

How to configure the positioning system for Desoutter TRA and D53 arms

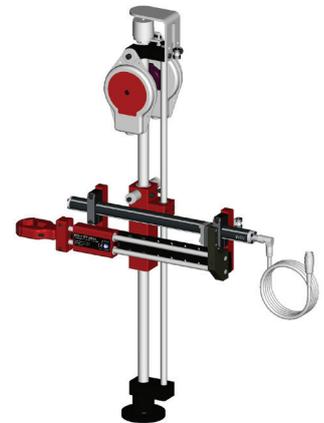
User manual

Model of arm	Part number
Folded D53-5 S X/Y CANopen	6158122720
Folded D53-12 S X/Y CANopen	6158122730
Folded D53-25 S X/Y CANopen	6158122740
Folded D53-50 S X/Y CANopen	6158122750
Folded D53-100 S X/Y CANopen	6158122760
Linear D53-5 X/Y CANopen	6158122670
Linear D53-12 X/Y CANopen	6158122680
Linear D53-25 X/Y CANopen	6158122690
Linear D53-50 X/Y CANopen	6158122700
Linear D53-100 X/Y CANopen	6158122710
TRA 12 1600 P CANopen UNI	6158121020
TRA 25 2100 P CANopen UNI	6158121030
TRA 50 2100 P CANopen UNI	6158121040
TRA 100 2100 P CANopen	6158121050
TRA 200 2100 P CANopen	6158121060
TRA 12 1600 P2 CANopen UNI	6158121070
TRA 25 2100 P2 CANopen UNI	6158121080
TRA 50 2100 P2 CANopen UNI	6158121090
TRA 100 2100 P2 CANopen	6158121100
TRA 200 2100 P2 CANopen	6158121110

Folded D53



Linear D53



TRA CANopen



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Original instructions

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1 - OVERVIEW

The purpose of this manual is to help you to configure the Desoutter range of TRA and D53 positioning arms.

CVI CONFIG wizard will help to calculate all data needed to correctly position the arm in the tightening area.

The controller "Learning mode" will help you to determine precisely the tightening positions.

- To get more information about controllers and arms, refer to the following user manuals available at <http://resource-center.desouttertools.com>.

Product	Language	Part number of the user manual
CVI CONFIG	English	6159939221
CVI3 Vision	English	6159930310
Folded D53	-	6159922530
Linear D53	-	6159922330
TRA CANopen	English	6159939310



- For further information, contact your Desoutter representative for support.

2 - PRE-REQUISITE AND CHECKINGS

2.1 - Pre-requisite

- CVI3 Vision controller, tool and positioning arm are installed and connected in the workstation.
- Connect an ePOD 2 or above to the controller.
- Ensure you have a tape meter and a protractor close at hand to measure the characteristics of your own installation.



- Check that the eBUS cable is connected from the encoder M12 -or T-junction in case of 2 encoders- to the controller Sub-D 9 pt.

		Length		Part number
		m	ft	
	eBUS cable	1	3.3	6159176210
	eBUS cable	3	9.9	6159176220
	eBUS cable	5	16.4	6159176230
	eBUS cable	15	49.2	6159176240
	eBUS termination plug			6159176250

2.2 - Checking the firmware and software versions

- Check the controller firmware version is the last official one (V1.7.8.1 minimum).
- Check that CVI CONFIG software is the last official one (V2.2.2.1 minimum).

2.3 - Checking the running mode of the tool

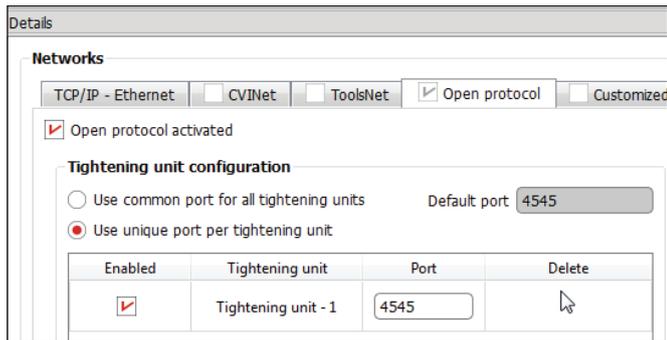
- Launch CVI CONFIG.
- Select the controller in the tree view area.
- Click the tightening unit which drives the tool.



- Check the Running mode is set to "Assembly Process".

2.4 - Checking the network parameters

- Go to CVI CONFIG, select the controller.
- Click "Networks".
- Click the tab "Open Protocol".

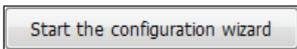
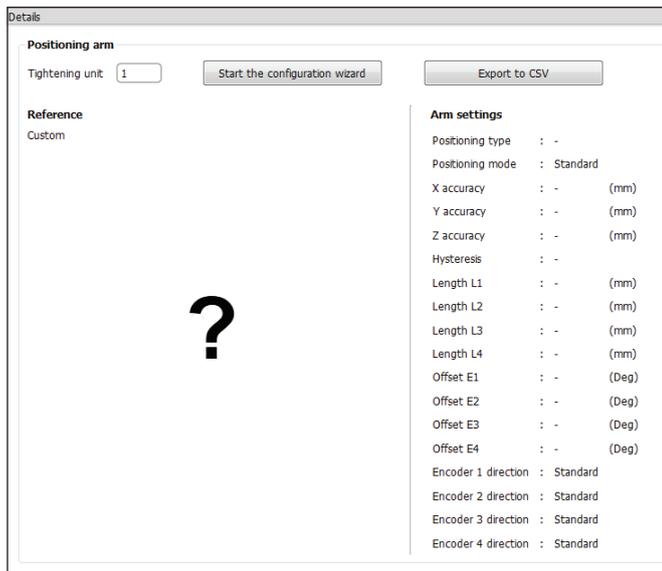


- Check that the following parameters are correct.
 - The box "Open Protocol activated" is ticked.
 - The configuration "Use unique port per tightening unit" is selected for the Tightening unit 1.
 - The port is set to "4545".

3 - HOW TO SET UP THE POSITIONING ARM IN CVI CONFIG

3.1 - How to start the configuration wizard

- Launch "CVI CONFIG".
- Select the controller in the tree view area, click "Parameters".
- Right-click "I/O and accessories" and add a positioning arm.



- Click this icon to launch the wizard.

3.2 - Selecting the tightening unit and the model of positioning arm



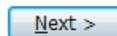
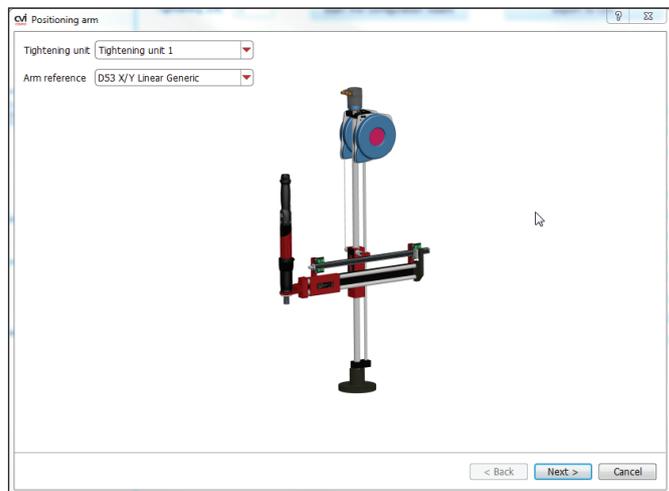
- Select the tightening unit which will drive the tool and the arm.
- Select the model of positioning arm in the list.



This manual is about installing TRA and D53 CANopen models. Other models of positioning arms are available on request.

- Contact your Desoutter representative for support.

For example:



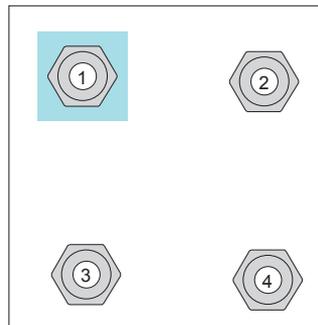
- Click this icon to continue.

3.3 - Selecting the positioning mode

This mode is used to control the tightening position versus the tool tightening bit. The position offset will be calculated automatically during the tightening process.

3.3.1 - "Standard" mode

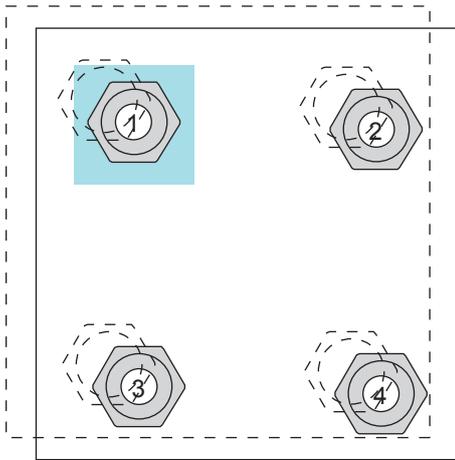
This mode is used when the part to tighten has always the same fixed position.



3.3.2 - "Relative X and Y" mode

This mode is used when the part to tighten is not always at the same position. There is small mechanical gap between the tightening bit and the part to tighten.

The first tightening position is not controlled and it is necessary to determine the position offset for all positions.

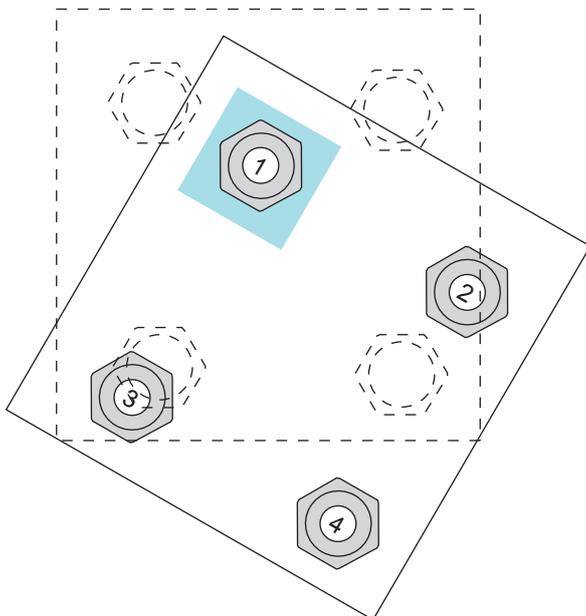


i The dotted outline shows the expected position of the part to tighten. The solid outline shows the actual position of the part.

3.3.3 - "Relative X and Y+Z rotation" mode

This mode is used when the position of the part to tighten is unknown.

The first tightening position is not controlled and it is necessary to determine the position offset for all positions. The second tightening position control is given by the theoretical distance between position 1 and 2. An angular offset is necessary to calculate all other positions.



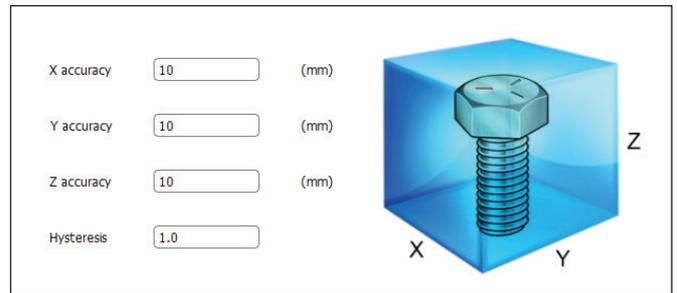
i The dotted outline shows the expected position of the part to tighten. The solid outline shows the actual position of the part.

[Next >](#) • Click this icon to continue.

3.4 - Setting tolerances and hysteresis

3.4.1 - Tolerances around the tightening point

This part allows to configure the X,Y and tolerances around the tightening point. The tightening tool is allowed to run in the blue area. The LED of the tool will blink in blue accordingly.

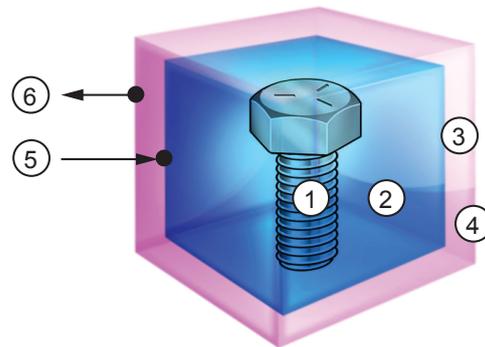


• Measure your own values in mm.

3.4.2 - Hysteresis

This coefficient is used to enlarge the authorized tightening area.

The value by default is: 1.0.



1. Screw
2. Authorized tightening area
3. Hysteresis
4. Detection of the exit area = authorized tightening area x hysteresis
5. Positioning arm entrance
6. Positioning arm exit

[Next >](#) • Click this icon to continue.

3.5 - Setting lengths and offsets

3.5.1 - General



Theoretical values given user manuals delivered with the positioning arm are for information only.

- Take your own measurements by yourself.
- Measure the lengths in millimeters when the positioning arm is extended.
 - Length 1 = Distance between encoder 1 and encoder 2
 - Length 2 = Distance between encoder 2 and encoder 3
 - Length 3 = Distance between encoder 3 and tightening axis
- Measure the offset in degrees when the positioning arm is in parking position.
 - Offset 1 = angle between length 1 and length 2
 - Offset 2 = angle between length 2 and length 3



2D/3D CAD drawings are available at <http://resource-center.desouttertools.com>.

3.5.2 - Linear D53 X/Y generic

Length and offset

Length L1 (mm)

Offset E1 Deg

3.5.3 - Folded D53 X/Y generic

Length and offset

Length L1 (mm)

Length L2 (mm)

Offset E1 Deg

Offset E2 Deg

3.5.4 - TRA 1 encoder

Length and offset

Length L1 (mm)

3.5.5 - TRA 2 encoders

Length and offset

Length L1 (mm)

[Next >](#)

• Click this icon to continue.

3.6 - Setting the direction of encoders

This parameter is used when the positioning arm moves away from the tightening axis. In that case, it is possible to invert the rotation direction of the encoder. X,Y and Z values will then increment CW or CCW.

Direction of the encoder	standard	The encoder position is incremented clockwise.
	inverted	The encoder position is incremented counterclockwise.



- Click this icon to end the wizard.

3.7 - Example of configuration

Positioning arm

Positioning unit:

Reference
X/Y Linear Generic



Arm settings

Positioning type : 12

Positioning mode : Standard

X accuracy : 10 (mm)

Y accuracy : 10 (mm)

Z accuracy : 10 (mm)

Hysteresis : 1

Length L1 : 887 (mm)

Length L2 : - (mm)

Length L3 : - (mm)

Length L4 : - (mm)

Offset E1 : 355 (Deg)

Offset E2 : - (Deg)

Offset E3 : - (Deg)

Offset E4 : - (Deg)

Encoder 1 direction : Standard

Encoder 2 direction : Standard

Encoder 3 direction : -

Encoder 4 direction : -

3.8 - How to export the programming

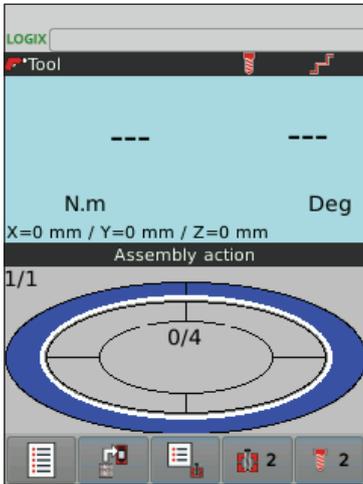


- Click to export the configuration file to in .csv format.

4 - HOW TO TRANSFER THE PROGRAMMING TO THE CONTROLLER



- Click to transfer the configuration file to the controller.



- Note that the values of lengths are displayed above the ellipse.

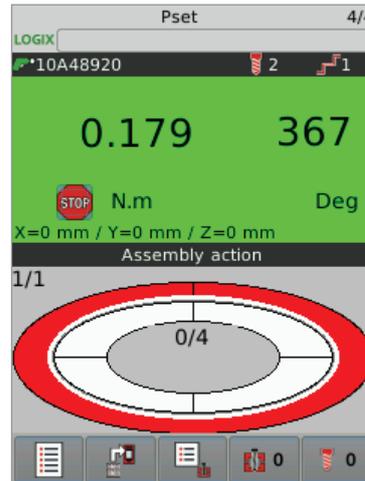
5 - SETTING THE TIGHTENING POSITIONS

- Use the "Learning mode" feature of the controller to define precisely the tightening positions.

5.1 - Checking the Assembly Process is ready to run



- From the main menu of the controller, click "Home" to display the monitoring screen.

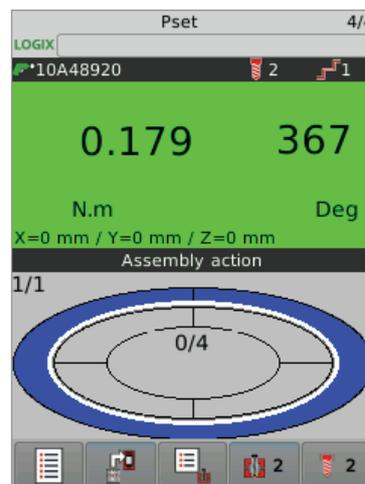


- Click this icon to select the number of the Assembly Process to run.



- Click this icon to validate.

For example:



5.2 - How to use the "Learning mode "

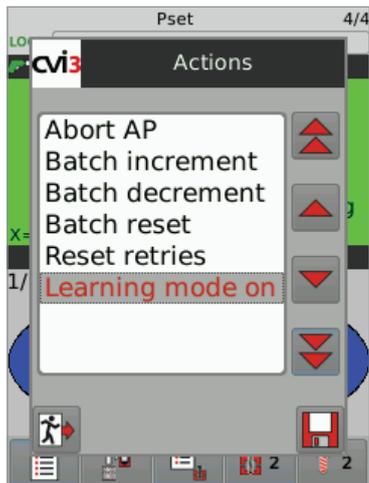
During the installation of the positioning arm or in case of replacement of an encoder, it is recommended to reset the encoders position to 0 by activating the "CVI Logix input 2" signal.



- Activate the reset when the positioning arm is folded away in parking position and outside the working area.



- From the monitoring screen, tap this icon to display the list of actions which can be done on the assembly.



- Select "Learning mode on".

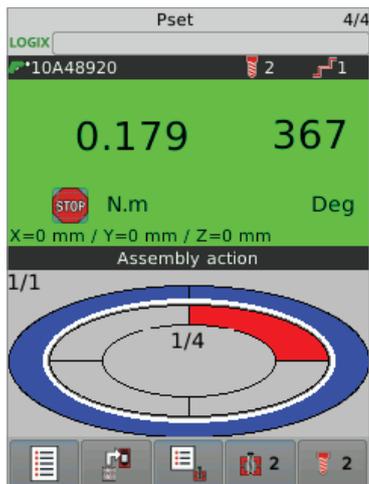


- Click this icon to validate.

The blue LED of the tool is blinking.

- Place the tool on the first position of the assembly and press the trigger around 2 seconds.

When the position is recorded, the blue LED of the tool turns steady and a red increment is displayed in the ellipse.



- Repeat the sequence until the end of the assembly process.

At the end, the ellipse is in red.

Example:



The controller quits the learning mode automatically.

The positioning arm is now ready to be used.



- Click this icon to select the number of the Assembly Process to run and validate.

- Make some tests and adjust the parameters if needed.

You can go back and use the "Learning mode" and the "Configuration wizard" at any time.

More Than Productivity