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GIMATIC
A business of BARNES GROUP INC

MOUNTING INSTRUCTIONS AND OPERATING MANUAL



KIT-TM-EQC20

11/2021

REVISIONS

DATE	REVISION	MAIN CHANGES
2020/09/01	Edition A	First release

DOCUMENT LAYOUT

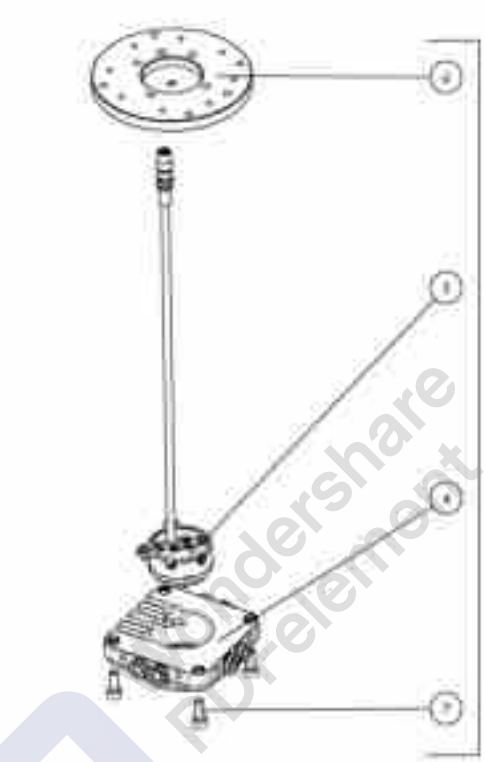
- Description
- Exploded view drawing of the final assembly
- Itemized list of assembly's components
- System's main data
- Main electrical connection
- Electrical connection to robot tool flange
- Tool changer flow diagram
- Assembly procedure
- Cautions
- Ordinary maintenance
- CE marking reference
- Software
- Overall dimensions

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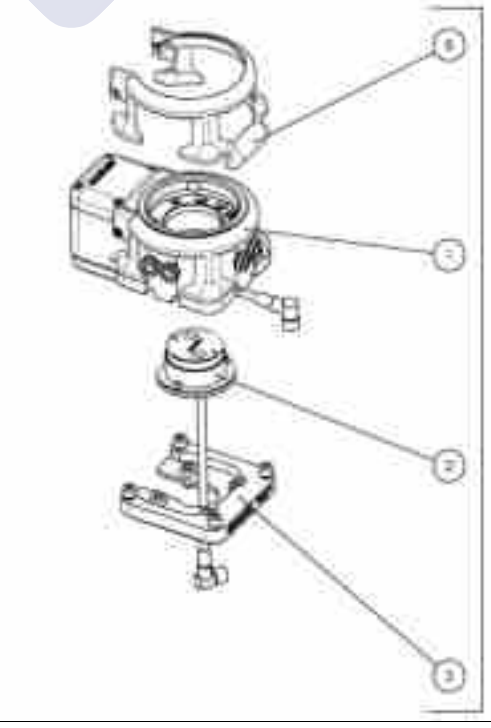
DESCRIPTION

The KIT-TM-EQC20 is an “Electrical Quick Changer” that allows an easy replacement of the EOAT (End Of the Arm Tool) on the robot. It is specifically designed for TM5/TM12/TM14 collaborative robots by TechMan Robot and it is completely compatible with KIT-TM-J and KIT-TM-V kits. These kits 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



KIT-TM-EQC20-B



KIT-TM-EQC20-A

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ITEMIZED LIST OF ASSEMBLY'S COMPONENTS

KIT-TM-EQC20-A

Position	Description	Q.ty	Code	Edition
1	Tool changer	1	EQC20TM-A	H
2	Electric connection module, one 8-pole cable, 8 electrical connections (side A)	1	RMAQC-TM	C
3	Kit plate ISO-9409-50-4-M6	1	EQC20-K50	A
8	Cover	1	KIT-COBOT-006	A

KIT-TM-EQC20-B

Position	Description	Q.ty	Code	Edition
4	Tool changer flange	1	EQC20-B	D
5	Electric connection module, one 8-pole cable, 8 electrical connections (side B)	1	RMBQC-TM	C
6	Flange EQC20/KIT-COBOT	1	KIT-COBOT-007	A
7	Screw TCEI M5X14 DIN912 INOXA2	4	VITE-048	-

SYSTEM'S MAIN DATA



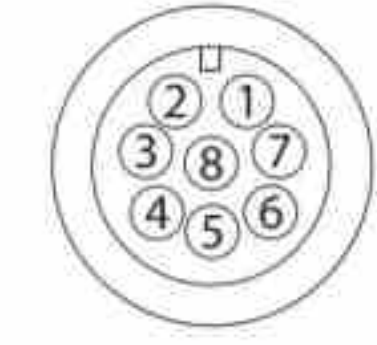
Safety loads	Vertical	2000 [N]
	Moment	100 [Nm]
Maximum payload		20 [kg]
Temperature range		-10 ÷ +60 [°C]
Mass robot + tool side		810+210 [g]
Total mass		1.2 [kg]
Number of pneumatic connections		2+2+2 (air fittings ø6)
Working pressure range		-1 ÷ 6 [bar]
Electric connection (robot flange side)		Standard M8, 8 poles, female connector
Protection rating		IP40
Power supply		24 [Vdc] +/- 10% 0.5 [Arms], 1.2 [Apk]
Output initialization delay		200 [ms]

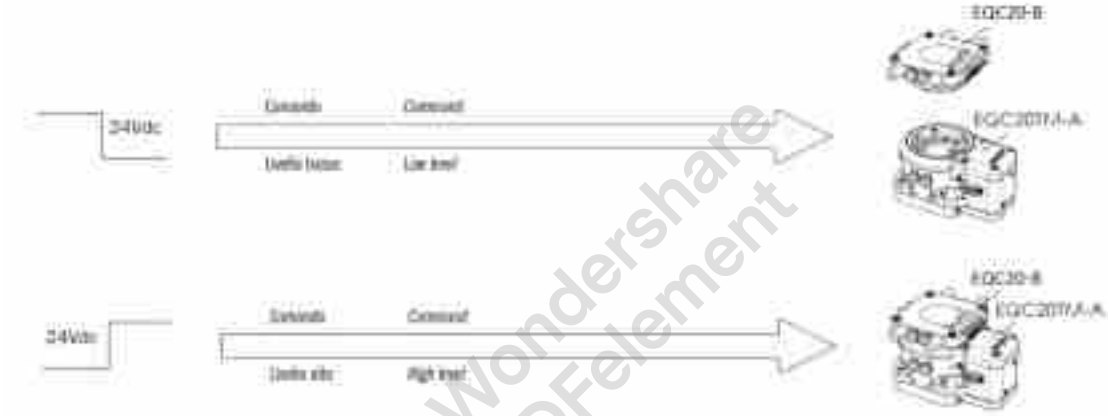
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MAIN ELECTRICAL CONNECTION

The electric quick changer is equipped with an 8-pole M8 male connector that provides a 24 VDC power supply for the locking/unlocking command and for the connection of the digital outputs that identify the coupled and uncoupled system status. No additional external electronic control system is required.

PIN	WIRE COLOR	EQC20TM-A
1	White	+24V
2	Brown	Digital Input 0
3	Green	Digital Input 1
4	Yellow	Digital Input 2
5	Grey	Digital Output 0
6	Pink	Digital Output 1
7	Blue	Digital Output 2
8	Red	GND





ELECTRICAL CONNECTION TO ROBOT TOOL FLANGE

The KIT-TM-EQC20 allows the user to choose between two different connection configurations.

1) SINGLE CONNECTION AT THE WRIST

This solution is based on one cable only connected to the wrist that feeds both the tool changer and the tool.

a) Connect the EQC20TM-A M8 male connector with the M8 female connector of RMAQC-TM.



EQC20TM-A
Standard M8, 8 poles male connector (to RMAQC-TM)

RMAQC-TM
Standard M8, 8 poles male connector (to wrist)

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b) Connect the RMAQC-TM M8 male connector with the M8 female connector of the robot tool flange.



The following picture shows the electric connection schema of the connector located at the wrist of TM collaborative robots and at the output of KIT-TM-EQC20.

PIN	WIRE COLOR	EQC20TM-A (used)	Tool
1	White	Used (+24Vdc)	+V24 (Supply)
2	Brown	Used (Out open NPN)	/
3	Green	Used (Out closed NPN)	/
4	Yellow	/	Digital Input 2
5	Grey	/	Digital Output 0
6	Pink	Used (EQC command NPN)	/
7	Blue	/	Digital Output 2
8	Red	Used (GND)	GND

2) RMAQC-TM CONNECTED AT THE CONTROL BOX AND EQC20TM-A AT THE WRIST

This solution allows to feed the tool changer from the wrist of the robot and to connect the tool to the I/O of the Control Box.

a) Connect the EQC20TM-A M8 male connector with the M8 female connector of the robot tool flange.



PIN	WIRE COLOR	EQC20TM-A (used)
1	White	Used (+24Vdc)
2	Brown	Used (Out open NPN)
3	Green	Used (Out closed NPN)
4	Yellow	/
5	Grey	/
6	Pink	Used (EQC command NPN)
7	Blue	/
8	Red	Used (GND)

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b) Connect the RMAQC-TM M8 male connector to the I/O Control Box in the cabinet of robot considering the following pinout:

RAMQC M8 female connector	RMBQC M8 male connector
White wire – pin 1	White wire – pin 1
Brown wire – pin 2	Brown wire – pin 2
Green wire – pin 3	Green wire – pin 3
Yellow wire – pin 4	Yellow wire – pin 4
Grey wire – pin 5	Grey wire – pin 5
Pink wire – pin 6	Pink wire – pin 6
Blue wire – pin 7	Blue wire – pin 7
Red wire – pin 8	Red wire – pin 8



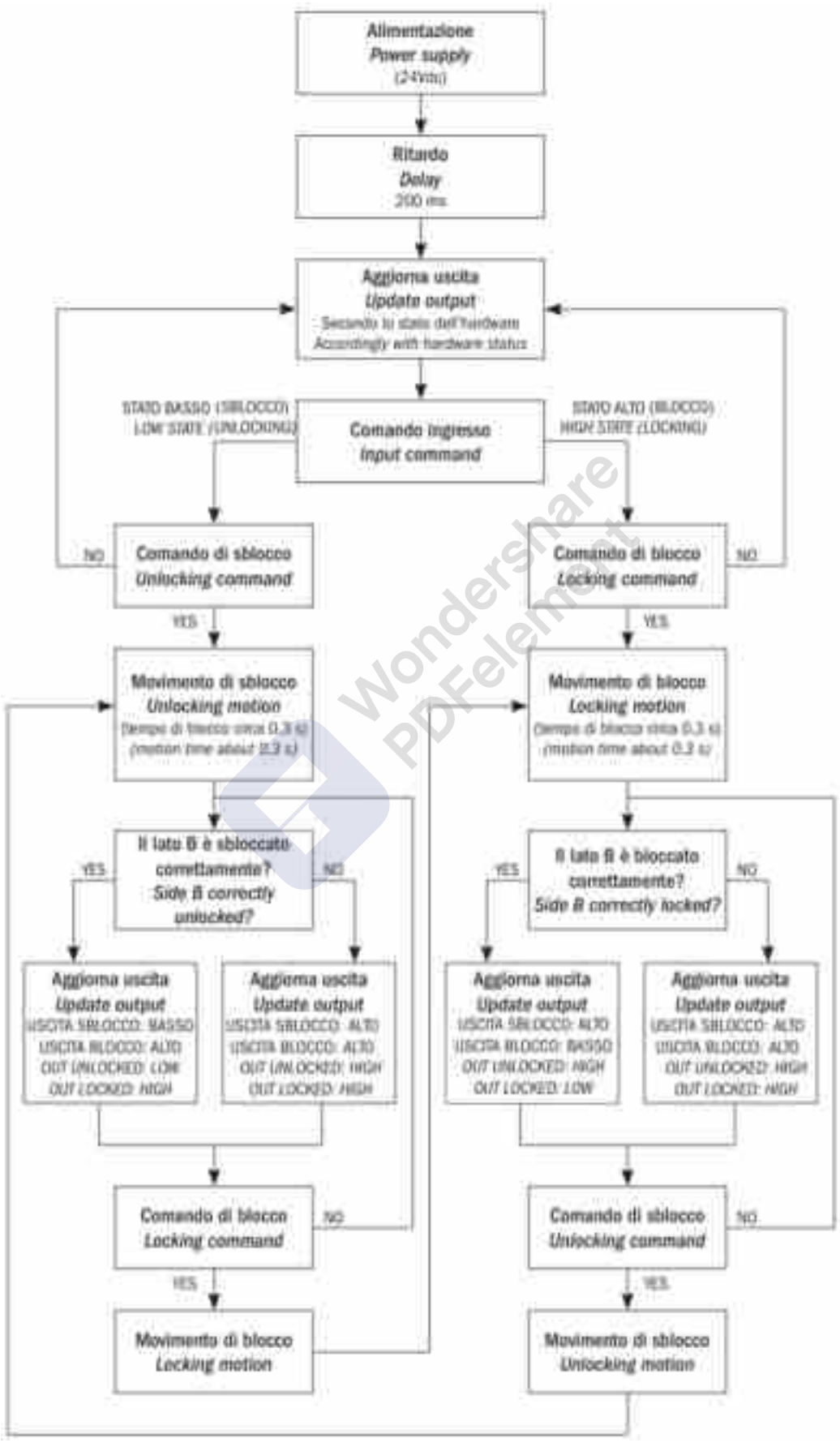
EQC20TM-A
Standard M8, 8 poles male connector
(to wrist)

RMAQC-TM
Standard M8, 8 poles male connector
(to cabinet)



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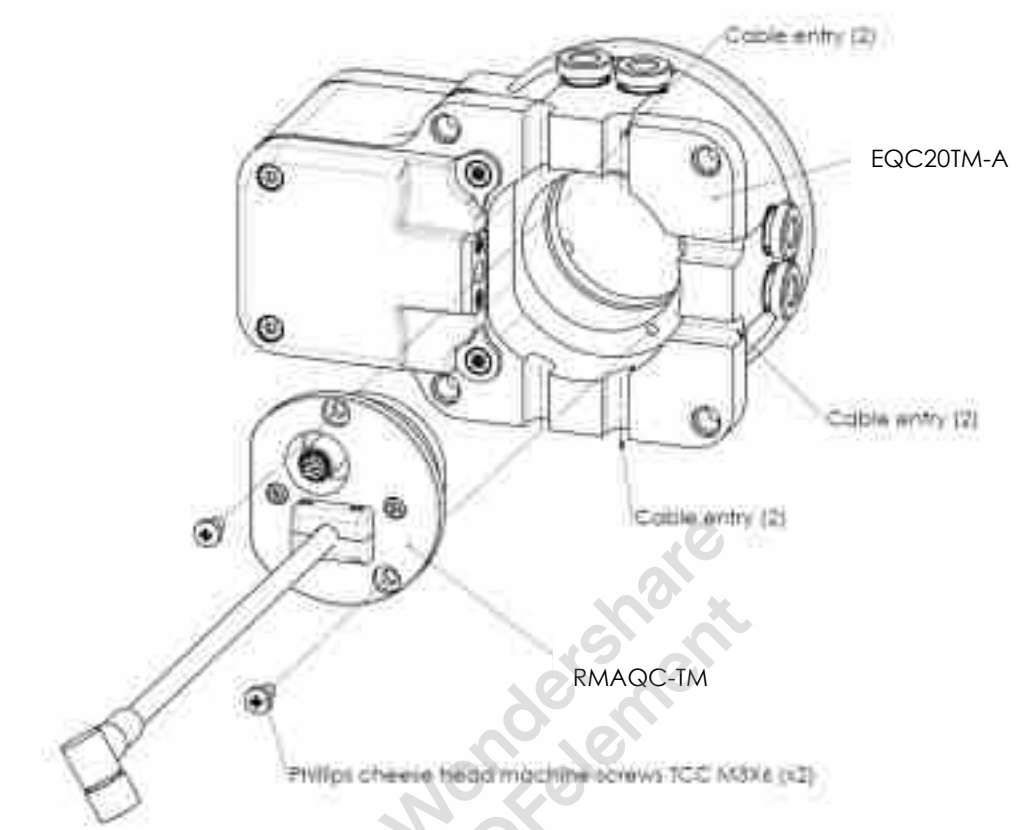
TOOL CHANGER FLOW DIAGRAM



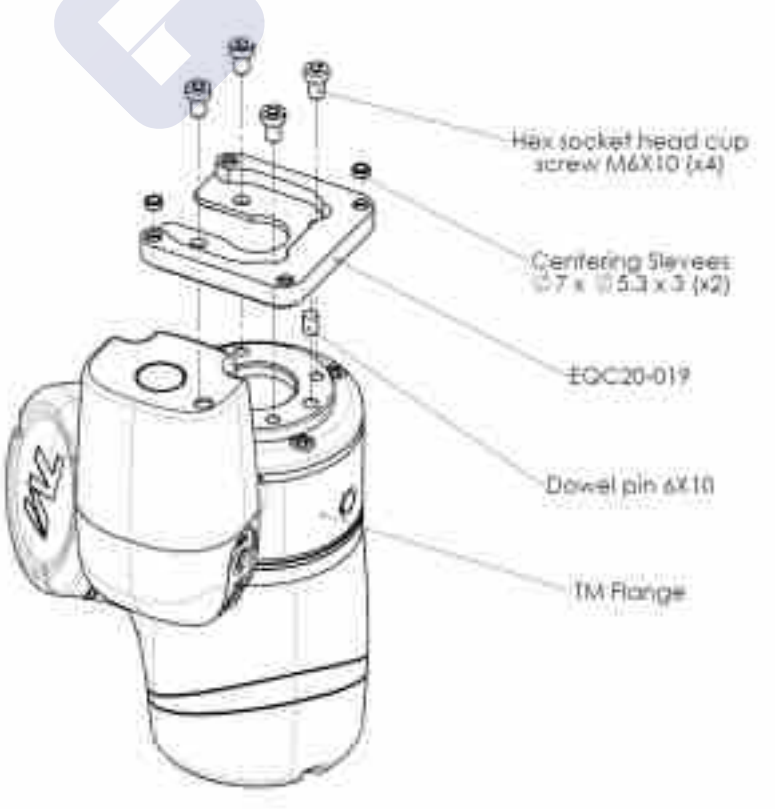
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ASSEMBLY PROCEDURE

1. Electric connection module (optional): Fix the RMAQC-TM to the Tool Changer EQC20TM-A using two screw (TCC M3x6) like in figure below.



2. Install the adaptor plate (EQC20-019) on the robot flange using the dowel pin (ϕ6x10) and four hex socket head cup screws (M6x10)

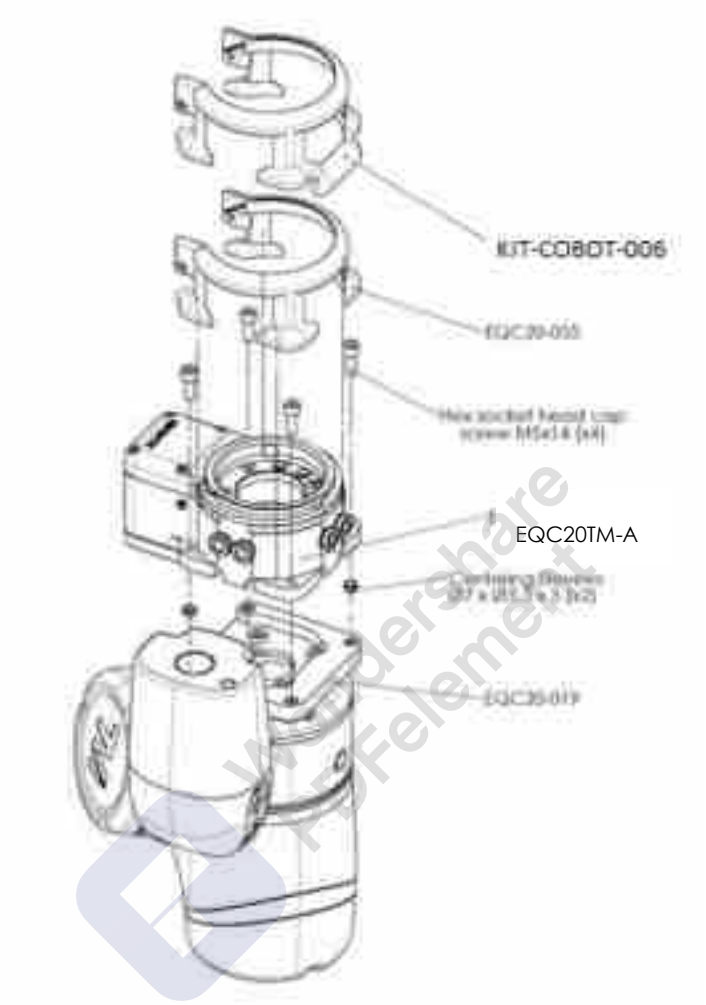


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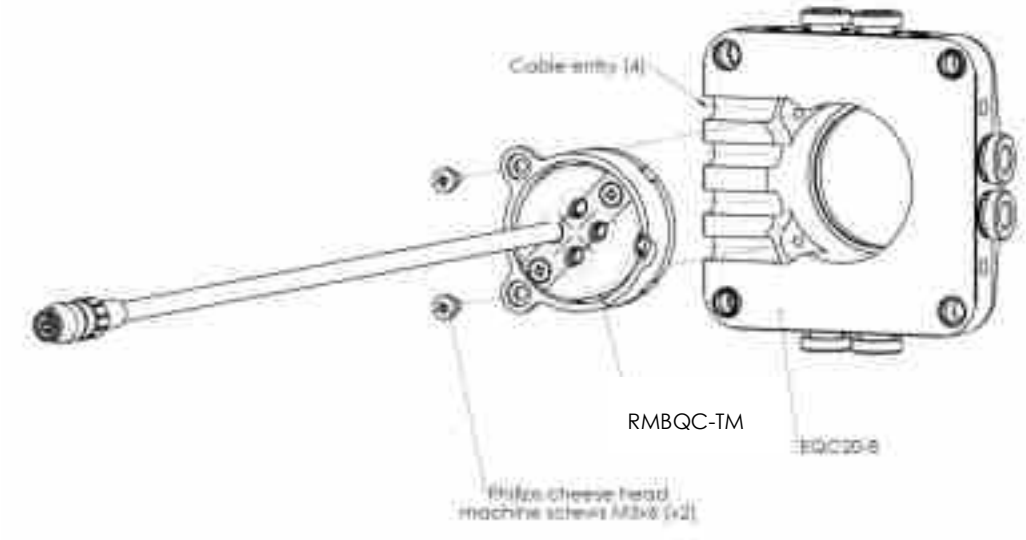
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3. Subsequently fix the Tool Changer EQC20TM-A on the plate (EQC20-019) using the centering sleeves (ϕ7xϕ5.3x3) and four hex socket head cap screws (M5x14).

a) If it has been chosen the "1) Electrical connection solution" mount the cover KIT-COBOT-006
b) If it has been chosen the "2) Electrical connection solution" mount the cover EQC20-055

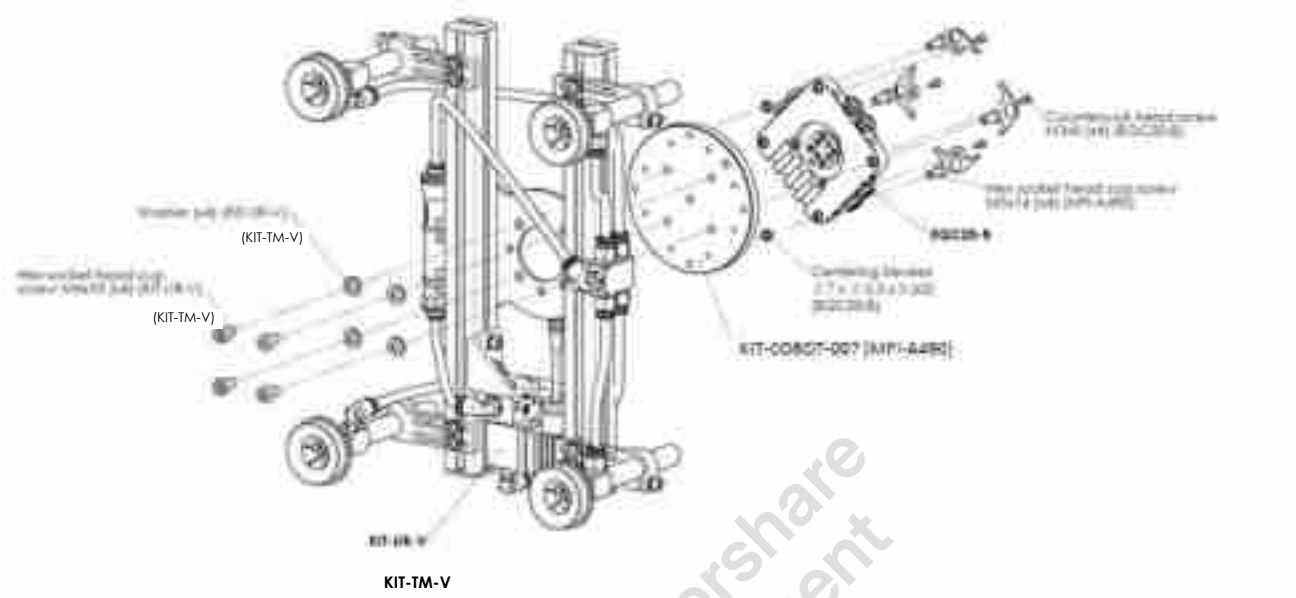


4. Electric connection module (optional): Fix the RMBQC-TM to the Tool Changer EQC20-B using two screw (TCC M3x6) like in figure below.



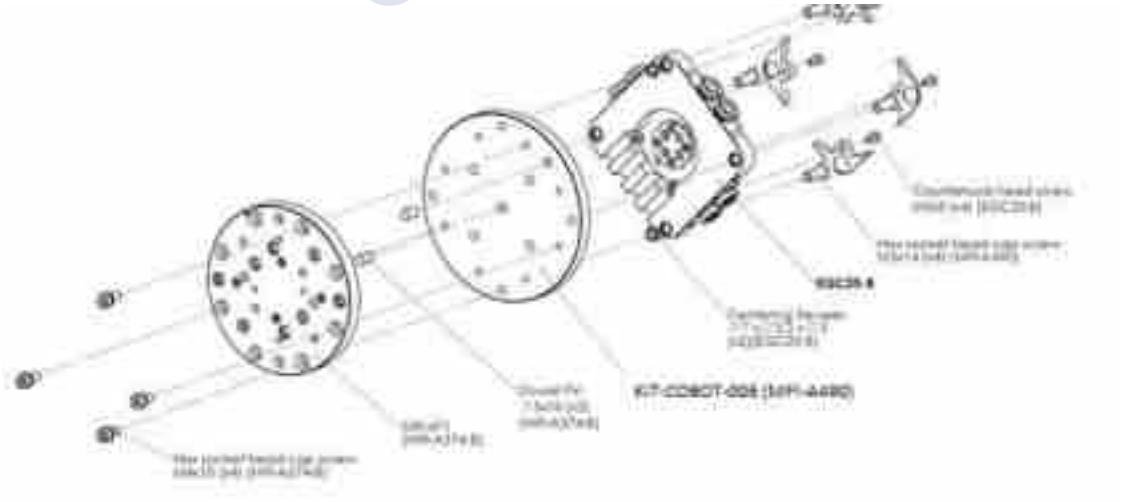
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5a. ONLY FOR KIT-TM-V: Fix the KIT-TM-V to the plate KIT-COBOT-007 (MFI-A490 kit containing) using four screws contained in the KIT-TM-V kit. Subsequently fix the gripper with the plate to the Tool Changer Flange EQC20-B using four screws (VITE-048) and two centering slevees (ϕ7xϕ5.3x3). Finally connect the KIT-TM-V M8 male with the RMBQC-TM M8 female.



5b. ONLY FOR KIT-TM-J: Couple the fixing plate MFI-A374-B supplied in the KIT-TM-J with the plate KIT-COBOT-007 (MFI-A490 kit containing) and fix the gripper using the four screws contained in the KIT-TM-J kit. Subsequently fix the gripper with the plate to the Tool Changer Flange EQC20-B using four screws (VITE-048) and two centering sleeves (ϕ7xϕ5.3x3). Finally connect the KIT-TM-J M8 male with the RMBQC-TM M8 female.

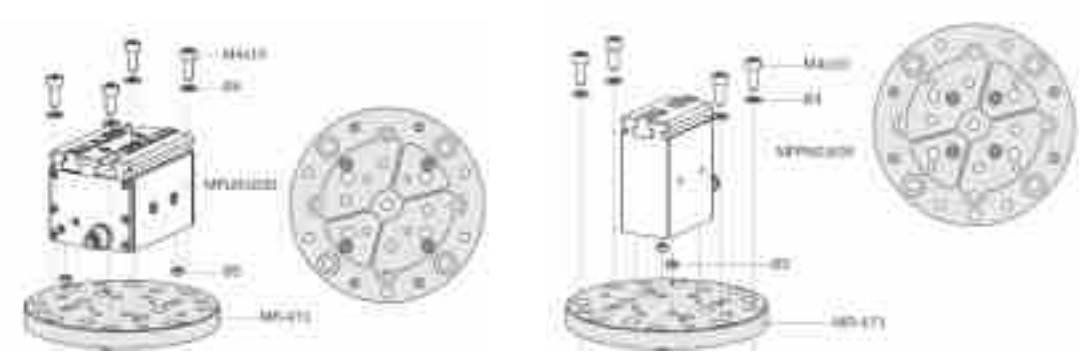
5c. GENERIC GIMATIC ELECTRIC GRIPPER (no collaborative solution): The KIT-TM-EQC20-B is compatible with all Gimatic electric grippers thanks to the MFI-A374-B interface and the MFI-A490.



Compatible with MPPM, MPBM, MPBS, MPRM, MPXM, MRE, MPRJ families.

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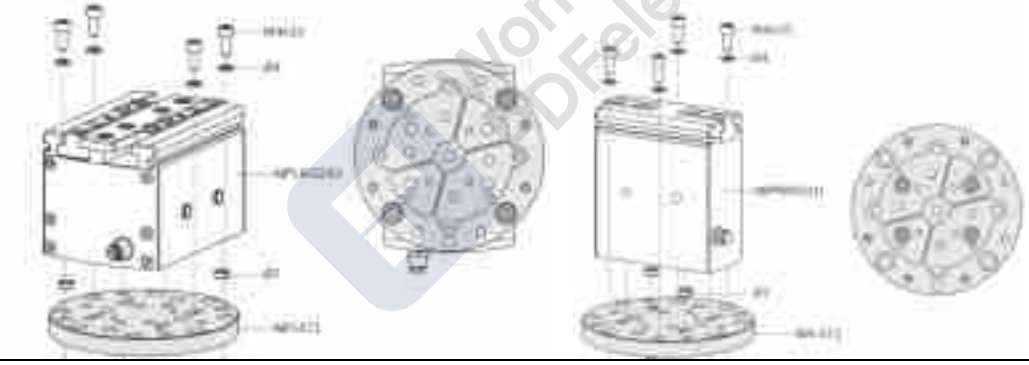
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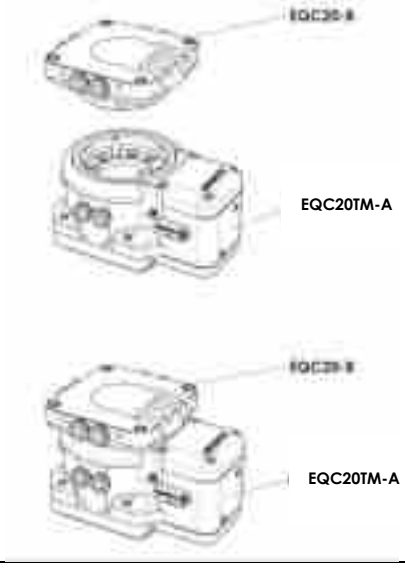
Size 25



Size 32



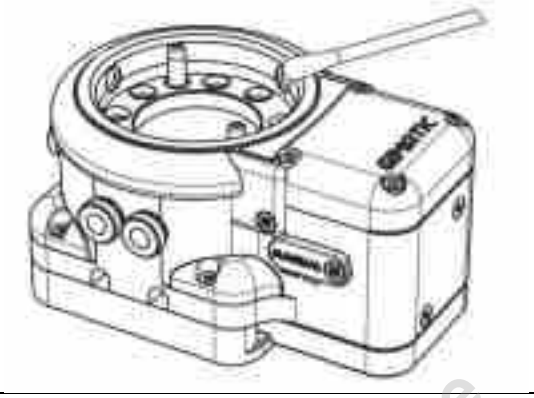
6. Joint the EQC20TM-A and EQC20-B and close the mechanism by electrical command as explaned in the section "MAIN ELETRICAL CONNECTION".



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CAUTIONS
Never let the unit come into contact with corrosive substances, soldering splashes or abrasive powders as they may damage the electric quick changer. 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
For correct operation of the device, a periodic cleaning of the ball seats using a common cotton swab.



CE MARKING REFERENCE
The system is in conformance with: Directive 2004/108/CE, EN 62233 (2008-04), EN 61000-6-2+EC+IS1 (2005-08;2005-09;2005-11), EN 61000-6-3+A1 (2007-01;2011-03), EN 61000-6-4 (2007-01), EN 55016-2-1+A1 (2004-10;2005-08), EN 55016-2-3 (2006-12), EN 61000-4-2 (2009-03), EN 61000-4-3+A1+IS1+A2 (2006-05;2008-02;2009-02;2010-07), EN 61000-4-4+A1 (200412;2010-03), EN 61000-4-5 (2006-11), EN 61000-4-6+A1+IS1 (1996-07;2001-12;2004-07), EN 61000-4-6 (200903), CEI EN 60529 (1997-06).

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SOFTWARE:

Gimatic provides a dedicated software package for TM robot: it allows an easy payload assignment and tool central point (TPC) update.



Download and Installation:

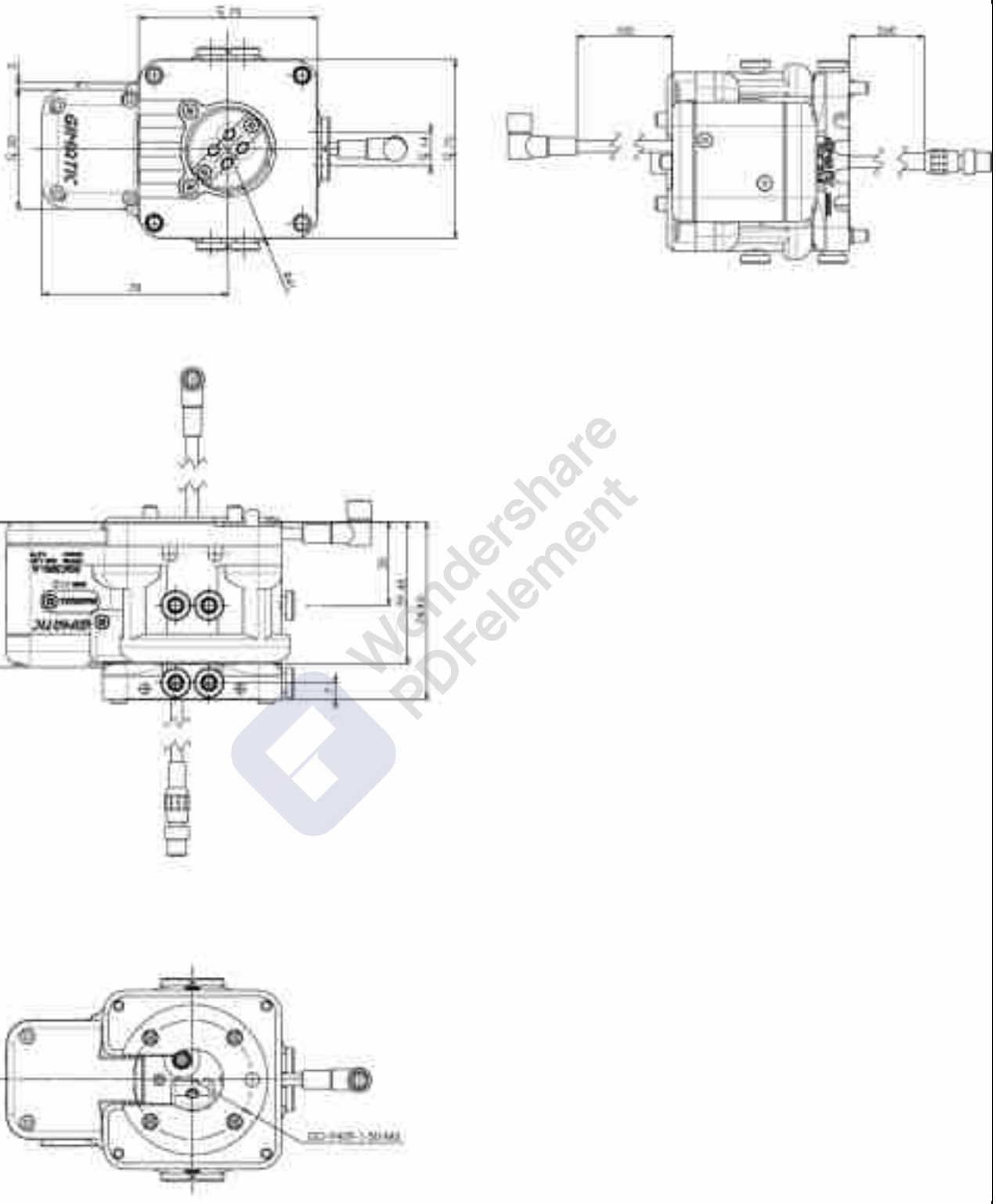
1) Download “TM software” and “User Guide” on Gimatic official website: https://shop.gimatic.com/it/kit-robot



2) Copy the compressed folder to an USB pen drive labeled with “TMROBOT” and insert it in the appropriate port on the robot controller.
3) Follow “**KIT-TM-EQC20 User Manual**” instruction to install and configure the Software.

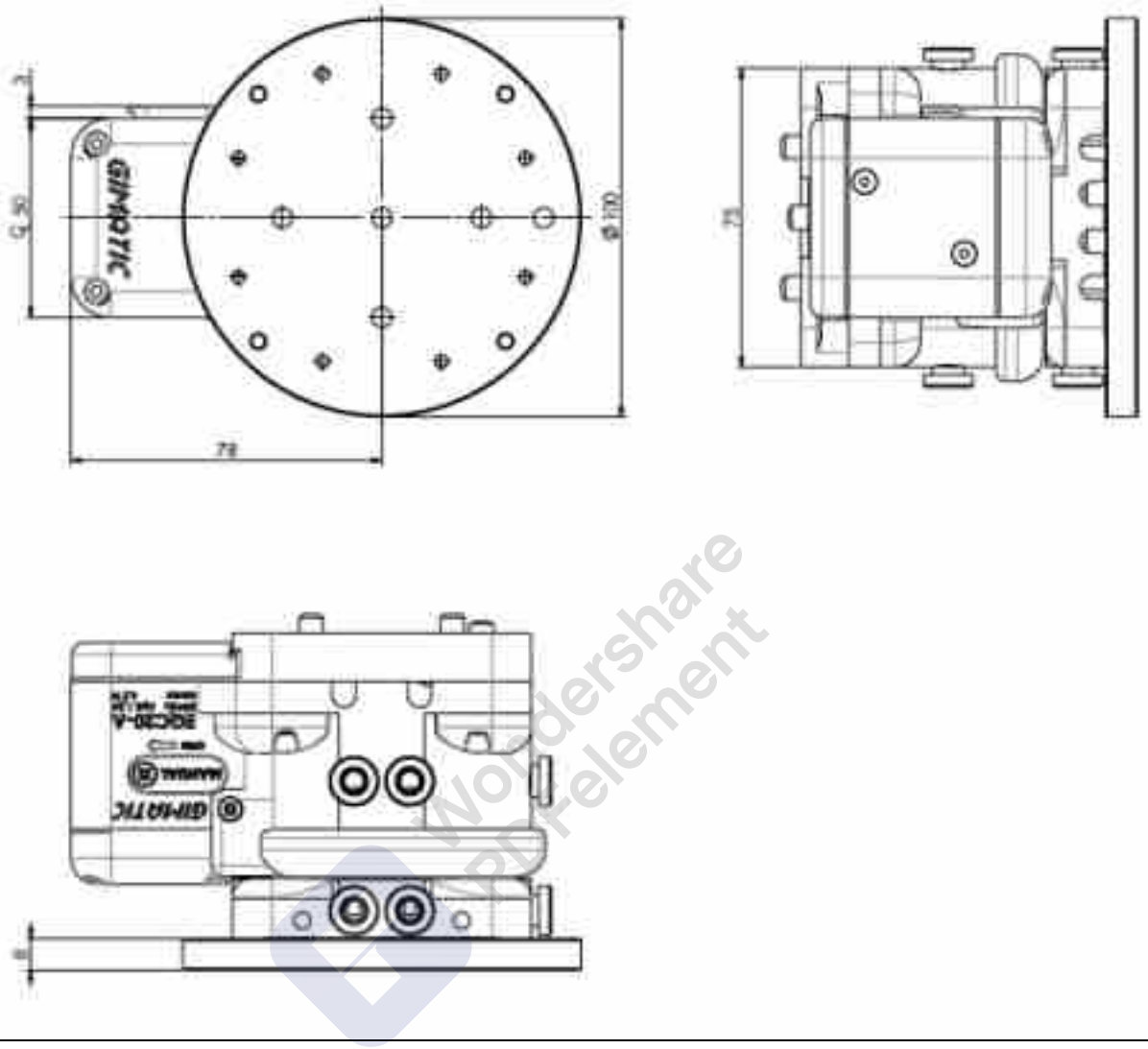
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OVERALL DIMENSIONS



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MOUNTING INSTRUCTIONS AND OPERATING MANUAL



KIT-TM-J

05/2021

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REVISIONS

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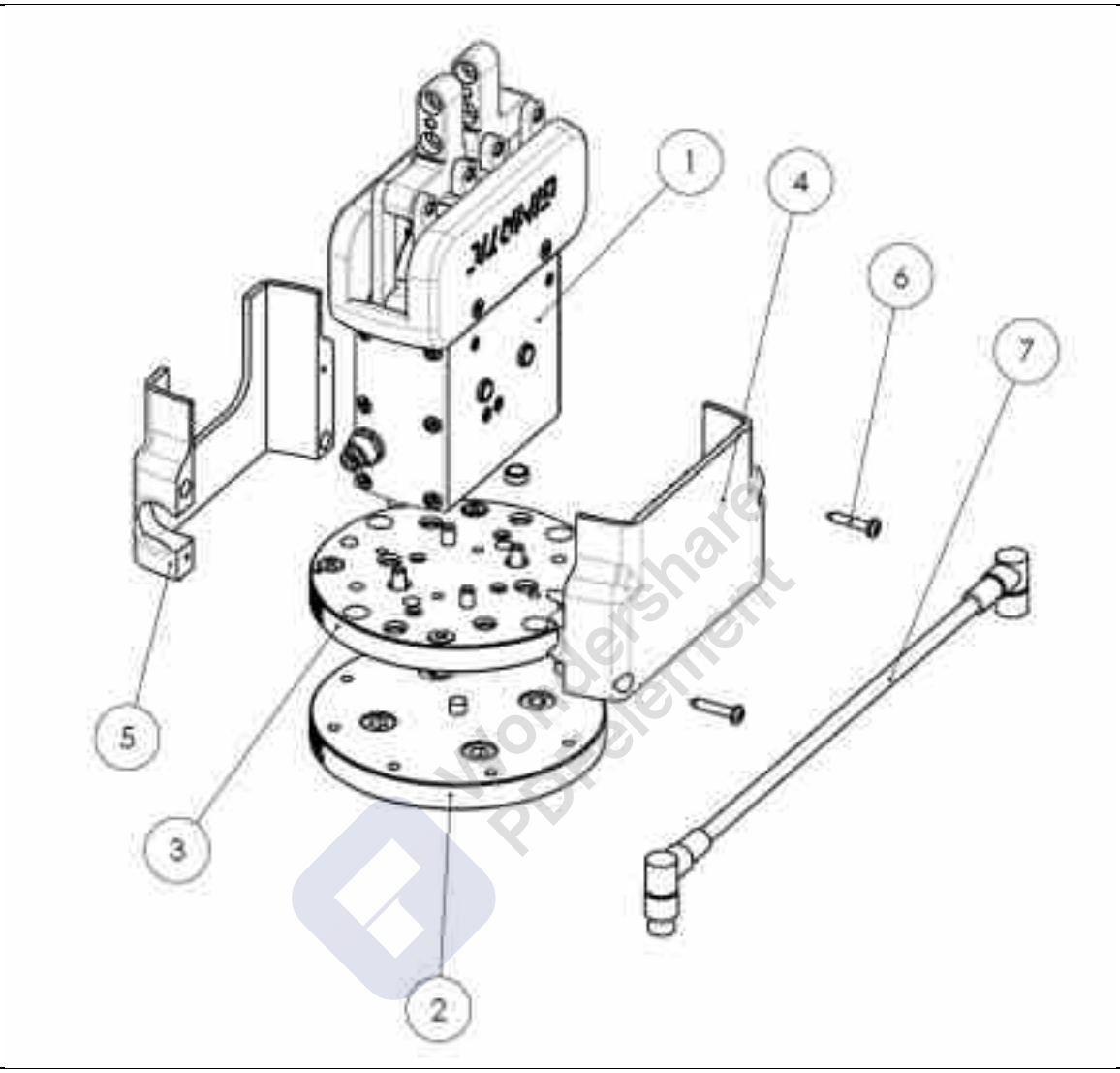
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- Gripper's main data
- Electrical connections to robot wrist
- Fixing system on the robot
- Assembly procedure
- Software
- Gripping force
- Electrical connections of the gripper
- Cautions
- CE marking reference
- Dimensional drawings

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DESCRIPTION

The KIT-TM-J is a plug & play gripping solution for TM5/TM12/TM14 collaborative robots by TechMan 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	Parallelogram Electric gripper (NPN, peak output)	1	MPRJ2553NP	A
2	Fixing kit electric gripper for robot (robot side)	1	MFI-A374-A	A
3	Fixing kit electric gripper for robot (gripper side)	1	MFI-A374-B	A
4	Frontal cover of the gripper	1	KIT-COBOT-021	A
5	Posterior cover	1	KIT-COBOT-019	A
6	Self tapping screw 2.9X16 DIN 7981 C INOX A2	2	VITE-393	-
7	Connector 8 poles male, 4 poles female, wire ϕ5	1	KIT-COBOT-022	A

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GRIPPER'S MAIN DATA



	MPRJ2553NP
Total gripping force	24 [N]
Stroke	53 [mm] (±0.2 [mm])
Maximum frequency (at an ambient temperature of 30 [°C])	1.6 [Hz]
Jaw closing time	0.15 [s]
Gripper working time	0.24 [s]
Maximum duty cycle (at an ambient temperature of 30 [°C])	76%
Power supply	24 [Vdc] ±10%
Peak current	1.2 [A]
Nominal current	0.4 [A]
Electrical connections	M8 4 poles
Open/closed input signal	NPN open collector
Operating temperature	5÷60 [°C]
Environmental degree	IP54
Mass	445 [g]

ELECTRICAL CONNECTIONS TO ROBOT WRIST

The following picture shows the electric connection schema of the connector located at the wrist of TM collaborative robots. The CAPBOX unit has been designed to be directly connected to the robot wrist.

PIN	WIRE COLOR	
1	White	+V24
2	Brown	Digital Input 0
3	Green	Digital Input 1
4	Yellow	Digital Input 2
5	Grey	Digital Output 0
6	Rose	Digital Output 1
7	Blue	Digital Output 2
8	Red	GND

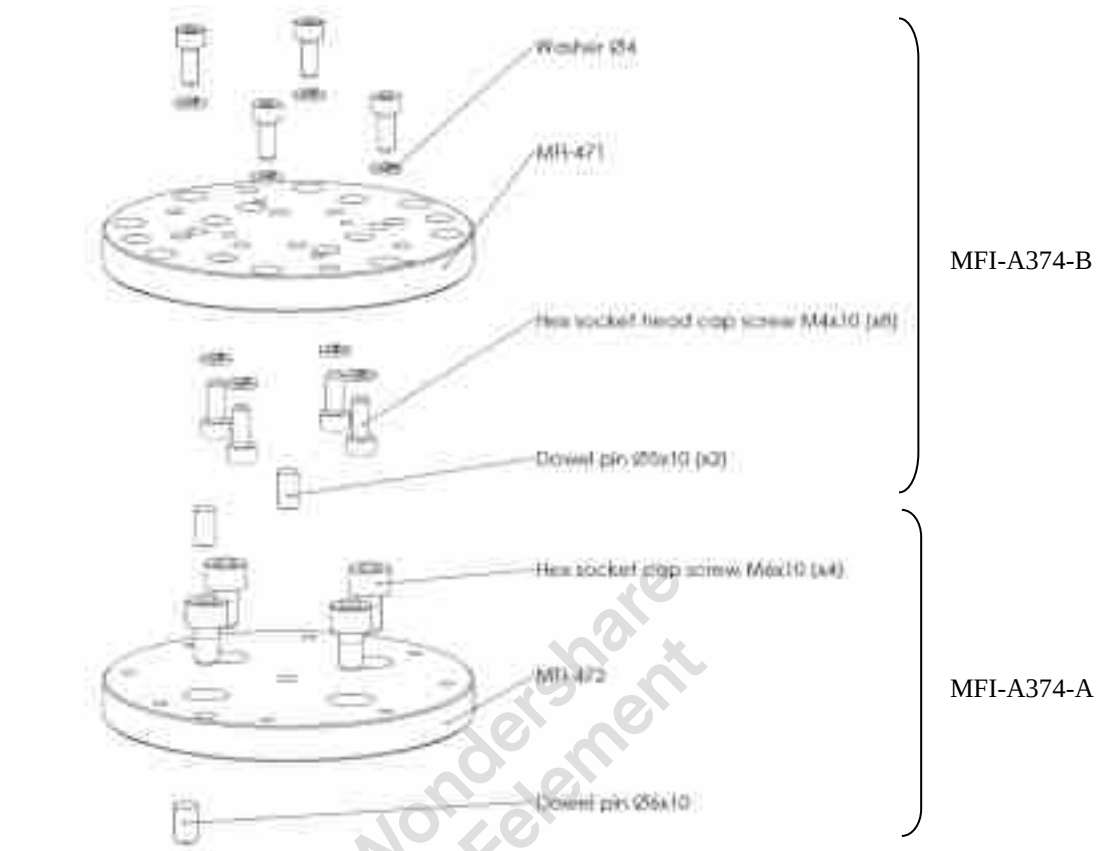


GRIPPER CONNECTION	**TM CONNECTION**
-+24Vcc - WHITE	PIN 1 - +24Vcc
GND - RED	PIN 8 – GND
NPN digital input - GREY	PIN 5 – Gripper command
Gripper's peak output - BROWN	PIN 2 – Peak input

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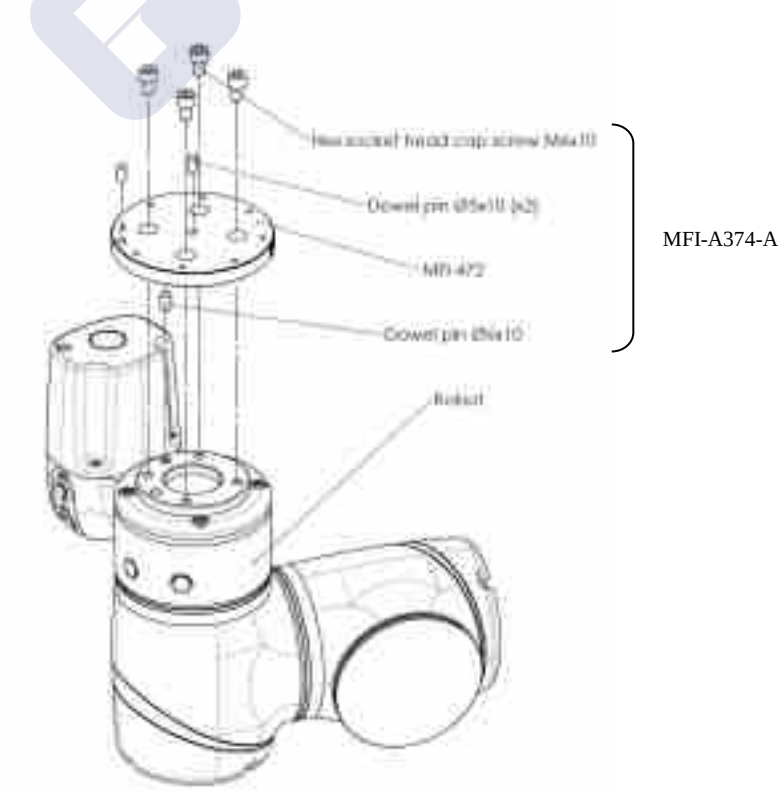
FIXING SYSTEM ON THE ROBOT

The following picture shows how MFI-A374-A and MFI-A374-B (Fixing kit electric gripper for TM robot) is composed.



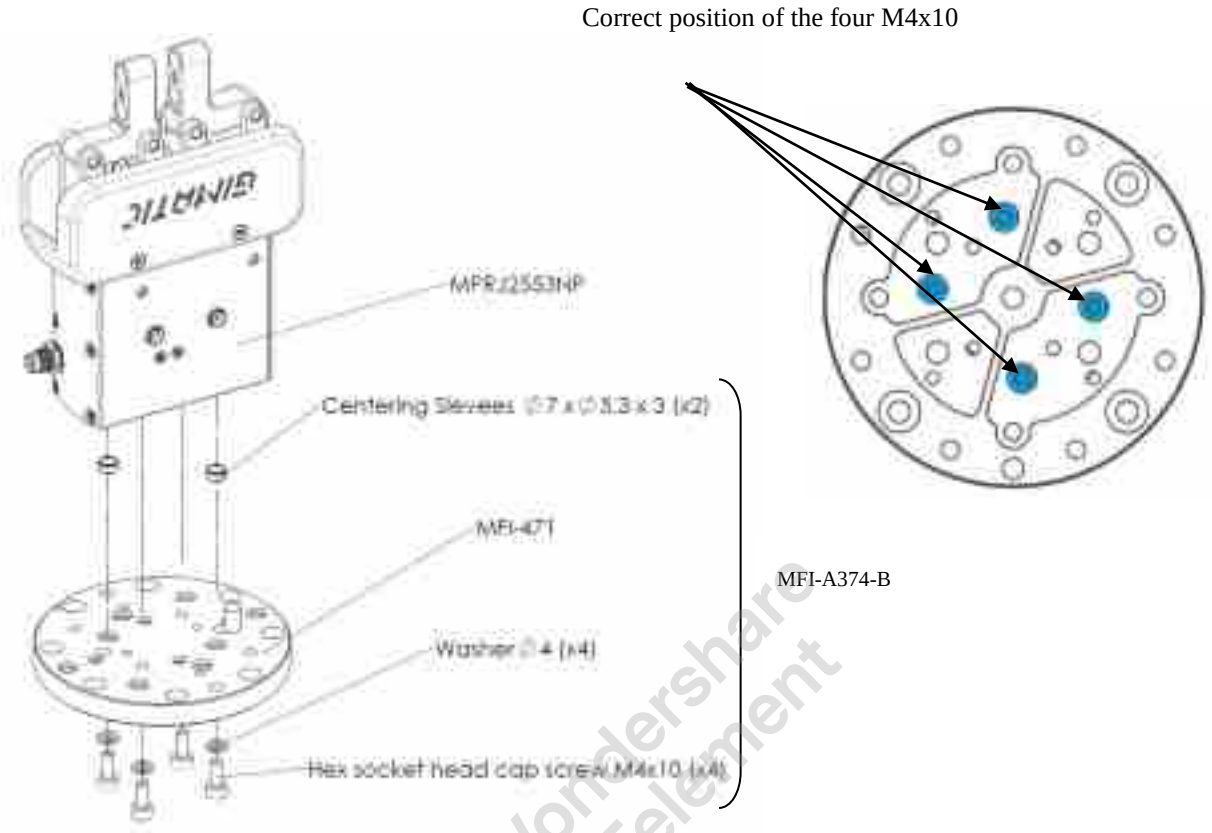
ASSEMBLY PROCEDURE

Insert four M6x8 hex socket head cap screws and three dowel pins into the mechanical flange MFI-472 and fix all to the robot flange.

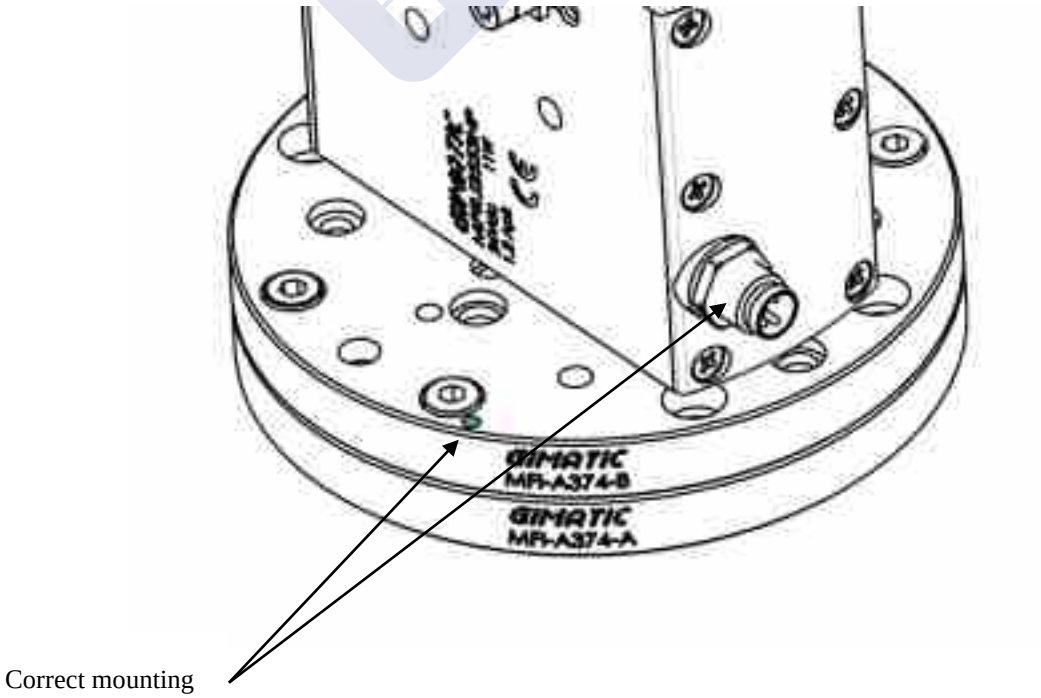


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Fix the gripper to the mechanical interface MFI-471 by using two centering sleeves, four washers and four M4x10 hex socket head cap screws.

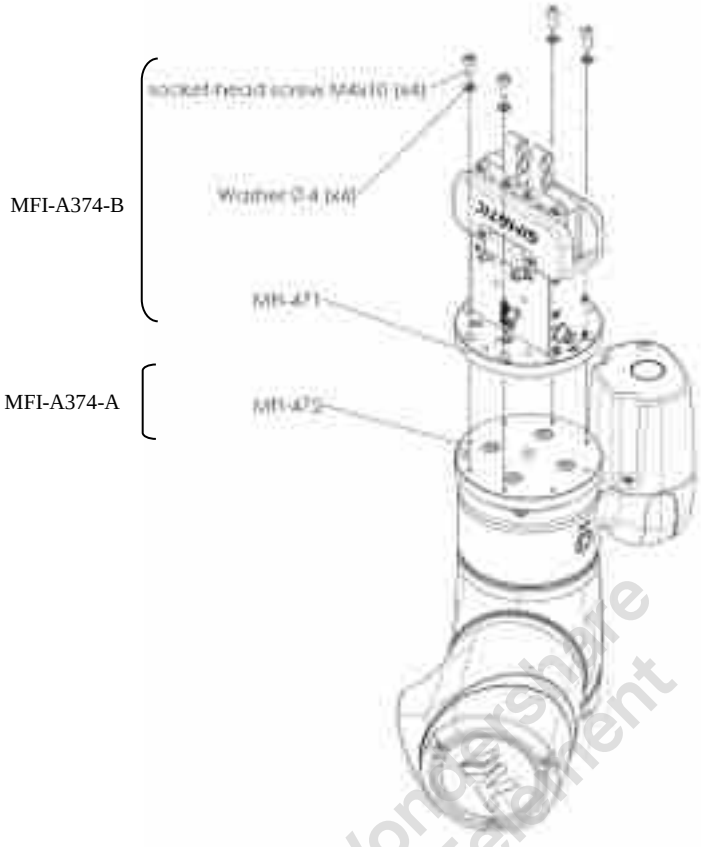


CAUTION: fix the gripper to the plate so that the connector is on the side of the plug hole highlighted in the image.

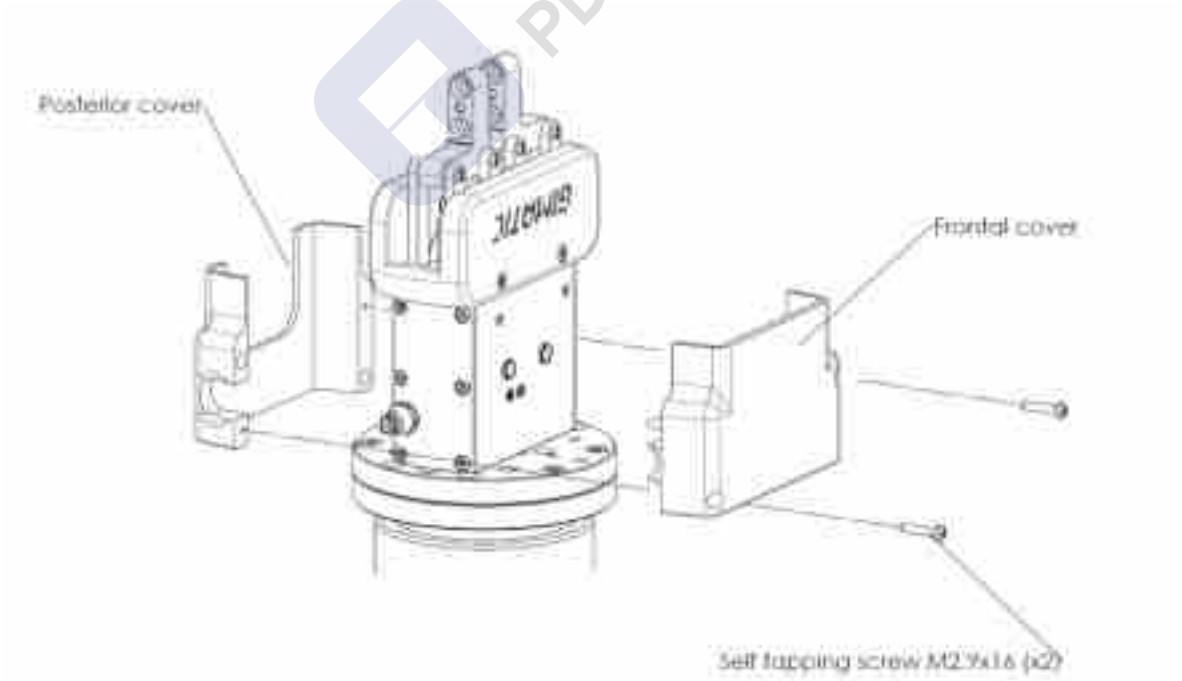


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Fix the gripper subsystem to the robot wrist using four M4x10 hex socket head cap screws and four washers as shown.

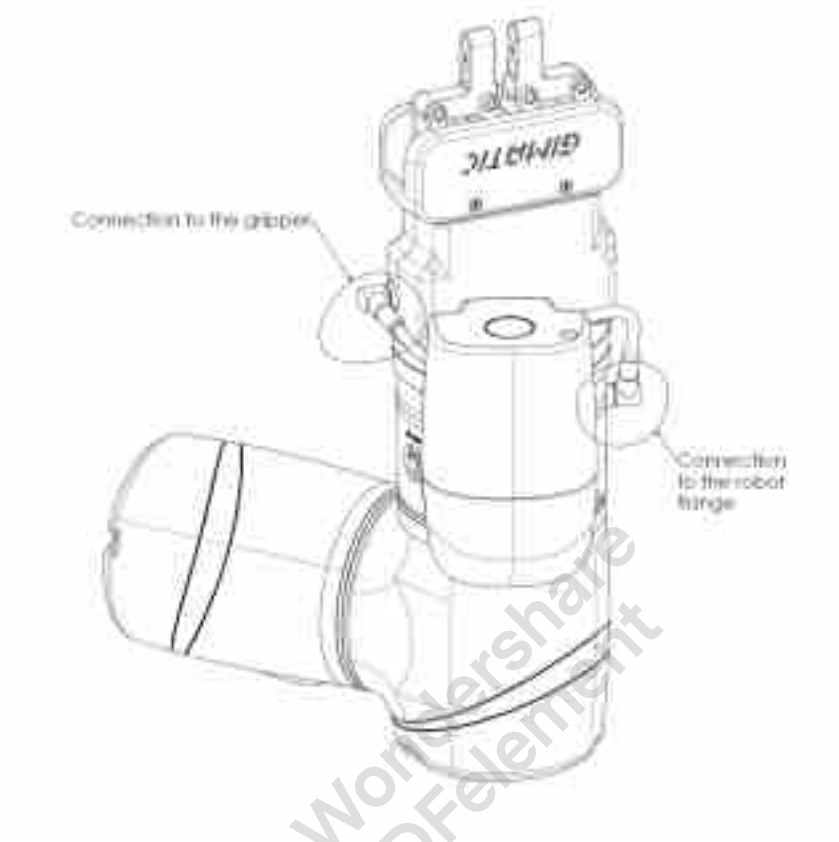


Install the covers of the gripper KIT-COBOT-019 and KIT-COBOT-021 by using two M2.9x16 self-tapping screws.



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Connect the 4 poles plug to the gripper MPRJ2553NP and connect the 8 poles plug to the robot flange (KIT-COBOT-022).



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SOFTWARE:

Gimatic provides a dedicated software package for TM robot: it allows an easy payload and type of grip (internal/external) assignment and tool central point (TPC) update.



Download and Installation:

1) Download “TM software” and “User Guide” on Gimatic official website: https://shop.gimatic.com/en/kit-co-robot



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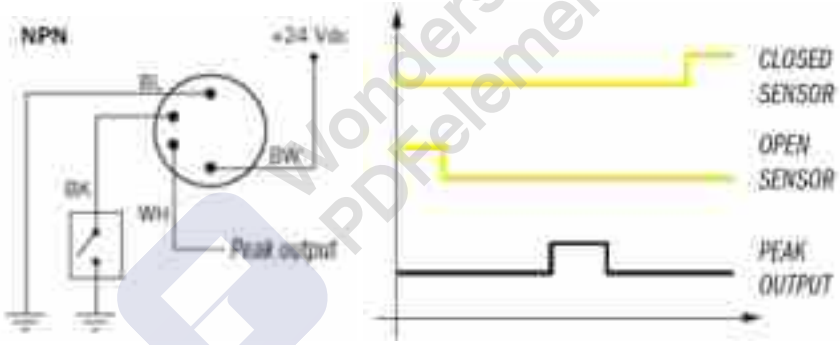
GRIPPING FORCE

Depending on the design of custom jaws, the electric gripper can be used for either external or internal gripping applications. The part will be gripped in any position within the jaw stroke. After the part is gripped, the spring force will hold the part (Motor OFF and ZERO consumption). Even in case of power black-out. Furthermore, the gripper mechanism is irreversible, even without power supply. Do not attempt to open or close the gripper manually.



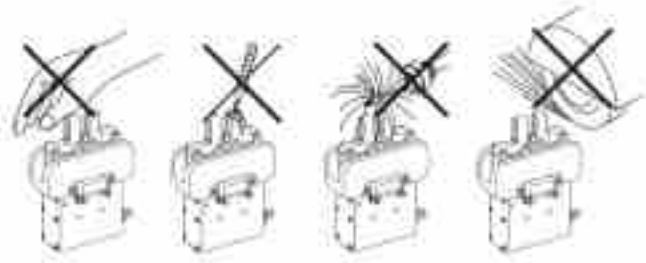
ELECTRICAL CONNECTIONS OF THE GRIPPER

The MPRJ2553NP comes with a M8 4 poles connector. Beside the power supply and the input command signal pins, the last pin is associated to a digital output channel which is automatically enabled by the device when the jaws exert the gripping force. This will work like an integrated proximity sensor which can operate independently of the initial position of the jaws, and therefore with no adjustment.



CAUTIONS

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

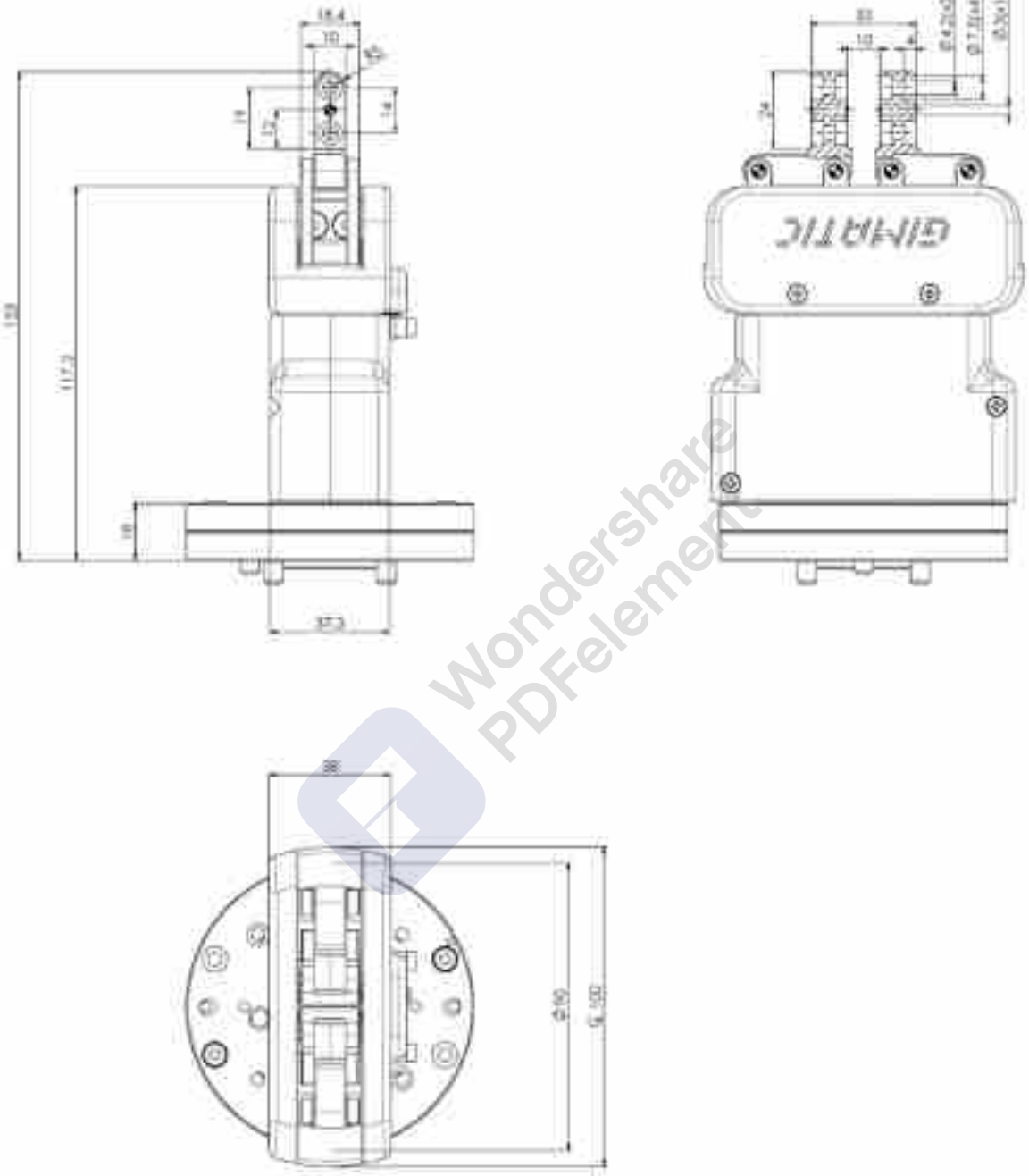


CE MARKING REFERENCE

The system is in conformance with:
Directive 2004/108/CE, EN 62233 (2008-04), EN 61000-6-2+EC+IS1 (2005-08;2005-09;2005-11), EN 61000-6-3+A1 (2007-01;2011-03), EN 61000-6-4 (2007-01), EN 55016-2-1+A1 (2004-10;2005-08), EN 55016-2-3 (2006-12), EN 61000-4-2 (2009-03), EN 61000-4-3+A1+IS1+A2 (2006-05;2008-02;2009-02;2010-07), EN 61000-4-4+A1 (2004-12;2010-03), EN 61000-4-5 (2006-11), EN 61000-4-6+A1+IS1 (1996-07;2001-12;2004-07), EN 61000-4-6 (2009-03), CEI EN 60529 (1997-06).

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DIMENSIONAL DRAWINGS



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MOUNTING INSTRUCTIONS AND OPERATING MANUAL



KIT-TM-QC75

11/2021

Wondershare PDFelement

REVISIONS

DATE	REVISION	MAIN CHANGES
2020/06/01	Edition A	First release

DOCUMENT LAYOUT

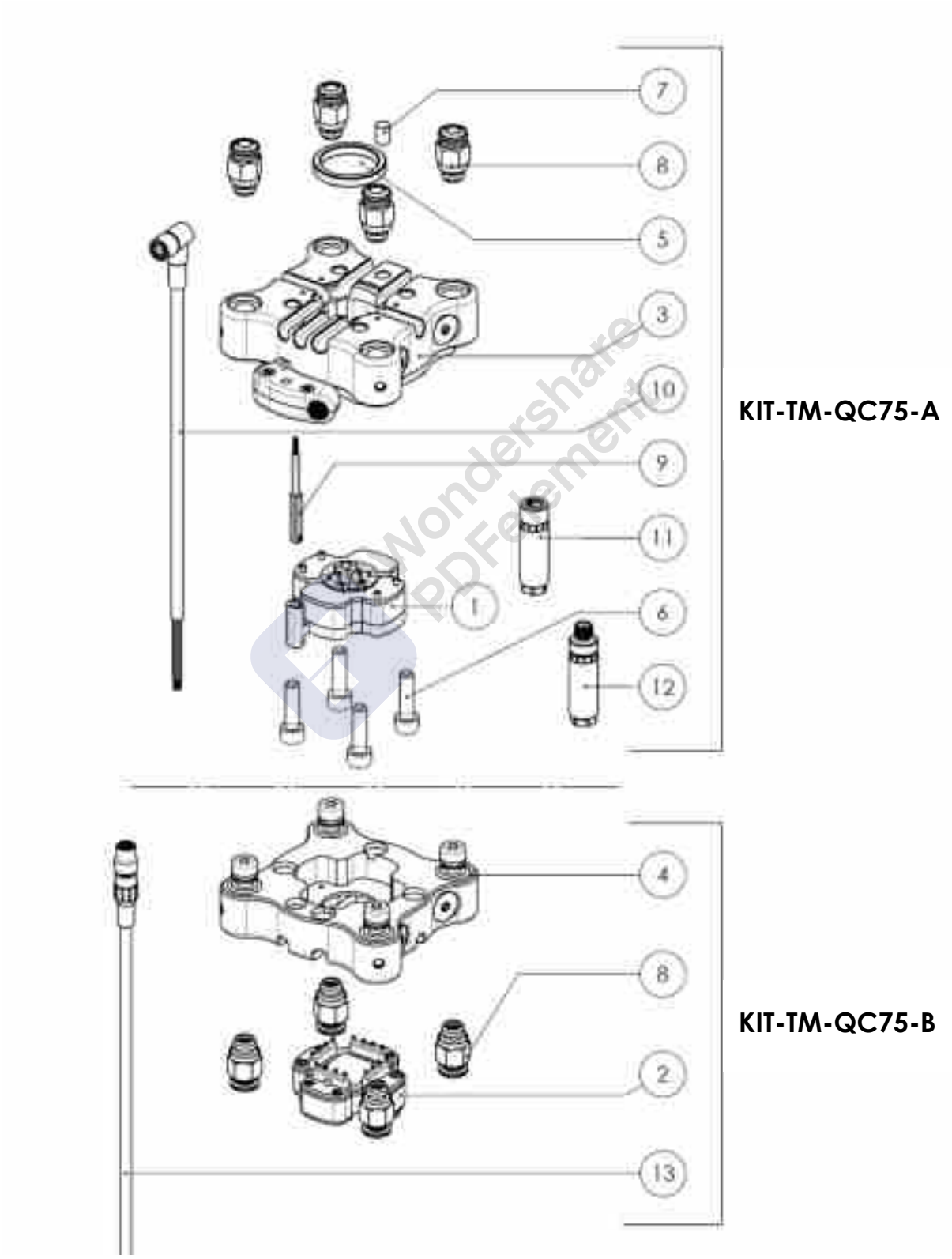
- Description
- Exploded view drawing of the final assembly
- Itemized list of assembly's components
- System's main data
- Electrical connection to robot tool flange
- Electric connection module's data
- Assembly procedure
- Cautions
- Ordinary maintenance
- CE marking reference
- Software
- Overall dimensions

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DESCRIPTION

The KIT-TM-QC75 is a “Quick Changer” that allows an easy replacement of the EOAT (End Of the Arm Tool) on the robot. It is specifically designed for TM5/TM12/TM14 collaborative robots by TechMan Robot and it is complete compatible with KIT-TM-J and KIT-TM-V kits. These kits 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



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ITEMIZED LIST OF ASSEMBLY'S COMPONENTS

KIT-TM-QC75-A

Position	Description	Q.ty	Code	Edition
1	Electric connection module (side A)	1	CMAQC	C
3	Collaborative quick changer, -1/6 bar, robot side	1	QC75-A	C
5	Centering sleeve for QC75 ISO 9409	1	KIT-COBOT-005	A
6	Hex socket cap screw M5x22	4	TCEI M6x22 DIN912 INOXA2	-
7	Dowel pin ø6X10	1	SPINA-049	-
8	Straight male adaptor ø6 G1/8	4	RG.5002000N03-01	-
9	Magnetic sensor for slot "C", SS series, digital output NPN, cable PVC plate 3x0.14mm², 2.5m	1	SS4M225-G	-
10	M8 8 pin male 90° connector	1	CMGM890803PR-01	-
11	Field-wireable M8 8 pin female straight connector	1	CFGM800300	-
12	Field-wireable M8 8 pin male straight connector	1	CMGM800300	-

KIT-TM-QC75-B

Position	Description	Q.ty	Code	Edition
2	Electric connection module (side B)	1	CMBQC	C
4	Collaborative quick changer, -1/6 bar, lato EOAT	1	QC75-B	B
8	Straight male adaptor ϕ6 G1/8	4	RG.5002000N03-01	-
13	M8 8 pin female straight connector	1	CFGM800803P-02	-

SYSTEM'S MAIN DATA



Safety loads	Maximum axial holding force (coupled)	1000 [N]
	Maximum bending holding torque	50 [Nm]
	Maximum torsional holding torque	100 [Nm]
Maximum recommended payload		10 [kg]
Temperature range		-10 ÷ +60 [°C]
Mass quick changer		318+227 [g]
Number of pneumatic connections		12
Working pressure range		-1 ÷ 6 [bar]
Electric connection (robot flange side)		Standard M8, 8 poles, female connector
Electric connection (tool side)		Standard M8, 8 poles, male connector

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ELECTRICAL CONNECTION TO ROBOT TOOL FLANGE

Connect the QC75-A M8 male connector with the M8 female connector of the robot tool flange.



The following picture shows the electric connection schema of the connector located at the wrist of TM collaborative robots and at the output of KIT-TM-QC75.

TM ROBOT OUTPUT		CMGM890803PR-01 OUTPUT
WHITE WIRE – PIN 1	+V24	WHITE WIRE – PIN 1
BROWN WIRE – PIN 2	Digital Input 0	BROWN WIRE – PIN 2
YELLOW WIRE – PIN 3	Digital Input 1	GREEN WIRE – PIN 3
GREEN WIRE – PIN 4	Digital Input 2	YELLOW WIRE – PIN 4
GREY WIRE – PIN 5	Digital Output 0	GREY WIRE – PIN 5
PINK WIRE – PIN 6	Digital Output 1	PINK WIRE – PIN 6
BLUE WIRE – PIN 7	Digital Output 2	BLUE WIRE – PIN 7
RED WIRE – PIN 8	GND	RED WIRE – PIN 8



ELECTRIC CONNECTION MODULE'S DATA

Inside the CM_QC boxes there is a circuit with 16 reconfigurable electric lines with screw terminals (as shown in the image below).



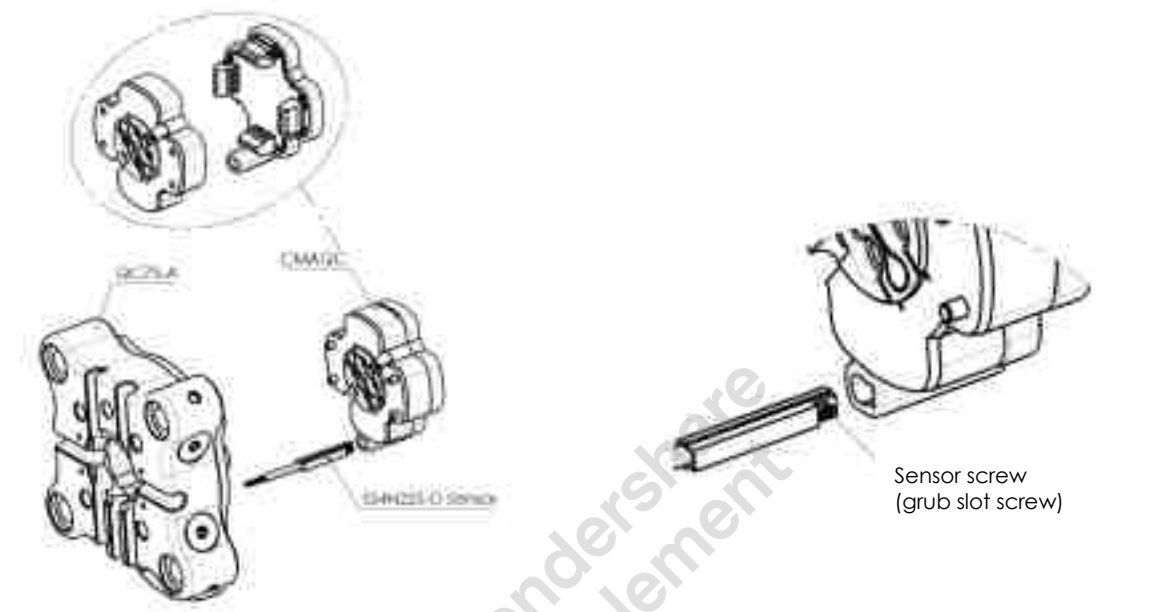
User connections number	16
Maximum current per contact	1 [A]
Nominal voltage	24 ± 10% [Vdc]
Cable diameter suitable for cable entry	≤ Ø5 [mm]
Conductor cross section (min/max)	0.14 [mm^2] / 0.5 [mm^2]
Contacts	Spring contact pin
Temperature range	5 ÷ 60°

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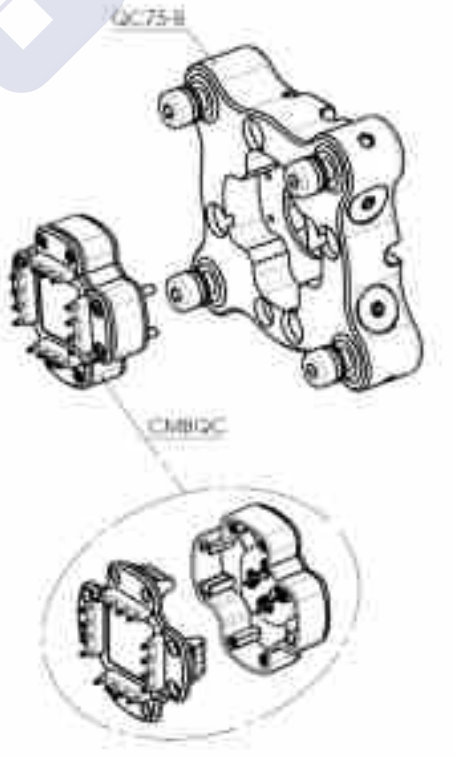
ASSEMBLY PROCEDURE

1. Electric connection module side A (optional):
   a. Open the box CMAQC and using a multicore cable (CMGM890803PR-01) wire the circuit board to the M8 connector at the robot wrist or to the robot controller according to the specific application requirements.
      Note: connectors have a progressive number written on the circuit.
   b. Insert the sensor SS4N225-G into the cavity of the CMAQC box up to the mechanical stop. Screw the small sensor screw to lock it and prevent it from moving.
   c. Fix to the CMAQC box to the body of the QC75-A with the 4 countersunk head screws.

NOTE: the CMAQC is necessary to properly install the magnetic sensor.

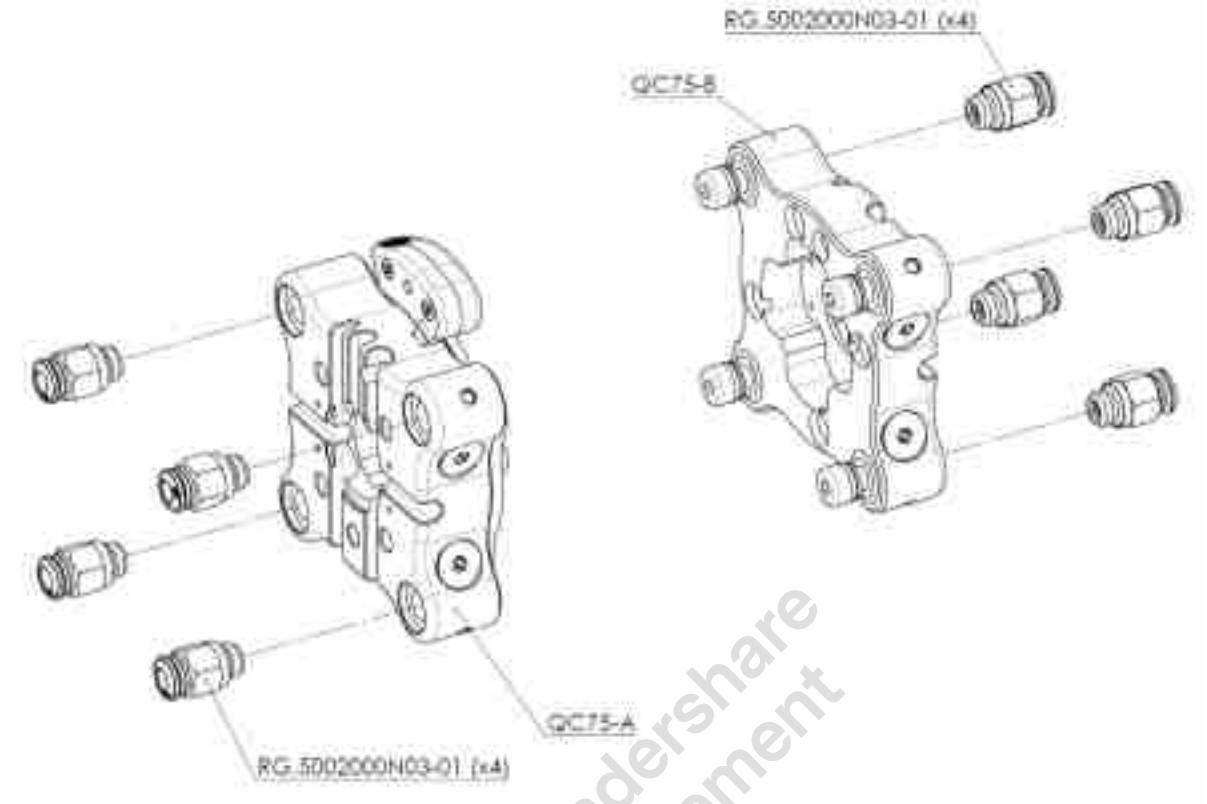


2. Electric connection module side B (optional):
   a. Open the box CMBQC and using a multicore cable (CFGM800803P-02) wire the circuit board to the tool according the specific application requirements.
      Note: connectors have a progressive number written on the circuit.
   b. Fix to the CMBQC box to the body of the QC75-B with the 4 countersunk head screws with cross notch.

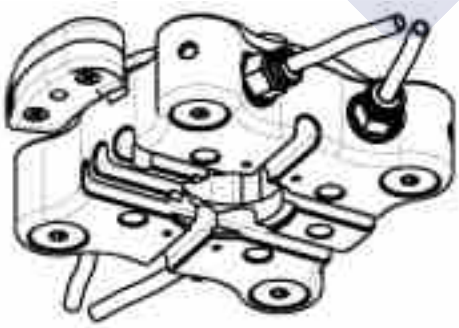


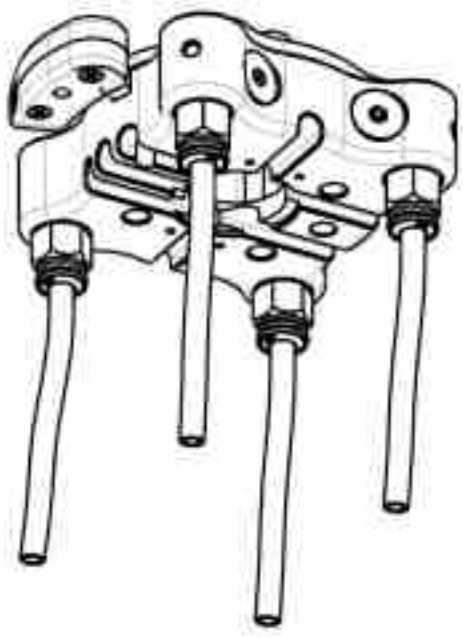
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3. Pneumatic fittings (optional): Screw the pneumatic fittings (RG500200N03-01) (x4 + x4) to the Quick Changer parts (QC75-A, QC75-B) like in figure below.



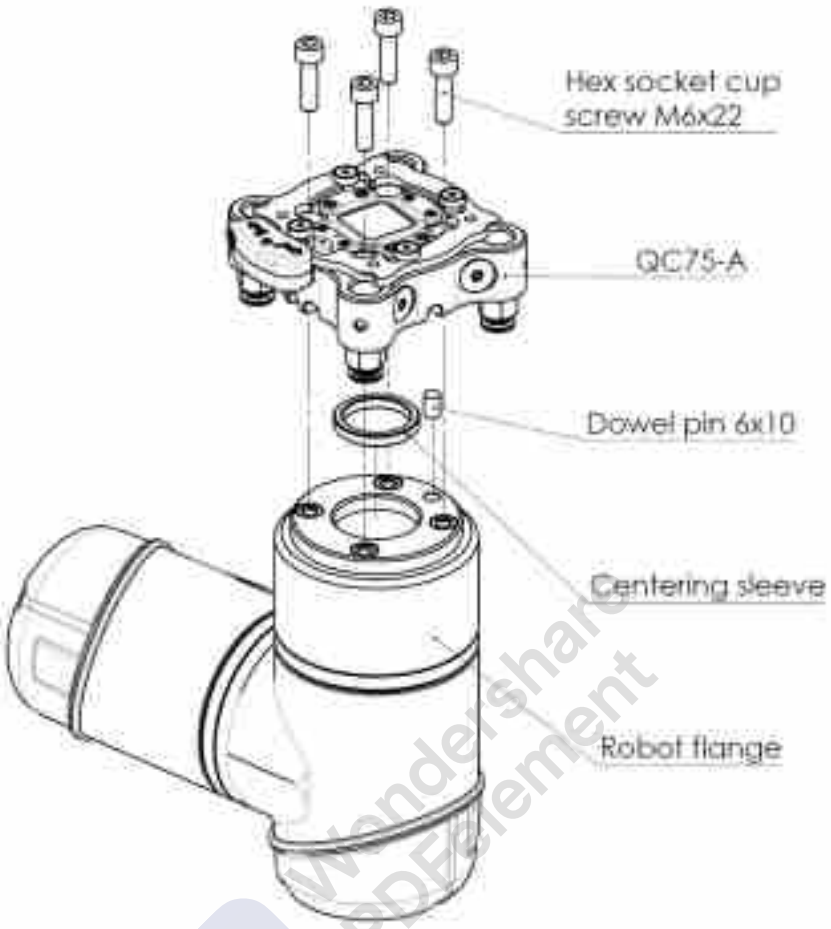
NOTE: The fittings can be fixed in several configurations by simply moving the threaded cap with the hexagon recessed as in the figure below.



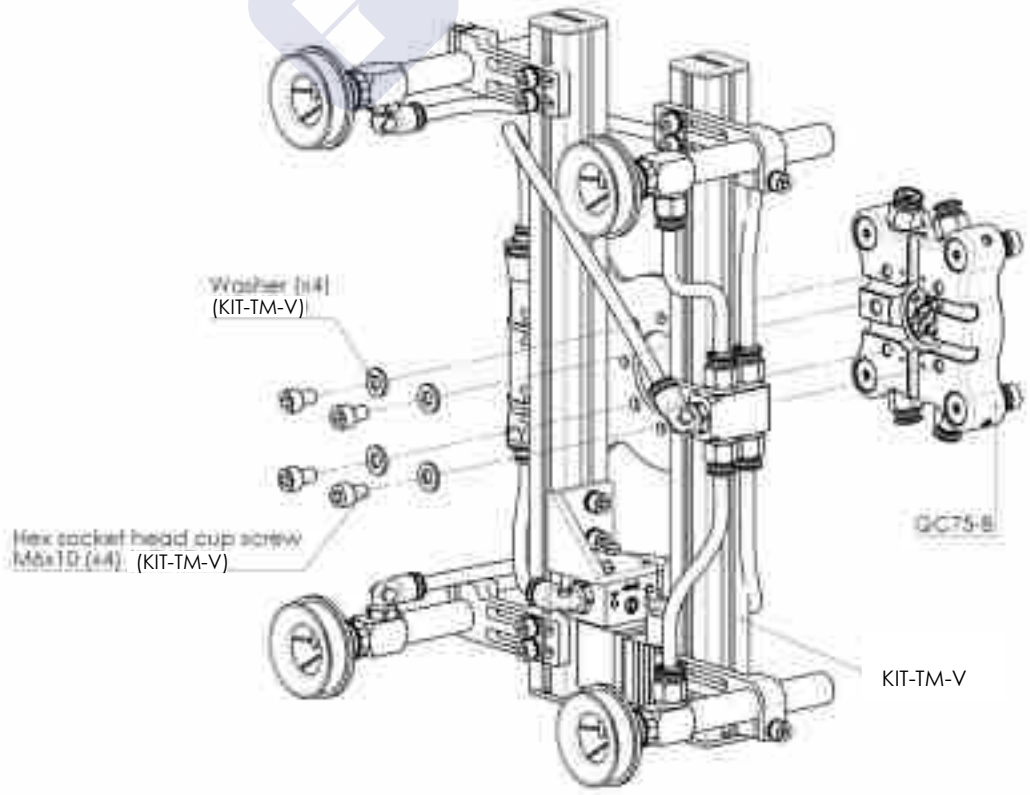


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4. Install the collaborative quick changer robot side (QC75-A) on the robot flange using the dowel pin 6x10 (SPINA-049), the centering sleeve (KIT-COBOT-005) and four hex socket cup screws M6x22 (VITE-135).



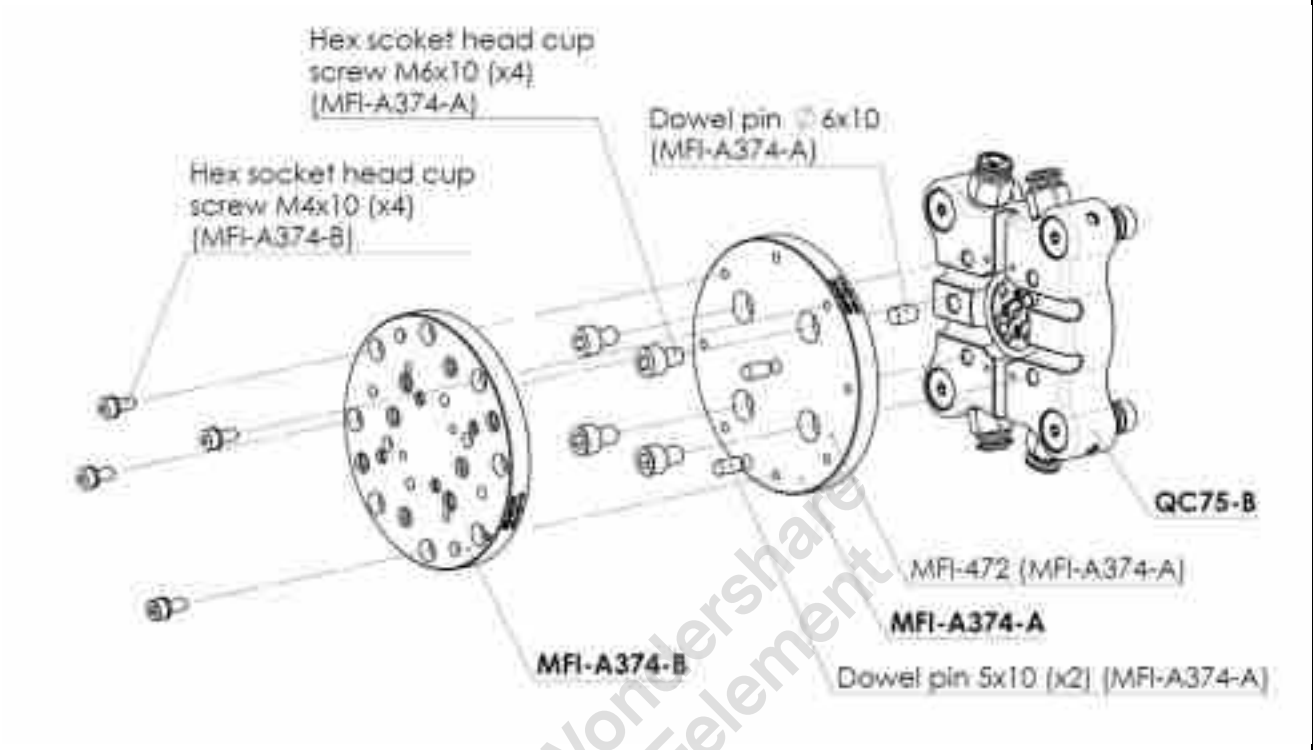
5a. ONLY FOR KIT-TM-V: Fix the KIT-TM-V to the sub-base QC75-B using four hex socket head cup screws M6x10 and four washer (KIT-TM-V included).



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5b. ONLY FOR KIT-TM-J: the collaborative tool changer tool side (QC75-B) has the same ISO interface as the TM robot and therefore follow the fixing instructions as if the tool side (QC75-B) were the robot flange.

5c. GENERIC GIMATIC ELECTRIC GRIPPER (no collaborative solution): The KIT-TM-QC75-B is compatible with all Gimatic electric grippers thanks to the MFI-A374-A and MFI-A374-B interface.

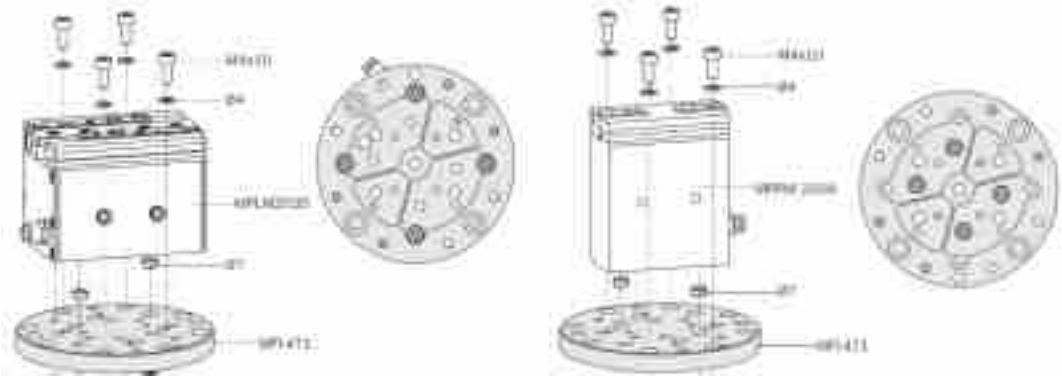


Compatible with MPPM, MPBM, MPBS, MPRM, MPXM, MRE, MPRJ families.

Size 16

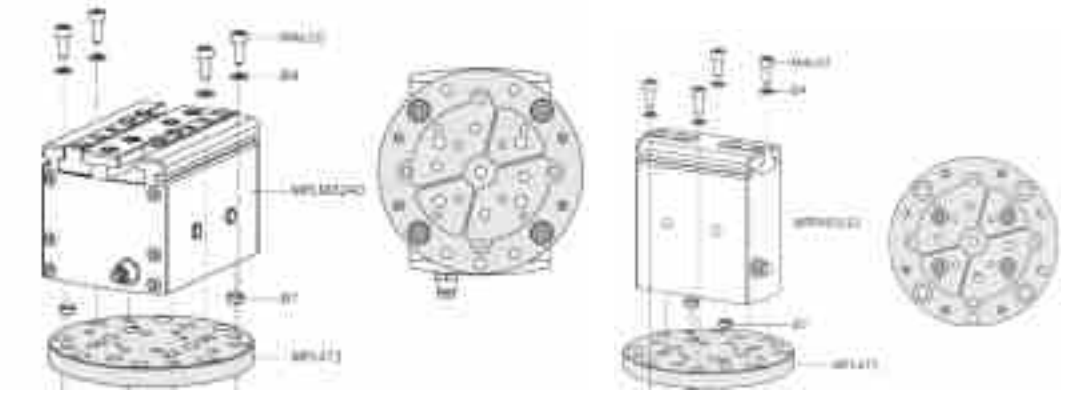


Size 25



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Size 32



6. Joint the QC75-A and QC75-B and close the mechanism by turning the lever as shown.



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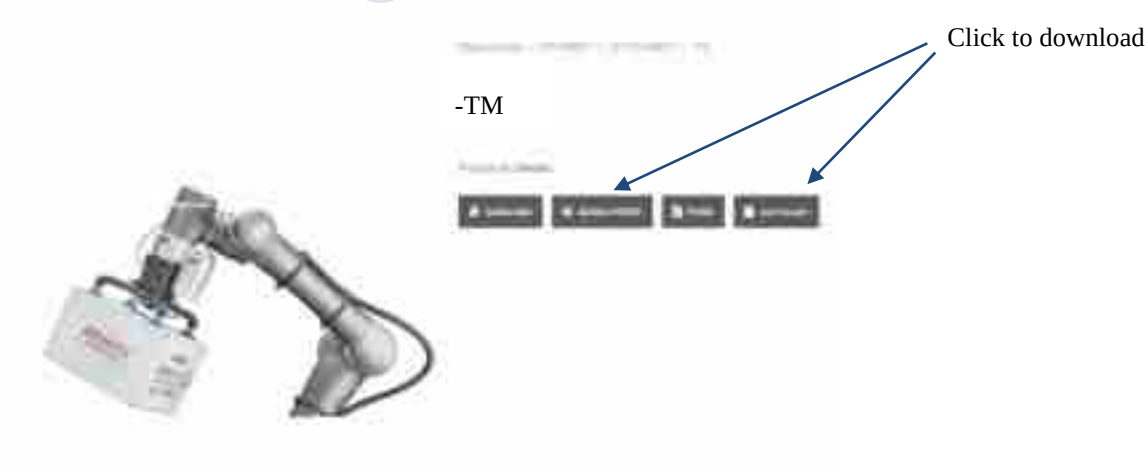
SOFTWARE:

Gimatic provides a dedicated software package for TM robot: it allows an easy payload assignment and tool central point (TPC) update.



Download and Installation:

1) Download “TM software” and “User Guide” on Gimatic official website: https://shop.gimatic.com/en/kit-co-robot



2) Copy the compressed folder to an USB pen drive labeled with “TMROBOT” and insert it in the appropriate port on the robot controller.
3) Follow “**KIT-TM-QC75 User Manual**” instruction to install and configure the Software.

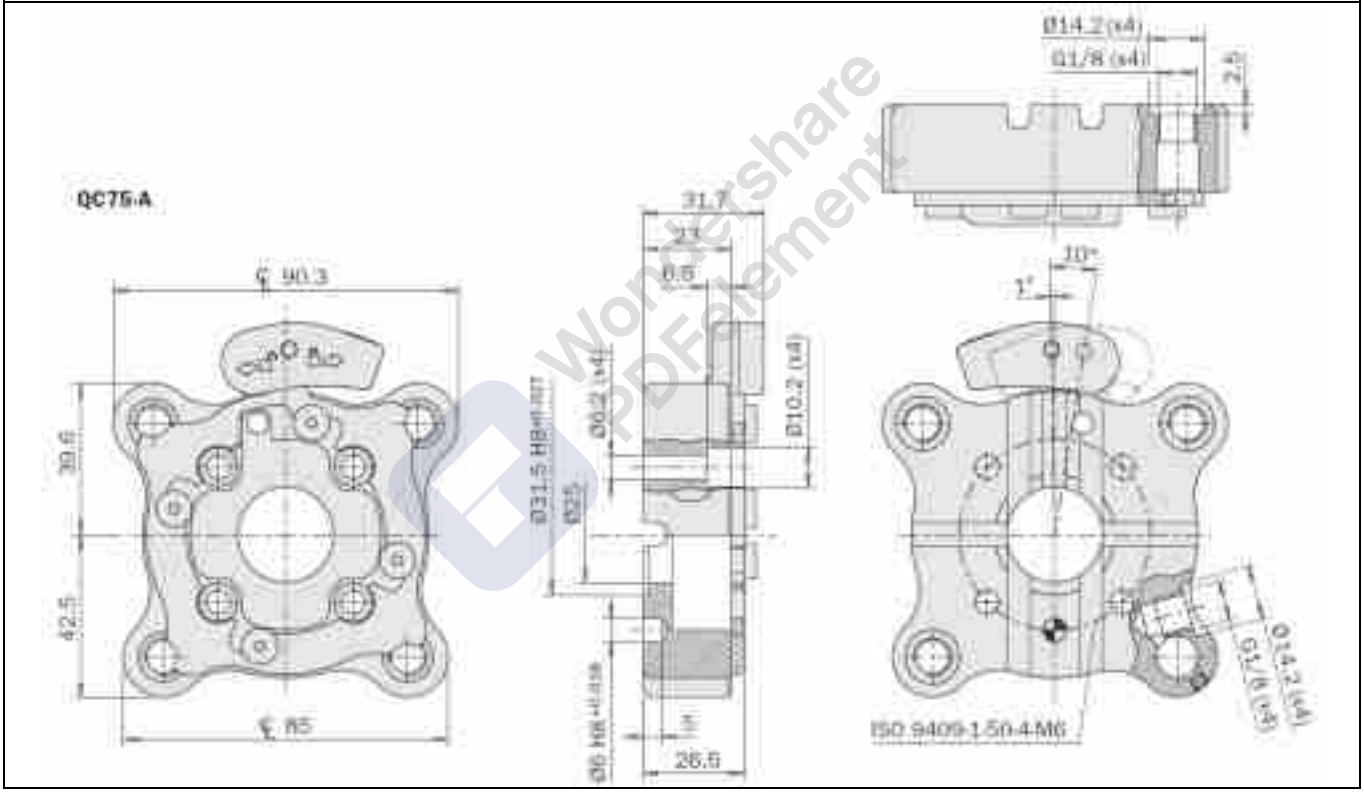
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CAUTIONS
Never let the unit come into contact with corrosive substances, soldering splashes or abrasive powders as they may damage the quick changer. Never let personnel or objects stand within the operating range of the system. Never operate the system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

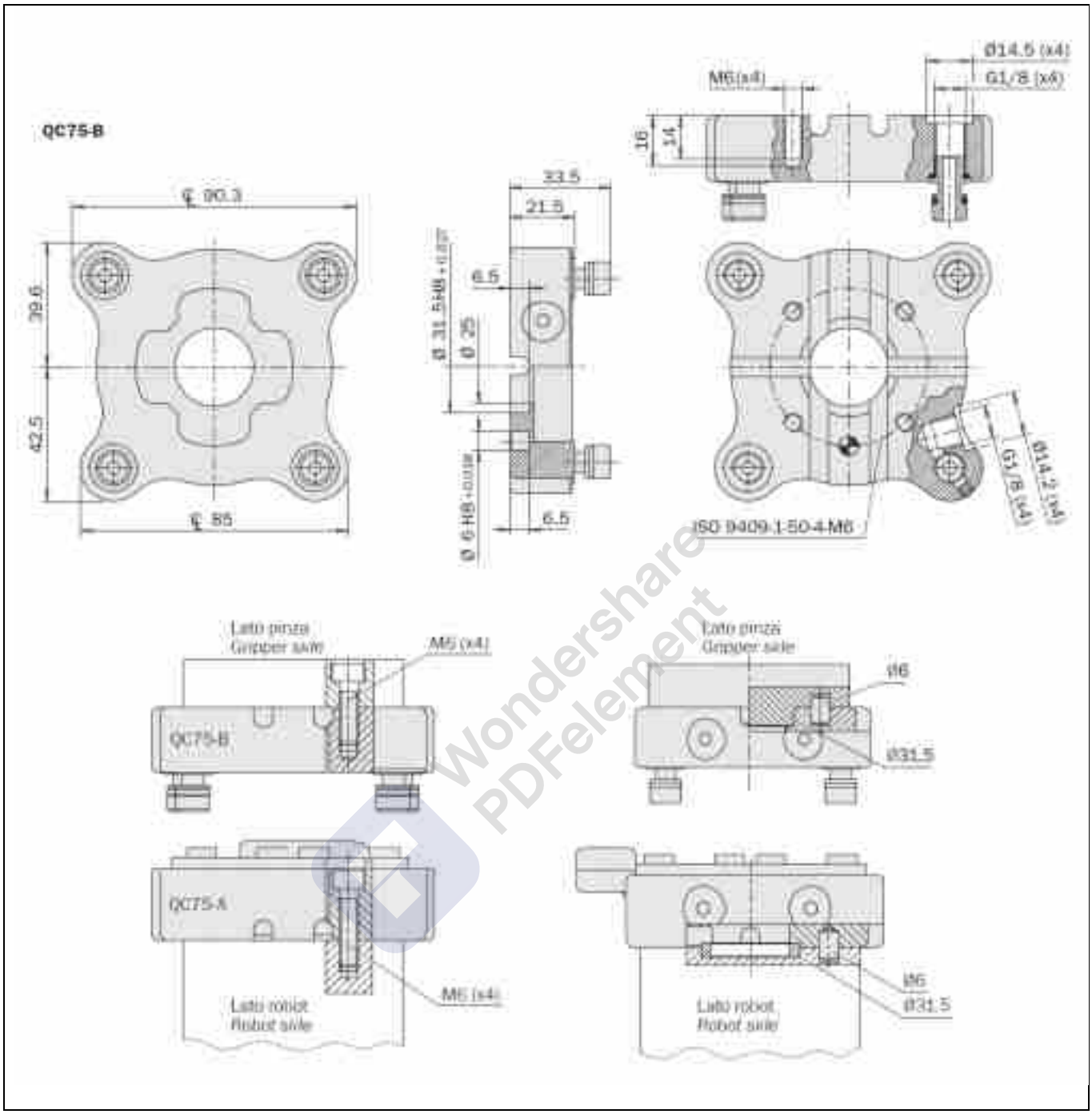
ORDINARY MAINTENANCE
The gripping hand is subject to vibrations, is recommended a periodic verification of screws, fixings and components of the gripping hand. For correct operation of the device, we recommend periodic cleaning the Quick Changer.

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



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MOUNTING INSTRUCTIONS AND OPERATING MANUAL



KIT-TM-V

01/2022

REVISIONS

DATE	REVISION	MAIN CHANGES
2020/07/01	Edition A	First release

DOCUMENT LAYOUT

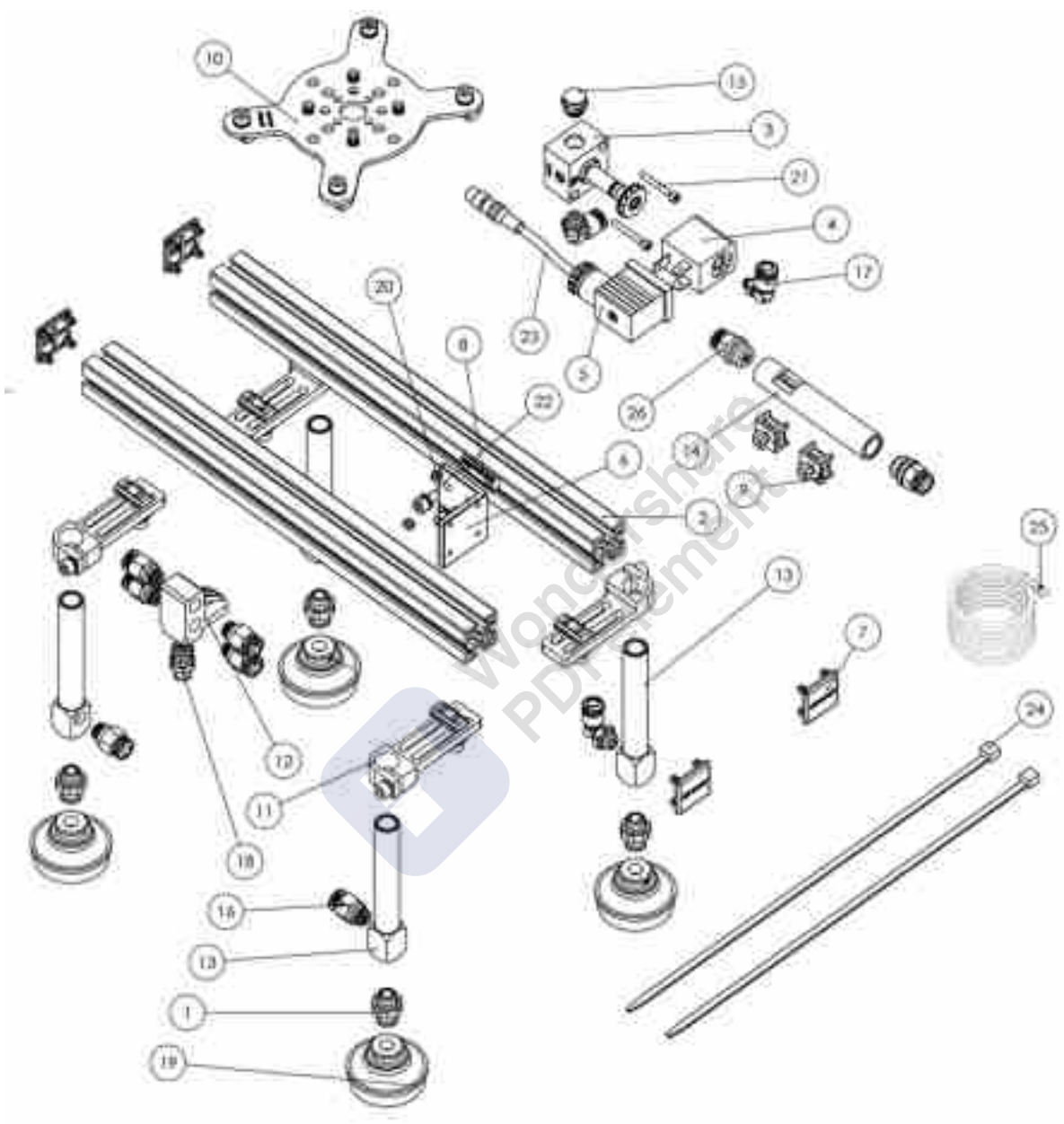
- Description
- Exploded view drawing of the final assembly
- Itemized list of assembly's components
- System's main data
- Solenoid valve's details
- Electrical connection to robot tool flange
- Assembly procedure
- Configuration options
- Mechanical connection to robot tool flange
- Software
- Cautions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

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DESCRIPTION

The KIT-TM-V is an End Of the Arm Tool (EOAT) for pick & place which exploits the vacuum technique and it is specifically designed for TM5/TM12/TM14 collaborative robots by TechMan 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



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ITEMIZED LIST OF ASSEMBLY'S COMPONENTS

Position	Description	Q.ty	Code	Edition
1	Nipple for vacuum cups male	4	AV0118M16	A
2	Extruded 25x25 L=300	0.6m	EMB-2525	C
3	Electropilot with manual control 3/2 NO G1/8	1	KIT-COBOT-001	-
4	Solenoid 22 mm	1	KIT-COBOT-002	-
5	Connector 22 mm LED + CDR 0 -24V	1	KIT-COBOT-003	-
6	Mounting bracket 90° Electropilot	1	KIT-COBOT-004	A
7	Plug for profile	4	MFI-034	A
8	Nut M5 L=25 (5-17)	1	MFI-148	A
9	Half-bracket for mounting hose	4	MFI-235	A
10	Mounting bracket robot rectangular	1	MFI-A498	A
11	Kit angular connection ϕ14 (L=40)	4	MFI-A05	D
12	Kit side manifold block (single channel) G1/8	1	MFI-A68	C
13	Kit leg for vacuum cup 1/8 – 1/8 ϕ14x80	4	MFI-A72	B
14	EJ-LINE-MEDIUM-HF-2 vacuum pump G1/4	1	3330088	A
15	Silencer G1/8	1	RG.07020000002-01	-
16	Straight male adaptor ϕ6 G1/8	6	RG.5002000N03-01	-
17	Swivelling elbow male adaptor ϕ6 M5	1	RG.5511600011-01	-
18	Swivelling elbow male adaptor ϕ6 G1/8	4	RG.5511600013-01	-
19	Vacuum cup ϕ42	4	2321632	A
20	Nut M3 DIN 985 Z/B	2	VITE-228	-
21	TCEI M3x25 DIN 912 Inox A2	2	VITE-251	-
22	TCEI M5x10 C/ROND DENT De/ZnNi 7 IV	2	VITE-496	-
23	Connector 8 poles wire ϕ5 male	1	KIT-COBOT-009	-
24	Cable tie 4.8x300	2	LV25050-50	-
25	Polyurethane hose 98 shore blue	8m	TUBO6x4BL	-
26	Straight male adaptor ϕ6 G1/4	2	RG.5002000N04-01	-

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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]
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



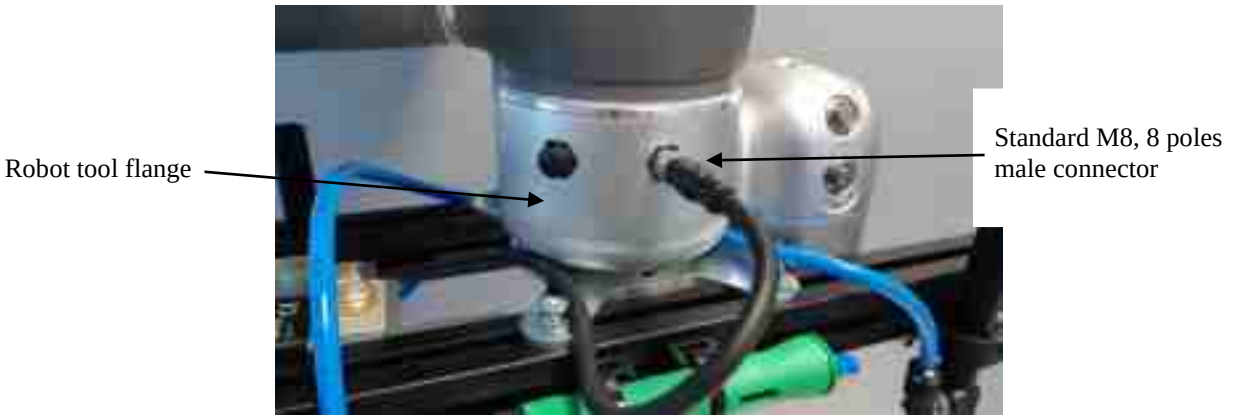
Threaded	G 1/8 (bore 2-3) - M5 (bore 1)
6 [bar] flow rate with Δp 1 [bar]	30 [Nl/min]
Optimal operating pressure	6 [bar]
Solenoid voltage	24 [V] DC
Power consumption	2 [W]
External electrical connection	Standard M8, 8 poles, male connectior
Ways	3/2
Function	Normally Open
Reactivation	Monostable spring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

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

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ELECTRICAL CONNECTION TO ROBOT TOOL FLANGE

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



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

PIN	WIRE COLOR	
1	White	+V24
2	Brown	Digital Input 0
3	Green	Digital Input 1
4	Yellow	Digital Input 2
5	Grey	Digital Output 0
6	Rose	Digital Output 1
7	Blue	Digital Output 2
8	Red	GND

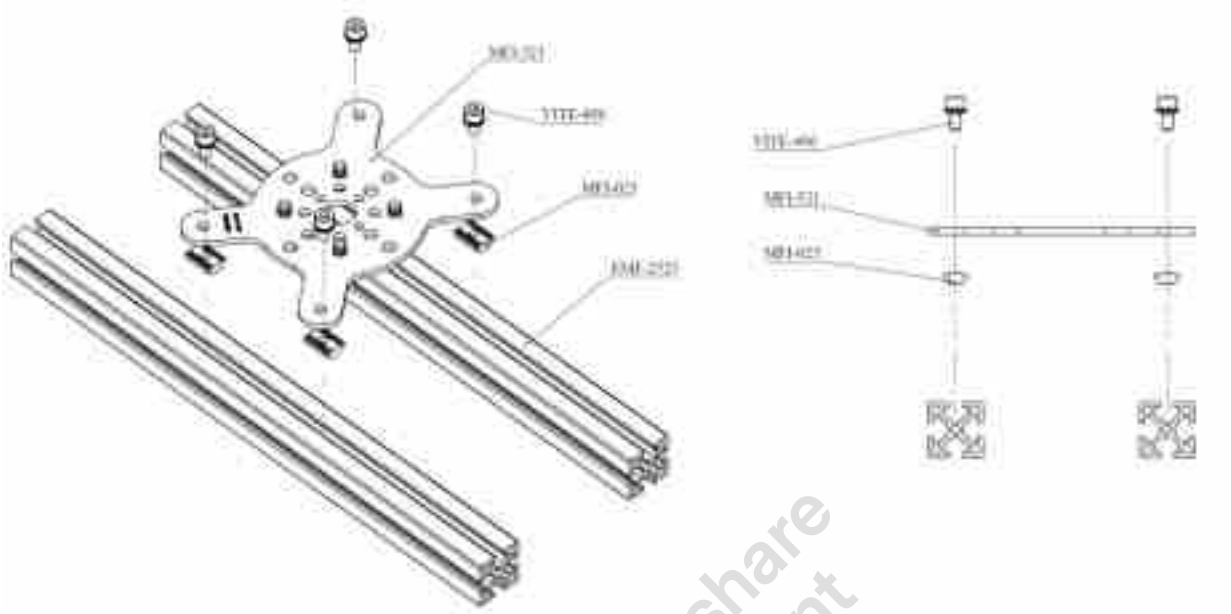


SOLENOID VALVE CONNECTION	TM CONNECTION
+24Vcc – WHITE	PIN 1 - +24Vcc
GND - GREY	PIN 5 - Tool command (NPN)

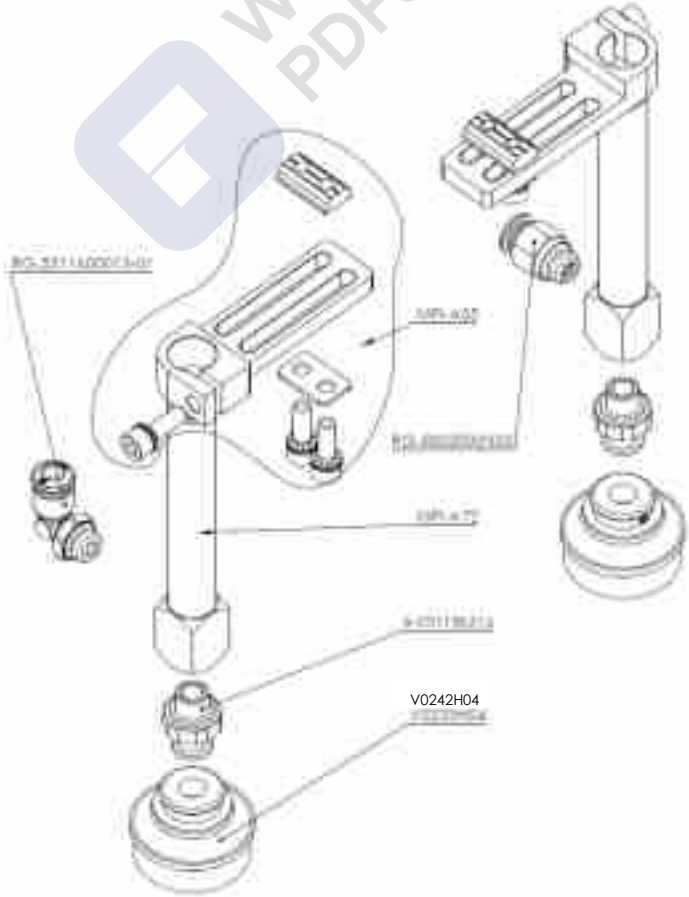
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Wondershare PDFelement

ASSEMBLY PROCEDURE

1. Fix the MFI-A498 to the two square beams EMF-2525 with the four TCEI M5x10 SCREWS and relative square nuts (included in MFI-A498 kit).

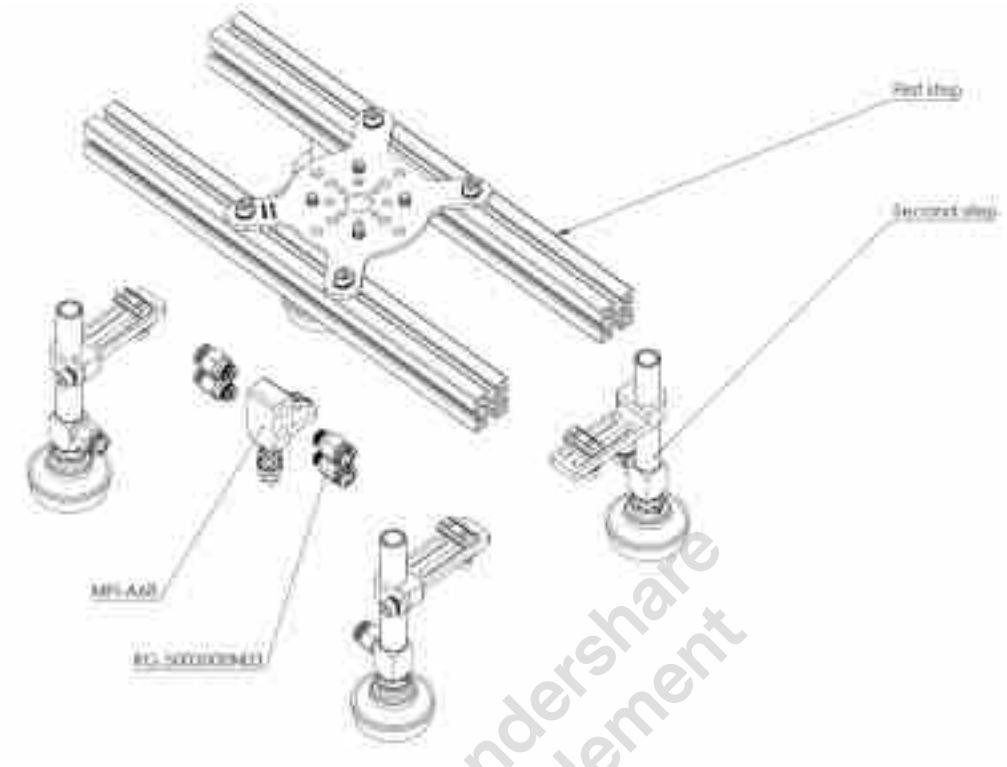


2. Assembling the four “vacuum cup group”. Put the nipple (AV0118M16) into the vacuum cup (V0242H04) and screw the nipple (AV0118M16) into the leg (MFI-A72), then fix the MFI-A05 to the leg (MFI-A72). At last connect the adaptors RG.5511600013-01 and RG.5002000N03 to the legs (MFI-A72).

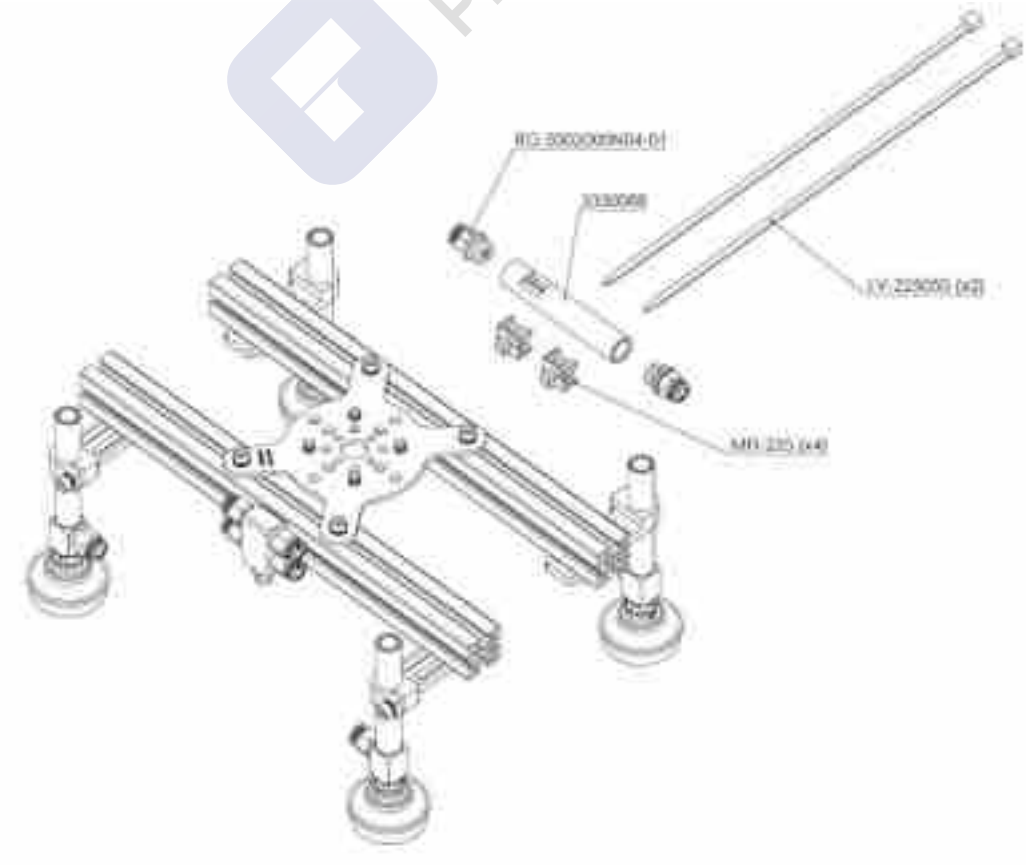


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3. Position and fix the four “vacuum cup group” (assembled in step 2) on the square beams (fixed in step 1). Position and fix the “kit side manifold block” (MFI-A68) on one side of a square beam and insert the adaptors: four sideways (RG.5002000N03)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

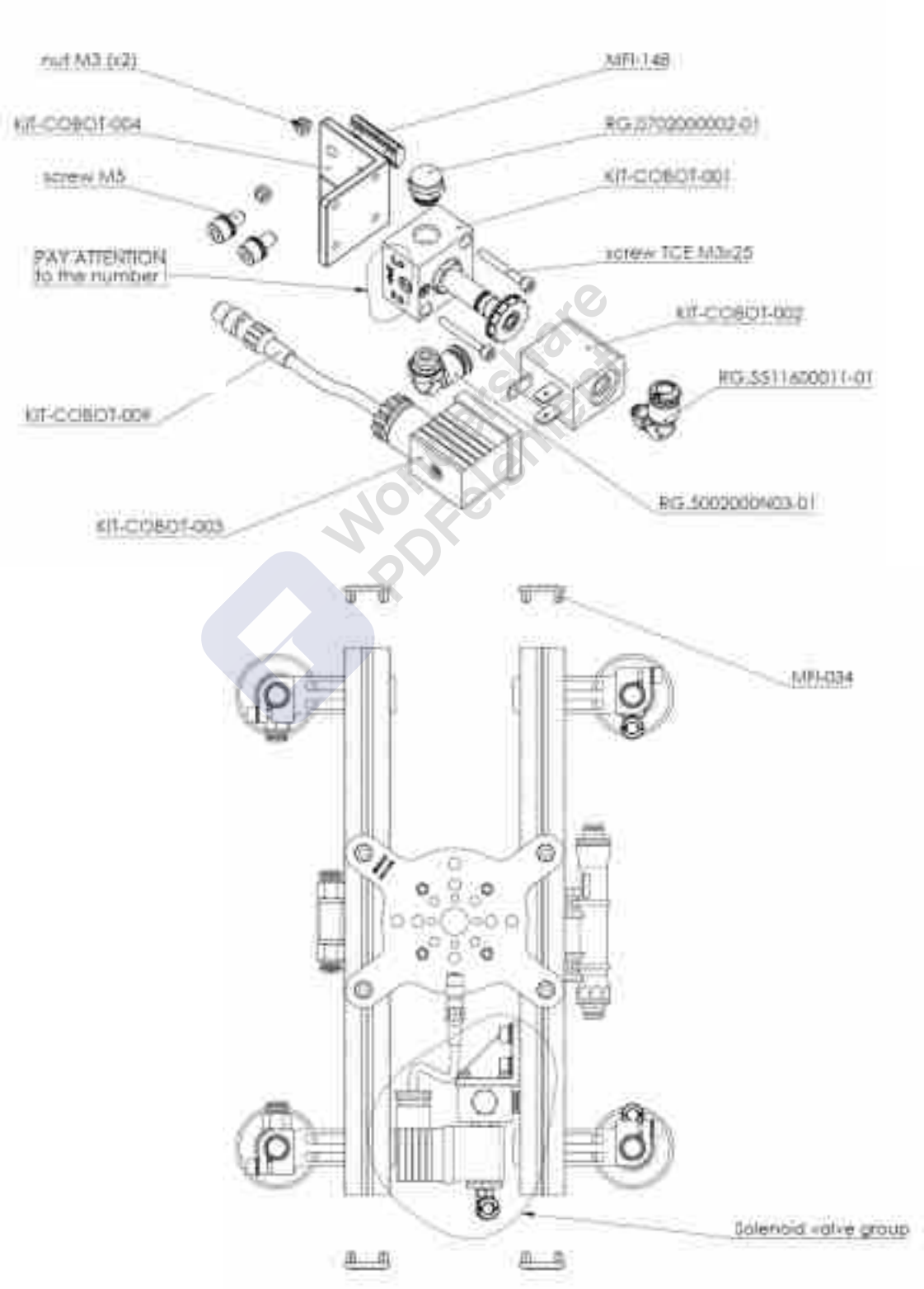


4. Fix the vacuum pump (3330088) using mounting brackets (MFI-235(x4)) and the “cable tie 4.5x280” (LV-225050(x2)). At last connect the adaptors RG.5002000N04-01 to the pump (3330088).



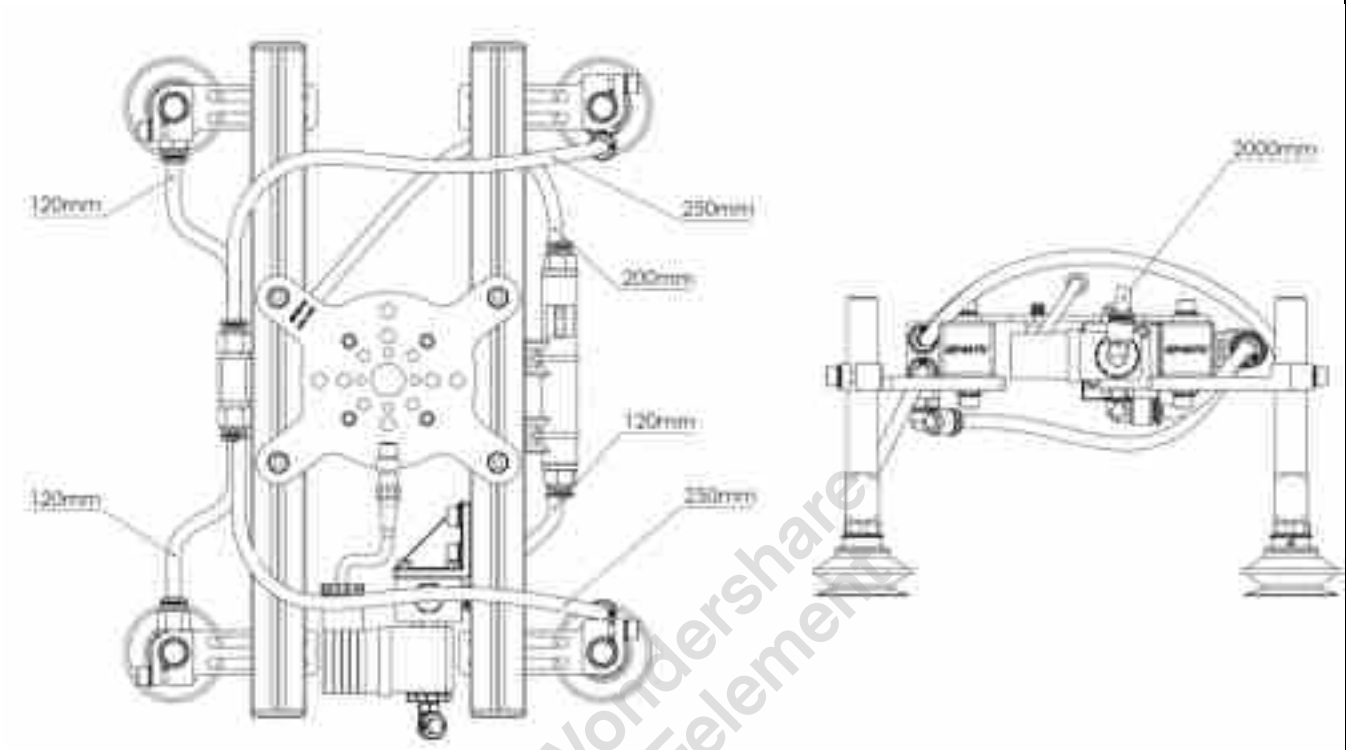
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5. Wire the cable (KIT-COBOT-003) with the connector (KIT-COBOT-003): following the previously described electrical connection schema. Fix the solenoid to the electropilot (KIT-COBOT-001), connect the connector (KIT COBOT-003) to the solenoid (KIT-COBOT-002). Connect the silencer (RG.07020000002-01) at the electropilot (KIT COBOT-001 - 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-COBOT-004) with two screws TCE M3x25 and two nuts M3. Pay attention to the direction of the arrow of the electropilot (KIT-COBOT-001). 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.



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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 (3330088) with the hoses as shown in the following figure. Connect the vacuum pump (3330088) 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.



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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).

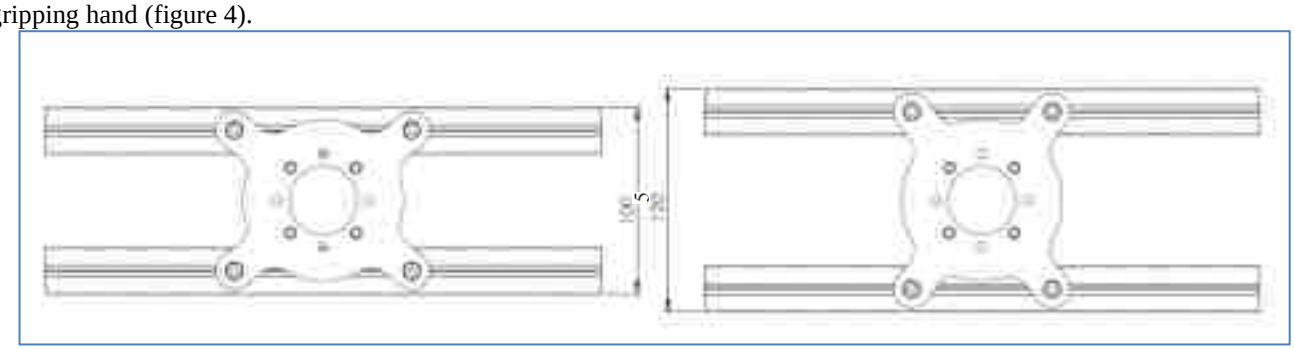


Figure 1

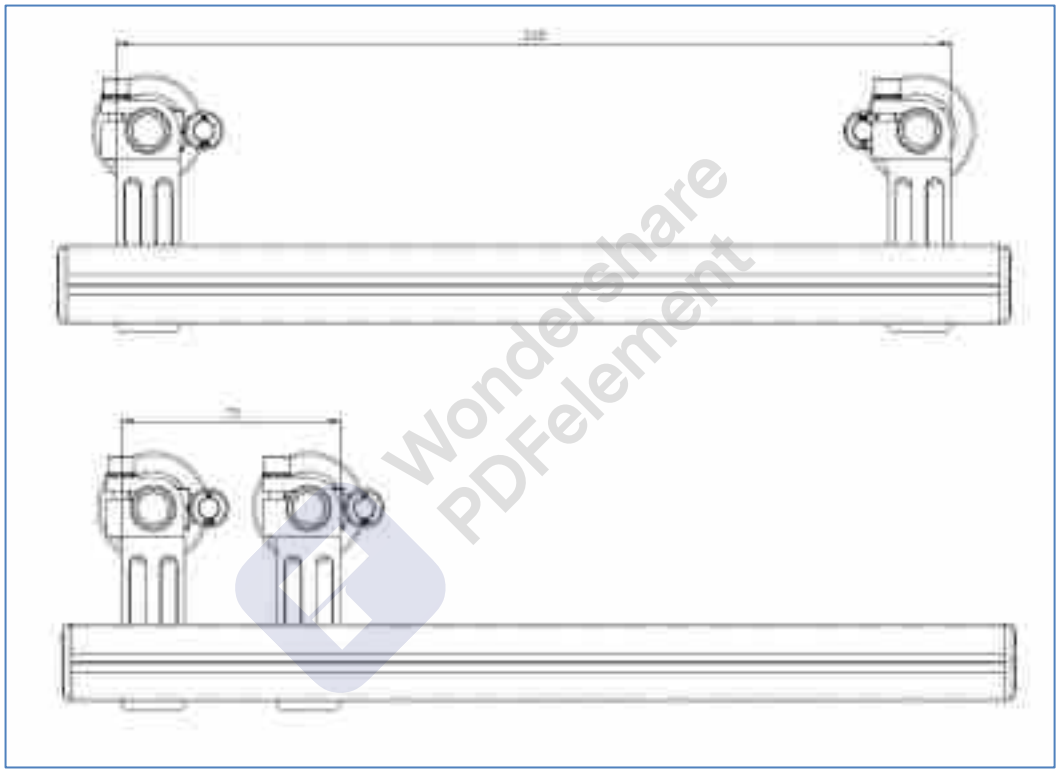


Figure 2

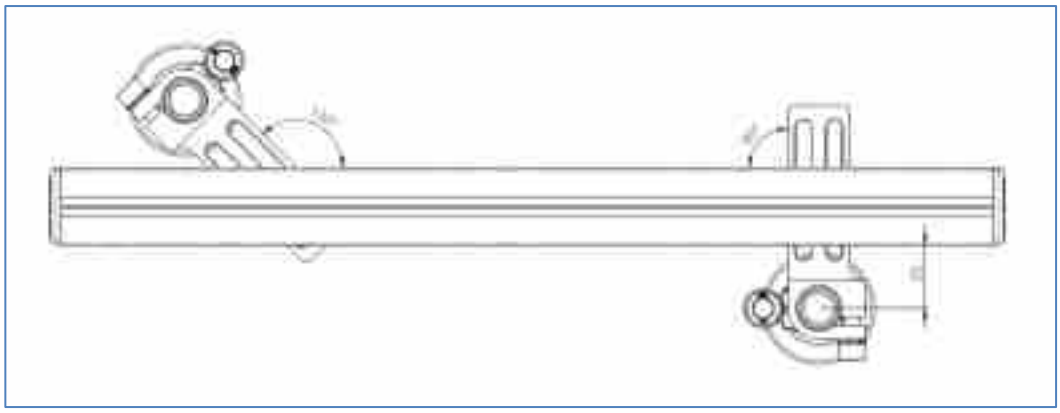


Figure 3

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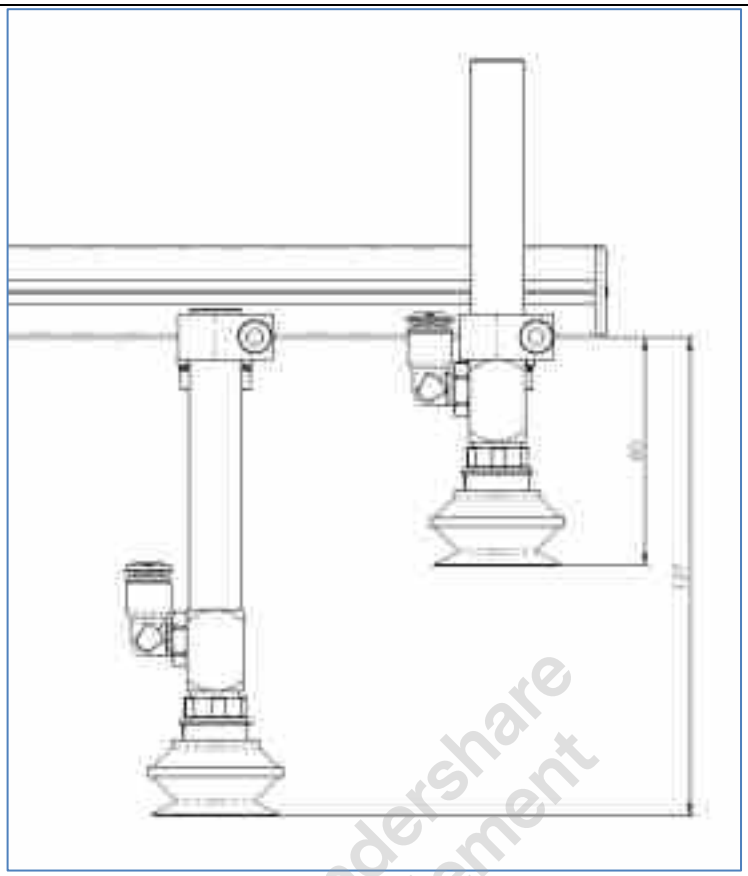
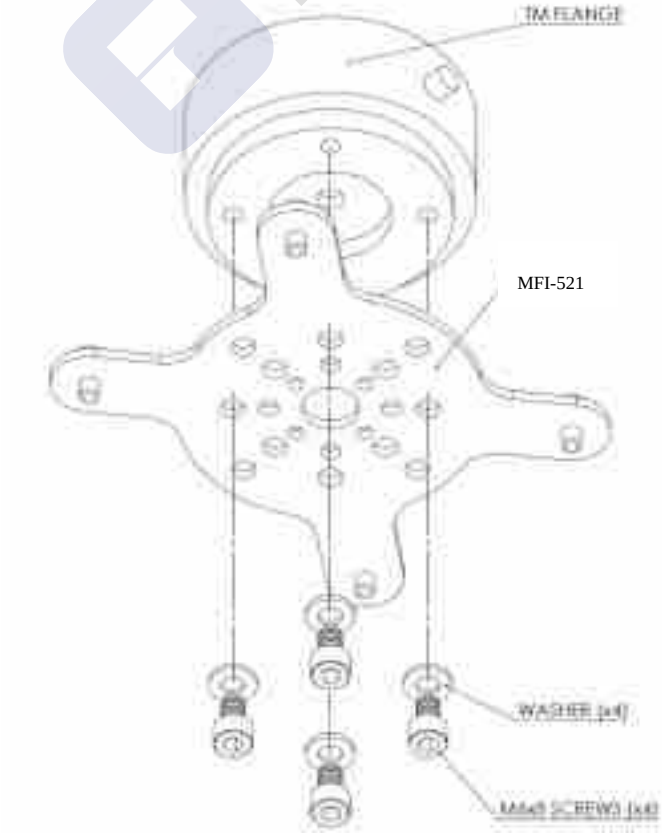


Figure 4

MECHANICAL CONNECTION TO ROBOT TOOL FLANGE

Insert four M6x10 screws and relative washers (included in MFI-A498 kit) into the mechanical flange MFI-521.



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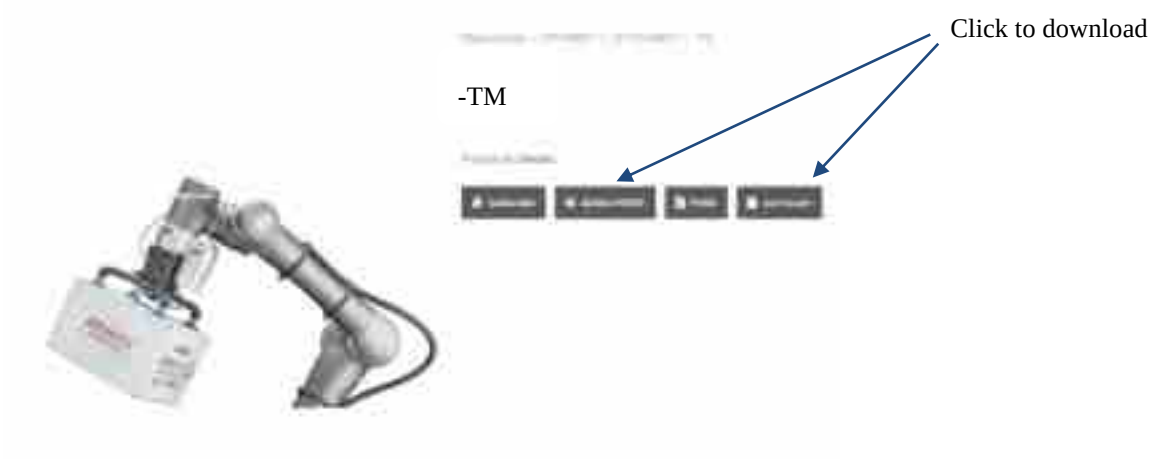
SOFTWARE:

Gimatic provides a dedicated software package for TM robot: it allows an easy payload assignment and tool central point (TPC) update.



Download and Installation:

1) Download “TM software” and “User Guide” on Gimatic official website: https://shop.gimatic.com/it/kit-robot



2) Copy the compressed folder to an USB pen drive labeled with “TMROBOT” and insert it in the appropriate port on the robot controller.
3) Follow “**KIT-TM-V User Manual**” instruction to install and configure the Software.

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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

