LARGE DISPLAYS TEMPERATURE

FEMA ELECTRÓNICA

Series BDF Temperature

LARGE DISPLAYS for Temperature

BDF-xx-21 for «*Pt100 / RTD*»

BDF-xx-22 «*Thermocouple J*»

BDF-xx-23 «*Thermocouple K*»

BDF-xx-24 «*Thermocouple T*»

BDF-xx-25 «*Thermocouple E*»

BDF-xx-26 «*Thermocouple S*»

BDF-xx-27 «*Thermocouple R*»

BDF-xx-28 «*Thermocouple L*»

IDEAL SOLUTION for reading temperature values at long distances from standard «Pt100 / RTD» probes and «Thermocouples» signals. Very strong housing and electrically protected units, designed for all type of industrial applications.

FEMA ELECTRÓNICA, S.A.

USER'S MANUAL

(HT2497-r140207)

BDF Temperature

LARGE DISPLAYS for Temperature signals

The BDF series of large displays for temperature signals is composed of instruments model «21» for «PT100 / RTD» probes in 2 and 3 wire systems, and instruments model «22», «23», «24», «25», «26», «27» and «28» for several types of standard thermocouples («J», «K», «T», «E», «S», «R», «L»). All these instruments are available in 4 digits format, with digit height of 57mm and 100mm, and negative led sign.

The instrument is connected to the temperature probe («PT100 / RTD» or thermocouple) and directly displays the temperature value scaled in «ºC». In case the probe breaks, the instrument displays «9999» in flashing mode for advise.

The instrument for «PT100 / RTD» allows for an automatic compensation of the ohmic resistance of the probe wires up to 10 Ohms. The instruments for thermocouple allow automatic compensation of the «Cold Junction» of the thermocouples. It is recommended to connect the thermocouple to the instrument using compensated wire, the same type as the thermocouple connected.

The mechanical of the BDF instruments is a very strong and sturdy aluminium housing anodized in black color, for panel mount, and for wall mount as an option. The front lens is antirreflexive and is firmly inserted on the aluminium profile with a rubber gasket around, providing IP65 protection on the front.

The signal wires are connected to plug-in screw clamps for higher security of the connections, accesible at the rear side of the instrument. The power is connected to a 3 terminal plug (2 power connections and 1 earth) containing an integrated protection fuse and an additional fuse as spare part.

0.- ORDERING REFERENCE

	Size	*Model*	*Power*	*Color*
BDF				
	24 44	21 22 23 24 25 26 27 28	230 Vac 115 Vac 24 Vdc	R - Red

1.- GENERAL CHARACTERISTICS

DISPLAY
4 digits in red color
7 segments Led type
negative sign«-»
digit 57mm (2,3") with BDF-24 Series
digit 100 mm (4") with BDF-44 Series
Antirreflexive front filter
IP65 front protection

A/D CONVERTER
dual slope autozero, mean value
integration time 100 msec.
2,5 readings/ second
400 KHz Quartz crystal oscilator

BROKEN PROBE automatic detection. Advises with flashing display at «9999» reading

POWER
standard 230 Vac 50/60 Hz
optional 115 Vac 50/60 Hz
optional 24 Vdc isolated

CONSUMPTION 6 VA for BDF-24 Series
12VA for BDF-44 Series

HOUSING
extruded aluminium
anodized in black color
for panel mount (optional wall mount)

WEIGHT
2.3 Kg (5,0 lbr) for BDF-24 Series
5.0 Kg (11,0 lbr) for BDF-44 Series

ENVIRONMENTAL DATA
Working Temp. 0/+50ºC (32/122 ºF)
Storage Temp.-20/+85°C (-4/185ºF)
Relative Hum. 0 to 85% non condensated

MODEL BDF-xx-21.- Temperature display for «RTD/PT100» probes in 2 and 3 wire systems, with automatic compensation for the ohmic wire resistance up to 10 Ohms. Sensor curve linearized according to IEC751-DIN43760

MODEL BDF-xx-22.- Temperature display for Thermocouple «J» (Fe-Kons) with automatic «Cold Junction» compensation , and detection for broken probe. Sensor curve linearized according to IEC584, IPTS1968, ANSI/MC96.1, DIN43710

MODEL BDF-xx-23.- Temperature display for Thermocouple «K» (Cr-Al) with automatic «Cold Junction» compensation, and detection for broken probe. Sensor curve linearized according to IEC584, IPTS1968, ANSI/MC96.1, DIN43710

MODEL BDF-xx-24.- Temperature display for Thermocouple «T» (Cu-Kons) with automatic «Cold Junction» compensation, and detection for broken probe. Sensor curve linearized according to IEC584, IPTS1968, ANSI/MC96.1, DIN43710

MODEL BDF-xx-25.- Temperature display for Thermocouple «E» (Cr-Kons) with automatic «Cold Junction» compensation, and detection for broken probe. Sensor curve linearized according to IEC584, IPTS1968, ANSI/MC96.1, DIN43710

MODEL BDF-xx-26.- Temperature display for Thermocouple «S» (Pt-PtRh10%) with automatic «Cold Junction» compensation, and detection for broken probe. Sensor curve linearized according to IEC584, IPTS1968, ANSI/MC96.1, DIN43710

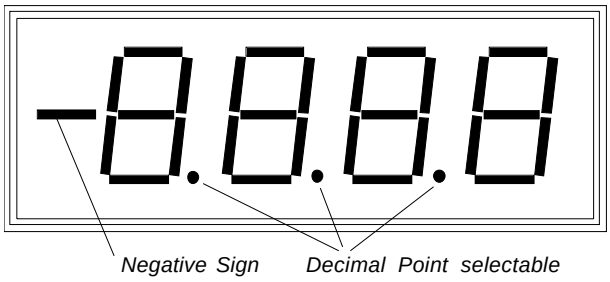
MODEL BDF-xx-27.- Temperature display for Thermocouple «R» (Pt-PtRh13%) with automatic «Cold Junction» compensation, and detection for broken probe. Sensor curve linearized according to IEC584, IPTS1968, ANSI/MC96.1, DIN43710

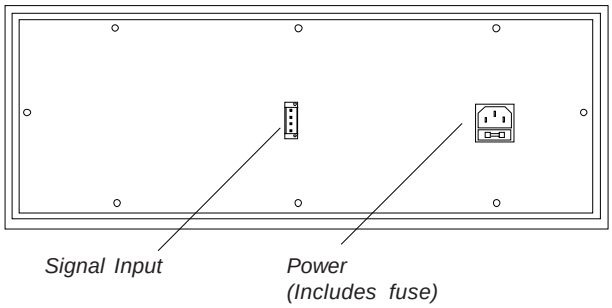
MODEL BDF-xx-28.- Temperature display for Thermocouple «L» o «DIN-J» (Fe-Kons) with automatic «Cold Junction» compensation, and detection for broken probe. Sensor curve linearized according to IEC584, IPTS1968, ANSI/MC96.1, DIN43710

SIZE BDF-24.- Instrument with 4 digits digit 57mm height (2,3'')

SIZE BDF-44.- Instrument with 4 digits digit 100 mm height (4,0'')

2.- FRONT AND REAR VIEW



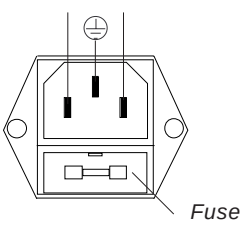


3.- POWER SUPPLY CONNECTION

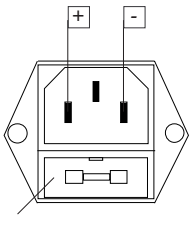
The power connector allows one terminal for earth and two power terminals. Internal fuse is integrated on the connector and an additional fuse is available as a spare part. The value of the fuses depends on the power supply, and is according to rule IEC127/2

230 Vac - 200 mA fuse time-lag
115 Vac - 400 mA fuse time-lag
24 Vdc - 350 mA fuse fast

Powered
230 Vac (115 Vac optional)



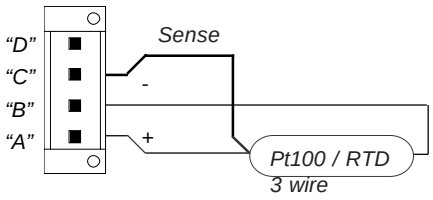
Powered
24 Vdc Isolated



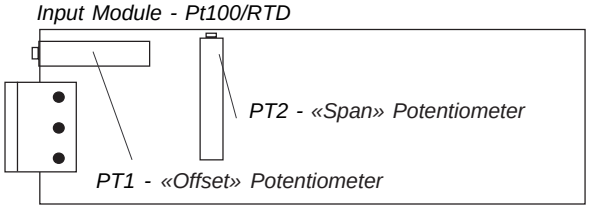
4.-MODEL FOR PT100/RTD .- CHARACTERISTICS, CONNECTIONS, INPUT MODULE

Model	Probe	Temperature	Accuracy	Resolution	Compensation
21	PT100/RTD	-100.0 to +650.0 ºC	0.4% ±1 Digit	0.1ºC	up to 10 Ohms

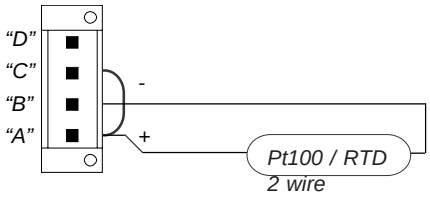
Connections for «Pt100/RTD» 3 wires



Input Module - Pt100/RTD



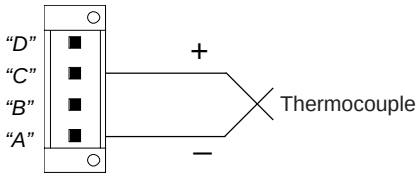
Connections for Pt100/RTD 2 wires
Note .- shortcircuit terminals C and A



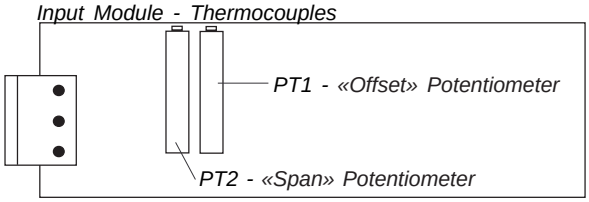
5.-MODEL FOR THERMOCOUPLES .- CHARACTERISTICS, CONNECTIONS, INPUT MODULE

Model	Thermocouple	Temperature	Accuracy	Resolution	Compensation
22	J	-50 to +600 ºC	0.5% ±1 Digit	1ºC	from 0 to +50ºC
23	K	0 to +1250 ºC	0.5% ±1 Digit	1ºC	from 0 to +50ºC
24	T	-50 to +400 ºC	0.5% ±1 Digit	1ºC	from 0 to +50ºC
25	E	0 to +650 ºC	0.2% ±1 Digit	1ºC	from 0 to +50ºC
26	S	+970 to +1750 ºC	0.1% ±1 Digit	1ºC	from 0 to +50ºC
27	R	+1000 to +1750 ºC	0.2% ±1 Digit	1ºC	from 0 to +50ºC
28	L (DIN-J)	-50 to +600 ºC	0.5% ±1 Digit	1ºC	from 0 to +50ºC

Connections for Thermocouples
Note .- Use compensated cable, the same type as the thermocouple



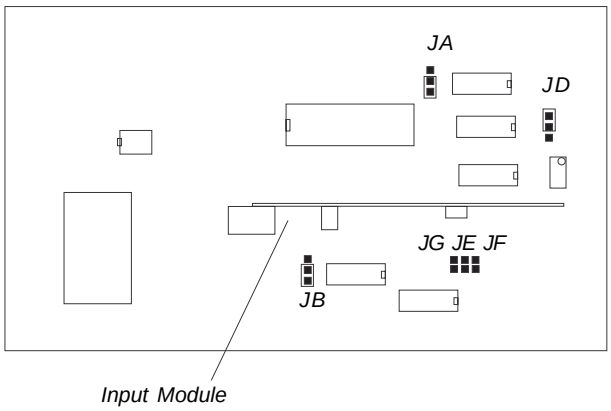
Input Module - Thermocouples



6.- CONTROL BOARD

On the *«Control Board»* is placed the *«Input Module»*, and the jumpers for *«Decimal Point»* selection.
***Note** .- Do not operate the potentiometers placed on the «Control Board».*

«Control Board»



Jumper JA

reading «/1» (for «PT100/RTD» units)

reading «/10» (for thermocouples units)

Jumper JD

digit fixed to «0»

digit free (all units)

Jumper JB

FLASH on «Control Board» (all units)

FLASH on module

Decimal Point

JG = XXX.X
JE = X.XXX
JF = XX.XX

7.- RECONFIGURING THE READING OF THE UNIT

In case a recalibration of the reading values for the displays is needed, generate the desired signal at the input terminals (with a «Pt100/RTD» simulator or thermocouple simulator) and operate the potentiometers «SPAN» and «OFFSET» according to the instructions indicated in the following examples:

Example .- Recalibrate a *«BDF-xx-21»* instrument for a *«PT100/RTD»* probe

a.- Unplug the instrument from the power supply Unscrew the rear side cover to access the *«Control Board»* and the *«Input Module»*

b.- Connect a «Pt100/RTD» simulator to the input signal terminal. Plug the power supply, and leave 3 minutes for warm-up

c.- Place jumper *«JG»* on the *«Control Board»* to light the decimal point

d.- Generate 0ºC and operate PT1 «*Offset Potentiometer*» to fix a reading of «000.0»

e.- Generate 650ºC and operate PT2 «*Span Potentiometer*» to fix a reading of «650.0»

f.- Repeat the steps for generating signal / adjust reading at «0ºC» and «650ºC» until the reading is correct.

***Note** .- the value in Ohms for the signals used in this example are 0ºC = 100.0 Ohms and 650ºC = 329.51 Ohms*

Example .- Recalibrate a *«BDF-xx-22»* instrument for a thermocouple «J» probe

a.- Unplug the instrument from the power supply Unscrew the rear side cover to have access to the *«Control Board»* and to the *«Input Module»*

b.- Connect a thermocouple «J» simulator to the input signal terminals. Plug the power supply, and leave 3 minutes for warm-up

c.- Generate -50ºC and operate PT1 «*Offset Potentiometer*» to fix a reading of «-50»

d.- Generate 600ºC and operate PT2 «*Span Potentiometer*» to fix a reading of «600»

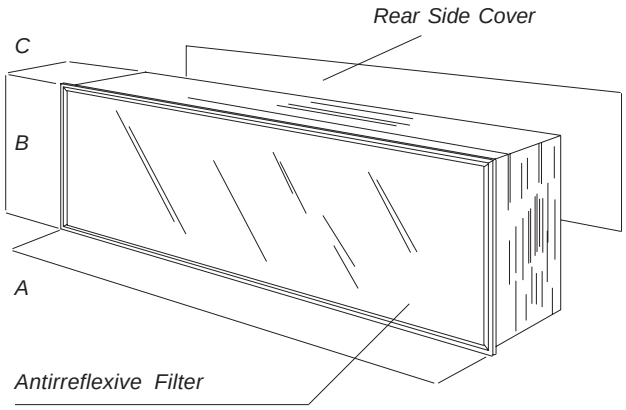
e.- Repeat the steps for generating signal / adjust reading at «-50ºC» and «600ºC» until the reading is correct.

8- SIZES AND DIMENSIONS

Size 24	A	B	C
4 digits 57mm (2'')	264mm (10,40'')	120mm (4,75'')	112mm (4,41'')

Size 44	A	B	C
4 digits 100mm (4'')	480mm (18,90'')	180mm (7,09'')	112mm (4,41'')

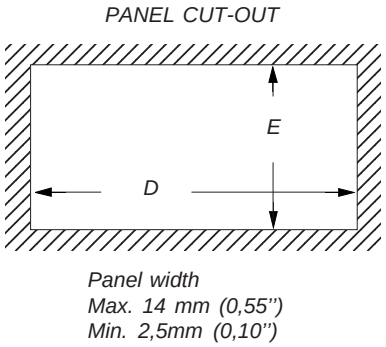
Note *.- add 27mm to the «C» dimmension for the power supply plug*



9.- PANEL CUT-OUT AND WEIGHT

Size 24	D	E	Weight
4 digits 57mm (2'')	256mm (10,07'')	112mm (4,40'')	2.3 Kg (5 lbs)

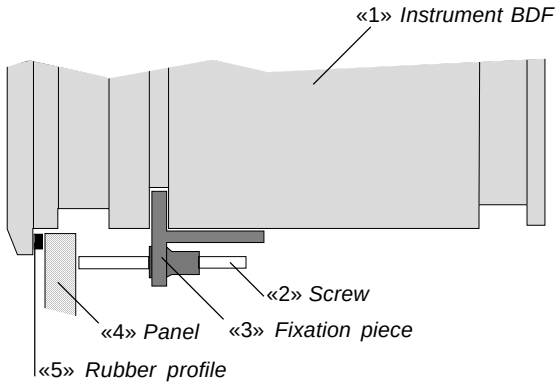
Size 44	D	E	Weight
4 digits 100mm (4'')	472mm (18,58'')	172mm (6,77'')	5.0 Kg (11 lbs)



10.- PANEL INSTALLATION

Introduce the instrument «1» into the panel cut-out and place a fixation piece «3» on each side. Place the screw «2» through the fixation piece «3» until it presses the panel «4» and is firmly fixed.

Note *.- The front of the instrument is sealed with a protection level IP65. To have the same level of protection between the panel and the instrument, place a rubber profile (squared or round) as indicated «5».*



11.- WARRANTY

FEMA ELECTRÓNICA, S.A. warrants this instrument free of defects for a period of 24 MONTHS from the date of shipment. This warranty covers both the materials of the instrument and the processes used for manufacturing.

This warranty is excluded and does not apply if the instrument is damaged due to misuse, improper application, accident, or if the instrument has been manipulated or repaired by unauthorized personnel or companies.

12.- SECURITY PRESCRIPTIONS

INSTALLATION PRECAUTIONS.- The installation and operation of this instrument must be done by qualified operators. This instrument DOES NOT have power switch and will start to operate as soon as the power supply is connected. The instrument has an internal protection fuse, according to IEC-127/2, and is located inside the power-supply connector. The values are

Fuse 200 mA Time Lag (for 230 Vac power)
Fuse 400 mA Time Lag (for 115 Vac power)
Fuse 350 mA Fast (for 24 Vdc power)

When the instrument is used to control machines or processes where the personnel or the process can be damaged, the appropriate security elements must be added to the system in order to protect the operator and / or the system.

SAFETY PRESCRIPTIONS.- This instrument has been designed and verified according to the UNE-20553 rules and is delivered in perfect conditions of operation. This manual contains the adequate information for the electrical installation. Before starting operations for connections, readjustment, substitution, maintenance, repair, etc, the instrument must be unplugged from the power supply. The instrument must be installed in places with good ventilation to avoid excesive heating, and far from sources of electrical noise or magnetic field generators, such as power relays, electrical motors, speed controls, etc... The instrument can not be installed in open places. Do not use until the installation is finished. The instrument is designed to be mounted on a metallic panel with the adequate protections. DO NOT clean the front lens with abrasive products (such as solvents, alcohol, etc) use a clean and water humid rag. Do not expose the instrument to excesive moisture. DO NOT operate the unit in the pressence of flammable gases or fumes.

EXCITATION VOLTAGE Vexc.-
Instruments BDF-xx-32 and BDF-xx-36 supply an excitation voltage of 10 to 24 Vdc (50mA) to power transducers, available between terminals A and C. Do NOT connect these terminals to an external power supply, permanent damages may result on both instruments.

POWER SUPPLY .- Connect the Power Supply to the terminals indicated in this manual. Verify that the voltage and frecuency of the power supply is according to the voltage and frecuency values indicated in the label attached to the unit. DO NOT connect the instrument to power lines which are overloaded, or power lines with loads working in ON/OFF cycles, or with inductive loads.

SIGNAL WIRING .- Information to consider relating the wiring of the sensors, probes, transducers, etc. The wires can act as antennas and introduce electrical noise from the environment into the signal wires, specially if the wires are close to noise sources or electromagnetic sources. There are several rules generally known which should be taken into consideration for the wiring :

a.- DO NOT install impulse, control or signal wires together in the same conduits as the wires connected to power lines, connected to CC or AC engines, electromagnets, ...

b.- When using shielded wires, connect the shield to the common of the instrument, and leave not-connected the probe side

c.- The wires of impulse, control and signal should be placed in places far away from switches, transformers, control relays, etc...

IN CASE OF FIRE
1.- Disconnect the unit from the power supply.
2.- Give the alarm according to the local rules.
3.- Switch off all the air conditioning devices.
4.- Attack the fire with carbonic snow, do not use water in any case.

WARNING : In closed areas do not use systems with vaporized liquids.

13.- DECLARARION OF CONFORMITY

CE DECLARATION OF CONFORMITY

Manufacturer.- **FEMA ELECTRÓNICA, S.A.**
Address.- Pol. Ind. Santiga - Altimira 14 (T14 - N2)
E-08210 Barberà - BARCELONA
ESPAÑA - SPAIN

Conforming Products
Series.- BDF-24 and BDF-44
Models.- 21, 22, 23, 24, 25, 26, 27 and 28

We hereby declare that the above products conform to the essential protection requirements of Directives and Harmonized standards indicated below.

Signed.- D. Juncà
Position.- Quality Manager
Place .- Barberà, 2005

DIRECTIVES

EUROPEAN DIRECTIVE FOR LOW VOLTAGE D73/23/CEE AMMENDED BY D93/68/CEE. Equipments powered from 50 to 1000 Vac and/or from 75 to 1500 Vdc.

EUROPEAN DIRECTIVE FOR ELECTROMAGNETIC COMPATIBILITY D89/336/CEE AMMENDED BY D93/68/CEE

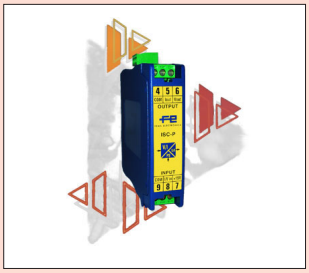
STANDARDS

IMMUNITY	**UNE EN 50082-1 (1998)**
EMMISIONS	**UNE EN 50081-2 (1994)**
ELECTRICAL SAFETY	**UNE EN 61010-1 (1997)**
	UNE EN 60204-1 (1998)

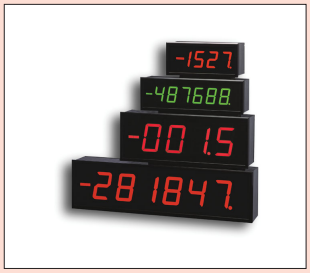
NOTE .- During an electromagnetic disturbance (10V/m) it is permitted a worst case error of 1% of the A/D range. The instrument will recover automatically its functionality when the disturbance stops, without need of the operator to reset or restart.

more products

Programmable
Panel Meters



Signal Converters &
Isolated Transmitters



Large Displays

Standard
Panel Meters

Miniature
Panel Meters

Large Displays
for TIME

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ELECTRONIC INSTRUMENTATION FOR INDUSTRY

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