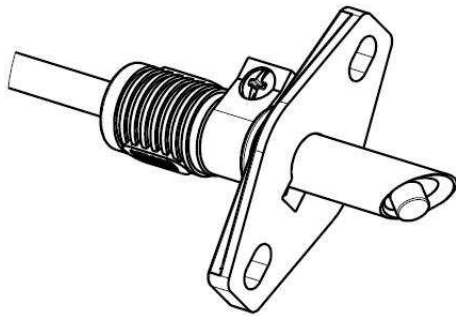
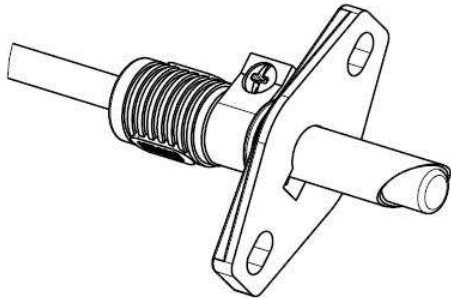


**PHOTOTRANSISTORS**  
**FT11, FT13**

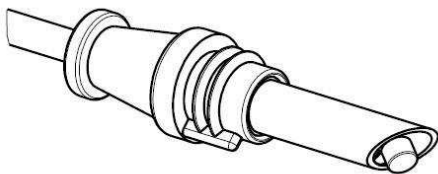
**FLAME SENSORS FOR OIL OR BIOMASS BURNERS**



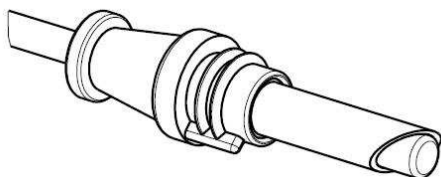
**FT11 /...**



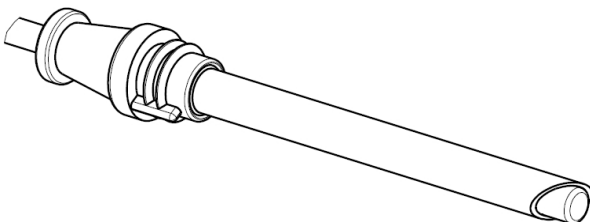
**FT11 /... F**



**FT13 /...**



**FT13 /... F**



**FT13L /... F**

**Introduction**

Flame detection in oil burners occurs by means of sensors detecting the presence of flame through an electrical signal, which can be used by ignition and control devices.

FTxx use a phototransistor to detect the light generated by the flame and are in compliance with the directive RoHS 2011/65/EU.

**Description**

These sensors, originally used for detecting the flame generated by oil burners, are also suitable for biomass burners (pellets, wood, seeds, etc). The sensing element actually changes its current as a function of the incident light and this property is exploited to detect the presence of flame in the burner.

Brahma phototransistors are available in two models, FT11 and FT13, which are distinguished by a different case.

A FT13L was created to complete the product range: is equal to FT13 only has neck longer than the standard.

These sensors are designed to be coupled to Brahma control units and have been developed to replace previous photocells FCxx. For compatibility please refer to Table 2 and to the wiring diagrams. FTxx can be used with other controllers after a mandatory test of suitability.

Figure 1 shows the phototransistor type FT11: the oblique position of the sensing element allows excellent sensitivity for both frontal and lateral light source. The same construction principle characterizes also the FT13 shown in figure 2.

FTxx are available also with a protective transparent cap for frontal light source (option "F") as shown in figure 3 and figure 4.

The connection cable has a standard length of 620mm, the operating temperature range must be strictly between -20°C and + 70 ° C and the maximum operating voltage is +12Vdc.

**Sensitivity**

The sensitivity is within the range 300-750 nm, including thus the spectrum of visible light.

It is the installer's responsibility to place the phototransistor in a suitable and noise-free ambient light.

Given the many applications in which this sensor can be used it was thought to realize it with three different degrees of sensitivity, identified by the casing color: green for low sensitivity, red for medium sensitivity and cyan for high sensitivity.

To connect FT11 - FT13 to controllers not made by Brahma refer to the data of table 1 and verify the suitability.

Sensibility	Low			Medium			High			
Colour	GREEN			RED			CYAN			
	Current [µA]			Current [µA]			Current [µA]			
V <sub>DC</sub>	Lux	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
5	0	0	0	0	19	20	21	37	38	39
	3	5	9	10	25	29	31	43	47	49
	10	18	30	34	38	50	55	56	68	73
10	0	0	0	0	39	40	41	75	76	77
	3	5	9	10	45	49	51	81	85	87
	10	18	30	34	58	70	75	93	106	111

Measures related to 25 °C

Table 1

**NOTE:** Possible customizations of the output current are available according to customer's requirements.

**Installation**

As the phototransistor is polarized it is important to connect the cyan wire to the neutral of the control unit.

For a correct phototransistor-to-device coupling please refer to Table 2 below, to the technical documentation of the devices using these sensors and to the wiring diagrams.

Brahma control units that can be coupled to FTxx sensors
EUROOIL: VM440 / VM450
DIGITAL MICROFLAT "N": NDMxx and DMNxx
KOMPACT SERIES: TGRx (analog) and TGRDxx (digital)
OIL-SYSTEM SERIES: OS1 OS2
EUROOIL S10:
GR1 GR1/Z GR2
OR1 OR1/Z OR2 OR3/B
DIGITAL EURO-OIL: DR1 / DR2
EURO-OIL: BT..O

Table 2

For the use of the FTxx with other control units not manufactured by Brahma it is necessary to make a verification of suitability.

**Overall dimensions (mm)**

- FT11

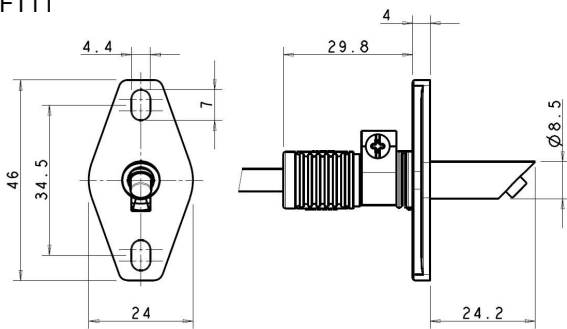


Figure 1

- FT13

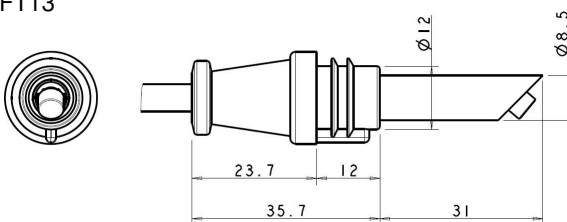


Figure 2

Under particular test conditions which make sensing element dirty, it's available a version of FTxx with front views and covered by a special transparent protection (option F). For this version is available also FT13L: this fit in burner with the flame far away from the hole of insertion of phototransistor. See realization in figure 3, figure 4 and figure 5.

- FT11 /... F

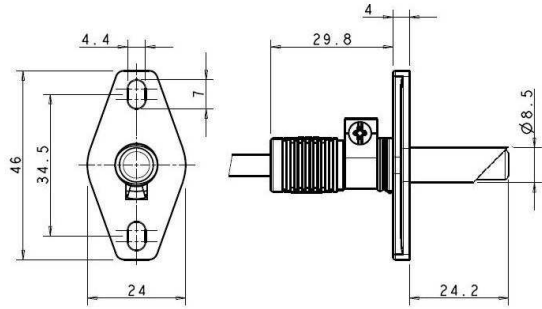


Figure 3

- FT13 /... F

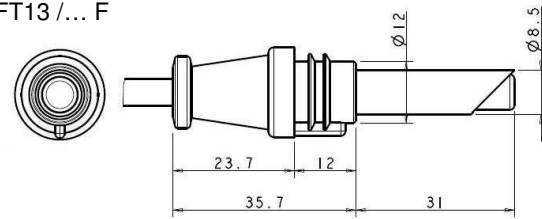


Figure 4

- FT13L /... F

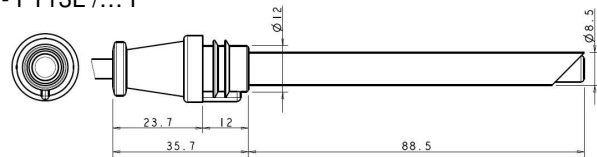


Figure 5

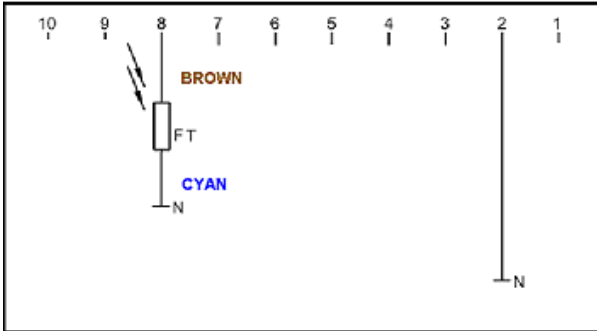
**Drilling plane for FT11 and FT13**

FT11	FT13
<p>(fastening by mechanical interference with the phototransistor case)</p>	

Ø4mm screws are recommended to fasten FT11 flame sensors.

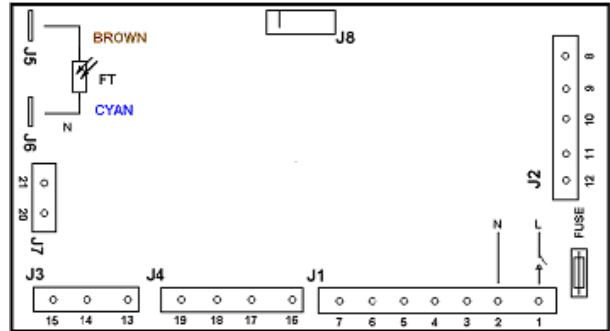
# WIRING DIAGRAMS

## EURO-OIL SERIES



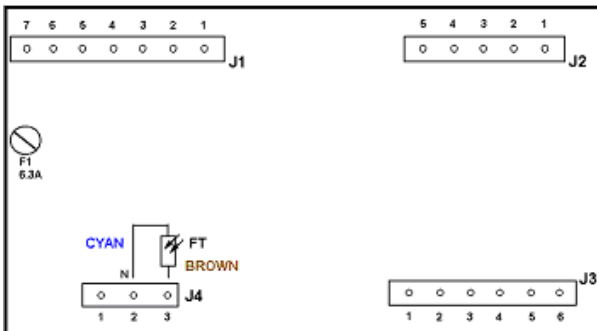
TYPE VM44O VM45O

## DIGITAL MICROFLAT "N" AND NEW DIGITAL MICROFLAT SERIES



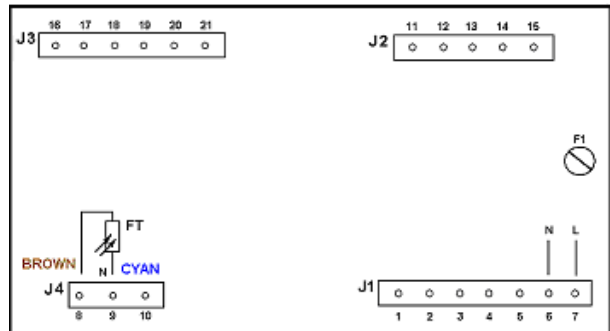
TYPE NDTMxxO DTMNxxO

## KOMPACT SERIES (TGRx)



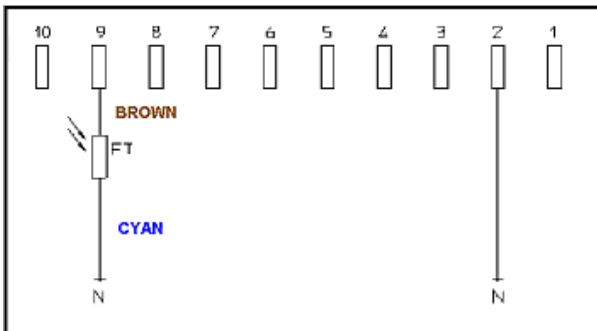
TYPE TGRx

## KOMPACT SERIES (TGRD)

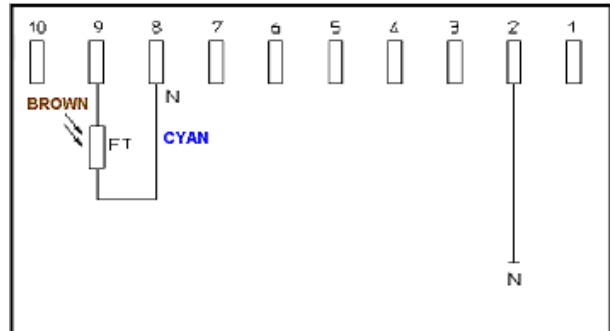


TYPE TGRD7x TGRD9x

## EURO-OIL CONTROLS SERIES 10

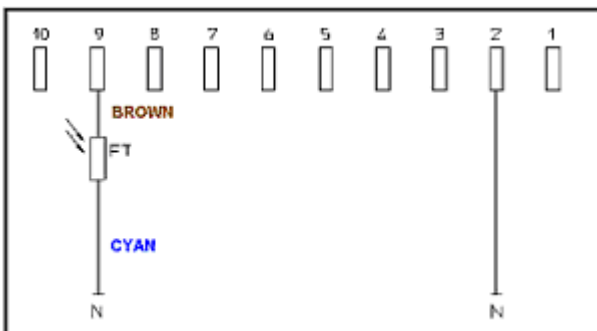


TYPE GR1 GR2 GR1/Z OR3/B



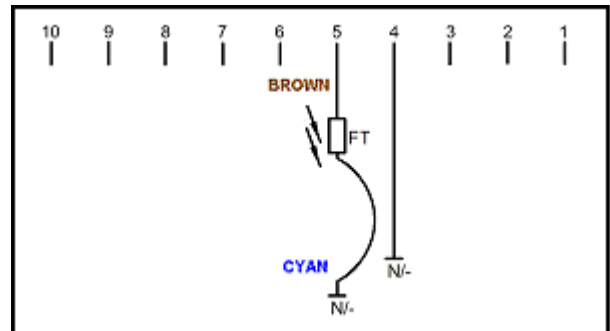
TYPE OR1 OR1/Z OR2

## DIGITAL EURO-OIL CONTROLS



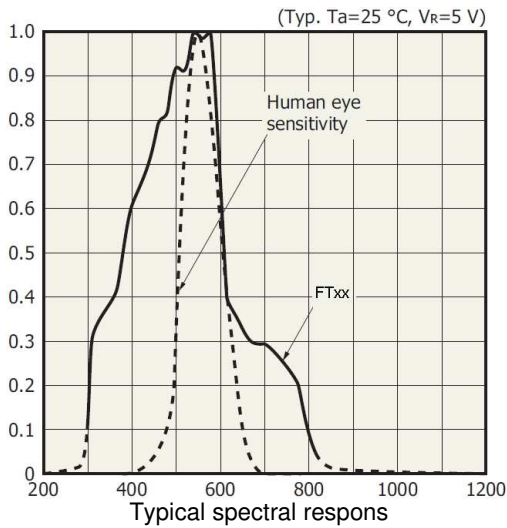
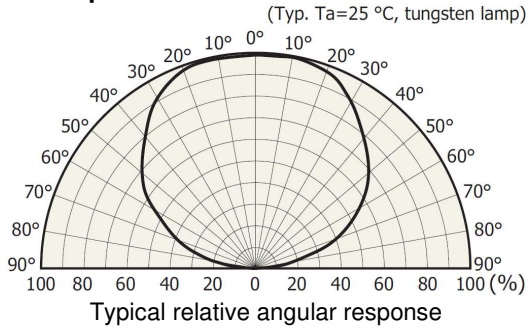
TYPE DR1 / DR2

## EURO-OIL CONTROLS SERIES BT



TYPE BT..O

**Typical response**



**Part reference**

**Phototransistor FTX /Y Z MMjjj O**

- X 11:** Phototransistor type FT11 (fig 1 and 3)
- 13:** Phototransistor type FT13 (fig 2 and 4)
- 13L:** Phototransistor type FT13L (fig 5)
- Y** Case colour:
  - V:** Green / Low sensibility
  - R:** Red / Medium sensibility
  - A:** Cyan / High sensibility
- Z** **No letter:** FT bent at 45° (fig 1 and 2)
- F:** FT with frontal view and protective cap (fig 3, 4 and 5)
- jjj** Cable length (mm)
- O** Cable termination. See Table 3.  
Performing other finishes according to customer requirements



**NOTES ABOUT PRODUCT DISPOSAL** The device contains electronic components and cannot therefore be disposed of as normal household waste. For the disposal procedure, please refer to the local rules in force for special waste.

**ATTENTION** -> Company Brahma S.p.A. takes no responsibility for any damage resulting from Customer tampering with the product.

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CABLE TERMINATION		
Identification letter	Z	J1 Specific for TGRx
Description	Skinned	Crimp terminal + crimp terminal housing molex (series 3001-03 ÷ PN 10011034)
Identification letter	W	J2 Specific for TGRD
Description	Spliced connector	Crimp terminal + crimp terminal housing molex (series 3001-03 ÷ PN 10011034)

Table 3

**Example:**

- **PHOTORANSISTOR FT11 /R MM620 W**  
**Phototransistor FT11** Phototransistor type FT11  
**R** Red case (medium sensibility)  
**-** Sensor element bent at 45°  
**MM620** Cable length 620 mm  
**W** Spliced connector
- **PHOTORANSISTOR FT13 /V F MM620 Z**  
**Phototransistor FT13** Phototransistor type FT13  
**V** Green case (low sensibility)  
**F** Frontal view and protective cap  
**MM620** Cable length 620 mm  
**Z** Skinned