

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%) 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 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 -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° 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° 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

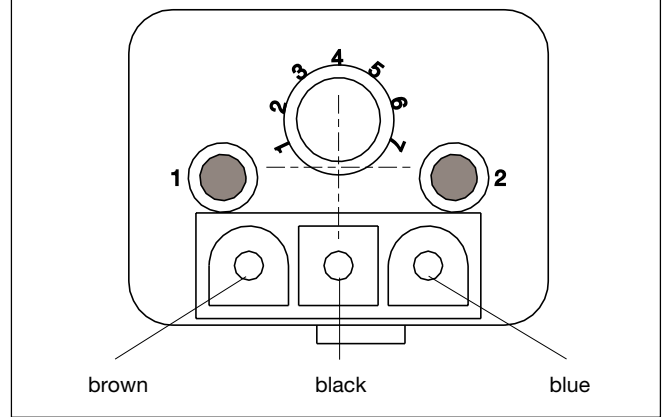
1. LED's light up during the pre-purge phase (control box switches to lockout):

- 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).

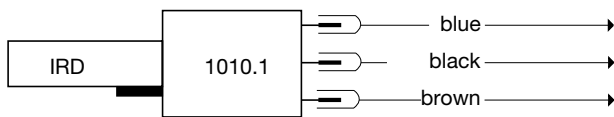
2. No indication from LED's after establishment of flame:

- 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

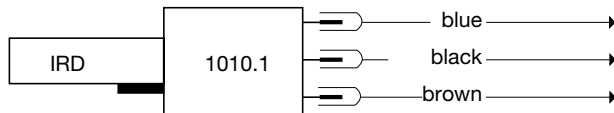
IRD 1010.1 TERMINALS



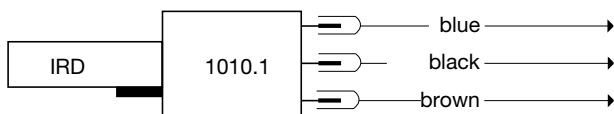
CONNECTION OF IRD 1010.1 TO SATRONIC BURNER CONTROL BOXES



Control box type	TF 8..	TF 9..	DKO 9.. DKW 9.. DMO 9..
Terminal no.	2	7	2
Terminal no.	1	1	1
Terminal no.	9	9	9



Control box type	MMD 900 MMD 900.1	TTO 872 TTO 876	MMO 872 MMO 876
Terminal no.	2	1 or 8	1 or 8
Terminal no.	1	2	2
Terminal no.	9	9	9

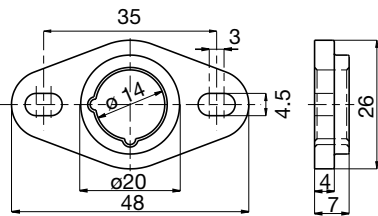


Control box type	TMO 720-4
Terminal no.	2
Terminal no.	1
Terminal no.	9

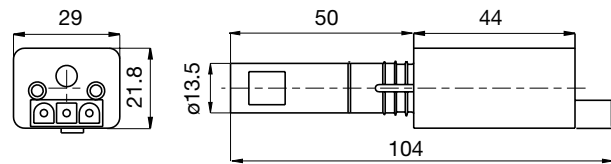
SENSITIVITY-CHARACTERISTIC OF IRD 1010.1 (BLUE, WHITE, RED)

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. Important! The use from the IRD 1010.1 red must from the burner manufacturer be tested and approved.

HOLDER M74

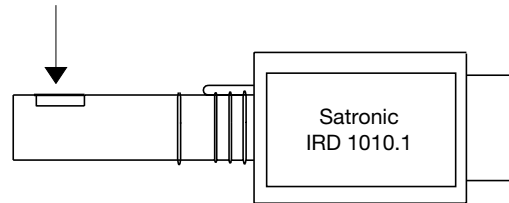


FLICKER DETECTOR IRD 1010.1

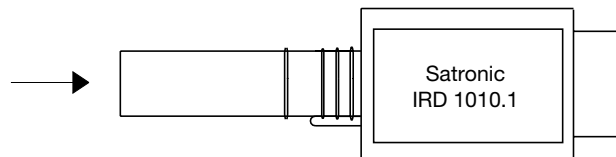


VARIANTS

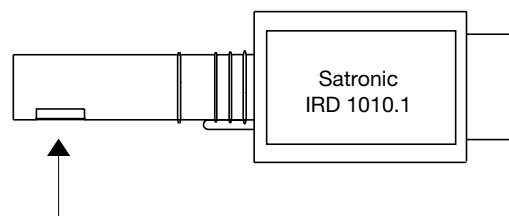
Light entrance from right	blue	Item no.	16501
	red		1650105
	white		1650106



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 blue	16501
	Flicker detector IRD 1010.1 right red	1650105
	Flicker detector IRD 1010.1 right white	1650106
optional	Flicker detector IRD 1010.1 end-on blue	16502
	Flicker detector IRD 1010.1 end-on red	1650205
	Flicker detector IRD 1010.1 end-on white	1650206
optional	Flicker detector IRD 1010.1 left blue	16503
	Flicker detector IRD 1010.1 left red	1650305
	Flicker detector IRD 1010.1 left white	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



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