KARBU LED

Fuel price display kit

Installation and operating manual

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Upon receipt, always check the product for damage during shipment. If any is found, you may file a damage claim with the carrier.

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I - General presentation

Before installation, please read the document in appendix, entitled «General safety instructions and precautions for use of BODET products».

I.1 - Introduction

This system is used to control the display of fuel prices by remote control.

I.2 - Equipment

This equipment offers a wide variety of installation possibilities according to the desired number of display lines, single or double sided signs, wire or HF radio link, etc.
Each KARBU LED unit is supplied with a box containing the CPU board, the power supply unit and the necessary number of flat cables :

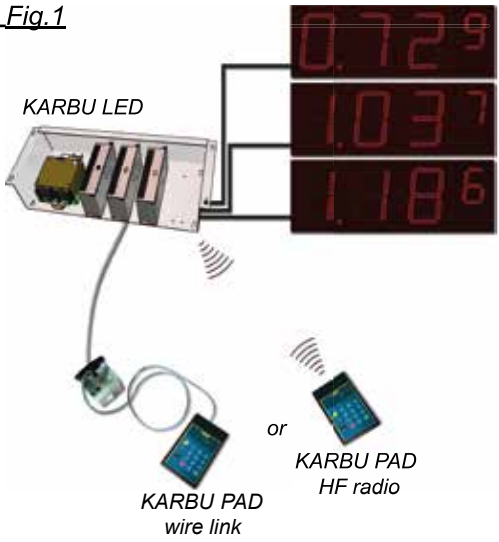
Electronic kit	Figures 10 / 15 cm	Figures 20 cm	Figures 25 cm	Figures 30 cm	Figures 42 cm
4 price lines SF/2 lines DF	940021	940021	940022	940022	940027
6 price lines SF/3 lines DF	940023	940023	940023	940024	940024 x 2 (*)
4 price lines DF	940025	940025	940026	940027	940030 x 2 (*)
5 price lines DF	940029	940029	940030	940030	
8 price lines SF (*)	940021 x 2	940021 x 2	940022 x 2	940022 x 2	
6 lines DF/12 lines SF (*)	940023 x 2	940023 x 2	940023 x 2	940024 x 2	

(*) the kits are associated in series.

I.3 - Operating principle

The keypad is connected to the CPU board by wires or by an HF radio link. The CPU board then controls each module line via a flat cable.

Fig.1



II.1 - KARBU LED box

The KARBU LED box receives data from the control keypad and retransmits it to the price lines on the sign.

The KARBU LED box contains :

- 1 central processing unit (CPU) with an HF radio reception board,
- 1 or 4 coupled power supply units with 1 circuit breaker.
- 1 to 5 power boards (depending on the number of lines installed on the fuel totem).

It must be correctly installed inside the totem in accordance with the following requirements :

- ***The box is intended for assembling on a concrete wall or any other non combustible surfaces only.***
- Cable outlets must be facing downwards to avoid water infiltration.
- ***Lock the cables with collars.***

Fig.2

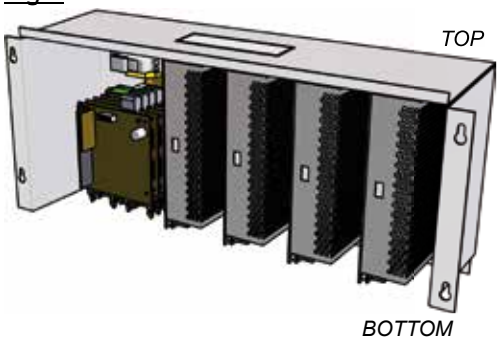
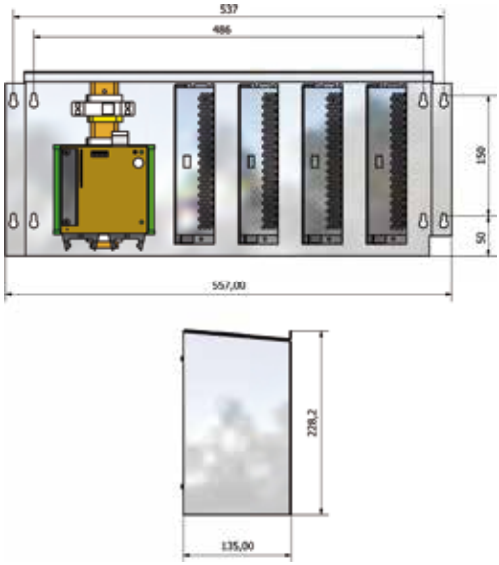


Fig.3 *Dimension in mm*



II.2 - CPU board and power boards

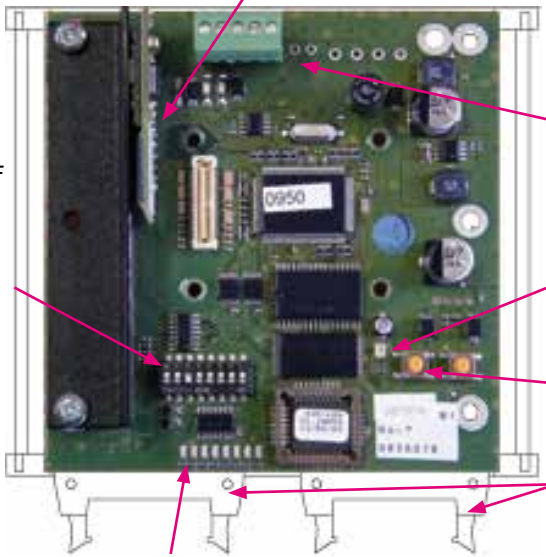
The CPU board is supplied with power by the power supply unit (15V) and is located above the power boards (1 or 4 power supply units depending on the number of lines to be controlled).

Each power board has two connectors for flat cables. These cables are used to control each price line. A CPU board can control a maximum of six price lines.

Installation procedure (the CPU board and power boards are pre-wired in factory) :

- Connect up the connection box to use the control keypad in wire link mode (fig.5).
- Connect to the second KARBU LED box, where applicable (if more than 6 price lines or double-sided sign).

Fig.5

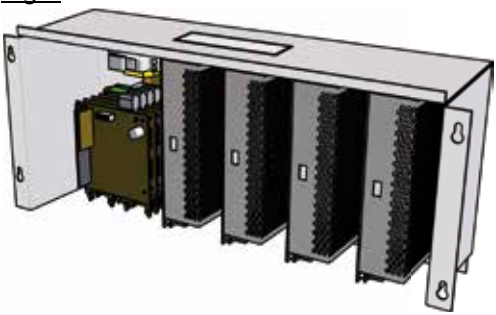


The red LED 7 and 8 turning on when a key is pressed means that the CU has recognized the keyboard and the message, the pairing of the keyboard and the display has been successful.
If only the red LED 8 turns on then it means that the keyboard was not recognized by the display, the pairing procedure must be redone, see page 8.

II.3 - Power supply

The KARBU LED box is pre-wired in the factory.
Simply connect up the mains power supply (230 V) + earth inside the box.

Fig.6

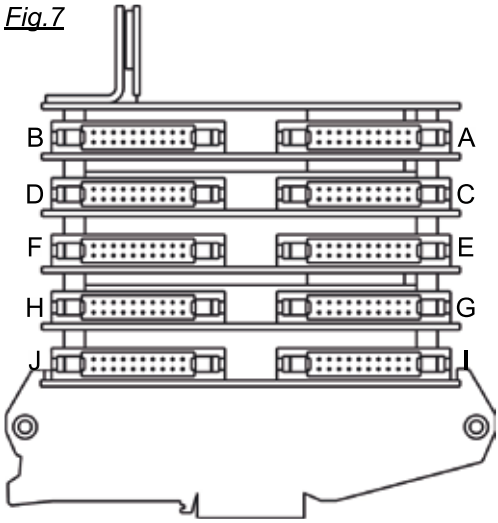


Number of power supply modules	LD150 25W / line	LD200 34W / line	LD250 50W / line	LD300 63W / line	LD400 88W / line
1 line SF	1	1	1	1	1
1 line DF	1	1	1	1	2
2 lines SF	1	1	1	1	2
2 lines DF	1	1	2	2	4
3 lines SF	1	1	1	2	3
3 lines DF	1	2	3	3	2 kits 3L SF
4 lines SF	1	1	2	2	4
4 lines DF	2	2	4	4	2 kits 4L SF
5 lines SF	1	2	3	3	5
5 lines DF	2	3	5	5	2 kits 5L SF

II.4 - Wiring of price lines

Install each price line on the fuel totem.

Fig.7



Every price line has a light sensor.
For a single-sided price sign, only the sensor of the line connected to the connector A is active.
For a double-sided price sign, only the sensors of the lines connected to the connectors A and B are active. These two sensors manage independently the brightness of each side of the price sign.

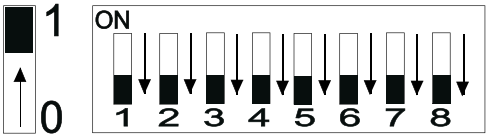
Connect each flat cable from the CPU board connectors to each price line.

Note : the brightness of a display line may be affected by the length of the flat cable. For optimal display quality, all the flat cables to a totem should be the same length (standard flat cable 7.5 m long supplied).
To wire the lines in single or double face see the chart here below and fig. 7.

Attention: the place of lines varies according to the number of line to be installed.

Number of ligne	Number of face	Configuration			Line locations									
		Dip 4	Dip 5	Dip 6	A	B	C	D	E	F	G	H	I	J
1 to 6	1	OFF	OFF	OFF	1	2	3	4	5	6	-	-	-	-
1 to 3	2	OFF	OFF	ON	1	1	2	2	3	3	-	-	-	-
4	2	OFF	ON	OFF	1	2	3	4	3	4	1	2	-	-
5	2	OFF	ON	ON	1	2	3	4	5	5	1	2	3	4

Nota : the line wired to the connector A of the CPU card is the only line managing the brightness level of the price sign.



Remarks on brightness adjustment :
By default, the brightness level is set to medium.
Three levels are available (low, medium and high).
Each state (night, cloudy and sunny) can be set individually (see technician menu Chapter III).

II.5 - Installation of the KARBU PAD in HF radio mode

Before the first use of the totem or after replacement of the keyboard it is necessary to memorize the keyboard number in the UC card (a unique number is loaded in the keyboard at the factory).

- Turn off the power of controller.
- Turn the power back on and press any key on the keyboard within 30 seconds following the restoration of the power.

Fig.8

A) Single-sided sign

Make sure the HF radio reception board is properly installed on the CPU board.
Install the two 1.5 V batteries supplied in the KARBU PAD keypad.
The maximum range for the input of data on the keypad is 25 metres. Beyond that distance, communication cannot be ensured.

Fig.9

The KARBU LED will now operate correctly and prices can be displayed on the totem or totems.

B) Double-sided sign

To wire 1 to 6 lines in single face or 1 to 5 lines in double face, only one KARBU LED box is required.

The KARBU LED will now operate correctly and prices can be displayed on the totem.

See DIP configuration page 7.
Configure the technician menu see page 16.

Fig.10

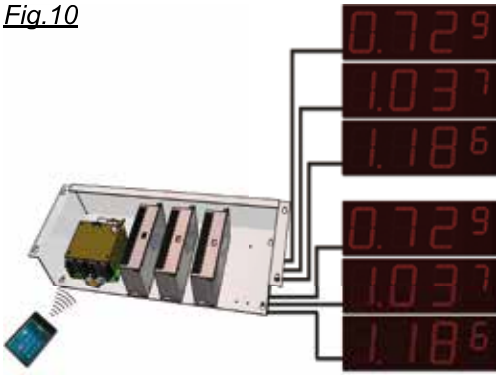
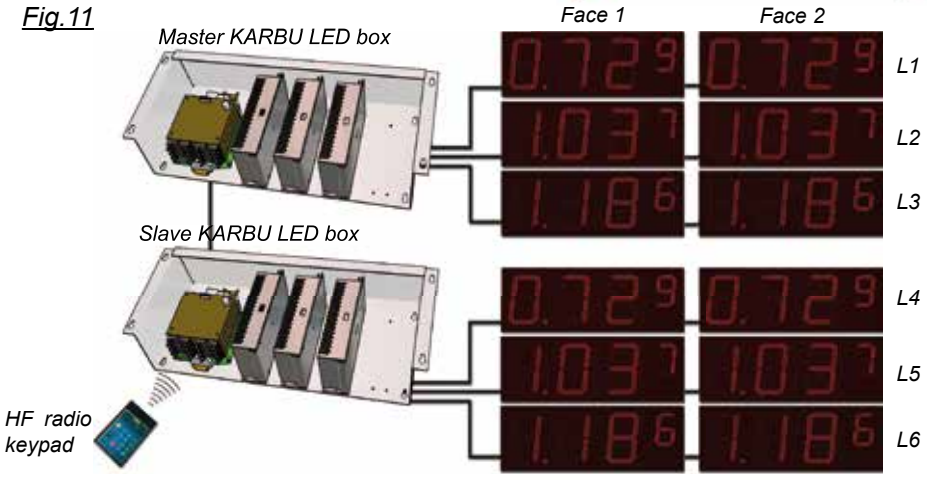


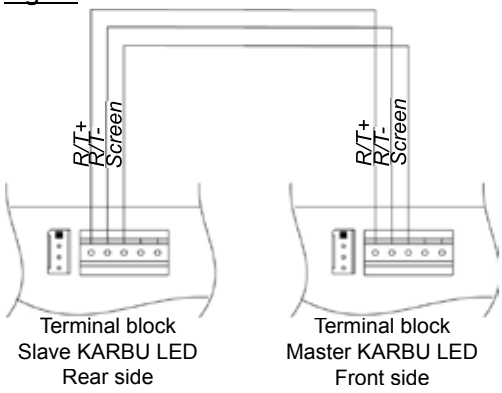
Fig.11



To wire 6 to 10 lines in double face, connect the 2 KARBU LED together (fig. 12).
Disable the HF radio receiver of the slave KARBU LED box by switching the Dip 1 to OFF.

- The UC kit with the enabled HF radio receiver (dip 1=ON) is the master kit (dip 7 = OFF).
- The UC kit with the disabled HF radio receiver (dip 1=OFF) is the slave kit (dip 7 = ON).

Fig.12



Each kit (master and slave) must control a number of line almost identical.
See opposite chart.

Each kit (master and slave) must control a number of line almost identical.
See opposite chart.

Number of total lines	Master kit	Slave kit
7 lines double face	4 lines	3 lines
8 lines double face	4 lines	4 lines
9 lines double face	5 lines	4 lines
10 lines double face	5 lines	5 lines

Operating mode (only for 6 to 10 lines in double face)

Number of line in double face	Master kit							Slave kit						
	CL-	NL-	Dip 1	Dip 4	Dip 5	Dip 6	Dip 7	CL-	NL-	Dip 1	Dip 4	Dip 5	Dip 6	Dip 7
6 lines	3	1	ON	OFF	OFF	ON	OFF	3	4	OFF	OFF	OFF	ON	ON
7 lines	4	1	ON	OFF	ON	OFF	OFF	3	5	OFF	OFF	OFF	ON	ON
8 lines	4	1	ON	OFF	ON	OFF	OFF	4	5	OFF	OFF	ON	OFF	ON
9 lines	5	1	ON	OFF	ON	ON	OFF	4	6	OFF	OFF	ON	OFF	ON
10 lines	5	1	ON	OFF	ON	ON	OFF	5	6	OFF	OFF	ON	ON	ON

1/ Configure the slave kit in the technician menu in Totem setup (CnF) (see page 16).
2/ Once the slave kit configured, configure the master kit. To do that, the cable between the two kits must be disconnected (fig. 12).
3/ Configure the master kit in the technician menu in Totem setup (CnF) (see page 16).
4/ Connect the cable between the two kits (fig. 12).
5/ Cut the power and switch it on again.

The KARBU LED will now operate correctly and prices can be displayed on the totem or totems.
Caution : the light sensors are active on the two faces.

Note : if two separate totems are set up with HF radio link, use two single-side KARBU LED kits (see previous page). After installation, check the consistency of the display on the two totems.

II.6 - Installation of KARBU PAD keypad in wire link mode

Before the totem is used for the first time, the keypad number must be memorised on each CPU board.

- Switch off all CPU boards.
- Set DIP 8 on each CPU board to position 1 (ON).
- Connect the keypad to the connection box.
- Switch on all CPU boards.
- Press a key on the keypad.
- Set DIP 8 to 0 (OFF).

A) Single-sided sign

Connect the connection box to the terminal block on the CPU board. Connect the DIN plug for the keypad to the connection box. The locking bush on the DIN plug must be properly engaged to avoid communication problems.

- Connect R/T- (blue wire) from the connection box to R/T- on the CPU board.
- Connect R/T+ (white wire) from the connection box to R/T+ on the CPU board.
- Connect - (black wire) from the connection box to the earth on the CPU board.
- Connect + (red wire) from the connection box to +Vdc on the CPU board.

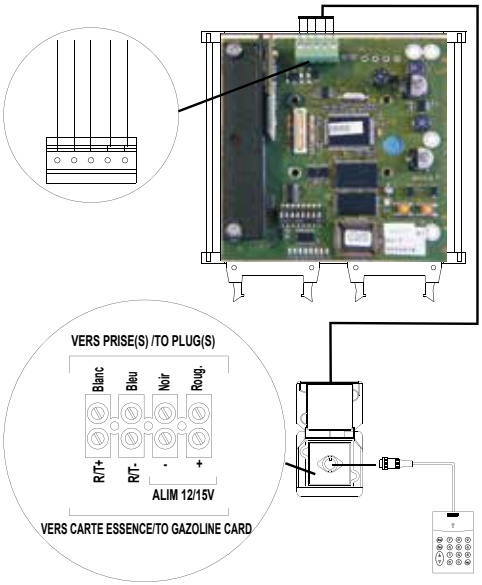
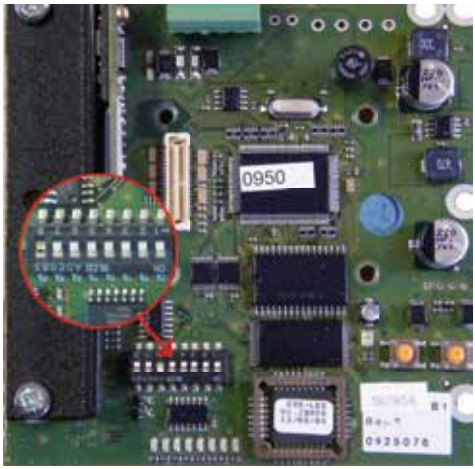


Fig.14

The KARBU LED will now operate correctly and prices can be displayed on the totem or totems.

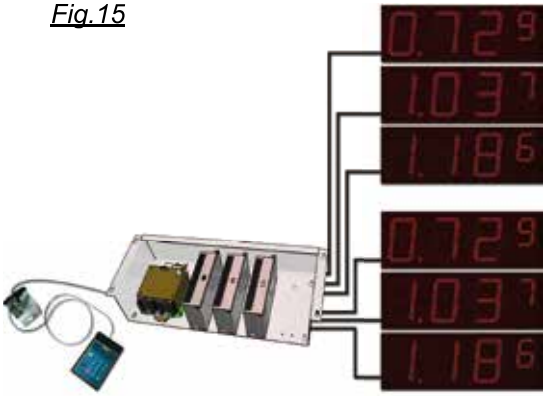


B) Double-sided sign or 2 totems

Connect the connection box to the terminal block on the CPU board of one of the two KARBU LED units (connection identical to that for a single-sided installation with wire link.

To wire 1 to 6 lines in single face or 1 to 5 lines in double face, only one KARBU LED box is required.

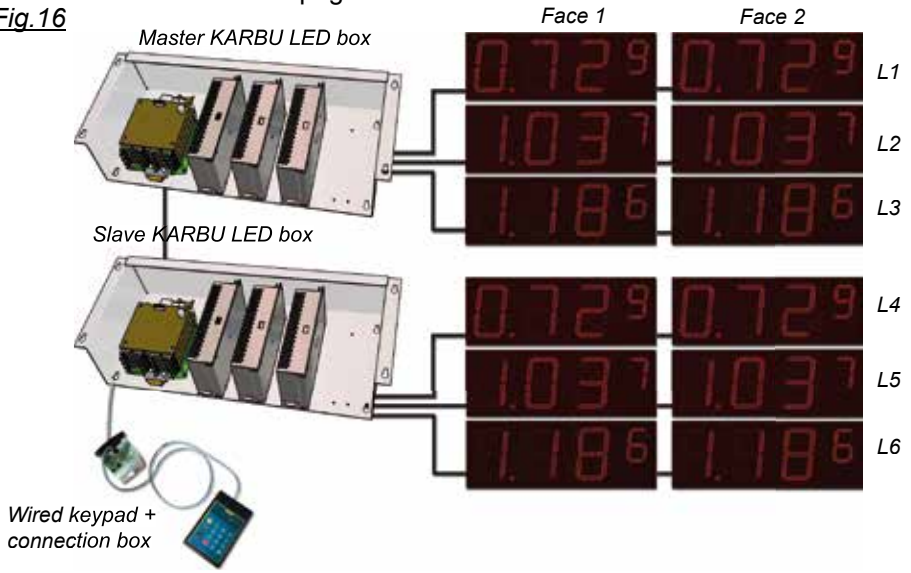
Fig.15



See DIP configuration page 7.

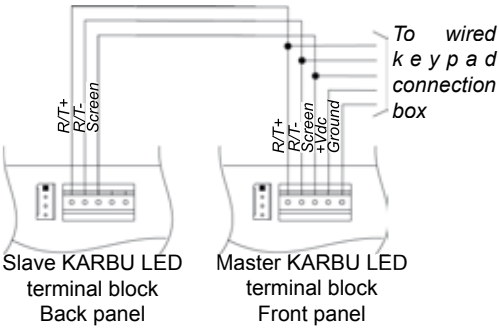
Configure the technician menu see page 16.

Fig.16



To wire 6 to 10 lines in double face, connect the 2 KARBU LED together (fig. 17).

Fig.17



To wire 6 to 10 lines in double face, connect the 2 KARBU LED together (fig. 17).

See DIP configuration page 7 to know the line locations and the configuration of the DIP switches 4 to 6 of each kit.

Number of total lines	Master kit	Slave kit
7 lines double face	4 lines	3 lines
8 lines double face	4 lines	4 lines
9 lines double face	5 lines	4 lines
10 lines double face	5 lines	5 lines

Operating mode (only for 6 to 10 lines in double face)

Number of line in double face	Master kit							Slave kit						
	CL-	NL-	Dip 1	Dip 4	Dip 5	Dip 6	Dip 7	CL-	NL-	Dip 1	Dip 4	Dip 5	Dip 6	Dip 7
6 lines	3	1	ON	OFF	OFF	ON	OFF	3	4	OFF	OFF	OFF	ON	ON
7 lines	4	1	ON	OFF	ON	OFF	OFF	3	5	OFF	OFF	OFF	ON	ON
8 lines	4	1	ON	OFF	ON	OFF	OFF	4	5	OFF	OFF	ON	OFF	ON
9 lines	5	1	ON	OFF	ON	ON	OFF	4	6	OFF	OFF	ON	OFF	ON
10 lines	5	1	ON	OFF	ON	ON	OFF	5	6	OFF	OFF	ON	ON	ON

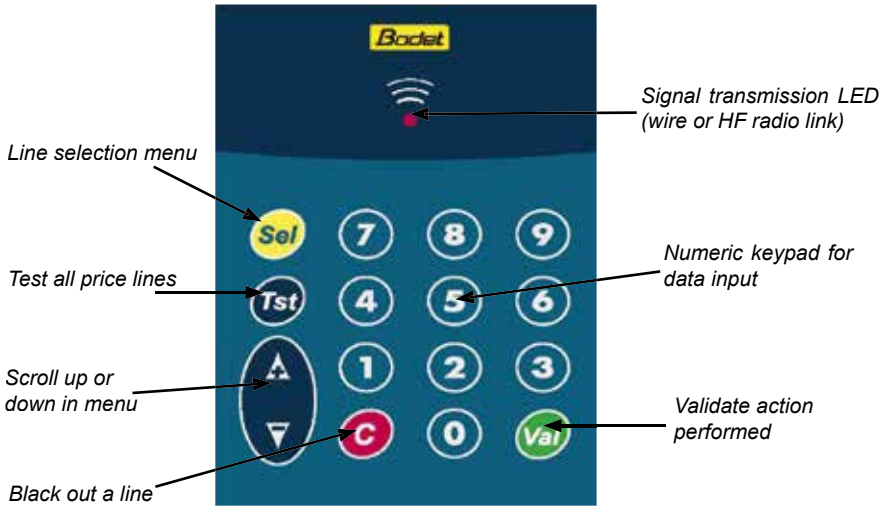
1/ Configure the slave kit in the technician menu in Totem setup (CnF) (see page 16).
2/ Once the slave kit configured, configure the master kit. To do that, the cable between the two kits must be disconnected (fig. 17).
3/ Configure the master kit in the technician menu in Totem setup (CnF) (see page 16).
4/ Connect the cable between the two kits (fig. 17).
5/ Cut the power and switch it on again.

The KARBU LED will now operate correctly and prices can be displayed on the totems.

III - USING THE CONTROL KEYPAD

III.1 - Description of keypad keys

Fig.17



III.2 - Pairing a Wireless keybpad

For the wireless keypad to operate with a LED display it is necessary to perform a pairing. This operation ids accomplished in the factory. However you may have to do the pairing in case of replacement of the keypad.

The pairing is done during a limited period of 30 seconds after powering up of the Karbu LED by pressing any key of the keypad for at least 1 second.

The pairing of the keypad can also be done with Dip 8, see page 5.

III.3 - User menu

The following operating procedure is applicable for both keypad versions.

A) Test

All price lines can be tested simultaneously.
Press the Tst key. All the segments of all the modules light up.
Press again = the line number blinks
Press again = each module displays its own address
Press again = all the modules go blank
Press again = Back to the starting display.

B) Select a line to modify the price

This is done by repeatedly pressing the ***Sel***, as required, or using ***keys + and –***.
When a line is selected, it flashes.

C) Enter a price

After selecting a line use the numerical pad (keys 0 to9) to enter the price and Tst to blank a module.
Validate the price line and go on to the next line by pressing the ***Sel key***.
To validate all the price lines, press the ***Val key***.

D) Black out a price line

After selecting a line, you can black out a line by pressing ***key C***. The line then displays ***- - -*** in flashing mode.
To validate the blacked out line, press the ***Val key***. The totem display reappears in steady mode with the selected line completely cleared.
Nota : if selection of a line already to the black, it flashes with hyphens ***- - -***.

III.4 - Technican menu

This menu is activated by entering the technician's code ***- 4 9 3 4 -*** and then pressing the Val key. You can exit from the technician's menu at any time by pressing ***key C*** or ***Val*** (press one or more times depending on where you are in the menu) - or when a minute goes by without any key being pressed.

The menu is displayed in place of the first three digits on the first line.
The totem displays ***LUM*** (for brightness). Other menus (display of totem version and setup) can be accessed by pressing ***key + or –***. You can exit by pressing ***C***.

A) Adjust the brightness (***LUM***)

Display on the first line : ***LUM***.

Press the Val key. Choose between the 5 menus with ***keys + and -***.
- Menu ***A.d*** sets the brightness for a sunny day.
- Menu ***A.c*** sets the brightness for a cloudy day.
- Menu ***A.n*** sets the brightness for night-time.

Press the ***Val key*** in menu ***A.d***, ***A.c*** or ***A.n*** if you want to adjust the brightness level. The current level is shown on the third module in flashing mode. Press ***key + or –*** to increase or decrease that brightness level :
- High brightness level : all horizontal segments are lit up ( ).
- Medium brightness level : only the middle and bottom horizontal segments of the module are lit up ( ).
- Low brightness level : only the bottom horizontal segment is lit up ( ).

Grading of brightness levels (1 to 9) in the LUM menu (A.n/A.c/A.d)

A.n (night)	***A.c (cloudy)***	***A.d (sunny)***
3 =	6 =	9 =
2 =	5 =	8 =
1 =	4 =	7 =

The night/sunny triggering levels can be modified. Please contact the BODET maintenance department for details of these settings.

- Menu ***L.m*** is for manual setting of fixed brightness (the probe is deactivated). Press the ***Val key*** to adjust the brightness level to between 1 (night) and 9 (sunny). The display shows : ***L.m-*** with ***-*** flashing and adjustable to between 1 and 9 with ***keys + and –***.

- Menu ***d.EF*** is for FACTORY setting of brightness (grey-shaded part of the table below).

When you have validated the desired value with the ***VAL key***, the next menu is displayed.

B) Totem setup (CnF)

This menu is used to define the number of lines on the totem and the number of digits per line. When you press the ***Val key***, the first submenu described below is displayed.

1- Enter number of lines

The display shows ***CL-*** with ***-*** flashing and adjustable to between 1 and 6 with ***keys + and –***. When you validate with the ***Val key***, the next menu is displayed (price format). Press ***key C***, to switch to menu ***CnF***.

2- Choose price format

The display shows ***Cd-*** with - flashing and adjustable to between 1 and 8 with ***keys + and –***. When you validate with the ***Val key***, the software version menu is displayed (***Uxx***). Press ***key C***, to switch to menu ***CnF***.

3- Enter start line number

This menu is used to define the first line controlled by the slave kit. For a master kit, it is always NL = 1. The display shows NL- with - flashing and adjustable with keys + and -.

When you validate with the Val key, the next menu is displayed (price format).
Press key C, to switch to menu CnF.

Ex: for 9 lines in double face, NL = 1 for the master kit and NL = 6 for the slave one.

C) Display the software version (***Uxx***)

The totem software version is displayed : ***U11*** (or another version, as applicable).
When you press the ***Val key***, the next menu is displayed.
Press ***key C*** to exit from the technician's menu.

IV - WHAT TO DO IF...?

The price is not displayed on a line ?

1- Check that the flat cable for the price line is properly connected.
2- Check that the right number of lines has been defined in the technician's menu (***CL-***).

The price is not displayed in the first digit on each line ?

Check that the right price format has been defined in the technician's menu (***Cd-***).

The keypad does not work ?

1- Check that the keypad memorising procedure has been performed.
2- In wire link mode, check that the connection box is properly connected.
3- In HF radio link mode, check that the reception boards are connected to each CPU board. Check the batteries of the keypad. Make sure you are close enough to the totem to avoid any communication problems.

On a double-sided sign, the display is different on the two sides ?

Switch off each KARBU LED unit and then switch back on. Enter the prices on the keypad. Check that the wiring is properly installed between the two KARBU LED units.

The price lines do not light up even when the KARBU LED unit is switched on ?

First of all, check that each KARBU LED is switched on : the green «power on» LED should be illuminated.
Even if the green LED is on, there may be a problem with the power supply : a protective device may have been triggered. Switch off the power supply, wait a little while and then switch the power back on.

The brightness of the price display is not suitable ?

Carry out the brightness adjustment procedure in the technician's menu (***LUM***).

V - TECHNICAL CHARACTERISTICS

Power supply

Mains power supply of 230 V +/- 10% for the KARBU LED unit. 230 V circuit breaker.

- 2-amp fuse 2 A for KARBU LED, 1 to 4 price lines.
- 4-amp fuse for KARBU LED, 5 to 6 price lines.

Price lines supplied with power via CPU board.
In wire link mode, the keypad is supplied with power via the CPU board.
In HF radio link mode, the keypad is supplied with power by two 1.5 V batteries (LR6).

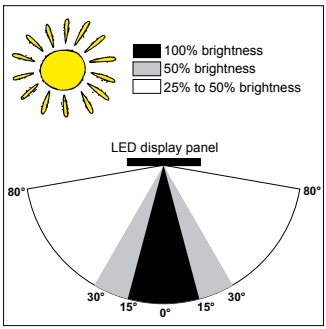
Power for a 150mm line: 25W.
Power for a 200mm line: 34W.
Power for a 250mm line: 50W.
Power for a 300mm line: 63W.
Power for a 400mm line: 88W.

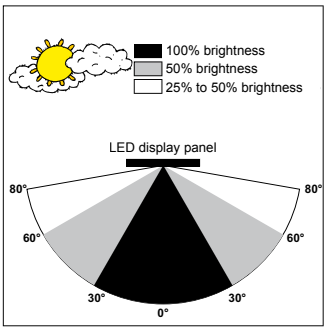
Communication

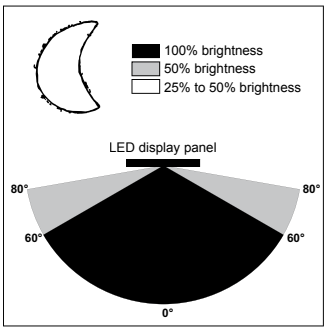
In wire link mode : communication via RS485 link (max. cable length : 300m).
In HF radio mode : communication via HF radio link 869.525 MHz (range of about 25 metres).

Display

High brightness LED 60° (useful life = 100 000 hours).
Max. brightness = 2000 mcd.







Mechanical characteristics

Aluminium box.
Dimensions of the box : 557 x 240 x 122 mm.

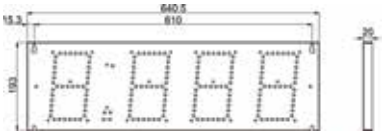
Environment

Operating temperature : -20°C to +70°C.
Relative humidity : 93% to +40°C.

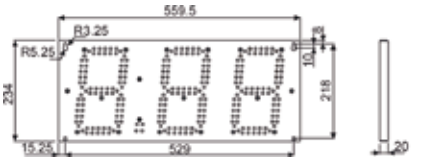
Standards

For transmission : EN50293 (2000).
For immunity : EN50293 (2000).

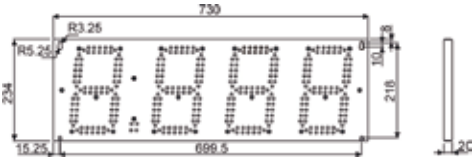
Line S15-2 (4 digits 15 cm (6”) + dot)



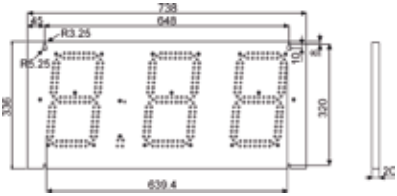
Line S20-1 (3 digits 20 cm (8”) + dot)



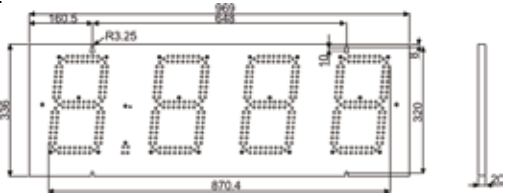
Line S20-2 (4 digits 20 cm (8’) + dot)



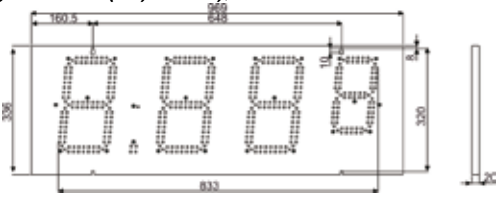
Line S25-1 (3 digits 25 cm (10”) + dot)



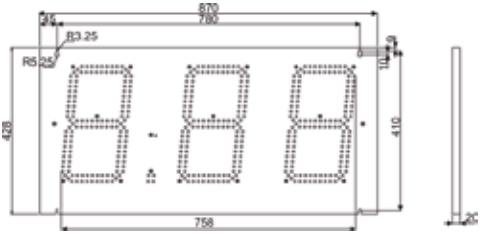
Line S25-2 (4 digits 25 cm (10”) + dot)



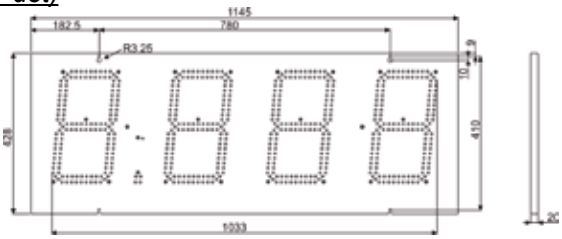
Line S25-3 (3 digits 25 cm (10”) + 1 digit 20 cm (8”) + dot)



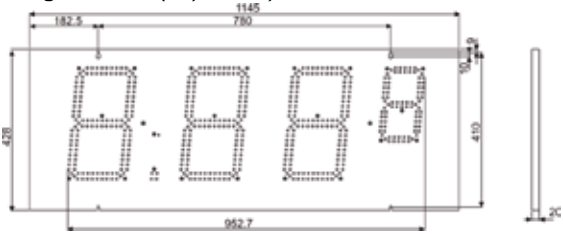
Line S30-1 (3 digits 30 cm (12”) + dot)



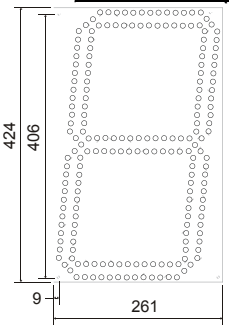
Line S30-2 (4 digits 30 cm (12”) + dot)



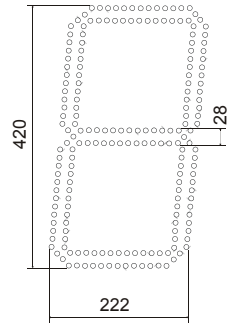
Line S30-3 (3 digit 30 cm (12”) + 1 digit 20 cm (8”) + dot)

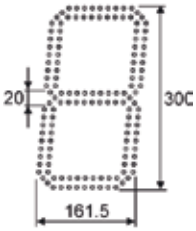


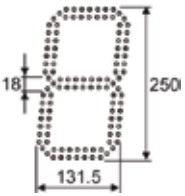
Line S42-2 (4 digit 42 cm)*

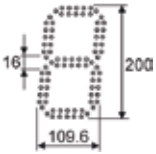


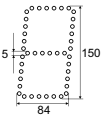
Detail of digits











VI - Recommandation on installation

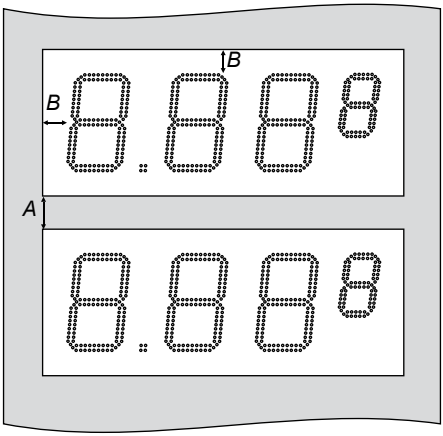
VI.1 - Brightness

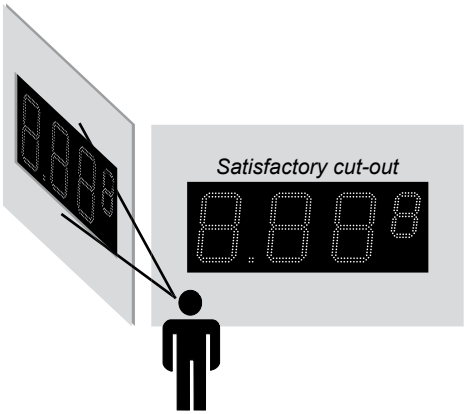
As far as possible, avoid placing the totem near direct sources of light (street lamps, etc.) so as not to disturb the automatic brightness setting.

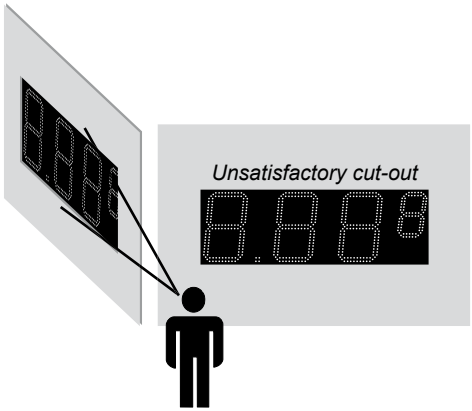
VI.2 - Principle for installation of price lines in totem

Fit a protective pane in front of each line.
If it is a non-reflective pane, position it 2 or 3 cm from the figures.
To ensure good readability of all the figures, allowing for parallax errors : the distance between the LED figures and outer structure of the totem must be properly calculated to allow easier reading from the side from below :

- When the cut-out is made in the totem, make sure enough space is left around the figures (B).
- Make sure there is sufficient space between the lines (A).

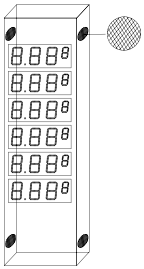






VI.3 - Totem ventilation

To avoid any problems due to condensation inside the totem, it is advisable to ventilate it.
Ventilation is provided by creating openings at the top and bottom of the structure on each side of the totem.
To prevent the entry of insects or small animals, it is essential to fit an insect-proof grid over each ventilation hole. The KARBU LED CPU box is ventilated mechanically.



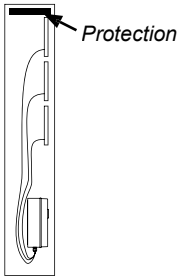
VI.4 - Protection against water infiltration

The KARBU LED kit must be mounted at the bottom of the price sign.

The flat cables must be placed as indicated opposite.

We recommend to protect the electronics from possible water flowing down with a protection above the price lines.

The panel in front of the price lines must be watertight to avoid water splattering on the LEDs.



Do not put flammable material (e.g. wood) under the KARBU LED box for safety reasons.