

MULTI - Modular Spindle Solution

Installation and Upgrade Manual



	⚠ WARNING
	Read all safety warnings and instructions
	Failure to follow the safety warnings and instructions may result in electric shock, fire and/or serious injury. Save all warnings and instructions for future reference

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Introduction

About Installation and Upgrade manual

This manual describes how to install and upgrade MULTI system.

Desoutter should not be held responsible for any injury, accident or damage which may be the consequence of an incorrect installation, modification or start-up, or a use out of the intended use of Desoutter products, by the customer or a third party.

- ① Before starting, you **must** read and understand the safety instructions given in the booklet supplied in the packaging box of products (printed matter: [6159929530](#)).

At the end of the installation, the tool status is "Tool locked", awaiting the selection of the tightening operation named "Pset".

To test and validate that the system is properly working, follow the procedure described in this manual.

Warranty

- Product warranty will expire 12 months after the product is first taken into use, but will in any case expire at the latest 13 months after delivery.
- Normal wear and tear on parts is not included within the warranty.
 - Normal wear and tear is that which requires a part change or other adjustment/overhaul during standard tools maintenance typical for that period (expressed in time, operation hours or otherwise).
- The product warranty relies on the correct use, maintenance, and repair of the tool and its component parts.
- Damage to parts that occurs as a result of inadequate maintenance or performed by parties other than Desoutter or their Certified Service Partners during the warranty period is not covered by the warranty.
- To avoid damage or destruction of tool parts, service the tool according to the recommended maintenance schedules and follow the correct instructions.
- Warranty repairs are only performed in Desoutter workshops or by Certified Service Partners.

Desoutter offers extended warranty and state of the art preventive maintenance through its Tool Care contracts. For further information contact your local Service representative.

For electrical motors:

- Warranty will only apply when the electric motor has not been opened.

Quick Start

The following sections describe how to install your MULTI system



Read before installing

⚠ WARNING Read all safety warnings and all instructions. Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.

Save all warnings and instructions for future reference.

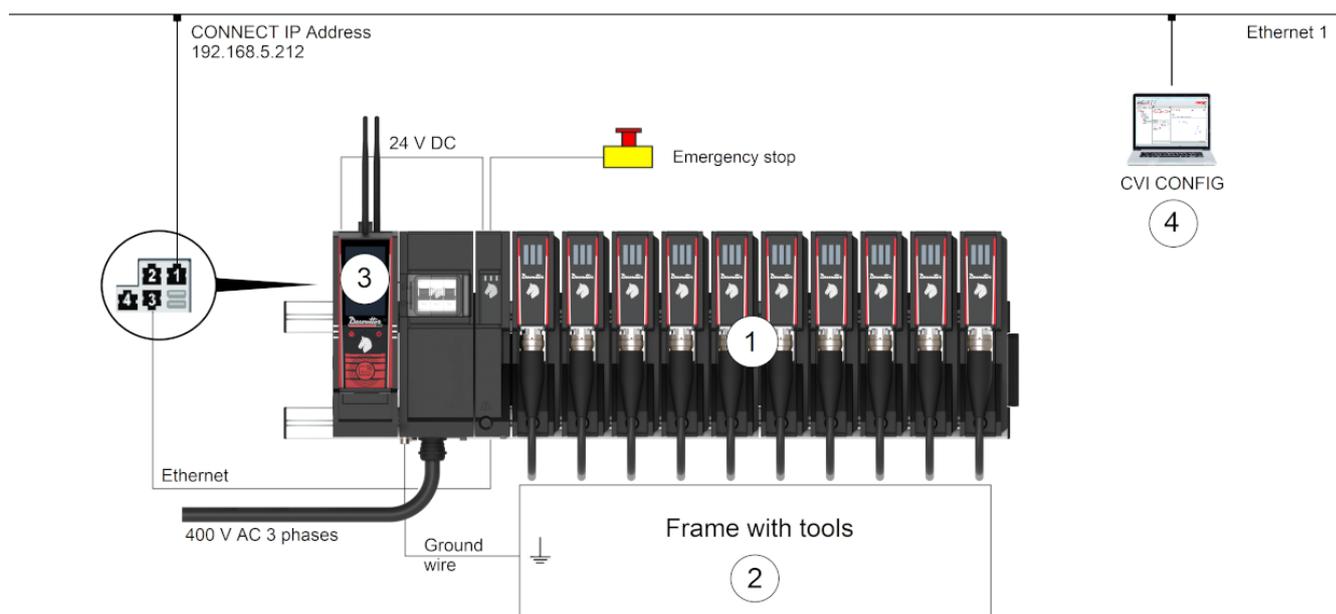
Refer to the "Safety Information" booklet provided in the product box.

⚠ WARNING All locally legislated safety rules regarding installation, operation and maintenance shall be respected at all times.

System description

Overview

Example of installation with CONNECT-W and 10 M-DRIVE.

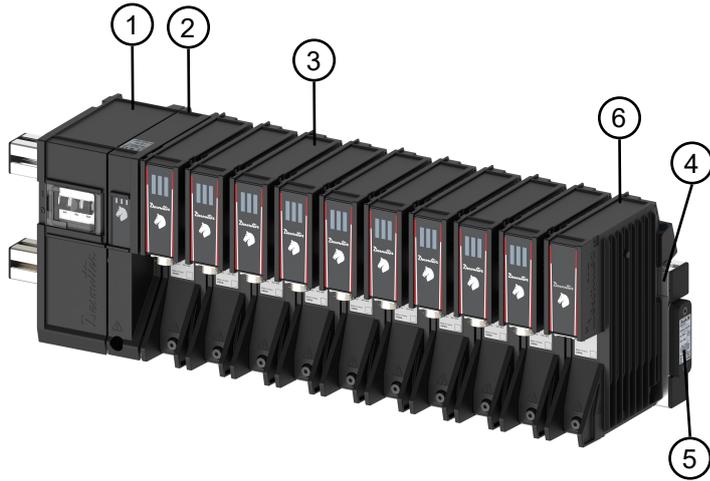


MULTI system is composed of the following items.

1. MULTI is providing the power supply, the connectivity and the safety devices.
2. The frame is equipped with cord fixtured tools designed by Desoutter.
3. CONNECT is managing the tightening units and all data communications.
4. CVI CONFIG is the software dedicated to set up the system.

Description

MULTI is composed of the following elements:



1	M-POWERBOX	2	M-SAFETYBOX
3	M-DRIVE	4	M-MODURACK2, M-MODURACK3 or M-MODURACK5
5	M-RACKPLUG	6	M-PROTECTRACK

- M-POWERBOX provides the power supply to the system. It is connected to the mains via the power distribution cable (not supplied)
- M-SAFETYBOX provides the connectivity and the safety devices.
- M-DRIVE are powered by M-MODURACK. The drives are powering the cord fixtured tools.
- M-RACKPLUG is used to close the last M-MODURACK.

⚠ WARNING Installation

- ▶ It is compulsory to place a M-PROTECTRACK if there is no M-DRIVE in a slot (empty slot)
- ▶ It is compulsory to place a M-RACKPLUG to close the last M-MODURACK before powering on the M-POWERBOX

(i) In case of using a minimum of 1 (one) spindle in the range of EB12 motors:

- EFM80-700 - 6151662320
- EFM80-950 - 6151662330
- EFM106-1400 - 6151662340
- EFM106-1900 - 6151662350

Each M-POWERBOX must not power more than 6 (six) M-DRIVES

CONNECT

Both models (CONNECT-W and CONNECT-X) can manage up to 4 MULTI tightening units and 2 wireless tightening units.

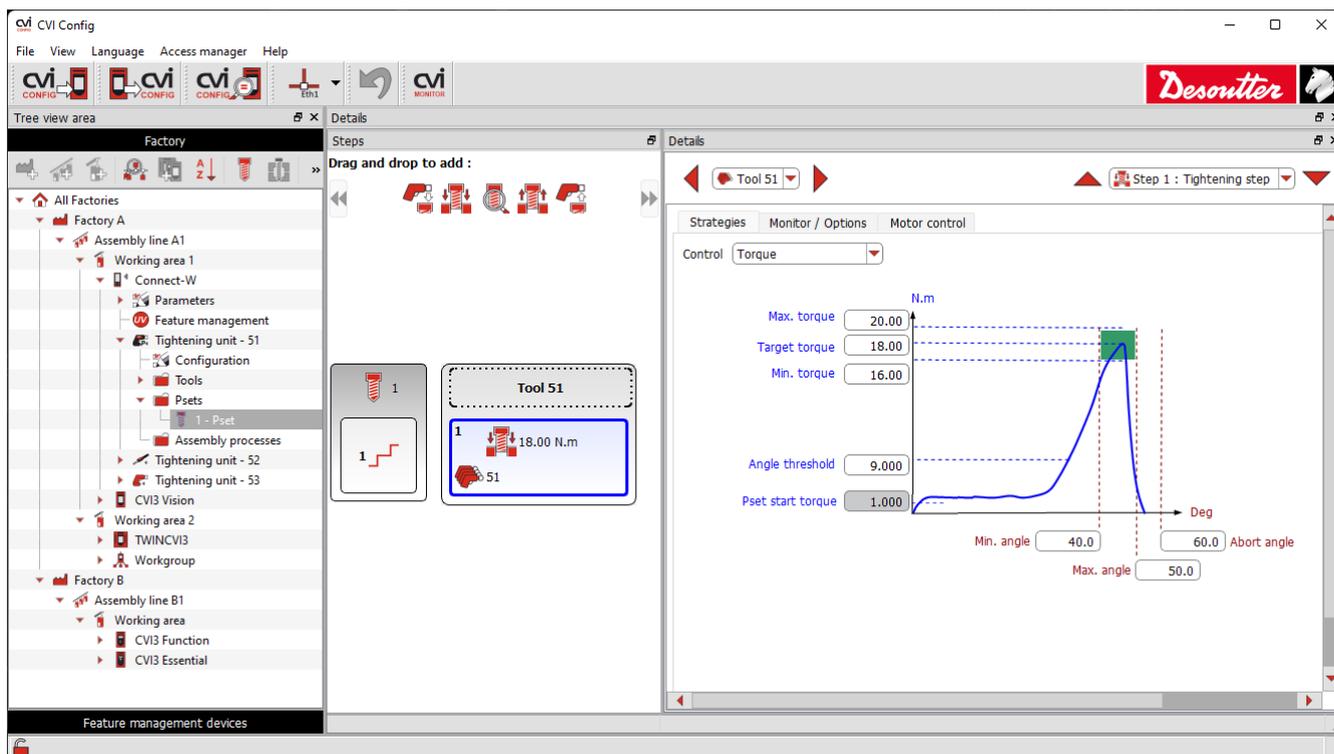
In MULTI system, CONNECT is managing the M-DRIVE(s) via Ethernet.

(i) CONNECT can be powered by M-SAFETYBOX.

CONNECT can be placed on the rail on the left of M-POWERBOX or anywhere else as long as it is connected to MULTI via an Ethernet cable.

Refer to the **Product Instructions** of CONNECT (printed matter: [6159924300](#)) directly available from this link: [CONNECT Online Documentation](#)

CVI CONFIG



CVI CONFIG is designed to set your systems point to point or via network with an intuitive and guided interface.

From your computer, you can set up Desoutter tightening products, cord tools, cordless tools, WI-FI cordless tools, accessories, peripherals and tightening processes.

You can also configure Fieldbus, protocols, backup and you can send data to CVINET WEB for traceability.

Cord fixtured tools

Each cord fixtured tool is powered by a M-DRIVE.

Tools must be clamped on a frame.

- ❶ The frame where tools are clamped must be properly grounded and connected to the M-POWERBOX before powering on the system.

Ordering information

M-POWERBOX	6159327510
M-SAFETYBOX	6159327520
M-DRIVE	6159327630
M-PROTECTRACK	6159327550
M-MODURACK2	6159327560
M-MODURACK3	6159327570
M-MODURACK5	6159327580
M-RACKPLUG	6159327590

CONNECT-X	6159327220
CONNECT-W	6159327230

Tool models can be different according to the installation type.

Contact your Desoutter representative to get more information and support.

Connection cables for M-SAFETYBOX

- ❶ Always make sure to use the cables supplied with the system.

Power cables to connect M-SAFETYBOX to CONNECT

Length (m)	Length (ft)	Part number
1	3.28	6159177530
30	98.42	6159177540

Ethernet cables to connect M-SAFETYBOX to CONNECT

Length (m)	Length (ft)	Part number
1	3.28	6159177560
30	98.42	6159177570

M12/open - Emergency stop cable

Length (m)	Length (ft)	Part number
10	32.8	6159177660

Tool cables

Length (m)	Length (ft)	Part number
2.5	8.20	6159176510
5	16.0	6159176520
10	32.8	6159176540
15	49.2	6159176550

Tool extension cables

Length (m)	Length (ft)	Part number
8	26.2	6159175810
16	52.5	6159175840
32	105	6159175870

Technical data

Power supply

Overvoltage equipment category II



Electrical Equipment Class 1

Power supply

Input voltage (V)	3 ~ 380-480 (phase to phase)
Frequency (Hz)	50/60

Power supply fluctuations must not exceed +/- 10% of the nominal voltage

Power consumption

Item	A
M-POWERBOX	32
M-SAFETYBOX	2
M-MODURACK (used here as a cable)	32
M-DRIVE	3

Output voltage

Item	
M-POWERBOX	380 – 480 V ~
M-SAFETYBOX	24 V 
M-MODURACK	-
M-DRIVE	3 ~ 520 V ~
	15 V 

Ingress protection level

Ingress protection level of MULTI is IP54.

MULTI is protected from limited dust ingress.

MULTI is protected from water spray from any direction.

The protection level is valid for the whole system only, in use conditions. All covers must be closed, and all slots must be filled with a M-DRIVE or a M-PROTECTRACK.

Separate elements are not protected when they are not included in a whole system.

Storage and use conditions

Storage temperature	-20 to +70 °C (-4 to +158 F)
Operating temperature	0 to 40 °C (32 to 104 F)
Storage humidity	0-95 % RH (non-condensing)
Operating humidity	0-90 % RH (non-condensing)
Altitude up to	2000 m (6562 feet)
Usable in Pollution degree 2 environment	
Indoor use only	
IP54 only in use conditions	

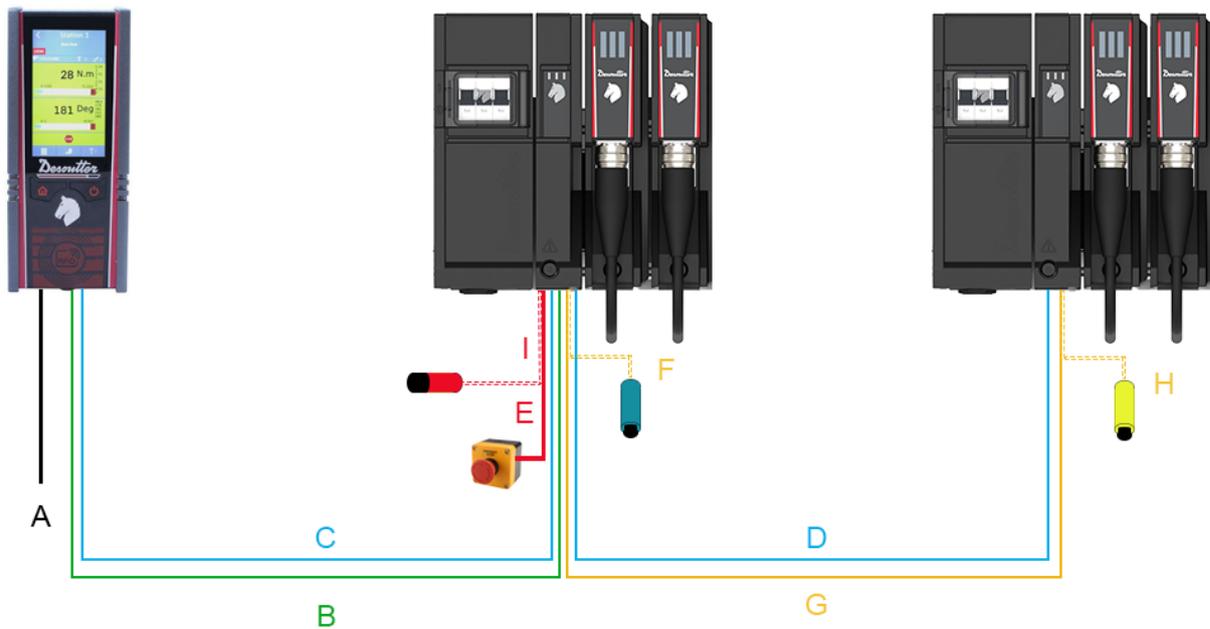
Weight

	kg	lb
M-POWERBOX	6.0	13.22
M-SAFETYBOX	2.5	5.51
M-MODURACK2	0.5	1.10
M-MODURACK3	0.7	1.54
M-MODURACK5	1.22	2.20
M-DRIVE	3.5	7.72
M-PROTECTRACK	2.2	4.85

Additional accessories

 These additional accessories must be ordered separately

Accessories	Part number
CONNECT-X	6159327220
CONNECT-W	6159327230
MULTI - SUPPORT CONNECT	6159327620



i Always insert the plugs F, G, I (see references in the diagram above) when cables are not connected.

Cables	Part number	References in diagram
CONNECT EUROPE CABLE 2.5M	6159177390	A
CONNECT USA CABLE 2.5M	6159177410	A
CONNECT UK CABLE 2.5M	6159177400	A
CONNECT CHINA CABLE 2.5M	6159177420	A
CONNECT POWER CABLE 2M	6159177530	B
CONNECT POWER CABLE 5M	6159177540	B
CONNECT ETHERNET CABLE 2M	6159177560	C
CONNECT ETHERNET CABLE 5M	6159177570	C
M-SAFETYBOX ETHERNET CABLE 2M	6159177600	D
M-SAFETYBOX ETHERNET CABLE 5M	6159177610	D
M-SAFETYBOX EMERGENCY STOP CABLE 2M	6159177630	G
M-SAFETYBOX EMERGENCY STOP CABLE 5M	6159177640	G
OPEN WIRES EMERGENCY STOP CABLE 5M	6159177660	E

Installation restrictions

Checking the line voltage

⚠️ WARNING Risk Of Electric Shock

Only qualified and trained operators should install, adjust or use this equipment.

Before connecting the Power Box to the main supply, check that the line voltage is appropriate.

Line voltage	3~ 380-480 V ~
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The symbol ~ means "alternating current".

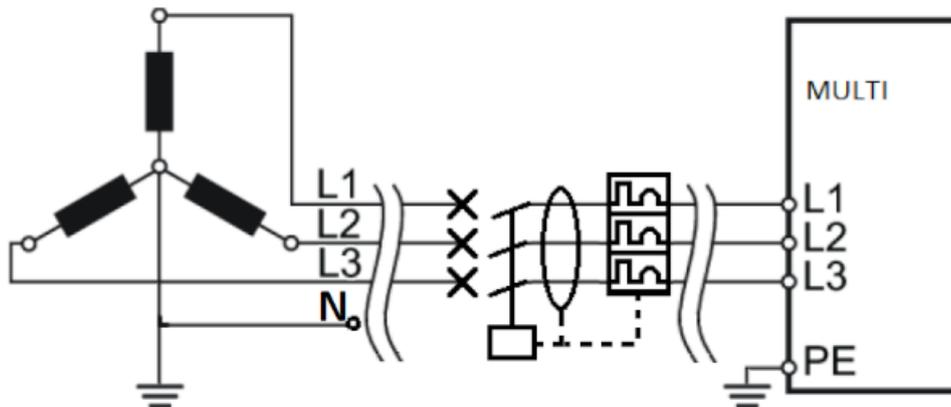
Connecting to factory power network

Recommended overcurrent protection: circuit breaker 32A curve D - Fuses not recommended

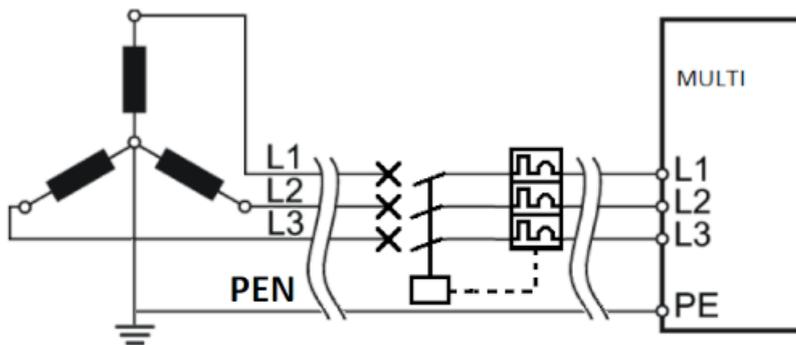
Only for factory power system based on "wYe" (Y) connected transformer as follow

- Earthing schemes:

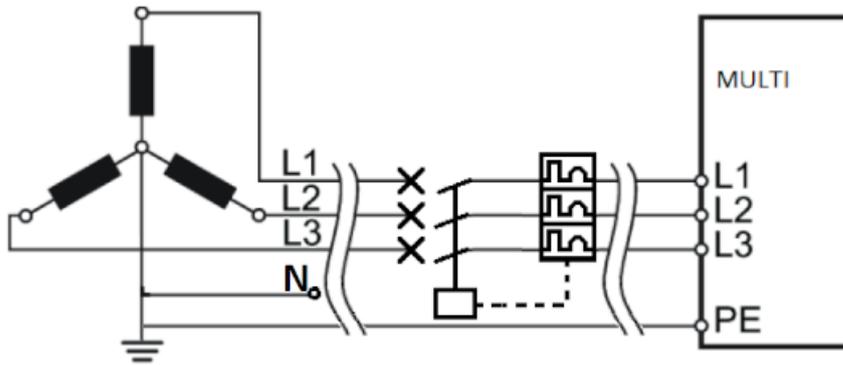
- TT + Ground Fault interruptor (GFI) 300 mA or higher



- TNC



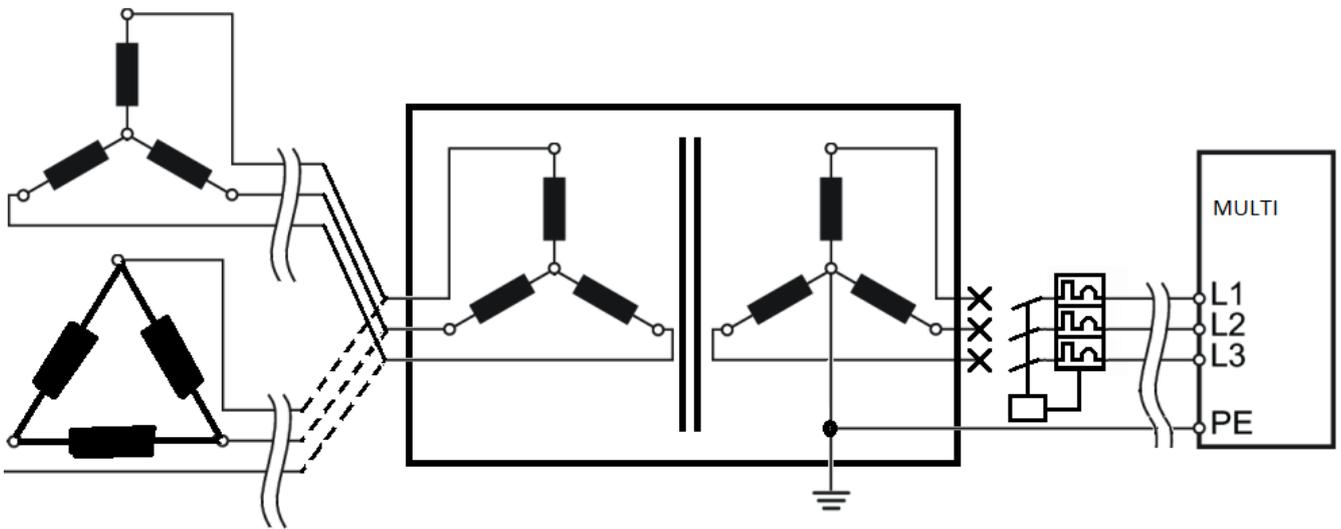
- TNS



For any other factory power system based on:

- “wYe” (Y) connected with IT earthing scheme or other scheme not mentioned above,
- “Delta” (Δ) connected transformer,

Isolation transformer mandatory to allow ground current fault



⚠ WARNING Electromagnetic Interference (EMI)

Incorrect grounding may cause momentary disturbance and unwanted effects due to Electromagnetic Interference (EMI).

- ▶ Grounding must be carefully verified by electrician.

Permanently connected equipment

Power distribution cable to this equipment must be connected to terminals at opposite cable end. No pluggable power socket permitted.

⚠ WARNING This equipment must be earthed (grounded)!

Should the equipment suffer electronic malfunction or breakdown, or present current leakage, the earth provides a low resistance path to carry electricity away from user.

Overall dimensions

The system must not be confined nor covered.

- ⓘ The system should be mounted vertically for optimal system functionality. This will allow for best air flow and heat transfer.

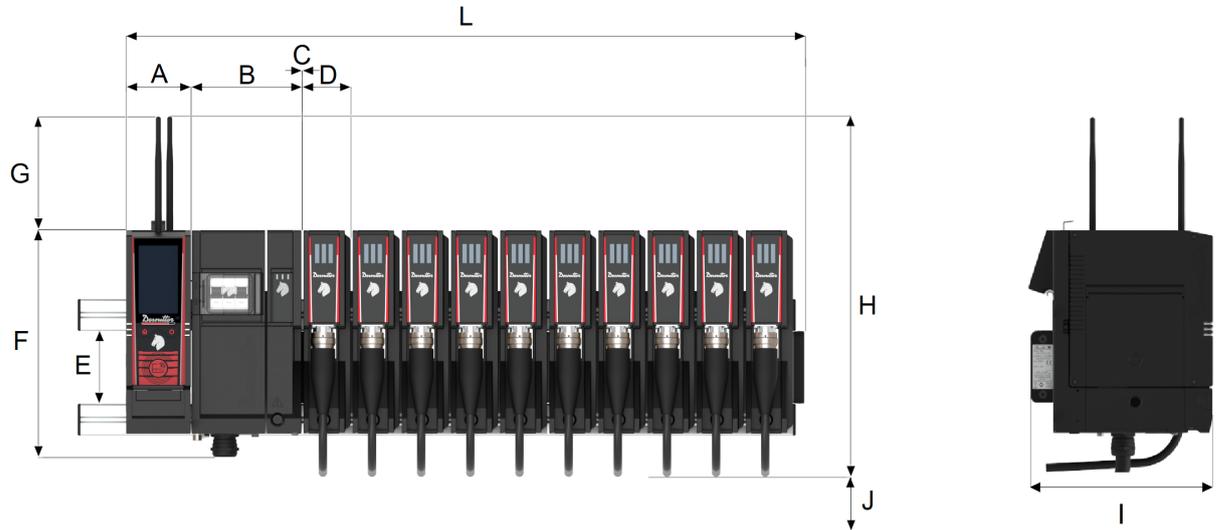


Hot Equipment

Abnormal ventilation may cause momentary disturbance. Do not touch radiator.

Always wait until equipment is cooled down before commencing service operation. Failure to respect these instructions may result in burns.

i Overall dimensions are given with CONNECT mounted on the rail.



	mm	in.
L	908	35.75
A	91	3.58
B	154	6.06
C	3	0.12
D	66	2.60
E	104	4.09
F	319	12.56
G	160	6.30
H	498	19.61
J	150	5.91
I (Depth without rail)	273	10.75

i When the side door of CONNECT is opened, L is 1030 mm (40.55 in.).

It is mandatory that area J remains empty.

Hardware installation

Installing the system

Recommended installation order

WARNING Risk Of Electric Shock

Do not use faulty nor damaged tool or equipment.

Respect the following order.

1. Mount the rails.
2. Install M-POWERBOX, M-SAFETYBOX, M-DRIVES and CONNECT.
3. Connect M-SAFETYBOX to CONNECT.
4. Connect the Emergency stop device to M-SAFETYBOX.
5. Install and connect tools.
6. Power ON the system.
7. Test the Emergency stop device.

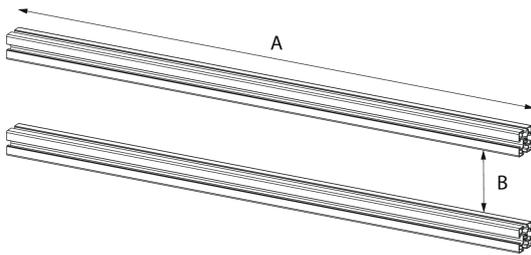
Mounting the aluminum profiles

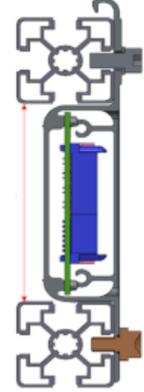
MULTI and CONNECT are planned to be mounted on aluminum profiles.

Suggested format of the aluminum profiles: 40x40 or 45x45.

 Aluminum profiles and M8 T-nuts are not supplied.

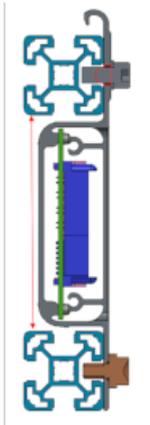
Mount the profiles on the workstation following the instructions below.



45x45 BOSCH profiles	mm	in.	
	A (min.)	854	33.62
	B	104	4.09

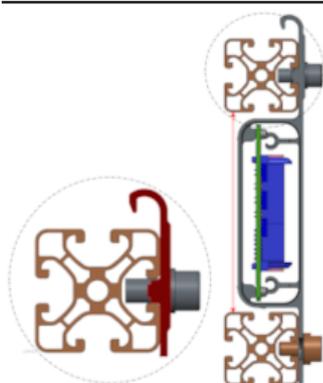
 We highly suggest the following mounting order:

1. Mount and fix the lower profile
2. Using a steel bracket, mount the upper profile and let it loose (informative value for distance B: 104mm)
3. Place M-MODURACK leaning on the lower profile to adjust the position of the upper profile
4. Screw to secure the position of the profiles

40x40 BOSCH profiles

	mm	in.
A (min.)	854	33.62
B	109	4.29

- ① We highly suggest the following mounting order:
1. Mount and fix the lower profile
 2. Using a steel bracket, mount the upper profile and let it loose (informative value for distance B: 109mm)
 3. Place M-MODURACK leaning on the lower profile to adjust the position of the upper profile
 4. Screw to secure the position of the profiles

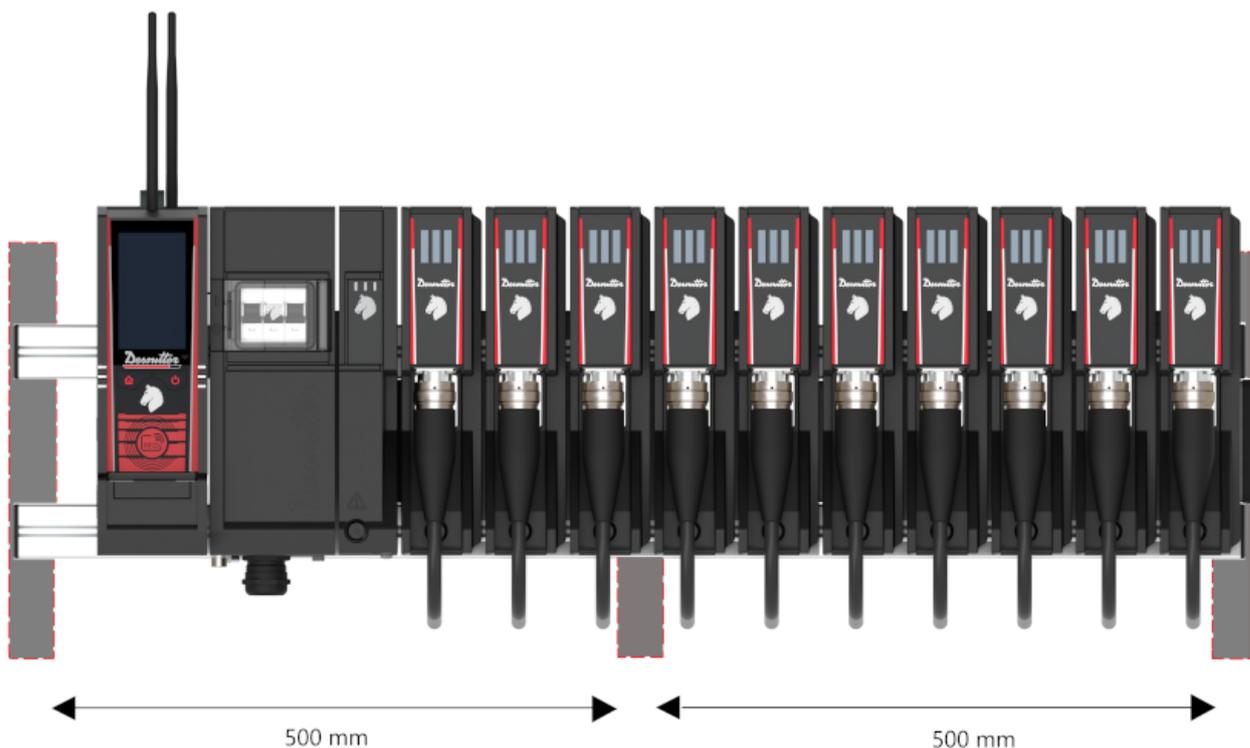
40x40 ITEM profiles

	mm	in.
A (min.)	854	33.62
B	109	4.29

- ① We highly suggest the following mounting order:
1. Mount and fix the upper profile
 2. Using a steel bracket, mount the lower profile and let it loose (informative value for distance B: 109mm)
 3. Place M-MODURACK leaning on the upper profile to adjust the position of the lower profile
 4. Screw to secure the position of the profiles

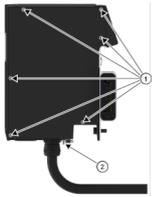
Consolidating the installation

In case the system is subjected to vibration or shocks, it is compulsory to mount the MULTI on a **rigid structure or to add supporting structure on the profiles every 500mm**



Opening M-POWERBOX

Remove the cover at the right before mounting M-POWERBOX on the rail.

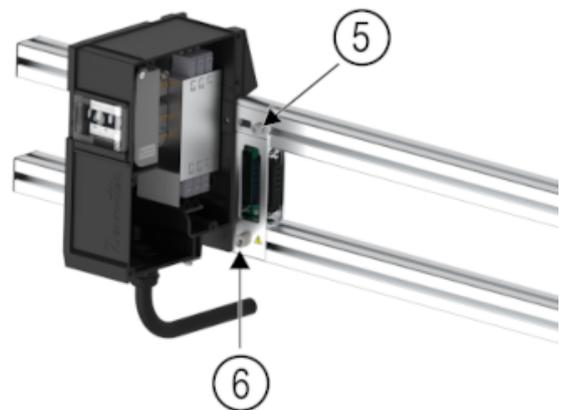
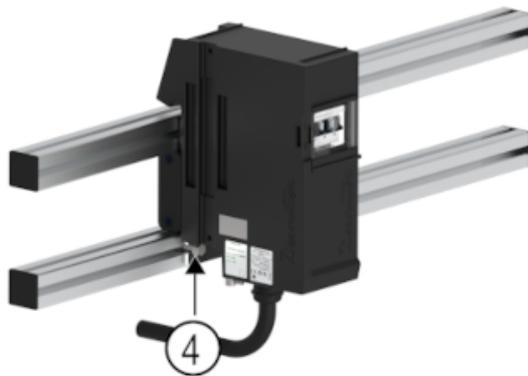
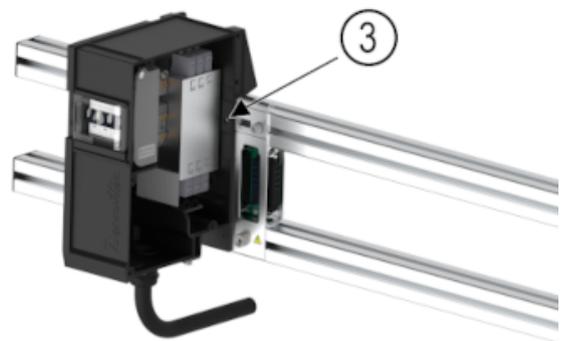
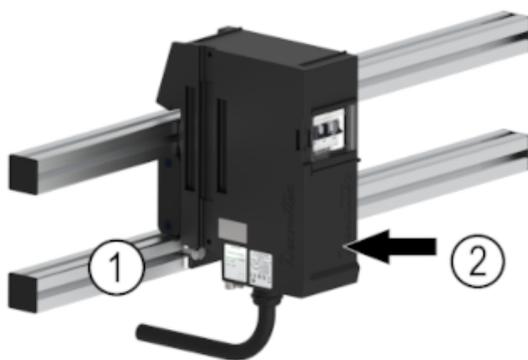


1. Remove the 6 screws. Use Torx T20.
2. Unscrew the screw located at the bottom. Use 5mm Allen key.

Mounting M-POWERBOX

WARNING Risk Of Electric Shock

Make sure that the M-POWERBOX circuit-breaker can be easily reached.
Always leave free access to the M-POWERBOX front panel.



1. Place M-POWERBOX on the lower profile
2. Push it all the way in
3. Secure the mounting by adding a seal washer and tightening the screw located on the right side at 18 Nm
4. Tighten the screw at 18 Nm
5. Add a lock washer and tighten the screw at 18 Nm
6. Use the special screw 6153111740 and tighten it at 18 Nm.

Connecting the power input

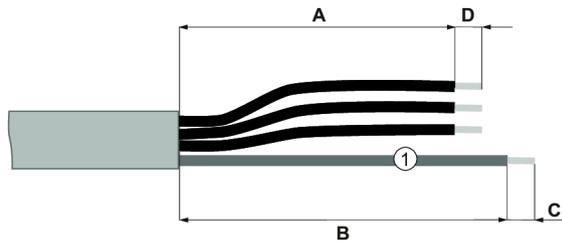
WARNING Risk Of Electric Shock

Only qualified and trained operators should install, adjust or use this equipment.

i Do not connect the power distribution cable to the mains.

Connecting the power distribution cable to M-POWERBOX

Respect the following lengths and strip the cables as indicated:



1 Yellow/Green Protective Earth Cable

Length	mm	in.
A	200	7.87
B	160	6.30
C	15	0.59
D	20	0.79

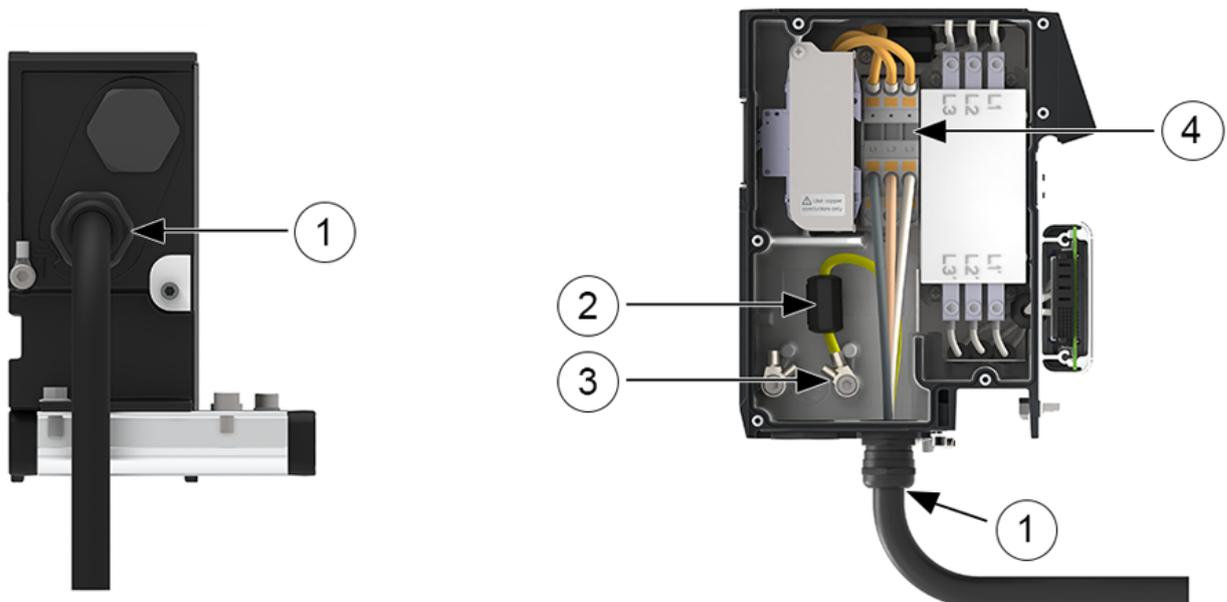
Select the following electrical contact depending on the cable cross section used.

Cable cross section	Recommended electrical contact
10 mm ²	TE 323167
16 mm ²	TE 323171
25 mm ²	TE 710026-5

Crimp a ferrule on each phase.

i In case of flexible wires, ferrules 18 mm long must be used.

Crimp an electrical contact on the protective earth.



1. See on the bottom panel of M-POWERBOX the grommet designed to route the power distribution cable. Route the cable through the grommet.
2. Clip the ferrite (6159217730) onto the ground wire.

3. Connect the protective earth to one of the protective conductor terminals.
Put the toothed lock washer into place and tighten the M8 screw at 15 Nm.
4. Connect the phases to the terminal block.
In case of a pullout, the ground cable must be the last to be pulled out.

Power distribution cable

The power distribution cable is the cable that connects the M-POWERBOX to the local power supply system.

Suggested cable specification	Value
Voltage	560 VACrms

Respect the following cable sections according to the length of the cable.

Length < 54 m	10 mm ² minimum
54 m < Length < 86 m	16 mm ² minimum
86 m < Length < 135 m	25 mm ² minimum

⚠ WARNING Use Copper Conductors only (CU)

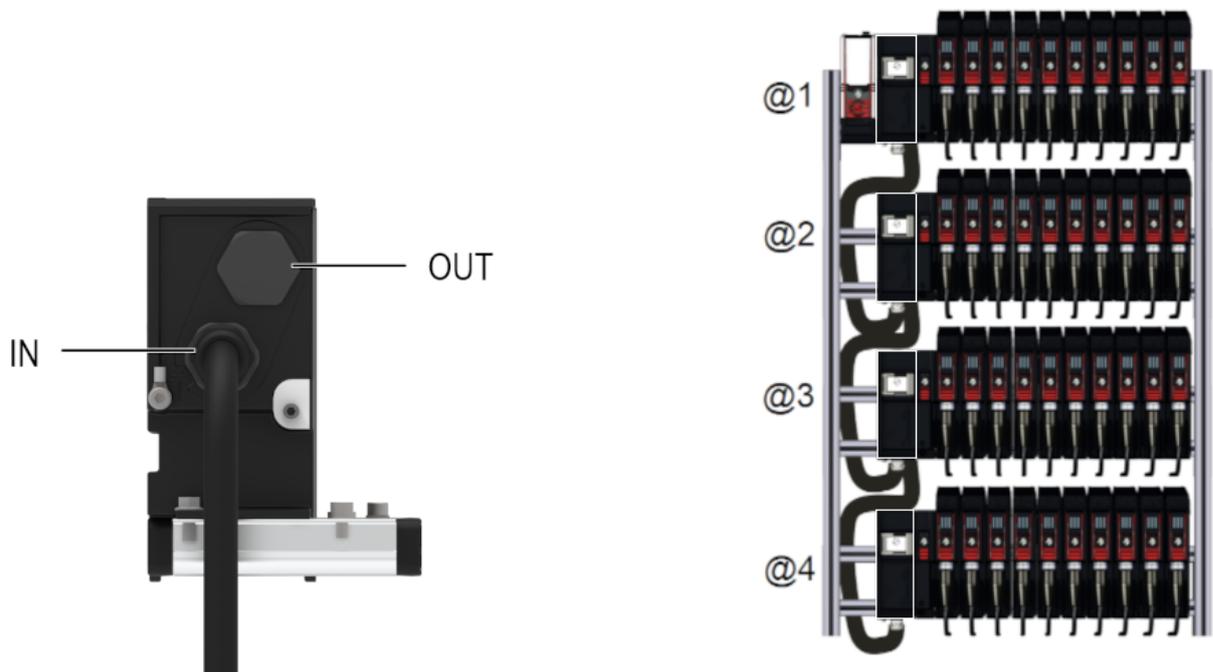
- ▶ Aluminium and Copper-Clad Aluminium Conductors not permitted

- ⓘ Power cable wires can be flexible or rigid.
25 mm² wires must be rigid.

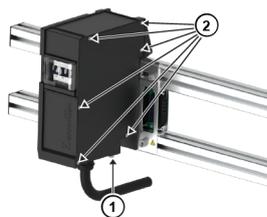
Daisy chain of several M-POWERBOX

- ⓘ It is possible to daisy chain up to 4 M-POWERBOX.

On the bottom panel, use the second grommet to route the power distribution cable to the next M-POWERBOX.



Closing M-POWERBOX



1. Tighten the M6 screw at 4 Nm. Use 5mm Allen key.
2. Fasten the 6 M4 screws at 2 Nm. Use Torx T20.

Connecting the power distribution cable to the mains

WARNING Risk Of Electric Shock

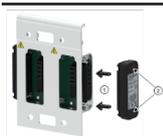
Only qualified and trained operators should install, adjust or use this equipment.

1. Connect the power distribution cable to the mains.
2. Do not power on the distribution circuit-breakers.
3. Lockout-tagout the circuit-breaker in the position OFF as the installation is not completed yet.

Mounting M-MODURACK

Mount M-RACKPLUG on the last M-MODURACK.

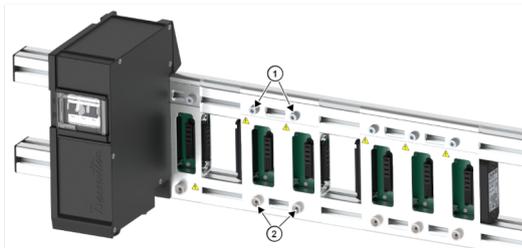
The M-MODURACK equipped with M-RACKPLUG **must** be positioned in the last position.



1. Place M-RACKPLUG into M-MODURACK.
2. Place the O-rings and tighten the screws at 1.2 Nm. Use 4 mm Allen key.

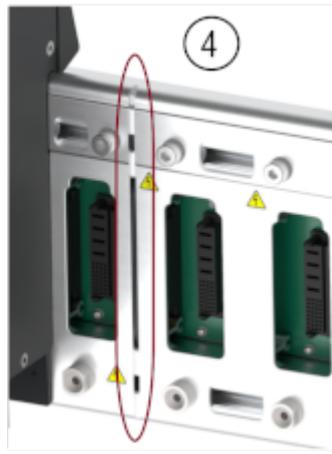
Mount all M-MODURACK at the right of the M-POWERBOX.

1. Place 2 M8 screws at the top, equipped with their lock washer.
2. Place 2 specific screws (part number: 6153111780) at the bottom.



Tighten slightly by hand the screws. M-MODURACK must be free of movement.

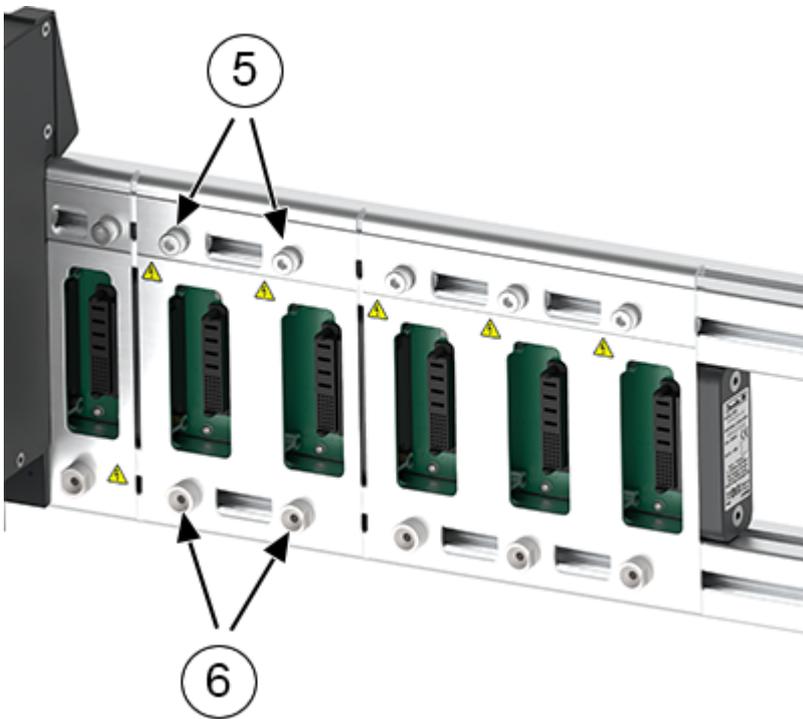
3. Slide M-MODURACK until abutment (the seal must be invisible).
4. Check that the gasket support module is completely sealed.



Secure the mounting by tightening the 4 screws:

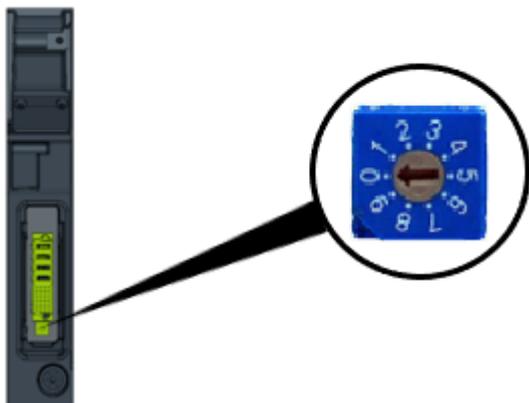
5. For screws at the top, tighten at 18 Nm. Use 6 mm Allen key.

6. For screws at the bottom, tighten at 18 Nm. Use a 15 mm flat wrench.



Managing multiple racks

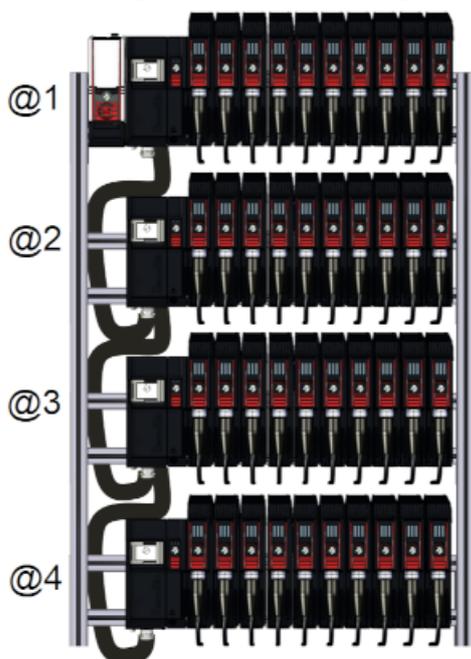
1. Rack addressing rotary wheel is located behind M-SAFETYBOX, nearby rack connector.



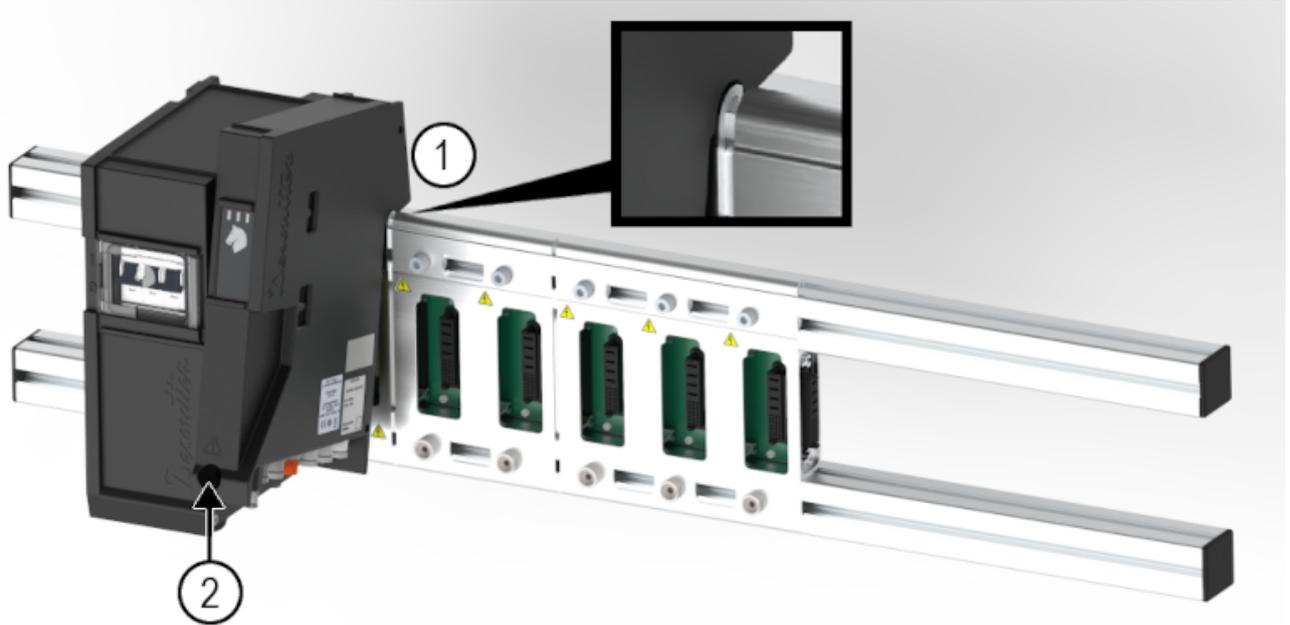
By default it is set to @0

i M-POWERBOX must be switched off

2. Set the address according to instructions below:
 - For one rack, select @1
 - For multiple racks, the address depends on the position of the M-SAFETYBOX



Mounting M-SAFETYBOX



1. Place M-SAFETYBOX on the pivot hook of M-MODURACK next to M-POWERBOX (space of about 3mm).
2. Let it rotate and secure the mounting by tightening the screw (part number: 6153111730) at 7 Nm. Use 5mm Allen key.

Mounting M-DRIVE



1. Place the first M-DRIVE on the pivot hook of M-MODURACK next to M-SAFETYBOX.
2. Let it rotate and secure the mounting by tightening the screw (part number: 6153111730) at 7 Nm. Use 5mm Allen key.

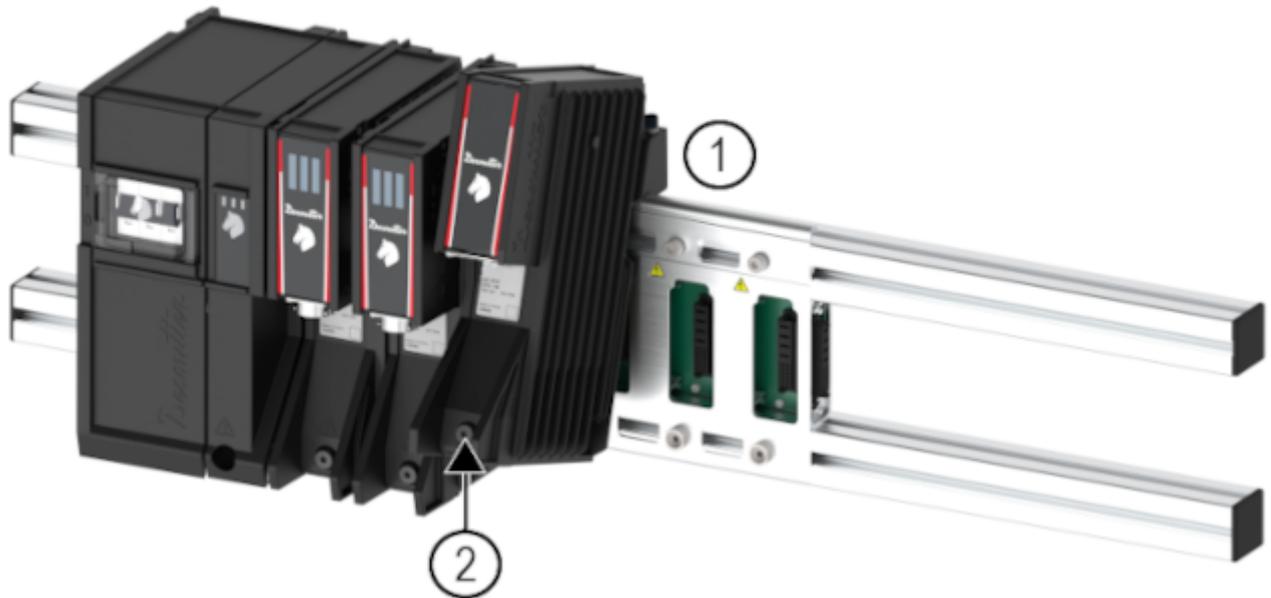
Repeat the procedure for other M-DRIVE.

⚠ WARNING It is forbidden to remove a M-DRIVE while the M-POWERBOX is powered

- ▶ To replace a M-DRIVE, switch the circuit-breaker of M-POWERBOX to O (see section *Powering off M-POWERBOX [Page 35]*)

Mounting M-PROTECTRACK

- ⓘ In case a slot is empty (no drive), it is **compulsory** to place a M-PROTECTRACK into the slot.



1. Place M-PROTECTRACK on the pivot hook of M-MODURACK.
2. Let it rotate and secure the mounting by tightening the screw (part number: 6153111730) at 7 Nm. Use 5mm Allen key.

Mounting CONNECT

Refer to the **Product Instructions** of CONNECT (printed matter: [6159924300](#)) directly available from this link: [CONNECT Online Documentation](#)

(i) For the MULTI system, CONNECT must be mounted *upon its dedicated support* (6159327620)

1. Fix the support on the rails
2. Slightly tilt the CONNECT to mount it on the support from the top



3. Gently push the CONNECT towards the back of the support until you hear a "click"
The CONNECT must be completely upright on its support



Installing cord fixtured tools

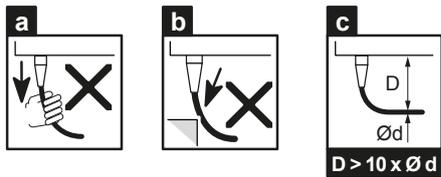
i The maximum length authorized for tool cables is 47 m /154 feet (15 m tool cable + 32 m extension cable)

Use only screws with quality class 12.9.

i Be sure that the motor is free of motion to enable torque measurement.

Read before installing tool cables

i Do not connect several extension cables together. Preferably use the longest length of extension cable and the shortest length of tool cable.



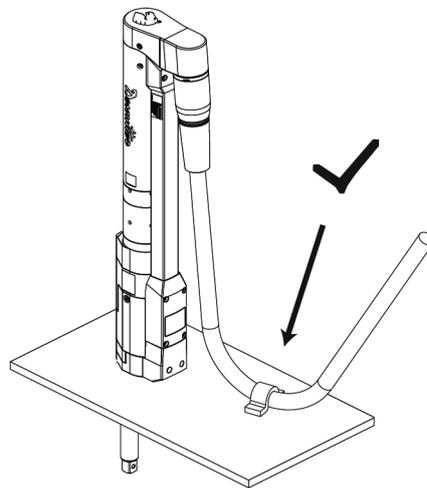
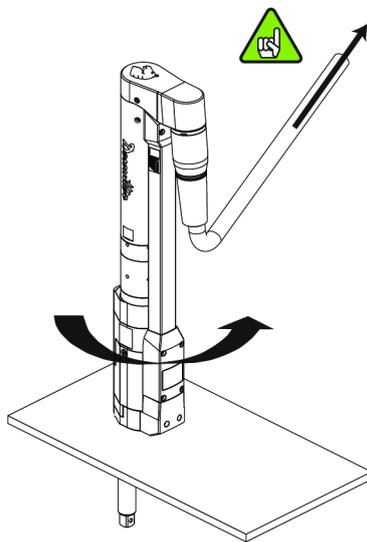
Although our tool cables are designed to work under drastic conditions, we recommend that you check the following points for longer service life:

- a - Any direct pull on the cable should be avoided.
- b - Friction with the outer sheath should be restricted.
- c - Bending radii should not be lower than 10 times the cable diameter.

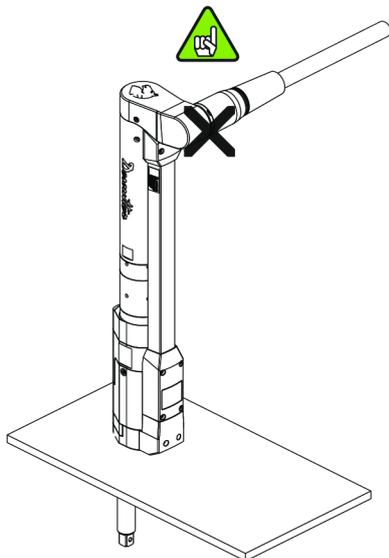
Instructions for cables of fixtured tools

The cable shall not apply any traction to the tool. Any traction force on the cable (even low intensity depending on the cable orientation) can generate a torque signal on the transducer.

Check the cables are long enough or clamp the tool cable on the frame as shown below.

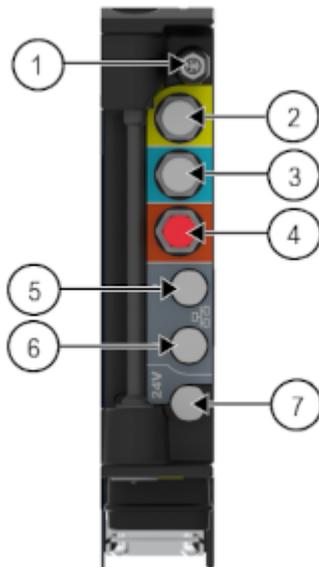


Do not set up the tool cable as shown below.



Connecting the system

M-SAFETYBOX - bottom panel

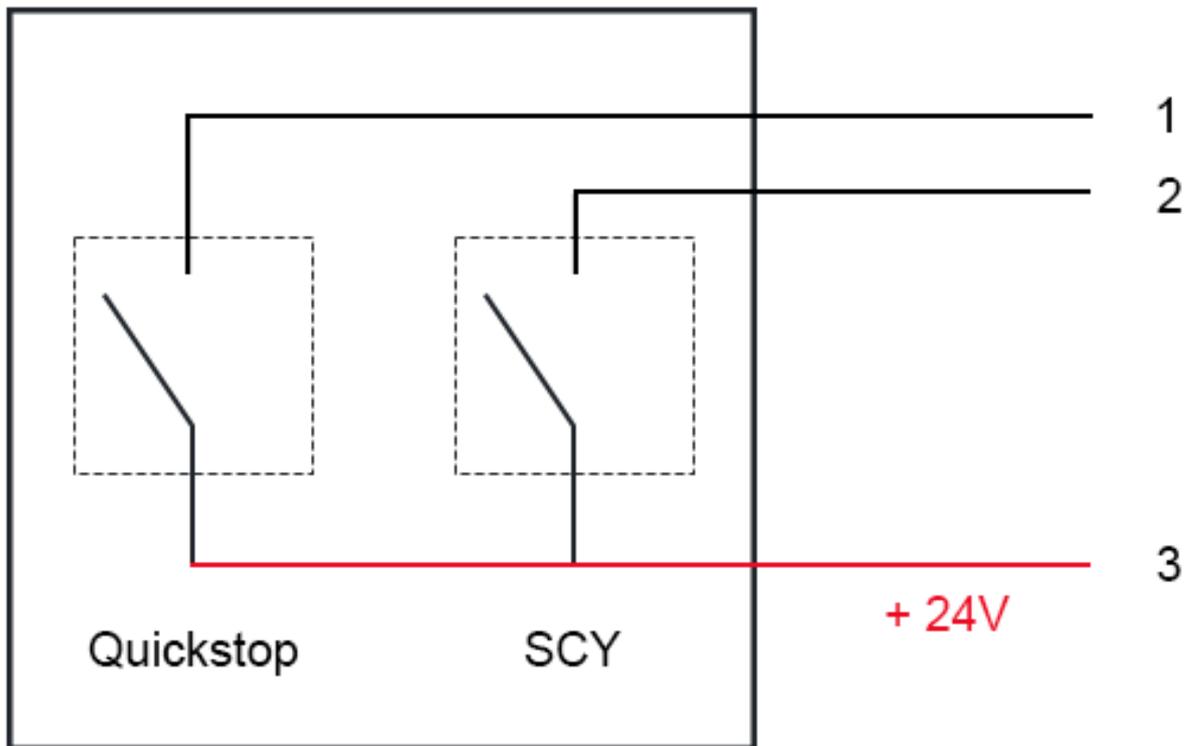


1	Quickstop - green connector
2	Emergency stop - yellow connector - OUT
3	Emergency stop - blue connector - IN
4	Emergency stop - red connector
5	Ethernet
6	Ethernet
7	CONNECT power supply

Connecting the Quickstop

Pin	Function	Wire
1	Quickstop	Black
2	Start cycle (SCY)	White
3	+ 24V	Red
4	Not used	Not used

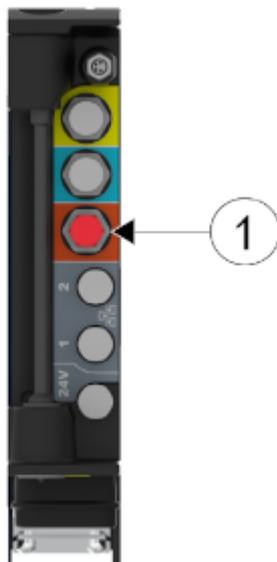




Connecting the Emergency stop

The M-SAFETYBOX must be equipped with a safety system which immediately stops the tools when the emergency system of the workstation is activated.

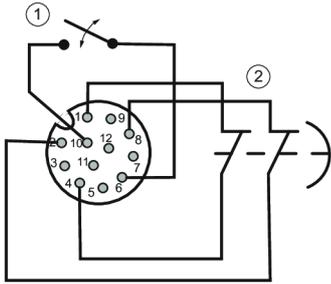
- ⓘ The Emergency stop button and the safety PLC are not considered to be a part of the MULTI system. These sources must be verified by the machine tool builder (MTB).



1 Emergency stop

Plug the supplied **M12/open - Emergency stop cable** into the M12 connector of the M-SAFETYBOX.

Refer to the following view to connect the cable to the safety system.



1 - Reset

2 - Emergency push-button (2 normally closed (NC) contacts)

1	CHANNEL1_P
2	CHANNEL2_P
3	0 V
4	CHANNEL1_M
5	0 V
6	RESET_M
7	0 V
8	CHANNEL2_M
9	0 V
10	RESET_P
11	0 V
12	0 V

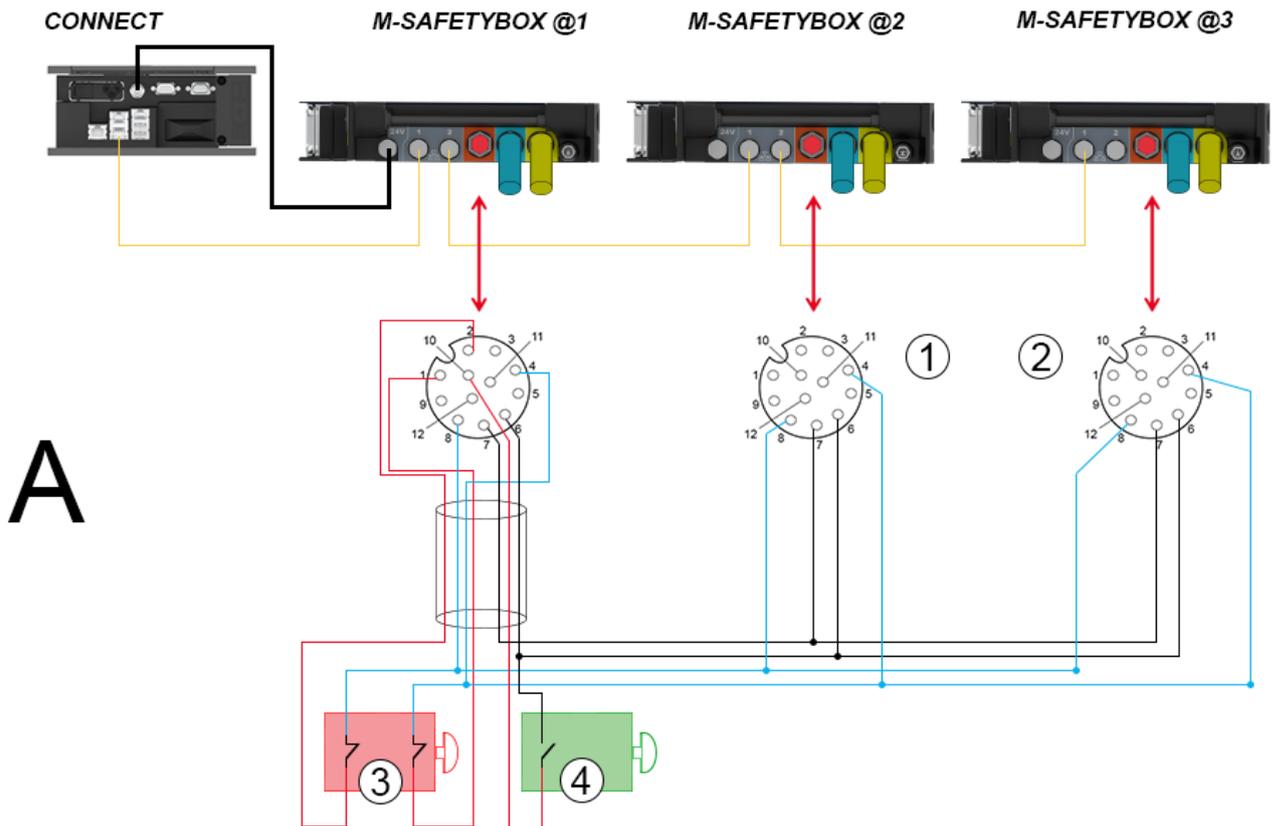
ⓘ If RESET_M and RESET_P are connected together, then emergency stop is automatically reset once emergency push button has been released.

Wiring recommendations for an emergency stop capable of managing several M-SAFETYBOX

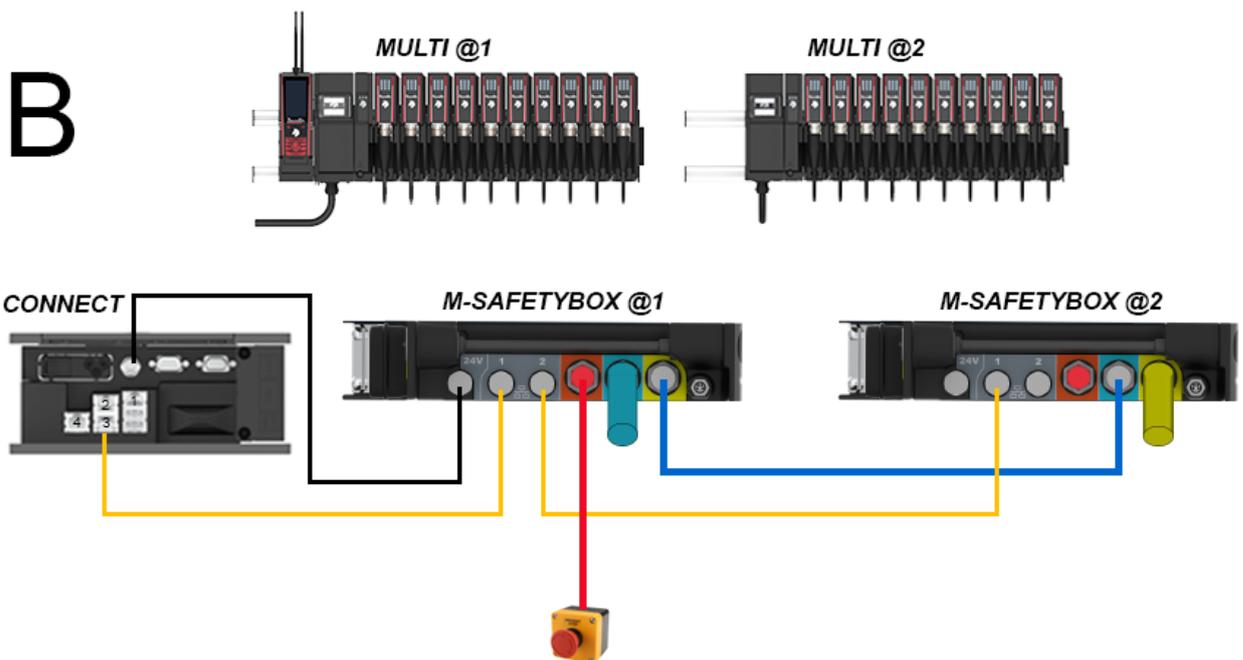
Emergency stop wiring to use for M-SAFETYBOX with Serial Number lower than 120624xxxxx (excl): **see diagram A below.**

For serial number 120624xxxxx (incl), the M-SAFETYBOX will accept both wiring:

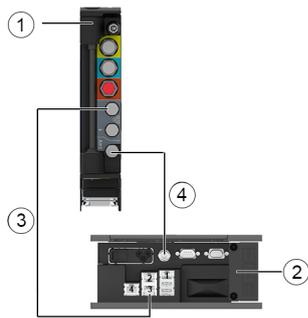
- Parallel wiring (**see diagram A below**)
- Or, daisy chain of the emergency stop with cables 6159177630 or 6159177640 (**see diagram B below**).



- | | |
|---|--|
| 1 | Pin connections for Emergency stop: 4 and 8 |
| 2 | Pin connections for Emergency Reset: 6 and 7 |
| 3 | Emergency stop button |
| 4 | Emergency stop Reset |

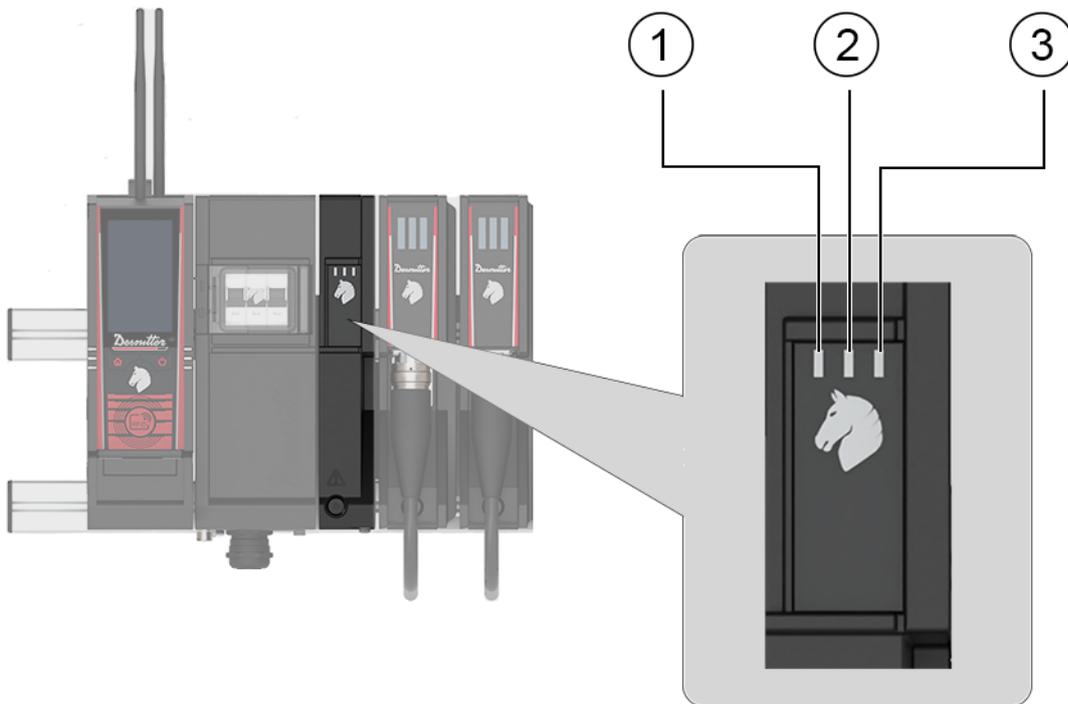


Connecting CONNECT to M-SAFETYBOX



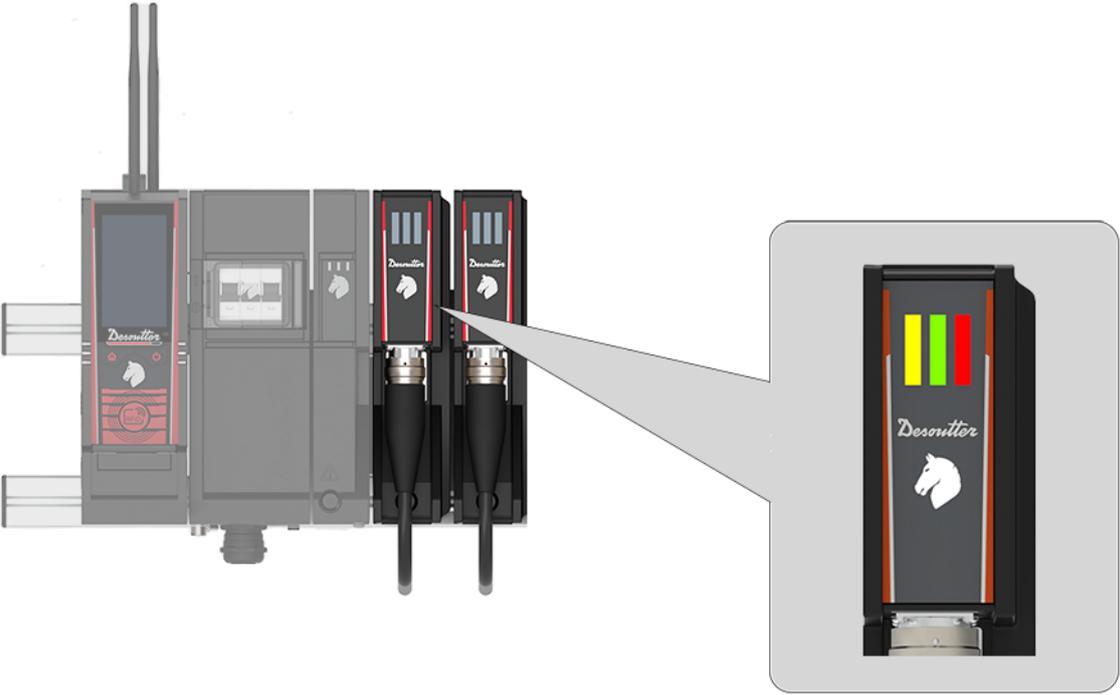
-
- | | |
|---|--|
| 1 | M-SAFETYBOX bottom panel |
| 2 | CONNECT inside panel |
| 3 | Plug the supplied Ethernet cable (6159177560 or 6159177570) to any Ethernet connector of M-SAFETYBOX and to the Ethernet port 3 of CONNECT |
| 4 | Plug the supplied M12/M12 power cable (6159177530 or 6159177540) to M-SAFETYBOX and to CONNECT. |
-

Managing M-SAFETYBOX LEDs



-
- | | |
|---|-----------------------------------|
| 1 | Emergency switch channel 1 state |
| 2 | Emergency switch channel 2 state |
| 3 | Emergency stop OK : ready to work |
-

Managing M-DRIVE LEDs



Blinking Red LED Hardware Fault



No LEDs on No Tight



Blinking Yellow LED Connected but not recognized



Steady Yellow LED Tight Not OK



Blinking Green LED and Horse Head Update in progress



Steady Yellow and Red LEDs Tight Not OK



Blinking Horse Head Drive not connected



Steady Red LED Tight Not OK



All Blinking LEDs Tool Connection



Steady Red LED Tight OK

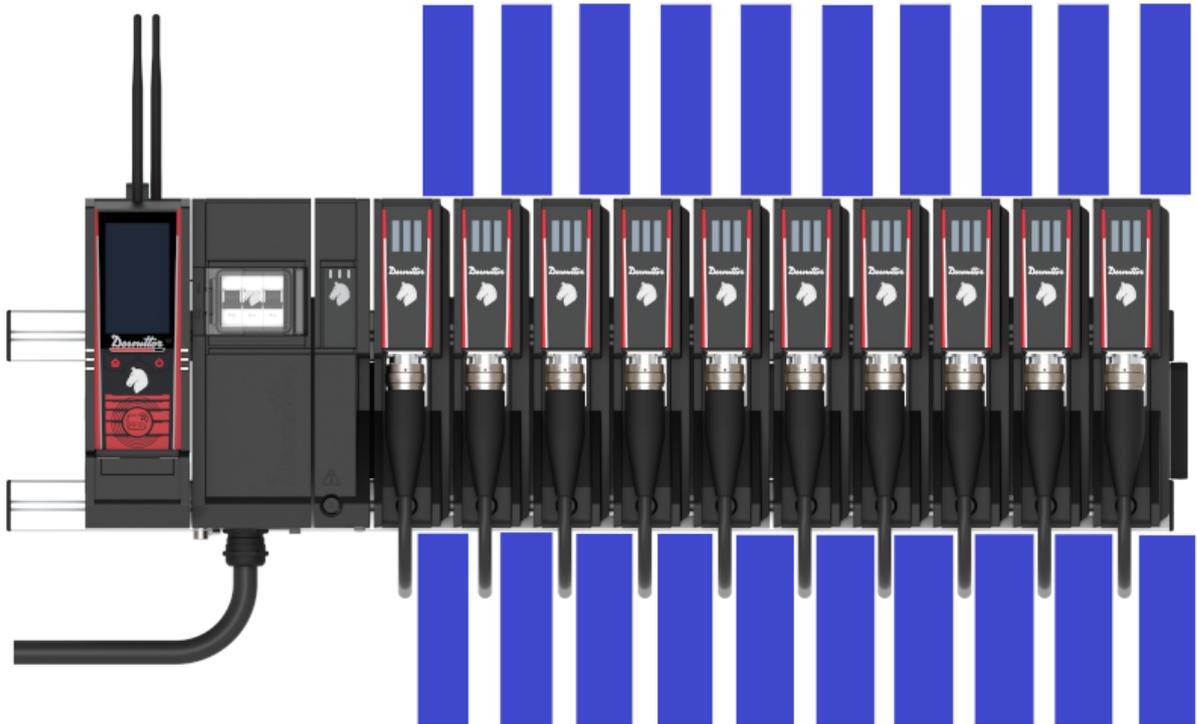
Connecting cord fixtured tools

Connecting the tool cable to M-DRIVE



1. Locate the tool connector at the bottom of M-DRIVE. Connect the tool cable to the M-DRIVE.
2. Manually guide the cable to ensure a correct bending of the cable. See *Read before installing tool cables [Page 24]*

Do not block the airflow (blue area on the schema below) on top and bottom of M-DRIVE



Connecting the ground wire to the tools mounting plate

For safety reasons, electrical bonding must be ensured between the M-POWERBOX and the tools.

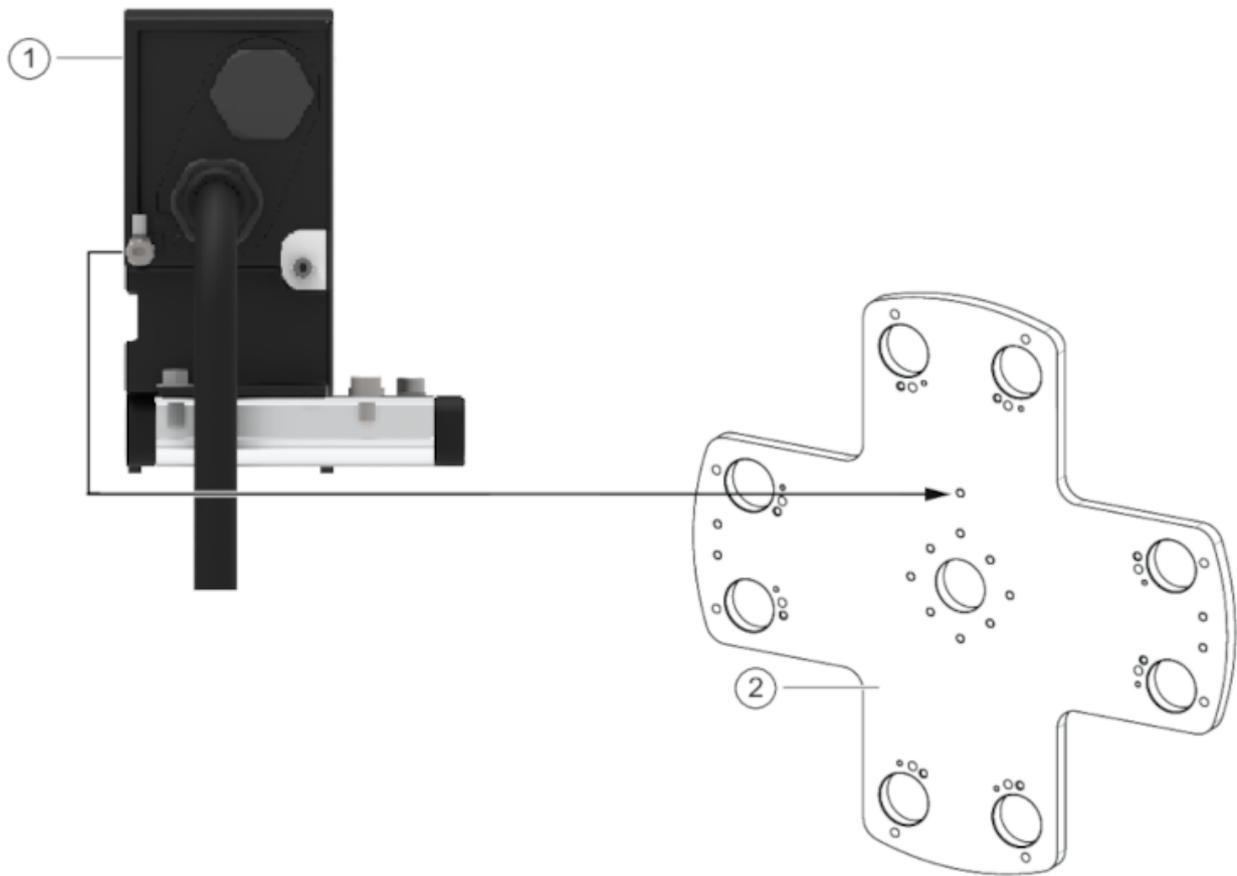
Connect the ground of the mounting plate where tools are clamped to the M-POWERBOX ground in order to form an equipotential zone.

⚠ WARNING Risk Of Electric Shock

The mounting plate where tools are clamped must be **earthed**.

The specifications of the ground wire (not supplied) must be as follows:

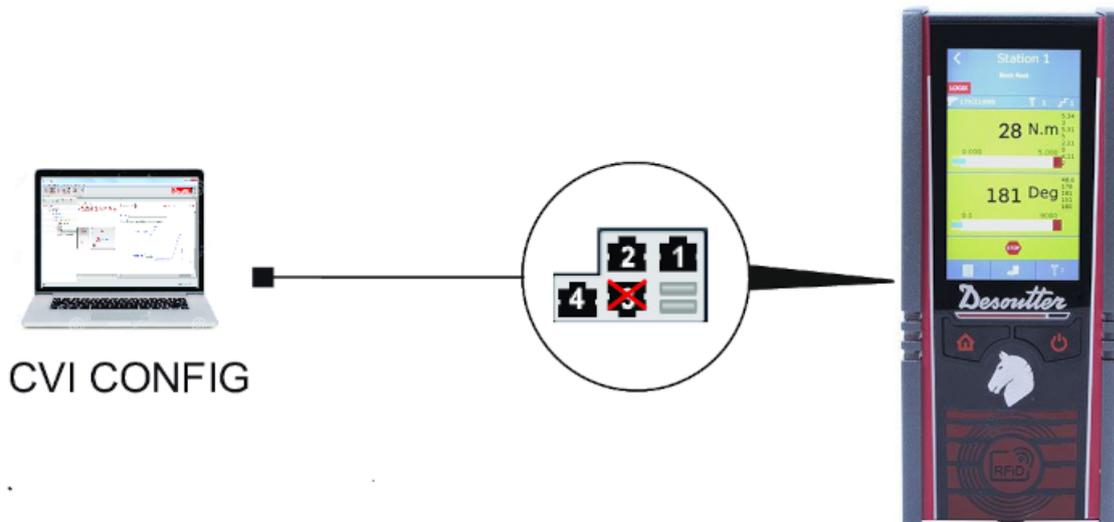
- The ground wire must be long enough to reach the mounting plate where the tools are clamped.
- Use a 10 mm² minimum Yellow/green copper wire.



-
- | | |
|---|--|
| 1 | M-POWERBOX bottom panel |
| 2 | Mounting plate where tools are clamped |
-

Connect the ground wire to the M8 screw located at the bottom of the M-POWERBOX.
Use the recommended electrical contact TE 323167.
Place the toothed lock washer and tighten the screw at 15 Nm.
Repeat the procedure to connect the ground wire to the mounting plate.

Connecting a computer to CONNECT



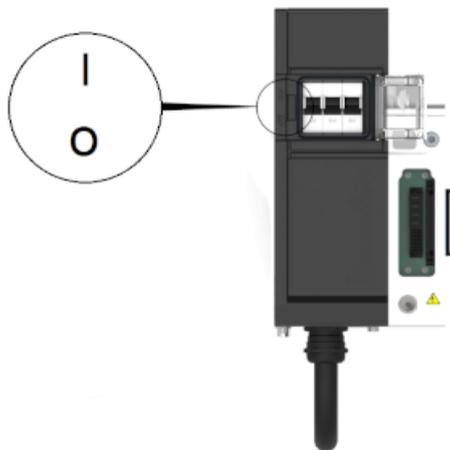
Connect the computer -where CVI CONFIG is installed- to one of the Ethernet ports (1, 2 or 4) of the inside panel of CONNECT.

Powering on

WARNING Risk Of Electric Shock

Only qualified and trained operators should install, adjust or use this equipment.

Powering off M-POWERBOX



1. Open the cover on the front of M-POWERBOX
2. Switch the circuit-breaker of M-POWERBOX to **O**.

This will turn the system to **OFF**.

WARNING Wait at least 30 seconds between power off and power on when you restart the system.

Powering on the distribution circuit-breaker

WARNING Risk Of Electric Shock

It is dangerous to use systems, cables or units that are not in good condition or not connected according to electrical regulations and system requirements, whether manufactured by Desoutter or third party.

Carry out a general inspection of the installation before powering on the system.

Check that:

- Cables are not damaged.
- Electrical connections are not damaged.

If these conditions are not fulfilled, the system must not be connected to mains or switched on. Systems where damages to connections or cables are found must be disconnected and repaired immediately.

Switch the distribution circuit-breaker to **I**.

This will power supply the M-POWERBOX.

Powering on M-POWERBOX and CONNECT



1. Switch the circuit-breaker of M-POWERBOX to **I**.
This will turn the system **ON**.
2. Close the cover on the front of M-POWERBOX
3. If CONNECT is powered by M-POWERBOX, it will start automatically.
If CONNECT is directly powered by a standard main connection, refer to CONNECT Safety Information.

Reporting LEDs at powering on

The LEDs of the drives are briefly blinking.



Wait for a few seconds while the firmware is being initialized.

- i** Wait at least 30 seconds between power off and power on when you restart the system.

Drive state	Description	
	The Desoutter logo is blinking.	The power supply is present but the connection with CONNECT is not established.
	The Desoutter logo is steady.	The power supply is present and the connection with CONNECT is established.

Software installation

Read before installing software

Location of Desoutter programs

Once installed, installation programs are located here:
C:\Program Files (x86)\Desoutter.

Computer minimum requirements

General

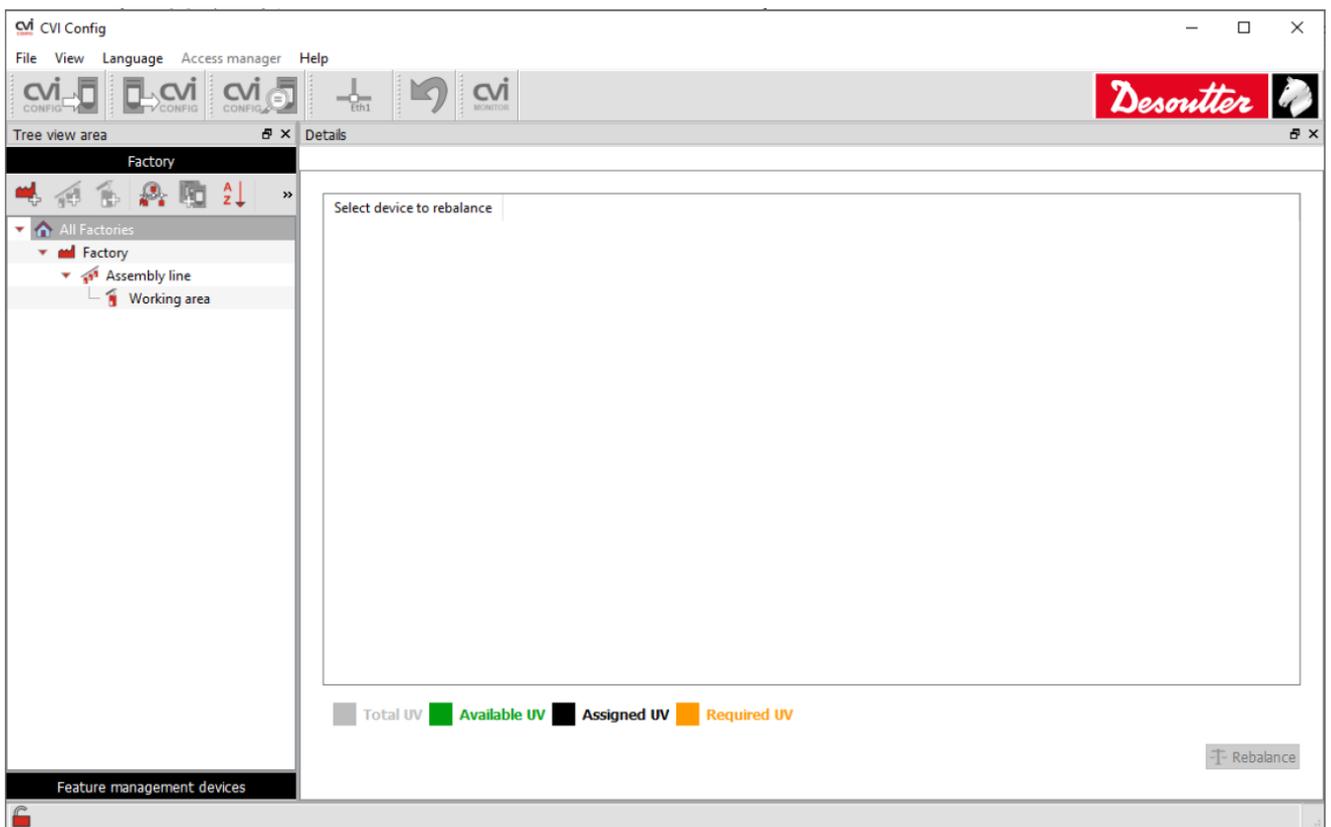
The computer has to be connected to an Ethernet network.
Check you have the administrative privileges on your computer.

CVI CONFIG / CVI ANALYZER

Operating systems	Windows 7 ; Windows 10
Free disk space	350 Mo
Monitor resolution	1280 x 1024

Installing CVI CONFIG

Contact your Desoutter representative to get the last release of the software.
Unzip the file and run the .exe file.
The following start screen is displayed.



Test and validate installation

Testing and validating

The goal is to test that tightening tools are running and that they immediately stop when the Emergency stop device is activated.

Follow the steps below.

Setting up MULTI in CVI CONFIG

i Plug an Ethernet cable to the computer and to any available port of CONNECT.

1. Launch CVI CONFIG from the computer desktop.
2. Right-click **Working area** and click **Add product**
3. Click **CONNECT**
4. Enter CONNECT IP address

CVI Add "Connect-W" ×

Parameters

Description

IP address

Embedded Wi-Fi access point activated

Customized protocol activated



i CONNECT-W is packaged with an internal Access Point.
The Internal Access point can managed up to 10 Wireless Tightening Units.
When the internal Access point is deactivated and CONNECT-W is connected with External Access point(s), up to 20 Tightening Units can be activated

Click "Next" to configure your Tightening Units.
Click "Finish" to add your product to your working area.

5. Go to the middle panel and add 1 M-DRIVE per tool.

cv Add "Connect-W"

Tightening Units

Tightening unit - 1
Add tools

- 0 +

Allowed: 40

Drives configuration

Add drives

 - 4 +
Allowed: 10

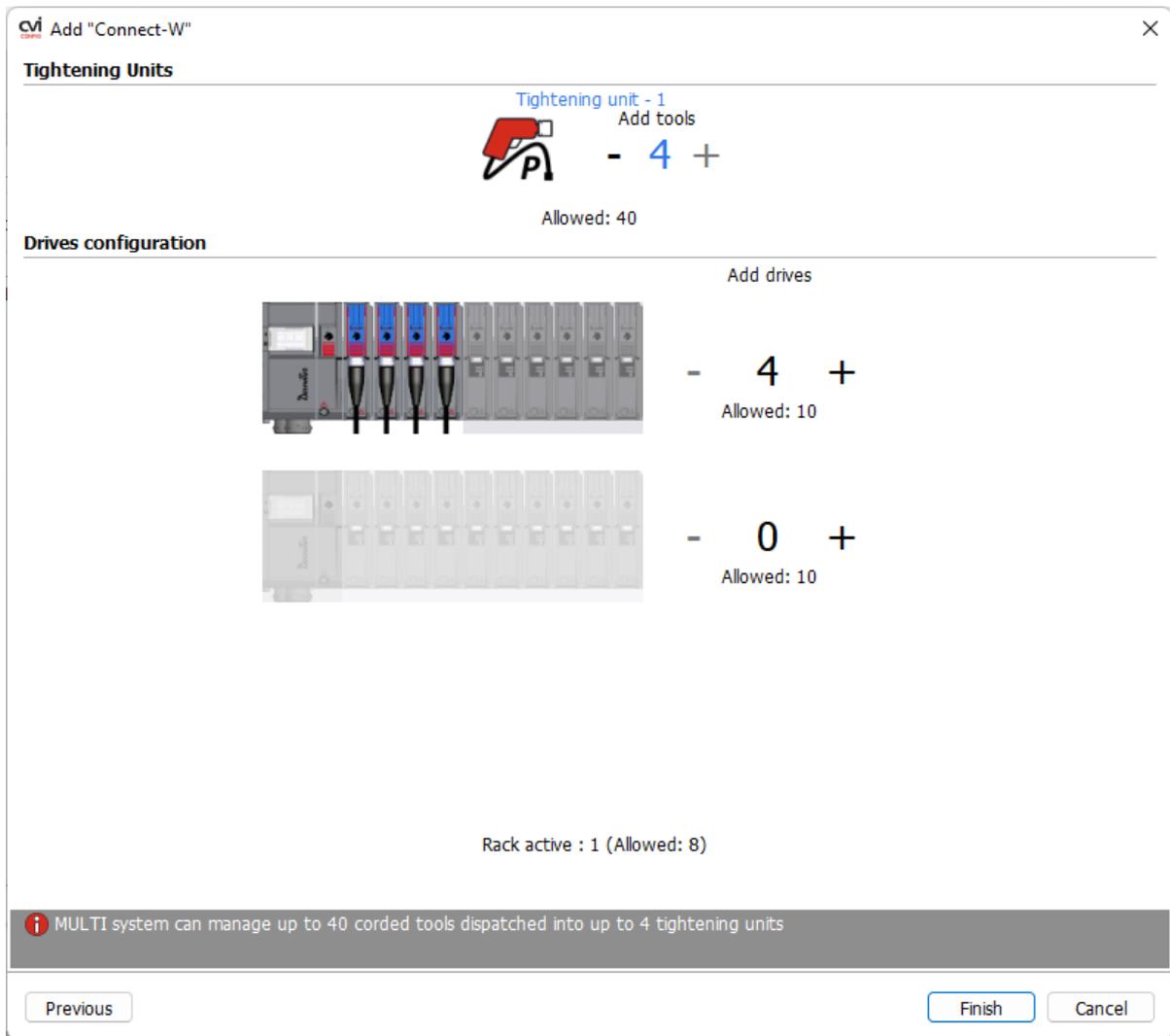
 - 0 +
Allowed: 10

Rack active : 1 (Allowed: 8)

i MULTI system can manage up to 40 corded tools dispatched into up to 4 tightening units

Previous Finish Cancel

- Go to the panel on the right and allocate the tools to Tightening Unit-1.



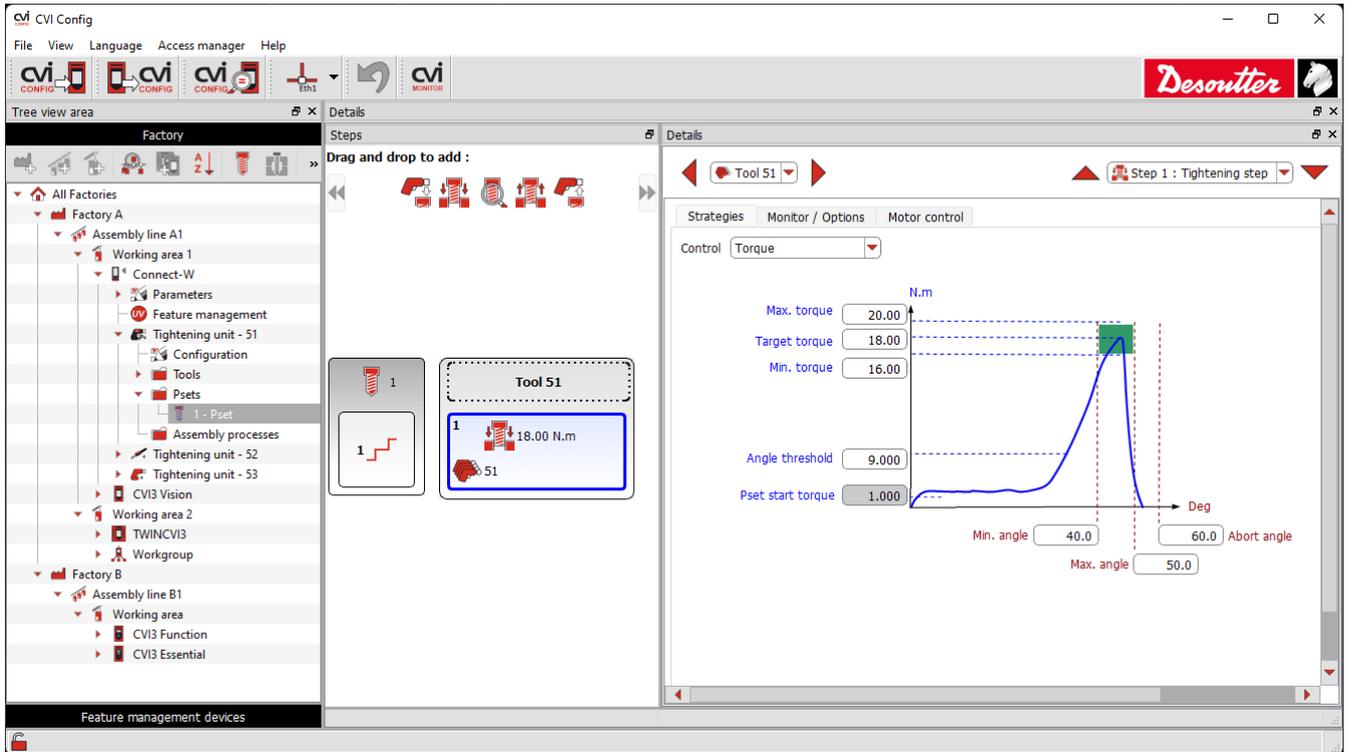
- Click **Finish**.

Setting up the tools

- Go to the tree view.
- Click **Tightening unit - 1 --> Tools**.
 - By default, the tool model is EMFS43-15.
- Click the tool and go to the pane **Setup**.
- Scroll the list of models and select your model. Repeat the procedure for each tool.
- Right click each tool and select **Update** to read the tool. A green tick will indicate that the tool is recognized.

Configuring a Pset

- Go to the tree view.
- Select **Tightening unit - 1 --> Psets**
- Right-click **Psets** and click **Add**.
- Select **Expert mode** and click **OK**.
- Go to the middle panel and click the box which shows the tightening step.
- Adjust the values according to your application.



Updating CONNECT



Click this icon to update the product.

Check that CONNECT IP address is correct.

Click **Start transfer**.

(i) If the access to the product is denied, go to CONNECT and quit the screen by pressing **Home**.

Restart the transfer.

Testing a Pset with CVI MONITOR

1. Go to CVI CONFIG.

2. Go to the tool bar at the top.



Click this icon to launch CVI MONITOR.

3. Go to the menu bar.

Click **View --> Monitoring --> Tightening unit --> Pset test**.

To activate the screens, you need to have an ACCESS KEY USB stick with the right profile (configured with the Desoutter CVIKEY software).

If not, contact your CVIKEY manager for support.

4. Go to the pane **Pset test**.

5. Click **Update Pset list**.

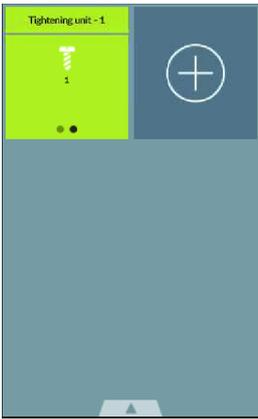
Select the Pset.



Make sure that the tool is in perfect working order and the system is programmed correctly, to reduce the risk of injury to the operator as a result of unexpected behaviour of the tool.

6. Click **Start test**.

7. Go to **CONNECT**.



8. Click **Tightening unit-1**.



9. Click the box **Over-all result**.



Activating the Emergency stop system

1. Run the Pset again.
2. Activate the Emergency stop system.
Tools **must** stop immediately.
3. Go to CONNECT.
The user info **E918 - Emergency stop activated** is displayed.
4. Release the Emergency stop system to unlock the tools.

Hardware upgrade

Upgrading **CONNECT**

Checking the existing system firmware



Go to the start screen and tap this icon.

Tap **Versions**.



Tap this icon to quit.

Checking the firmware version with **CVIMONITOR**

Launch CVI MONITOR software from the launchbar on your computer desktop.

Type the IP of the relevant system and click "Select".



Click this icon to display information about the system.

Upgrading the firmware

Contact your Desoutter representative to get the last firmware version.

Copy the files to the **root** of a USB key.

Plug the USB key into the front panel.



Go to the start screen and tap this icon.

Tap **System > USB key > Upgrade SW**.

Tap **Yes**.

CONNECT beeps during 2 seconds and starts the process.

Do not switch off CONNECT. Wait for the automatic reboot.

The update lasts a few minutes.

When the upgrade is successful, the green LED of the front panel is ON and steady.

Software upgrade

Upgrading software

① It is not necessary to backup your configurations before upgrading software.

To get the last release, go to <https://www.desouttertools.com/resource-centre>.

Select "Software", and download the .zip file.

Go to the folder "Downloads" of your computer, copy the file and paste it in a safe location.

Unzip the file and run the program.

Contact your Desoutter representative to get more information and support.

References

Logical input

General commands

Name	Description	Status
Start stop Tightening on state	<p>Initiates a fastening cycle if:</p> <ul style="list-style-type: none">- the "Spindle validation forward" is active and required by the tightening unit,- a Pset is selected. <p>A rising edge must be detected to initiate a tightening, that is the change in the state of the tool from off to on as the trigger is released, then pressed again must be detected. For the tightening to proceed, this input must remain active. If this input becomes inactive at any time during the tightening, the tightening will be aborted and the tool will stop running. At the end of tightening, a tightening can began only if signal falls and then rise. After power-up, even if this signal is active, an edge is necessary to start tightening."</p>	State
Toggle start stop tightening on edge	<p>This input is enabled for fixed tools only (tools without trigger). Initiates or ends a fastening cycle.</p> <p>A cycle can be initiated only if:</p> <ul style="list-style-type: none">- the "Spindle validation forward" is active and required by the tightening unit- the Pset is selected. <p>If no tightening is currently executed, a rising edge will initiate a tightening. A falling edge has no effect on the tightening to proceed. If a tightening is in execution, a rising edge will stop it."</p>	Rising edge
Reverse direction	<p>When activated, the tool green & red lights are flashing to indicate that the tightening unit reverse direction is selected.</p> <p>This signal status is not controlled during a tightening but only when tool is not running.</p>	State
Error acknowledge	<p>Enables the "Reject lockout" function. When locked out, the tool cannot run until this input is reset.</p>	Rising edge

Name	Description	Status
Reset	<p>When input reset raises (and there is no cycle running):</p> <ul style="list-style-type: none"> - defaults are acknowledged - batch counter of current Assembly Process is reset - reports lights on controller and tool are set off - result on display is erased but the last 5 result values on Vision display stay readable - in Pset mode, Pset selected remains unchanged. In AP mode, AP is aborted. - ready output stay on - echo identifier is reset <p>When input reset raises (and there is cycle running):</p> <ul style="list-style-type: none"> - tightening is immediately stopped - defaults are acknowledged - batch counter of current Assembly Process is reset - at tightening end, there is no report generated. - at tightening end, it is impossible to start a new tight, reset input must be released first. - in Pset mode, Pset selected remains unchanged. <p>In AP mode, AP is aborted.</p> <ul style="list-style-type: none"> - ready output stay on - echo identifier is reset 	State
Reset only status	<p>When input reset raises (and there is cycle running):</p> <ul style="list-style-type: none"> - tightening is immediately stopped <p>Resets only:</p> <ul style="list-style-type: none"> - Tightening OK/NOK - Spindle OK/NOK - Pset finished - Pset finished no timeout - Batch OK/NOK/Finished <p>The Assembly Process is not aborted. Result values (angle, torque) are still present in Fieldbus. LEDs on tool and system are not affected.</p>	State
Ack error message	Acknowledge error message displayed on HMI.	Rising edge
Force Pset mode	<p>Forces the Tightening unit to switch in Pset mode in order to temporary run Psets (nothing saved).</p> <p>When AP mode + input state high, then switch to Pset mode.</p> <p>When Temporary Pset mode + input state low, then switch to AP mode.</p> <p>Switching on the system power with the input set will switch to Pset mode.</p> <p>Other cases do nothing."</p>	State
Ack result	<p>Acknowledges the current result. The tool is then unlocked and can tight again. Formerly dedicated to Fieldbus only, this behaviour is now also available for IOs and OpenProtocol</p>	Rising edge

Name	Description	Status
Keep alive	Input used to check that the controller is still alive. State of this input is copied to "Keep alive ack" output. This input is also used by a PLC to inform the controller that Fieldbus communication is working.	State
Time Synchro Trigger	Execute date & time synchronisation from Fieldbus (SYN in VWXML Protocol)	Rising edge
Enable access manager	Enable/disable access manager	State
Lock display	Lock/unlock the controller display.	State
Restart controller	Reboots the controller. Everything must be done by software before using this input	Rising edge
Reset identifiers	Erase all ongoing accepted identifiers fields from system/tool memory in order to guarantee a correct traceability	Rising edge

Tool commands

Name	Description	Status
Tool validation forward	Enables the tool to run the selected Pset. Note: the forward and reverse validation can be done by setting both validations on the same input. When the validation signal falls down, the tool stops.	State
Tool validation reverse	Enables the tool run reverse. Note: the forward and reverse validation can be done by setting both validations on the same input. When the validation signal falls down, the tool stops.	State
Reset tool locks	Reset tool locks, only the none safety tool locks will be affected	Rising edge
Tool stop	Stops the tool.	Rising edge
Tool blue light ctrl by IO	1 = tool blue light is controlled by IO 0 = tool blue light is managed by the controller	State
Tool blue light	If "tool blue light ctrl by IO" is set to 1 (see upward) then: 1 = tool blue light is set to on 0 = tool blue light is set to off	State
Tool green light ctrl by IO	1 = tool green light is controlled by IO 0 = tool green light is managed by the controller	State
Tool green light	If "tool green light ctrl by IO" is set to 1 (see upward) then: 1 = tool green light is set to on 0 = tool green light is set to off	State
Tool red light ctrl by IO	1 = tool red light is controlled by IO 0 = tool red light is managed by the controller	State
Tool red light	If "tool red light ctrl by IO" is set to 1 (see upward) then: 1 = tool red light is set to on 0 = tool red light is set to off	State

Name	Description	Status
Tool yellow light ctrl by IO	1 = tool yellow light is controlled by IO 0 = tool yellow light is managed by the controller	State
Tool yellow light	If "tool yellow light ctrl by IO" is set to 1 (see upward) then: 1 = tool yellow light is set to on 0 = tool yellow light is set to off	State
Tool white light ctrl by IO	1 = tool white light is controlled by IO 0 = tool white light is managed by the controller	State
Tool white light	If "tool white light ctrl by IO" is set to 1 (see upward) then: 1 = tool white light is set to on 0 = tool white light is set to off	State
Reset of redundancy error	Resets only redundacy error	State

Pset commands

Name	Description	Status
Pset select bit (0..7)	Used to select Psets. These inputs must be in the desired state BEFORE the activation of the cycle start input. If the selected Pset is zero, there is no Pset selected.	State
Select previous Pset	Select lower number Pset.	Rising edge
Select next Pset	Select higher number Pset.	Rising edge
External stop abort Pset	This input is used with proximity detectors to end immediately Pset running. The user can choose which state or transition will stop the Pset: No, Rising, Falling, Change, High, Low. When a Pset is aborted with this input, the Pset result is NOK.	"rising edge or state
External stop to next step	This input is used with proximity detectors to end the running step. The user can choose which state or transition will stop the Pset : No, Rising, Falling, Change, High, Low. The user can also choose the step result when the stop request occurs: OK, NOK, Monitoring (Monitoring means that the result is computed depending on monitoring requested).	"rising edge or state
Synchro in	Step synchronisation input. The step starts when a transition to 0 is detected.	State
External tool inputs bit (0..9)	Indicates that these inputs can be used by external tool (to generate OK/NOK report for example)	State

Assembly Process commands

Name	Description	Status
Assembly process selection bit (0-7)	Used to select an Assembly process. These inputs must be in the desired state BEFORE the activation of the assembly process start input.	Rising edge

Name	Description	Status
Abort assembly process (tightening unit)	The "Abort assembly process" input stops the Assembly process being processed. The Assembly process is finished. The Assembly process result is memorized as "aborted" and "AP aborted" and "AP NOK" events are set.	Rising edge
Batch-1	The "Batch-1" input allows the operator to select the previous operation of a batch whatever the result of the next operation. The batch counter is decremented. The action is recorded OK or NOK according to the result and "Batch-1 event" is set.	Rising edge
Batch+1	In case you cannot complete the current operation of a batch, jump to the next one by using the external input "Batch+1". The action is declared as NOK and "Batch+1" event is set.	Rising edge
Restart batch	Restarts the current batch of the current Assembly Process step. The "Restart batch" event is set.	Rising edge
Reset number of retries	Reset the number of retries counter. If the max counter has been reached the tool is unlocked	Rising edge

External input

Name	Description	Status
External in AP bit (0..49)	Inputs used in Assembly process in start conditions or in assembly actions sense input	Rising edge
External In PLC bit (0..9)	Indicates this input can be used by an PLC via Fieldbus (like a remote I/O). For PLC side, it is an input.	State
External In Open Protocol 1-8	Inputs used in Open Protocol. They can be monitored from the Open Protocol client by subscription. These inputs are named "External monitored 1..8" in Open Protocol specification.	State

Socket tray

Name	Description	Status
Socket lifted bit (0..4)	Used with CVI II controllers only: 24V socket trays (BSD). Informs which socket has been lifted.	State

Customized Protocol commands

Name	Description	Status
PFCS End Of Cycle	Input used in PFCS Chrysler to flush the result FIFO when the operator has completed the work	Rising edge
SAS	Starts tightening job	State

Name	Description	Status
RST	Resets any running tightening job	State
LSN	Disables reverse	State
TOL	Tool validation	State
STR	Tool start	State
EDZ	Resets results	State
XMS	Synchronous XML	State
XMA	XML activated	State

CVILOGIX

Name	Description	Status
External In CVILOGIX bit (0..100)	Indicates that this input can be used by an internal CVILOGIX application	State
CVILOGIX validation	Enables CVILOGIX to lock/unlock the tool.	State

List of user infos

List of user infos related to the system

Type	Colour	Description	Action
Information	White	For information only.	No action is required.
Warning	Orange	The tool is locked.	Click the message to clear (acknowledge) the message and unlock the tool.
Error	Red	The tool is locked.	The issue has to be solved to unlock the tool and clear the error message.

Number	Description	Procedure
I001	Tubenut open	1- Tubenut tool is detected as open.
I002	Tool connected	1- The tool is connected and correctly recognized by the system.
I003	No tool connected	1- The tool has been disconnected. 2- If the tool is not physically disconnected, check the tool cable.
I015	Tool lock on reject	1- The tool is locked forward after a NOK. 2- Unlock the tool in function of the "lock on reject option" selection i.e. by reversing, loosening or input.
I016	Tool lock by Open Protocol	1- Tool has been locked by Open Protocol. 2- Unlock the tool by sending an "Enable tool" message via Open Protocol.
I017	Loosening prohibited	1- Loosening is prohibited. 2- The loosening is disabled in the Assembly action. 3- The batch count type OK + NOK is used.
I021	Maximum retries reached	1- The maximum number of retries has been reached. 2- The tool is locked. 3- The running Assembly Process has to be aborted.
I022	Lock wait socket	1- The tool is locked. Put all sockets back and lift the correct sockets combination.
I024	Loosening prohibited XML	1- Loosening is disabled by VWXML protocol.
I025	Tightening prohibited XML	1- Tightening is prohibited by VWXML protocol.

Number	Description	Procedure
I040	Tool over speed	1- Motor speed exceeds 130% of its maximum value. 2- Check tool parameters (wrong motor tune parameters). 3- Contact your Desoutter representative for support.
I042	Tool locked by GeoPositioning system	1- Tool has been locked by GeoPositioning system. 2- Unlock the tool by moving the tool in its defined area.
I043	Tubenut maintenance	1- Tubenut settings need to be reconfigured. 2- Contact your Desoutter representative for procedure.
I044	GeoTracking/Positioning learning mode ongoing	1- GeoTracking/Positioning learning mode.
I049	Access denied	No procedure.
I050	Tool detection for pairing	No procedure.
I051	ePOD connected	ePOD connected.
I052	Incorrect network parameters	Incorrect network parameters
I053	No Tightening Unit available	No Tightening Unit available
I054	Pairing success	No procedure.
I055	eDOCK already present on system	No procedure.
I056	ePOD disconnected	ePOD disconnected
I057	Pairing error	No procedure.
I058	Tool locked by GeoTracking system	1- Tool has been locked by GeoTracking system. 2- Unlock the tool by moving the tool in its defined area.
I059	New tool detected	No procedure.
I060	Tool synchro ongoing	No procedure.
I061	ExBC connection conflict	1- Two ExBC are configured with the same network settings. 2- Verify communication ports and IP addresses.
I100	Cable ID invalid parameter	1- Invalid tool cable parameter. 2- Check that the tool cable is Desoutter certified. 3- Contact your Desoutter representative for support.
I101	Cable ID not detected	1- Tool cable communication error. 2- Check that the tool cable is Desoutter certified. 3- Contact your Desoutter representative for support.
I102	Cable ID not certified	1- Tool cable authentication error. 2- Check that the tool cable is Desoutter certified. 3- Contact your Desoutter representative for support.
I199	Console activated	1- The serial console is activated. 2- Warning: this console is dedicated to debug purposes only and should not be used in production.
I202	Fieldbus lost	1- Fieldbus connection with PLC is lost. - no heartbeat is received from PLC. - the cable is broken or disconnected. - the PLC is offline or not powered. 2- Check the Fieldbus configuration.
I204	Tool not validated	1- Tool locked by I/O. 2- Check I/O settings: "Tool validation" must be active to unlock the tool.
I207	Assembly done	1- Assembly Process is done, the tool is locked. 2- Select a new Assembly Process to unlock the tool.
I208	Invalid run reverse parameter	1- Invalid Run Reverse setting: torque or speed are greater than tool characteristics or loosening strategy is not supported. 2- Check Pset settings with the current tool characteristics. 3- Reduce the maximum number of turns.

Number	Description	Procedure
I209	Pset invalid parameters	1 - Software internal error. 2 - Pset is corrupted. Try to transfer it again to the system. 3 - If the error persists, contact your Desoutter representative for support.
I215	Current calibration error	1- Current calibration failed. 2- Try once again. 3- If the problem occurs again, contact your Desoutter representative for support.
I225	Error angle	1- Tool communication error. 2- Check tool and cable connections. 3- If the problem occurs again, contact your Desoutter representative for support.
I226	Error torque	1- Tool communication error. Check tool and cable connections. 2- Try once again. 3- If the problem occurs again, contact your Desoutter representative for support.
I234	Fieldbus mismatch	1-The Fieldbus module declared in configuration is not the same than the module connected to the system.
I237	Invalid data	1- The Fieldbus mapping has too many items.
I238	Invalid address	1- The device address affected to Fieldbus is invalid.
I239	Invalid communication settings	1- Fieldbus communication settings are invalid.
I241	CVINET FIFO alarm	1- CVINET FIFO has reached the alarm threshold, the connection is lost. 2- Check the Ethernet cable. 3- Check the Ethernet configuration. 4- Check that CVINET is running correctly.
I242	ToolsNet FIFO alarm	1- ToolsNet FIFO has reached the alarm threshold, the connection is lost. 2- Check the Ethernet cable. 3- Check the Ethernet configuration. 4- Check that ToolsNet is running correctly.
I244	Accessory disconnected	1- The accessory at the given address has been disconnected from the eBUS of the system. 2- Check the accessory cable.
I245	Wait report acknowledge	1- Acknowledge report with its corresponding input.
I254	Drive communication error	1- Error detected in drive communication. 2- Restart the system. 3- If the problem occurs again, contact your Desoutter representative for support.
I259	Reset input active	1- "Reset" input is active. 2- The tightening unit will unlock when input switches to "Inactive".
I261	Locked by IPM	1- IPM protocol has locked the system. 2- Check the connection with the IPM gateway. 3- Check the IPM configuration in the system.
I262	Open Protocol connection lost	1- Open Protocol connection has been lost.
I263	Socket tray conflict	1- For this tightening unit, do not associate more than one socket combination to a Pset.
I264	Too many steps	1- Connect an ePOD3 to the system to enable more steps per Pset.
I266	Message:	Incoming message received with dynamic text.
I269	Pset modified	No procedure.
I271	External tool Pset selected	1- Tool is locked because of "External tool Pset" selection.

Number	Description	Procedure
I275	Invalid eCompass Pset	1- Check tool is compatible with gyroscope (eCompass). 2- Else use a tool compatible with gyroscope. 3- Else edit your Pset to remove gyroscope settings.
I310	Identifier OK:	1- An identifier has been received and accepted. 2- The identifier is matching an Assembly Process start condition.
I311	Identifier NOK:	1- An identifier has been received. 2- The identifier does not match any Assembly Process start condition.
I312	Access expired	1- The access rights on the USB key cannot be read. 2- Unplug the key and insert it again. 3- If the issue is persistent, the access right file is probably corrupt. 4- Contact your "CVI Key" administrator.
I313	Access invalid	1- The access rights on the USB key cannot be read. 2- Unplug the key and insert it again. 3- If the issue is persistent, the access right file is probably corrupt. 4- Contact your "CVI Key" administrator.
I314	CVIKey plugged	No procedure.
I315	CVIKey unplugged	No procedure.
I316	Barcode lost	No procedure.
I400	Default network configuration	1- Network configuration has been set to default.
I401	Network configuration error	1- Network configuration failed. 2- Check your settings. 3- If the problem occurs again, contact your Desoutter representative for support.
I500	CVILOGIX user info	Message generated by CVILOGIX program.
I503	CVILOGIX	1- Tool has been locked by CVILOGIX. 2- Check the CVILOGIX program status. 3- Check an ePOD is plugged to the system.
I700	eWallet plugged	eWallet plugged
I701	eWallet unplugged	1- eWallet unplugged. 2- Try unplugging the key and insert it again. 3- If the problem occurs again, contact your Desoutter representative for support.
I702	RIM unplugged	RIM unplugged
I703	RIM unplugged	RIM unplugged
I888	System software updated	No procedure.
I889	Device software updated	No procedure.
I891	System started	No procedure.
I899	Downgrade not allowed	1- Software downgrade is not allowed for this version. 2- Check the software image version on your USB key. 3- If the problem occurs again, contact your Desoutter representative for support.
I900	Software update failed	1- Software upgrade failed. 2- Do not remove the USB key and restart the system. 3- If the problem occurs again, contact your Desoutter representative for support.
I901	Software not found	1- The software upgrade failed: software image invalid. 2- Check your USB key: it must have only one image at the root directory.

Number	Description	Procedure
1902	Software invalid	<ol style="list-style-type: none"> 1- The software upgrade failed: software image invalid. 2- Remove and copy again your software image. 3- Try another USB key. 4- Contact your Desoutter representative for more information.
1903	Software updater missing	<ol style="list-style-type: none"> 1- The software updater is not available or damaged. 2- Contact your Desoutter representative for more information.
1904	Backup disabled	<ol style="list-style-type: none"> 1- The "Save parameters" utility is not available. 2- Contact your Desoutter representative for more information.
1905	USB key full	<ol style="list-style-type: none"> 1- Your USB key is full, all data were not saved. 2- Delete your old backup files and try again.
1906	Save parameters failed	<ol style="list-style-type: none"> 1- An error occurred during backup: data were not saved. 2- Check the available space on your key, delete files and try again. 3- If the problem occurs again, contact your Desoutter representative for support.
1907	Wrong USB port	<ol style="list-style-type: none"> 1- Your USB device is plugged to the wrong port. 2- If your device is a USB key, plug it to the USB front port. 3- If your device is a USB barcode reader or keyboard, plug it to the bottom USB ports.
1908	Too HID device	<ol style="list-style-type: none"> 1- Too many USB devices (barcode reader or keyboard) are plugged to the system. 2- Remove all devices and plug them again to the bottom USB ports only.
1909	HID device error	<ol style="list-style-type: none"> 1- Your USB device is not supported by the system. 2- Only USB barcode reader and USB keyboard are supported. 3- If the problem occurs again, contact your Desoutter representative for support.
1910	Save program error	<ol style="list-style-type: none"> 1- Plug an USB key to the front panel. 2- Check available space on your USB key, delete some old backup and try again.
1911	Load program error	<ol style="list-style-type: none"> 1- Plug an USB key to the front panel. 2- The .zip file was not found: check that it is in the correct directory.
1912	Backup failed	<ol style="list-style-type: none"> 1- Check the ePOD connection. 2- Contact your Desoutter representative for support.
1913	Restore failed	<ol style="list-style-type: none"> 1- Check the ePOD connection. 2- Contact your Desoutter representative for support.
1914	Maintenance ongoing.	Maintenance ongoing.
1917	Accessory configuration error	<ol style="list-style-type: none"> 1- The accessory configuration is not correct. 2- Check type of elements and events associated.
1920	System reset	ePOD automatic backup must be configured again.
1921	Pset execution not authorized	<ol style="list-style-type: none"> 1- Check used features allowance. 2- Contact your Desoutter representative for support.
1923	Additional transducer offset failure	<ol style="list-style-type: none"> 1- Offset value from additional torque sensor is outside bounds. 2- Restart the tool with no mechanical constraints. 3- If the problem occurs again, contact your Desoutter representative for support.
1924	Tool calibration required	<ol style="list-style-type: none"> 1- Perform a calibration of the tool.

Number	Description	Procedure
W041	Unauthorized tool	1- The tool connected to the system is not authorized. 2- Maximum number of battery tools reached or tightening unit associated does not exist anymore. 3- Check the ePOD/RIM connection and capacity.
W201	Replace RTC battery.	1- The "Real Time Clock" backup battery needs to be replaced.
W214	Short circuit	1- Serial peripheral default. 2- Disconnect and reconnect. 3- Check the serial peripheral.
W219	Trig. safety failure	1- Drive hardware failure. 2- Safety issue. 3- Contact your Desoutter representative for support.
W220	Hardware trip	1- Drive hardware failure. 2- Safety issue. 3- Contact your Desoutter representative for support.
W229	Drive PWM error	1- Software failure. 2- Restart the system. 3- If the problem occurs again, contact your Desoutter representative for support.
W246	Synchro I/O problem	1- Error detected on synchronisation input. 2- Check the configuration of I/O. 3- Check the synchronisation cable.
W250	Pset corrupted	1- Pset is not defined correctly. 2- Check the Pset.
W253	Incorrect tool Id	1- Pset is not defined correctly. 2- One tool declared in the Pset is not part of the tightening unit. 3- Check the Pset.
W257	Remote start error	1- Verify the tool trigger is correctly pushed.
W258	Calibration need Pset mode	1- For tool calibration, the tightening unit has to be in "Pset" mode. 2- Change the tightening unit mode into "Pset" mode.
W276	Database error	1- It was not possible to access the database. 2- Try to clear the database. 3- If problem persists, contact your Desoutter representative for support.
W726	Desoutter Protocol: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
W727	Desoutter MIDs not authorized	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "Feature management" menu.
W735	Ford Protocol: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
W736	Ford Protocol not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "Feature management" menu.
W741	CVILOGIX: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
W742	CVILOGIX not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "Feature management" menu.

Number	Description	Procedure
W743	Up to 50 Pset: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
W744	Up to 250 Pset: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
W745	Up to 50 AP: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
W746	Up to 250 AP: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
W501	CVILOGIX user info	Message generated by CVILOGIX program.
W600	System disconnected	1- The system is disconnected. 2- Check the network cable.
W601	Result not OK	Result not OK.
W925	RIM update in progress	1-Wait until the RIM update is finished.
W926	Inconsistencies RIM information	1- Perform a firmware upgrade to fix the information in the RIM.
E006	Rotor locked	1- Replace the tool. 2- The damaged tool needs maintenance.
E013	Bad tool ground	1- Phase-phase or phase to ground short-circuit. 2- Disconnect the tool. Contact your Desoutter representative for support.
E014	Torque power default	1- The torque sensor is not correctly supplied. 2- The tool needs maintenance. If the problem occurs again, contact your Desoutter representative for support.
E019	Tool communication error	1- Tool communication error. 2- Check tool and cable connections. If the problem occurs again, contact your Desoutter representative for support.
E020	Tool LED error	1- Tool LEDs are not correctly supplied. 2- Disconnect and reconnect the tool. If the problem occurs again, contact your Desoutter representative for support.
E023	Unsupported tool	1- The tool connected to the system is not supported. 2- Contact your Desoutter representative for support.
E200	Quick stop !	1- The quick stop has been activated. 2- Check the Phoenix connector.
E213	Drive connection lost	1- Connection with the drive has been lost. 2- Reboot the system. 3- If the issue remains, contact your Desoutter representative for support.
E217	Drive disabled	1- Drive disabled by external source. 2- Contact your Desoutter representative for support.
E218	Drive power failure	1- Drive hardware failure. 2- Safety issue. Contact your Desoutter representative for support.
E221	Drive check error	1- Drive hardware failure. 2- Safety issue. Contact your Desoutter representative for support.

Number	Description	Procedure
E222	System too hot	1- Heatsink too warm. 2- Let the system cool down.
E230	DC bus high	1- Maximum current exceeded. DC-bus voltage high. 2- Contact your Desoutter representative for support.
E231	DC bus too low	1- Power failure. DC-bus voltage low. 2- Contact your Desoutter representative for support.
E232	Error ID Fieldbus	1- The Fieldbus module plugged to the system is not an authorized Desoutter module. 2- Contact your Desoutter representative for more information.
E233	CVINET FIFO full	1- CVINET FIFO is full, the connection has been lost. 2- Check the Ethernet cable. 3- Check the Ethernet configuration. 4- Check that CVINET is running correctly.
E236	ToolsNet FIFO full	1- ToolsNet FIFO is full, the connection has been lost. 2- Check the Ethernet cable. 3- Check the Ethernet configuration. 4- Check that ToolsNet is running correctly.
E240	XML not authorized	1- The selected XML protocol is not authorized. 2- Check the ePOD characteristics.
E243	PFCS not authorized	1- The selected PFCS protocol is not authorized. 2- Check the ePOD characteristics.
E247	XML version conflict	1- Conflict detected in Audi / VW XML protocol version. 2- Check the coherence of the version between the system and master PC/PLC.
E248	SAS order failed	1- Fieldbus SAS order has failed. 2- Check the value of RRG1, SIO, etc.
E249	XML PRG 0	1- The PRG value 0 has been set by Fieldbus.
E255	Drive choke too hot	1- Power electronics too warm. 2- Let the system cool down.
E256	Motor too hot	1- Tool is locked because the maximum motor temperature has been reached. 2- Tool will remain locked until the motor temperature comes back to its normal value.
E260	IPM not authorized	1- The selected IPM protocol is not authorized. 2- Check the ePOD characteristics.
E265	Socket(s) usable with more than one tightening unit	1- Reconfigure sockets combination to resolve conflicts.
E268	CVINET incompatible	1- Update CVINET WEB software.
E277	Half DC bus voltage out of range	1- Half DC-bus voltage is out of range. 2- Switch off the system. Wait at least 30 seconds. Switch on the system and try again. 3- If the problem occurs again, change the drive and try again. 4- Contact your Desoutter representative for support.
E278	Pre-loaded BUS capacitors failure	1- Bus capacitors are not correctly pre-loaded. 2- Switch off the system. Wait at least 30 seconds. Switch on the system. 3- If the problem occurs again, change the drive and try again. 4- Contact your Desoutter representative for support.
E280	Result not stored	1- It was not possible to persist the tightening result on ePOD. 2- Switch off the system. Wait at least 30 seconds. Switch on the system. 3- Contact your Desoutter representative for support.

Number	Description	Procedure
E502	CVILOGIX user info	Message generated by CVILOGIX program.
E704	Missing UV	1- The UV amount of the configuration is greater than the number of UVs available in the RIM. 2- Allocate UVs to this RIM. 3- Contact your Desoutter representative for more information.
E705	Missing demo UV	1- The demo UV amount of the configuration is greater than the number of demo UVs available in the RIM. 2- Allocate demo UVs to this RIM. 3- Contact your Desoutter representative for more information.
E706	Missing UV/demo UV	1- The demo UV amount of the configuration is greater than the number of demo UVs available in the RIM. 2- Allocate demo UVs to this RIM. 3- Contact your Desoutter representative for more information.
E711	Tightening Unit: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E712	Tightening Unit not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E717	Up to 50 Pset: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E718	Up to 250 Pset: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E719	Up to 50 AP: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E720	Up to 250 AP: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E721	Up to 50 Pset: not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E722	Up to 250 Pset: not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E723	Up to 50 AP: not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E724	Up to 250 AP: not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E729	PFCS: demo expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.

Number	Description	Procedure
E730	PFCS not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E732	VWXML: demo expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E733	VWXML not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E738	IPM: demo expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E739	IPM not active	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E890	Device Software Error	-
E915	Inconsistent version	1- Firmware version of all systems must be identical. 2- Update the systems firmware.
E916	Workgroup not authorized	1- Connect an ePOD3 to the primary system.
E918	Emergency stop !	1- The emergency stop has been activated. 2- Check the M8 connector.
E919	Additional transducer error	1- The additional transducer maximum torque is lower than the embedded transducer maximum torque. 2- The Pset uses an additional transducer not installed on the tool.
E927	Corrupted RIM information	1- It is not possible to use this RIM. 2- Contact your Desoutter representative for support.
E928	Tracking System communication failed	1- Tracking System communication failed.
E935	1 Working Space: demo expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E936	1 Working Space: not authorized	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.
E941	E-Lit WI-FI: demo mode expired	1 - The demo period for this feature was 90 days. 2 - This demo period is now elapsed. 3 - To continue to use it you need to activate it with UV.
E942	E-Lit WI-FI: not authorized	1 - This feature is configured but not active. 2 - To activate it with UV, go to the "feature management" menu.

List of user infos related to the tools

Type	Colour	Description	Action
Information	White	For information only.	No action is required.
Warning	Orange	The tool is locked.	Click the message to clear (acknowledge) the message and unlock the tool.
Error	Red	The tool is locked.	The issue has to be solved to unlock the tool and clear the error message.

Number	Description	Procedure
I004	Span failure	1- Span value from torque sensor is outside bounds. 2- Try once again to start the tool with no mechanical constraints. If the problem occurs again, contact your Desoutter representative for support.
I005	Offset failure	1- Offset value from torque sensor is outside bounds. 2- Try once again to start the tool with no mechanical constraints. If the problem occurs again, contact your Desoutter representative for support.
I026	Tool maintenance alarm n1	1- The tool tightening counter has been reached.
I027	Tool maintenance alarm n2	1- The tool tightening counter has been reached.
I038	Tool logs	1- Unexpected tool software exception. 2- Log file has been generated by the tool. 3- Contact your Desoutter representative for support.
I046	Abnormal battery current	1- Abnormal battery current consumption. Check the Pset settings. 2- This error can be due to wrong speed settings.
I063	Battery pack removed	1- Battery pack removed from the tool detected. 2- After few seconds, the tool will shutdown
I065	External start ignored	1- External start detected but ignored. 2- Check tool and external start configuration.
I103	Invalid rotary selector direction	1- Change the direction of the rotary selector. 2- Verify that the rotary selector is in correct position or not damaged.
I205	Torque settings	1- Invalid Torque setting: torque is greater than tool characteristics. 2- Check Pset settings with the tool characteristics.
I206	Speed settings	1- Invalid speed setting: speed is greater than tool characteristics. 2- Check Pset settings with the tool maximum speed.
I210	Invalid Pset selected	1- The selected Pset does not match the Pset selectable in the Assembly Process.
I211	Invalid trigger configuration	1- The tool connected to the system is not equipped with the trigger required by the trigger configuration. 2- Adjust your trigger configuration to the tool or change the tool according to the trigger configuration.
I224	IGBT too hot	1- Power electronics too warm. 2- Let the system cool down.
I251	No Pset selected	1- No Pset selected. 2- Select a Pset.
I270	Time settings	1-Invalid Time setting 2-Check Pset settings with correct time value settings
W010	Tool calibration expired	1- The tool calibration date has expired. 2- A tool calibration needs to be done to ensure the measurement accuracy.
W028	Battery tool version error	1 - Battery tool version and system version are not compatible.
W030	The battery is low.	1- The battery is low. 2- Recharge the battery.
W033	Tool time error	1- The tool time is not set correctly. The tightening results will not be time stamped. 2- Connect the tool to the system to set date and time.
W036	Tool memory full	1- The tool memory is full. 2- Connect the tool to the system to empty the memory.
W062	Overload of torque	1- Overload of the torque (could be a rehit). 2- Check the tool cable is not damaged.

Number	Description	Procedure
W212	Result not stored	1- It is not possible to store the tightening result in the system. 2- Contact your Desoutter representative for support.
W216	Current high	1- Maximum current exceeded. 2- Contact your Desoutter representative for support.
W267	Result transfer error	Result transfer error.
E007	Motor too hot	1- Tool is locked because the maximum motor temperature has been reached. 2- Tool will remain locked until the motor temperature comes back to its normal value.
E008	Tool angle fault	1- Problem detected with the tool angle sensor. 2- The tool needs maintenance.
E009	Tool invalid parameters	1- Check the tool compatibility. 2- The tool memory cannot be read or is invalid. 3- The tool needs maintenance. If the problem occurs again, contact your Desoutter representative for support.
E012	Tool EEPROM error	1- The tool memory cannot be read or is invalid. 2- The tool needs maintenance. If the problem occurs again, contact your Desoutter representative for support.
E018	Torque out of range !	1- The target torque value is above the tool maximum torque. 2- Check Pset settings with tool characteristics.
E029	The battery is empty.	1- The battery pack is discharged. The tool cannot tighten. 2- Recharge the battery pack.
E031	Battery error	1- Abnormal battery voltage. The tool cannot tighten. 2- Recharge the battery pack. If the problem occurs again, replace the battery pack.
E032	Tool display error	1- Board display malfunction. 2- Contact your Desoutter representative for support.
E034	Tool memory error	1- The tool memory does not work properly. 2- Contact your Desoutter representative for support.
E035	Tool memory locked	1- The tool memory is locked to protect old data from rewriting. 2- Connect the tool to the computer via eDOCK to retrieve old data.
E037	Tool trigger error	1- The tool trigger does not work properly. 2- Check and clean the trigger. If the problem occurs again, contact your Desoutter representative for support.
E045	Abnormal battery voltage	1- Check the battery pack. 2- This error can be due to charger malfunction or end of life battery.
E047	Battery is too low.	1- Check the battery pack. 2- If the problem occurs again, replace the battery pack.
E048	Battery type not allowed	1- Battery type not allowed. 2- Replace the battery pack or your configuration.
E223	Drive init error	1- Software failure. 2- Restart the system. 3- If the problem occurs again, contact your Desoutter representative for support.

Number	Description	Procedure
E227	Motor stalled	1- Motor stalled (could be missing phase, wrong motor tune or power electronics failure) 2- Try once again. 3- If the problem occurs again, contact your Desoutter representative for support.
E228	Drive error	1- Software failure. 2- Restart the system. 3- If the problem occurs again, contact your Desoutter representative for support.

Logical output

General status

Name	Description	Raising condition	Falling condition
Ready	The system is free of any internal issue that could prevent it from being fully operative. Communication between system and tool is OK.	No error in system nor in tool	Quick stop activated Error coming from the system
Identifier OK	Identifier received (e.g. barcode) matches masks (stays during 0,5 s at active level).	Identifier received and identified	0,5 s after rising
Identifier NOK	Identifier received (e.g. barcode) does not match masks (stays during 0,5 s at active level).	Identifier received but not identified	0,5 s after rising
User info present	User info (Info, Warning or Error) is present.	User info present on screen	No user info on screen
Keep alive ack	This output is the copy of the "Keep alive" input. It can be used by the PLC to check the system is still running.	When "Keep alive" input raises.	When "Keep alive" input falls.
Fieldbus Fault	No Fieldbus. The "Fieldbus fault" is on as long as the Fieldbus communication is not established. It switches off automatically when the communication works again.	Communication lost and/or keep alive missing.	Fieldbus communication established and keep alive present
Reporting Alarm	When working with ToolsNet or CVINet: FIFO Threshold Alarm reached. Results are stored in the system memory and are erased when sent to ToolsNet or CVINet. This way the system memory will never be full. A full system memory induces result losses and traceability error. To detect communication issues with ToolsNet or CVINet, the software measures the fill in rate (%) of the memory. When the rate overpasses the target threshold, the Reporting alarm will switch on; maintenance operators are then able to solve the issue before losing results."	FIFO Threshold Alarm reached	FIFO under threshold alarm.
Open Protocol activated	Open Protocol is activated in configuration	Protocol is enabled	Protocol is disabled
Open Protocol connected	Open Protocol is connected to the Tightening Unit	At least 1 peer connected	No peer is connected

Name	Description	Raising condition Falling condition
Time synchro done	Time synchronisation completed successfully using Fieldbus data (Q_SYN in VWXML)	-
Emergency stop	Emergency stop is activated.	Emergency stop activated Emergency stop deactivated
TU running	This indicates that the fastening operation has actually started: at least one involved tool is running. The signal switches off as soon as the fastening operation is finished (all reports sent).	Pset is started. The fastening operation is finished (all reports sent)

Tool status

Name	Description	Raising condition Falling condition
Tool ready	The tool is ready: - communication between system and tool is ok - a valid Pset has to be selected - the tightening strategy must cope with the tool"	Tool connected AND valid Pset. Tool disconnection, Pset selection.
Tool not locked forward	There is no tool lock in forward direction.	Tool unlocked in forward direction New lock in forward direction
Tool not locked reverse	There is no tool lock in reverse direction.	Tool unlocked in reverse direction New lock in reverse direction
Tool running	The tool is running (CW or CCW, tightening or loosening).	Tool starts to run. Turns off when the tool stops.
Tool direction	Indicates if the tool is in tightening mode. Active: tightening mode Inactive: run reverse mode Note: independent if tool is running or not.	Entering tightening mode. Entering run reverse mode.
Tool tightening	Tool is running in tightening mode. Pset threshold is not taken into account.	Tool start in tightening mode. Tool stops.
Tool middle course trigger	Reflects the raw state of tool middle course start trigger, independently from the "Tightening Unit" state.	Middle course of main trigger is reached. Main trigger is completely released.
Tool main start trigger	Reflects the raw state of tool main course start trigger, independently from the "Tightening Unit" state.	Trigger is pushed. Trigger is released
Tool reverse trigger	Reflects the raw state of tool reverse trigger, independently from the "Tightening Unit" state. (reverse or forward).	Trigger is pushed. Trigger is released
Tool push start or front start trigger	Reflects the raw state of tool push start or front start trigger, independently from the "Tightening Unit" state.	Trigger is pushed. Trigger is released
Manual reverse in progress	The operator has selected the reverse direction on the tool and is running the tool.	Manual runreverse selected and trigger pushed. Stay on as long as the operator is running the tool
Fastener loosened	There is a fixed minimum torque value to declare that the fastener was "loosened".	Run reverse Result generation. New start (tool trigger or external start)
Tube nut open	Indicates that the tube nut is open. The tool can be removed from the assembly.	- Tool running

Name	Description	Raising condition Falling condition
Tool maintenance alarm	Reflects the different tool maintenance alarm state with or condition.	Tool maintenance alarm 1 or 2 is active. No tool maintenance alarm is active.
Invalid spindle settings	Tool characteristics does not match Pset parameters (e.g. negative jog times or contradictions, torque over the maximum tool torque range, speed over the maximum tool speed, maximum tool torque range, etc...)	Pset selection or tool connection. Tool disconnection or new Pset selected.
Span failure	When starting a tightening, before running the tool, the system checks the torque span. "Span failure" indicates that the span drifts by $\pm 3\%$ or more, causing a tool lockout. This fault can be due to the torque transducer or the tool electronics. The only solution is to replace the tool.	Span failure detection. Disconnecting tool or new check without fault.
Offset failure	Indicates the offset (0 point) drifts by 50 % of full scale or more. This error exists when, at the beginning of the Pset, the torque transducer is seen to have 50 % or more of full-scale torque prior to even starting the motor. With an "Offset failure", the system cannot adequately compensate for this transducer error and, therefore, will not allow a tightening operation to occur. The only solution is to replace the tool.	Offset failure detection Disconnecting tool or new check without fault.
Motor over temperature	Indicates that the temperature of the tool motor windings has exceeded the temperature threshold. An error message remains.	Temperature threshold: - 100°C for fixtured tools - 60°C for portable tools The signal turns off as soon as the temperature returns below the threshold (minus hysteresis = 10°C).
Angle measurement fault	Drive detected angle sensor fault. It can be an angle sensor fault, a tool electronic fault or a combination of both. The communication is tested permanently. As soon as the fault disappears, the signal turns off.	Angle fault detection. Disconnecting tool
No tool connected	Indicates that the system is not detecting the tool. Systems are designed to work with a range of fastening tools. The tools have an Intelligent tool Interface (ITI) board which is continuously sending status information to the system. If the system requests status information from the tool and gets no response, the system software turns on the "No tool connected" output. This output resets immediately upon successful communication with a tool.	No tool connected or tool not recognized Tool connected and recognized.
Redundancy error	Redundancy error in case of operational control transducer and faulty monitoring transducer.	Result generation Use of "reset of redundancy error" input, change of tool free of this error

Pset status

Name	Description	Raising condition Falling condition
Pset selected bits (0..7)	Echoes the binary "Pset select bit 0 to 7" input if the corresponding Pset exists, echoes 0 if the Pset does not exist or if there is no Pset selected.	New Pset selected New Pset selected
Tightening running (old cycle declared)	This indicates that the fastening operation has actually started: the tool is running and the torque is over the Pset start torque threshold. The signal switches off as soon as the fastening operation is finished (all reports sent).	Torque reach the cycle start threshold. The fastening operation is finished (all reports sent)
Tightening finished	Indicates that a Pset report is available.	Result generation. New start (tool trigger or external start) or reset input
Tightening OK	Indicates that the fastening operation (for a specific Tightening Unit) ends correctly and that all controlled and monitored tightening parameters are within tolerances.	Result generation. New start (tool trigger or external start) or reset input
Tightening NOK	Indicates that the fastening operation (for a specific Tightening Unit) has failed.	Result generation. New start (tool trigger or external start) or reset input
Spindle OK	Indicates that the fastening operation (for a specific tool) ends correctly and that all controlled and monitored tightening parameters are within tolerances.	Result generation. New start (tool trigger or external start) or reset input
Spindle NOK	Indicates that the fastening operation (for a specific tool) has failed.	Result generation. New start (tool trigger or external start) or reset input
Angle low	Indicates a low angle reject. The angle must meet or exceed this value for a correct Pset. When the angle stays below this value, it becomes a "Low angle reject" and this output is turned on. Stays on until a new fastening operation starts.	Result generation. New start (tool trigger or external start) or reset input
Angle OK	Indicates a correct angle. The angle is inside the limits declared in the step.	Result generation. New start (tool trigger or external start) or reset input
Angle high	Indicates a high angle reject. The angle must stay below this value to be a correct Pset. When the angle meets or exceeds this value, it becomes a "High angle reject". The tool will stop when this limit is reached and this output is turned on. Stays on until a new fastening operation starts.	Result generation. New start (tool trigger or external start) or reset input
Torque low	Indicates the peak torque low reject. If the torque stays below the "Peak torque low limit" and results in a "Reject" Pset. This can happen when a Pset is prematurely finished, a thread strips out or when the Pset is automatically finished due to other error conditions, such as a High angle fault or when a Pset Time Monitor expires and causes the Pset to be terminated. Stays on until a new fastening operation starts.	Result generation. New start (tool trigger or external start) or reset input

Name	Description	Raising condition Falling condition
Torque OK	Indicates a correct torque. Torque is in inside limits declared in the step.	Result generation. New start (tool trigger or external start) or reset input
Torque high	Indicates the peak torque high reject. When the torque meets or exceeds this value, this output is turned on and the result is NOK. If a Peak Torque High error persists, it may be advisable to slow down the tool speed or replace the tool with one of lesser capacity. A second variable that can cause errors is a badly chattering joint. Chatter is the squawking noise you hear on some fasteners at the end of the fastening operation. Chatter is induced by slip-stick and actually causes the fastener to momentarily stop rotating, then crack loose and re-start turning. This condition can cause a Peak Torque High condition. Stays on as long as a new fastening operation starts.	Result generation. New start (tool trigger or external start) or reset input
Yellow report on tightening system	This output reflects the state of the system yellow light.	System yellow light is on New fastening operation starts
Green report on tightening system	This output reflects the state of the system green light.	System green light is on New fastening operation starts
Red report on tightening system	This output reflects the state of the system red light.	System red light is on New fastening operation starts
Lock on reject	Indicates that a tool is locked out because of an incorrect tightening operation. The system will not continue to run the tool depending on "lock on reject option " : - until the ""Error Acknowledge"" input is activated - until a run reverse operation - until a loosening operation	Tightening finished with bad result and option "lock on reject" activated. Input "Error acknowledge" activated or runreverse operation or loosening operation.,
Remove fastener	Indicates that the fastening operation resulted in a torque that exceeded the "Remove Fastener" setpoint. When correctly set, this means that the torque for any reason becomes very high. There is a risk that the fastening operation is not reliable: disassemble the joint and check parts.	Result generation. New start (tool trigger or external start) or reset input
Tightening finished without timeout	Indicates that a Pset report is available and the source stop is not overall timeout.	Result generation. New start (tool trigger or external start) or reset input
Overall time reached	Max overall time has been reached during tightening	Result generation. New start (tool trigger or external start) or reset input
Synchro out	Synchro output : set to 1 when running step starts, reset to 0 when a synchro step is reached.	Start of running step. Synchro step reached

Name	Description	Raising condition Falling condition
Invalid parameter set selected	Indicates the Pset is disabled (has not been set). For example, if 3 Psets are used, Psets 1, 2 and 3 are enabled. If, however, any Pset other than 1, 2 or 3 is selected, the Pset is invalid and this output is turned on. It is possible for an Assembly process to select invalid Psets.	Pset unselection Pset selection

Assembly Process status

Name	Description	Raising condition Falling condition
Assembly Process selected bits (0..7)	Indicates the Assembly Operation per tightening unit currently selected (Bit 0..7).	New AP selected. AP aborted New AP selected. AP aborted
Assembly process running	Indicates the assembly operation is being processed. The signal is on as long as the assembly operation is running. The signal falls down when the assembly operation is finished.	Assembly process start. Assembly process finished or aborted.
Assembly process finished	Indicates when an assembly operation is completed.	Assembly process finished. A new Assembly Process start or reset input
Assembly process OK	Indicates when an assembly operation is completed with no rejects. The signal stays on as long as a new Assembly process starts.	Assembly process finished and OK. A new Assembly Process start or reset input
Assembly process NOK	Indicates when an Assembly process reject occurs. Stay on as long as a new Assembly process starts.	Assembly process finished and NOK or aborted. A new Assembly Process start or reset input
Assembly process aborted	When an Assembly process has been aborted, "Assembly process aborted" is activated. Stays on as long as a new Assembly process starts.	Assembly process aborted. A new Assembly Process start or reset input
Current batch count bit (0..6)	Bit indicator of current batch count	Batch count increment When batch is finished, new start (tool trigger or external start) or reset input or new AP selection
Remaining batch count bit (0-6)	Bit indicator of the number of remaining bolts in the batch	Batch count increment When batch is finished, new start (tool trigger or external start) or reset input or new AP selection
Batch running	A batch process is underway. The output is set to 1 before the first tightening operation.	A batch operation is enabled Batch is finished or reset input
Batch finished	Indicates when the batch count equals the batch size and the batch is declared completed. It is used together with "Batch OK" to indicate the status of a batch.	Batch is finished. New start (tool trigger or external start) or reset input
Batch OK	Such as when the batch gets aborted...or in the case rejects are included as part of the batch count (managed by Assembly Process).	Batch is finished and NOK. A new AP has been selected. New start (tool trigger or external start) or reset input

Name	Description	Raising condition Falling condition
Batch NOK	Such as when the batch gets aborted...or in the case rejects are included as part of the batch count (managed by Assembly Process).	Batch is finished and NOK. A new AP has been selected. New start (tool trigger or external start) or reset input
Max retries reached	Indicates when max number of retries is reached.	Max number of retries is reached. Max number of retries is reset.

External output

Name	Description	Raising condition Falling condition
External Out AP bit	Outputs that can be set or reset within an Assembly process	Depending of AP behavior Depending of AP behavior
External Out PLC bit (0..9)	Indicates this output is controlled by a PLC via Fieldbus (like a remote I/O). On PLC side, it is an output.	Depending on PLC behavior Depending on PLC behavior
External Out OP bit (0..9)	Outputs dedicated to Open Protocol.	Depending on OP behavior Depending on OP behavior

Socket tray

Name	Description	Raising condition Falling condition
Socket selectable (0..4)	24 V socket trays (BSD). Informs which socket can be taken by the operator.	A new socket has to be taken by the user. No socket to be taken by the user.

Customized Protocol Status

Name	Description	Raising condition Falling condition
Customer Protocol activated	A customer Protocol has been activated in configuration	Protocol is enabled Protocol is disabled
Customer Protocol connected	The activated customer Protocol is connected	Protocol is connected Protocol is disconnected
Customer Protocol reporting alarm	The activated customer Protocol has declared an alarm about result reporting of this Tightening unit.	Alarm is raised Alarm is cleared
Q_SAS	ACK start tightening job	-
RDY	System ready	-
Q_LSN	Reverse disabled	-
WGZ	Tool disabled	-
Q_EDZ	Result and reports reset	-
Q_XMS	XML data transfer completed	-
EIO	Result OK	-
ENO	Result NOK	-
FSCIO	Group status OK	-
FSCNIO	Group status NOK	-

CVILOGIX

Name	Description	Raising condition Falling condition
External Out CVILOGIX bit (0..100)	Indicates that this output can be used by - an internal CVILOGIX application	-

Miscellaneous

Name	Description	Raising condition Falling condition
ON	On state, used to set level "1" to physical outputs.	At system startup. Never falls
OFF	Off state, used to set level "0" to physical outputs.	At system startup. Never falls

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