

## Infra-red flicker detector

**Flame monitoring device for yellow- or blue-burning oil flames**



### INTRODUCTION

The IRD 1010.1 is employed to monitor the flame of an oil burner. This flame monitoring device should be connected to a Satronic oil burner control box. Monitoring is based on the infra-red flicker principle, in other words, the flickering infra-red light of the flame is detected. The steady radiation from, for example, the glowing refractory layer on the inside of the boiler, has no effect on the detector. The IRD 1010.1 replaces the IRD 1010, 910, 911 and 911vi.

When exchanging the IRD 1010, care must be taken that the corresponding IRD 1010.1 with the same imprint (blue, white or red) is used (see page 3 and 4).

When exchanging the IRD 910, 911 or 911vi, care must be taken to wire the sensor correctly (see page 3).

For replacement of the IRD 910, 911 or 911vi with IRD 1010.1 is the sensor cable also needed

The infra-red flicker detector is suitable for use with the following control boxes:

IRD 1010.1   DKO 970, 972, 974, 976, 992, 996  
                   DKW 974, 976  
                   DMO 976  
                   TF 801, 802, 804  
                   TF 830, 832, 834, 836  
                   TF 844, 874, 876, 974, 976  
                   MMD 900, 900.1,  
                   TTO 872, 876  
                   MMO 872, 876  
                   TMO 720-4

### CONSTRUCTIONAL FEATURES

The infra-red sensor and the pre-amplifier are hermetically sealed in glass and along with the electronics form an integrated unit in the flame detector. Wiring is by way of a plug connection. The sensitivity control and two LED's for indication of the flame signal are situated on the rear of the flicker detector.

### TECHNICAL DATA

|  |  |
|--|--|
| Supply voltage   | 220 / 240 V (-15... +10%)<br>50 Hz (50 - 60 Hz)                |
| Nominal current input  | approx. 4 mA   |
| Power consumption  | 1 VA   |
| Ambient temperature  | -20° C to +60° C   |
| Insulation standard  | IP 41  |
| Mounting attitude  | any  |
| Weight   | 40 g   |
| Flame viewing attitude   | side-on or end-on according to type                            |
| Spectral response (with daylight filter)                       | 800 - 1100 nm<br>maximum 950 nm                                |
| Frequency range  | 15 Hz.... 250 Hz (-12 dB)                                      |
| Sensitivity adjustment range                                   | approx. 1 : 20 (26 dB)   |
| Switch-on delay (after connecting operating voltage)           | < 3.5 sec.   |
| Response time  | < 0.1 sec.   |
| Cut-out time   | < 1 sec.   |
| Approved ambient parameter - for operation                     | max. 95% at 30° C<br>-20° C... +60° C                          |
| - for storage  | -20° C... +80° C   |
| Build-up of ice, penetration of water and condensing water are | inadmissible   |
| Approvals according to European standards                      | EN 230, as well as all other relevant Directives and standards |

## TECHNICAL FEATURES

### 1. Flame detection

- Yellow- as well as blue-burning oil flames can be monitored.
- The flame detector is suitable for operation where the ambient temperature is within the range  $-20^{\circ}$  to  $+60^{\circ}$  C.
- The flickering detector IRD 1010.1 becomes active not before a minimum threshold-level of steady light is exceeded. That guarantees that neither electromagnetic- nor ignition-spark noise are affecting the IRD.
- Sensitivity is adjustable.
- LED 1 is a warning indicator for the pre-purge phase as well as normal operation. LED 2 indicates the actual status of the detector: On or off.
- During pre-purge, LED 1 indicates possible stray light, which may be produced either by a flickering or by a steady light source, before the detector switches on (LED 2).
- When the burner is operating normally, LED 1 acts as a warning indication of the flame signal current sensitivity being set too low - it begins to flicker or extinguishes before the detector switches off.
- The compact dimensions of the detector allow it to be installed on any burner. The detector shaft has the same dimensions as the FZ 711 S. It therefore also fits into the FZ holder M 74.

### 2. Installation instructions

- The detector probe should be fitted so that it receives the light which pulsates most strongly. This can be achieved by positioning the detector as close as possible to the flame or by directing it at a particular zone of the flame (e.g. by using a sighting tube).
- No stray light must be allowed to fall on the detector (e.g. through cracks or from a sight glass). Pulsating stray light (e.g. from fluorescent lighting or light bulbs) could cause the system to switch to lockout. Due to the very high sensitivity of the detector, it should not be exposed directly or indirectly (reflections) to the ignition spark.
- The infra-red flicker detector should be fitted in such a way that the ambient temperature cannot under any circumstances rise above  $60^{\circ}$  C. At higher temperatures, there is a risk of incorrect operation and the life expectancy of the unit could be reduced. In addition, care should be taken that the detector is not subjected to unusually harsh vibration and receives no hard knocks.

## COMMISSIONING AND MAINTENANCE

During commissioning and after servicing, the flame monitoring system should be checked for faultless operation as follows:

1. Check that the detector is connected properly. Wrong connections are a risk to safety, and could cause damage to the detector unit or burner system.
2. Adjust to maximum sensitivity and start the burner: If the LED indicator is lit after the start impulse, carefully adjust the sensitivity control until LED 1 extinguishes. No LED should light up during the pre-purge phase.
3. With the system set for normal operation, pull out the detector probe and cover it up to cut off light. Both LED indicators must extinguish. The control box should switch to lockout or attempt to re-start the sequence.
4. Attempt to re-start with the flame detector covered. There must be no indication from the LED's after the start impulse. The burner control box must switch to lockout at the end of the safety interval.
5. Attempt to start the burner with the detector exposed to stray light e.g. from fluorescent lighting, a cigarette lighter or light bulb (not daylight or an electric torch): Depending on the type of control box, it should switch to lockout either immediately or at the end of the pre-purge, as a result of stray light.
6. When the burner is operating normally, carefully turn back the sensitivity control until LED 1 begins to flicker. Increase the setting again by one or two increments until both LED's are lit. If LED 1 does not flicker even at position 1: Leave potentiometer at position 1-2. This adjustment should be carried out when the flame signal current is weakest (shortly after flame establishment or after stabilisation).

The flame detection device requires no maintenance of any kind, and as it is classed as safety equipment, no attempt should be made to open the housing.

Because the nature of the flame can change in time due to the accumulation of dirt, the indicators on the detector should be checked periodically.

#### Please note:

Burner operating normally = both LED's on  
Burner in pre-purge phase = both LED's off

**For safety reasons the sensitivity must not be set higher than necessary.**

**Possible faults**

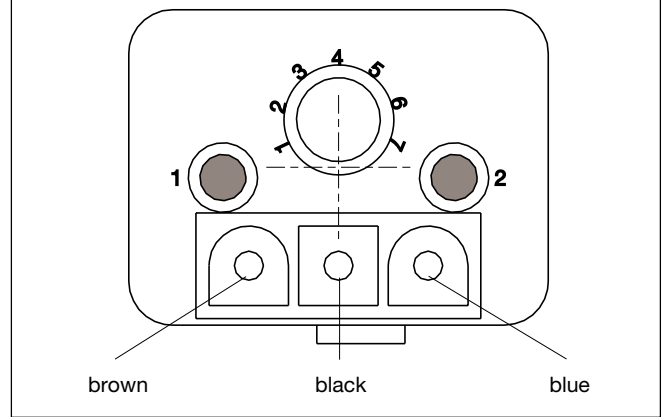
**1. LED's light up during the pre-purge phase (control box switches to lockout):**

- a) Sensitivity set too high
- b) Stray light
- c) Ignition spark visible to detector (directly or reflection). Correct by preventing direct sight of ignition spark.
- d) Interference from ignition cable (lay cables some distance apart, or possibly screen the detector).

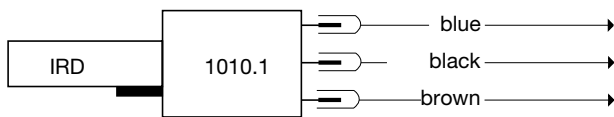
**2. No indication from LED's after establishment of flame:**

- a) Incorrect or faulty wiring
- b) Sensitivity set too low
- c) Detector positioned wrongly (receives no light)
- d) Detector or viewing window dirty
- e) Defective detector

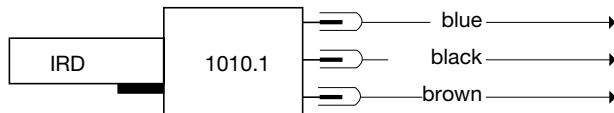
**IRD 1010.1 TERMINALS**



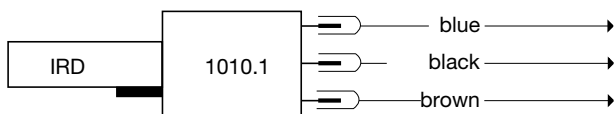
**CONNECTION OF IRD 1010.1 TO SATRONIC BURNER CONTROL BOXES**



| Control box type | TF 8.. | TF 9.. | DKO 9..<br>DKW 9..<br>DMO 9.. |
|------------------|--------|--------|-------------------------------|
| Terminal no.     | 2      | 7      | 2                             |
| Terminal no.     | 1      | 1      | 1                             |
| Terminal no.     | 9      | 9      | 9                             |



| Control box type | MMD 900<br>MMD 900.1 | TTO 872<br>TTO 876 | MMO 872<br>MMO 876 |
|------------------|----------------------|--------------------|--------------------|
| Terminal no.     | 2                    | 1 or 8             | 1 or 8             |
| Terminal no.     | 1                    | 2                  | 2                  |
| Terminal no.     | 9                    | 9                  | 9                  |

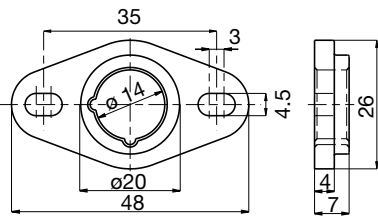


| Control box type | TMO 720-4 |
|------------------|-----------|
| Terminal no.     | 2         |
| Terminal no.     | 1         |
| Terminal no.     | 9         |

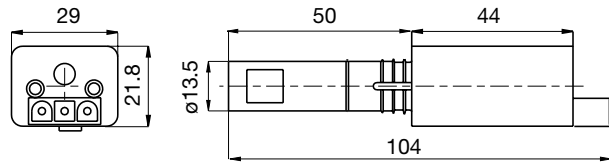
**SENSITIVITY-CHARACTERISTIC OF IRD 1010.1 (BLUE, WHITE, RED)**

| IRD-Type | Sensitivity | Steady-light threshold | Characteristic  |
|----------|-------------|------------------------|---|
| blue     | standard    | high                   | Standard detection for yellow and blue burning oil burners. Most immunity to ignition spark detection.  |
| white    | standard    | low                    | Increased detection for blue burning oil burners. Immune to ignition spark detection.   |
| red      | high        | low                    | Most sensitive detection for blue burning oil burners. Immune to ignition spark detection.<br><b>Important!</b> The use from the IRD 1010.1 red must from the burner manufacturer be tested and approved. |

### HOLDER M74

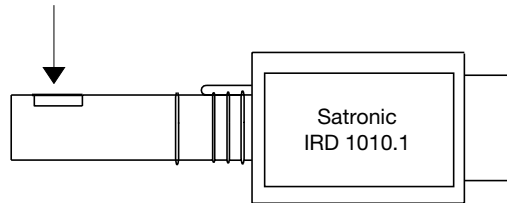


### FLICKER DETECTOR IRD 1010.1

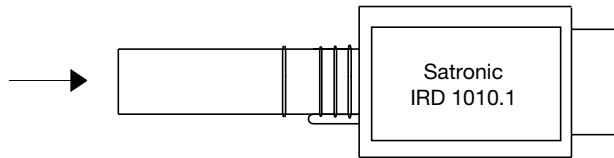


### VARIANTS

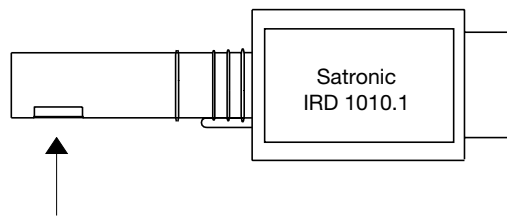
|                           |       |          |         |
|---------------------------|-------|----------|---------|
| Light entrance from right | blue  | Item no. | 16501   |
|                           | red   |          | 1650105 |
|                           | white |          | 1650106 |



|                       |       |          |         |
|-----------------------|-------|----------|---------|
| End-on light entrance | blue  | Item no. | 16502   |
|                       | red   |          | 1650205 |
|                       | white |          | 1650206 |



|                          |       |          |         |
|--------------------------|-------|----------|---------|
| Light entrance from left | blue  | Item no. | 16503   |
|                          | red   |          | 1650305 |
|                          | white |          | 1650306 |



### ORDERING INFORMATION

| ITEM             | DESIGNATION                                       | ITEM NO. |
|------------------|---|----------|
| Flame sensor     | Flicker detector IRD 1010.1 right <b>blue</b>     | 16501    |
|                  | Flicker detector IRD 1010.1 right <b>red</b>      | 1650105  |
|                  | Flicker detector IRD 1010.1 right <b>white</b>    | 1650106  |
| optional         | Flicker detector IRD 1010.1 end-on <b>blue</b>    | 16502    |
|                  | Flicker detector IRD 1010.1 end-on <b>red</b>     | 1650205  |
|                  | Flicker detector IRD 1010.1 end-on <b>white</b>   | 1650206  |
| optional         | Flicker detector IRD 1010.1 left <b>blue</b>      | 16503    |
|                  | Flicker detector IRD 1010.1 left <b>red</b>       | 1650305  |
|                  | Flicker detector IRD 1010.1 left <b>white</b>     | 1650306  |
| Mounting flange  | Holder M74  | 59074    |
| Connection cable | Plug type, 3 core cable, 0.6 m with tag wire ends | 7236001  |

The above ordering information refers to the standard version.  
Special versions are also included in our product range.

Specifications subject to change without notice.

# IRD 1010.1



Satronic AG  
Honeywell-Platz 1  
Postfach 324  
CH-8157 Dielsdorf