

Oil burner safety control

For burners on hot-air heaters, as well as burners above 30 kg/h in intermittent operation, 1- or 2-stage, direct lockout Flame detectors:

- Photoresistor MZ 770 S
- Flicker detector IRD 911 / 1010

INTRDUCTION

The oil burner automatic safety control MMO 872, resp., MMO 876 controls and monitors burners on hot air heaters, as well as burners with an oil consumption of over 30 kg/h (approved and certificated acc. to EN 230).

If the infrared flicker detector IRD 911 or 1010 is utilized as flame monitor, even red hot combustion chamber walls cannot affect the safe operation, since this sensor exclusively responds to the flame.

The oil burner automatic safety control MMO 872/876 is fully interchangeable with the type TTO 872/876, but going directly to lockout (=lockout at loss of flame).

It is possible to mount the remote reset device FR 870 (art. No. 70700, refer to the documentation "Remote Reset device FR 870").

The oil burner control boxes MMO 872/876 are equipped with a low-voltage protection according to DIN-EN 230.

TYPES AVAILABLE

MMO 872 without connecting terminal for oil pre-heater
 MMO 876 with bridging contact and connection for oil pre-heater.

CONSTRUCTIONAL FEATURES

The control box is enclosed in a protective, flame resistant, transparent, plug-in type plastic housing, and includes:

- Synchronous motor with reduction gearing driving cam switch
- Cam switch with informative, coloured programme indicator
- 10-way cam switch assembly controlling the programme sequence
- Electronic components on plug-in printed circuit

The following important indicators and operating controls are situated on the front of the control box:

- Reset button incorporating signal lamp for malfunction (lockout)
- Coloured programme indicator
- Central screw fastening



TECHNICAL DATA

Operating voltage	220 / 240 V (-15... +10%) 50 Hz (40 - 60 Hz)
AC frequency variations	result in proportional timing deviations
Rating fuse	max. 10 A rapid, 6 A slow
Power consumption	approx. 10 VA
Max. load per output	
- Kl. 3, ign. trafo	2 A, cos φ 0.2
- Kl. 4, fan motor	2 A, cos φ 0.4
- Kl. 5 + 6 + B, solenoid valves	1 A, cos φ 0.4
- Kl. 6, oil preheater	2 A, cos φ 1
- Kl. 7, alarm indicator	2 A, cos φ 0.4
total load	5 A, cos φ 0.4
Pre-purge time	23.5 sec
Pre-ignition time	23.5 sec
Post-ignition time	8.5 sec
Delay time valve 2	40 sec
Ignition safety time	5 sec max.
Waiting period after shut-down due to malfunction	none
Flame detector	
MZ 770 S	for side-on and end-on viewi.
IRD 911 / 1010	for side-on and end-on viewi.
Light sensitivity MZ 770 S	better than 8 Lux
Connection to flame detector	
MZ 770 S	2 m cable length maximum
IRD 911 / 1010	up to 100 m cable length
Weight, incl. base	0.35 kg
Mounting position	Any
Insulation Standard	IP 44
Recommended ambient operating temperatur for control and flame detector	-20° C... +60° C

APPLICATION NOTES

1. Flame control

The following flame detectors can be used for flame control:

- For yellow oil flame: photoresistor MZ 710 S (side-on or end-on viewing).
- For blue or yellow oil flame: infrared-flame detector type IRD 1010.

Generally the no flamesignal is generated at light levels below 3 Lux with respect to the operating cycle of the control. According to DIN 4787, clause 4.3.4, stray light safety level has to be established in conjunction with the accompanying burner.

Commissioning with MZ 770 S: Measuring the photo-current is unreliable, as the value does not change remarkably. It is recommended to measure the DC-voltage between terminals 1/- and 2/+.

voltage during pre-purge: > 55 VDC

voltage during operation: < 25 VDC

Input impedance of the voltmeter: $\geq 10 \text{ M}\Omega$

By installing the IRD/TTO adaptor cable between the IRD 1010 and the detector cable in conjunction with the MMO 872 or MMO 876 control boxes, the uniform system of baseplate wiring can be adhered to.

2. Burner Control

A special contact in the unit (only MMO 876) bridges the release thermostat of the oil pre-heater as soon as the burner goes into operation and a photocurrent is present. This prevents an interruption to the operating sequence as a result of declining oil temperature (e.g., high throughput capacity). In accordance with DIN 4787, part 1, section 4.2.6, the internal bridging of the release thermostat of the oil pre-heater is only permissible up to a throughput capacity of maximum 10 kg/h of oil. Burners with higher capacities have to switch off when the required oil temperature is not reached. The release thermostat must then be installed in the phase supply line and terminal 4 bridged with 6.

3. Safety

With respect to design and programme sequence, the oil burner automatic safety controls type MMO 872 and MMO 876 comply with the currently applicable European standards and regulations for hot air heaters and burners with capacities of over 30 kg/h. Features, which increase the safety above the standard:

- flame supervision with infrared-detector
- direct lockout

4. Mounting and Electrical Installation

Wiring base:

- 3 earth terminals with additional terminal for burner earthing.
- 3 neutral terminals with internal permanent connection to neutral terminal.
- 2 slide-in plates and 2 easy-knock out holes (PG 11 thread), plus 2 knock out holes in the base bottom facilitate the base wiring.
- For 2-stage burners, which are equipped with the TTO 876, the unit base type 701-TTG-EN (Art. No. 70101) or type 701-TTG-ENCD (Art. No. 70103) have to be used.

General:

- Mounting position optional, protection class IP 44 (water spray). Control box and flame detector should not be subjected to excessive vibration.
- When installing the control, the relevant regulations have to be observed.

COMMISSIONING AND ROUTINE CHECKS

1. Important notes

- On commissioning it is advisable to carefully check the wiring according to 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 exceeded. 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 ensured.
- 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. Functional control

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

- 2.1 Start-up with covered flame detector:
-> lockout at the end of the safety time
- 2.2 Start-up with exposed flame detector:
-> lockout after start of the fan motor
- 2.3 Normal start-up; with burner in the "run" position, cover up the flame detector:
-> direct lockout

3. Fault finding

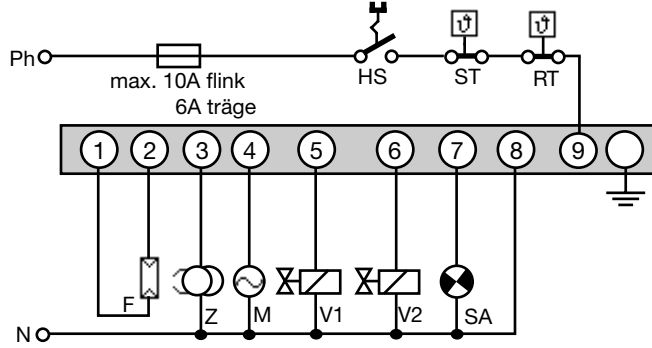
- 3.1 Burner does not operate, programme indicator remains stationary:
 - Fault in electrical supply
 - Thermostat OFF
- 3.2 Control box goes to lockout shortly after beginning pre-purge (programme indicator in blue area):
 - no load at terminal 5
 - flame sensor faulty control box faulty
 - Flame signal (stray light)
- 3.3 Control box goes to lockout at the end of the safety delay time (yellow area):
 - IRD sensitivity setting too low
 - flame sensor dirty or incorrectly installed
 - flame sensor incorrectly wired or faulty
 - control box faulty
- 3.4 No flame, lockout at the end of the safety delay time (yellow area):
 - no ignition
 - no fuel supply
- 3.5 lockout at the red area:
 - flame unstable after the end of the safety time
- 3.6 Control box goes to lockout during normal operation (end of green area):
 - Loss of flame
 - Flame signal too weak

Note:

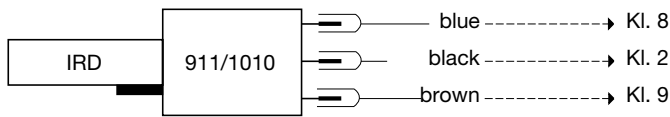
If a control box goes to lockout, it is in most cases doing its function for which it has been designed. Beside the mentioned possibilities, one of the following ones can be the reason for a burner fault:

- ignition spark at the wrong position
- oil tank empty
- oil tap closed
- oil filter stuck
- oil pump faulty

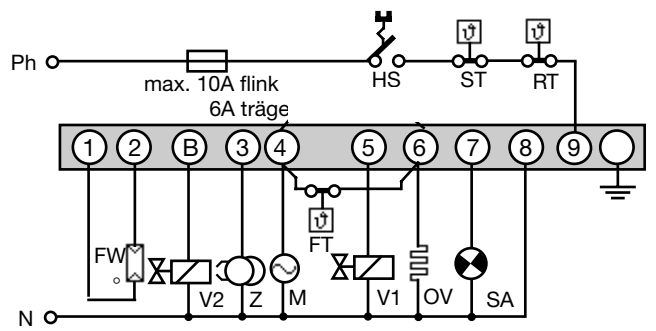
CIRCUIT AND TIMING DIAGRAM MMO 872



IRD-SUPPLY

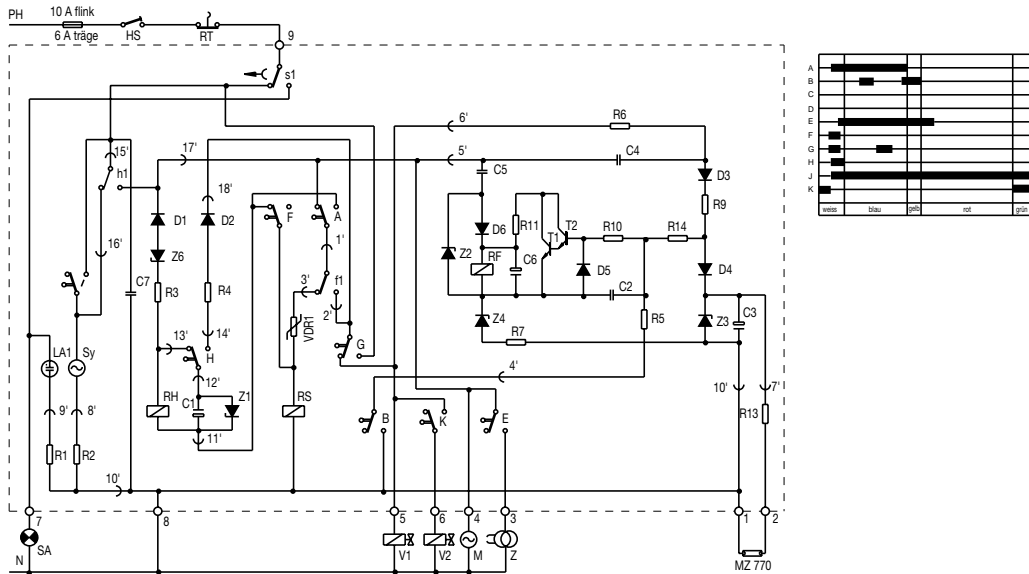


CIRCUIT AND TIMING DIAGRAM MMO 876

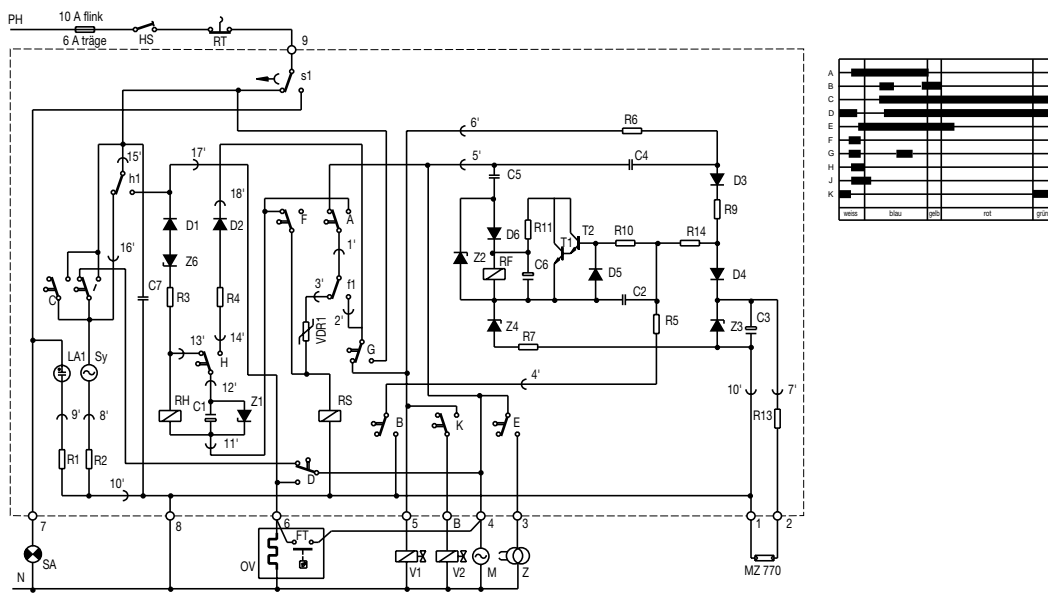


- HS Main switch
- ST Safety thermostat
- RT Controlling thermostat
- F Flame detector MZ 770 S (IRD 1010 in accordance with separate connection diagram)
- Z Ignition
- M Burner motor
- V1 Solenoid valve 1st stage
- V2 Solenoid valve 2nd stage
- FT Release thermostat oil preheater
- OV Oil pre-heater
- SA External indication of malfunction

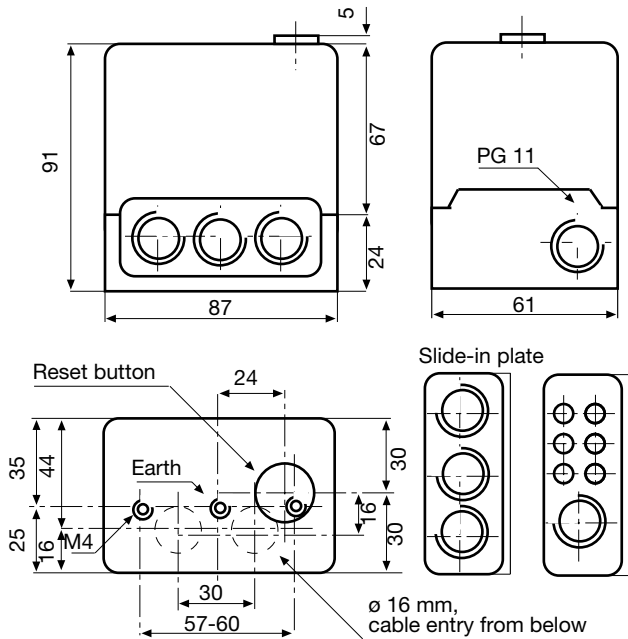
SCHEMATIC DIAGRAM MMO 872



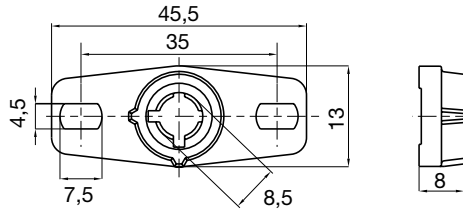
SCHEMATIC DIAGRAM MMO 876



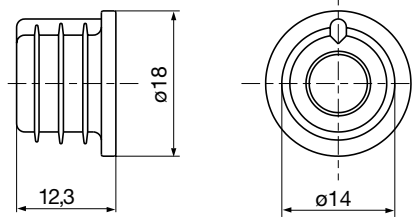
MMO 872 / 876 WITH BASE



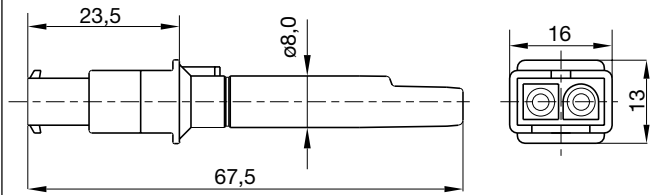
SUPPORT FOR MZ 770 S



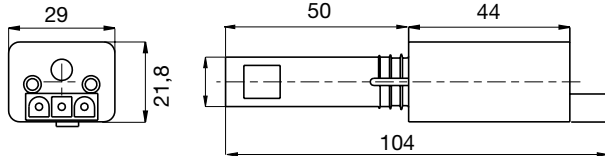
PLUG-IN SHAFT MZ 770 S



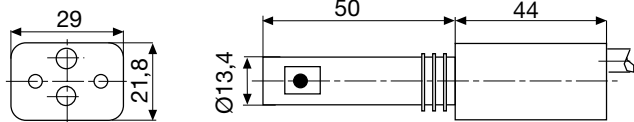
PHOTORESISTOR MZ 770 S



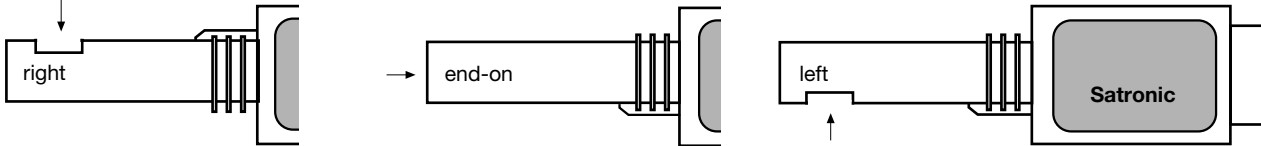
IRD 1010



IRD 911



VARIATION



ORDERING INFORMATION

ITEM	DESIGNATION	ITEM NO.
Control unit	Type MMO 872	06610
or	Type MMO 876	06611
Socket	Socket 701 ABEN	70001
Socket for TTO 876, 2-stage	Socket 701 TTG-EN	70101
Insert plate	PG-plate	70502
optionally	Cable entry plate	70501
Flame detector	MZ 770 S	50001
optional	MZ 770 S mounted with plug-in shaft	51001
optional	IRD 1010 right	16501
	IRD 1010 end-on	16502
	IRD 1010 left	16503
Support for flame detector	Holder for MZ	59101
optional	FZ Holder M 74	59074
Connection cable IRD	Plug-type, 3 core cable, 0.6 m, with tag wire ends	7236001
Connection cable MZ	Plug-type, 2 core cable, 0.5 m, with tag wire ends	7225001

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

Specifications subject to change without notice.

MMO 872 / 876



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