12	Polyurethane hose 98 shore blue	8m	TUBO6x4BL	-
13	Half-bracket for mounting hose	4	MFI-235	A
14	Cable tie 4.8x300	2	LV25050-50	-
15	Electropilot with manual control 3/2 NO G1/8	1	KIT-UR-007	-
16	Solenoid 22 mm	1	KIT-UR-008	-
17	Connector 22 mm LED + CDR 0 -24V	1	KIT-UR-009	-
18	TCEI M3x25 DIN 912 Inox A2	2	VITE-251	-
19	Nut M3 DIN 985 Z/B	2	VITE-228	-
20	Connector 8 poles wire ϕ5	1	CFGM800803P-01	-
21	Silencer G1/8	1	RG.07020000002-01	-
22	Swivelling elbow male adaptor ϕ6 M5	1	RG.5511600011-01	-
23	Mounting bracket 90° Electropilot	1	KIT-UR-010	A
24	TCEI M5x10 C/ROND DENT De/ZnNi 7 IV	2	VITE-496	-
25	Nut M5 L=25 (5-17)	1	MFI-148	A

SYSTEM'S MAIN DATA

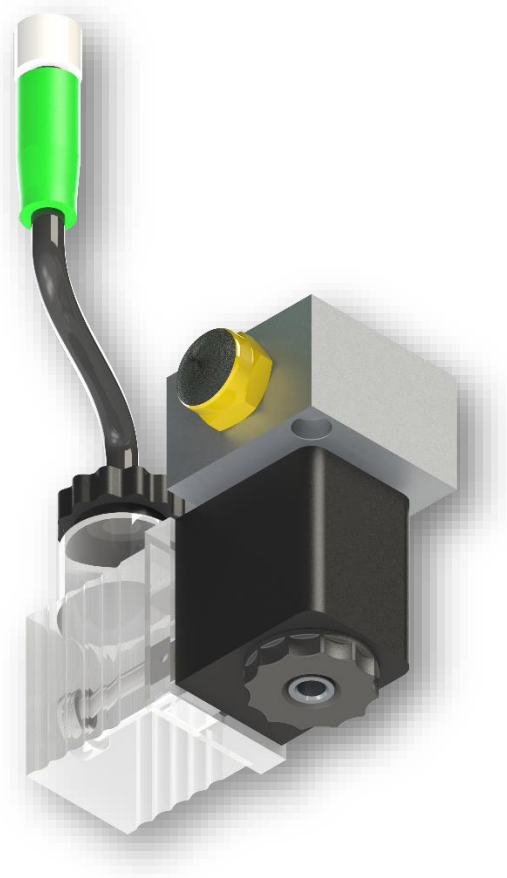


Total suction force at -0.75 [bar] [1]	Vertical	95 [N]
	Rotation/Horizontal	44 [N]
Power medium		Filtered, lubricated/ non-lubricated compressed air
Temperature range		-10 ÷ +80 [°C]
Noise level		68-84 [dBA]

[1] Testing carried out with a cardboard box of dimensions 280 x 370 x 250 [mm].

External pneumatic connection	ϕ6 [mm]
Total mass	1.3 [kg]
Optimal feed pressure	6 [bar]
Max vacuum	-0.75 [bar]
Vacuum cups hardness	60 [Sh.A]
Vacuum cups diameter	34 [mm]

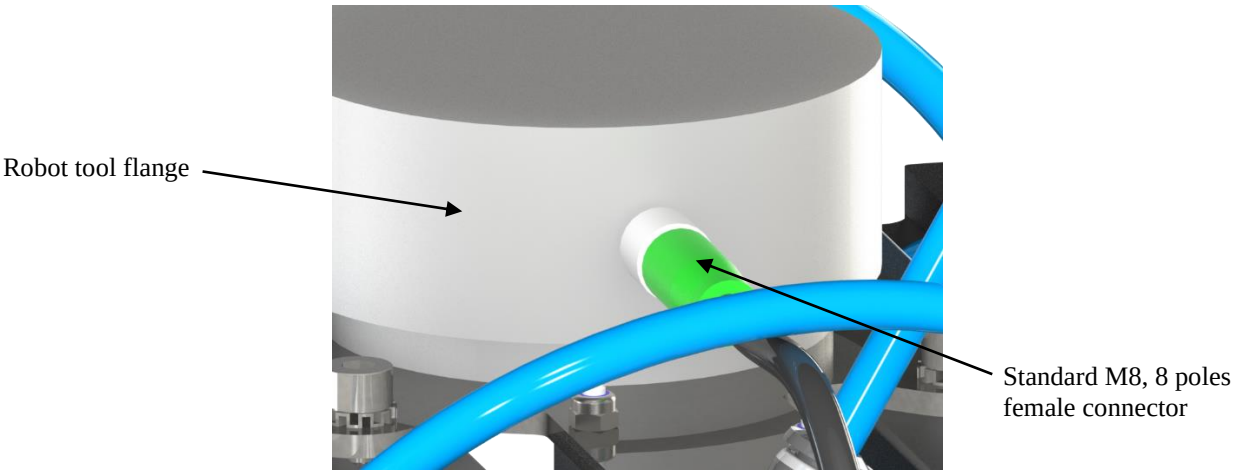
SOLENOID VALVE'S DETAILS



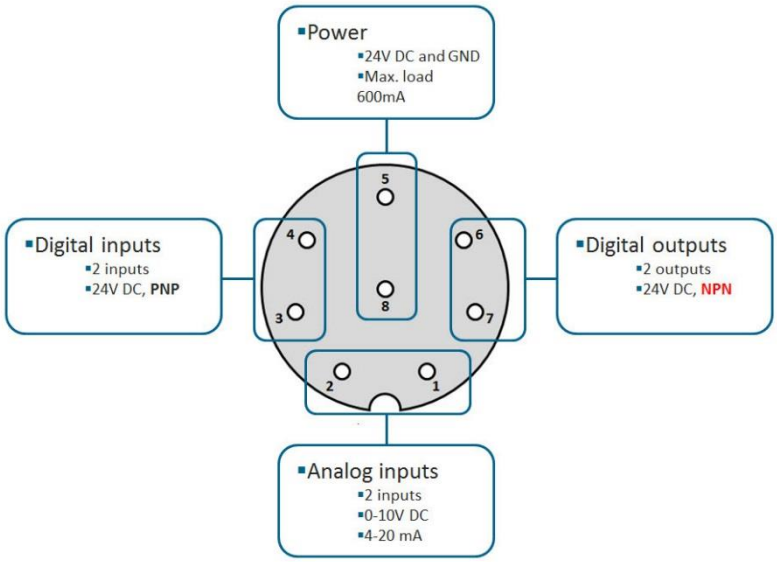
Threaded	G 1/8 (bore 2-3) - M5 (bore 1)
6 [bar] flow rate with Δp 1 [bar]	30 [Nl/min]
Optimal operating pressure	6 [bar]
Solenoid voltage	24 [V] DC
Power consumption	2 [W]
External electrical connection	Standard M8, 8 poles, female connectior
Ways	3/2
Function	Normally Open
Reactuation	Monostable spring return

ELECTRICAL CONNECTION TO ROBOT TOOL FLANGE

Connect the solenoid M8 female connector with the M8 male connector of the robot tool flange.



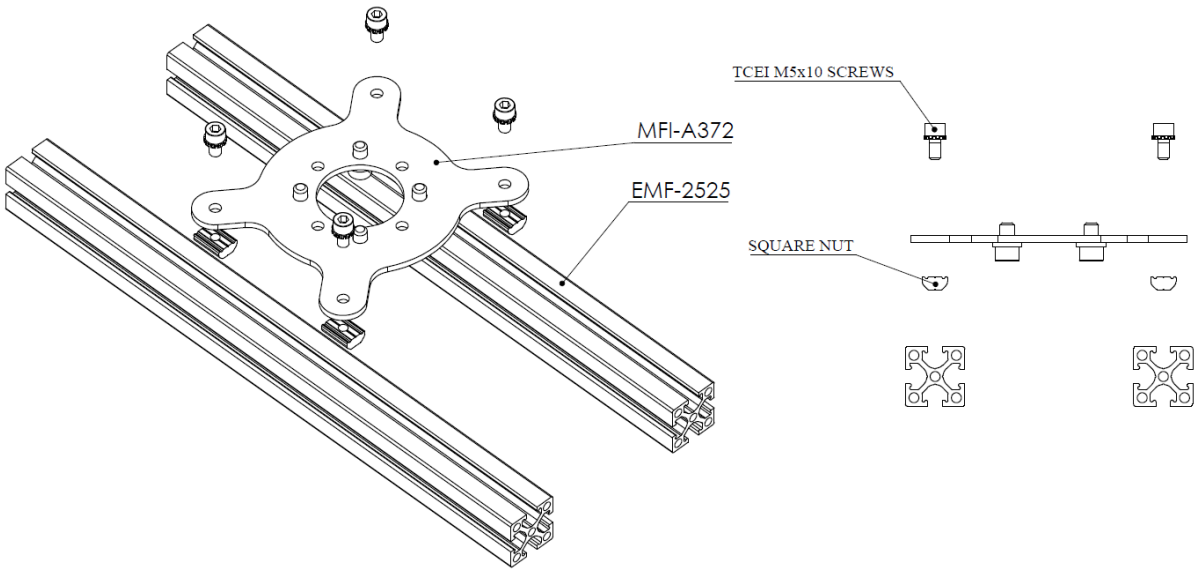
The following picture shows the electric connection schema of the connector located at the wrist of UR collaborative robots.



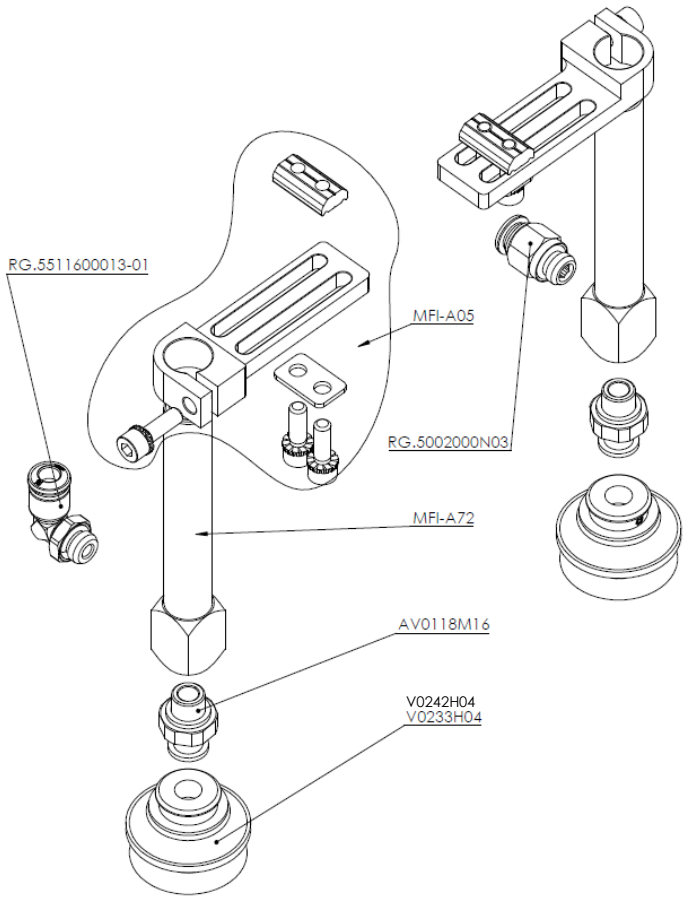
SOLENOID VALVE CONNECTION	UR CONNECTION
PIN 1 – +24V	PIN 8 – POWER – GREY WIRE
PIN 2 – 0VC	PIN 7 – Tool command – BLUE WIRE (NPN)

ASSEMBLY PROCEDURE

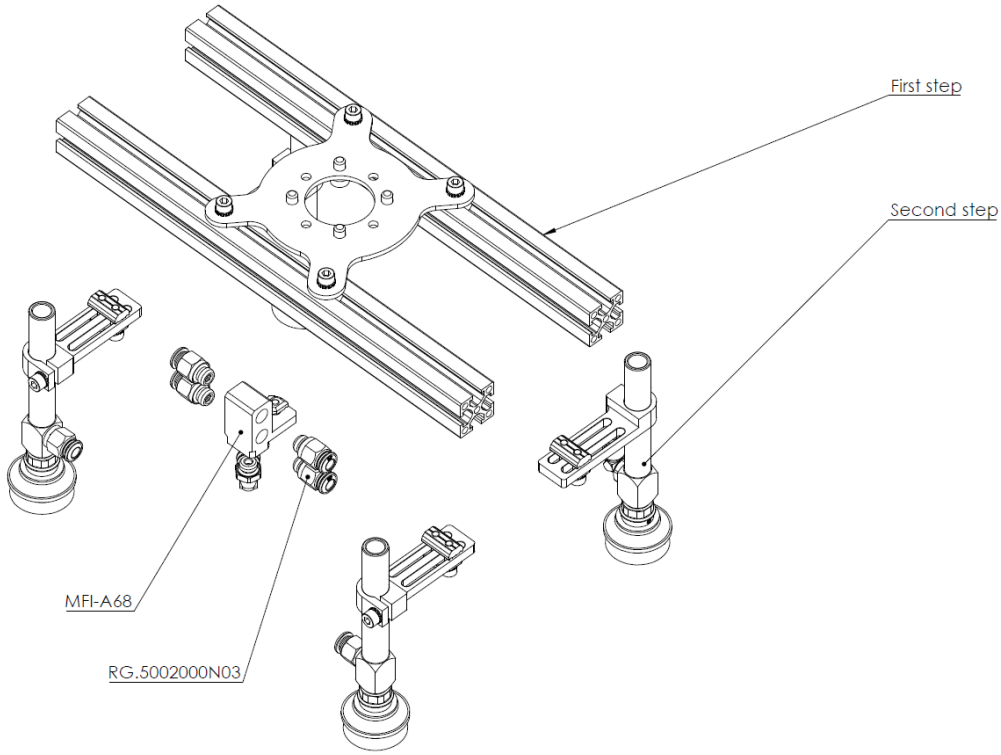
1. Fix the MFI-A372 to the two square beams EMF-2525 with the four TCEI M5x10 SCREWS and relative square nuts (included in MFI-A372 kit).



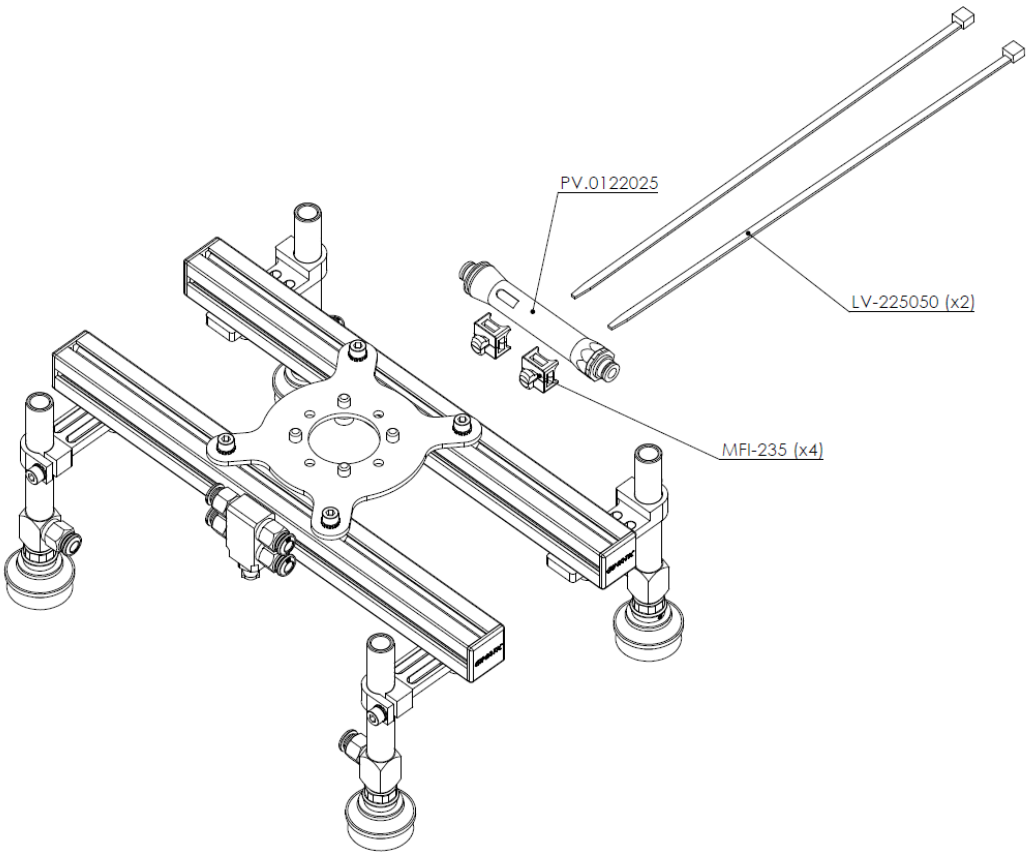
2. Assembling the four “vacuum cup group”. Put the nipple (AV0118M16) into the vacuum cup (V0242H04) and screw the nipple (AV0118M16) into the leg (MFI-A72), then fix the MFI-A05 to the leg (MFI-A72). At last connect the adaptors RG.5511600013-01 and RG.5002000N03 to the legs (MFI-A72).



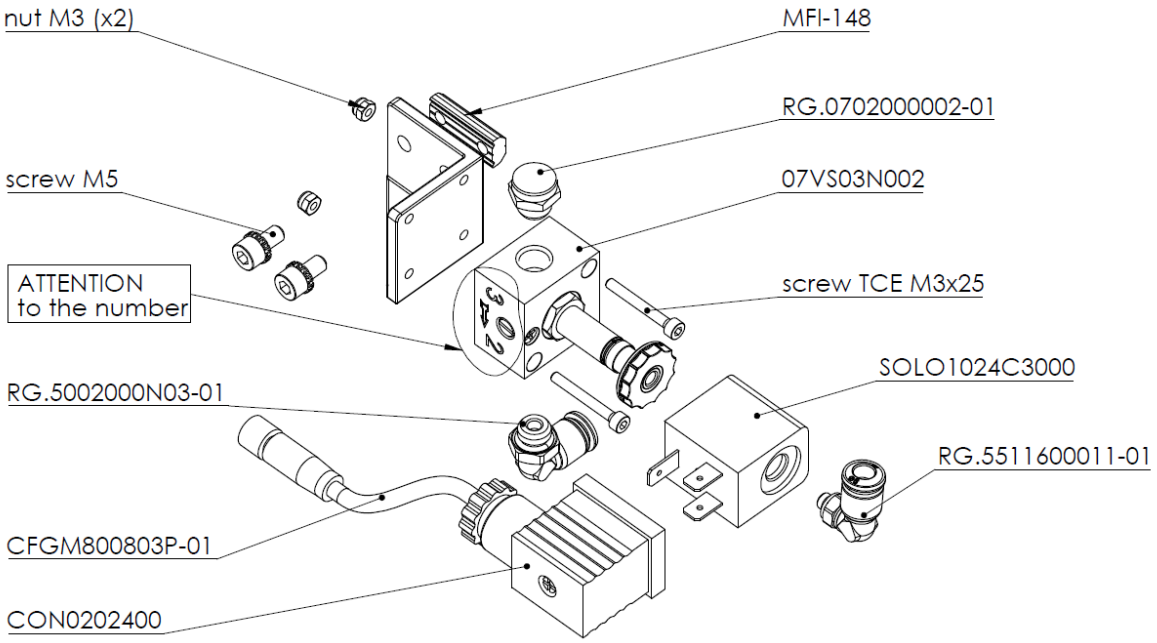
3. Position and fix the four “vacuum cup group” (assembled in step 2) on the square beams (fixed in step 1). Position and fix the “kit side manifold block” (MFI-A68) on one side of a square beam and insert the adaptors: four sideways (RG.5002000N03) and one bottom (RG.5511600013-01).

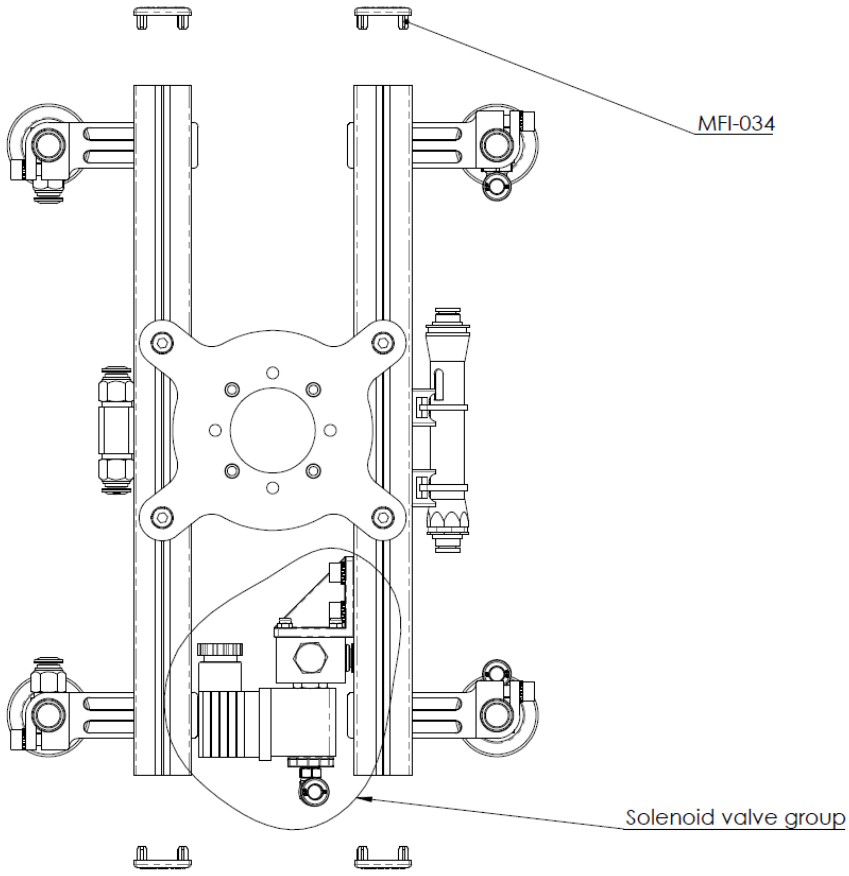


4. Fix the vacuum pump (PV.0122025) using mounting brackets (MFI-235(x4)) and the “cable tie 4.5x280” (LV-225050(x2)).

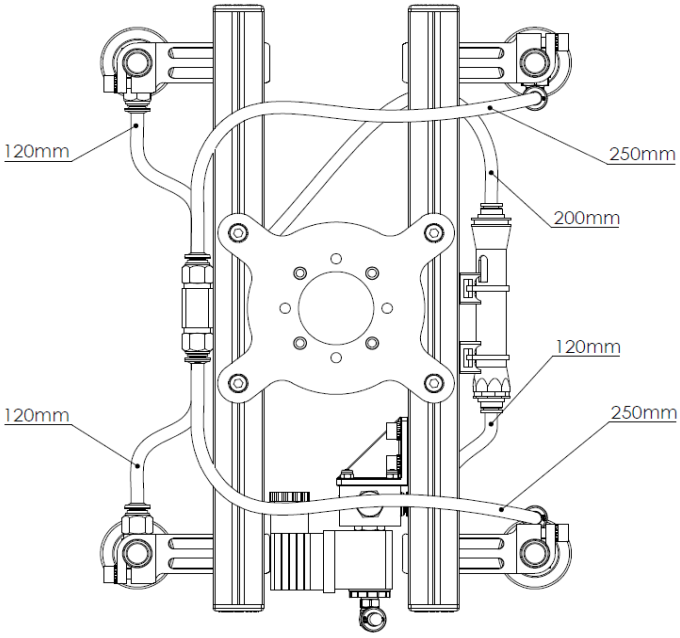


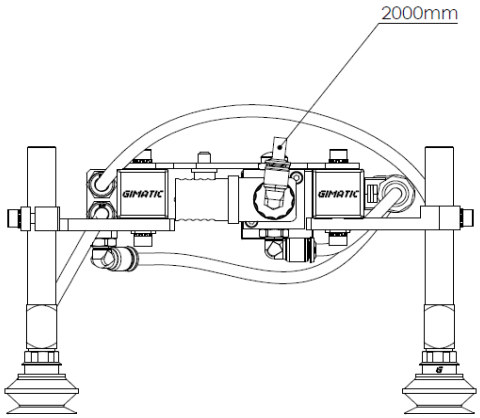
5. Wire the cable (CFGM800803P-01) with the connector (CON0202400): following the previously described electrical connection schema. Fix the solenoid to the electropilot (07VS03N002), connect the connector (CON0202400) to the solenoid (07VS03N002). Connect the silencer (RG.07020000002-01) at the electropilot (07VS03N002 - bore number 3), connect the adaptor in the other two bores (RG.5002000N03-01 in bore-2, RG.5511600011-01 in bore -1). At last fix everything to the braket (KIT-UR-010) with two screws TCE M3x25 and two nuts M3. Pay attention to the direction of the arrow of the electropilot (07VS03N002). Finally fix the "solenoid valve group" on the square beam with the two screws M5 and nut MFI-148. At last put the four plugs (MFI-034) at the ends of the square beams.





6. Connect the “vacuum cup groups” to the “kit side manifold block” (MFI-A68) and connect the “kit side manifold block” (MFI-A68) with the vacuum pump (PV.0122025) with the hoses as shown in the following figure. Connect the vacuum pump (PV.0122025) to the electropilot (07VS03N002 at bore-2). Finally connect the electropilot (07VS03N002 at bore-1) to the pneumatic power source and the cable (CFGM800803P-01) to the wrist of the robot.





CONFIGURATION OPTIONS

The gripping hand is highly flexible: it's possible to choose two different distances between the two beams (figure 1), to choose the position to the "vacuum cup group" and their angular inclination (figure 2-3) and choose the height of the gripping hand (figure 4).

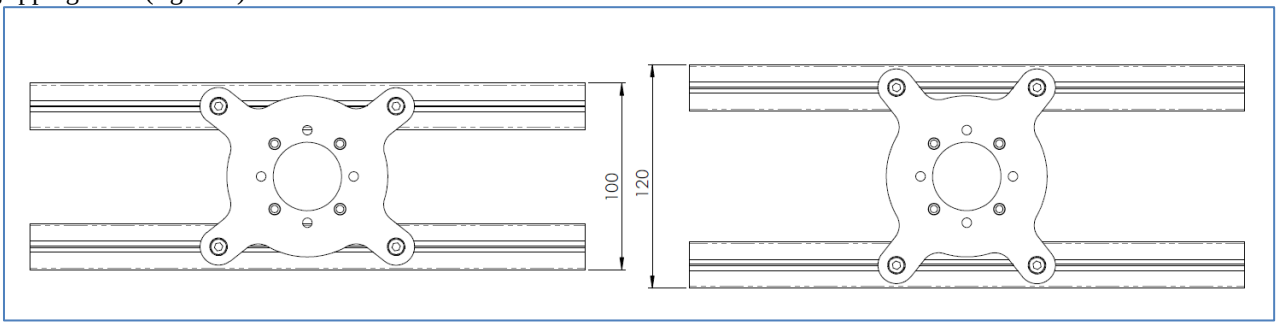


Figure 1

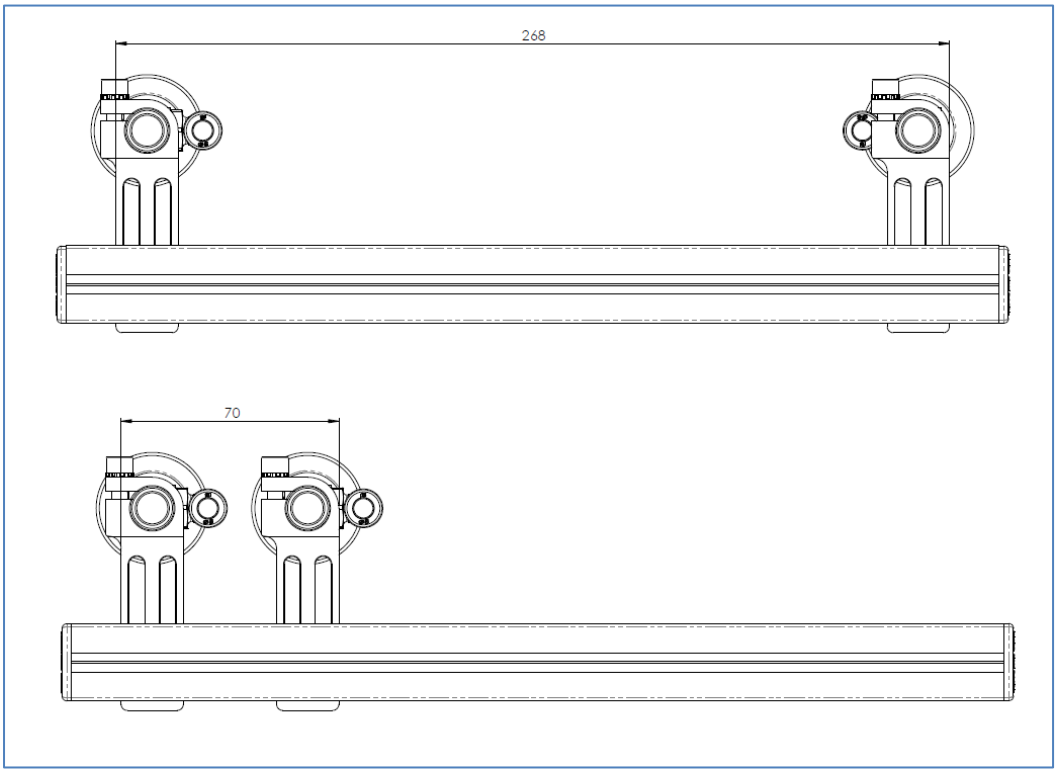


Figure 2

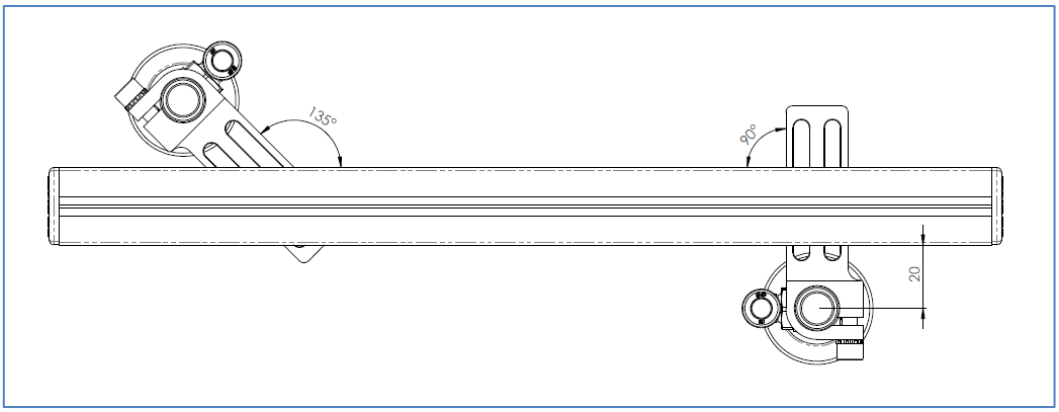


Figure 3

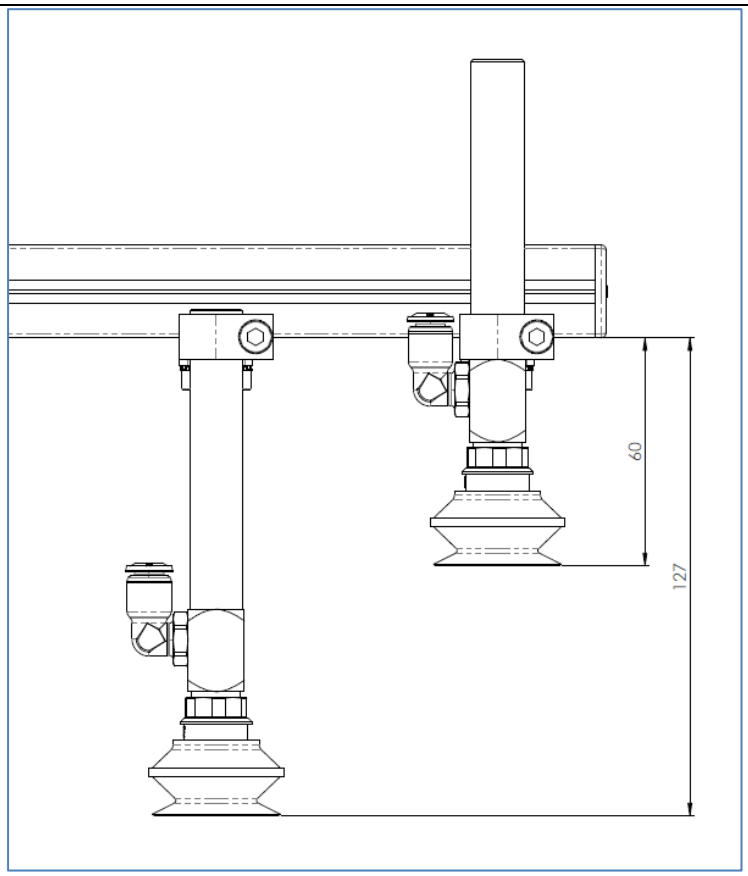
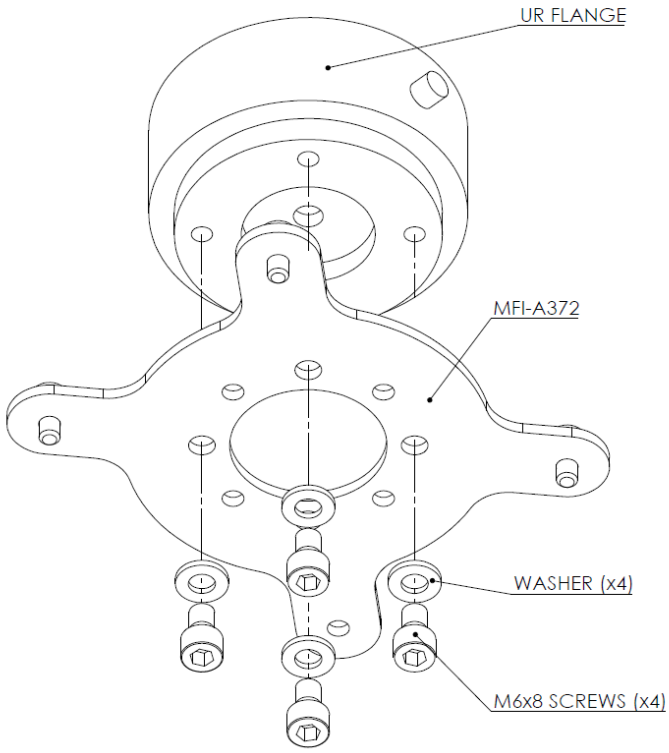


Figure 4

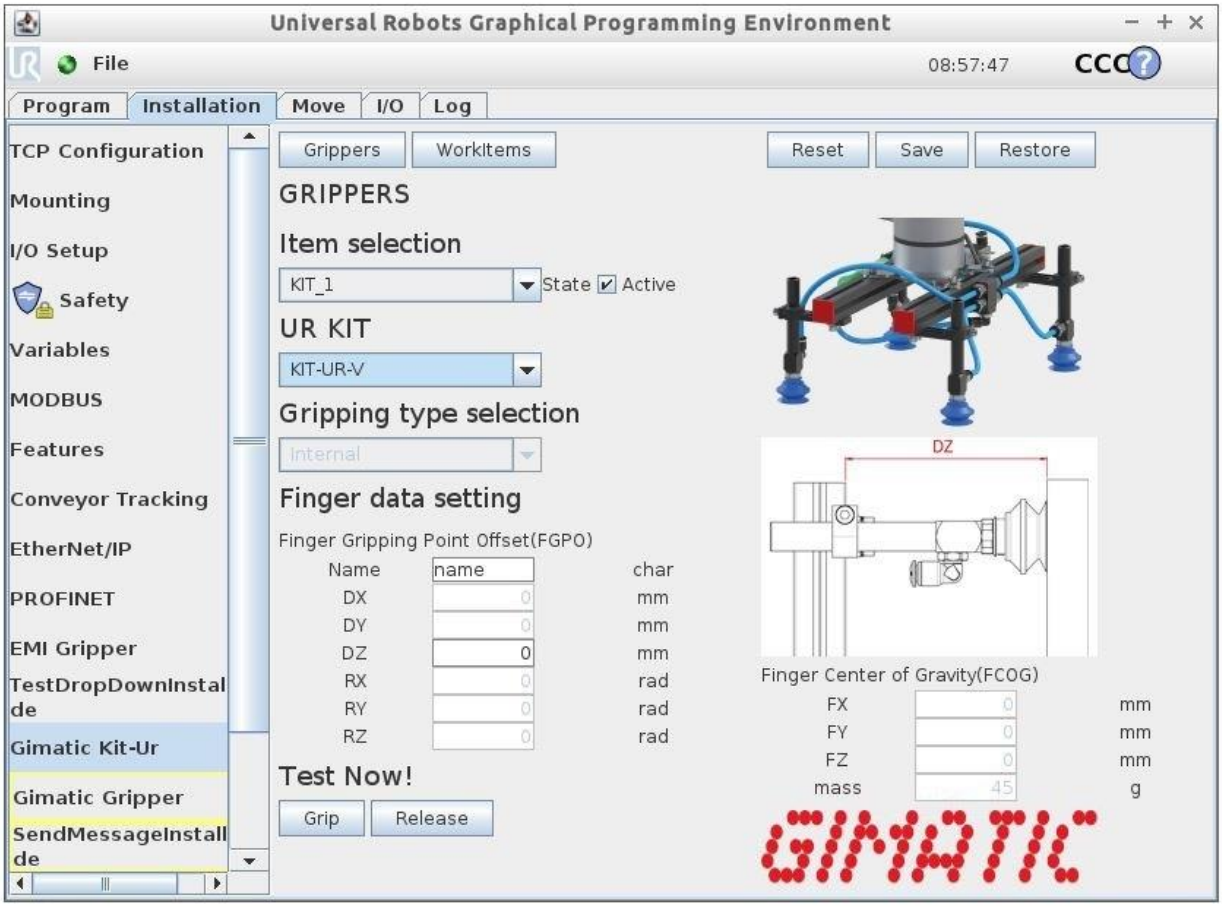
MECHANICAL CONNECTION TO ROBOT TOOL FLANGE

Insert four M6x10 screws and relative washers (included in MFI-A372 kit) into the mechanical flange MFI-A372.



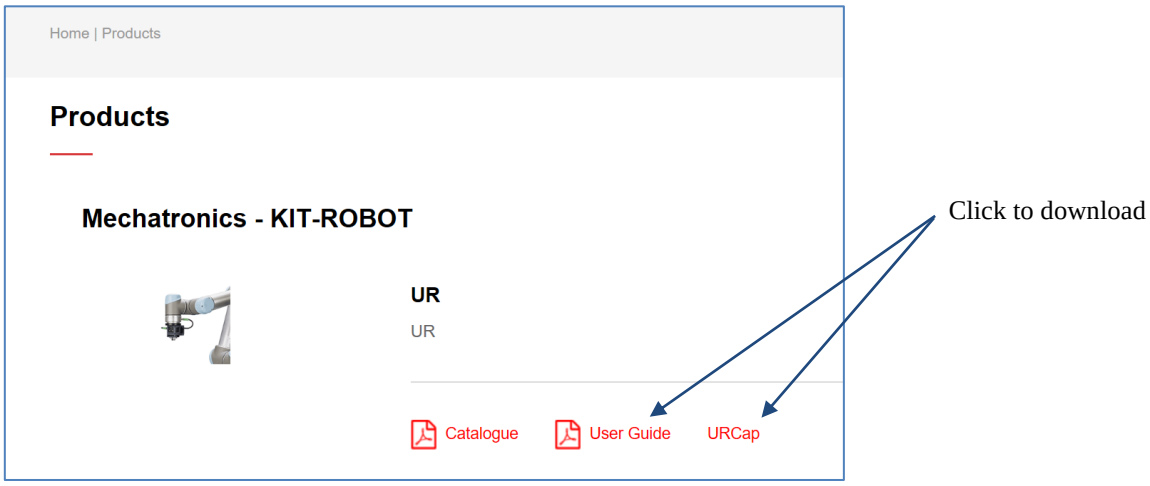
SOFTWARE: **URCAP**

URCap is a Polyscope PlugIn designed to control the KIT-URs as if they were parts of the UR robot: it allows an easy payload and Finger Gripping Point Offset (FGPO) assignment and automatic tool central point (TPC) update.



Download and Installation:

1) Download “URCap” and “User Guide” on Gimatic official website: http://www.gimatic.com/products/Details?language=en&catalogo=mechatronics&macrofamiglia=kit-robot&famiglia=ur



2) Copy the “gimatic_gripper-1.0-SNAPSHOT.urcap” file on USB memory stick and plug it in the robot teach pedant.
3) Follow “IST-KIT-URCAP” instruction to install and configure the URCap.

CAUTIONS

Never let the system come into contact with corrosive substances, soldering splashes or abrasive powders as they may either damage the system or affect the vacuum cup's functionality. Never let personnel or objects stand within the operating range of the system. Never operate the system if the machine on which it is fitted does not comply with safety laws and standards of your country.

ORDINARY MAINTENANCE

The gripping hand is subject to vibrations, is recommended a periodic verification of screws, fixings and components of the gripping hand. Periodically check the efficiency of the suction cups on the product and replace them if not considered more efficient for the application.

CE MARKING REFERENCE

The gripping hand is made in compliance with the relevant Community Directives.
The gripping hand falls into the category "PARTLY COMPLETED MACHINERY".
The gripping hand has been realized in compliance with the 2006/42 / CE Directive (Legislative Decree 17/2010 – attached IIB) and it respect the following essential requirements:
Directive: 1.1.1, 1.1.3, 1.1.5, 1.2.1, 1.3.1, 1.3.2, 1.3.4, 1.5.3, 1.5.4, 1.6.1, 1.7.2, 1.7.4, 2.1.1, 2.1.2

Other directives applicable to the product: UNI EN ISO 12100 part 1 and 2.

OVERALL DIMENSIONS