MANUAL
EDU 2AE/TOP - EDU 2AE/TOP/E - EDU 2AE/TOP/TA 5.00
Torque range: 0.2-50 Nm

IDENTIFICATION DATA OF THE MANUFACTURER
KOLVER S.r.l.
VIA M. CORNER, 19/21
36016 THIENE (VI) ITALIA

IDENTIFICATION DATA OF THE PRODUCT

MODEL:	EDU 2AE/TOP	EDU2AE/TOP/E	EDU2AE/TOP/TA
CODE:	032000/TOP	032000/TOP/E	032000/TOP/TA

TECHNICAL DATA OF THE PRODUCT
FUSE: 3,15 A
DIMENSIONS: 190 x 205 x h120 mm WEIGHT: 2,5 Kg

DECLARATION OF CONFORMITY

CE

KOLVER S.r.l. declares that the new tool here described: control unit model EDU2AE/TOP and EDU2AE/TOP/TA is in conformity with the following standards and other normative documents: 2006/42/CE, LVD 2014/35/UE, EMCD 2014/30/UE, EN 60745-1, EN 60204-1, EN 61000-6-2, EN 61000-6-3.
It is also in conformity with RoHS II normative (2011/65/UE).

Name: Giovanni Colasante
Position: General Manager
Person authorized to compile the technical file in Kolver

Thiene, September 1st 2016

Giovanni Colasante

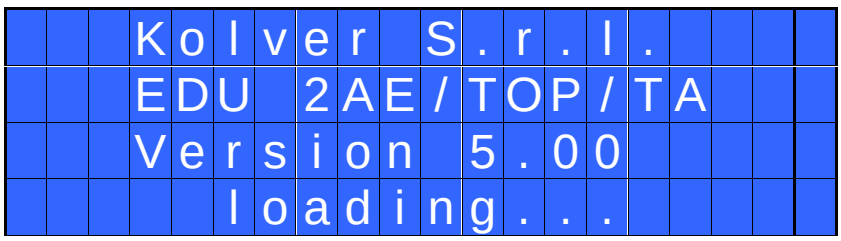
EDU 2AE/TOP power supply and control units are an innovative system for controlling the torque of any current control MITO and PLUTO electric screwdrivers: MITO15, PLUTO 3, PLUTO 6, PLUTO 10, PLUTO 15, PLUTO 20, PLUTO 35 and PLUTO50, either inline, pistol, push to start, for automation and with angle head (only PLUTO). It's also possible to use the following clutch models: PLUTO 3FR, PLUTO 5FR and PLUTO 7FR.

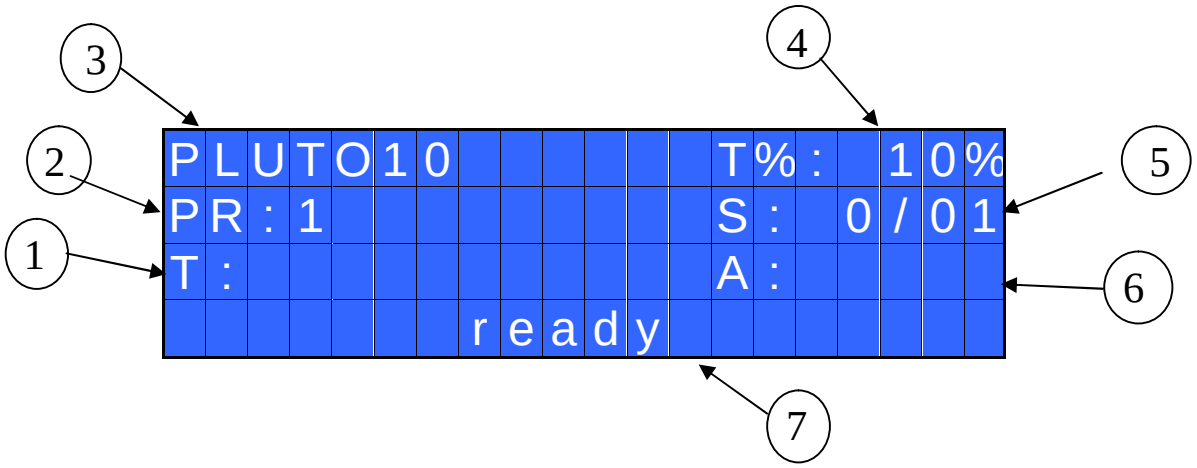
EDU 2AE/TOP delivers all the advantages of precision torque control electric tools at a fraction of the price of transdurized tools.
The state-of-the-art electronic control circuit cuts the power supply to the motor calculating the correct torque in response to 3 parameters; voltage, frequency and current, according to the selected options.
The AC 90÷260V - 50÷60Hz power supply is converted into 40VDC required by the PLUTO series screwdrivers through a switching board.

Model	Torque (Nm)	Speed (rpm)	
		Min	Max
MITO15	0,2-1,5	450	850
PLUTO 3	0,5-3	370	1300
PLUTO 6	0,7-6	200	850
PLUTO 10	1.5-10	110	600
PLUTO 15	2-15	60	320
PLUTO 20	3-20	50	200
PLUTO 35	3-35	40	140
PLUTO 50	5-50	20	90
PLUTO 6 ANG	0,7-6	200	850
PLUTO 8 ANG	1.5 - 7	110	600
PLUTO 15 ANG	2-15	100	320
PLUTO 20 ANG	3-18	60	200
PLUTO 3FR	0,5-3,2	800	1300
PLUTO 5FR	0,7-5	600	1000
PLUTO 7FR	1,5-7	350	600

IMPORTANT: EDU 2AE/TOP is a highly accurate unit but it is critically important to select the correct options to ensure that proper torque is being applied. Read the menu description carefully and in case you are unsure please contact Kolver for support information.

Turn the unit on through the on/off switch on the back panel. The unit will carry a general system check and the words "*waiting connection*" will appear on the last line of the display. If the connection with the motor control board is successful the following screen will be displayed:





1- Reached torque level in Nm, lbf.in or kgf.cm
2- Program number or sequence
3- Screwdriver model
4- Torque level in percentage
5- Screw count: done screws/total screws
6- Angle value in degrees (only EDU 2AE-TOP TA model)
7- Status bar (ready, errors, etc…)

FRONT PANEL KEYBOARD

To enter the menu press the **ESC** key for 2 seconds.

Select the line by pressing ⇧ or ⇩ then press **OK** (the symbol ➔ will turn into ➲). Press the ⇧ or ⇩ to select the required value and then confirm through **OK** (or **ESC** if you don't want to save the value).
The selected values will be immediately operational, even if you are still in the menu screen. Repeat the sequence for all the parameters you wish to change and then push **ESC** to return to the main screen.
Press **RESET** for 3 sec should you need to reset the screw, the program or the sequence. If you want to see all the set parameters press ⇧ for 2 seconds, however you cannot modify the displayed parameters on this screen.

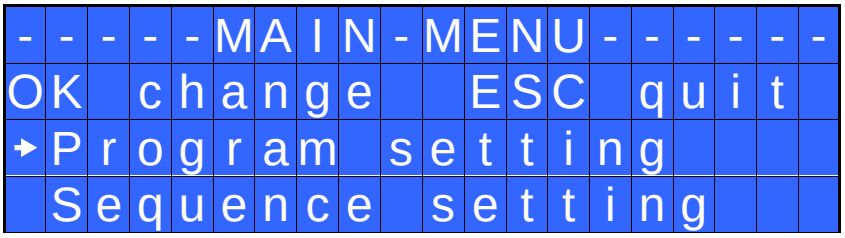
LEDS ON FRON PANEL

GREEN LED VERDE: indication of *Screw OK*.

YELLOW LED: indication of *Programm End* or *Sequence End*.

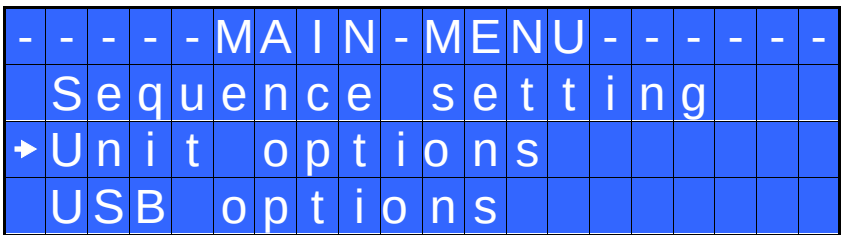
RED LED: any indication of error.

MAIN MENU:



Program setting: It indicates the menu section where you can set or modify the fastening parameters.

Sequence: It indicates the menu section where you can activate the sequence, the switchbox/socket tray and the bar code.

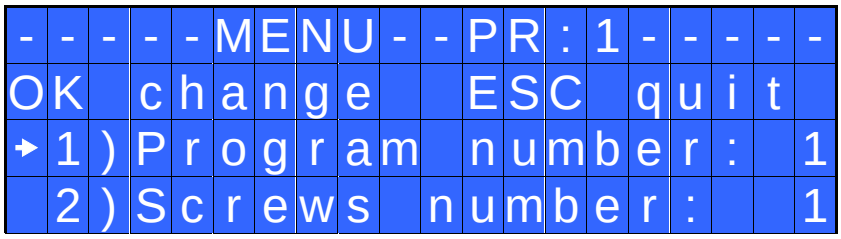


Unit Options: It indicates the menu section where you can set date and time, the password and the language.

AVAILABLE ONLY ON EDU2AE/TOP/E and EDU 2AE/TOP/TA (from 3.0 version on)
USB Options: It indicates the menu section where you can view, upload and create programs setting of the control unit.

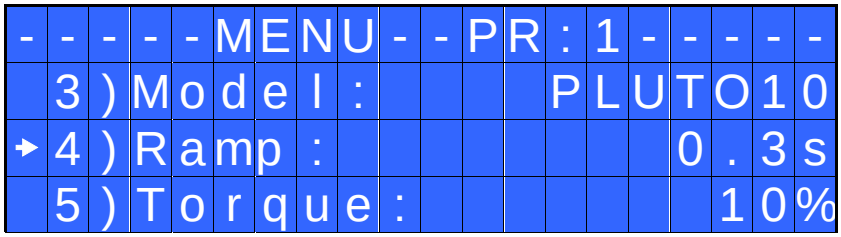
PROGRAM MENU:

The first 28 menu lines are available in both the EDU 2AE/TOP and EDU 2AE/TOP/TA models.
Lines from 29 to 32 are only available in the TOP/TA model.



1) Program number: you can select/ modify the desired program from 1 to 8.

2) Screws number: The EDU2AE/TOP can act as screw counter. You can set the number of screws from 1 to 99. To disable the function press ⇩ until you get to OFF.
If the number of correct screws matches to the number of set screws, "*PROGRAM END*" will appear on the status bar and the yellow led will light up. If the "*Press OK*" is ON (see point 18), "*PROGRAM END*" will automatically disappear at next screwing or any time you enter the menu. Otherwise, press OK at the end of each program.
ATTENTION: Every time you enter the menu, the number of screws will reset.



3) Model: you can select the screwdriver to be used. Your choice will automatically change the default settings. It's important to select the correct model you're going to use since most parameters regarding the motor software are specific to every single model.

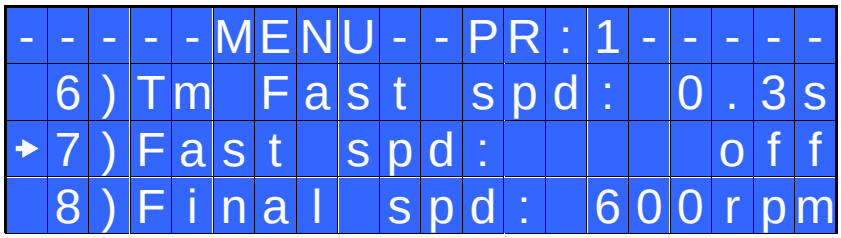
ATTENTION: The pre-set torque level in % and in Nm for PLUTO3FR, PLUTO5FR o PLUTO7FR models does not appear on the display. Moreover, some settings will be unchangeable, so if you try to modify such settings it will be displayed: "*not available for clutch*".

4) Ramp: You can select the slow start time (acceleration) from 0.2 to 3.0 sec. This option is only available for the screwing phase, while during the unscrewing phase the ramp time is always 0.2 sec. We suggest using this option with self tapping screws.

ATTENTION: Reaching the torque while the ramp is still on could give as result a different torque level from the one that results when the ramp is over. This is due to the motor acceleration.
Reaching the torque while the ramp is still on will activate the "screw OK" signal anyway (this option is useful if you need to tighten screws that are already tightened, the so called "double hit").
On the other hand, if you wish to see an error signal during the preset torque in the ramp phase, you can change the minimum time by setting value which is equal or superior to the ramp value (see point 7).

5) Torque: you can select the desired torque as a percentage of the torque range of the selected screwdriver. For example, for a Pluto10, a 50% setting will result in a torque in the area of 4 -5 Nm. The torque range is always referred to the MAX speed. In case you're not working at maximum speed, the torque range will progressively lower in order to avoid motor stalling. If the torque level is reached correctly, it will be displayed and you will hear a beep sound, too.
Such torque level is indicated as " T: ..% " on the main screen.

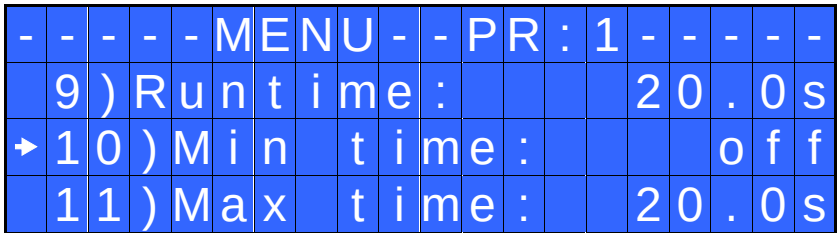
6) Tm Fast Spd (Time Fast Speed): You can select any speed value of the screwdriver between nominal (maximum speed given in the catalogue) and the minimum speed of every single screwdriver (see table with technical data).
This function is available only if the Fast Speed is active.



7) Fast spd (Fast Speed): It indicates how long the screwdriver should turn at the FAST SPEED speed (see point 8) before switching to "pre-set speed" (lower speed). The "pre-set speed" is the speed set at point 6. This FAST SPEED time can be set from 0.3 to 10.0 sec.
To disable the function press ⇩ until you get to OFF. In this case the screwdriver will automatically start at pre-set speed (see point 8).

CAUTION: The aim of the FAST SPEED is only to speed up the approach time in case of long screws. Reaching the torque at higher speed will result in inaccurate torque output. To avoid inaccurate torque values we suggest first to set a shorter time, and then increase it.
Torque reached during the FAST SPEED won't activate the torque signal and the message "*Error FAST SPEED*" will be displayed on the main screen and 2 beep sounds. The red led will turn on, too.

8) Final Spd (Final Speed): You can select the speed of the screwdriver during the FAST SPEED. It can be set between max speed and the pre-set one (see point 7).



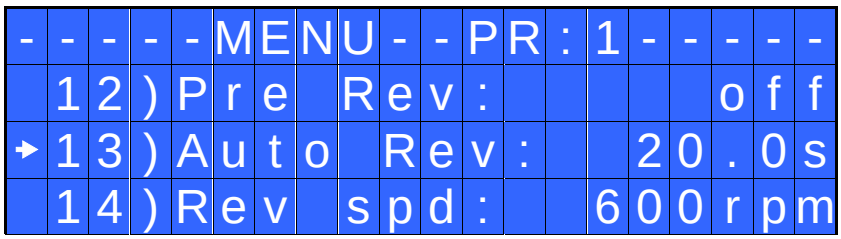
9) Runtime: You can set the time of a tightening, from OFF to 20.0 sec. When the pre-set time has been reached, it results in a torque signal.
The couple reached during this time results in a signal of *Correct screw*. If the correct screw signal is not required, set the Minimum time up to a value of 'Minimum Time -0.1sec'.

ATTENTION: Max Time must be set at 20.0 sec.

10) Min time - Minimum Time: You can select the minimum time of screwing from 0.1 sec to 'Max time - 0.1s'. To disable the function press ⇩ until you get to OFF (Min time = 0).
Torque reached below the minimum time won't activate the torque signal and will result in an error signal. "*Below minimum time*" will be displayed on the status bar and the red led will light up. You will hear two beep sounds, too.

11) Max time - Maximum time: You can select the maximum time of screwing. You can set from 'Min time + 0,1s' to 20.0 sec.
You also can set the Maximum time to OFF by pressing the ⇧ button when you have reached the value of 20.0s. In this case the screwdriver turns without any time limit.

ATTENTION: If torque isn't reached by the maximum time, the screwdriver will stop. "*Over maximum time*" will be displayed on the status bar and the red led will light up. You will hear two beep sounds, too.



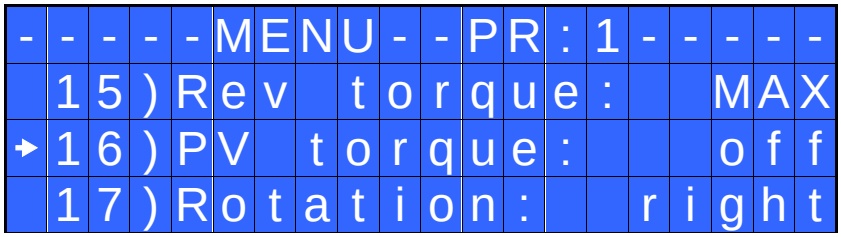
12) Pre-Rev.: pre-reverse. You can unscrew before tightening. This time can be set from OFF to 20.0 sec.

N.B. The speed and torque will be the same as those for the Auto Reverse.

13) Auto rev. – Auto reverse: This option will automatically start a reverse after a torque reached signal. You can set time from 0.1 to 20.0 sec.
To disable the function press ⇩ until you get to OFF.

ATTENTION: During the reverse, it is necessary to keep the lever or the start signal pressed as long as it doesn't stop. "*Correct screw*" will be displayed on the status bar and a green led will light up. You will hear one beep sound, too. In case the lever is released before the end of the reverse, "*unfinished screw*" will be displayed and a red led will light up. You will hear two beep sounds, too.

14) Rev spd - Reverse speed: You can select any reverse speed value of the screwdriver between the maximum and the minimum specific speed of every single screwdriver (see table with technical data).

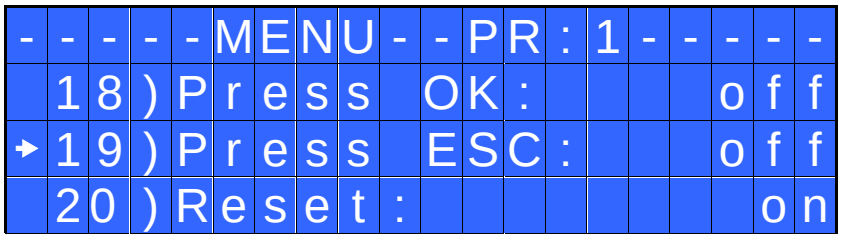


15) Rev torque – Reverse torque: You can select the desired reverse torque as a percentage of the torque range of the selected screwdriver (see point 2). If the torque is set on MAX, the reverse torque is about 20% higher than the possible maximum torque, so that it is always possible to unscrew a tightened screw (we suggest leaving this function on in normal use). If the setting is from MIN to 99% the reverse torque with the same percentage will be equal to the settings of the screwing phase.
ATTENTION: **If you're using open-end wrenches, the reverse torque has to be set to MIN value in order to bring the wrench back to the correct position.**

16) PV torque: Period of time in which the screwdriver works at **maximum torque** before switching to the torque that has been set by the user. You can set time from 0.1 to 10.0 sec.
To disable the function press ⇩ until you get to OFF.
This function overlaps other time settings (Fast Speed, ramp time, minimum time, maximum time) from the motor start on.

ATTENTION: This function is useful for applications where the prevailing torque is higher than the final torque (for example trilobal screws or locknuts).
Please use this function with utmost attention because an incorrect use can damage both the assembly and the screwdriver.
Torques reached during the max torque time won't activate the torque signal. "*Error pvt time*" will be displayed and the red led will light up. You will hear two beep sounds, too.

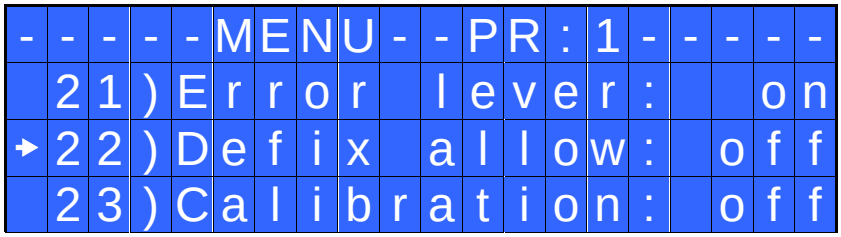
17) Rotation: You can choose between right tightening (standard screws) or left tightening (left threaded screws). All the other functions will adapt to the selected direction of rotation.



18) Press OK: when ON, press OK at the end of each screwing.
When OFF, the control unit resets automatically after a screwing.

19) Press ESC: when ON, press ESC to reset the control unit.
When OFF, the control unit resets automatically after an error signal

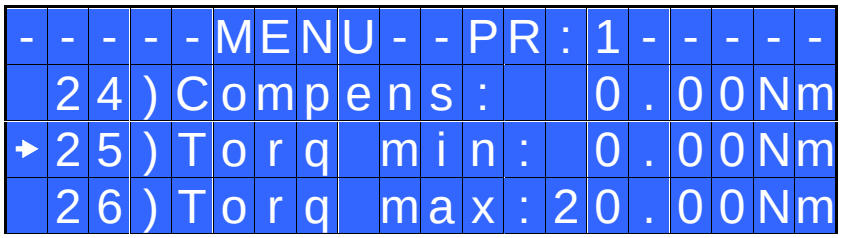
20) Reset: you can reset the program or the single screw.



21) Error lever: when ON, an error signal will occur when the lever has released before reaching the torque.
When OFF, this function doesn't work.

22) Defix allow: when OFF, the reverse is NOT enabled.

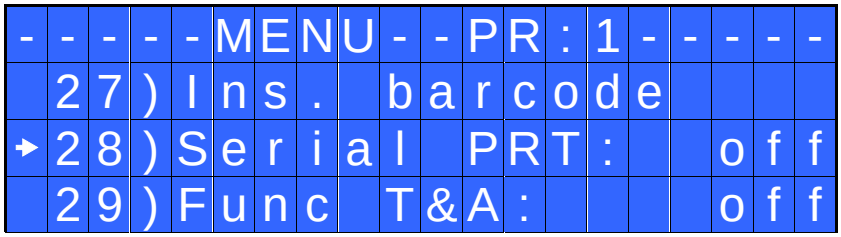
23) Calibration: When ON, you will see the torque value (Nm or in.lbs) on the main screen.
When OFF, the torque value won't be displayed.
(To modify the calibration parameters see paragraph *Torque calibration*).



24) Compens – Compensation: This function allows an increase or decrease of the displayed torque value after a calibration. The available range is from 0 to ±55 Nm. For example: after calibration (see Torque calibration) you make a screwing on your assembly and compare the displayed value to the value you see on a torque tester (for example a mini-K or a K model). Let's say you notice that the torque displayed in the unit EDU 2AE/TOP is +0.2 Nm higher than the value indicated on the tester (which is the right one). In this case you can modify this value by setting -0.2 Nm so that the value on the display will be the same as the value on the tester. If it's lower than 0.3 Nm, you need to set +0.3 Nm and so on.

25) Torq min – Minimum torque: The minimum torque and maximum torque options allow the user to set the acceptable torque range for each single application. When the reached torque is within this range, "Screw OK" will be displayed on the status bar and the green led will light up. If the reached torque is outside this range, "error minimum torque" or "error maximum torque" will be displayed and the red led will light up. You can set the torque range from 0 to 'Torq Max-0.01 Nm' in steps of 0.01 Nm.
The minimum torque option allows to set the lowest value of the torque range. When Calibration is OFF, the minimum torque value automatically sets on 0 Nm.
The selection of the torque value is carried out by entering the digit cell by cell.

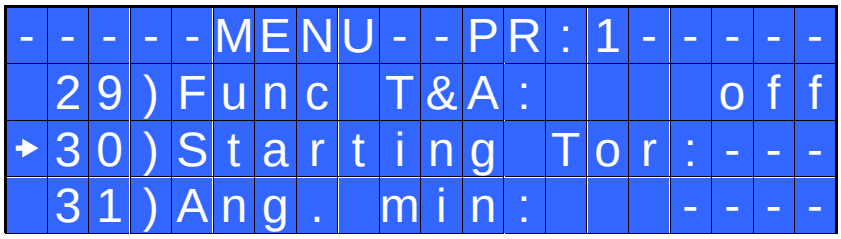
26) Torq max – Maximum Torque: The minimum torque and maximum torque options allow the user to set the acceptable torque range for the single application. When the reached torque is within this range, "Screw OK" will be displayed on the status bar and the green led will light up. If the reached torque is outside this range, "error minimum torque" or "error maximum torque" will be displayed. You can set the torque range from 'Torq Min+0.01 Nm' to 55 Nm at intervals of 0.01 Nm.
The maximum torque option allows to set the highest value of the torque range. When Calibration is OFF the maximum torque value automatically sets on 55 Nm.
The selection of the torque value is carried out by entering the digit cell by cell.



27) Ins. barcode: to scan a barcode and recall the desired program. To be used in combination with option 4. of the Sequence Menu.

28) Serial PRT: Serial print: from OFF to 5.
When OFF, no print.
If it is set up to 5, this value identifies the number of line feeds between a string and another.

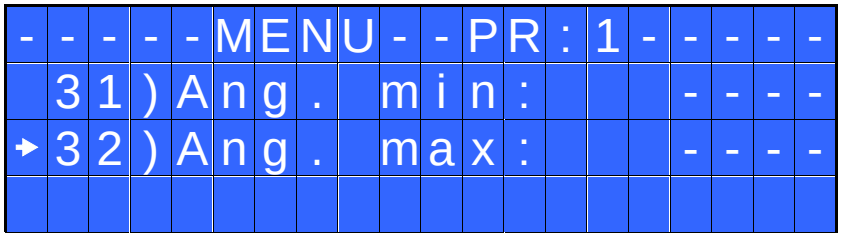
THE FOLLOWING MENU IS AVAILABLE ON T&A VERSION ONLY



29) Func T&A–T&A function mode: You can activate the Torque & Angle function. Set OFF when you don't need this function. When you set ON you can choose among six working conditions (see T&A specific instructions).

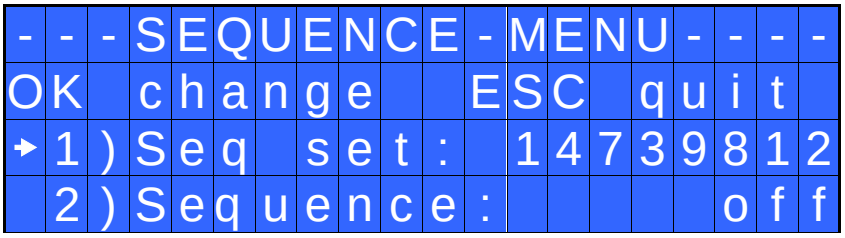
30) Starting Tor – Starting torque: If T&A option is set on Tor mode (See T&A paragraph), you can set the torque threshold the angle starts to be read from. When T&A is set on angle mode (see T&A paragraph), you can set the torque threshold the angle starts to be carried out from.

31) Ang. min – Minimum angle: Minimum angle threshold. You can set it when T&A is set on Tor, T/in or T/lv (see T&A specific instructions). The minimum angle the operator can set is 5°.



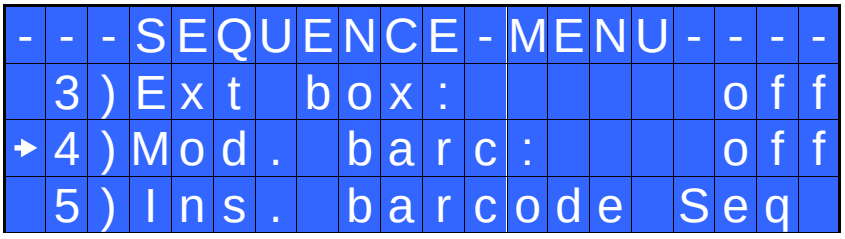
32) Ang. max - Maximum angle: Maximum angle threshold. You can set it when T&A is set on Tor, T/in or T/lv (see T&A specific instructions). The maximum angle the operator can set is 9720°.
When T&A is set on Ang., A/in or A/lv mode, maximum angle corresponds to the angle that has to be carried out.

SEQUENCE MENU:



1) Seq set: you can set a sequence up to max. 8 programs.
To set the next program in the sequence, press OK.
Press ← to save the sequence and quit.

2) Sequence: to enable or disable the sequence. ON = enabled; OFF = disabled.

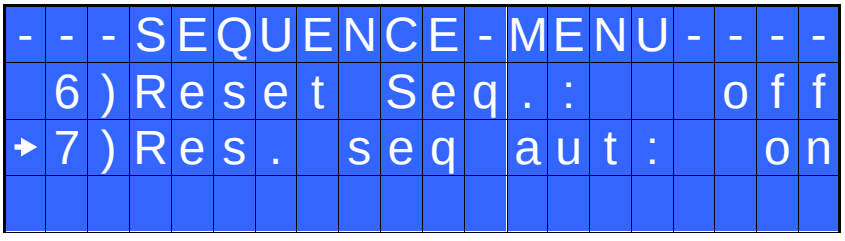


3) Ext box: It allows to enable or disable the external switch box. ON = switch box enabled; OFF = switch box disabled.

4) Barc. mode: – Barcode mode: It allows to choose the barcode mode.

- **OFF:** barcode disabled.
- **ON prog:** you can select the program to be executed by scanning the bar code of the product. The unit compares the scanned code to the one previously entered in each program (see point 27: Barc. Set.). If the two codes match, the program is loaded; otherwise it will display *Error Barcode*. The scanned product code is also printed on the serial port of the control unit (see paragraph "*serial print*").
- **ON S.N.:** the product code is required before running a program or a sequence. The product code is printed on the serial port of the control unit.
- **ON Seq.**: you can set the Sequence by scanning its barcode. The code scanned is compared with the sequence entered in the menu (see point 5: Ins. Barcode Seq on Menu Sequence). If the two codes match, the sequence set is loaded, otherwise display "*Repeat scan*". The read code is also printed on the serial port of the control unit (see section Serial Print).

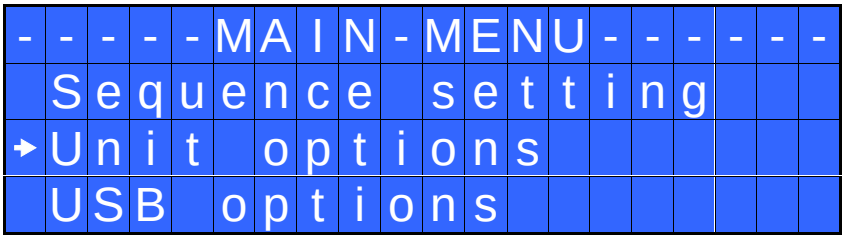
5) Ins. Barcode Seq: When ON on "Barc. Mode → ON Seq.", you have to scan the barcode to enable the Sequence.



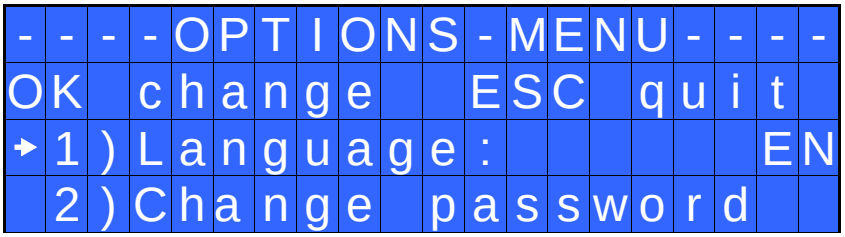
6) Reset seq.: When ON, you can reset the Sequence (pushing the Reset button).

7) Aut. res seq- Automatic Reset Sequence: When ON, the control unit automatically resets after the end of the sequence. When OFF it is necessary to press OK at the end of each sequence.

OPTION MENU:

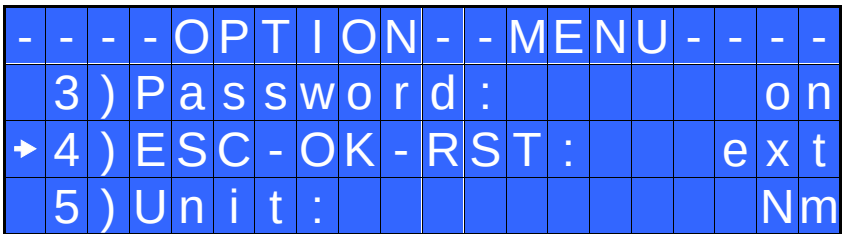


Unit Options:



1) Language: This option allows to choose among the languages available: English, French, German, Italian, Spanish and Portuguese.

2) Change password: You can change password (see point 3).

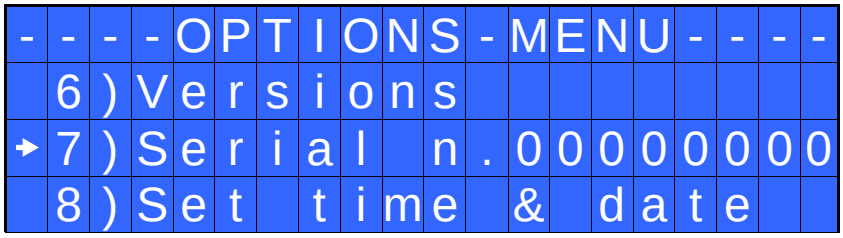


3) Password ON: When YES, you will be asked for the password to enter the menu. Otherwise select NO.

ATTENTION: Password is only asked to enter the menu the first time after switching the unit on.
The default password is: 0000.

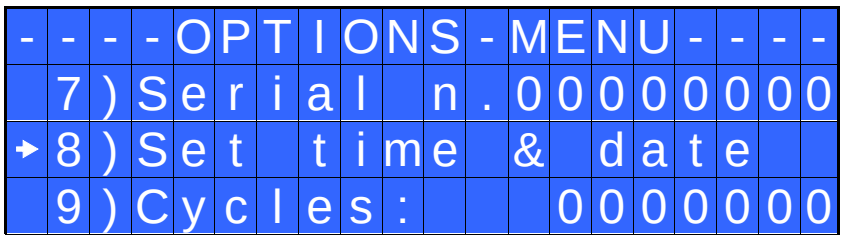
4) ESC-OK-RST: Press ESC in case of error. Press OK at the end of a program or to reset a sequence or a program (see point 7: Reset).
When INT, the operator must press the required key on the front panel.
When EXT, functions can only be enabled through proper connections on the back panel (see paragraph I/O connections).
When INT+EXT you can press either he button on the front or on the back panel.

5) Unit: You can choose between the following units of measurements: Nm, lbf.in and kgf.cm



6) Versions: in this screen you can see the versions of boards mounted inside the unit.

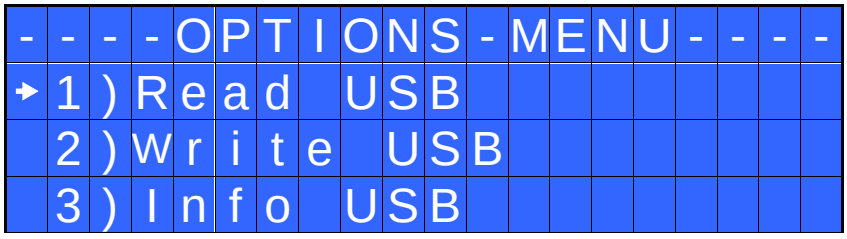
7) Serial number: it is the indication number of the control unit. Default number: 0000000.
It could be the real serial number of the unit or another one you could choose (7 digits max).
This number will also be the name of the folder in the USB drive where you will save the report of your data (see EDU EXPAND part).



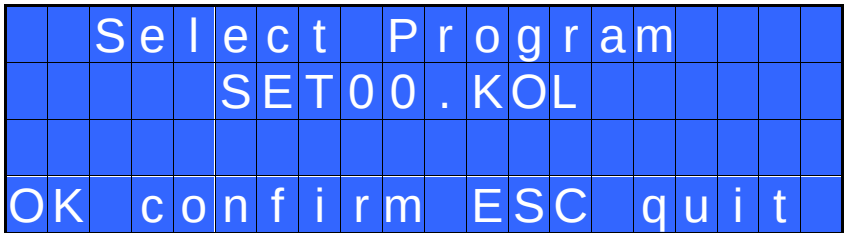
8) Set time & date: to set time and date on the control unit.

9) Cycles - Total number of cycles: It shows the number of tightened and loosened screws. This number can't be modified.

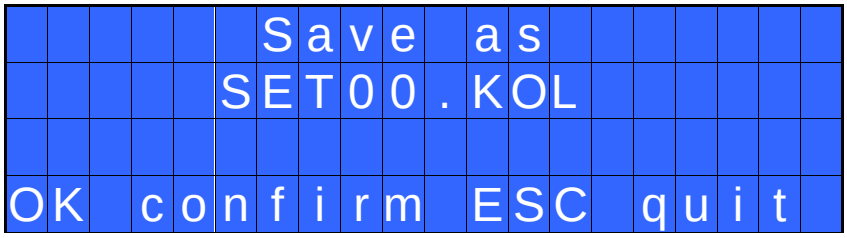
USB Options:



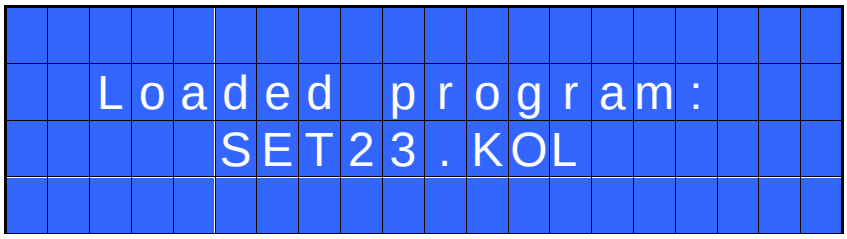
1) **Read USB**: press OK and read the USB drive and select the file SETxx.KOL you desire.
The EDU control unit recognizes only files as SETxx.KOL (see EDU EXPAND part).



2) **Write USB:** press OK and create your new SETxx.KOL application where you save all the parameters you have set in the control unit.



3) **Info USB:** press OK and see the loaded program.
You can see the loaded program only if you have saved the program in your USB drive as named as SETxx.KOL.

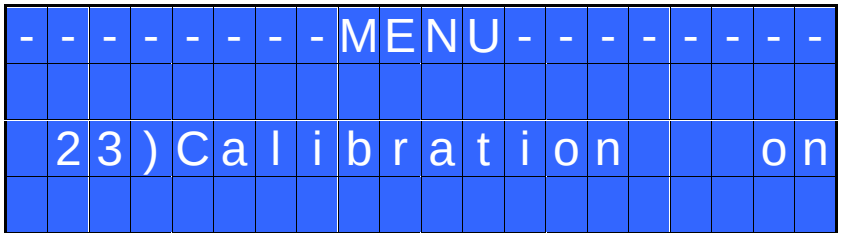


TORQUE CALIBRATION

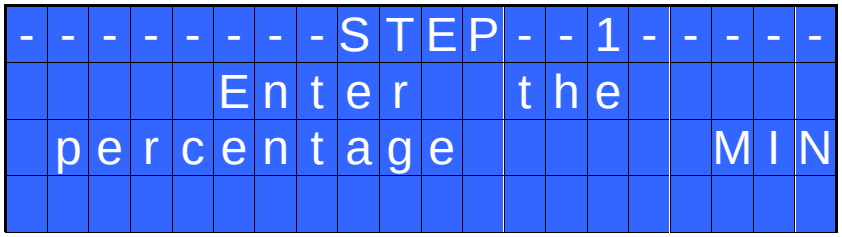
The torque calibration function allows to view the torque value in Nm or in.lbs or kgf.cm directly on the display of the control unit.

IMPORTANT: You need a torque tester to proceed, either with static transducer (model minik or K) or with rotary transducer (model minik-e).

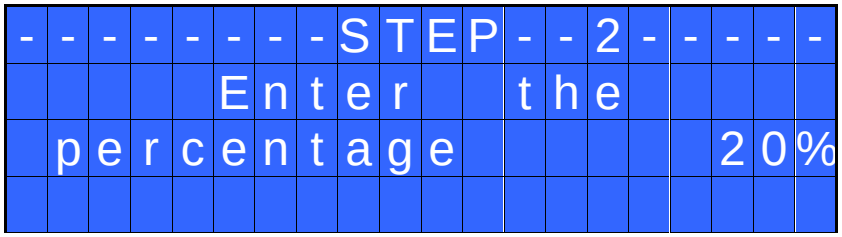
CALIBRATION PROCESS:
1. Select Calibration at point 23 of the menu and press OK.
2. The following screen will appear on the display:



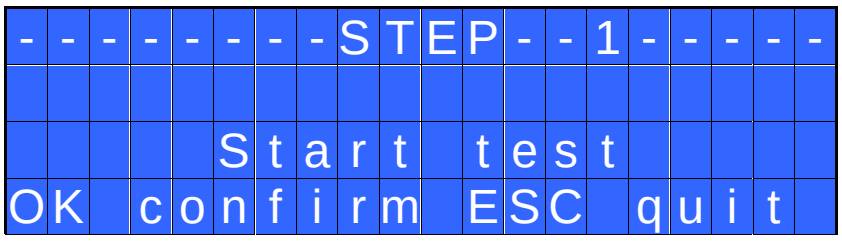
3. Press OK to confirm. If you choose OFF, calibration will be interrupted and no torque value will be displayed. You choose ON, calibration will continue and the following screen will be displayed:



4. Set the first torque level at 20% percentage by pressing ⇧.

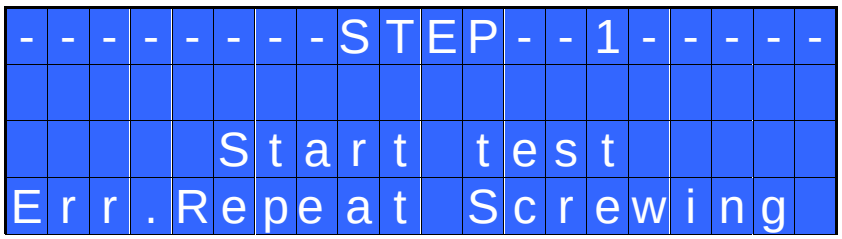


5. Press OK. You will see:



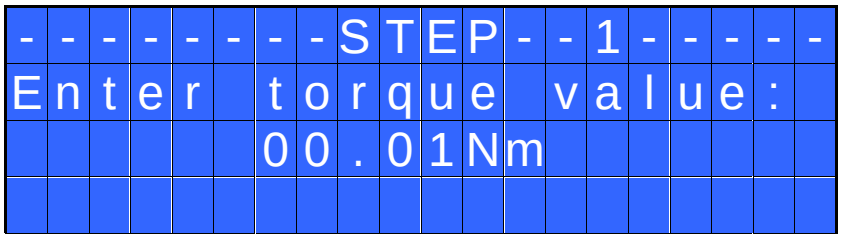
Complete a screwing cycle on the mini k5 and take note of torque value.

In case of error, you will see:

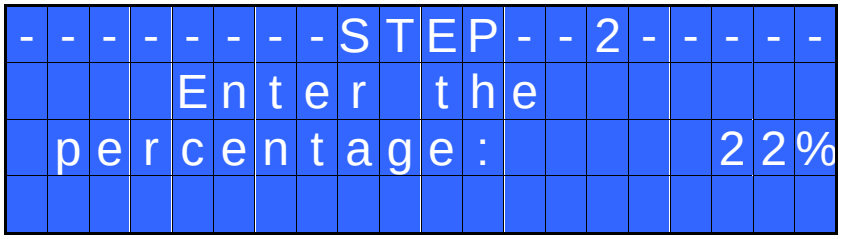


Just repeat the test.

6. Press ESC to abort the calibration process.
Press OK, then the display will show:



Set the torque value by selecting each digit individually pressing ⇧ and ⇩ and press OK to confirm it, then press OK again to save. You will see:



7. Set the percentage of the second torque to 30% by pressing ⇧ and press OK.
8. Repeat the procedures described on points 4 and 5.
9. When calibration ends, “Setting end” will be displayed. You will hear two beep sounds, too.
Now you are ready to work and see the correct torque on the display.

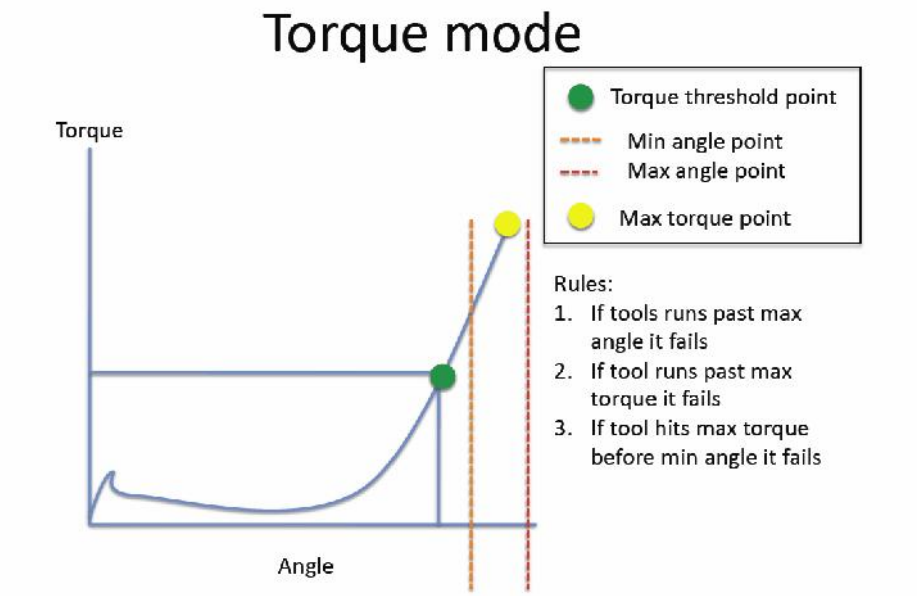
WARNING:

- Calibration values will be referred to the parameters of the control unit which are set during calibration, i.e. if you modify speed or torque, the unit will need to be recalibrated. During calibration when a screwing is not carried out correctly or if for any reasons you’re not sure of the torque value it is possible to repeat it. A wrong screwing can affect the precision of the calibration.
- Calibration is carried out for two torque levels optionally chosen. The minimum calibration interval is 5% (example: if I have to work at 50%, I can calibrate at 45% and 55%). In this case, if for any reasons I need to work at torque percentages which are lower or higher than the min-max ones set during the calibration, they will be analyzed and displayed anyway but since they won’t be based on effective data the torque value displayed may be not accurate.
- During calibration it is not possible to go back to the previous screen. Press ESC to stop calibration and then repeat the screwing cycles.

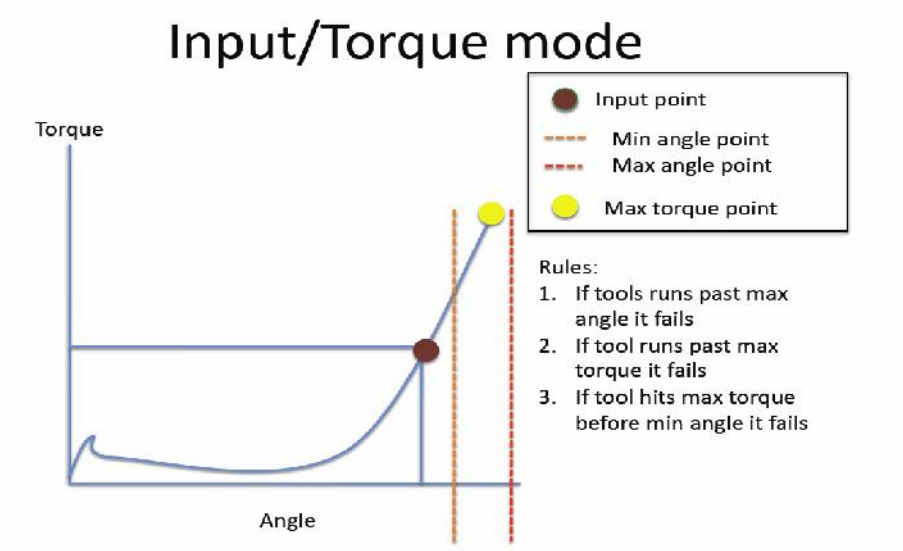
USE OF T&A (Torque & Angle)

Choose the T & A mode (see point 26: Modify function on the program menu)
It is possible to set 6 different modes:

- TORQUE (Torque): It's the most common use mode. The control unit shows the tightening torque and the torque starting from a certain torque percentage (threshold torque, see point 27). If the final torque and angle values are within the preset minimum and maximum values, the screw is correctly tightened. If the torque and/or angle are outside the preset values, the screw will be considered as incorrectly tightened. In this case the red led will light up and the message "*Error Max (Min) Angle*" or "*Error Max (Min) Torque*" will be displayed.

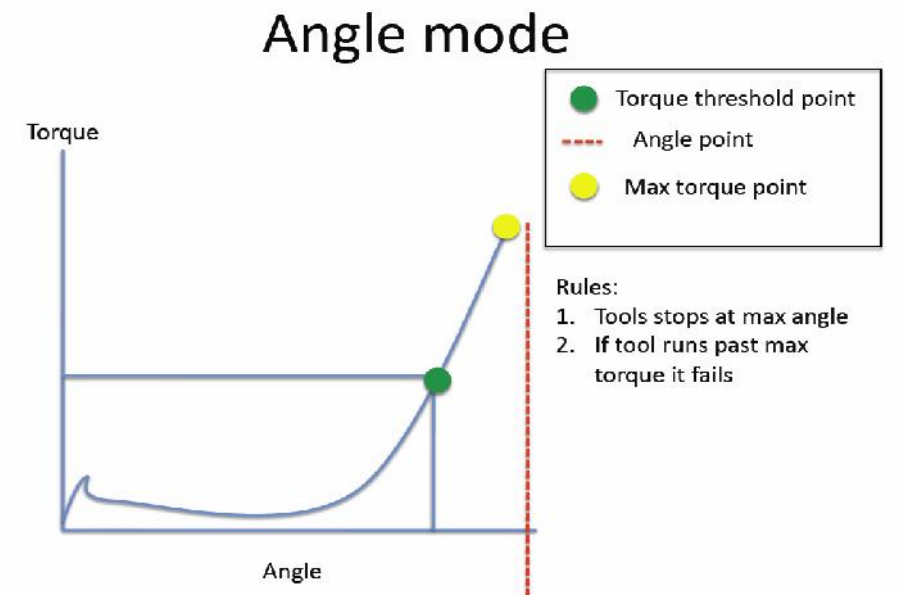


- TORQUE/INPUT (T/IN): It corresponds to *Torque* mode, except for the threshold torque which can't be set by the operator: in fact the value is the result of an external impulse through a proper contact (see paragraph "connections"). It can be very useful if the operator wants the control unit to start counting the angle from a position which is indicated by a precision instrument.

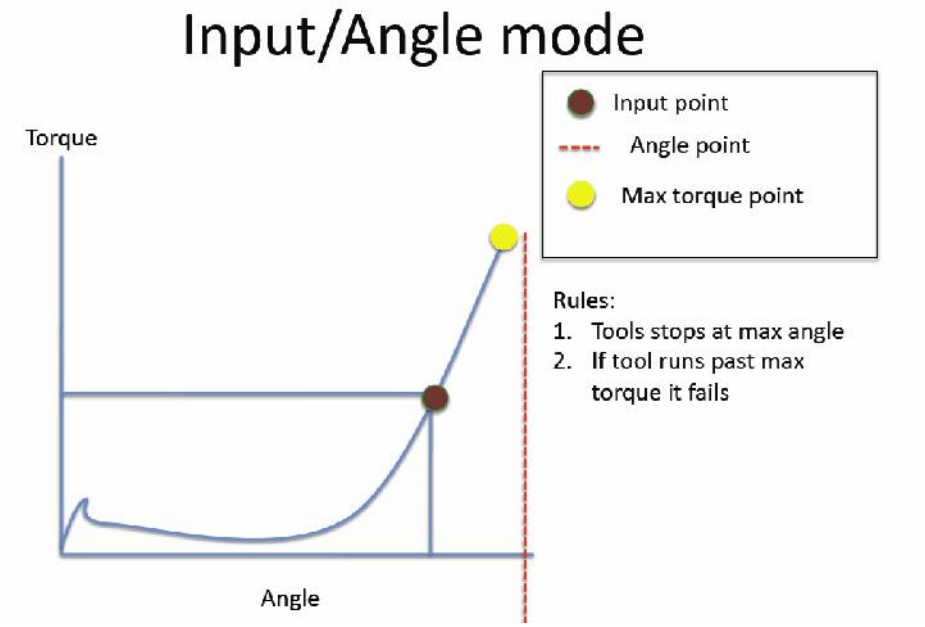


- TORQUE/LEVER (T/LV): No threshold is preset by the operator: the angle value that appears on the display corresponds to the angle that is carried out starting from the moment in which the lever is pressed until the torque is reached.

- ANGLE (Ang.): This mode gives priority to the angle to be reached. The value is measured starting from a tightening torque percentage.
  Starting from the preset threshold torque (see point 27) the system will start counting the degrees and when the preset angle is reached the screwdriver will stop. If the preset angle is reached the screw will be considered as correctly tightened, the green led will light up and the message "*tightening OK*" will be displayed on the status bar. If the screwdriver stops before reaching the preset angle the tightening will be considered not ok, the red led will light up and the message "error angle not reached" will be displayed on the status bar. Therefore it's very important to set a torque value (line 4) which is sufficiently higher than the threshold value (line 27), so that the set value is reached before the screwdriver stops because of the reached torque.



- ANGLE/INPUT (A/IN): The threshold can't be set by the operator: in fact the value is the result of an external impulse through a proper contact (see paragraph "connections").
  This function can be very useful if the operator wants the screw to rotate a certain number of degrees after reaching a position indicated by a precision instrument.



- ANGLE/LEVER (A/LV): the threshold torque value can't be set by the operator and the angle value that appears on the display corresponds to the angle that is carried out starting from the moment in which the lever is pressed.

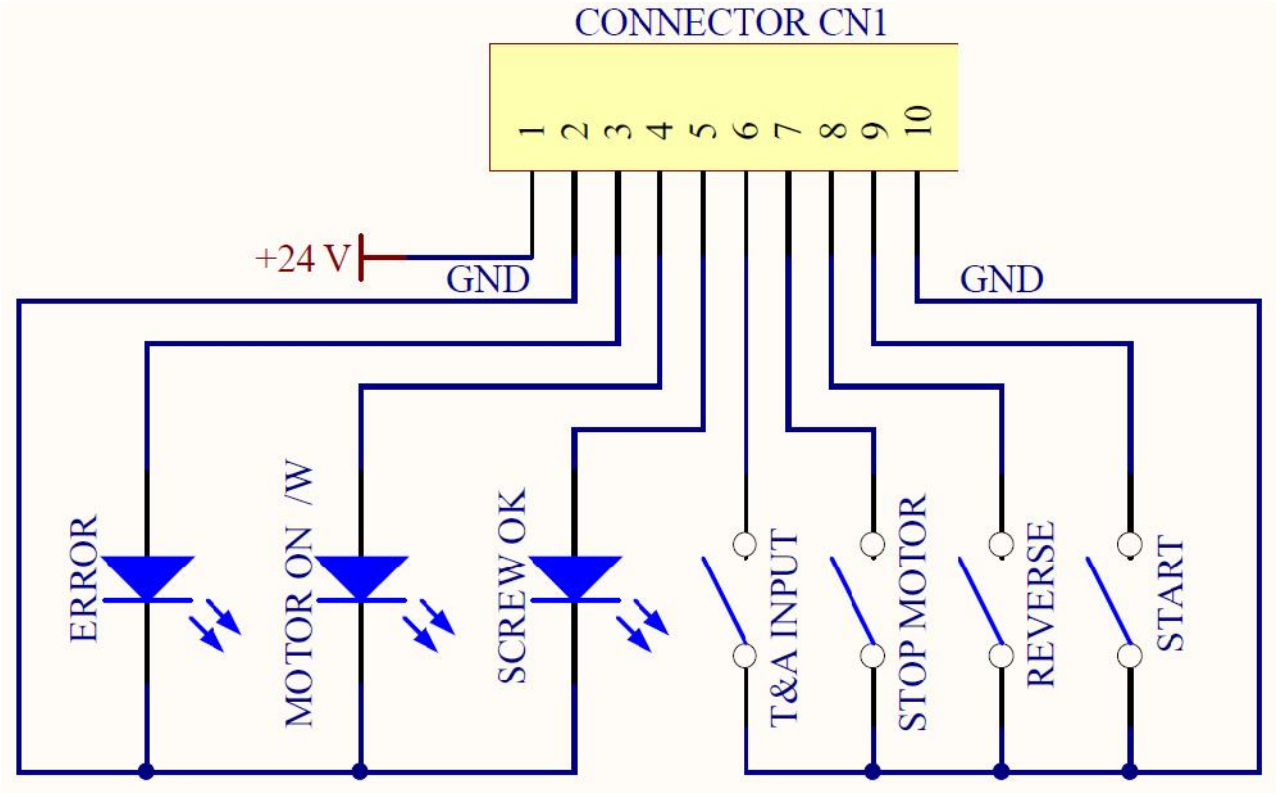
INTERPRETATION OF ACOUSTIC SIGNALS

The control unit emits sounds which help you understand if the screwing has been carried out correctly or not. When the torque is reached meeting all the parameters set, the control unit utters a 0.5 sec beep as confirmation. In case of Program End, the unit will utter other two beeps. On the other hand, torque reached under min time, during the Ramp time or under the Fast Speed (see error signals on the display) will cause the control unit to utter three beep sounds.

I/O CONNECTIONS:

- CN1 CONNECTOR – 10 pins

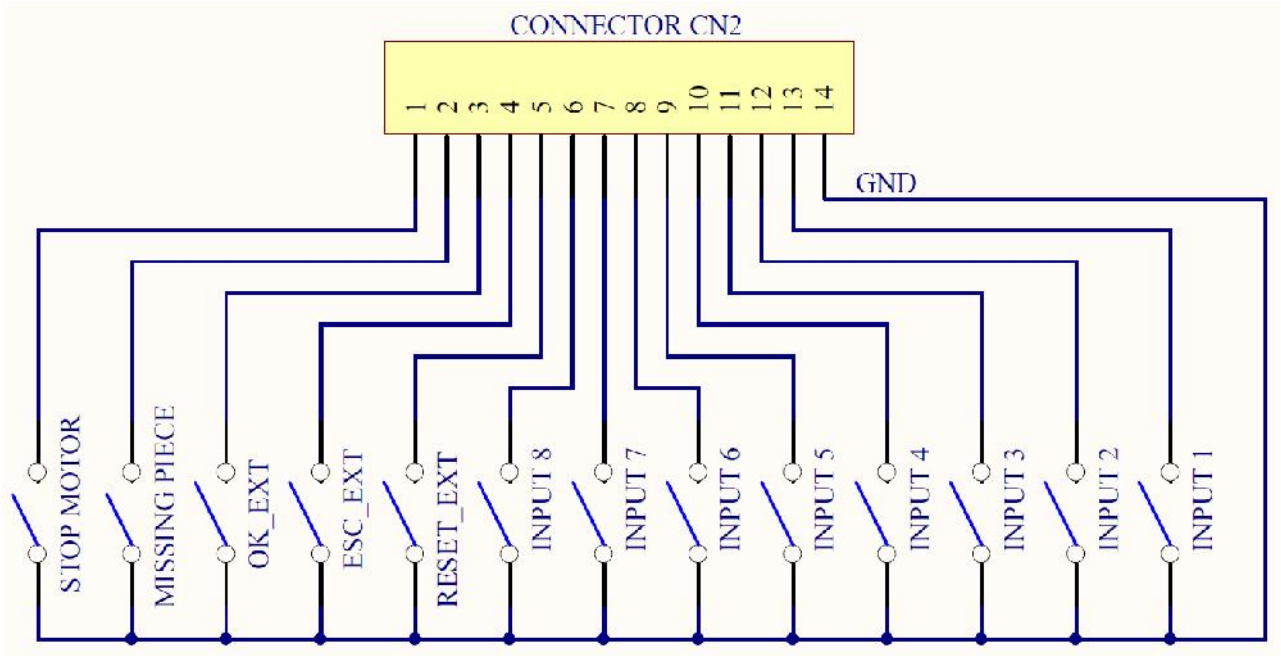
It is situated on the upper part of the back panel.



PIN	NAME	FUNCTION
		OUTPUT
1	+24V	+24V voltage protected. The maximum current consumption is 400mA. CAN NOT BE USED TO POWER EXTERNAL DEVICES.
2	GND	Common pin. Signals must be taken between this pin (GND and the respective signal pins (pin 3, 4 and 5).
3	ERROR	Error signal: it activates every time an error occurs. The red led on the front panel will switch on. Signal is 24V.
4	MOTOR ON (\W)	It activates when the motor turns during screwing. Signal is 24V.
5	SCREW OK	Correct screw signal. The green led on the front panel will switch on. Signal is 24V.
		INPUT
6	T&A INPUT	External input for making the control unit start to count the angle. It can be only used in A/IN and T/IN mode (see T&A paragraph)
7	STOP MOTOR	Remote motor stop. If it's activated the message "STOP MOTOR ON" appears on the display. The motor will stop and won't start working again as long as the contact is closed (as Input pin 1 of CN2).
8	REVERSE	Remote motor start with torque control while unscrewing.
9	START	Remote start with torque control while screwing.
10	GND	Common pin. The desired function is activated through a contact between this pin and one of the other pins.

- CN2 CONNECTOR – 14 pins

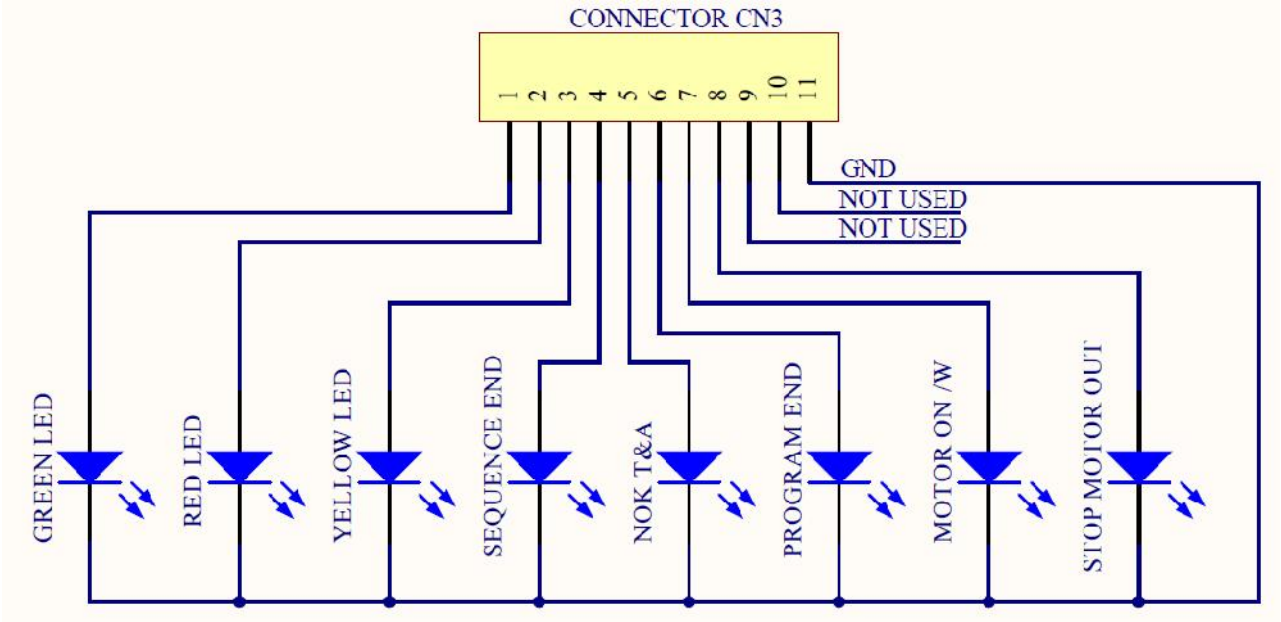
All of the following pins are input: make a contact with pin 14 to activate them.



PIN	NAME	FUNCTION
1	STOP MOTOR	Remote motor stop. If it's activated the message "STOP MOTOR ON" appears on the display. The motor will stop and won't start working again as long as the contact is closed (as Input pin 1 of CN2).
2	MISSING PIECE	If enabled it stops the motor, enables the error signal and "*Error missing piece*" is displayed on the status bar.
3	OK EXT	If enabled (see point 4: OK-ESC commands, in the option menu), remote OK key function.
4	ESC EXT	If enabled (see point 4: OK-ESC, in the option menu), ESC key function to reser remote errors.
5	RESET EXT	If enabled (see point 4: OK-ESC commands, in the option menu), it resets program or sequence according to the preset function (see point 5: Reset, in the option menu)
6	INPUT 8	Switch – selection of program 8
7	INPUT 7	Switch – selection of program 7
8	INPUT 6	Switch – selection of program 6
9	INPUT 5	Switch – selection of program 5
10	INPUT 4	Switch – selection of program 4
11	INPUT 3	Switch – selection of program 3
12	INPUT 2	Switch – selection of program 2
13	INPUT 1	Switch – selection of program 1
14	GND	Common to every input. Signals have to be enabled making contact between the desired signal and this pin (GND) .

- CN3 CONNECTOR – 11 pins

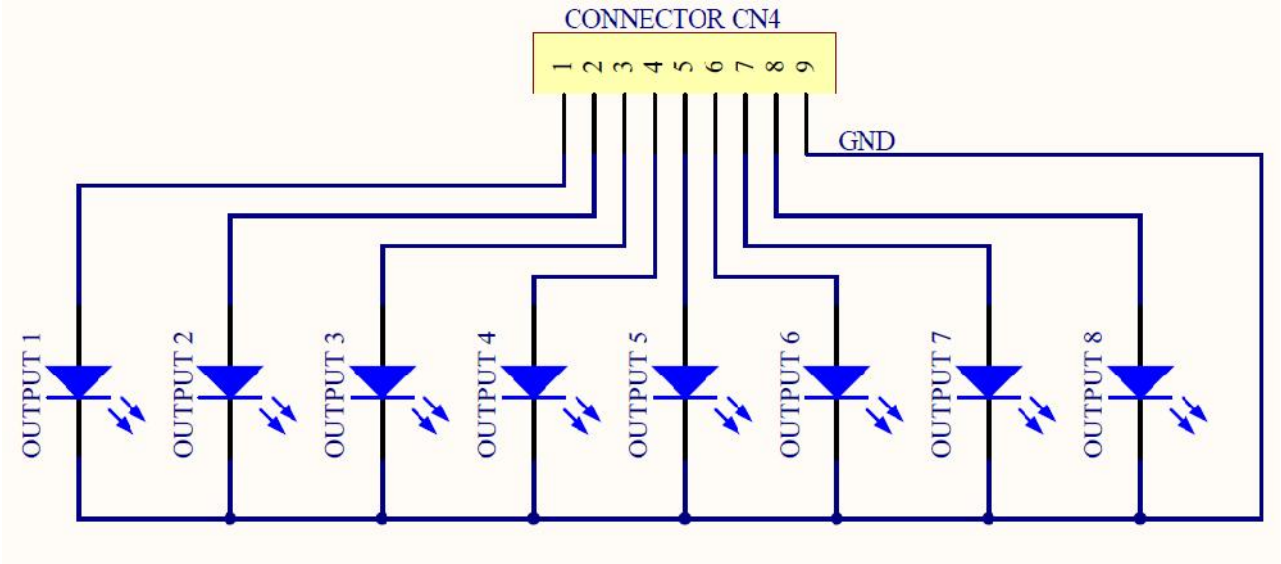
All of the following pins are output.



PIN	NAME	FUNCTION
1	GREEN LED	This signal works in parallel with the green led on the front panel.
2	RED LED	This signal works in parallel with the red led on the front panel.
3	YELLOW LED	This signal works in parallel with the yellow led on the front panel.
4	SEQUENCE END	It indicates the end of a sequence, if enabled.
5	NOK T&A	It activates if any angle error occurs.
6	PR OK	It activates at the end of each program.
7	MOTOR ON (\W)	It activates when the motor runs while tightening.
8	STOP MOTOR	It activates when stop motor is enabled.
9	NOT USED	
10	NOT USED	
11	GND	Common to every output. Signals have to be enabled making contact between the desired signal and this pin (GND).

- CN4 CONNECTOR – 9 pins

All of the following pins are output.



PIN	NAME	FUNCTION
1	OUTPUT 1	It indicates you're using program 1
2	OUTPUT 2	It indicates you're using program 2
3	OUTPUT 3	It indicates you're using program 3
4	OUTPUT 4	It indicates you're using program 4
5	OUTPUT 5	It indicates you're using program 5
6	OUTPUT 6	It indicates you're using program 6
7	OUTPUT 7	It indicates you're using program 7
8	OUTPUT 8	It indicates you're using program 8
9	GND	Common to every output. Signals have to be enabled making contact between the desired signal and this pin (GND).

- CN5 CONNECTOR (25 pin connector - female):

PIN	NAME	FUNCTION
1	GND	Common to every input. Signals have to be enabled making contact between the desired signal and this pin (common 0VDC).
2		Not used
3	STOP MOTOR OUT	It indicates stop motor is enabled
4	OUTPUT 8	It indicates you're using program 8
5	OUTPUT 7	It indicates you're using program 7
6	OUTPUT 6	It indicates you're using program 6
7	OUTPUT 5	It indicates you're using program 5
8	OUTPUT 4	It indicates you're using program 4
9	OUTPUT 3	It indicates you're using program 3
10	OUTPUT 2	It indicates you're using program 2
11	OUTPUT 1	It indicates you're using program 1
12	+24V	+24V available on this pin, they can't be used to charge external devices.
13	+5V	+5V available on this pin, it can't be used to charge external devices
14	OK EXT	If enabled (see point 4: OK-ESC, in the option menu), remote OK key function.
15	ESC EXT	If enabled (see point 4: OK-ESC, in the option menu), ESC key function to reset remote errors.
16	RESET EXT	If enabled (see point 4: OK-ESC, in the option menu), it resets program or sequence according to the preset function (see point 5: Reset, in the option menu).
17	INPUT 8	Switch – selection of program 8
18	INPUT 7	Switch – selection of program 7
19	INPUT 6	Switch – selection of program 6
20	INPUT 5	Switch – selection of program 5
21	INPUT 4	Switch – selection of program 4
22	INPUT 3	Switch – selection of program 3
23	INPUT 2	Switch – selection of program 2
24	INPUT 1	Switch – selection of program 1
25	+15V	+15V available on this pin, not used to charge external devices

- CN6 CONNECTOR (serial connector 9 pin - male) - FOR BARCODE CONNECTION

PIN	NAME	FUNCTION
1	+15V	+15V available on this pin, it can't be used to charge external devices.
2	RX	Serial reception.
5	GND	Common to every input. Signals have to be enabled making contact between the desired signal and this pin (GND)
9	+5V	Not used.

- CN7 CONNECTOR (9 pin serial connector - female) – PRINT FUNCTION

PIN	NAME	FUNCTION
1	+15V	Not used.
2	TX	Serial transmission.
3	RX	Serial reception.
5	GND	Common to every input. Signals have to be enabled making contact between the desired signal and this pin (GND).
9	+5V	Not used.

- **USB-PRINT CONNECTOR**

Only used to print data on PC (see dedicated paragraph).

ATTENTION: Output signals are protected from an appropriate circuit. Overload of the available signals (> 400 mA) or short circuit will result in the stop of the unit. To re-activate signals, it is necessary to switch off the unit for 5-6 seconds, check connections and output loads then switch the unit on.

CORRECT SCREWS MESSAGES ON DISPLAY

On the status bar it will display *"Screw OK"*.	A correct screwing has been performed, reaching the pre-set torque value.
On the status bar it will display "*Angle OK*".	A correct screwing has been performed, reaching the pre-set angle.
On the status bar it will display "*Runtime OK*".	A correct screwing has been performed, reaching the pre-set runtime.
On the status bar it will display "*Reverse torque OK"*	A correct screwing has been performed, reaching the pre-set reverse torque value.

TROUBLE SHOOTING

ERROR	PROBLEM	SOLUTION
0	"*waiting connection*" doesn't turn into "*loading*" after it's been switched on.	Contact the nearest Kolver dealer.
1	"*Error Torque Control*" is displayed on the status bar	Make a new screw. If the error persists, change the torque and speed settings.
2	"*Error Fast Speed*" is displayed on the status bar (the torque signal is displayed during the brake time).	
3	"*Reverse incomplete*" is displayed on the status bar (the displayed torque signal is correct but the set unscrewing is not complete).	
4	"*Pre-Reverse incompl*." is displayed on the status bar (the lever has been released before the runtime has been achieved)	
5	"*Under min time*" is displayed on the status bar (the torque signal is displayed below the pre-set minimum time).	
6	"*Over maximum time*" is displayed on the status bar (torque is not reached and the screwing time is over the preset maximum time).	
7	"*Error PV torque*" is displayed on the status bar (the torque signal is displayed inside the set maximum time).	
8	"*Error min torque*" is displayed on the status bar (the torque signal is displayed below the preset minimum torque).	
9	"*Error max torque*" is displayed on the status bar (the torque signal is displayed over the set maximum torque).	
10	"*Error min angle*" is displayed on the status bar (the torque signal is displayed below the set minimum angle).	
11	"*Error max angle*" is displayed on the status bar (The max preset angle has been reached. Only available in Tor, T/lv and T/in mode).	

12	"*Error angle not OK"* is displayed on the status bar (The preset angle hasn't been reached. Only available in Ang., A/lv and A/in mode).	
13	"*Warning! No piece*" is displayed on the status bar (The "missing piece" contact is enabled).	-check contact 2 on the CN2 connector
14	"*Compensation error*" is displayed on the status bar. A negative torque value is displayed due to a high negative compensation value.	- increase or decrease the compensation value
15	"R*eleased lever error*" is displayed on the status bar (The lever has been released while tightening).	Such error can be enabled or disabled through "PROGRAM-MENU" (see point 18 on the program menu).
16	"*Reverse torque error"* is displayed on the status bar (The torque signal is displayed while loosening, but only if it's set on "max").	- The screwdriver couldn't loosen - Avoid motor stalling - Loosening too heavy
17	"*Output Disabled*". Protection of output signals was activated after exceeding maximum load (400mA).	- Check the set load is not over the allowed maximum value - Restart the control unit to reset error
18	"*Protection 12A*" is displayed on the status bar (it happens when current on mosfets of bridge H is > 12 A for at least 1 s)	- Decrease screwing time and check settings - Avoid motor stalling - Unscrewing too heavy - Joint too soft
19	"*Protection 14p5A*" is displayed on the status bar (it happens when current on mosfets of bridge H is > 14.5 A for at least 800 ms)	- Decrease screwing time and check settings - Avoid motor stalling - Unscrewing too heavy - Joint too soft
20	"*Protection 15A*" is displayed on the status bar (it happens when current on mosfets of bridge H is > 15 A for at least 500 ms)	- Decrease screwing time and check settings - Avoid motor stalling - Unscrewing too heavy

ATTENTION: IF THE OK/ESC OPTION IS DISABLED, ERRORS RESET AT THE FOLLOWING SCREW/PROGRAM. OTHERWISE PRESS ESC. IF THE PROBLEM PERSISTS, PLEASE CONTACT YOUR NEAREST KOLVER DEALER.

SERIAL PRINT:

Every control unit is supplied with a 9 pin serial female connector (connection pin: PIN 2 = TX, PIN 3 = RX, PIN 5 = GND) and a mini USB connector. You can print the results of each screwing on PC (for example through Hyper Terminal or EDU EXPAND programs) and/or a printer (for example Kolver model PRNTR1). You can also save those results on a USB device (only on EDU2AE/TOP/E and EDU2AE/TOP/TA ver. 3.00). The transmission characteristics (only serial and USB) are the following: 9600 (bits per second), 8 (data bits), n (no parity), 1 (bits stop 1).
The print string is the following:

BARCODE	*RESULT*	*PROGRAM NUMBER*	*MODEL*	*TORQUE%*	*SCREWING TIME*	*SPEED*

SCREW	*SEQUENCE STAGE*	*TORQUE*	*ANGLE*	*DATE HOUR*	*NOTICE*

BC: Barcode = it begins with “BC:” and it’s followed by the code of the scanned product.

Result = screwing result: correct or incorrect.
OK = the torque has been correctly reached, all the selected parameters are satisfied and the control unit will give out a beep sound of 0.5 sec.
NOK = the torque has been reached during ramp time or Fast Speed (see error table). In this case, the unit will give out 2 beep sounds and the red led will light up.

PR: Program number = it indicates the running program.

Model = Model of screwdriver you’re using.

T%: Torque% = percentage of the set torque level.

S: Speed = preset speed value.

ST: Screwing time = it indicates the time of the screwing.

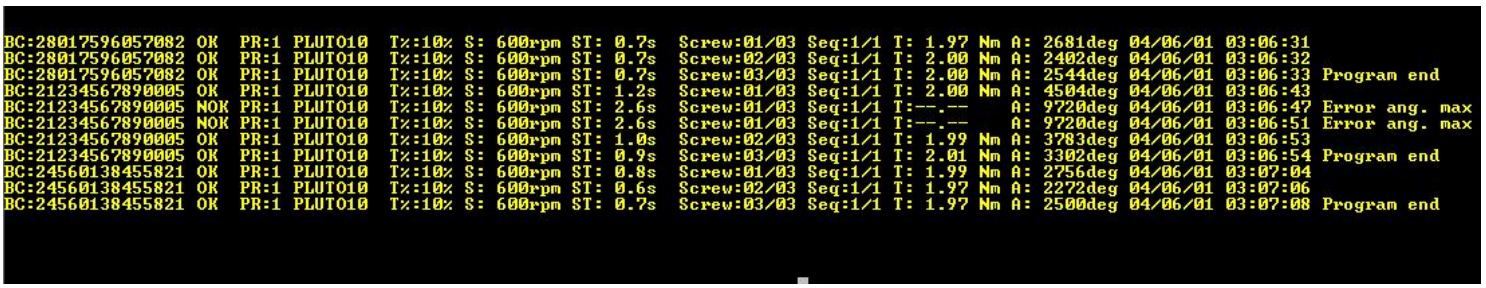
Screw: Number of screws = number of tightened screws/total number of screws.

Seq: Sequence stage = it indicates the stage of the sequence.

T: Torque = torque value.

A: Angle = angle value.

Notice = in case of program end, it prints “Program End”, in case of sequence end, it prints “Seq. end” or it indicates the type of error (see paragraph: trouble shooting).



EDU EXPAND

EDU EXPAND is the software for pc created by Kolver to set, change and save all parameters of EDU2AE/TOP/E or EDU2AE/TOP/TA 3.0 unit.

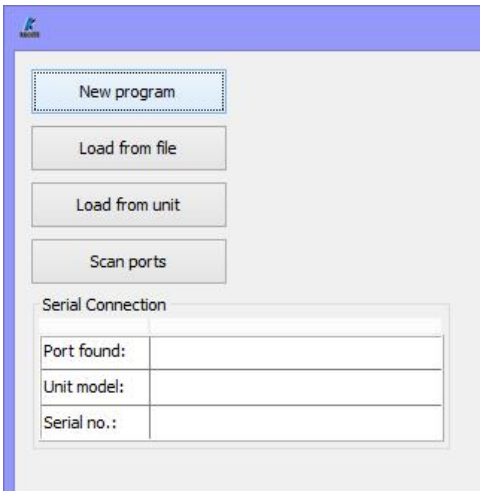
It communicates with the control unit via miniUSB or RS232 and makes you create up to 100 different settings configurations, save them on your USB drive and then recall on your EDU unit.

Just connect your USB drive to the port on the front panel of the EDU unit and recall the desired program on the menu (see Menu Options, USB Options).

At the same time the programs set on control unit can be downloaded on USB and recalled on another unit and on EDU EXPAND, too.

Here is a quick guide to use EDU EXPAND.

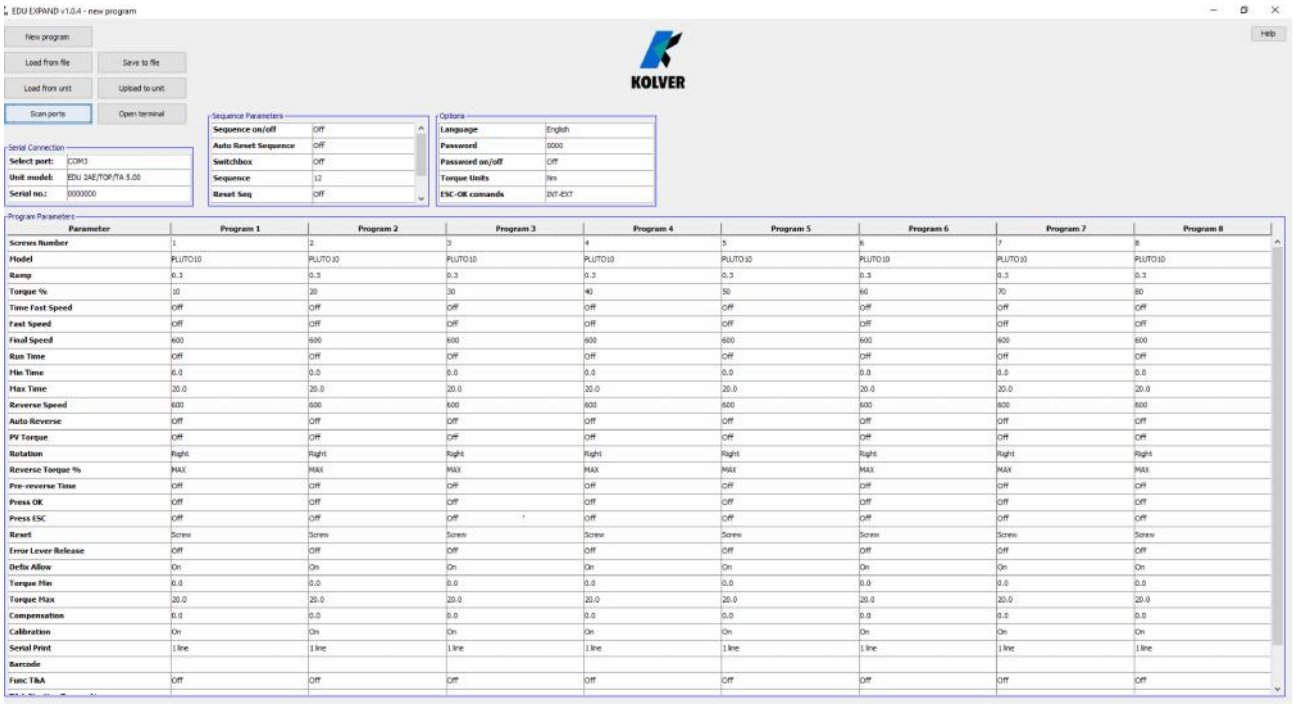
Double click the icon program and this is the main view.



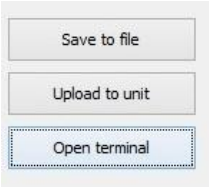
- **New program:** to load a new program.
- **Load from file**: it loads all programs, sequences and option settings from a previously saved file on your computer.
- **Load from unit**: it loads all program, sequence and option settings from the unit. The unit must first be connected to the pc using *Scan ports*.
- **Scan port**: it locates the unit. EDU EXPAND recalls the port, the model of the control unit and its serial number.
-

The control unit must be connected to the PC via miniUSB port or RS232 seat in the back panel of the unit.
If you cannot locate the control unit, make sure the unit and PC are connected properly or that the unit is on the initial screen of the Menu.

Here is the main screen when a program has been recalled or when you are creating a new one.

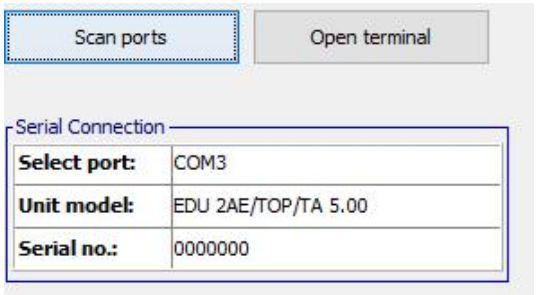


- To modify or enter any parameter values, double click a cell, select a number within the proper range, then press Enter. If the value is not within its valid range, pressing Enter will not confirm the change.



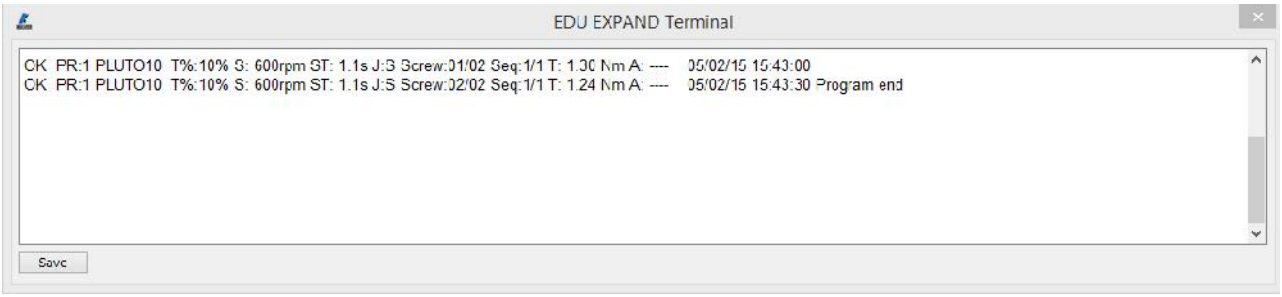
- **Save to file**: it saves all programs to a file. This file can be read directly from a USB drive connected to the unit on its front panel. In this case, the file name must be SETxx.KOL (xx = range from 00 to 99). This file could be copied in the USB drive and upload to the unit or recall with EDU EXPAND.

- **Upload to unit**: it uploads all the setting to the EDU control unit
  Connect the unit to your computer through miniUSB or RS232. Switch the unit on.



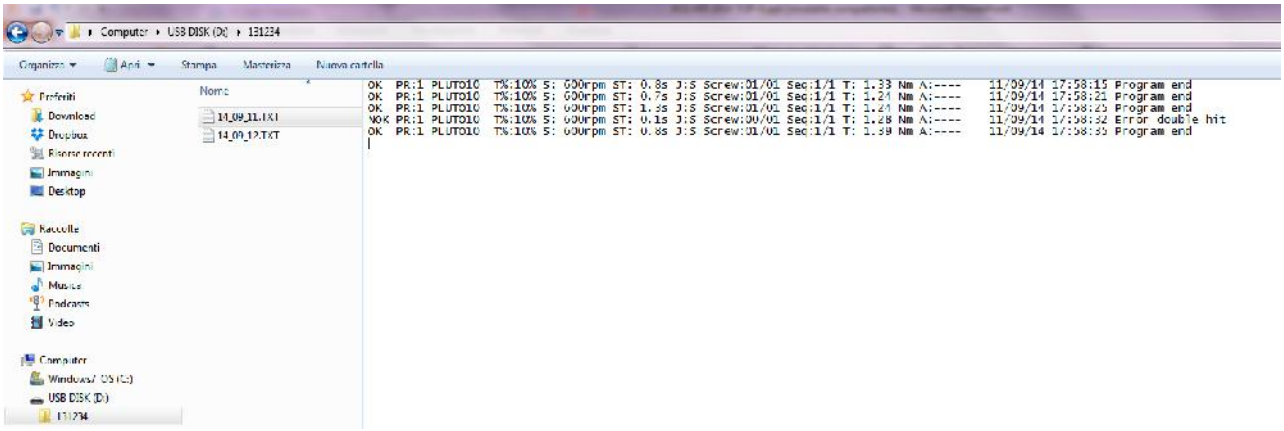
  Click *Scan ports* to locate the unit. EDU EXPAND recalls the port, the model of the control unit and its serial number. Then click *Upload to unit*. The text *Programming…* will appear on the EDU display. When the text *Programming…*disappears, you may disconnect the cable.
  Uploading can only be initiated if the control unit shows *Ready* on the main screen.

- **Open terminal**: to display the print string (see Serial Print). To save in a .txt file the results of each tightening, push Save.

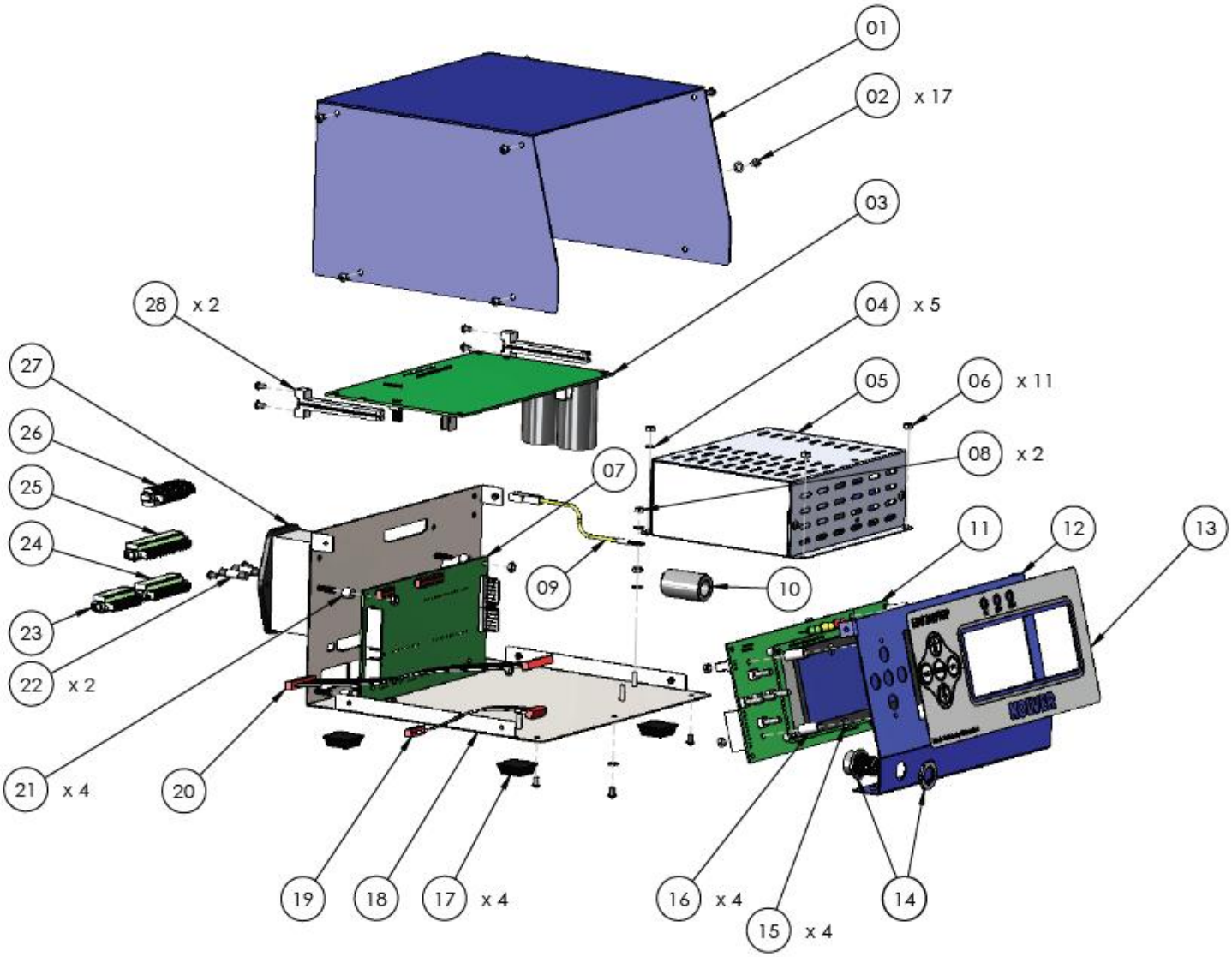


Report of the screwing done

- If you connect the USB drive to the control unit, the unit creates a folder where the report of the screwing done will be saved.
  The folder is named as the serial number of the unit.
  The text file which contains all the screwing data is named as the current date.



EXPLODED VIEW: EDU2AE/TOP 5.00



SPARE PARTS:

Position	Description	Quantity	Code
1	Upper panel EDU2AE/TOP	1	819003
2	3x5 Button head screw burnished TX10	17	872444
3	Motor board	1	852521/SW
4	M3 toothed washer	5	800041
5	Switching 48V 600W	1	872490
6	M3 burnished nut	11	800056
7	I/O EDU 2AE/TOP board	1	852525
8	M3 brass nut	2	800056/O
9	Ground cable	1	800090/E
10	Ferrite	1	872468
11	Display board EDU2AE/TOP	1	852526
12	Front panel EDU2AE/TOP	1	819002
13	Membrane EDU 2AE/TOP	1	819004
14	M12 5pin + nut + ferrite connector	1	201666/R1
15	M3 Washer h0,5 mm	4	800042
16	Spacer 15mm dest 4,8 mm	4	890004/T
17	Plastic support	4	800016/B
18	Bottom panel EDU2AE/TOP/SW	1	819001/SW
19	Flat cable 10 vie	1	819007
20	Flat cable 20 vie	1	872438/T
21	Spacer 6,3 mm dest 6.2mm	4	241003
22	Fuse 3.15A	2	800619
23	I/O Connector 9 pin spacing 3.81	1	800164
24	I/O Connector 11 pin spacing 3.81	1	800165
25	I/O Connector 14 pin spacing 3.81	1	800166
26	I/O Connector 10 pin spacing 3.81	1	800102
27	Filtered plug	1	800718
28	Main board support	2	872442
	Label	1	818006/SW
	Schuko Cable	1	800620

EXPLODED VIEW: EDU2AE/TOP/E 5.00

GUARANTEE

1. This KOLVER product is guaranteed against defective workmanship or materials, for a maximum period of 12 months following the date of purchase from KOLVER, provided that its usage is limited to single shift operation throughout that period. If the usage rate exceeds of single shift operation, the guarantee period shall be reduced on a prorata basis.
2. If, during the guarantee period, the product appears to be defective in workmanship or materials, it should be returned to KOLVER or its distributors, transport prepaied, together with a short description of the alleged defect. KOLVER shall, at its sole discretion, arrange to repair or replace free of charge such items.
3. This guarantee does not cover repair or replacement required as a consequence of products which have been abused, misused or modified, or which have been repaired using not original KOLVER spare parts or by not authorized service personnel.
4. KOLVER accepts no claim for labour or other expenditure made upon defective products.
5. Any direct, incidental or consequential damages whatsoever arising from any defect are expressly excluded.
6. This guarantee replaces all other guarantees, or conditions, expressed or implied, regarding the quality, the marketability or the fitness for any particular purpose.
7. No one, whether an agent, servant or employee of KOLVER, is authorized to add to or modify the terms of this limited guarantee in any way. However it’s possible to extend the warranty with an extra cost. Further information at kolver@kolver.it.