CD-KP
FOR MULTIDRIVE & CD3000E

CD-KP for MULTIDRIVE and CD3000E
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1 CD-KP for MULTIDRIVE and CD3000E

1.1 General description

CD-KP is a panel device allowing to display some operative parameters of thyristor units as voltage, current, power, reference, alarms, etc.

CD-KP can be configured to select which parameter to display and is possible to execute commands as start and stop of the connected unit, display and reset of alarms, to change reference and ramp.

All the menus (except the operator menu) can be protected by password to avoid accidental change of configuration parameters by unauthorised personnel.
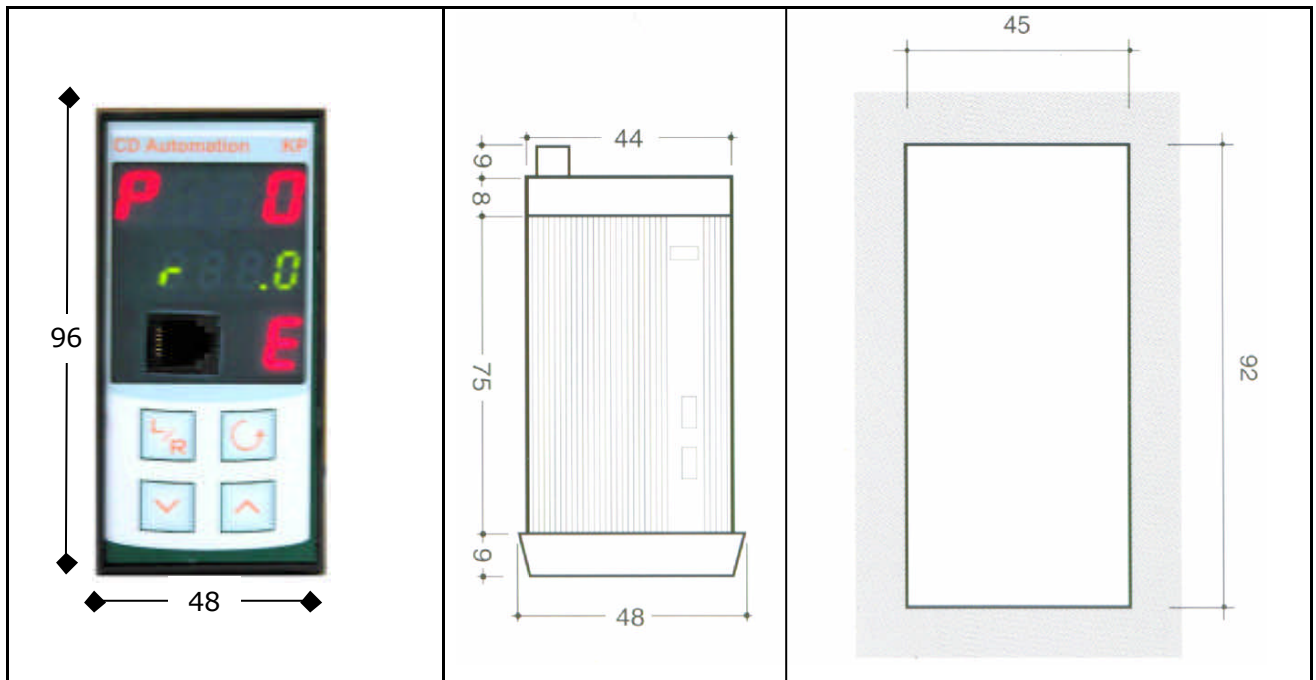
CD-KP has an isolated analog output 0÷10V/0÷20mA/4÷20mA to retransmit parameters' value as voltage, power and reference.

Working temperature	0÷45°C (HR<90%)
Supply votage	115-230 Vac ±10% 50-60 Hz
Power drain	3VA
Display 1	LED 7 segments 10mm.
Display 2	LED 7 segments 8mm.
Display 3	LED 7 segments 10mm.
Units featured	CD-KP can communicate with CD3000E or Multidrive units via RS-485.
Wirings	Extraible 8 poles terminal
Protection	Ip30
Communications	RS485 Modbus
Retransmission	Isolated 0÷20mA/4÷20 mA, impedance 500Ω or 0÷10V, impedance 1KΩ.

1.2 Ordering code

CD-KP	TYPE/	AUXILIARY VOLTAGE SUPPLY(V)/	MANUAL TYPE

TYPE
• 5 – CD3000E-2PH • 6 – CD3000E-3PH • 7 – MULTIDRIVE-2PH • 8 – MULTIDRIVE-3PH

AUXILIARY VOLTAGE SUPPLY(V)
• 1 – 120V • 2 – 240V

MANUAL TYPE
• 1 – Italian version • 2 – English version

1.3 Dimensions

1.4 Wiring connection

All the wirings are done via the rear terminals, following the schema.
The supply of CD-KP can be 120Vac or 240Vac and must be specified in ordering code.
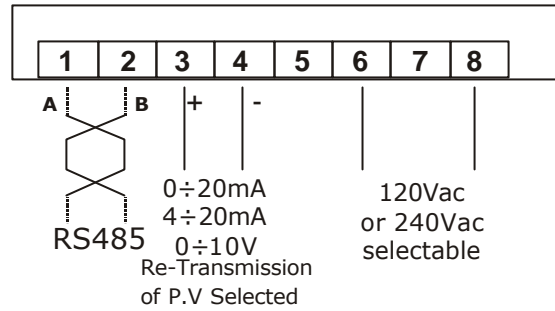
1.5 Retransmission selection

In configuration menu it is possible to select which variable to retransmit and the output type: 0÷20mA, 4÷20mA, 0÷10V.
There is also an hardware configuration that must be done: a jumper must be set near the rear terminals, as showed in figures on the right.

Fig. A Current selection

If the output is configured as 0÷20mA or 4÷20mA, the jumper must be set as in fig. A (current selection).
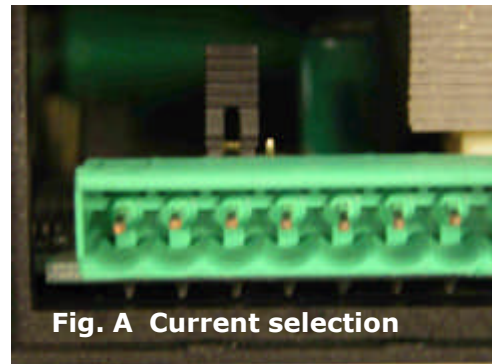If the output is configured as 0÷10V, the jumper must be set as in fig. B (voltageselection).
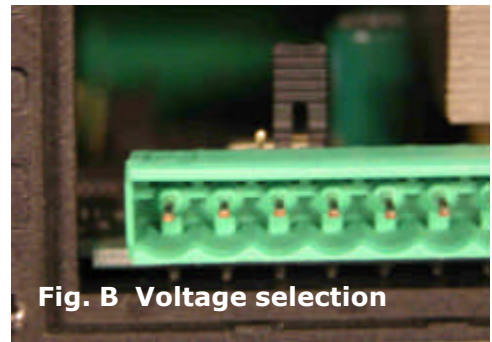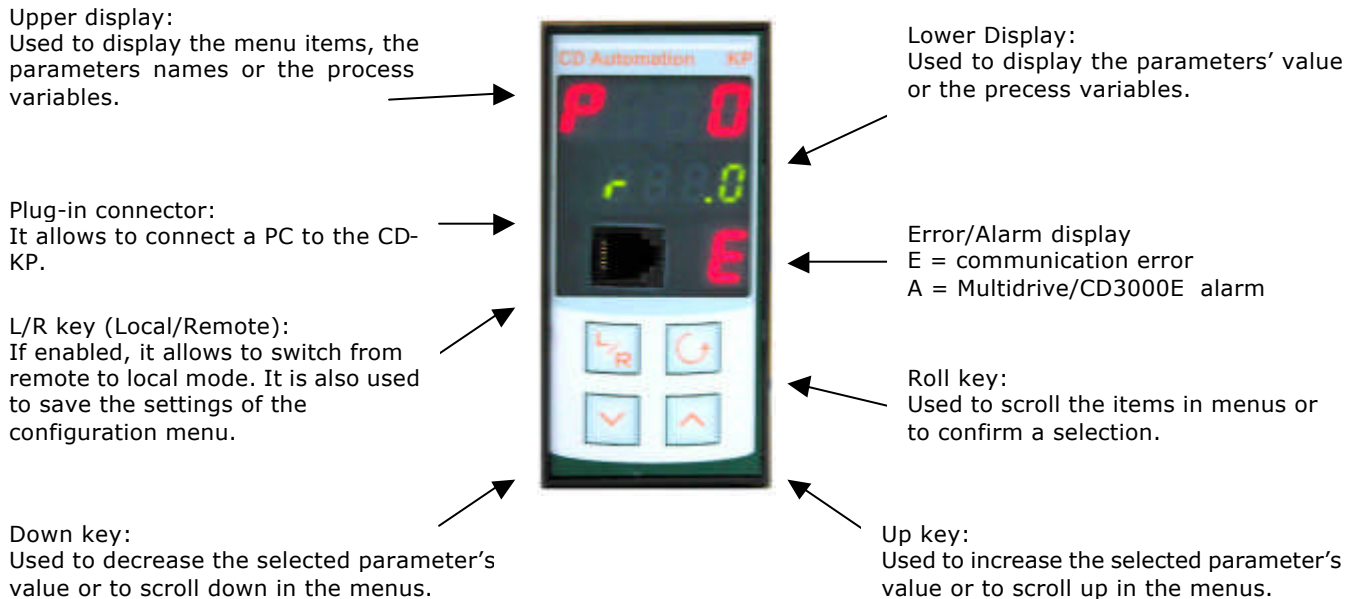

Fig. B Voltage selection

1.6 Frontal Keypad

In the figure below are showed the displays, the keys and the frontal plug-in of CD-KP.

Upper display:
Used to display the menu items, the parameters names or the process variables.

Plug-in connector:
It allows to connect a PC to the CD-KP.

L/R key (Local/Remote):
If enabled, it allows to switch from remote to local mode. It is also used to save the settings of the configuration menu.

Down key:
Used to decrease the selected parameter's value or to scroll down in the menus.

Lower Display:
Used to display the parameters' value or the precess variables.

Error/Alarm display
E = communication error
A = Multidrive/CD3000E alarm

Roll key:
Used to scroll the items in menus or to confirm a selection.

Up key:
Used to increase the selected parameter's value or to scroll up in the menus.

1.7 Frontal plug-in connector

The plug-in connector on front of CD-KP allows to put a PC in communication with a CD3000E or MULTIDRIVE thyristor unit.
Usually, the thyristor unit is mounted in a cabinet and to have access to it the operator must pay attention to high voltage or stop the plant. Connecting the configuration cable (supplied separately) to the CDKP, it will provide the physical link with the thyristor unit releasing the control on communication line. All the displays of CD-KP will flash and the control on serial link will be released. In this condition, no operation is possible on CDKP and all keys are disabled.
Unplugging the configuration cable, the CD-KP will return in its normal working condition.

1.8 Default settings

CD-KP is supplied with a base configuration allowing the immediate usage without any further configuration. Some default values are reported in the following table.

Function	Value	Notes
Addressed unit	1	
Baud Rate	19200	
L/R key	Off	Disabled
Cmd feature in operator menu	Off	Disabled
Retransmission	Off	Disabled
Upper operator display 1	P32	Power (average on 3 phases)
Lower operator display 1	P8	Reference
Upper operator display 2	Arst	Current (average on 3 phases)
Lower operator display 2	P8	Reference
Upper operator display 3	P31	Voltage
Lower operator display 3	P8	Reference
Command menu password	255	Enabled
Calibration menu password	255	Enabled
Diagnostic menu password	255	Enabled
Setup menu password	255	Enabled
Configuration menu password	255	Enabled

By default, CDKP is configured to communicate with units at address 1 and baud rate 19200. The variables displayed in operator menu are: average power (P32), average current (Arst parameter), voltage and reference signal in percentage. All the menus are protected by password with value 255.

1.9 Start-up

Before to supply the CD-KP check that the wiring is correct and verify the supply line voltage value (120Vac or 240Vac). Automatically, the operator menu 1 will be displayed with power value in upper display and reference value in lower display.
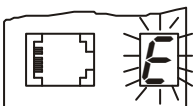
 If an "E" is flashing in error/alarm display, there is a communication error, CD-KP is not able to exchange data with thyristor unit. The user must verify:
- that CD-KP and thyristor unit have the same baud rate
- that the address called by CD-KP is the unit's address
- that the polarities of RS485 link are correct
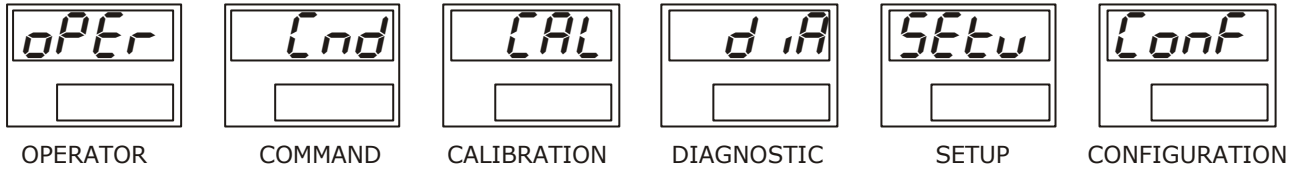- that the thyristor unit is supplied and in ON condition.
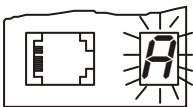
 If an "A" is flashing in error/alarm display, it means that CD-KP received an alarm indication from the thyristor unit. The user must go in the operator menu, scroll up to alarm sub-menu ($ALAr$), identify the alarm type and remove its cause (see operator menu's paragraph).

2 Menu general description

2.1 General description of menus

The main menu of CD-KP is composed by 6 sections:

| $oPEr$	Cnd	CAL	$d\,iA$	$SEtu$	$ConF$
OPERATOR	COMMAND	CALIBRATION	DIAGNOSTIC	SETUP	CONFIGURATION

Each section is composed by one or more items or sub-menus.

At any time, it's possible to return to the $oPEr$ item in main menu by pressing together the roll key 🔄 and up key ⌃.

The up ⌃ and down ⌄ keys scroll through the sections, the roll key 🔄 gives access to the selected section.

All the sections (except the $oPEr$ section) are usually protected by password to avoid access by unauthorised personnel. The password policy can be changed in configuration menu. ($ConF$).

2.2 Password usage

When the user tries to enter in a protected menu, the CD-KP will ask for a password.
Insert the password using the up ⌃ and down ⌄, keys and confirm with roll key 🔄.
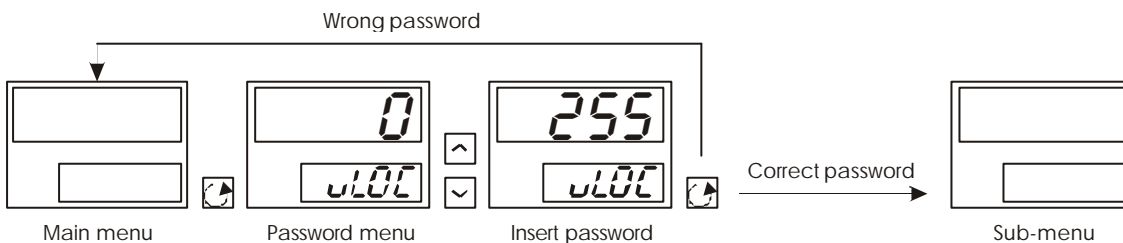
If the operator inserts the correct password, then it is possible to access to sub-menu, otherwise the CD-KP will return to the main menu. There is no limit to tries.
By default, all passwords are set to 255 and can be changed in configuration menu.
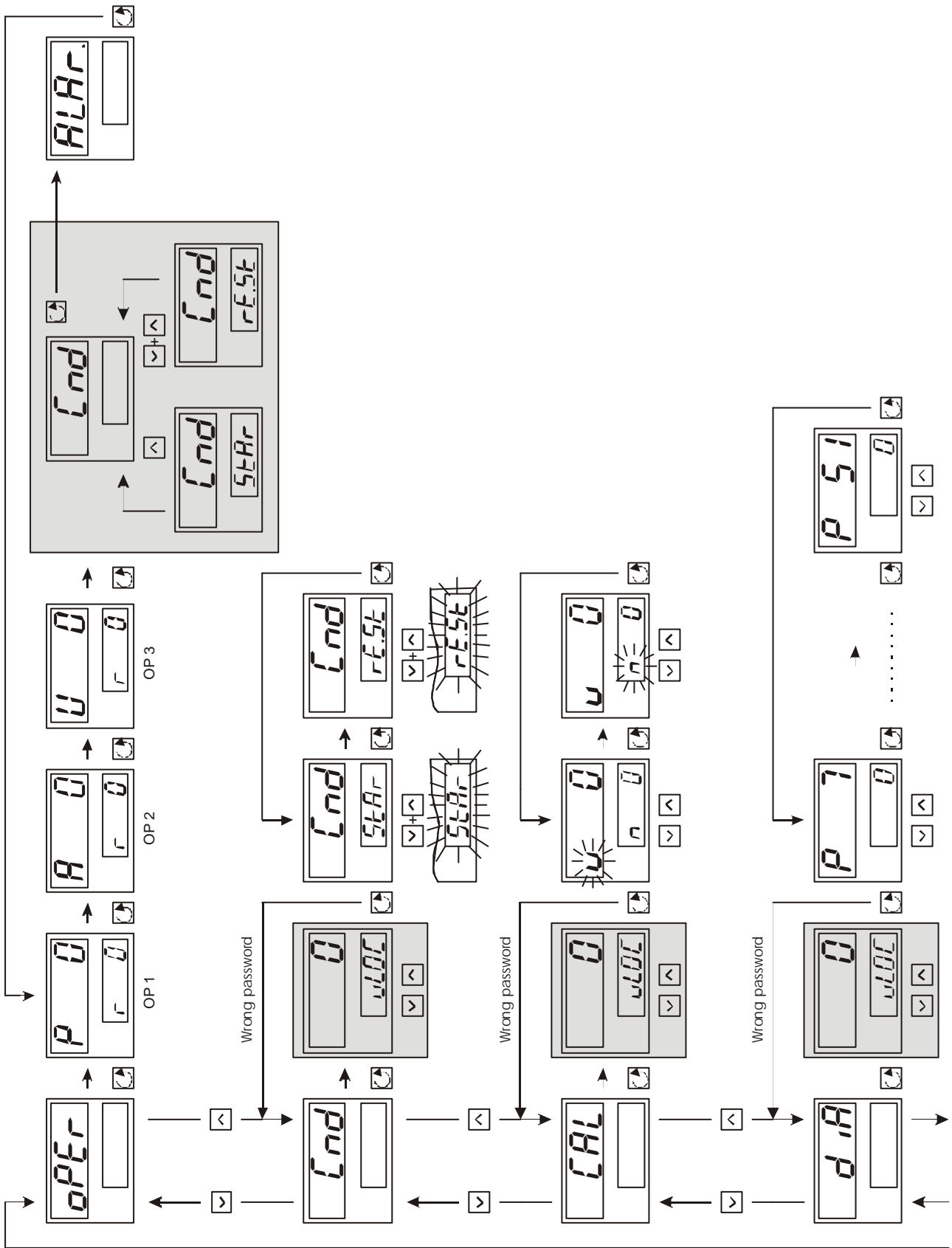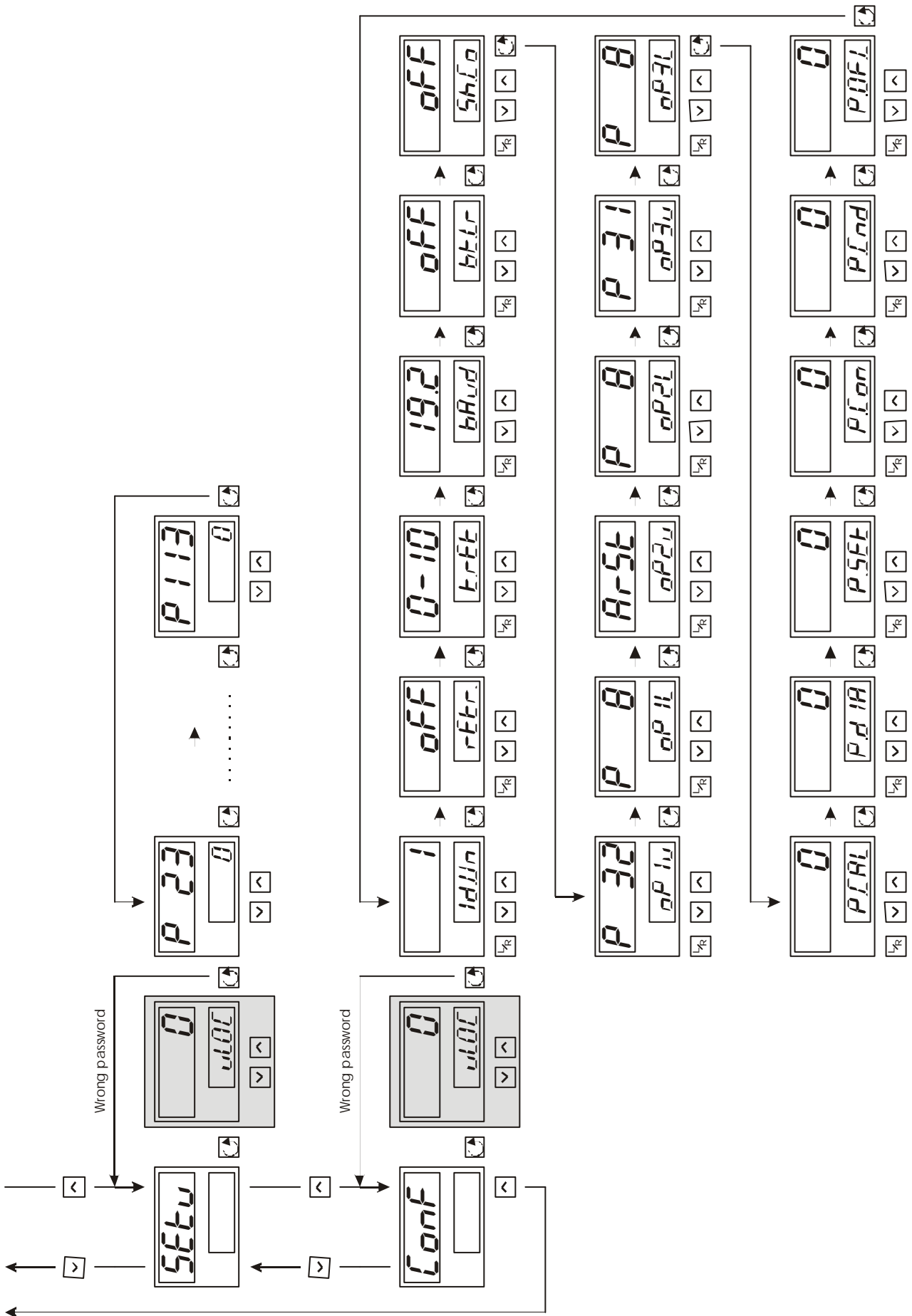
2.3 Operator menu ($oPEr$)

The operator menu can't be protected by password. It is composed by 5 sub-menus. The scrolling through the sub-menus is done by pressing the roll key ⬚.

To return to main menu, press together the roll ⬚ and up ⬚ keys.

2.3.1 OP1 sub-menu

By default, in this sub menu are displayed the average power on three phases (upper display) and the reference (lower display).
The average power can be expressed in watts or kilowatts (see parameter 032 on CD3000E or Multidrive manual).
The external reference is displayed in percentage (see parameter 008 on CD3000E or Multidrive manual).
The user can choose the parameters displayed in OP1 sub-menu by changing this setting in configuration menu ($ConF$).

2.3.2 OP2 sub-menu

By default, in this sub menu are displayed the average current on three phases (upper display) and the reference (lower display).
The average current is expressed in ampere (see parameter ??? on CD3000E or Multidrive manual).
The external reference is displayed in percentage (see parameter 008 on CD3000E or Multidrive manual).
The user can choose the parameters displayed in OP2 sub-menu by changing this setting in configuration menu ($ConF$).

2.3.3 OP3 sub-menu

By default, in this sub menu are displayed the voltage to the load (upper display) and the reference (lower display).
The voltage is expressed in volts (see parameter 031 on CD3000E or Multidrive manual).
The external reference is displayed in percentage (see parameter 008 on CD3000E or Multidrive manual).
The user can choose the parameters displayed in OP3 sub-menu by changing this setting in configuration menu ($ConF$).

2.3.4 Command sub-menu (Cnd)

By default, in sub-menu is hidden and the CD-KP will jump directly to alarm sub-menu (see next paragraph).
The user can enable this sub-menu by changing the value of $ShCo$ parameter in configuration menu ($ConF$):
- $ShCo = On$ → the command sub-menu will be displayed
- $ShCo = oFF$ → the command sub-menu will not be displayed

The commands that can be sent to the thyristor unit are two:
- by pressing together the up ⬚ and down ⬚ keys, CD-KP will send the reset command and $rE.St$ will appear in lower display.
- by pressing the up ⬚ key, CD-KP will send the start command and $StAr$ will appear in lower display.

The start and reset commands can be found also in command menu (Cnd).

2.3.5 Alarm sub-menu ($ALAr$)

In there is no alarm, in the lower display will appear no, otherwise CD-KP will display the alarm type:

- $noPh.$ Loss of one or more phases.
- $Ph.Er$ Wrong phase rotation.
- $E.A.$ External alarm.
- $HEAt.$ Over-temperature on heatsink.
- $SCr.C$ Shortcircuit on thyristors.
- $H.b..$ Heater break alarm.
- $Un.Ld$ Unbalanced load.
- $WJ.d.$ Watch dog software alarm.

More informations about alarms can be found on CD3000E and Multidrive manuals.

If more than one alarm is present, it is possible to display the others by pressing the up ⌃ and down ⌄ keys.

Warning: *the alarm's displaying sequence doesn't respect the alarm's event time.*

2.3.6 Local/remote mode

CD-KP can switch between local and remote mode only when the user is in OP1, OP2 or OP3 menu.

Pressing once the L/R ⌷ key CD-KP switch in local mode and a "L" will flash in lower display.

At this moment the operator can use the up ⌃ and down ⌄ keys to give a reference to the unit from 0% to 99,9%.

Pressing the L/R ⌷ key CD-KP switch in remote mode and the remote reference will appear in lower display (or other parameter defined in configuration)

By default, the local/remote mode is disabled. The user can change the value of $btLr$ parameter in configuration menu ($ConF$):

-   $btLr = On$ → the L/R key ⌷ is enabled
-   $btLr = oFF$ → the L/R key ⌷ is disabled

2.4 Command menu (Cnd)

In this menu is possible to send two commands to the thyristor unit connected to CD-KP:
-   reset command to delete alarms and restore the unit to re-start ($rE.St$ will flash in lower display)
-   start command to start the unit after a reset ($StAr$ will flash in lower display)

The operator can select the command by pressing the roll key ⟳.
The command will be sent by pressing together the up ⌃ and down ⌄ keys.

To return to main menu, press together the roll ⟳ and up ⌃ keys.

2.5 Calibration menu (CAL)

In this menu is possible to display and modify the parameters 116 (operative voltage) and 119 (nominal current of the load) and to execute the automatic heater break alarm calibration.
The parameter 116 will appear in upper display ($u400$), the parameter 119 will appear in lower display ($n\ 8.6$). The roll key ⟳ will choose wich parameter to modify (flashing letter) and up ⌃ and down ⌄ keys will change the value.
Pressing together the up ⌃ and down ⌄ keys will launch the heater break alarm calibration and the CAL message will appear in lower display.

Warning: *also when the CAL message disappear the thyristor unit could be still in calibration.*

To return to main menu, press together the roll ⟳ and up ⌃ keys.

2.6 Diagnostic menu ($d\ IA$)

This menu is useful during installation or in case of malfunction. The scrolling through the parameters is done by pressing the roll key ⬚.

To return to main menu, press together the roll ⬚ and up ⬚ keys.

2.6.1 Parameter 7 – External feedback ($P\ \ \ \ 7$)

This parameter displays the percentage value of external feedback on terminals 1-2 on terminal block M2 of Multidrive. This value will be always 0 when CD-KP is connected to CD3000E thyristor units.

2.6.2 Parameter 8 – Reference signal ($P\ \ \ \ 8$)

This parameter displays the percentage value of reference signal on terminals 17-18 on terminal block L2 of Multidrive or terminals 7-8 on terminal block LB1 of CD3000E.

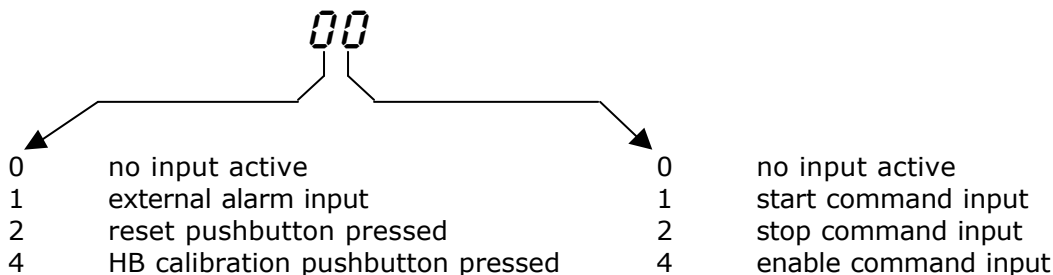### 2.6.3 Parameter 10 – Current limit ($P\ \ \ 10$)

This parameter displays the percentage value of reference signal on terminals 21-22 on terminal block L2 of Multidrive or terminals 7-10 on terminal block LB1 of CD3000E.

2.6.4 Parameter 48 – Digital inputs ($P\ \ \ 48$)

This parameter displays two digits indicating the input's status as below specificated:

$$00$$

0	no input active	0	no input active
1	external alarm input	1	start command input
2	reset pushbutton pressed	2	stop command input
4	HB calibration pushbutton pressed	4	enable command input

Example: if parameter 48 displays 56 it means:
external alarm input + HB calibration pushbutton pressed
AND
stop command input + enable command input.

2.6.5 Parameter 49 – Digital outputs ($P\ 49$)

This parameter displays two digits indicating the output's status as below specificated:

$$00$$

0	no output active	0	no output active
1	configurable output 2 active	1	line activation signal
		2	alarm signal
		4	configurable output 1 active
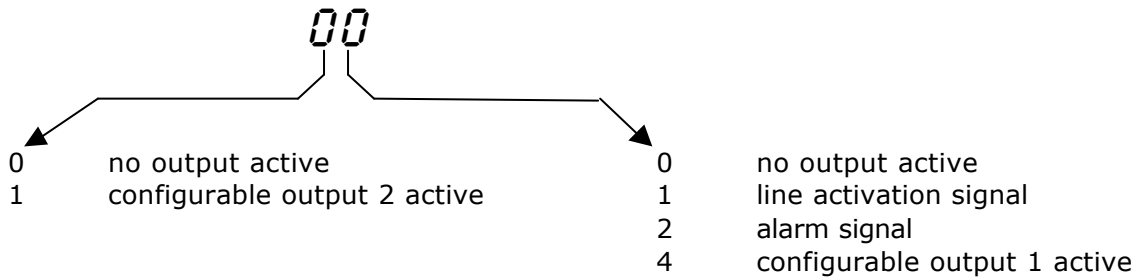
Example: if parameter 48 displays 03 it means:
no output active
AND
line activation signal + alarm signal.

2.6.6 Parameter 51 – Current limit enabling ($P\ 51$)

This parameter displays the current limit's status:

- $P\ 51 = 0$ → the current limit is disabled
- $P\ 51 = 1$ → the current limit is enabled

2.7 Setup menu ($5EЕ\it{U}$)

This menu is similar to diagnostic menu. The scrolling through the parameters is done by pressing the roll key ⟳. To modify parameters' values press up ⌃ or down ⌄ keys.
All the parameters showed in this menu are stored in CD3000E or Multidrive eeprom, more informations can be found on thyristor units manuals.

To return to main menu, press together the roll ⟳ and up ⌃ keys.

2.7.1 Parameter 23 – Firing mode selection (P 23)

        0   Burst firing
        1   Phase angle
        2   Delayed triggering + Burst firing

2.7.2 Parameter 24 – Ramp up (P 24)

        0 – 4095   x 0,7 sec.

2.7.3 Parameter 25 – Ramp down (P 25)

        0 – 4095   x 0,7 sec.

2.7.4 Parameter 66 – HB sensitivity (P 66)

        0 – 100%

2.7.5 Parameter 68 – HB enabled/disabled(P 68)

        0 – 9999

2.7.6 Parameter 70 – Feed back selection (P 70)

        0   Current I (rms)
        1   Voltage V (rms)
        2   Power VxI
        3   External

2.7.7 Parameter 83 – Burst Firing setting (P 83)

        1 – 256

2.7.8 Parameter 84 – Ramp setting in Burst Firing (P 84)

Parameter available only with Multidrive 3PH
        1 – 100

2.7.9 Parameter 85 – Delay triggering (P 85)

Parameter available only with Multidrive 2PH
        1 – 100

2.7.10 Parameter 91 – Internal current limit value (P 91)

        1 – 100

2.7.11 Parameter 98 – Load type connection ($P \ \ 98$)

    0   Star without neutral
    1   Star with neutral
    2   Delta
    3   Open delta

2.7.12 Parameter 104 – Analog output 1 rescaling ($P \ 104$)

Span for external indicator
    1 – 4095

2.7.13 Parameter 106 – Analog output 2 rescaling ($P \ 106$)

Span for external indicator
    1 – 4095

2.7.14 Parameter 108 – Analog output 3 rescaling ($P \ 108$)

Span for external indicator
    1 – 4095

2.7.15 Parameter 110 – Analog output 4 rescaling ($P \ 110$)

Span for external indicator
    1 – 4095

2.7.16 Parameter 112 – Digital output 2 configuration ($P \ 112$)

    0   Current limit
    1   Heater Break
    2   Unbalanced load

2.7.17 Parameter 113 – Digital output 3 configuration ($P \ 113$)

    0   Current limit
    1   Heater Break
    2   Unbalanced load

2.8 Configuration menu ($\mathcal{L}on\mathcal{F}$)

In this menu is possible to configure CD-KP. The scrolling through the parameters is done by pressing the roll key ⟳. To modify parameters' values press up ⌃ or down ⌄ keys. When a parameter is being modified, its value will flash. To confirm and save the new value, press the L/R ⌷ key.

To return to main menu, press together the roll ⟳ and up ⌃ keys.

2.8.1 Unit's address ($Id.Un$)

Address of the thyristor unit connected with CD-KP.
Possible values: $I - 255$
CD-KP (Master device) can connect with just one slave device located at address specified by this parameter. The communications between CD-KP and thyristor unit is on serial link RS485 with MODBUS protocol.

2.8.2 Retransmission ($rEtr.$)

Retransmission parameter's selection.
Possible values: $oFF , P\ 4 , P\ 8 , P31 , P32 , P33 , P34$
CD-KP can read from the connected thyristor unit one of the above parameters and to retransmit it on analog output in voltage (0÷10V) or current (4÷20mA or 0÷20mA).
More informations about thyristor unit's parameters can be found on CD3000E and Multidrive manuals.

2.8.3 Retransmission type ($t.rEt$)

Retransmission type's selection.
Possible values: $0-10 , 0-20 , 4-20$
Retransmission type's selection: 0÷10V, 0÷20mA, 4÷20mA.

Warning: *this selection must be compatible with hardware selection done via link jumper (see retransmission selection paragraph).*

2.8.4 Baud rate ($bAud$)

Communication speed's selection.
Possible values: $4.8 , 9.6 , 19.2$
The communication speed can be set at 4800, 9600 or 19200 Bps.

Warning: *be sure that CD-KP and thyristor unit have the same communication speed.*

2.8.5 L/R key ($bt.Lr$)

L/R ⌷ key function.
Possible values: oFF , On
When in remote mode, the thyristor unit is driven by its remote reference. When in local mode, the thyristor unit is driven by CD-KP using the up ⌃ and down ⌄ keys.

2.8.6 Command sub-menu ($Sh.Co$)

Enable/disable of command sub-menu in operator menu.
Possible values: oFF , On

2.8.7 OP1 upper display (*oP1u*)

Displayed parameter in upper display of OP1 menu.

Possible values: *P 4 , P 8 , P 10 , P 11 , P31 , P32 , P33 , P34 , P35 , ArSt*
More informations about thyristor unit's parameters can be found on CD3000E and Multidrive manuals.

2.8.8 OP1 lower display (*oP1L*)

Displayed parameter in lower display of OP1 menu.

Possible values: *P 4 , P 8 , P 10 , P 11 , P31 , P32 , P33 , P34 , P35 , ArSt*
More informations about thyristor unit's parameters can be found on CD3000E and Multidrive manuals.

2.8.9 OP2 upper display (*oP2u*)

Displayed parameter in upper display of OP2 menu.

Possible values: *P 4 , P 8 , P 10 , P 11 , P31 , P32 , P33 , P34 , P35 , ArSt*
More informations about thyristor unit's parameters can be found on CD3000E and Multidrive manuals.

2.8.10 OP2 lower display (*oP2L*)

Displayed parameter in lower display of OP2 menu.

Possible values: *P 4 , P 8 , P 10 , P 11 , P31 , P32 , P33 , P34 , P35 , ArSt*
More informations about thyristor unit's parameters can be found on CD3000E and Multidrive manuals.

2.8.11 OP3 upper display (*oP3u*)

Displayed parameter in upper display of OP3 menu.

Possible values: *P 4 , P 8 , P 10 , P 11 , P31 , P32 , P33 , P34 , P35 , ArSt*
More informations about thyristor unit's parameters can be found on CD3000E and Multidrive manuals.

2.8.12 OP3 lower display (*oP3L*)

Displayed parameter in lower display of OP3 menu.

Possible values: *P 4 , P 8 , P 10 , P 11 , P31 , P32 , P33 , P34 , P35 , ArSt*
More informations about thyristor unit's parameters can be found on CD3000E and Multidrive manuals.

2.8.13 Calibration menu password (*P.CAL*)

Protection password for calibration menu.
Possible values: *0 – 255*
If this value is set to *0* then there is not password protection and the access to calibration menu is free for all operators.
If this value is different from *0* then a password is asked (*uLOC*) before to enter in calibration menu. The operator must insert a valid password by pressing the up ⌃ and down ⌄ keys and confirming it by the roll key ⌸. If a wrong password is entered, the CD-KP will return to the main menu.

2.8.14 Diagnostic menu password (*P.d IA*)

Protection password for diagnostic menu.
Possible values: *0 – 255*
As password for calibration menu, but referred to diagnostic menu.

2.8.15 Setup menu password (*P.SEt*)

Protection password for setup menu.
Possible values: *0 – 255*
As password for calibration menu, but referred to setup menu.

2.8.16 Configuration menu password (*P.Con*)

Protection password for configuration menu.
Possible values: *0 – 255*
As password for calibration menu, but referred to configuration menu.

2.8.17 Command menu password (*P.Cnd*)

Protection password for command menu.
Possible values: *0 – 255*
As password for calibration menu, but referred to command menu.

2.8.18 Off-line menu password (*P.OF.L*)

Protection password for off-line menu.
Possible values: *0 – 255*
As password for calibration menu, but referred to off-line menu (future implementation).

2.9 Restoring of default configuration

It is possible to restore the default settings of CD-KP:
1. disconnect the supply voltage to CD-KP
2. press up ⌃ and L/R ⌸ keys together
3. connect the supply voltage to CD-KP
4. the message *LdEF* will appear in upper display and after a while the operator menu will be displayed
5. the factory configuration has been restored (see default settings paragraph).
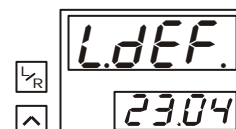
Warning: all changes done in configuration menu will be lost after this operation.