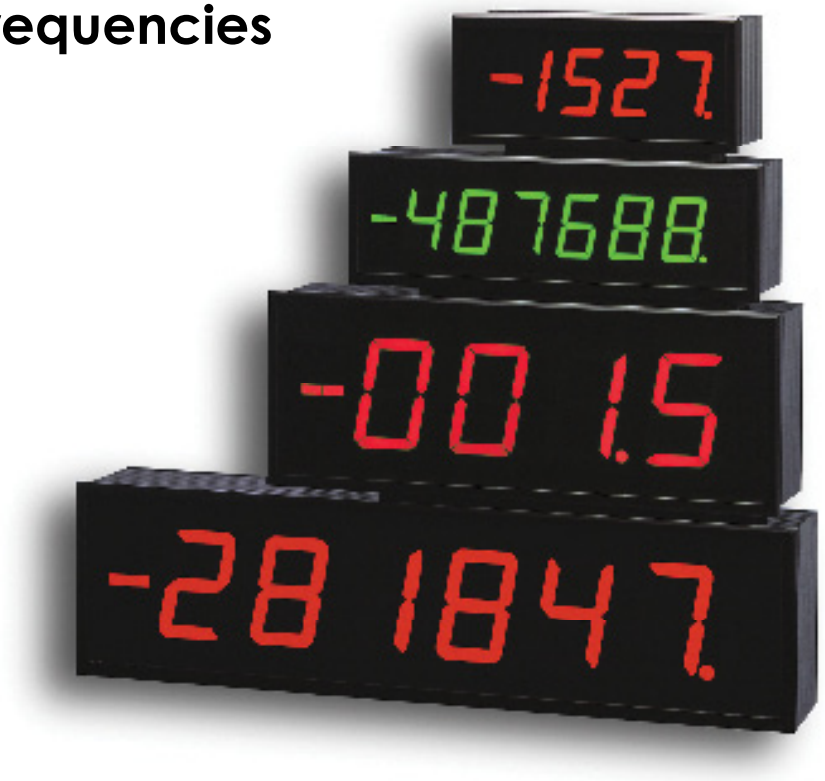
Large Displays

FEMA ELECTRÓNICA

Series BDF

Large Displays for frequencies



BDF-xx-TF Ratemeter

IDEAL SOLUTION for reading values scaled in «meters per minute», «RPM», «m3 per hour»,... at long distances, from standard «impulse per second» signals. Very strong housing and electrically protected units, designed for all type of industrial applications.

USER'S MANUAL
(1276R02)

Model TF

Large displays for frequency signals (impulse / second)

The BDF series of large displays with ratemeter function offer an indication proportional to the received frequency signal, measured in impulses per second. The instrument recognizes impulses from NPN and PNP sensors, Mechanical Contacts, Encoders, and others.

The received «impulses per second» signal is multiplied by internal «scale factors» and loaded on display, allowing to display in engineering units (meters per minute, RPM, m3 / hour), ... Position for the decimal point is programmable.

All instruments with 4 or 6 digits format, with digit height 57 or 100mm, in red color.

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, accessible 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.

Order reference

	Size	Model	Power	Color	Others	Adjust	Sensor
BDF -	**24** -	**TF** -	**0** -	**R** -	**---** -	**0/1000Hz=0/1000**	**NPN**
	-24 -44 -26 -46	-TF	-0 (230 Vac) -1 (115 Vac) -6 (24 Vdc isolated)	-Red -Green (check for availability)	-65 *(IP65)** *-(empty)*	0/100Hz=0/750 0/35Hz = 0/253 ...	NPN PNP Namur Contact ...

* the IP65 option uses a completely different type of housing from the indicated in this documentation. Check the BDF IP65 housing documentation for more information.

Sizes

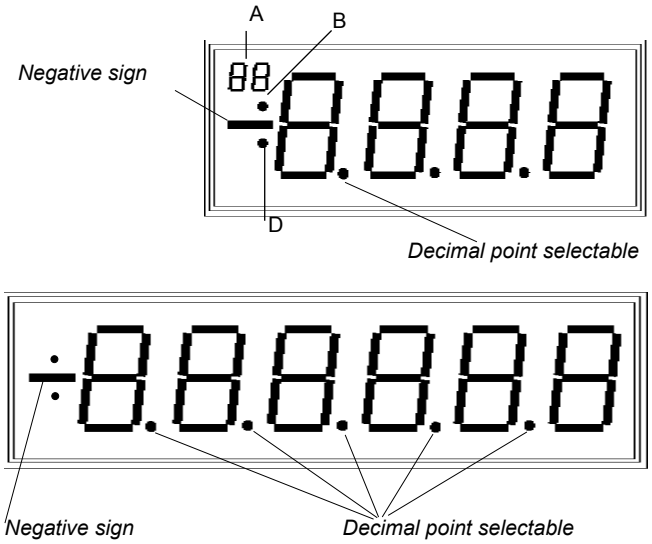
SIZE BDF-24 - Instrument with 4 digits digit 57mm height (2,3'')

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

SIZE BDF-26 .- Instrument with 6 digits 57mm digit height

SIZE BDF-46 .- Instrument with 6 digits 100mm digit height

Front view

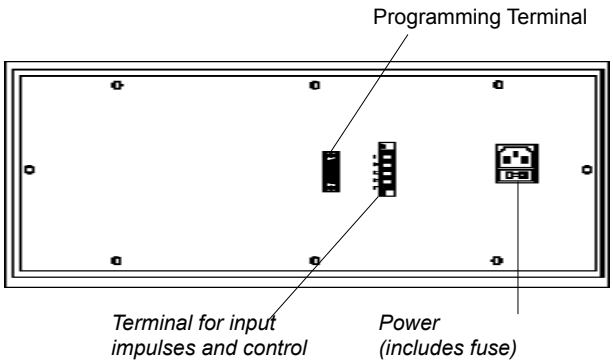


The BDF Ratemeter units are available in 4 and 6 digits format. All digits are 7 segment LED type with decimal point, red color

Leds «B» and «D» are lighted when the unit is being reprogrammed through the Programming Terminal on the rear cover.

Digits «A» are only available in units with 4 digits. These small digits will light only when the unit is being reprogrammed through the Programming Terminal on the rear cover.

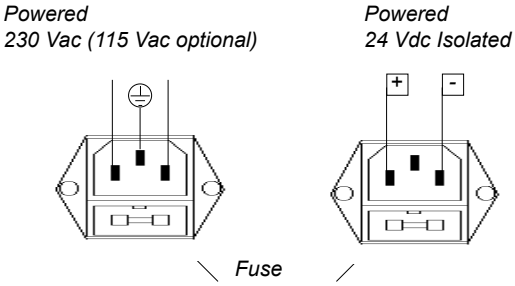
Rear view



Power supply connections

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



General specifications

DISPLAY
4 or 6 digits in red color
7 segment Led
reading from -9999 to 9999 in 4 digits
reading from -999999 to 999999 in 6 digits
decimal point selectable
digit 57 mm (2,3") in BDF-24 and BDF-26
digit 100 mm (4,0") in BDF-44 and BDF-46
antirreflexive front filter
IP65 front protection

SENSORS
NPN Vmax on terminals +28Vdc
PNP Vmax on terminals +28Vdc
Namur Vmax on terminals +28Vdc
mechanical contact
Pick-up

PICK-UP
150 mVpp sensibility
100 mV hysteresis
26,5 KOhms Impedance
60Hz
Vmax ±50Vdc

Note - Sensor type is jumper selectable

FREQUENCY maximum 10 KHz
minimum 0.03 Hz

ACCURACY 0.012%

Vexc +15 Vdc (±20%, 100mA)

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

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

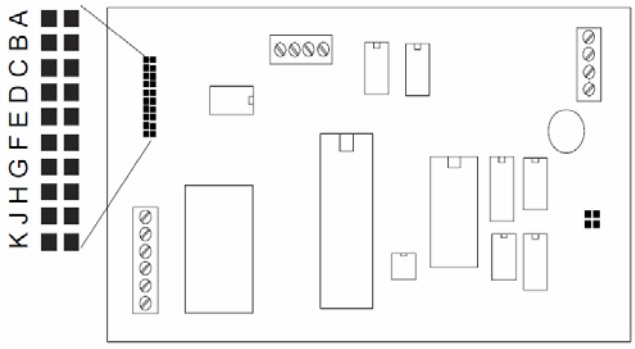
POWER SUPPLY
standard 230 Vac 50/60 Hz
(optional 115 Vac 50/60 Hz)
(optional 24 Vdc isolated)

CONSUMPTION
6 VA in series BDF-24 and BDF-26
12 VA in series BDF-44 and BDF-46

Internal jumpers

The instrument can select two levels of trigger for different NPN, PNP and NAMUR sensors, different types of input signals and two levels of filters. To access the selection jumpers, unscrew the rear side cover and locate the *«Control Board»* with the selection jumpers.

«Control board»



* Trigger levels for NPN, PNP, NAMUR

Trigger Level «LOW» .- Jumper H,G Closed

Logical Level «1» >3.75 Vdc
Logical Level «0» <1.50 Vdc

Trigger Level «HIGH» .- Jumpers H,G Open

Logical Level «1» >7.50 Vdc
Logical Level «0» <5.50 Vdc

* Antirrebound filter .- Jumpers J,K

Closed - Antirrebound filters at < 100 Hz
Open- Antirrebound filters at < 10 KHz

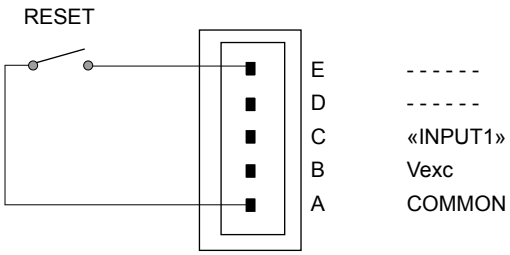
***Note** .- Use filters at <100Hz for inputs type mechanical contact, in order to filter rebounds on the contact.*

Connections terminal

The input signal is connected to the 5 pole plug-in screw terminal at the rear side cover of the instrument.

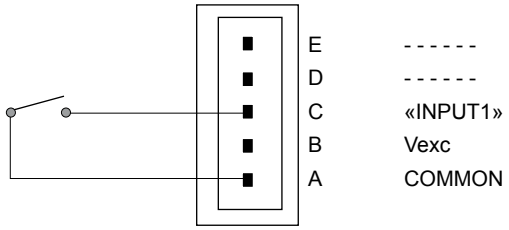
Terminal «B» provides a +15 Vdc (maximum 100 mA) signal to power-up sensors and transducers. Do not use this terminal to power sensors and transducers that need higher current.

The signal is connected to terminals «C» (Input1) and «A» (Common).

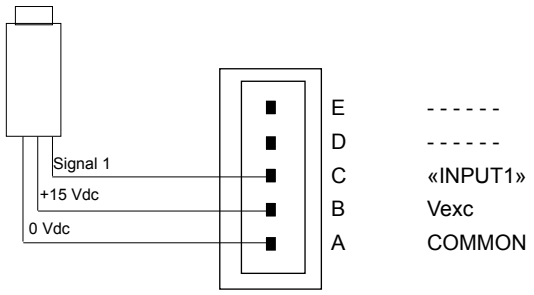


Sensor type selection and connection

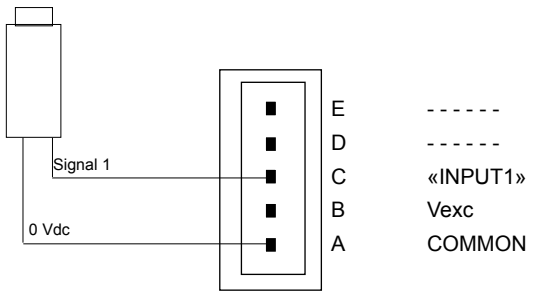
MECHANICAL CONTACT Jumpers ADF
«INPUT1» terminal «C» (Signal) and «A» (Common)
Note *- close internal jumpers J,K. See section 6*



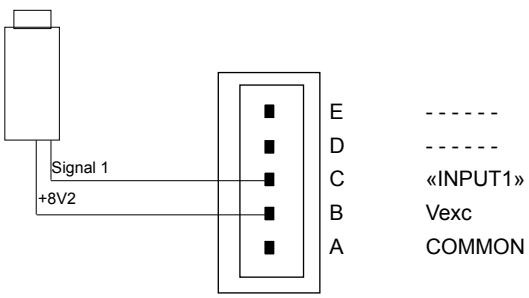
NPN Jumpers ADF
PNP Jumpers ABCDF
«INPUT1» terminal «C» (Signal), «A» (Com) and «B» (Vexc)



PICKUP Jumpers AE
«INPUT1» terminal C (Signal) and A (Common)



NAMUR Jumpers BCDF
«INPUT1» terminal B (Vexc) and C (Signal)



Programming the instrument

The BDF Ratemeter instruments are configured by programming codes that activate internal «scale factors», decimal points, and other elements which scale the signal reading on display.

The programming of these codes is done through the 15 pin SUB-D connector at the rear side of the instrument. A «KBD Programming Keyboard» is needed, or the connections shown in Figure 1 need to be set-up..

Buttons «1» to «6» introduce the numerical characters 1, 2, 3, 4, 5 and 6 on display, button «#» executes «ENTER» on the displayed code. Button «*» adds negative sign in some codes.

Note .- *When KBD (or contacts indicated in Figure 1) are connected to the BDF, the point placed on top of the negative sign will light. This led must be «on» during the reprogramming of the unit (if the led is not lightning, but the led below the negative sign lights, then press «*» to switch leds).*

Note *.- When KBD (or contacts indicated in Figure 1) are connected to the BDF Ratemeter with 4 digits, the 2 small 7 segment displays on top left part will light. These digits are needed to programm some codes which are 6 digit codes.*

Programming codes

The programming codes are made of 2 digits identifying the code, and a third digit identifying the value assigned to the code.

Code «41» with value «1» is represented as «41 1#». Button «#» acts as a validation of the code and value entered. If this button is not pressed, the unit will not validate the new value.

EXAMPLE

Introducing code «41 1#»

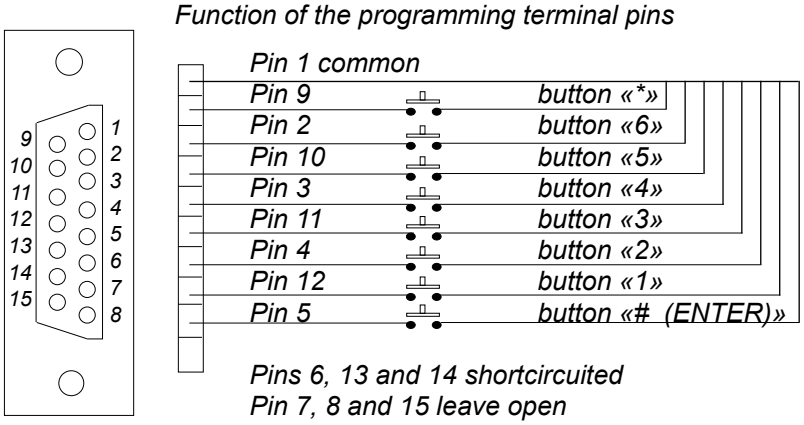
Press 4	Number 4 appears on display, to the left
Press 1	Number 1 appears on display, to the left The current value for code 41 appears to the right (it can be 1 or 2)
Press 2	Number 2 appears on display, to the right replacing the previous value
Press #	Validates the code and the value entered (in this case 41 1)

Note *.- After 6 seconds without introducing data, the instrument will cancel the programming code without validation.*

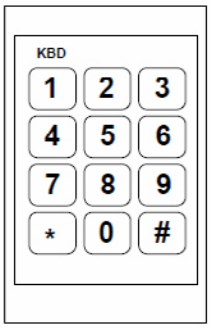
Note *.- Codes «1», «2» and «3» are special codes composed by only 1 digit. The value is a 6 digit numerical value and will load on display as soon as the code is pressed. The way to modify this value is to modify each digit value independently by pressing 1 to 6 and then # to validate the whole.*

Figure 1

Function of the programming terminal pins



KBD programming keyboard



Configure the ratemeter

«41 -1#» Resets the instrument configuration.
Activates the default parameters

Note - To place the negative sign, introduce codes «4», «1», «1», «*» and «#»

Note - The led on top of the negative sign must be ON during the programming. If it is not lightning and the led under the negative sign is on, then press «*» to switch leds.

«43 1#» BDF-xx-TF
«Input1» impulses input
Maximum frequency 10 KHz

Decimal point

«65 1# 0
«65 2# » 0.0
«65 3# » 0.00
«65 4# » 0.000
«65 5# »0.0000

Note - same codes but in negative, enable visualization of zeros to the left.. For example code «65 -2E» will visualize 00000.0

Configure the multipliers

«3» «Scale Factor»
multiplier between «0.0000» and «5.9999».
by default it is «1.0000»

«64 1#» «multiplier» x 1000
«64 2#» «multiplier» x 100
«64 3#» «multiplier» x 10
«64 4#» «multiplier» x 1
«64 5#» «multiplier» x 0.1
«64 6#» «multiplier» x 0.01

«62 1#» Display «per second» (x1)
Display = frequency input x 1
«62 2#» Display «per minute» (x60)
Display = frequency input x 60
«62 3#» Display «per hour» (x3600)
Display = frequency input x 3600

«63 1#» Time Base between 0.5 and 1 seconds
«63 2#» Time Base between 1 and 2 seconds
«63 3#» Time Base between 2 and 4 seconds
«63 4#» Time Base between 4 and 8 seconds
«63 5#» Time Base between 8 and 16 seconds
(maximum frequency 7500 Hz)
«63 6#» Time Base between 16 and 32 seconds
(maximum frequency 3250 Hz)

«61 1#» Digit fixed to zero XXXXX0
«61 2#» Digit fixed to zero XXXX00
«61 3#» Digit fixed to zero XXX000
«61 4#» No zero fixed XXXXXX

these codes move the whole reading to the left, placing zeros to the right

Default parameters

«41 1#» default
«42 3#» default
«43 1#» default
«44 1#» default
«45 1#» default
«46 1#» default
«61 4#» Without fixed zeros
«62 1#» «Display per second» x1
«63 1#» «Time base» between 0,5 and 1 second
«64 4#» «multiplier» x1
«65 1#» No decimal point
«51 2#» default
«52 3#» default
«53» default
«54 3#» default
«55» default
«56 1#» default
«66 1#» default
«1» default
«2» default
«3» 1.0000 «Scale factor»

Programming example

The default programming for the BDF Ratemeter units is 1 impulse/second = 1. If changing this relation is needed, then the programming codes need to be accessed to change the scale factors of the unit. We take as an example the reprogramming to 52 impulses/second = 247 meters/minute.

a.- The scale factors available and the values we can activate are the following :

«Scale Factor»	selectable between -5.9999 and +5.9999
«Multiplication Factor»	selectable at x1000, x100,x 10, x1, x0.1, x0.001
«Time Multiplication»	selectable at x1, x60, x3600

b.- To generate a total scale factor of 4,75 (= 247 / 52) we can assign the following values

«Scale Factor»	= 4,7500
«Multiplication Factor »	= x1
«Time Multiplication»	= x1

c.- The codes to program are

«3»	4,7500
«64 4#»	x1
«62 1#»	x1

Still, we need to program the Time Base which defines a «time window» where the unit will detect impulses, and will divide the received impulses by the Time Base value, thus getting the frequency in impulses per second. The Time Base also defines the refresh on display. By default, the Time Base of 0,5 to 1 second will be enough. In case the signal is too slow (0,1 impulses per second, for example) we would need a bigger Time Base. For 0,1 impulses per second we have 1 impulse every 10 seconds. If we define a Time Base of 1 second, the Ratemeter will always read «0000» because no impulse is detected, and every once a while, 1 impulse will be detected.

d.- To program the same relation (52 impulses per second = 247.0 meters/minute), but with 1 decimal point, we need to program the following:

«Scale Factor»	= 4,7500
«Multiplication Factor»	= x10
«Time Multiplication»	= x1
«Decimal Point»	= XXX.X

e.- The codes to program are

«3»	4,7500
«64 3#»	x1
«62 1#»	x1
«65 2#»	Decimal Point on at XXX.X

The possible combinations of scale factors and decimal points are very big. Take into consideration that the decimal point is only a led lightning, but it will not move the readings neither to the left nor to the right, and it will not multiply the reading in any case. Start always defining parameter «3» which is the only one able to define precise values, and then look for the appropriate fixed multiplication factors.

Mechanical dimensions

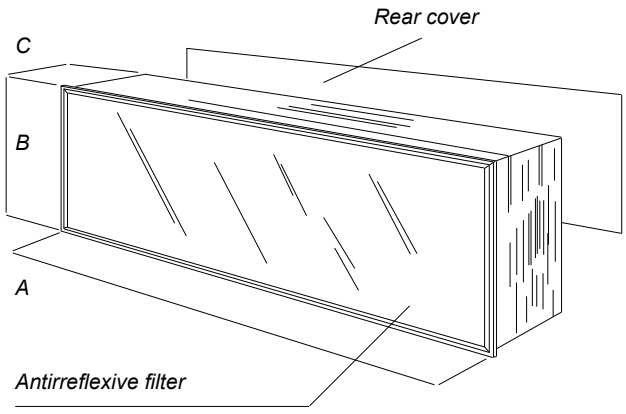
Size 24	A	B	C
4 digits 57mm (2")	264mm (10,40")	120mm (4,75")	112mm (4,41")

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

Size 26	A	B	C
6 digits 57mm (2")	384mm (15,12")	120mm (4,75")	112mm (4,41")

Size 46	A	B	C
6 digits 100mm (4")	668mm (27,10")	180mm (7,09")	112mm (4,41")

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



Panel cut-out and weights

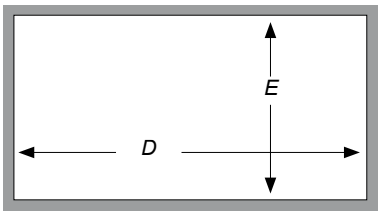
Size 24	D	E	weight
4 digits 57mm (2")	256mm (10,07")	112mm (4,40")	2.3 Kg (5 lbs)

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

Size 26	D	E	weight
6 digits 57mm (2")	376mm (14,80")	112mm (4,40")	2.7 Kg (6 lbs)

Size 46	D	E	weight
6 digits 100mm (4")	680mm (36,77")	172mm (6,77")	5.7 Kg (12,5 lbs)

PANEL CUT-OUT

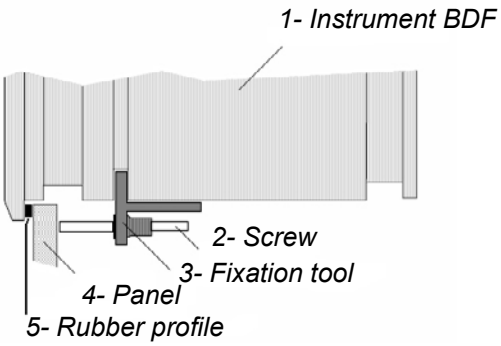


Panel width
Max. 14 mm (0,55")
Min. 2,5 mm (0,10")

Panel installation

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

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



Warranty

All instruments are warranted against all manufacturing defects for a period of 24 MONTHS from the shipment date. This warranty does not apply in case of misuse, accident or manipulation by non-authorized personnel. In case of malfunction get in contact with your local provider to arrange for repair. Within the warranty period and after examination by the manufacturer, the unit will be repaired or substituted when found to be defective. The scope of this warranty is limited to the repair cost of the instrument, not being the manufacturer eligible for responsibility on additional damages or costs.

CE Declaration of conformity

Manufacturer FEMA ELECTRÓNICA, S.A.
Altimira 14 - Pol. Ind. Santiga
E08210 - Barberà del Vallès
BARCELONA - SPAIN
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Series-Models BDF-24 y BDF-44
TF

The manufacturer declares that the instruments indicated comply with the directives and rules indicated below.

Directive of electromagnetic compatibility 2004/108/CEE
Directive of low voltage 73/23/CEE

Security rules	61010-1
Emission rules	50081-2
Immunity rules	50082-1

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.

Barberà del Vallès October 2009
Daniel Juncà - Quality Manager

Precautions on installation

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 excessive 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 excessive moisture. DO NOT operate the unit in the presence 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 frequency of the power supply is according to the voltage and frequency 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.

SECTION BLANK

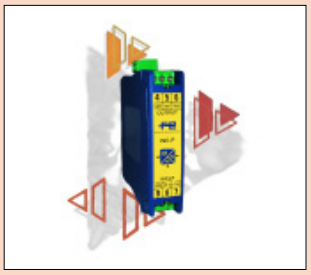
other products

Panel Meters
Standard 96x48mm

Panel Meters
Small 72x36 mm

Panel Meters
Miniature 48x24 mm

Large Displays
60 & 100 mm digit



Signal Converters
& Isolators

Panel Meters
Standard 96x48mm

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ELECTRONIC INSTRUMENTATION FOR INDUSTRY

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