

**EDU1AE/TOP Ver.1.1**  
**EDU1AE/TOP/LTP Ver.1.1**  
**Torque range : 0.4 – 15 Nm**



*Operator's Handbook*

**IDENTIFICATION DATA OF THE MANUFACTURER**

KOLVER S.r.l.  
VIA MARCO CORNER, 19/21  
36016 THIENE (VI) ITALIA

**IDENTIFICATION DATA OF THE PRODUCT**

CONTROL UNIT MODEL: **EDU 1AE/TOP – EDU1AE/TOP/LTP**  
CODE: **030000/TOP – 030000/TOP/LTP**  
YEAR OF CONSTRUCTION: **2009**

**TECNICAL DATA OF THE PRODUCT**

TRANSFORMER: 230V AC 50 Hz – 40 V DC 200 VA FUSE: 3,15 A  
DIMENSIONS: 236x121x208 mm WEIGHT: 4.00 Kg

**DECLARATION OF CONFORMITY**



KOLVER S.r.l. declares that the new tool here described: Control unit model EDU 1AE is in conformity with the following standards and other normative documents: 98/37/CE, 89/336/CE and 2006/95/CE, EN50144-1 and EN60204-1.



It is also in conformity with RoHS and WEEE  normatives.

Thiene, 01/01/09

KOLVER S.r.l

EDU1AE/TOP power supply and control unit is an innovative system for controlling the torque of our PLUTO 3, PLUTO10 and PLUTO15 electric screwdrivers either inline, pistol or for automation.

EDU1AE/TOP and PLUTO deliver all the advantages of precision torque control electric tools at a fraction of the price of transducerized 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.

**IMPORTANT: EDU1AE/TOP controller 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.**

Here are a few advantages of EDU1AE/TOP:

- One controller only for a torque range from 2 to 15 Nm. For lower torque values, we offer the EDU1AE/LTP/TOP.
- User interface screens: walk through a few simple steps to input the parameters requested for your application and your fastening process can begin.
- 8 independent programs: with one PLUTO screwdriver you can replace 8 conventional screwdrivers.
- Each program can accept the following settings: Torque, Speed, Type of Joint, Number of Screws to be tightened, Number of Rejects allowed, Minimum screwing time, Maximum screwing time, Ramp time, Auto reverse, Auto switch to the next program with any sequence, Allow or Prevent reverse option.
- Password protected.
- Statistics menu with summary of work done: at the end of the day you'll know how many cycles have been performed correctly, how many wrongly, total number of screws etc.
- 15 input and 11 output connectors: you can control all functions from PLC.
- Options include Socket tray or Switch box: maximum flexibility. USB port.
- Large 135 x 40mm blue display: easy to read from any angle.

Turn the unit on through the on/off switch on the back panel. The unit will perform a general system check then will show the first screen. Push **MENU** button for 1 second and display the main screen indicating the Program (1 to 8), the Torque Level, the Joint type (Hard or Soft), the Screws Done and Set and the Rejected Screws.

PR1	4%	Soft	SCREWS 0/5	0/1
Cycle	Torque	Joint	Done/Set	Reject
ScrOK	ScrNOK	CycleOK	CycleNOK	END

The five upper fields indicate the setting of the unit.

<b>PR_cycle:</b>	it indicates the Program you are in, it goes from 1 to 8 or EXT.
<b>% Torque:</b>	it indicates the pre-set torque as a percentage.
<b>Soft/Hard Joint:</b>	it indicates the pre-set joint.
<b>Screws Done/Set:</b>	it indicates the screws done on the pre-set screws.
<b>Reject:</b>	it indicates the rejected screws.

The five lower fields represent:

<b>ScrOK</b>	Correct screwing done between min and max time.
<b>ScrNOK</b>	Incorrect screwing done under min time or over max time.
<b>CycleOK</b>	Cycle done well not exceeding the pre-set reject screws.
<b>CycleNOK</b>	Incorrect cycle where in one or more screws the pre-set rejected screws have been gone over.
<b>END</b>	End of cycle or of sequence.

#### MENU :

To enter the password and to move through the menu, use only the encoder knob in the front panel of the unit: to move through the fields, just turn it; to enter a field to modify the value it must be pushed and turned until you reach the desired value. To save the value, push it again.

To go back push **ESC** and to go out push **ESC** again.

Values are saved automatically moving through a screen to another or returning to the first screen.

#### PROGRAMMING THE UNIT

To enter the programmable menu push the **MENU** button for 5 seconds. At the first starting (and every time after the unit has been switched off) the unit will ask for a password.

#### To enter/ modify the PASSWORD :

<div style="border: 1px solid black; padding: 5px; display: inline-block;">PASSWORD: - - - -</div>	ENTER
	ESCAPE
	CHANGE PWD

Push the MENU button for 5 secs. Push the encoder knob and enter the four numbers of the password (default password is: 1111). Once entered the password, turn the encoder to **ENTER**, push it and the unit will show the first screen.

To modify the password: digit the old password, enter **CHANGE PWD**, enter the new one and save it pushing the encoder.

Once entered, to move through the 4 programming screens just push the **MENU** button. These screens are: Setup Screwdriver, Setup Cycle, Setup Print and Statistics.

First screen:

SETUP SCREWDRIVER		PR 1	
MODEL Pluto 10	TORQUE 4%	JOINT Soft	BRAKE TM OFF
RAMP TM 0,20	SPEED 600	REV TM 0,0	

Here you can modify the screwdriver parameters: Program nr., Screwdriver Model, Torque, Joint, Brake Time (only HARD JOINT), Ramp Time, Speed and Reverse Time after the torque is reached.

To change any parameters: turn the encoder knob, select the parameter, push it in again. Turn the encoder to change the value, push it in again thus saving the new value. The new settings have now been saved even if the screen changes or **ESC** has been pushed. **N.B.** Only in this screen it is possible to select and set the required program.

**PR** (Program): set from 1 to 8 individual programs. If you set **EXT**, Programs 1..8 will be selected externally through the input connector, pins 8 thru 15, on the back panel.

If you decide to work thru **EXT** Program, you need first to set all the parameters of programs 1...8 and then select the **EXT** program; when working thru EXT program, no modification of programs 1..8 are possible. Other parameters are the same as standard EDU1AE unit.

**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 on hard joint will result in a torque in the area of 6 Nm.

Model	Code	Control unit	Torque (Nm)		Speed		Output	Dimensions L x ø mm
			SOFT	HARD	Min	Max		
<b>Pistol grip (PLUTO P)</b>								
PLUTO 3P	130204	EDU1AE/LTP	0,3-2	0,6-3	390	1200	Hex 1/4"	150x150x45
PLUTO 10 P/N	130210/N	EDU1AE/LTP	0,7-3,6	0,6-4,0	130	400	Hex 1/4"	150x150x45
		EDU1AE	2-8	2-9,8	200	600		
PLUTO 15 P/N	130215/N	EDU1AE/LTP	0,6-6,3	1,4-6,8	70	220	Hex 1/4"	150x150x45
		EDU1AE	2-13,5	2-14,7	100	320		
<b>Pistol grip top connector (PLUTO P/U)</b>								
PLUTO 3P/U	130204/U	EDU1AE/LTP	0,3-2	0,6-3	390	1200	Hex 1/4"	150x150x45
PLUTO 10 P/U/N	130210/U/N	EDU1AE/LTP	0,7-3,6	0,6-4,0	130	400	Hex 1/4"	150x150x45
		EDU1AE	2-8	2-9,8	200	600		
PLUTO 15P/U/N	130215/U/N	EDU1AE/LTP	0,6-6,3	1,4-6,8	70	220	Hex 1/4"	150x150x45
		EDU1AE	2-13,5	2-14,7	100	320		
<b>In-line (PLUTO D)</b>								
PLUTO 3D	130203	EDU1AE/LTP	0,3-2	0,6-3	390	1200	Hex 1/4"	216x40
PLUTO 10 D/N	130211/N	EDU1AE/LTP	0,7-3,6	0,6-4,0	130	400	Hex 1/4"	216x40
		EDU1AE	2-8	2-9,8	200	600		
PLUTO 15 D/N	130216/N	EDU1AE/LTP	0,6-6,3	1,4-6,8	70	220	Hex 1/4"	216x40
		EDU1AE	2-13,5	2-14,7	100	320		
<b>Automation (PLUTO CA)</b>								
PLUTO 3CA	130303	EDU1AE/LTP	0,3-2	0,6-3	390	1200	Hex 1/4"	164x40
PLUTO 10CA/N	130211/N	EDU1AE/LTP	0,7-3,6	0,6-4,0	130	400	Hex 1/4"	164x40
		EDU1AE	2-8	2-9,8	200	600		
PLUTO 15CA/N	133216/N	EDU1AE/LTP	0,6-6,3	1,4-6,8	70	220	Hex 1/4"	164x40
		EDU1AE	2-13,5	2-14,7	100	320		
PLUTO 20CA	130303	EDU1AE/20	2,5	20	43	130	Sq 3/8 "	200x45,5

**JOINT:** You can select the type of joint (soft or hard) you are working on. A soft joint is typically a self tapping screw on plastic or sheet metal, or a metric (machine) screw on a material subject to strain (for example: gasket, o ring etc). A hard joint is typically a fastener joining metal with metal.

If you select the option **SOFT** the screwdriver will run the complete cycle at the selected speed.

If you select the option **HARD** the screwdriver will maintain the selected speed for a chosen time (brake time) after the start and then the speed will be reduced automatically to apply a pre-torque before reaching the final preset torque.

**IMPORTANT:** An incorrect selection of the joint type can result in inaccurate torque output.

**BRAKE TIME:** This option can be selected only in combination with the option **HARD JOINT**. You can select a time between MIN (function excluded) and 10.0 seconds indicating how long the selected speed (higher speed) will be on before switching to “pre-torque speed” (lower speed). The “pre-torque speed” will be automatically chosen by the unit depending on the preset torque. The user cannot adjust the “pre-torque speed”. **CAUTION:** The scope of the Brake Time 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 we suggest selecting a shorter time, and then increase it step by step until finding the optimum time.

**RAMP TIME:** You can select the slow start time (acceleration) from 0.2 to 2 seconds. This option is mainly used with self-tapping screws. Reaching the torque while the ramp is still on will result in inaccurate torque output.

**SPEED:** You can select any speed value of the screwdriver between nominal (max) speed and 65% of max speed .

**N.B.** The torque range is ensured only at the nominal speed of the screwdriver. Should you need to set lower speeds, please check if the screwdriver stops correctly at the pre-set torque. In HARD JOINT the pre-set speed only relates to the Brake Time; the second (slower) speed will be automatically chosen by the unit depending on the preset torque.

**REV TM:** This option will automatically start a reverse cycle after a torque reached signal or a max TIME. You can select a time between 0 (function excluded) and up to 10 seconds. During the reverse cycle, it is necessary to keep the start lever pressed (or the start contact closed) otherwise the screwdriver will stop before the pre-set time.

To progress to the second screen, push **MENU** again.

Second screen: **SETUP CYCLE**

SETUP CYCLE		PR 1	
SCREWS 3	REJECTS 2	MIN TIME 0.3	MAX TIME 2.5
UNSCREW YES	NEW PR NO	PR CYCLE FREE	SEQUENCE _____

You can modify the cycle parameters: Number of screws, Rejected screws, Min and Max Screwing Time, Unscrewing, New program contact, Free cycle or Sequence.

**SCREWS:** number of screws in each Program, from 1 to 99.

**REJECT:** number of rejected screws allowed in each single cycle. Screws which result in NOK (Not OK - see below) may or may not be repeated if it has been set as rejected or zero. You can set up to 9 rejected screws.

If the number of rejected screws exceeded, the main screen changes with **OVER** and the screwdriver stops. To start again, push **ESC** or **RESET** contact.

If **OVER** appears during a sequence, there are 2 possibilities:

RESET SINGLE CYCLE > push **ESC** or close the **RESET** contact for 1 sec.

RESET SEQUENCE > push **ESC** or close the **RESET** contact for 5 secs. until the beginning of a new cycle.

**N.B.** These functions exist only in **OVER** situation. During the normal use of TOP unit, the ESC function does not work. Instead the **RESET** contact works only during a single cycle and not during a complete sequence. See also **RESET** on SIGNALS I/O.

PR	4%	Soft	SCREWS	OVER
			0/5	1/1
			Done/set	Reject
Cycle	Torque	Joint		
ScrOK	ScrNOK	CycleOK	CycleNOK	END

**MIN TIME:** time between the lever pressed and the torque reached. If torque is reached before the minimum time set, an error signal is sent, and the screw is identified as a NOK screw. This happens typically when operator tightens the same screw twice.

**MAX TIME:** time between the lever pressed and the maximum acceptable rundown time. No torque signal is generated. After max. time is reached, an error signal is sent, identified as a NOK screw. This identifies possible stripped screws.

**UNSCREW:** In this field if you select YES the reverse function of your screwdriver is active, i.e. you can unscrew as usual whenever you wish. If you select NO the reverse function of your screwdriver is not active (you can never unscrew). If you select NOK the reverse function of your screwdriver will be active only after a NOK screw signal (you can unscrew if you wish so after NOK screw).

**NEW PR:** if YES, at the end of the Program cycle you must close the contact New Cycle (pin #4) to continue.

If NO, signal will stay on until the start of the screwdriver for the next cycle.

**PR CYCLE:** In this field you have the choice between free and fixed sequence of programs. This parameter is valid for all 8 programs and the modification of 1 of them affects all of the Programs.

The PR CYCLE and SEQUENCE boxes are linked: the Sequence Program Numbers appear only if you select FIXED (see below).

PR CYCLE	SEQUENCE
----------	----------

PR CYCLE FIXED	SEQUENCE 2 3 6 _ _ _ _
-------------------	---------------------------

If you select **FREE**, you can choose the program you need: manually and/or externally (EXT).

If you want to change the program manually go to the SETUP SCREWDRIVER screen and select PR 1..8

If you want to change the program externally go to the SETUP SCREWDRIVER screen and select PR EXT, back to the main screen you will see:

EXT
PR ?
Cycle

You will see the number of the selected Program only after the choice through pins 8...15 of the input connector (through switchbox or PLC).

If you select **FIXED**, the second field (**SEQUENCE**) appears with a series of 8 squares where you can set the sequence you want.

Example:

2 3 6 \_ \_ \_ \_ automatically cycle 2, then 3, then 6 and back to 2 again.

1 3 8 1 5 \_ \_ \_ \_ automatically cycle 1, then 3, then 8, then 1, then 5, and back to 1 again.

If you select FIXED with PR **EXT**, the program to choose will be forced. On the screen you will see for example:

EXT
PR 2
Cycle

The number of the program due will flash until you choose it.



The program continues with the cycle sequence you have chosen, with the END signal lit at the end of the sequence.

To progress to the third screen, push **MENU** again.

Third screen: **SETUP PRINT**

SETUP PRINT		PR 1
DATE 12/01/2000	TIME 01:15	PRINTED CYCLE Program 1
PRINTED DESCRIPTION		Made in Italy by Kolver s.r.l.

Available only with USB port option.

You can set date and hour.

**PRINTED CYCLE:** different description for each cycle, max 15 letters. It will be printed after each screw.

**PRINTED DESCRIPTION:** This is the description of max 50 letters on the main screen. It can be printed only on request after specific input (pin 7) or at the beginning of each cycle (if this option has been allowed).

The TOP unit with USB port allows to save each cycle data.

It's just necessary to insert the key in the USB port, after a short bip, you can proceed.

In the key, a new folder will be created: EDU1AE\_T. In it, there will be another folder called like the date set in the unit (year-month-day). In this folder, every day you could save each cycle done in .txt file.

Example:

```
11/03/09 09:43 PR1 P15 S 20% 320RPM 01/03 OK_ ____ Program 1
11/03/09 09:43 PR1 P15 S 20% 320RPM 02/03 OK_ ____ Program 1
11/03/09 09:43 PR1 P15 S 20% 320RPM 02/03 NOK TMIN Program 1
11/03/09 09:43 PR1 P15 S 20% 320RPM 03/03 OK_ END_ Program 1
11/03/09 09:43 PR1 P15 S 20% 320RPM 00/03 NOK TMAX Program 1
11/03/09 09:43 PR1 P15 S 20% 320RPM 01/03 OK_ ____ Program 1
11/03/09 09:43 PR1 P15 S 20% 320RPM 02/03 OK_ ____ Program 1
11/03/09 09:43 PR1 P15 S 20% 320RPM 03/03 OK_ END_ Program 1
```

Date (day/month/year),

Hour (hh:mm)

Program number (PR1),

Model (in this example P15 means Pluto 15)

Joint (S = soft – H = hard)

Torque,

Speed (RPM)

Done/total Screws

Result (OK-NOK)

Error description and END (TMIN if the error is of the min time, TMAX if max time, END when cycle is ended)

15 letters description.

**N.B.** All firmware versions support BOMS devices formatted in FAT12, FAT16 or FAT32 file systems only where the sector size is 512 bytes. No other file systems or sector sizes are allowed. Furthermore, only BOMS devices which support the SCSI or AT command sets are supported. On devices which implement multiple LUNs, only the primary LUN (0) is supported. The VNC1L firmware can only access the primary partition of a disk.

To export and display these data in an Excel file: capture these data in an Excel sheet. Then re-select them, select DATA, TEXT TO COLUMNS, FIXED WIDTH, push twice CONTINUE, set the Done/Total Screws column as text. Now each single data has its own cell: this allows to make any statistics. (In OpenOffice, when coping, the file asks how to display the data: just set **space**.)

**N.B.** If in the 15 letters description you set several **spaces**, in the Excel file you will create as many columns as these **spaces**.

To progress to the fourth screen, push **MENU** again.

Fourth screen: **STATISTICS**

STATISTICS		PR 1	
SCREW OK 0	SCREW NOK 2	CYCLE OK 0	CYCLE NOK 0
T.SCREWS 0	T.CYCLE 0	TOTAL 0	RESET NO

Here you can see the statistics of each single program.

**SCREW OK:** Total number of correct screws done between MIN and MAX TIME. Torque signal: ok.

**SCREWS NOK:** Total number of not OK screws, which have fallen outside the set time parameters.

**CYCLE OK:** Total number of correctly completed cycles in each pre-set Program.

**CYCLE NOK:** Total number of cycles where the quantity of the rejected screws is higher than the preset number of rejected screws.

**T. SCREWS:** Total number of screws for each cycle.

**T. CYCLES:** Total number of done cycles.

**TOTAL:** Total number of screws done from the installation of the program (no possible reset).

**RESET:** if you set YES, all the statistics of the program you are in will reset.

## BIP SOUNDS

Bip sounds at the end of fastening of each screw help check if the operation is correct or not. When the torque has been reached meeting all the parameters set, a SINGLE OK signal (see below) and a 1 sec bip sound are generated. Each time you push a button or you move through the screens, the unit utters a 0,5 sec bip sound.

Torque reached under min time, during the Ramp time or under the Brake time (only HARD JOINT) will result in a SINGLE NOK signal (see below) and three x 1 sec bip sound.

## SIGNALS I/O

### INPUT

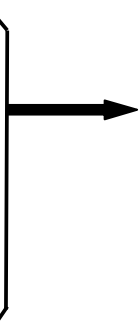
Input signals: contact to earth common pin 1 (COM 0vdc):

PIN2 > START	Contact between pin 1 and 2. Clockwise.
PIN3 > REVERSE	Contact between pin 1 and 3. Counterclockwise.
PIN4 > NEW CYCLE	Used only if NEW PR is set on YES; contact between pin 1 and 4 to start a new cycle.
PIN5 > STOP MOTOR	Contact between pin 1 and 5; it stops the motor in any situation. On the screen, you'll see STOP MOTOR.
PIN6 > RESET CYCLE	Contact between pin 1 and 6; it resets any partial values of the cycle you are working in. See also special functions in case of REJECT.
PIN7 > PRINT LABEL	Contact between pin 1 and 7: it prints on request the 50 letters label (see PRINT DESCRIPTIONS, SETUP PRINT).



PIN8 > PR1  
 PIN9 > PR2  
 PIN10 > PR3

PIN11 > PR4  
 PIN12 > PR5  
 PIN13 > PR6  
 PIN14 > PR7  
 PIN15 > PR8



Contact between pin 1 and 8-15, to choose the desired programs (possible only with EXT program)

PIN 16 > 24 Vdc

24 Vdc protection for switchbox and socket tray (max 250mA available).  
**N.B.** This output can be used but the protection threshold of 250mA must be valid for all the outputs. If exceeded, on the first screen, you'll see PROTECTION ACTIVATED PLEASE RESET. It is necessary to switch off the unit for 5-6 seconds.

### OUTPUT

PNP output 24Vdc signals.

Earth: pin 1.

PIN1 > COM 0VDC

PIN2 > SINGLE OK

Common earth for all Outputs.

Correct screwing done between min and max time.

Signal starts when the screwing is done and it resets when the lever is pressed to start a new one.

PIN3 > SINGLE NOK

Incorrect screwing done under min time or over max time. Signal starts at the end of the screwing and it resets when the lever is pressed to start a new one.

PIN4 > CYCLE OK

Cycle done well not exceeding the pre-set reject screws. Signal starts at the end of the cycle and it resets a new one starts.

PIN5 > CYCLE NOK

Incorrect cycle where in one or more screws the pre-set rejected screws have been gone over. Signal starts at the end of the cycle and it resets a new one starts.

PIN6 > TOTAL END

End of cycle or of sequence. Signal starts at the end of the cycle and it resets a new one starts.

PIN7 > LEVER

Signal starts when the lever is pressed or at input start and it stops when it is released.

PIN8 > MOTOR ON

Signal starts when the motor starts and it switches off when the motor stops.

PIN9 > STOP TIME

Signal starts when the screwing exceeds the max time (see also MAX TIME). This option is useful to a NOK screw which has reached the torque under min time or over the max time. It's also useful when a PLUTO tool is used with a stop time and not after the torque reached. Signal starts when the unscrewing is done and it resets when the lever is pressed to start a new screwing.

PIN10 > REV TIME

Signal starts if REV TM is on when the unscrewing cycle is over. Signal ends when the lever is pressed for a new cycle.

PIN 11 > FAILURE

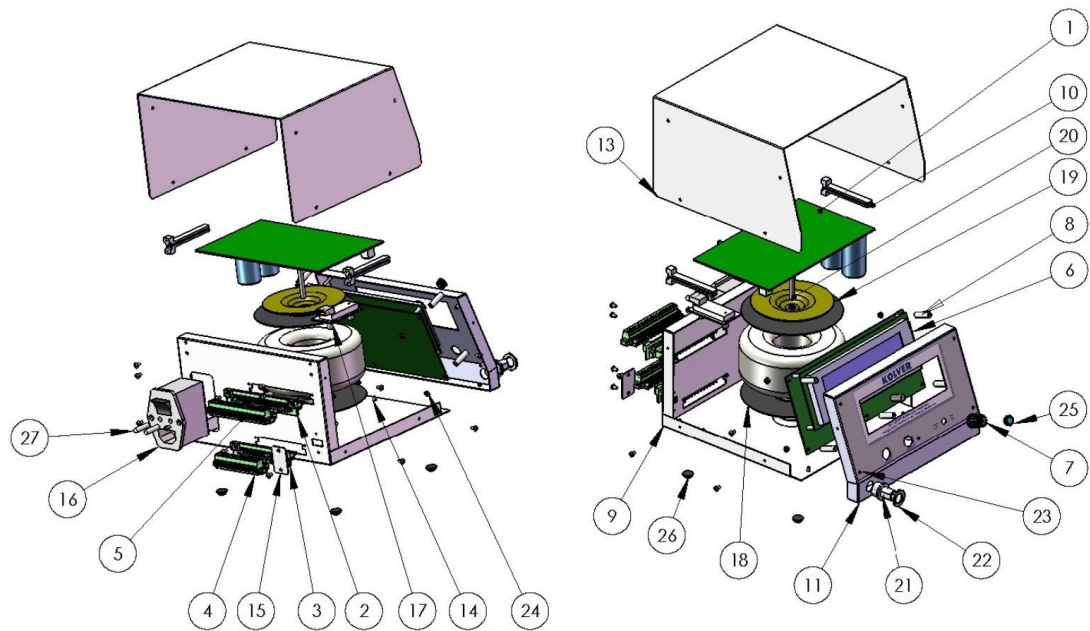
Signal starts at any error detected by the unit (see Trouble Shooting).

PIN 12 > NOT USED

Not Used.

**N.B. TO RESET ERRORS, TURN OFF THEN SWITCH ON THE UNIT. RESET OF ERRORS #6 AND #8 COMES AUTOMATICALLY AFTER THE PROBLEM END.  
 IF THE PROBLEM PERSISTS, PLEASE CONTACT YOUR NEAREST KOLVER DEALER.**

# ESPLOSO



Ref.	Description	Quantity	Code
1	Main board TOP - Main board TOP/LTP	1	852421/T - 852421/TL
2	Connector F TOP 16 pin	1	800112
3	Connector F TOP 12 pin	1	800110
4	Connector 12 pin TOP	1	800111
5	Connector 16 pin TOP	1	800113
6	Display board TOP - Display board TOP/LTP	1	852422/T - 852422/TL
7	Knob TOP	1	800040
8	Spacer 20mm Di 3 De6	5	872436/T
9	Bottom	1	812012/T
10	Board seat TOP	2	872442
11	Back panel	1	812014/T
12	Transformer 200VA 230V - Transformer 200VA 110V	1	848009 - 848009/110
13	Cover	1	812013/T
14	ISO 7380 - M3 x 6 --- 6N	25	872443
15	812012-T-1 Cover for USB port	1	812012/T
16	Connector 220V filtered	1	800718
17	USB Board	1	852423
18	Rubber	2	see 12
19	Plate	1	see 12
20	ISO 4762 M5 x 40 --- 22N	1	872430/N
21	Connector of screwdriver	1	201666/T
22	Hexagon Nut ISO – 8675 - M12 x 1 - N	1	
23	Membrane	1	872445/T
24	Hexagon Nut ISO – 4036 - M3 - N	6	800056
25	Knob cover	1	800040
26	Support	4	800016
27	Fuse	2	800619