

## Oil Burner Safety Control

**For 1- or 2-stage oil power burners up to 30kg/h capacity with or without oil preheater and intermittent operations.**

### Flame detection:

- Photoresistor MZ 770 S
- Infrared-flicker detector IRD 1010
- UV solid state sensor UVD 970

### APPLICATION RANGE

The TF 834.3 or TF 836.3 oil burner safety control boxes are suitable to control and monitor oil power burner up to 30 kg/h capacity (approved and certified according to EN230). A special contact in the control unit short-circuits the thermo-switch of the oil preheater as soon as the burner is operating and the flame signal is present. Therefore interruption of the burner due to decreasing oil temperature (e.g. in case of high oil flow) can be prevented. If the control box goes into lock-out mode, the oil preheater power supply is also disconnected.

### TYPES AVAILABLE

TF 834.2	1-stage operation post-ignition time ca. 20 sec. low voltage protection according to EN230
TF 834 E.3	1-stage operation no post-ignition low voltage protection according to EN230.
TF 836.3	2-stage operation post-ignition time 2-4 sec. low voltage protection according to EN230

### CONSTRUCTIONAL FEATURES

The control box circuitry is protected by a flame resistant, transparent plastic housing. It incorporates the thermo-mechanical, temperature compensated timer, flame check and reset circuits.

Manual reset from lockout is provided by a push button with an integrated lockout signal lamp. A central fixing screw locks the control box to the wiring base. The wiring base and control box have a positive plug-in arrangement, making it impossible to achieve an incorrect connection between the two parts. A variety of cable entry points provides utmost flexibility of electrical wiring.



The TF 834 and TF 834 E are fully compatible with the TF 734 and TF 734-2 respectively. Using the TF 83X.3 as a replacement, the flame detector IRD 911 must be replaced by its compatible type IRD 1010.

An optional extension button (item no. 70601) compensates for height differences.



### TECHNICAL DATA

Operating voltage	220/240 V (-15...+10%) 50 Hz (40-60Hz)
Fuse rating	10 A fast, 6 A slow
Power consumption	ca. 5 VA
Max. load per output	
- terminal 3	1.5 A, cos φ 0.2
- terminal 4	4.0 A, cos φ 0.4
- terminal 5	0.5 A, cos φ 0.4
- terminal 6	4.0 A, cos φ 0.4
- terminal 7	0.1 A, cos φ 0.4
- terminal B	0.5 A, cos φ 0.4
total load	5.0 A, cos φ 0.4
Pre-purge time	ca. 12 sec.
Pre-ignition time	ca. 12 sec.
Post-ignition time	TF 834.3 ca. 20 sec. TF 834 E.3 none TF 836.3 ca. 2-4 sec.
Delay time to oil valve 2	ca. 20 sec. (TF 836.3)
Lockout safety time	10 sec.
Reset time from lockout	ca. 60 sec
Flame detector:	
MZ 770 S	side-on and end-on viewing
Light sensitivity MZ 770 S	> 6 Lux
IRD 1010	side-on or end-on viewing
UVD 970	end-on viewing
Sensor operating current	min. 30 µA
Weight incl. wiring base	0.25 kg
Mounting position	any
Protection class	IP44
Recommended ambient operating temperature for control and flame detector	0°C...+60°C
approved and certified according to European standards	EN 230

## APPLICATION NOTES

### 1. Flame control

The following detectors can be used for flame control:

- For yellow oil flame: photoresistor MZ 770 S
- for blue or yellow flame: infrared-flicker detector type IRD 1010 or as alternative the UV solid state sensor UVD 970.

Using the photo resistor MZ 770 S, the no flame signal is generated at light levels below 3 Lux with respect to the operating cycle of the control. According to EN 230 stray light safety level has to be established in conjunction with the accompanying burner.

Connecting the IRD 1010 or the UVD 970, the correct wiring has to be observed.

### 2. Burner control

With oil preheater:

The fuel heater of the burner must have a temperature control switch. The closing contact-switch of the preheater has to be connected between terminals 4 and 6. A special contact in the control unit-connects the thermo-switch of the heater as soon as the burner is operating and a photocurrent is generated. Therefore an interruption of the burner operation due to a decrease in oil temperature is prevented (e.g. in case of high oil flow).

According to EN 230 A2.1, the short circuiting of the thermo-switch is allowed only for an oil flow of max. 10 kg/h. Burners with a higher throughput have to shut down if the oil temperature gets below the allowed minimum. In such a case the thermo-switch has to be put in the phase-circuit and terminals 4 and 6 have to be connected with a link.

Without oil heater:

In such a case the terminals 4 and 6 have to be connected with a link.

### 3. Low-voltage protection

The start up of the burner can only take place if the mains voltage is higher than a limit which is 15% below nominal value. If the voltage drops below 160V, a start-up is prevented or – without allowing to release the fuel – the control box goes into lock out mode.

### 4. Safety

The design and control sequence of the TF 834.3, TF 834 E.3 and TF836.3 control boxes comply with the currently applicable European standards and regulations.

### 6. Mounting and electrical wiring

Wiring base:

- 3 earth terminals with additional terminal for burner earthing
- 3 neutral terminals with internal permanent connection to neutral terminal (terminal 8)
- 2 spare auxiliary terminals
- 2 slide in plates and 2 easy-knockout holes (PG 11 thread), plus 2 easy-knockout holes in the bottom of the base facilitate the wiring.

General:

- The control box can be mounted in any position. The protection class is IP44 (water spray tight). Neither the control box nor the flame detector should be subjected to excessive vibration.

## COMMISSIONING AND ROUTINE CHECKS

### 1. Important notes

- The controls must be installed by qualified personnel only. The relevant national regulations have to be observed.
- On commissioning the wiring has to be carefully checked according the appropriate diagram, Incorrect wiring can damage the unit and endanger the installation.
- The fuse rating has to ensure that the limits specified in TECHNICAL DATA will not be exceed. If these precautions are not observed, the effect of a short circuit can cause severe damage to the control and installation.
- For safety reasons a minimum of one control shut-down per 24 hours has to be observed.
- Disconnect the mains before the control box is plugged in or out!
- The control box is a safety device and must not be opened!

### 2. Function control

For safety reasons the flame detection system should be tested on commissioning the installation as well as after a service or longer shut-down.

- a) Start-up with covered flame detector
  - After lock-out safety time is over the unit has to go in to lockout mode!
- b) Start-up with exposed flame detector:
  - After 20 sec. pre-purge time the unit has to go into lockout mode!
- c) Normal start-up with burner in the normal position, cover up the flame detector:
  - After start-up, and end of lock-out safety time the unit has to go into lockout mode!

### 3. Fault findings

Burner is not working:

- thermostat circuit open
- faulty electrical wiring
- mains voltage too low

Burner starts, but the flame does not establish, a lock out occurs:

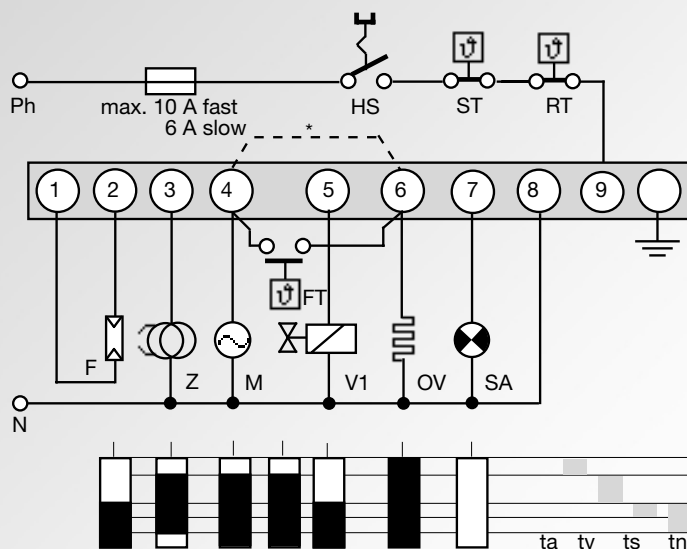
- stray light on flame detector
- no ignition or no fuel
- mains voltage more than -15% below nominal value.

Burner starts, the flame establishes, but after the safety time, a lock out occurs:

- dirty or faulty flame detector
- insufficient light on detector
- sensitivity adjustment too low on IRD.

For a quick and safe diagnosis use the Satronic UP 940 burner test box.

### CIRCUIT AND TIMING DIAGRAM TF 834.3



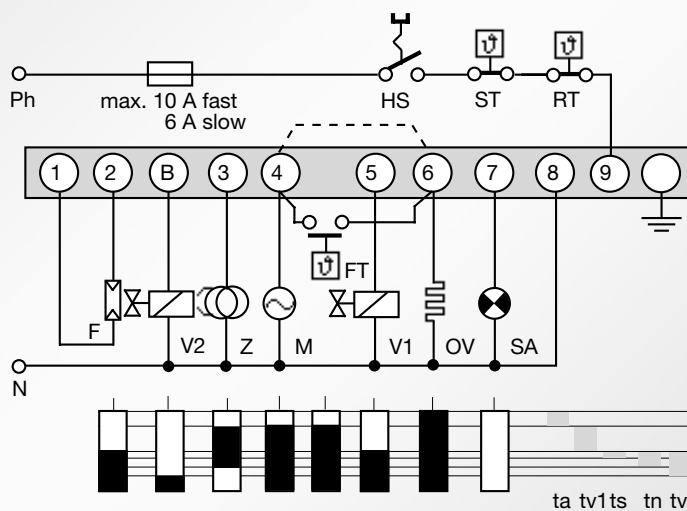
### IRD-OR UVD CONNECTION



HS Mains switch  
ST Limit thermostat  
RT Control thermostat  
F Flame detector MZ 770 S  
(IRD 1010/UVD 970 see sspare diagram)  
Z Ignition  
M Burner motor  
FT Release thermostat oil preheater  
V1 Oil solenoid valve  
OV Oil preheater  
SA External lock out signal  
\* For burners without fuel heaters term.  
4 and 6 have to be connected with a link

ta Pre-heat-time oil preheater  
tv Pre-purge and pre-ignition time  
tf stray light monitoring  
ts Lock out safety time  
tn Post-ignition time

### CIRCUIT AND TIMING DIAGRAM 836.3



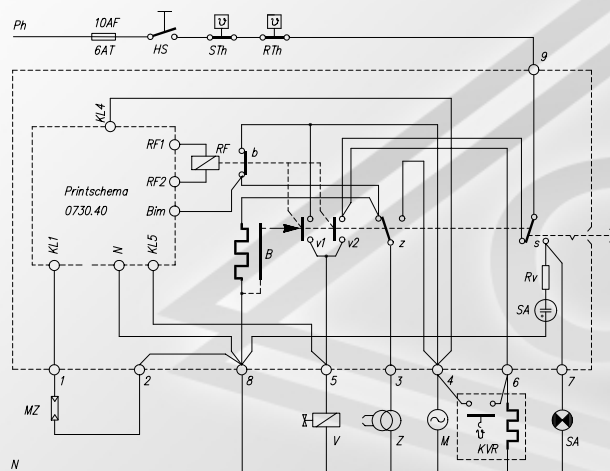
### IRD-OR UVD CONNECTION



HS Mains switch  
ST Limit thermostat  
RT Control thermostat  
F Flame detector MZ 770 S  
(IRD 1010/UVD 970 see separate diagram)  
Z Ignition  
M Burner motor  
V1, V2 Solenoid valves  
OV Oil preheater  
FT Release thermostat oil preheater  
SA External lock out signal  
\* With burners without fuel heaters term.  
4 and 6 have to be connected with a link

ta Pre-heat-time oil preheater  
tv1 Pre-purge and pre-ignition time  
ts Lock out safety time  
tn Post-ignition time  
tv2 Delay time to oil V2

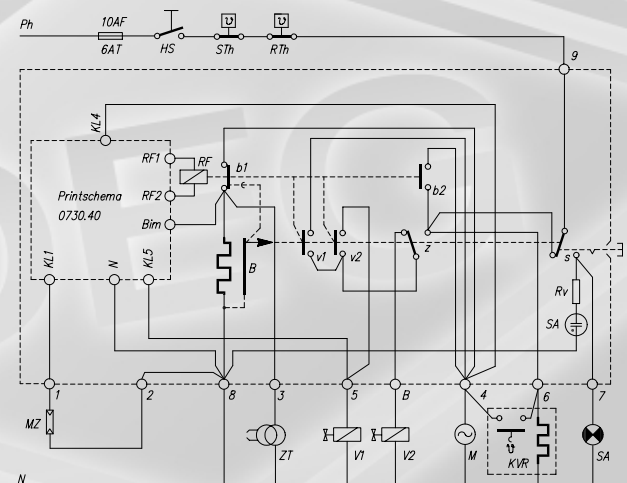
### SCHEMATIC DIAGRAM TF 834.3



HS Mains switch  
ST Limit thermostat  
RT Control thermostat  
SA Lock-out signal indicator

F Flame detector MZ 770 S, IRD 1010 or UVD 970  
V Valves  
Z Ignition  
M Burner motor  
OV Oil preheater

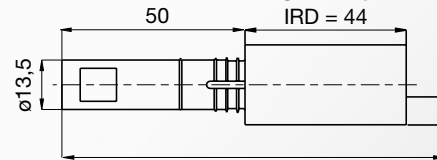
### SCHEMATIC DIAGRAM TF 836.3



RF Flame relay  
rl low voltage relay  
B Thermomechanical timer  
RV Resistor

[illegible]

UVD = 29  
IRD = 44



UVD = 89  
IRD = 104

ITEM	DESIGNATION	ITEM NO.
Control box	Type TF 834.3	02234
Control box	Type TF 834 E.3	02235
Control box	Type TF 836.3	02236
Socket	Socket 701 ABEN	70001
Insert plate	PG-Plate	70502
optional	Cable entry plate	70501
Flame detector	MZ 770 S	50001
optional	MZ 770 S mounted in shaft	51001
optional	IRD 1010 right	16501
optional	IRD 1010 end-on	16502
optional	IRD 1010 left	16503
optional	UVD 970	16702
Support for flame detector	Holder for MZ	59101
optional	Holder M 74 for IRD, UVD	59074
Connectioncable	Plug type, 3 core cable, 0.6 m, with tag wire ends	7236001
Connectioncable	Plug type, 2 core cable, 0.5 m, with tag wire ends	7225001

Specifications subject to change without notice