POSITX-3D

Torque Arm Positioning Controller

USER'S MANUAL

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SUMMARY

1 PRELIMINARY INFORMATION

1.1 SAFETY SYMBOLS AND SIGNALS USED IN THE MANUAL

	Care point annotation
	Warning sign. Maximum care required
	Individual protection is mandatory, e.g. protective gloves

1.2 DOCUMENT IDENTIFICATION

Date of first publication 12/2019

Revision Number..... Rel. 1.0

1.3 MANUAL PROPERTY

The property rights of this manual belong exclusively to Builder This right is conceded to the buyer in terms of use of this manual exclusively for personal use.

Translations, printing and other copying of this manual, even if partial and/or in any other form, must be accompanied by the expressed consent of Builder.

1.4 VALIDITY

This manual is referred to the device "POSITX-3D" and is reflecting the state of the technique at the moment of its introduction on the market.

The builder reserves the rights of making changes to the present manual without notice in advance.

Eventual integrations to the present manual decided by the builder might be sent to the users. In this case the user will be responsible

1.5 DOCUMENTS ENCLOSED TO THE PRESENT MANUAL

- "CE" Certification

1.6 IMPORTANCE OF THIS MANUAL

Among the information included into this manual, those related to safety device s and safe operation modes to avoid damages to things or injuries to humans have to be considered as very important.

! *In advance of any operation, is mandatory to read this manual with maximum care. The regular functioning and the duration over time of the machiery depend on the observance and fullfillment of procedures described into the manual.*

1.7 MANUAL DESTINEE

- Safety and Prevention Manager.
- Equipment connection personnel
- Training and functional check personnel
- Device operators.
- Eventual disposal responsible personnel.

1.8 MANUAL KEEPING

The manual must be preserved in good conditions and kept in appropriate location, knwn to all users and always available for the reading..

The builder must be contacted in case it get lost, damaged or for request of additional copies.

The manual have to bee kept until device demolition!

Should the device be sold to another user, this manual and related CE have to be delivered to the new owner.

1.9 SERVICE SUPPORT

For any need related to use, maintenance and spare parts, please contact directly the builder, specifying the identification data mentioned on the CE label applied on the device.

We strongly recommend to avoid any repairation or intervent which is not mentioned in this manual.

All operations requiring parts disdevice must be done exclusively by Builder authorized personnel.

! - *Any unauthorized intervention will immediately invalidate the warranty.*
- *Please always report datas printed on the device identification CE label (Serial, Year) in case of request for assistance and spare parts.*

1.10 PICTOGRAMS

Pictograms must be applied in areas easily visible from anybody who is approaching the device and must be in points to which the personnel may eventually promptly react with actions in order to prevent potentially dangerous situations.

When possible, pictograms should be placed in areas not exposed to damaging, wear, chemicals, dust or any other agent which ay reduce the visibility and readability.

Temperature use range should be between -40°C and +80°C.

Surfaces must be appropriately clean, smooth and free from oils, grease or chemicals prior to pictograms application.

Rulements require that safety pictographs have to be regularly controlled and cleaned to ensure the readability from the safety distance.

Should the pictograms be submitted to extreme environmental conditions or in case they loose the required visibility features, they must be replaced.

PICTOGRAMS RELATED TO HAZARD

ID.	SYMBOL	DESCRIPTION
3		Generic hazard Read instructions carefully

PICTOGRAMS RELATED TO PROHIBITIONS

ID.	SYMBOL	DESCRIPTION
4		Use forbidden to unauthorized personnel

PICTOGRAMS RELATED TO OBLIGATIONS

SYMBOL	DESCRIPTION
	Protective gloves must be worn
	Safety shoes must be worn.
	Protective clothing must be worn.
	Protective goggles must be worn

1.11 DEVICE IDENTIFICATION

NAMING

The device object of this manual is named "POSITX-3D" and is intended only for industrial use.

1.12 DEVICE INCOMING RECEPTION

Check that goods are corresponding to the shipping document contents. Should some components be missing, inform the builder immediately.

Check absence of damages on the packaging due to transportation. Should relevant damages to be found, inform the courier and write on the shipping documents the clause "Acceptance with reserve of control".

Damages relevant to transportation must be sent to the courier in writing within 8 days from the date of receipt.

In case of heavy damages, inform the builder immediately.

1.13 CUSTOMER RESPONSIBILITY PROVISIONS

Except for specific contractual agreements, normally the customer is responsible for:

Installation area provision, including eventual building works/ piping, if required;

Electrical power device , in conformity with laws in force in the country of installation;

1.14 WARRANTY

The device is warranty covered from manucturing defects. Warranty details are mentioned into device sales contract.

1.15

See EC Conformity Declaration in Appendix 1.

REFERENCE TECHNICAL RULES

See EC Conformity Declaration in Appendix 1.

2 WARNINGS

2.1 RISK PREVENTION

Personnel operating the device has to be professionally trained and able to read and understand the instructions of this manual.

Before and after the device set up, the user is recommended to use personal protection equipment (PPE) according to current regulations, such as:

Protective gloves for manipulation of parts with irregular surface or sharp edges;

Crush resistant shoes for manufacturing of heavy parts;

Safety earmuff when the work enviroment requires for them;

Protective goggles to protect against powder, splinters, etc.

Lung protection systems if the enviroment requires for them.

2.2 RESPONSIBILITY

Builder denies any responsibility for consequences of:

Use of the device in violation of general safety protection regulations provided by Community Directives and by laws of the Country in which the device is used;

Wrong predisposition of structures on which the device will be installed;

Feeding of device electrical circuits with different voltage than those prescribed;

Wrong or missing compliance with instructions mentioned into the manual;

Exceptional events, calamities.

2.3 DEVICE EXPECTED USE

The device must be used only in the following conditions:

For professional use, by expressily trained personnel
For purposes indicated into “Technical Features” section;

2.4 DEVICE USE LIMITS

The device must not be used in the following conditions:

For use in areas with risk of fire and explosion, aggressive environment or with high concentration of sprayed oils, exposed to wheather

For use by two or more people, as indicated in this manual;

In case damages found either on the structure or components of the device ;

For different uses than those for which the device has been designed;

2.5 GOOD RULES

Learn how to stop the device in case of emergency and danger.

Learn how to use all commands and function.

Comply to all warning and hazard indication applied to the device .

Always use Personal Protection Equipments.

Personnel on training must be always supervised by expert personnel.

Promptly inform the builder in case of defects, misfunctioning of safety device s and for presumed potential danger situations;

2.6 WHAT MUST NOT BE DONE

Do not modify the partly completed device /device s included in the device for any reason.The builder denies any responsibility for misfunctioning caused by unauthorized modifications and/or alterations of the device.

Do not make operations out from one's own competence.

2.7 INSTALLATION WARNINGS

See "Installation" chapter.

2.8 ADJUSTMENT AND STARTUP WARNINGS

See "Functioning and Adjustments" chapter".

2.9 MAINTENANCE AND CLEANING WARNINGS.

See"Maintenance" chapter.

2.10 INDICATIONS FOR OUT OF OPERATION, DISMANTLING AND DISPOSAL

See "Installation" chapter"

2.11 LIGHTING WARNINGS

Customer is responsible for appropriate lighting of the area in which the device will be installed, ensuring that:

Visibility inside the work environment in conformity with work area laws in force, so as there should not be dangerous reflexes and to ensure clear readability of commands installed on the device

3 PRODUCT SPECIFICATIONS

3.1 GENERAL INFORMATON'

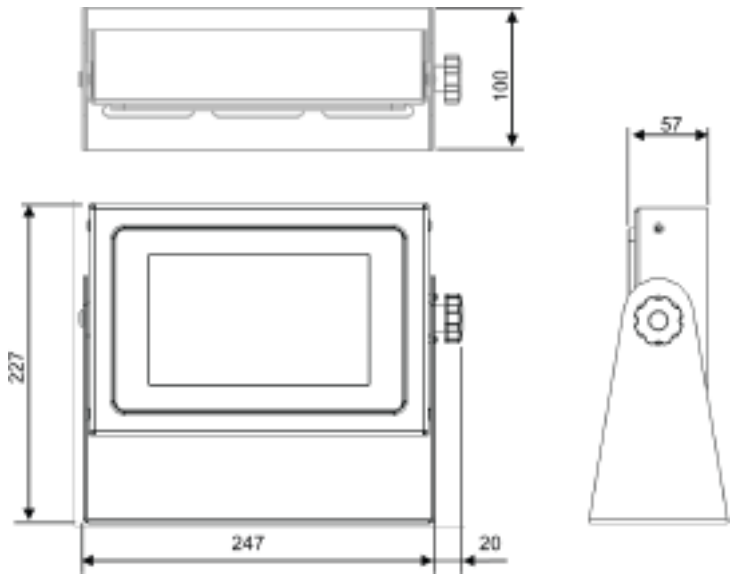
The "POSITX-3D" is designed in order to help the operator during the tightening operations which are normally performed during industrial assembly processes.

It allows control of the tool position in order to perform tightenings according to a pre-defined work sequence

The device is feeded with electrical power only.

3.2 HARDWARE

- Management up to 4 axis
- 450MHz32 bit Microcontroller Cpu;
- User memory 128Mbyte RAM, 128Mbyte Flash ;
- 2 Ethernet ports 10/100 BASE_T (EtherCat Protocol);
- 1 USB port HOST 2.0;
- Display 7 segment for diagnostic;
- Power supply 24Vdc or 18Vac;
- Dimensions (without frame): 121 x 195 x 61 mm (W x H x D);
- Display version:
- LCD TFT 7" Wide 262000 colors, resolution 800x480 touch-screen;
- Dimensions 208 x 179 x 135 x 5 mm (W x H x D);



3.3 TECHNICAL FEATURES

CONNECTIONS SPECIFICATION

General CNC Installation Specifications

The installation staff must be suitably qualified and competent and must read the manual content before to start with the installation.

you should follow this manual for a correct installation. Possible question to make clear can be request at supplier.

Builder accepts no liability for any consequences resulting for incorrect installation or inappropriate use of the Numerical Control.

Installations notes

To wire the electric frame that must contain the Numerical Control, conform with the electromagnetic compability standard and the safety standard in force.

In particular, the safety standard in force impose that the emergency stop circuits must be constituted with electro mechanical components and must be not dependent by hardware or software.

To prevent problems due to coupling between power and control signals, follow these suggestions:

- power and control cables must be separate (min. 20 cm) and, should crossing necessary, they must cross only with 90°angle;
- if possible, the power area (drivers, and so on) and the control area (POSITX-3D), must be physically separate with an interruption of metal base;
- use adequate noise suppressor (filters, and so on);

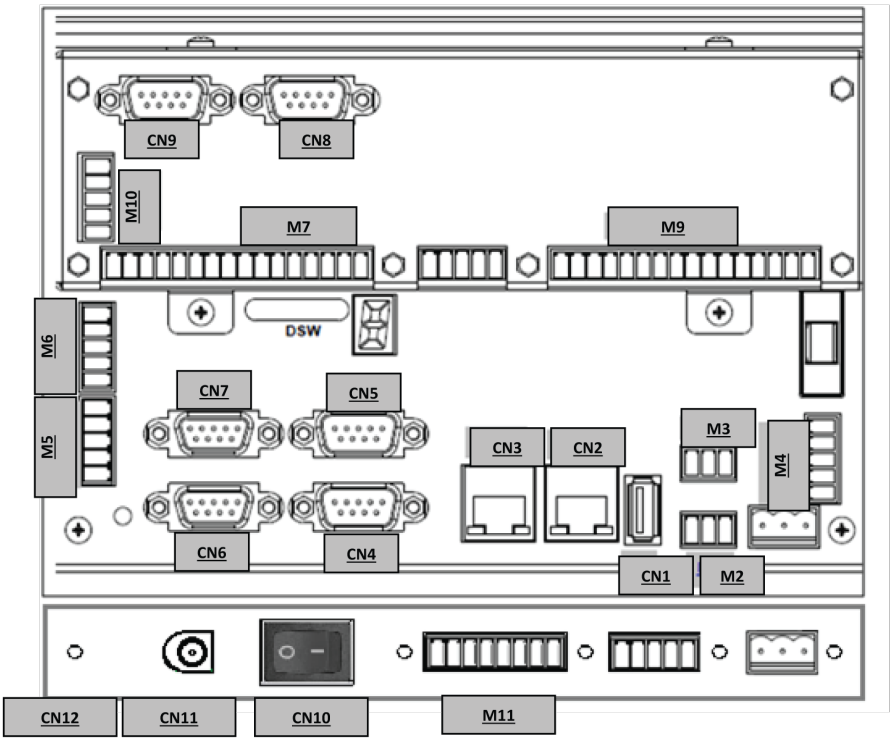
3.4 Danger of damage for incorrect connection

The electronic components of the POSITX-3D are equipped with many protection circuits.

However, the following rules must be accurately applied:

- *connect the inputs (digital and analog) of controls only at voltage correspondent to indicated technical characteristics;*
- *the load on outputs (digital and analog) must correspond at technical characteristics indicated and in particular the outputs are not protected against short circuit;*
- *In advance of high voltage testing (insulation resistance test) the device must be disconnected to prevent damages on electronic component.*

Connector layout (backside)



CONNECTOR	FUNCTION	CONNECTOR	FUNCTION
CN1	USB key	M2	CAN OPEN 1 (NOT USED)
CN2	ETHERNET network (NOT USED)	M3	CAN OPEN 2 (NOT USED)
CN3	ETHERCAT network (NOT USED)	M4	INTERRUPT INPUT
CN4	Encoder 1	M5	ANALOG OUTPUT (NOT USED)
CN5	Encoder 2	M6	ANALOG INPUT (NOT USED)
CN6	COM1-COM2 : RS232	M7	DIGITAL INPUT
CN7	COM3: RS232/RS242/RS485	M9	DIGITAL OUTPUT
CN8	Encoder 4	M10	ANALOG OUTPUT (NOT USED)
CN9	Encoder 3	M11	POWERED COMMON I/O FOR USER APPLICATIONS (4 x 0 VDC + 4 x 24 VDC)
CN10	ON/OFF SWITCH		
CN11	POWER SUPPLY		
CN12	GROUND CONNECTION		

3.5 CYCLE DESCRIPTION

Input/ Output Charts

INPUT 24 Vdc			
ID	**Name**	**Description**	**Mandatory**
1	OK Tool 1	Tightening signal OK from tool controller	X
2	NOK Tool 1	Tightening signal NOK from tool controller	X
3	Clamp closed	Block signal activated (sensor)	
4	External Start	Start sequence from external input	
5	External Reset	Reset sequence from external input	
6	External Back	Repeat tightening signal from esxternal input (even if screw was correctly tightened)	
7	External NOK Acknowledge	Accept a NOK result through digital input	
8	Loosening / Rework	Activate untightening from external	
9	Force external Job Selection	Activate external sequence selection. When this input is active the work sequence will be selected by selection input only. Other selection methods will be disregarded	
10	Job select Bit 1	Value of Bit 1 external sequence selection (0-5 bits available)	
11	Job select Bit 2	Value of Bit 2 external sequence selection (0-5 bits available)	
12	Job select Bit 4	Value of Bit 4 external sequence selection (0-5 bits available)	
13	Job select Bit 8	Value of Bit 8 external sequence selection (0-5 bits available)	
14	Job select Bit 16	Value of Bit 16 external sequence selection (0-5 bits available)	
15	Job select Bit 32	Value of Bit 32 external sequence selection (0-5 bits available)	

OUTPUT 24 Vdc			
ID	**Name**	**Description**	**Mandatory**
1	Output ready	Positioning system ready to start	
2	Output in job	Active when job is being done	
3	Out clamp 1	Activate component blocking electrovalve 2 possible modes: -Out clamp 1 activated: to command mono-stable valve (continuous power feed of locking reel) - Out clamp 1 and Out clamp 2 activated: to command dual-stable valve (gives pulse to power locking reel)	
4	Out clamp 2	Disactivation of component blocking electrovalve - Out clamp 1 and Out clamp 2 activated: to command dual-stable valve (gives pulse to power locking reel)	
5	Out Tool 1 enable	Power tool enabled	*
6	Out in position	Active when tightening position is correct	
7	Out OK	Active when single tightening got positive result in the pre-defined position	
8	Out NOK	Active when tightening position is wrong	
9	Out Complete OK	Active when all tightenings got positive result in the pre-defined positions	
10	Out Complete NOK	Active when one or more tightenings got negative result or when job has been cancelled.	
11	Out cycle bit-1	Value of Bit 1 cycle selection (0-5 bit possible)	*
12	Out cycle bit-2	Value of Bit 2 cycle selection (0-5 bit possible)	*
13	Out cycle bit-4	Value of Bit 4 cycle selection (0-5 bit possible)	
14	Out cycle bit-8	Value of Bit 8 cycle selection (0-5 bit possible)	
15	Out cycle bit-16	Value of Bit 16 cycle selection (0-5 bit possible)	
16	Out cycle bit-32	Value of Bit 32 cycle selection (0-5 bit possible)	

4 INSTALLATION

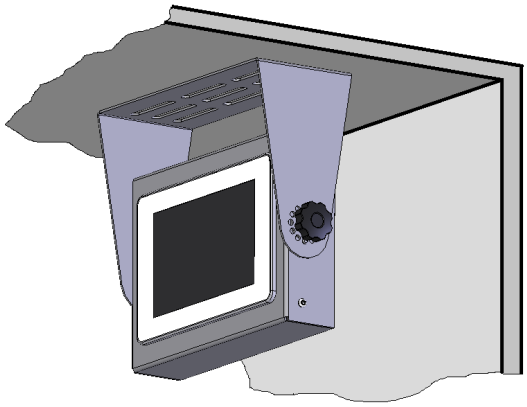
4.1 WARNINGS

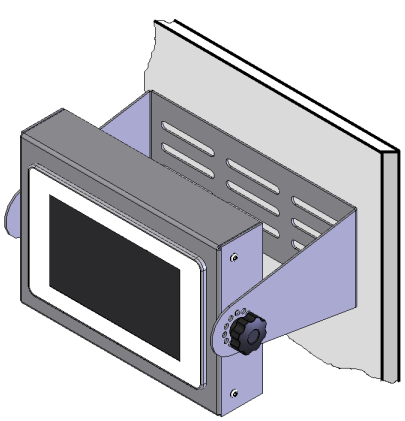
GENERAL WARNINGS

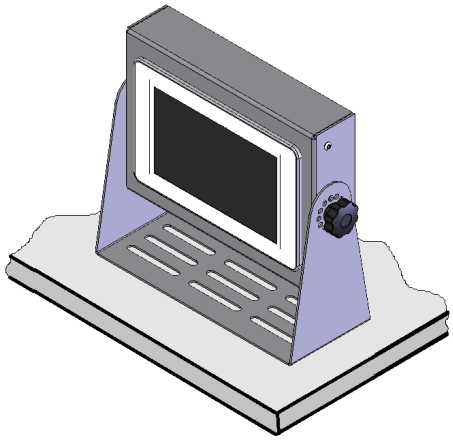
- *All operations must be carried out either by builder personnel or by builder's authorized personnel, but professionally trained and teached, under supervision of a responsible person.*
- *Operators must wear personal protection equipment according to the kind of operation and must have appropriate tooling.*
- *Missing compliance with following paragraphs, will relieve builder of any responsibility in case of accidents, damages or misfunctioning of the device .*

4.2 INSTALLATION

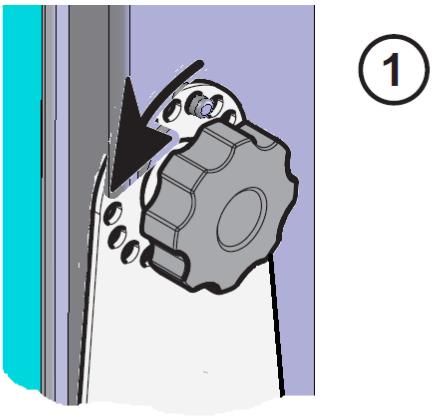
INSTALLATION OPTIONS

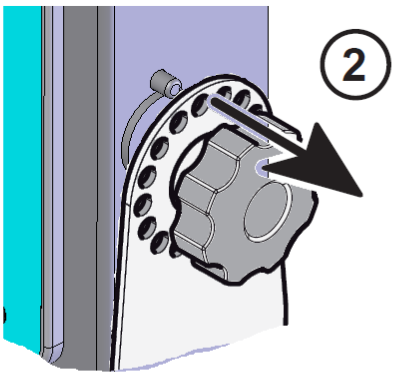


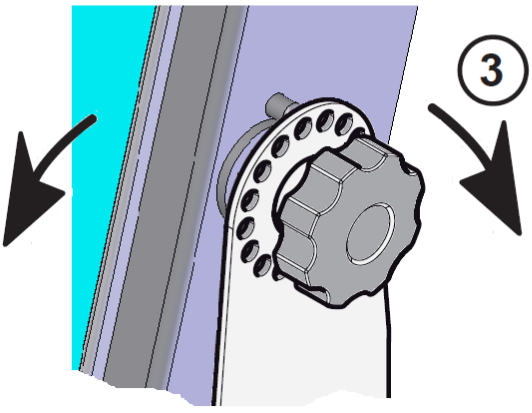


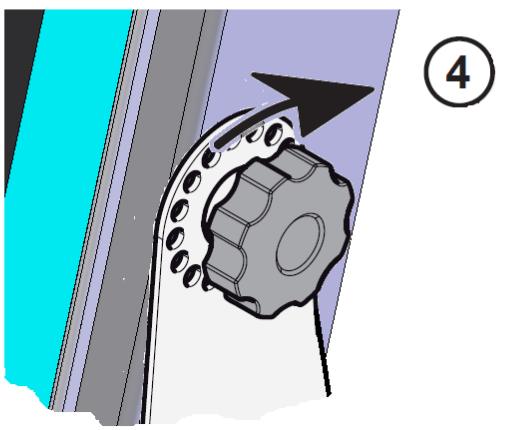


SCREEN INCLINATION

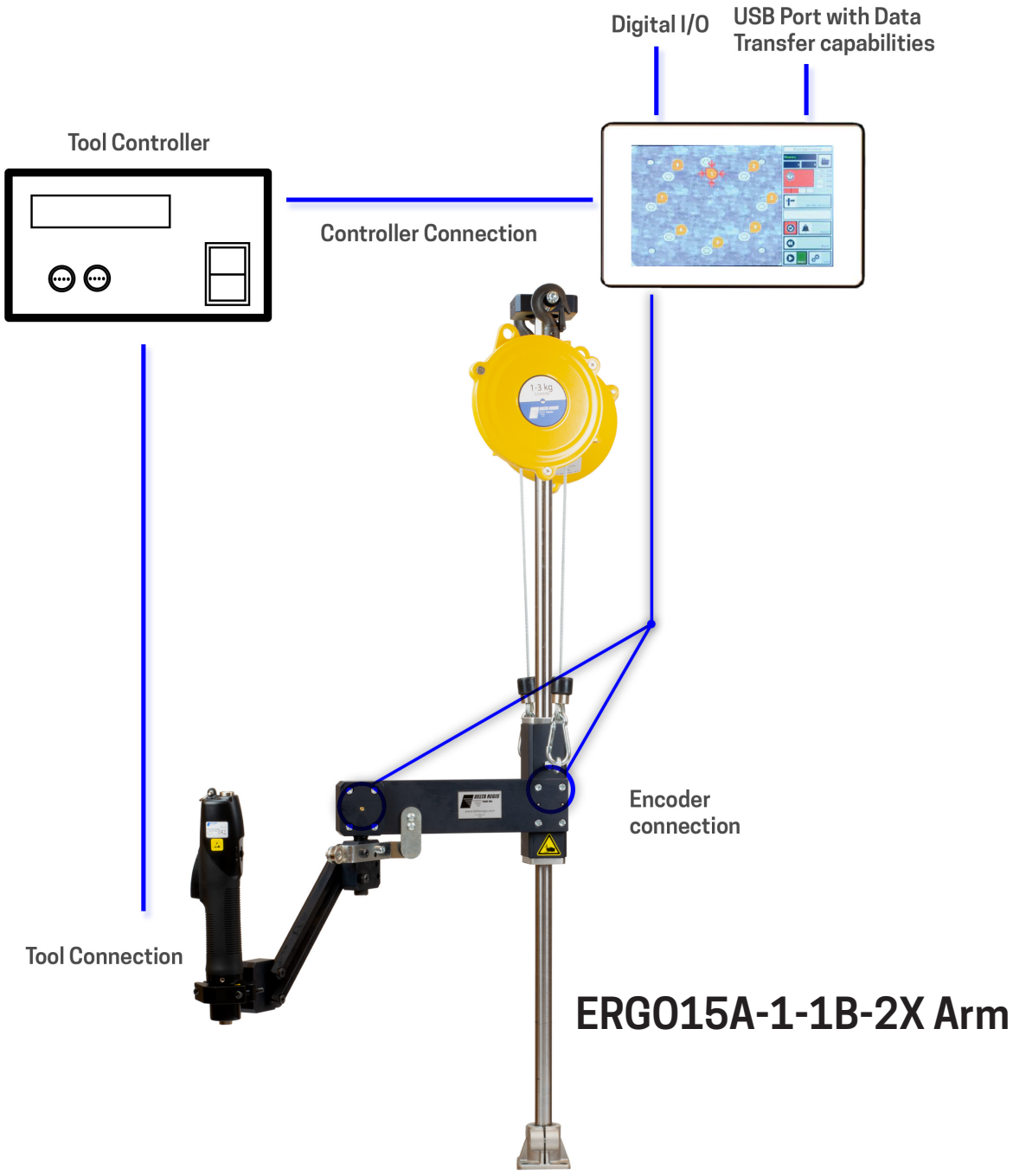








4.3 CONNECTION SCHEME - EXAMPLE



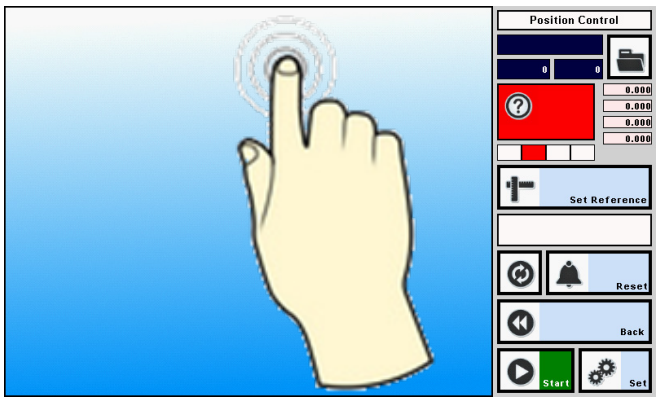
5 OPERATIVE INSTRUCTION

5.1 INTRODUCTION

Do not alterate or disconnect the device during use.

Alteration or in-observance of warnings from operator, will relieve builder form any responsibility about damages and/or injuries to people or things which may occur and will give the operator the full responsibility towards control bodies.

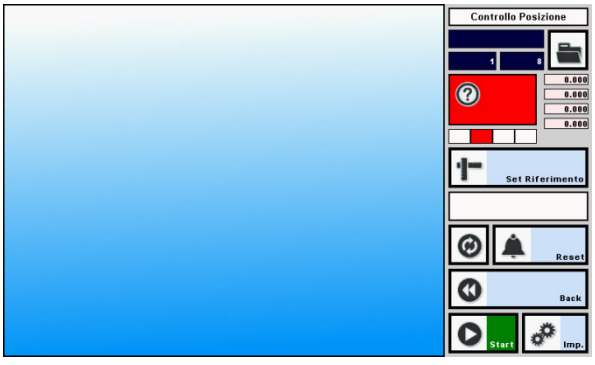
To access the overall POSITX-3D functionalities, users will go through the touch-screen HMI. Here is the appearance of the main screen

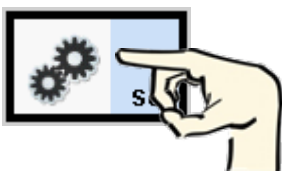


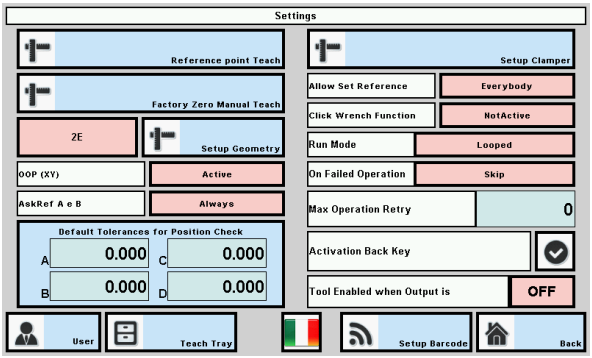
SELECTION OF LANGUAGE

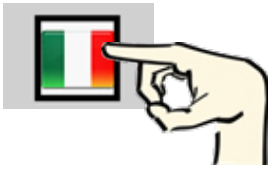
Current available languages: Italian, English

To select appropriate language, tap “Set” (“Imp.” If Italian) from main screen









Tap "Back" and return to main screen. Now language is set to English.

ACCESS MODE

POSITX-3D software allows two levels of access, with different functionalities:

- Administrator mode: hereinafter called Admin
- User mode: hereinafter called User

Admin mode functionalities:

- Programming
- Positioning reference setup
- Pictures uploading
- Positioning teach
- Activation/deactivation of additional functions
- Eventually modify factory setting (under Builder supervision)
-

User mode functionalities:

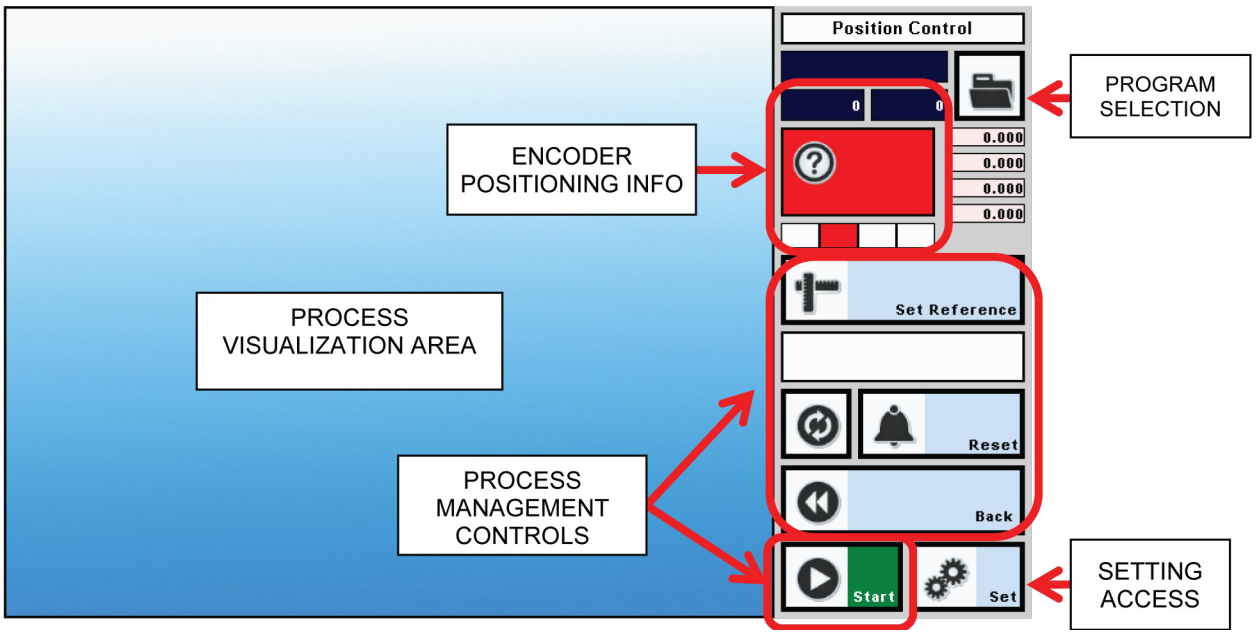
- Working
- Positioning reference confirmation
- Process with positioning functions

Admin functions are accessible through a password supplied by builder with the device.

The Administrator password is fix and cannot be modified. User is responsible for appropriate use of the password.

6 PROGRAMMING

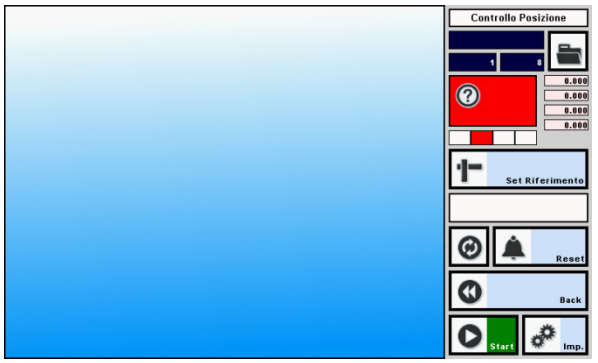
6.1 MAIN SCREEN DESCRIPTION

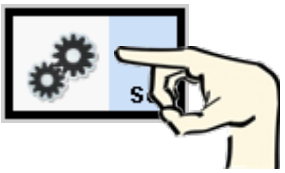


6.2 ACCESS TO ADMINISTRATOR MODE

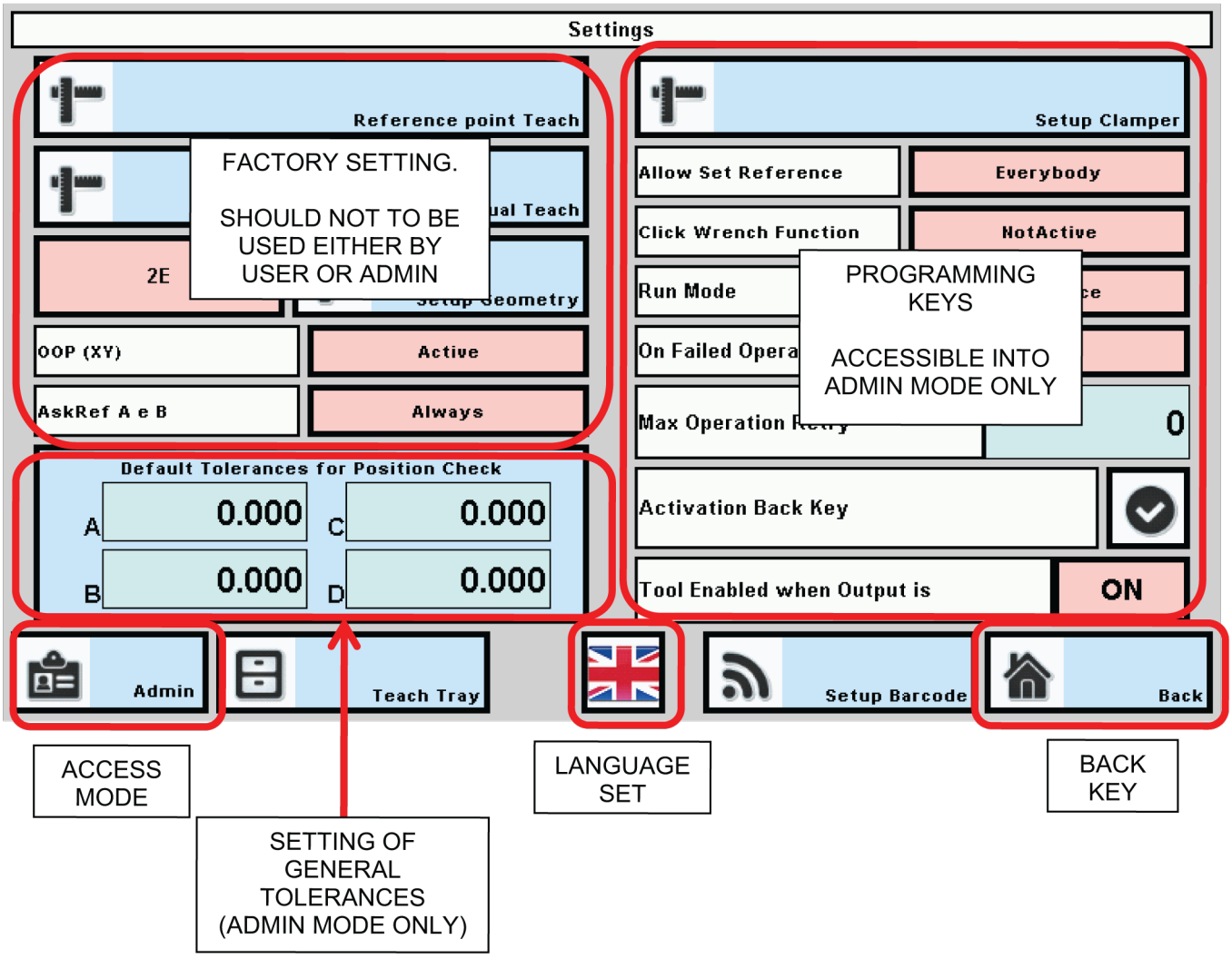
To access the Admin mode, from main screen tap "Set".

Enter into "Settings" screen

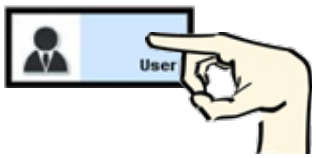




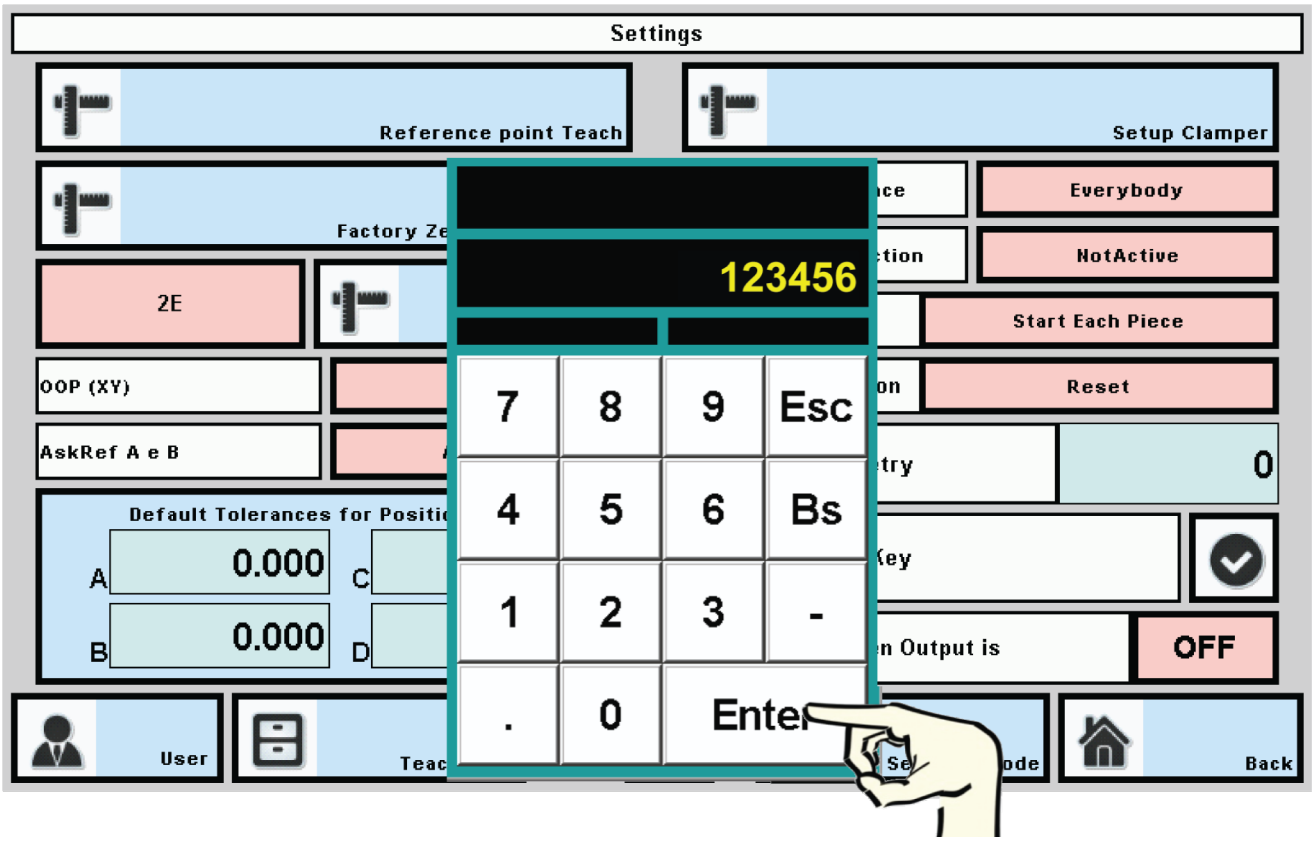
DESCRIPTION OF SETTINGS SCREEN



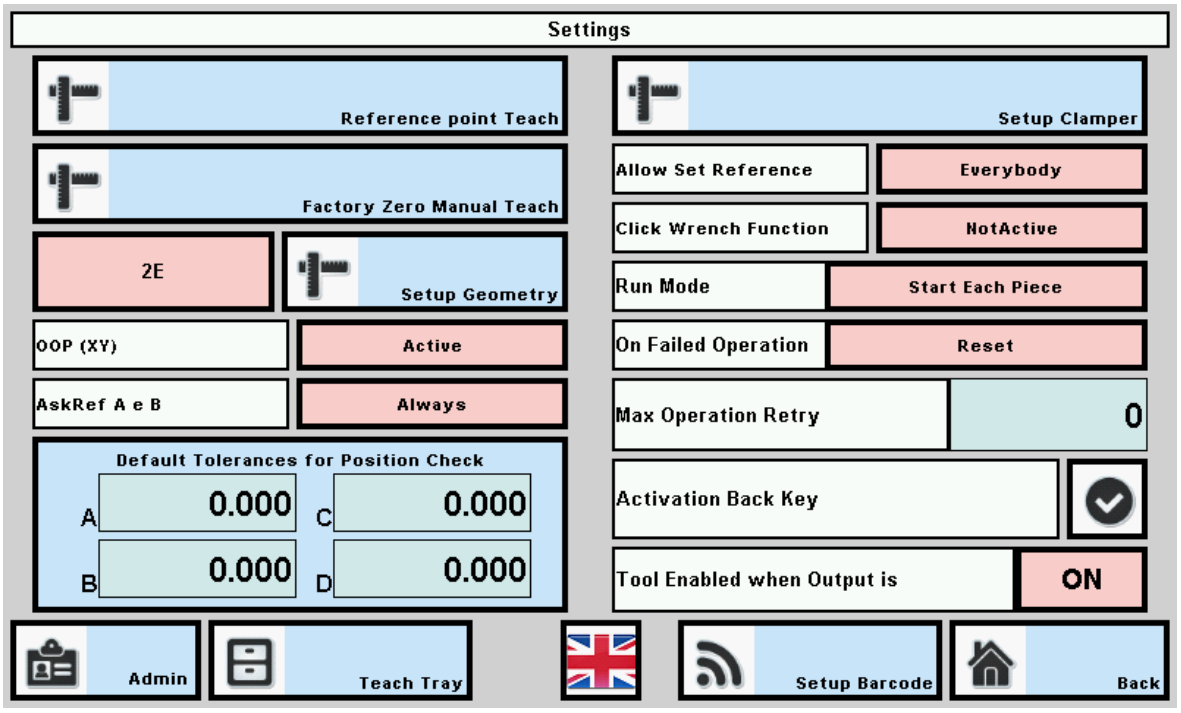
Tap "User"



To enter into Admin mode, type the administrator password supplied by builder through the popup keyboard, then tap "ENTER"

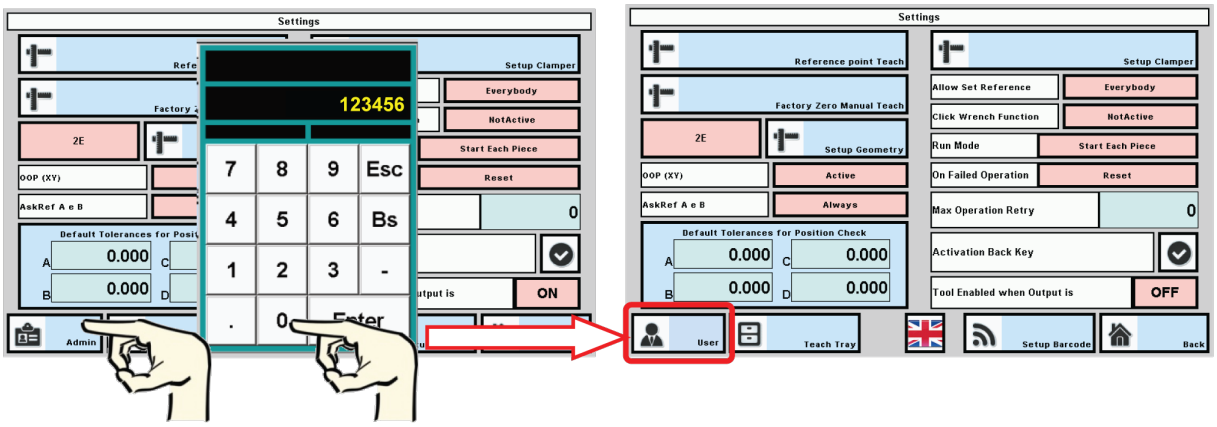


The screen is now into Admin mode and all functions are accessible.



6.3 EXIT ADMINISTRATOR MODE

To exit Admin mode do that, tap "Admin", then type "0" (zero) on the popup keyboard and "Enter". The "Settings" screen goes to "User" mode



Tap "Back" and go to main screen "Position Control"

The POSITX-3D is now in User mode and is ready to start production process work.

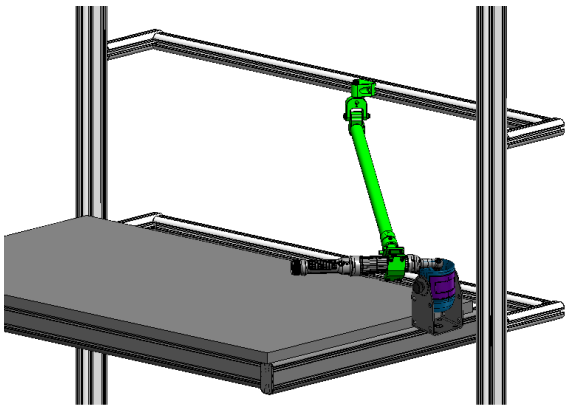
6.4 SETTING OF REFERENCE START POSITION

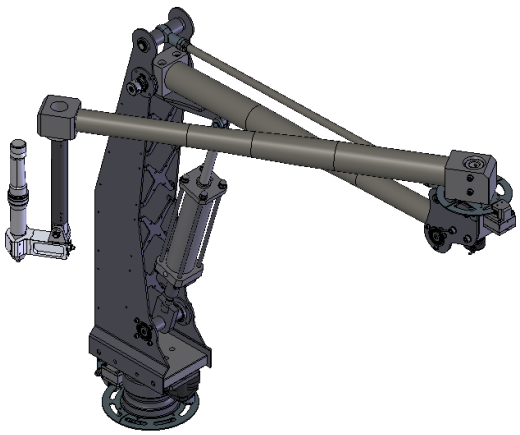
The reference start position is the point to which the operator will leave the arm at the end of work day and where he will pick it up the next day, but after starting the POSITX-3D device on.

- It should be a resting point in which the torque arm can be clearly and firmly positioned.
- It will have to be easily identified, so it should be supported by a mechanical rest point.

It could be either a tool holder or a specific arm rest position.

Some examples in the following sketch



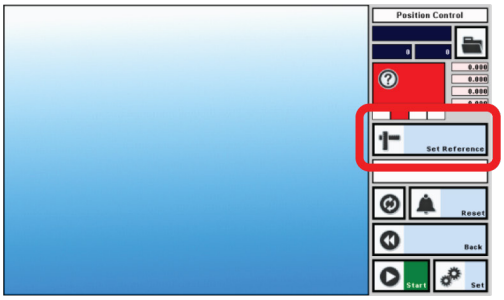


DAILY ACCESS AND RESTORE OF REFERENCE START POINT

- Check that arm is in the pre-defined start reference position. If not, move it there.
- Turn the POSITX-3D device on
- Start working

In case the arm is not in the pre-defined reference startup position when the POSITX-3D is turned on:

- Move the arm to the reference startup position
- From main screen, tap "Set Reference".



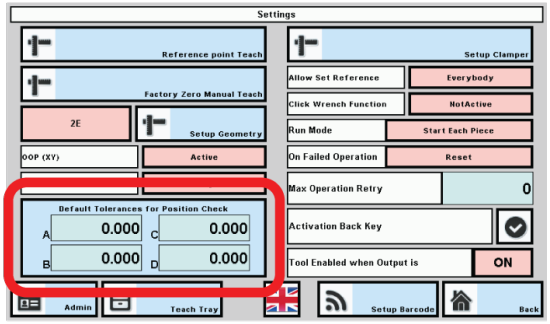
- Start tightening process

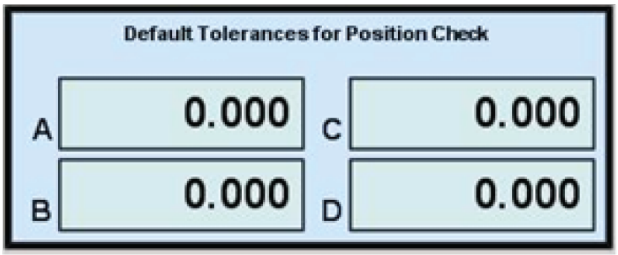
6.5 SETUP OF DEFAULT POSITIONING TOLERANCES

This function allows setting of a general value of positioning tolerance which will be used as default for all cycles.

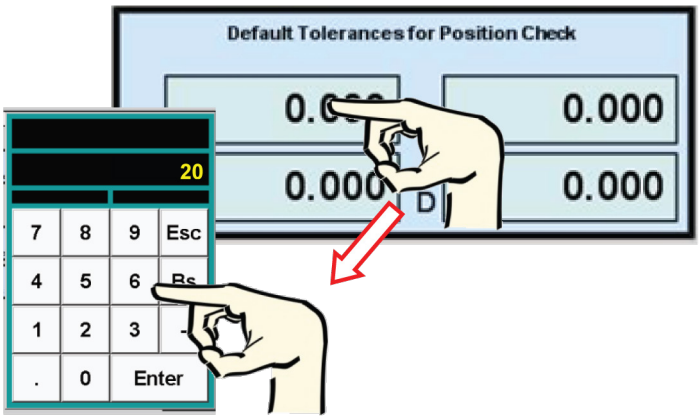
It is also possible setting specific tolerance values per each selected tightening point. Procedure for setting of specific tolerances is explained in paragraph 6.8.

- From Service screen, tap Default Tolerance for Position Check





- Tap windows A, B, C and D for setting the tolerances and type the value using the pop-up keyboard



A,B,C,D correspond to axis measured by arm encoders and are related to the arm geometry. Typically, axis D is corresponding to 4th encoder. To select the appropriate axis, follow the indications of Table 2.

Arm Geometry	Type of Arm	A	B	C	D
1E	Telescopic 1 encoder	X			
2E	Telescopic 2 encoder	X	X		
ARM3E	Folded 3 encoder	X	X	X	
ARMV3E	Zero G 3 encoder	X	X	X	
ARM4E	Folded 4 encoder	X	X	X	X
ARMV4E	Zero G 4 encoder	X	X	X	X

- After values input completion, tap Back and go to Position Control main screen

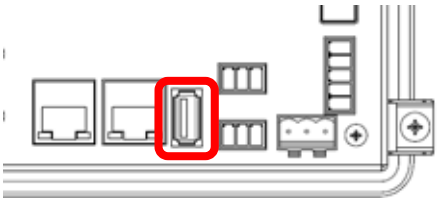
6.6 PART PICTURES/ IMAGES UPLOAD INTO DEVICE

To program the POSITX-3D, admin should upload either pictures or CAD graphics of the part/ parts to be assembled into device. The pictures will help the user to see the position of each tightening point and make a more efficient assembly sequence.

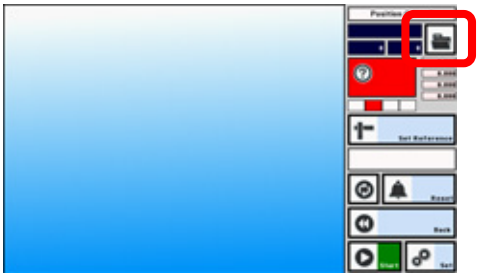
To upload the pictures into POSITX-3D, follow this procedure:

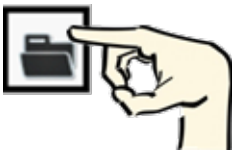
- Create a folder into a personal computer, named with the product name. It is suggested using concise names.
- Take pictures of the components, save them in Bitmap 24bit format, resolution 600x480.
- Name each picture with sequential numbers, starting from 001 ahead.
- Save pictures into the cartel with product name
- Save the cartel into a USB flash drive

- Insert the USB drive into the USB port on the device backside

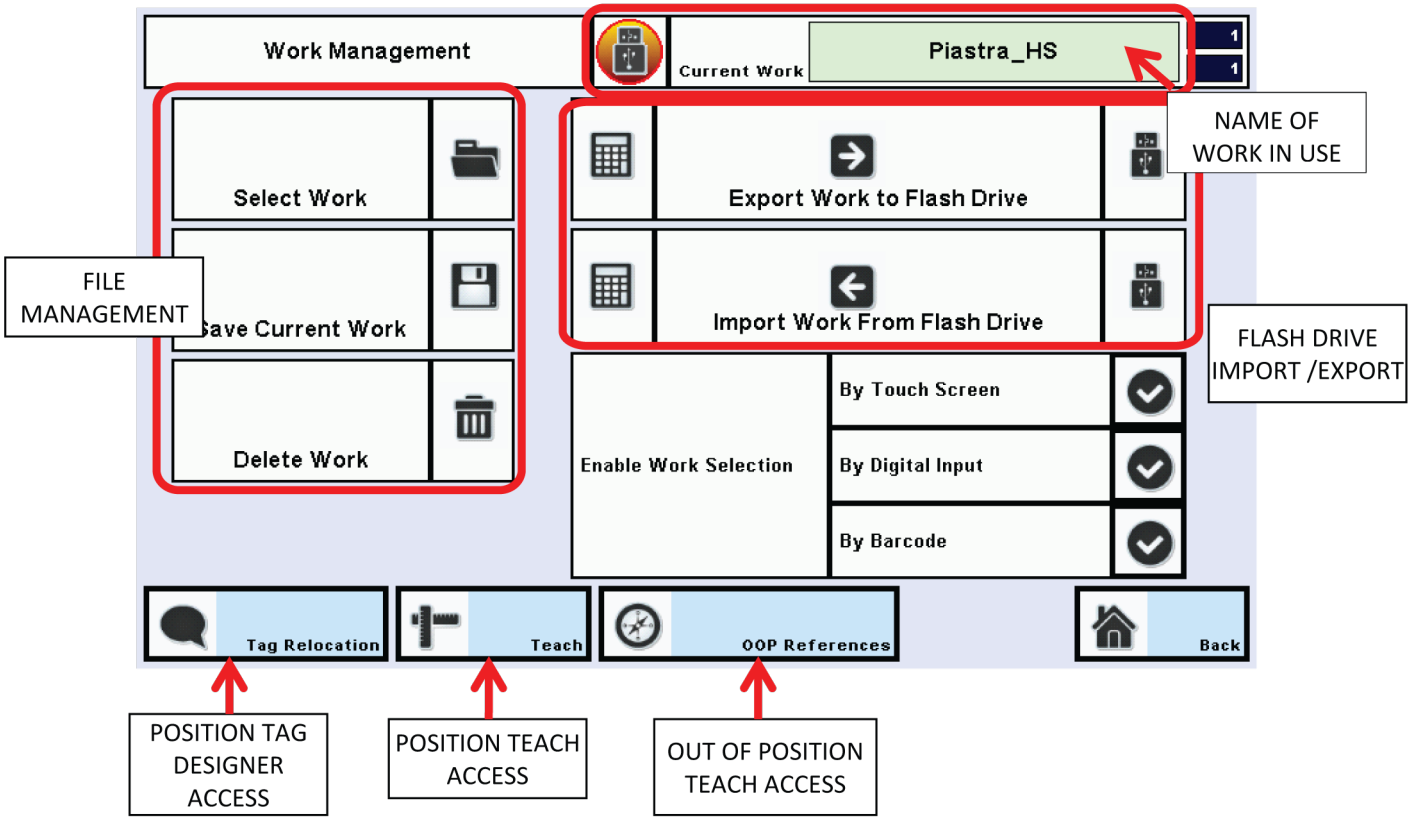


- Tap "open file" icon on main screen and go to Work Management screen



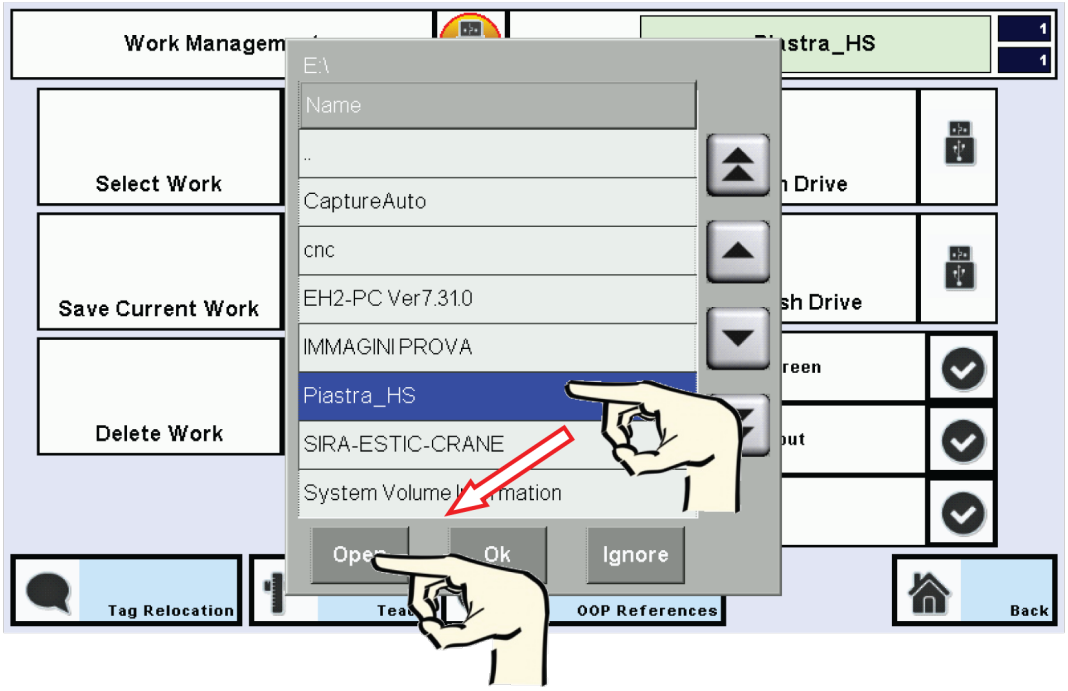


DESCRIPTION OF WORK MANAGEMENT SCREEN



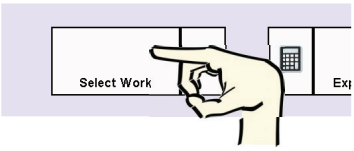
- Tap "Import from flash drive"

- From pop-up window select the file name corresponding to the cartel (e.g.: " Flangia"), then tap "copy"

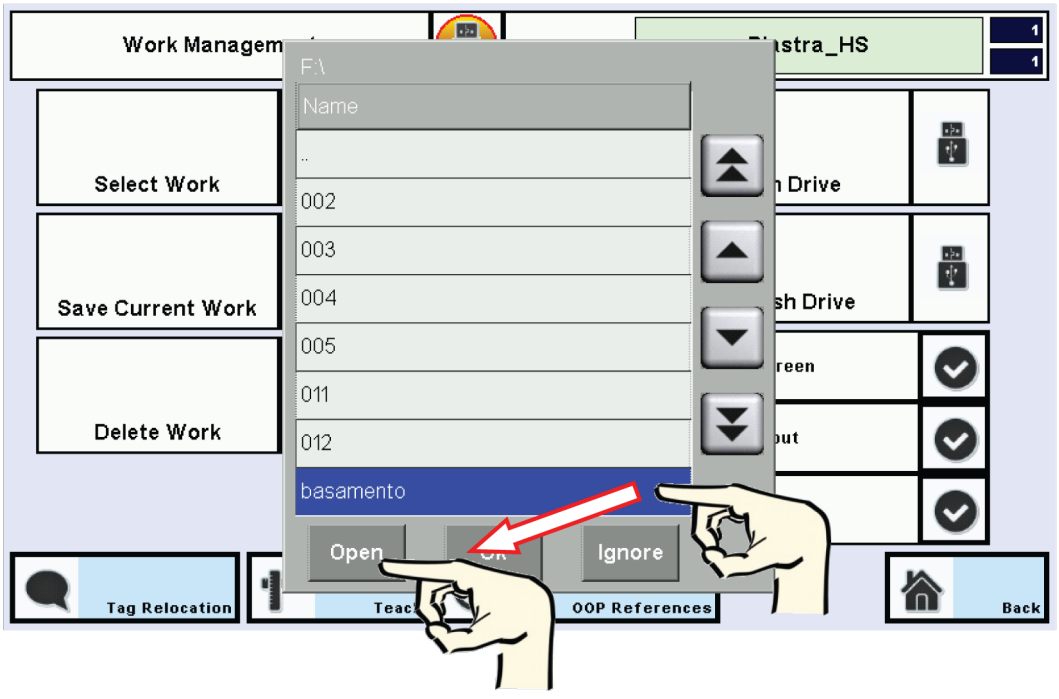


Wait until file is copied into POSITX-3D hard drive.

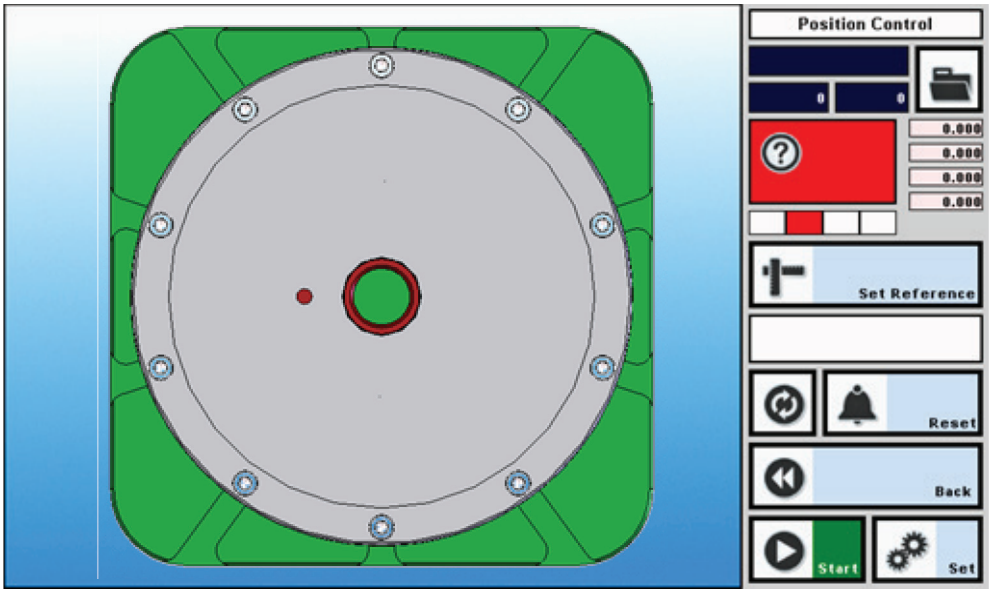
- Tap Select Work



- Select the desired work from the pop-up window, then tap "open



The pictures are now uploaded. Here is an example of what will appear on screen

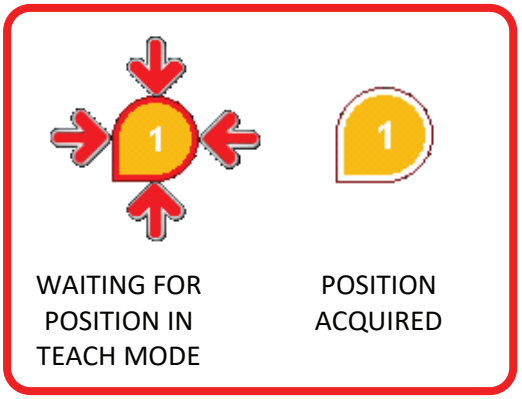


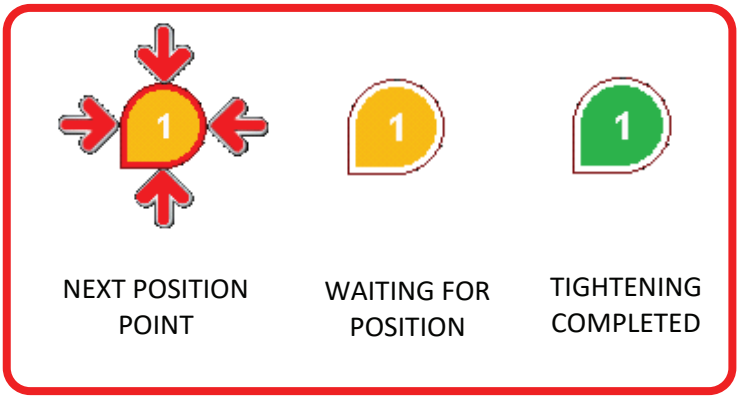
6.7 POSITIONING TAG DESIGN

Positioning tags are interactive icons which identify the tightening points of the process. Each tag will be numbered automatically during the design phase.

Numbering of tag correspond to the assembly sequence, so is also be linked to tightening program selected through the power tool control unit (controller).

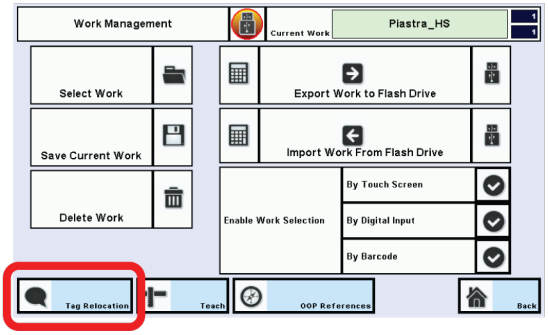
Tags change color and/or shape, according to the status mode:





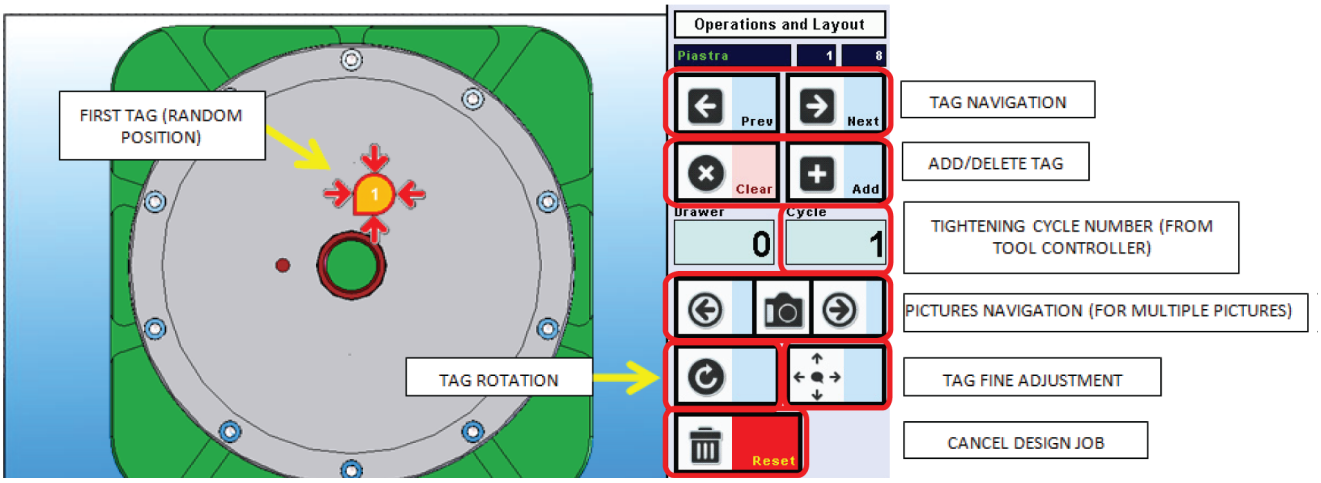
TAG DESIGN SEQUENCE

- Tap Tag Designer into Work Management Screen

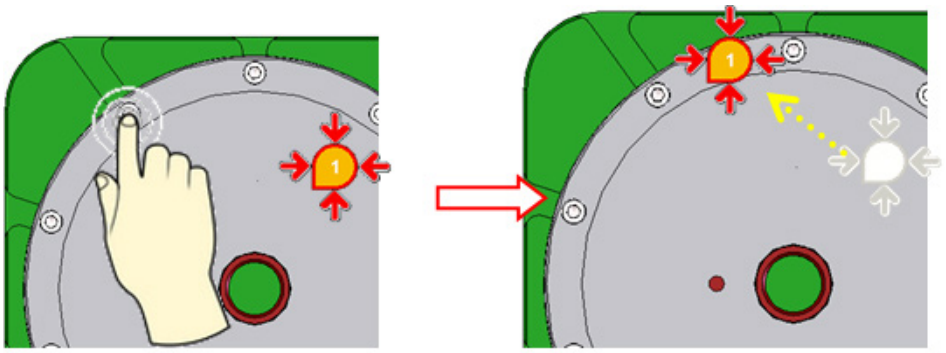


- Enter into Operations and Layout screen, with the pre-loaded first tag ready to be moved to the first point of the sequence, like into example here below.

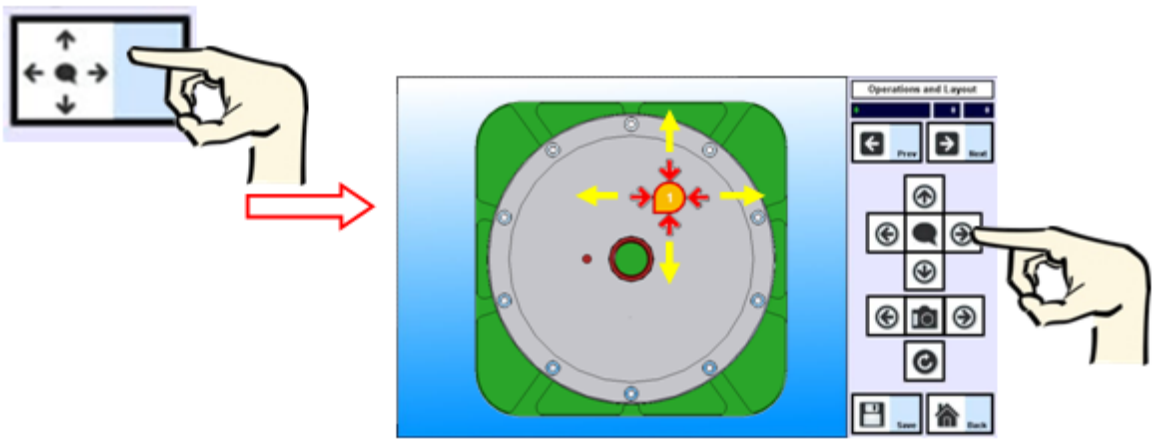
DESCRIPTION OF OPERATIONS AND LAYOUT SCREEN



- To move the tag to the first tightening point, tap on the first point position. The tag will move itself near to that position.

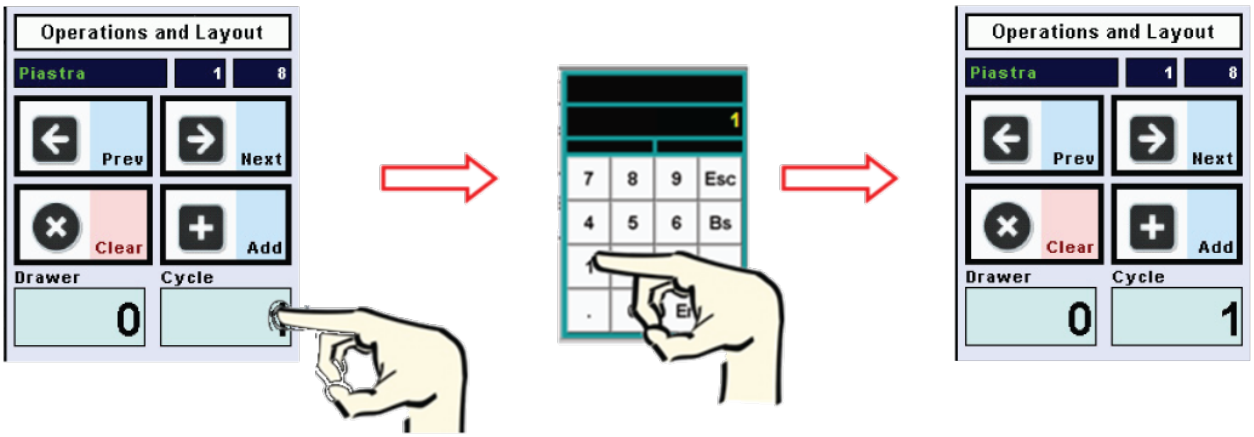


- Tag position can be fine tuned or rotated. To fine tune the tag position, tap on the "□" icon and then multiple tap on the arrows which appears on a NEW window. In this way it is possible to precisely adjust the tag position.

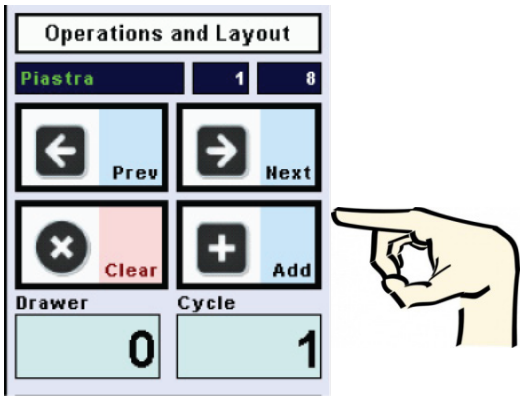


- To rotate the tag, tap the "  " icon and then multiple tap until the tag reaches the desired rotation.

- After fine adjustments, tap "Back" and return to main screen
- From main screen, select the tightening program by tapping Cycle, then digit the program number into pop-up keyboard and confirm with Enter



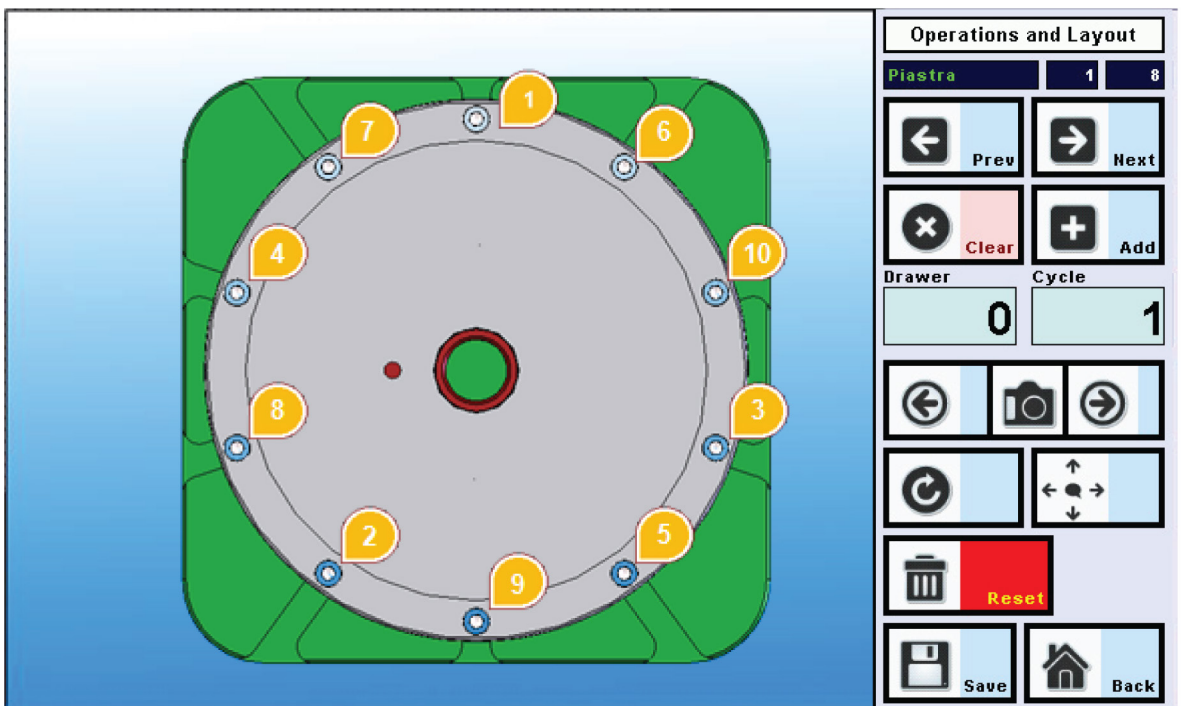
- Add a new tag by tapping Add.



- Repeat the sequence until the all tags have been added

Each tag is linked to a tightening program. Definition and programming of tightening program must be done separately by the end user with the power tool controller. POSITX-3D cannot either manage or modify the tightening programs.

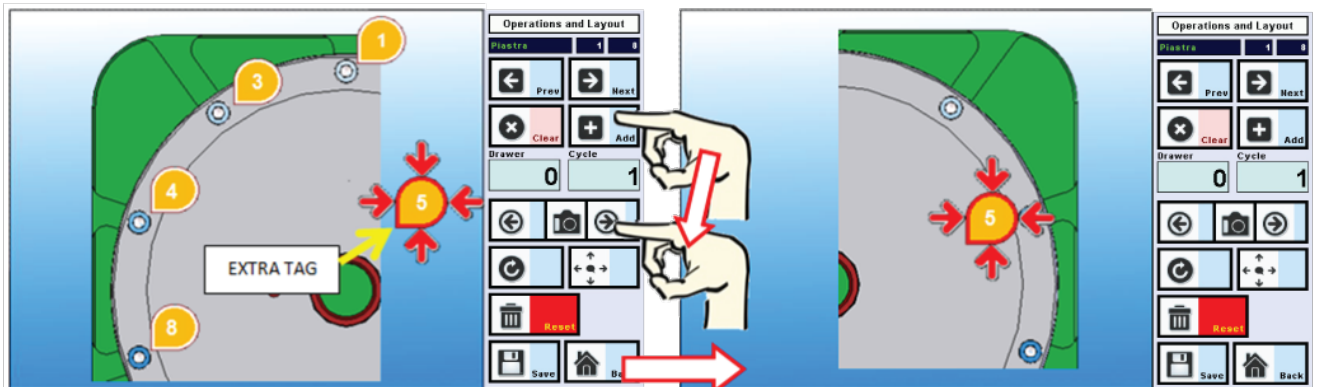
- At the end of the sequence the screen should appear as follows



MANAGEMENT OF MULTIPLE PICTURES

In case the part image need to be split in multiple images, POSITX-3D manages the change of screen in accordance with the tightening sequence.

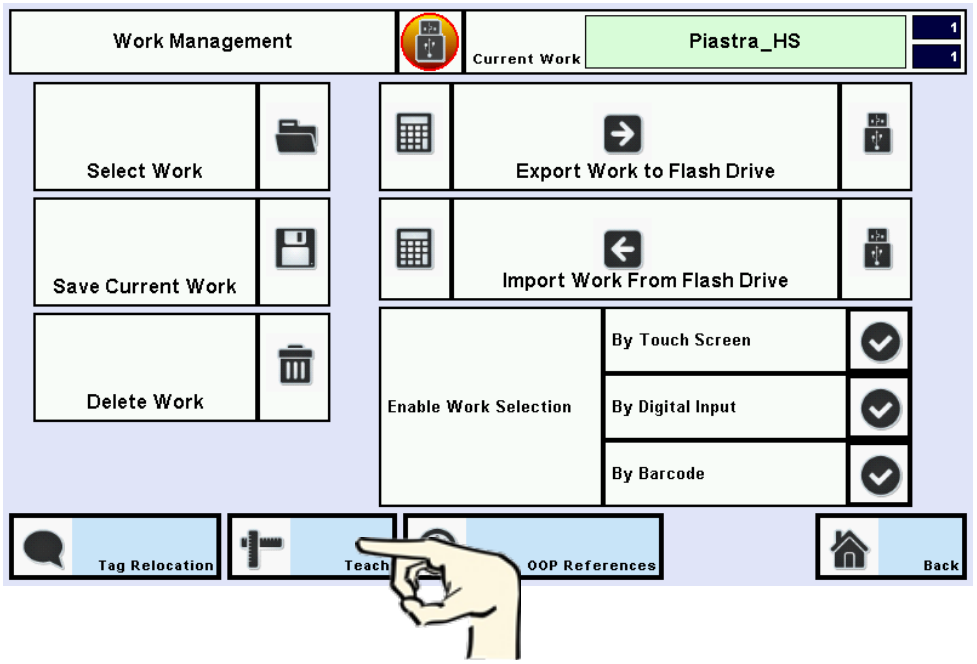
To apply tags to multiple pictures, follow instructions in point 6.6, but when the first page is fully tagged tap Add once more in order to create a new tag, then tap the right arrow on "  " icon. In this way the latest tag will be automatically transferred to the new page.



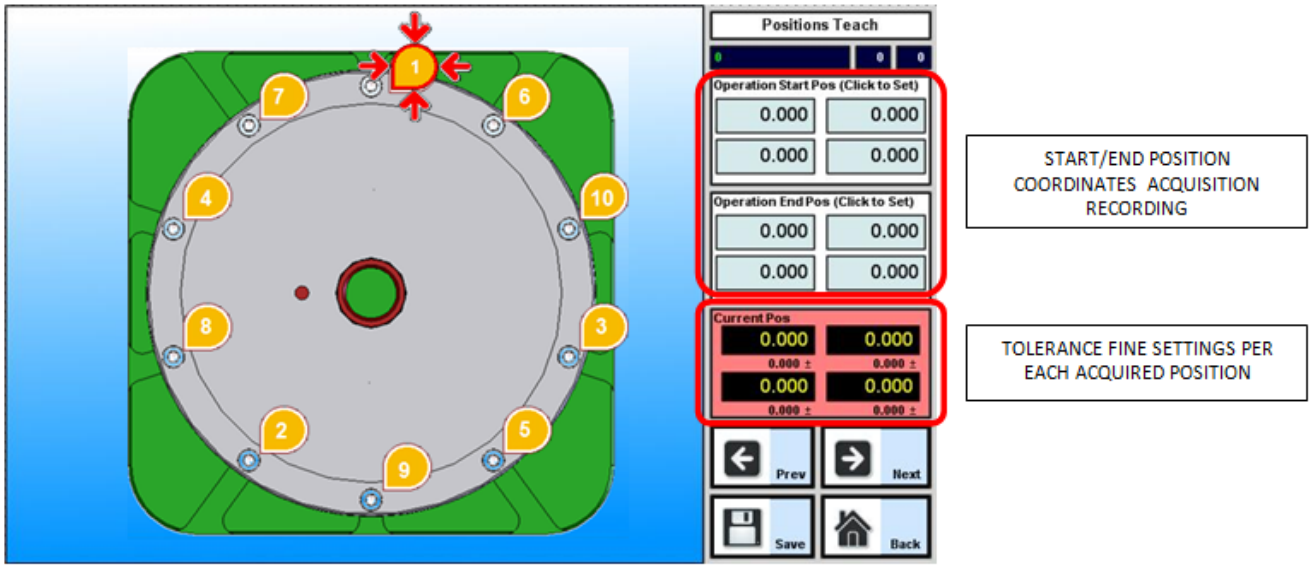
6.8 TIGHTENING SEQUENCE TEACH

After completion of tagging sequence, either with single or multiple picture:

- Tap "Save"
- Tap "Back" and enter into Work Management screen and tap "Teach"



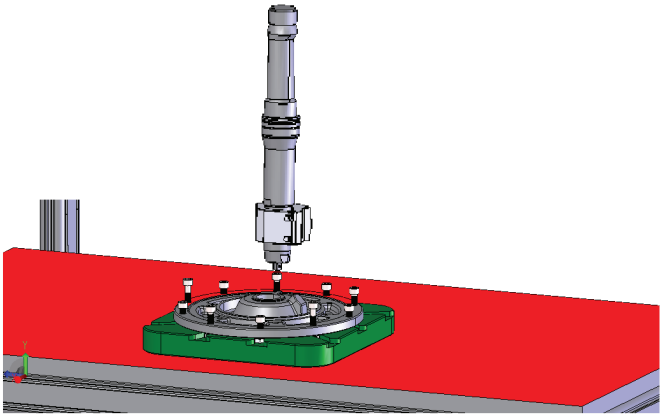
Enter into Position Teach screen

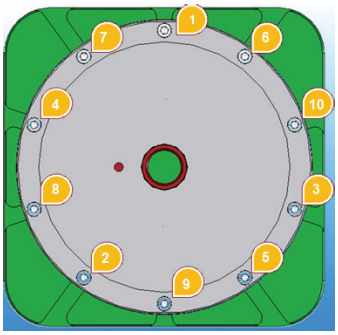


NOTE: the first tightening point tag goes to status change.

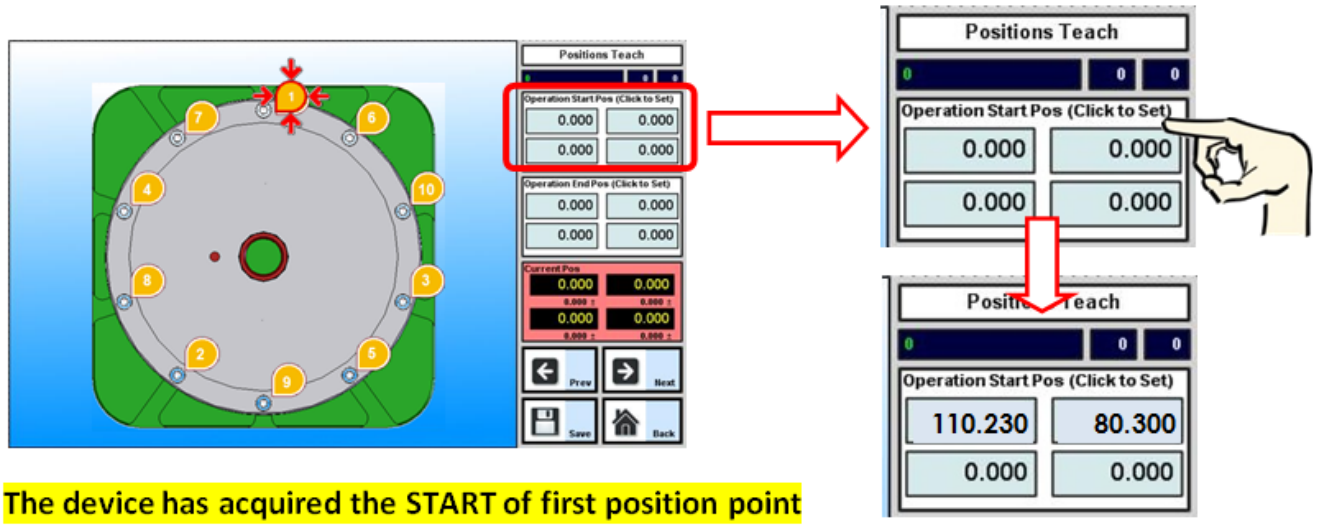
After graphical tagging POSITX-3D requires to learn tightening positions. User in charge of programming will need to handle power tool installed on torque arm over the desired tightening points. Screw will have to be leaned on the tightening point. Here is the correct sequence for teaching positions

- Position the power tool over the 1st tightening point



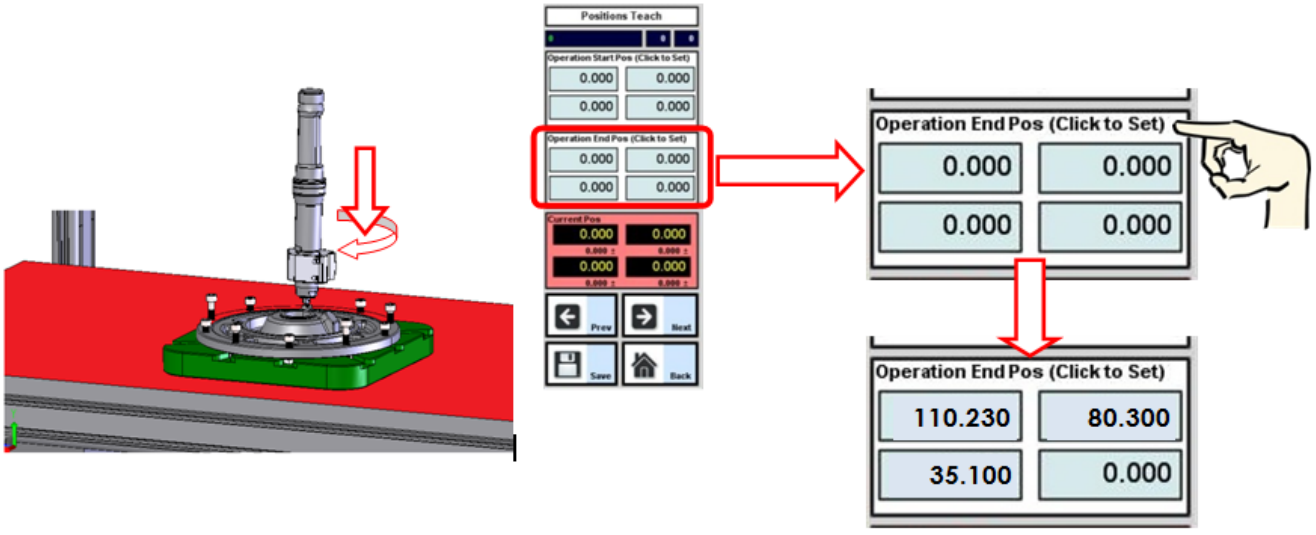


- Tap over group of values named "Operation Start Pos"



The device has acquired the START of first position point

- Tighten the screw down to the end and tap over "Operation End Pos" field

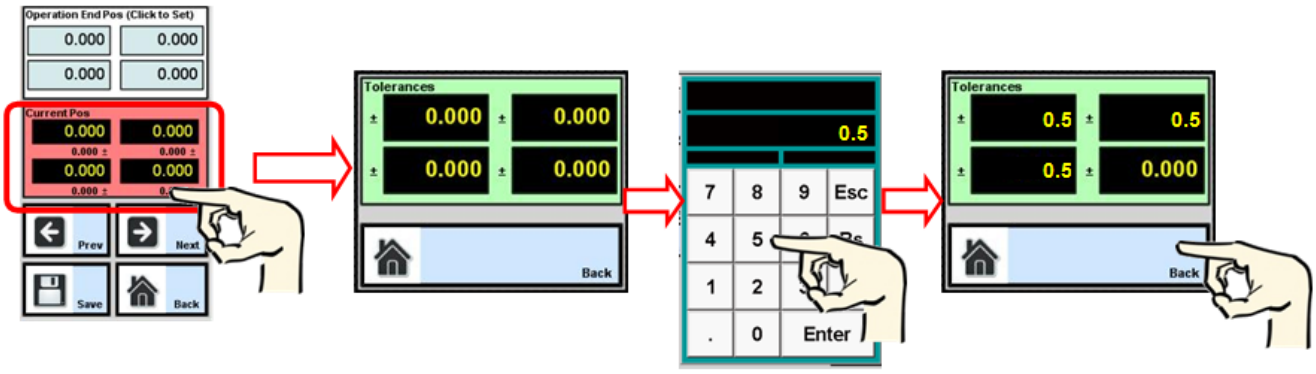


The device has acquired the END of first position point

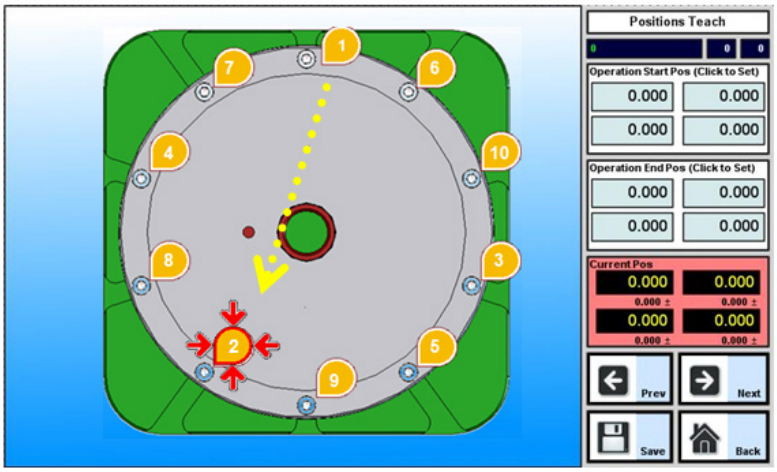
- Fine tuning of position tolerance (optional)

To modify the position tolerance range with respect to Default Position Tolerance mentioned in Paragraph 6.5, tap on the "Current Pos" field and enter the tolerance value by using the pop-up keyboard, then tap Back to go back to Position Teach main screen.

Follow the sequence shown here.



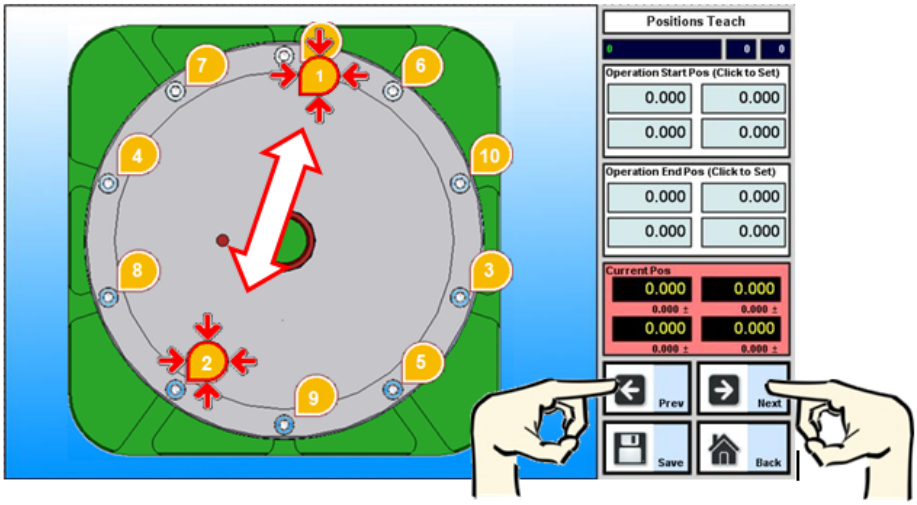
Once completed the configuration of first point, the program goes automatically to next point.



TAGS MODIFICATION

After the positioning design is also possible to move to previous or next tags for making modifications.

- On Position Teach screen tap "Prev" or "Next" icons to move among tags



- Modify the tag according to needs

- At the end of tag design, tap “Save”
- Tap “Back” to go to “Work Management” screen
- Tap “Back” to go to “Settings” screen

7 SETUP OF ADDICTIONAL FUNCTIONS

7.1 CLAMPER

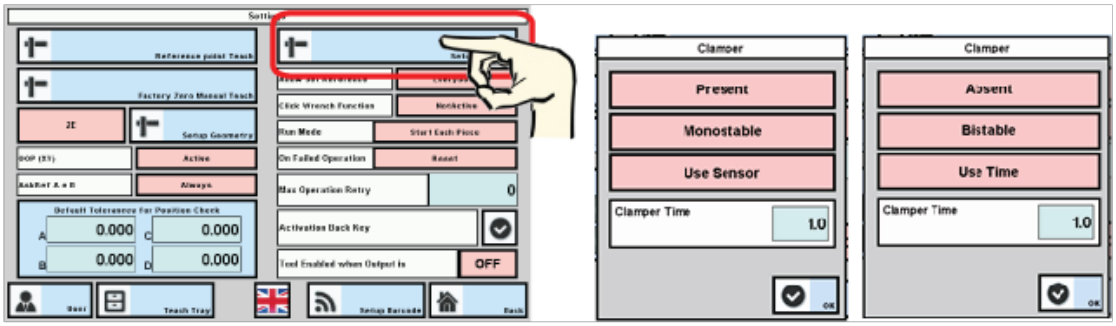
This function allows activation of electro-valve for part locking at the beginning of tightening process. There are different options:

- Present/absent: defines whether electro-valve is present or not
- Monostable/bistable: defines the type of electro-valve
- Use sensor/ Use time: defines clamping time in seconds. If "use sensor" is active there is an additional check of clamping correct activation. Sensor procurement is upon user responsibility.

To select the above functions, tap Setup Clamper and then tap on the icons which appear on the popup window.

At the end of the setting, tap OK to complete the job.

SAMPLE PICTURES OF CLAMPER SETUP FUNCTIONS



7.2 RUN MODE

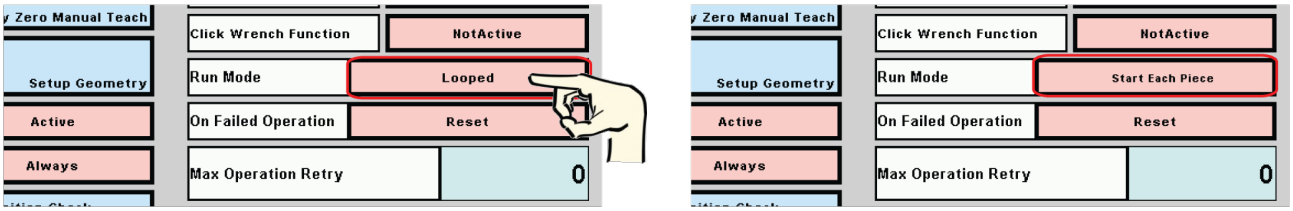
Options

- - Looped: automatically restart tightening cycle at the end of previous one.

This function cannot be activated when"Present" setting is active in "Setup Clamper"

- - Start Each Piece: any new positioning cycle have to be activated by user

To select the desired option, tap on the pink field close to "Run Mode". The options will appear alternatively



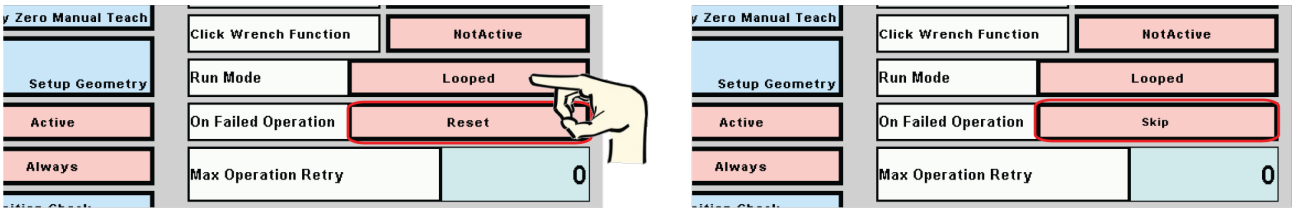
7.3 ON FAILED OPERATION

Define what the device should do when reached the maximum number of operation retry

Options:

- Skip: goes to the next tightening point without scrapping the part
- Reset: user will have to manually reset the cycle, either scrapping the part or restart from beginning.

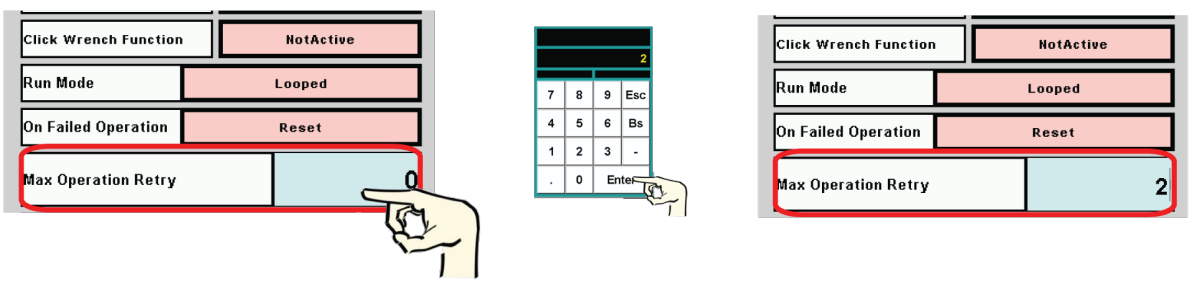
To select the desired option , tap on the pink field close to "On Failed Operation". The options will appear alternatively



7.4 MAX OPERATION RETRY

Define the amount of maximum operations retry on a single position. Maximum value is 9.

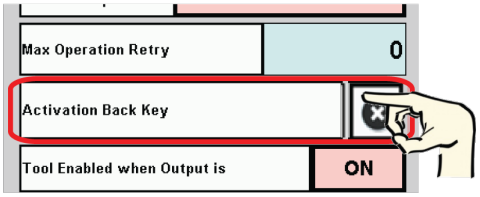
To set the desired number of trials, tap on the light green field close to "Max Operation Retry" and digit the value on the popup keyboard, then tap "Enter"



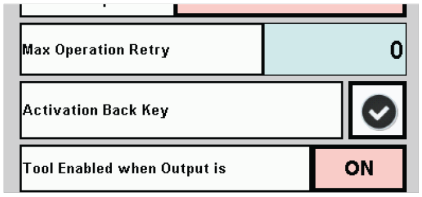
7.5 ACTIVATION BACK KEY

Activate/ deactivate the Back key, which allows to go back to previous tightening point. This could be done even in case the previous tightening was OK.

To select the desired option, tap on the icon close to "Activation Back Key". The options will appear alternatively



Inactive

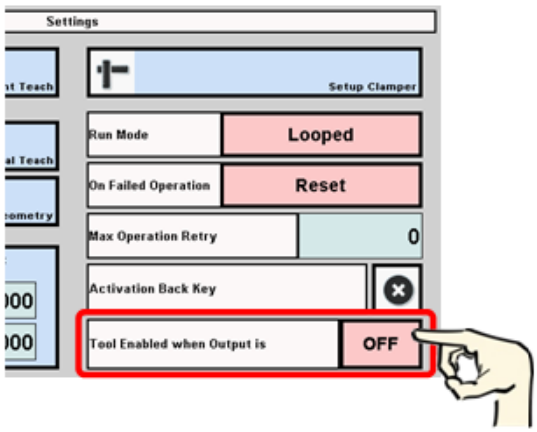


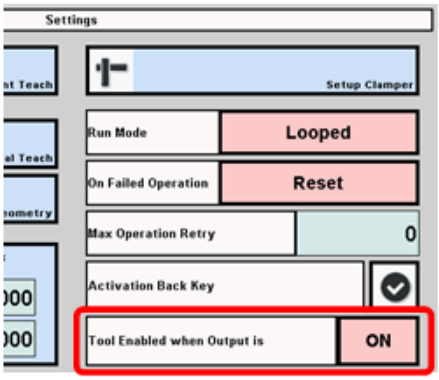
Active

7.6 TOOL ENABLED WHEN OUTPUT IS

This mode is related to the type of power tool in use, based upon its function logic.

To select the desired option, tap on the pink field close to "Tool Enabled When Output is". The options will appear alternatively

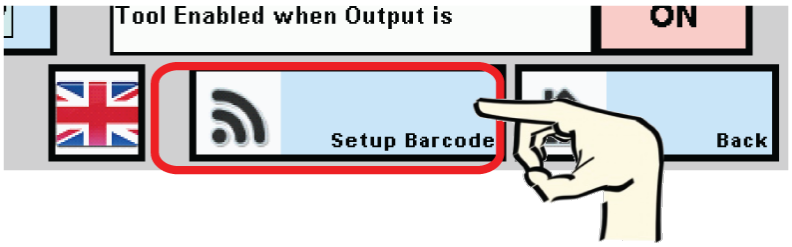




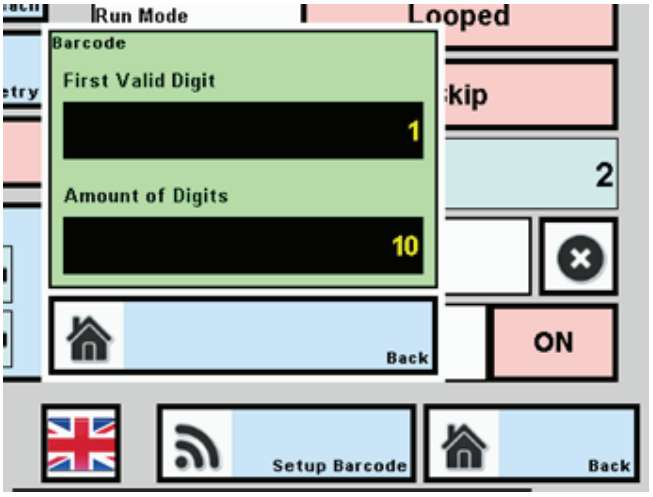
7.7 SETUP BARCODE READER

This function allows using of a barcode reader with the device when the part is labeled with a

barcode. It allows identification of the part and related tightening sequence.
Tap “Setup Barcode”.



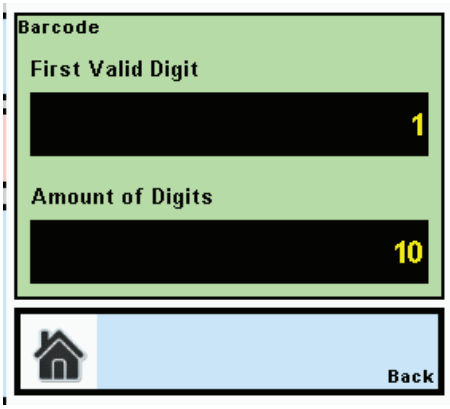
A popup window appears and will wait for input



“First Valid Digit”: defines which is the first digit from which the software has to read the barcode. Previous digits in the barcode will be disregarded. Default value is 1.

“Amount of Digits”: defines how many digits will be read by the software. Further digits will be disregarded. Default value is 10

EXAMPLE

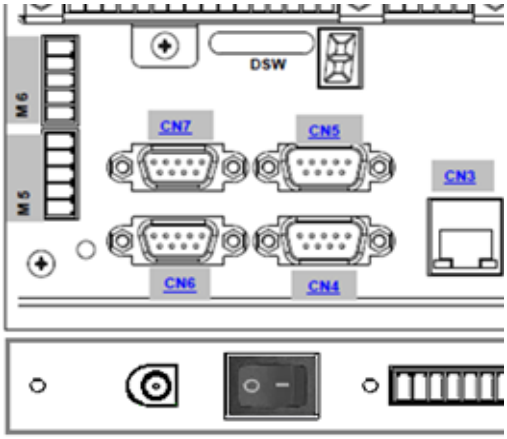


In the example shown here:

- - First valid digit is 7
- - Last valid digit is 0 (7th digit)

Other digits are disregarded

The barcode reader has to be connected to the RS422/485 port (CN7) on the device backside



The POSITX-3D is set for a specific barcode reader, which features are shown into Appendix 1. builder guarantee the function only with this type of reader. Other reader models need to be tested. Builder deny any responsibility for missing functionality in case a different reader is used.

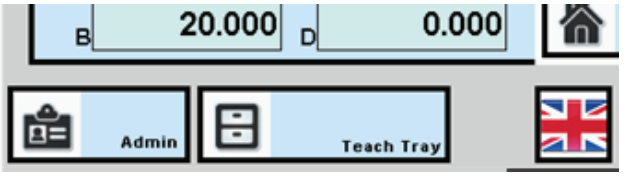
7.8 TEACH TRAY

Allows activation of the power tool out from the tightening sequence. It is intended to allow the user picking screws from a tray or a dispenser.

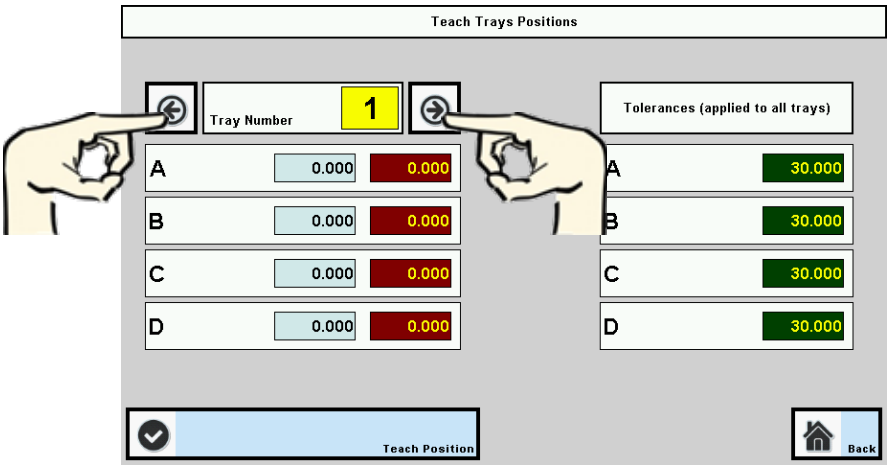
After the screw picking, the power tool will not be active until it reaches the first tightening position of

the programmed sequence.

- Tap Teach Tray on Setting screen

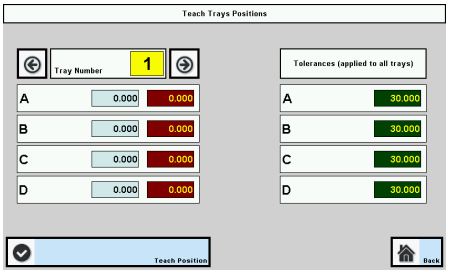


- From Teach Tray Positions screen select the Tray Number by tapping on the arrows on the side

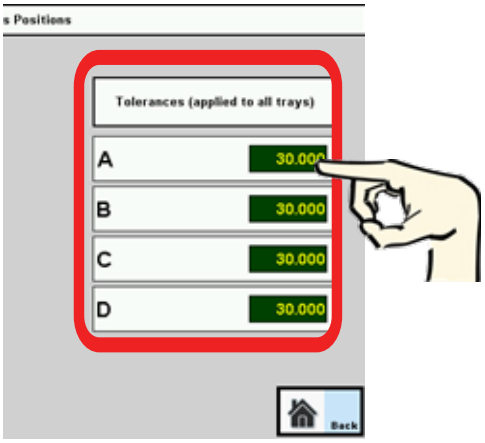


Maximum number of trays is 5.

- Move the power tool on the position corresponding to selected tray and tap "Teach Position"



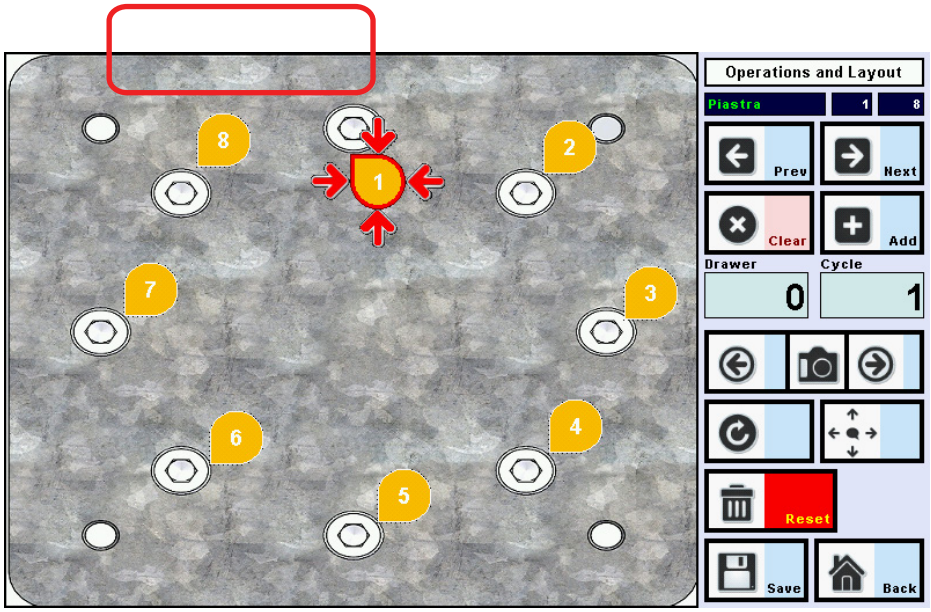
- If required, set the tray position tolerances using icons on the right side of the screen. Tap on black fields and type the tolerance value through the popup keyboard, then confirm with Enter.



- Repeat the procedure for all other trays.

TRAY NUMBER ASSIGNMENT TO WORK CYCLE

A tray number can be also assigned to each work cycle during the tag design phase (see 6.7)
During Tag design phase into Operation and Layout screen, tap on "Drawer" icon and then digit the tray number corresponding to the tigtening position.
The tray number will be combined with the screw needed for that specific tightening position.
Should tray identification to be unnecessary, leave 0 on "Drawer".



7.9 OUT OF POSITION (OOP) REFERENCE

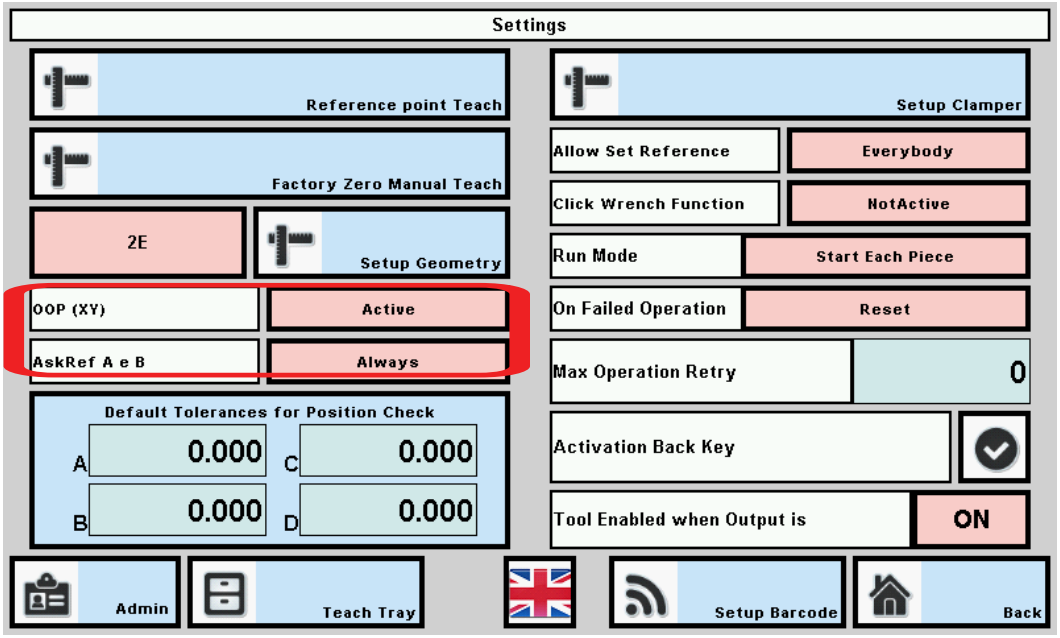
This function allows identification of a tightening sequence even if the part is not always in the same position during the assembly cycle. For example, when the part is not clamped on a jig and is placed on a table or a conveyor Mispositioning of the part has to be on a plane surface. Should the mispositioning also on a different hight than the plane surface, the software will not detect it.

When OOP function is activated, the user can detect the right tightening sequence by touching two

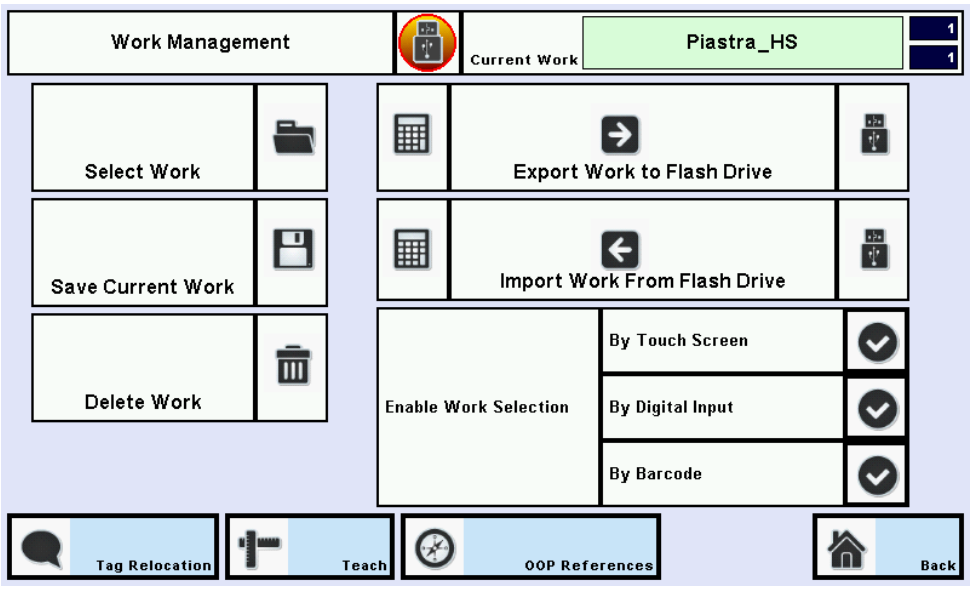
reference Zero Points and then he can start the tightening.

When OOP function is activated, reference Zero Point detection must be repeatedper each tightening sequence

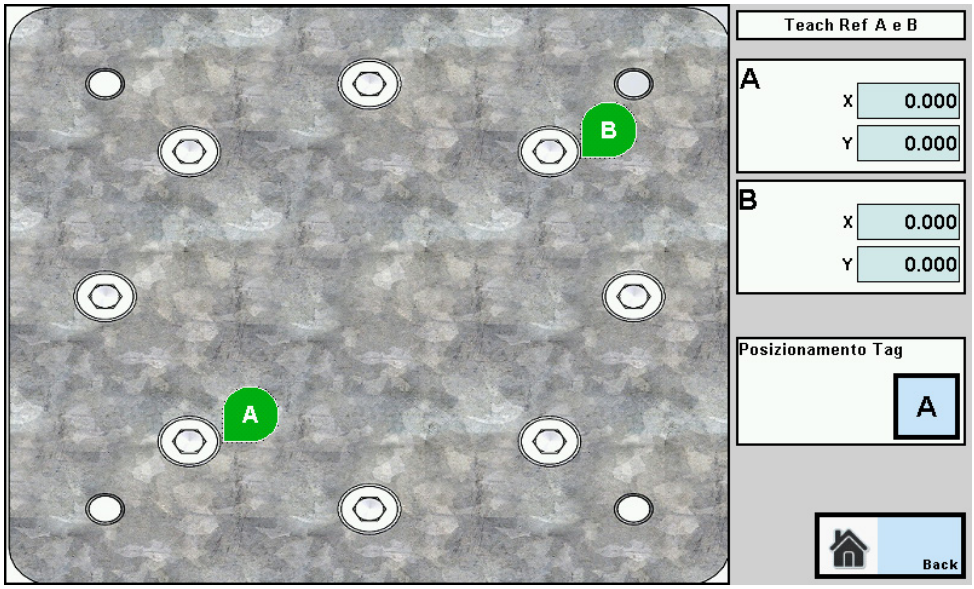
- In Setting screen, tap on right side of OOP (XY) icon, until "Active" appears in pink field.



- Tap "Back" to enter the "Position Control" screen
- Tap on "Open Folder"  icon to enter the "Work Management" screen
- Tap on "OOP References" icon



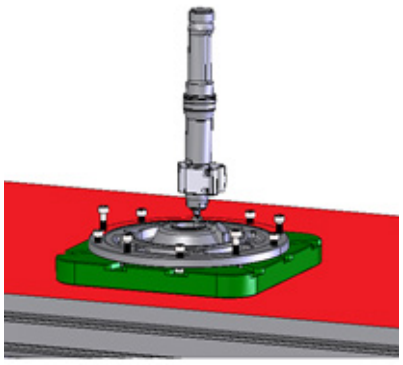
- Enter into Teach Ref A & B screen

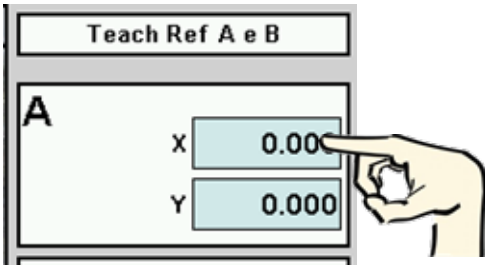


The first picture saved into the part folder (i.e. picture 001) is uploaded automatically

Tags for identification of Zero Points A and B can be positioned according to user needs by using the same procedure as per Tag design.

- Position the tag A
- Position the tool on the point corresponding to Zero Point A and tap on the "A –XY" icon over the "X-Y" fields

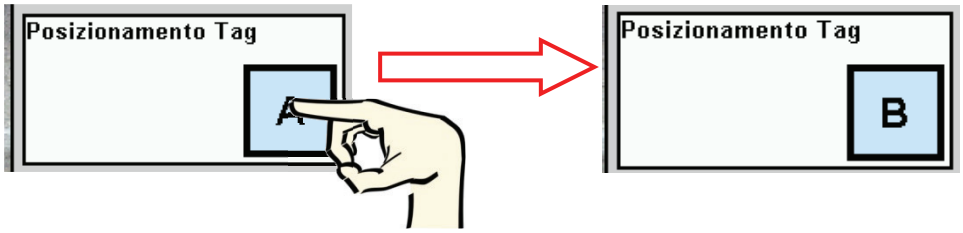




the device has acquired the Zero point A

! *Zero Point positions will be used only for the position identification. They might correspond to tightening positions, but the power tool will not be activated during the Zero Point detection phase.*

To switch from tag A to tag B, tap on "Tag Positioning" icon



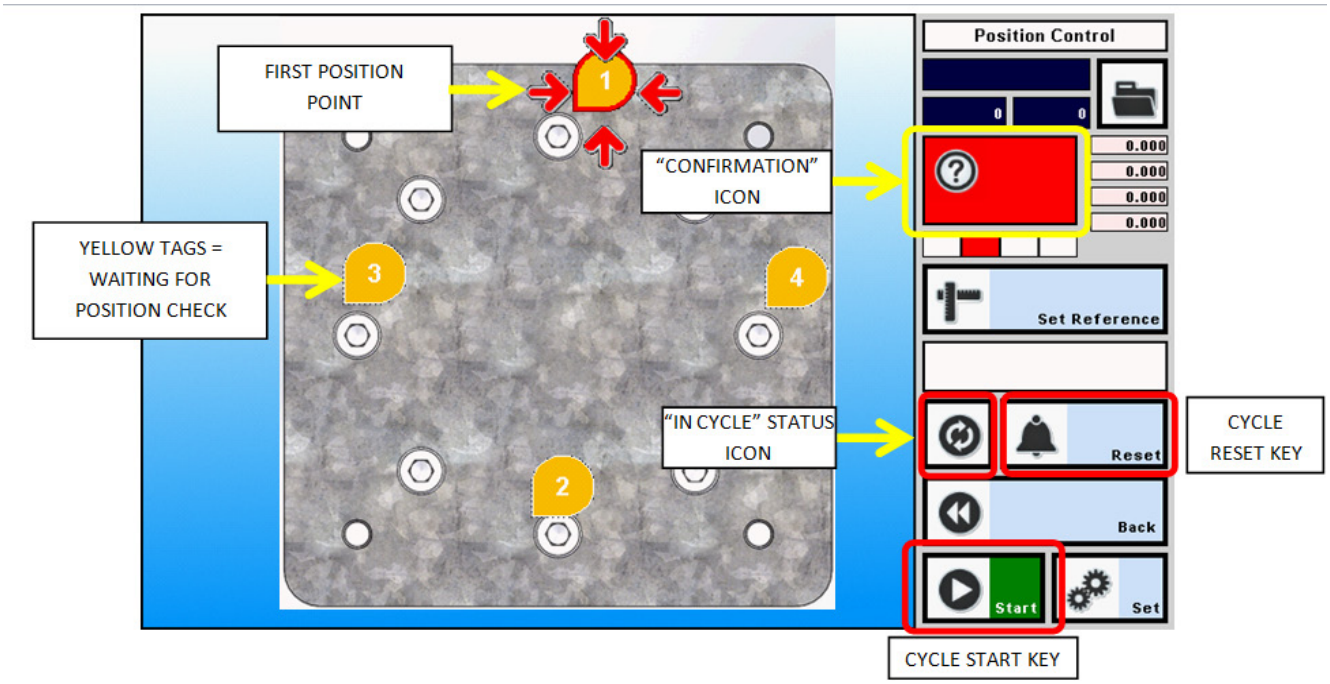
- Repeat above procedure to acquire the Zero Point B position.
- After the acquisition of Zero Point B, the software goes back to “Position Control” screen

From now on, the “Teach Ref A & B” screen will appear at the start of each working cycle whit activation of OOP function.The above work process is explained in the paragraph 8.1.1

8 WORK MODE

8.1 WORK CYCLE

When POSITX-3D is in work mode, can be controlled through Position Control screen by the user.
DESCRIPTION OF "POSITION CONTROL" SCREEN



How to start a new cycle:

- Check that arm has been positioned into Start Reference Position. If not, place the arm in that position.
- Turn POSITX-3D on and wait until Position Control screen appears.
- Tap "Set Reference"
- Tap "Start" . Work cycle is now started. "In-cycle" icon turns into red: 
- Move the power tool over the first position point which is indicated with arrowed tag. Once the tool goes into correct position, the "confirmation" icon turns into white and shows a check mark: 

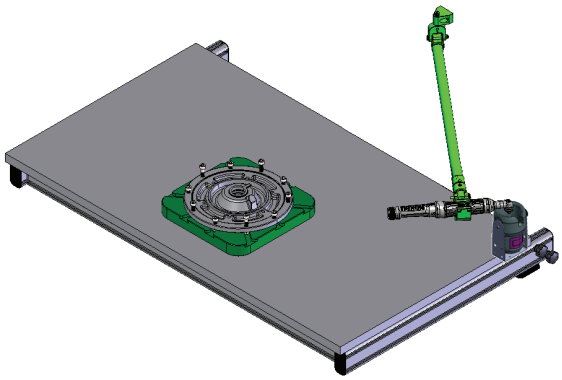
In this condition the power tool is allowed to start and to complete the tightening operation.

If the tightening parameters are conform to programming input, the position tag turns into green and the next tag becomes ready for the position check.

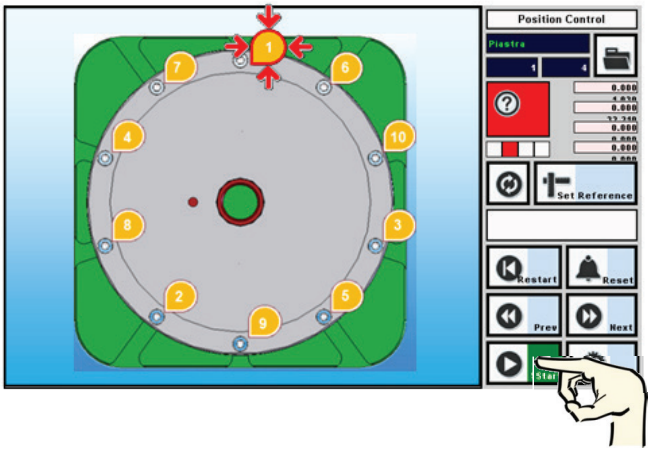
WORK CYCLE WITH ACTIVE OOP FUNCTION

- Check that arm has been positioned into Start Reference Position. If not, place the arm in that position.
- Turn POSITX-3D on and wait until Position Control screen appears.
- Tap "Set Reference"
- Tap "Start". In this case, the program goes to "Teach A&B" screen
- Position the power tool on Zero Point A and tap on the "A –XY" icon over the "X-Y" fields
- Position the power tool on Zero Point B and tap on the "B –XY" icon over the "X-Y" fields. After that the program goes to the first tightening point.
- Start the tightening sequence.

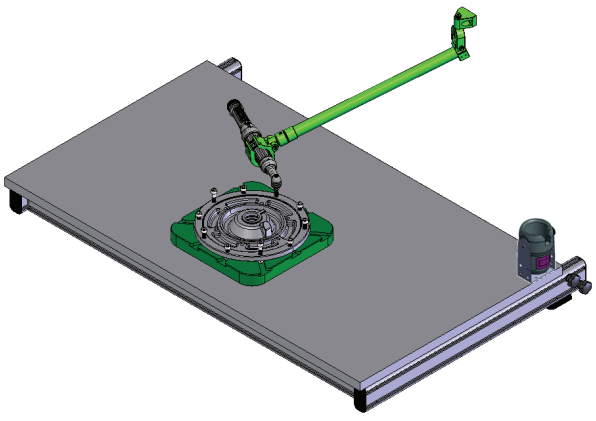
8.2 POSITIONING SEQUENCE SIMULATION

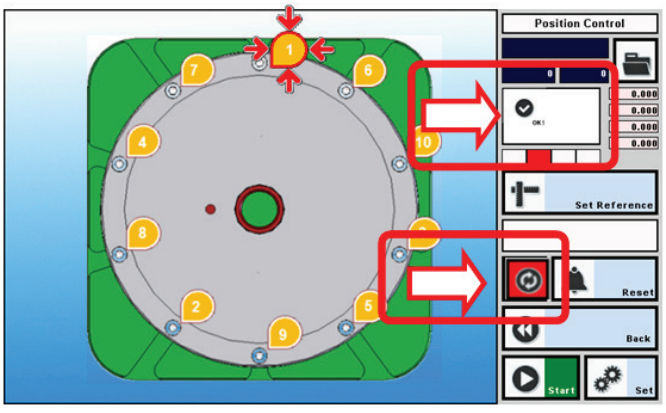


1) ARM IN REST POSITION

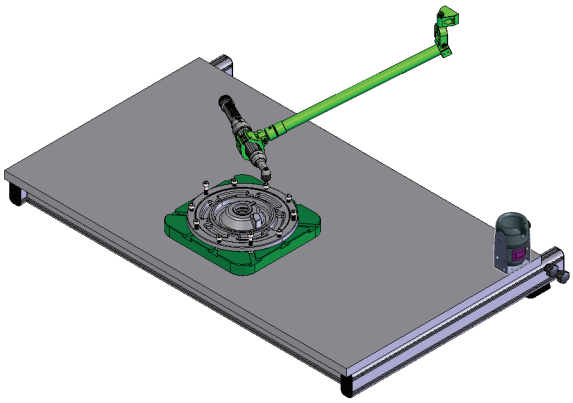


TAP "START"

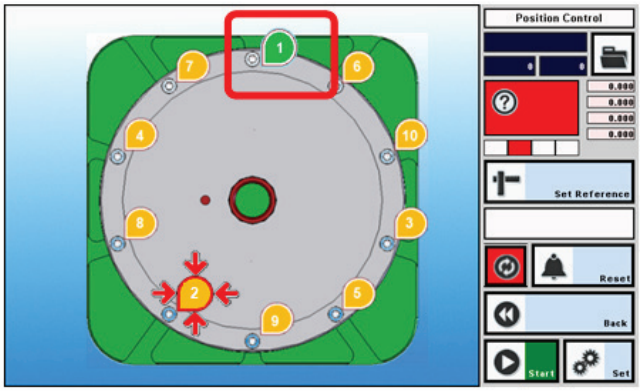




2) POSITIONING OVER FIRST POINT



POSITION "OK" CONFIRMATION



3) TIGHTENING COMPLETE

FIRST SCREW COMPLETED (TIGHTENING OK)

The device is now ready for the next tightening point. To complete the sequence, repeat steps from 1).

8.3 JOB SELECTION FROM EXTERNAL SOURCE

The POSITX-3D device allows program selection from external source.

In this mode, the programs can be selected through digital input in binary mode.

To use the external program selection:

- Connect through the connector ref. M7 (Pic. 1 – page 6) to Job Selection input as indicated in the list at page 7

- In the external source, name the program cartel with a numeric value (starting from 001) corresponding to Job which will be recalled though the digital input

9 MAINTENANCE

The POSITX-3D device is maintenance free.

10 DISPOSAL

Dispose components and parts in compliance with the country laws and safety procedures.

11 LIMITED WARRANTY

1. This product is guaranteed against defective workmanship or materials, for a maximum period of 12 (twelve) months following the date of purchase from builder or its agents, provided that its usage is conform to prescriptions described in this manual.

2. During the validity of warranty period, should the product show any material or functional defect, it must be returned to builder or its agents, together with a short description of the alleged defect. builder shall, at its sole discretion, arrange to repair or replace free of charge such items as are deemed faulty by reason of defective workmanship or materials.

3. This warranty ceases to apply to products which have been abused, misused or modified, or which have been repaired using other than genuine or authorized builder spare parts or by someone other than builder or its authorized service agents.

4. Should builder incur any expense correcting a defect resulting from abuse, misuse, accidental damage or unauthorized modification, they will require that such expense shall be reimbursed in full.

5. Builder will not accept claims either for labor or other expenditure made upon defective products.

6. Any direct, incidental or consequential damages whatsoever arising from any defect are expressly excluded.

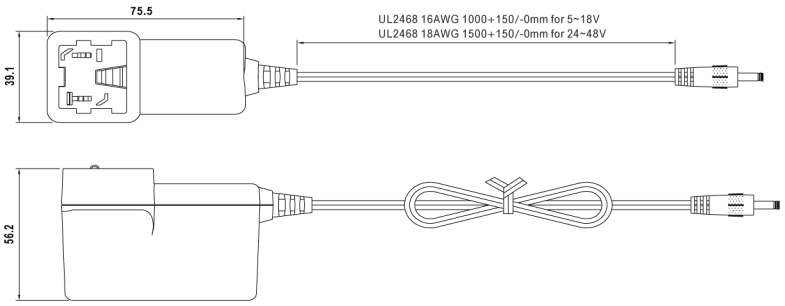
7. This warranty is given in lieu of all other warranties, or conditions, expressed or implied, as to the quality, merchantability or fitness for any particular purpose.

8. No one, whether an agent or employee of Builder, is authorized to add to or modify the terms of this limited warranty in any way.

12 POWER UNIT

SPECIFICATION

ORDER NO.									
OUTPUT	SAFETY MODEL NO.	GEM60I24-P1J							
	DC VOLTAGE Note.2	GEM60I24							
	RATED CURRENT	24V							
	CURRENT RANGE	2.5A							
	RATED POWER (max.)	0 ~ 2.5A							
	RIPPLE & NOISE (max.) Note.3	60W							
	VOLTAGE TOLERANCE Note.4	120mVp-p							
	LINE REGULATION Note.5	± 3.0%							
	LOAD REGULATION Note.6	± 1.0%							
	SETUP, RISE, HOLD UP TIME	± 2.0%							



INPUT	VOLTAGE RANGE Note.7	80 ~ 264VAC 113 ~ 370VDC							
	FREQUENCY RANGE	47 ~ 63Hz							
	EFFICIENCY (Typ.)	80%	85%	87%	88%	88%	88%	88%	90%
	AC CURRENT	1.5A / 115VAC 0.8A / 230VAC							
	INRUSH CURRENT (max.)	Cold start 50A / 115VAC 100A / 230VAC							
	LEAKAGE CURRENT(max.)	Touch current < 100μA/264VAC							
PROTECTION	OVERLOAD	105 ~ 160% rated output power							
		Protection type : Hiccup mode, recovers automatically after fault condition is removed							
	OVER VOLTAGE	110 ~ 140% rated output voltage							
		Protection type : Clamp by zener diode, output short							
ENVIRONMENT	WORKING TEMP.	-30 ~ +70° (Refer to "Derating Curve")							
	WORKING HUMIDITY	20% ~ 90% RH non-condensing							
	STORAGE TEMP., HUMIDITY	-30 ~ +85° , 10 ~ 95% RH non-condensing							
	TEMP. COEFFICIENT	± 0.03% ☒ (0 ~☒40)							
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes							
SAFETY & EMC (Note. 8)	SAFETY STANDARDS	TUV EN60601-1/EN60601-1-11,ANSI/ AAMI ES60601-1/ES60601-1-11(3.1 version), CAN/CSA-C22 3rd edition, EAC TP TC 004 approved							
	ISOLATION LEVEL	Pimary - Secondary: 2 x MOPP							
	WITHSTAND VOLTAGE	I/P-O/P:5656VDC							
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms / 500VDC / 25☒ / 70% RH							
	EMC EMISSION	**Parameter**	**Standard**	**Test Level / Note**					
		Conducted emission	EN55011 (CISPR11),FCC PART 18	Class B					
		Radiated emission	EN55011 (CISPR11),FCC PART 18	Class B					
		Harmonic current	EN61000-3-2	Class A					
		Voltage flicker	EN61000-3-3	-----					
	EMC IMMUNITY	EN55011, EN60601-1-2							
		Parameter	**Standard**	**Test Level / Note**					
		ESD	EN61000-4-2	Level 4, 15KV air ; Level 4, 8KV contact					
		RF field susceptibility	EN61000-4-3	Level 3, 10V/m(80MHz~2.7GHz) Table 9, 9~28V/m(385MHz~6GHz)					
		EFT bursts	EN61000-4-4	Level 3, 2KV Line-Line,1KV ineterconnect Lines at 100KHz rate					
		Surge susceptibility	EN61000-4-5	Level 3, 2KV/Line-Line					
		Conducted susceptibility	EN61000-4-6	Level 2, 3V					
		Magnetic field immunity	EN61000-4-8	Level 4, 30A/m					
		Voltage dip, interruption	EN61000-4-11	>95% dip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods					
OTHERS	LIFE	3 years : 100% load 40☒ , 8hours / day							
	MTBF	400Khrs min. MIL-HDBK-217F(25☒)							
	DIMENSION	75.5*39.1*56.2mm (L*W*H)							
	PACKING	200g ; 60pcs / 13kg / CARTON							
CONNECTOR	PLUG	See page 4~5 ; other type available by customer requested							
	CABLE	See page 4~5 ; other type available by customer requested							

NOTE

1.All parameters are specified at 230VAC input, rated load, 25☒ 70% RH ambient.
2.DC voltage: The output voltage set at point measure by plug terminal & 50% load.
3.Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1μf & 47μf capacitor.
4.Tolerance: includes set up tolerance, line regulation, load regulation.
5.Line regulation is measured from low line to high line at rated load.
6.Load regulation is measured from 10% to 100% rated load.
7.Derating may be needed under low input voltage. Please check the derating curve for more details.
8.The power supply is considered as an independent unit, but the final equipment still need to re-confirm that the whole system complies with the EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on http://www.meanwell.com)

13 BARCODE READER

Brand: DATALOGIC
Model: Touch TD1100 90 LITE RS232
Technical features:

DECODING CAPABILITY

1D / LINEAR CODES Autodiscriminates all standard 1D codes including GS1 DataBar™ linear codes.
STACKED CODES GS1 DataBar Expanded Stacked; GS1 DataBar Stacked; GS1 DataBar Stacked Omnidirectional

ELECTRICAL

CURRENT Operating (Typical): < 100 mA @ 5 VDC
Standby/Idle (Typical): 20 mA @ 5 VDC INPUT VOLTAGE 5 VDC +/- 0.5 V

ENVIRONMENTAL

AMBIENT LIGHT 0 - 20,000 lux
DROP RESISTANCE Withstands repeated drops from 1.5 m / 5.0 ft onto a concrete surface
ESD PROTECTION (AIR DISCHARGE) 16 kV
HUMIDITY (NON-CONDENSING) 5 - 95%
PARTICULATE AND WATER SEALING IP30
TEMPERATURE Operating: 0 to 50 °C / 32 to 122 °F - Storage/Transport: -20 to 70 °C / -4 to 158

INTERFACES

INTERFACE RS-232

TPHYSICAL CHARACTERISTICS

DIMENSIONS: 17.0 x 10.4 x 6.7 cm / 6.7 x 4.1 x 2.7 in
WEIGHT 90 Pro & LIte: 153.0 g / 5.4 oz

READING PERFORMANCE

LIGHT SOURCE Illumination: 640 nm LED
PRINT CONTRAST RATIO (MINIMUM) 25%
READ ANGLE Pitch: +/- 65°; Roll (Tilt): +/- 45°; Skew (Yaw): +/- 70°

READING INDICATORS Beeper (Adjustable Tone); Good Read LED
RESOLUTION (MAXIMUM) 0.102 mm / 4 mil

READING RANGES

TYPICAL DEPTH OF FIELD Minimum distance determined by symbol length and scan angle.
Printing resolution, contrast, and ambient light dependent.
Code 39: 7.5 mils: 0 to 8.1 cm / 0 to 3.2 in
Code 39: 10 mils: 0 to 12.0 cm / 0 to 4.7 in
EAN13: 13 mils: 0 to 15.0 cm / 0 to 6.0 in

REGULATORY

LED Emission Class (IEC-62471:2006-07) Exempt Risk Group (RG 0)
Electrical Safety IEC 60950-1 , CAN/CSA C22.2 No. 60950-1-07; UL 60950-1
EMI/RFI North America (FCC) : Part 15 Class B, Canada (IC) : ICES-003 Class B, European Union EMC Directive, Australian (C-tick), Russia (Gost); Korean KCC; Japan (VCCI)

Additional components accessories needed for using the reader:

CAB-327 Serial cable
PG5-05P55 Power unit 5VDC
Power cord