
Technical Information and Installation Instructions Oil Burners GB2020 / GB2025

Hoval

May 2003

Subject to alterations

4 203 740 / 00



Hoval Schweiz

Hoval Herzog AG
CH-8706 Feldmeilen
General-Wille-Str. 201
Tel. 01 / 925 61 11
Fax 01 / 923 11 39

Hoval Österreich

Hoval Gesellschaft mbH
A-4614 Marchtrenk
Hovalstrasse 11
Tel. 07243 / 550-400
Fax 07243 / 550-17

Hoval Deutschland

Dipl. Ing. Karl Hagenberger GmbH
D-85609 Aschheim-Dornach
Karl-Hammerschmidt Strasse 45
Tel. 089 / 92 20 97-0
Fax 089 / 92 20 97-77

For further addresses, see last page

Contents

1. General information	2
2. Safety notices	2
3. Servicing	2
4. Conformity declaration	3
5. Technical specifications	3
6. Installing flange and burner	3
7. Establishing electrical connection of boiler control system	4
8. Oil pump	4
9. Installing oil lines	5
10. Changing nozzles	6
11. Adjusting ignition electrodes	6
12. Adjusting air quantity	6
13. Adjusting recirculation	7
14. Run-on relay TRRG	7
15. Operability check of the flame monitoring control device	8
16. Boiler/burner matching	10
17. Smokestack connection	10
18. Exhaust gas thermometer	10
19. Circuit diagram	11
20. Troubleshooting	12
21. Burner structural dimensions / boiler connecting dimensions	13

1. General information

The oil fan burners are tested and approved to LRV '92 for heating oil EL in compliance with State 23.8.35 sec. oel ,DIN 51603, ÖNORM C 1109, SN 181 160/2.

2. Safety notices

Observe the rules of engineering, the building inspection regulations and the statutory stipulations concerning the erection and operation of the plant.

Installation of the oil and exhaust gas connections, the commissioning, power connection, servicing and maintenance may be performed by a specialized company only.

For the making of the electrical connections the VDE- SEV or ÖVE regulations and the regulations of the responsible electricity supply company must be taken into consideration.

Any work on the electrical systems may be performed only by a skilled electrician in accordance with the relevantly valid VDE - SEV and ÖVE stipulations.

Risk of injury by fan wheel during activation in service position.

3. Service

Pursuant to section 9 of the heating systems ordinance it is required that you have the plant regularly serviced in order to ensure reliable and safe operation of the equipment.

Servicing is required annually. We recommend that you arrange a service contract with an approved specialised company.

4. Declaration of conformity

This is to certify that the HOVAL GB2020 and GB2025 oil fan burners comply with the fundamental requirements of the following directives:

- "Low-Voltage Directives" in compliance with directive 73/23/EEC in conjunction with DIN VDE 0700 Part 1/ issue 04.88 and DIN VDE 0722/issue 04.83
- "Electromagnetic Compatibility" in compliance with directive 89/336/EEC in conjunction with EN 55014/ issue 04.93 and EN 50082-1/issue 01.92
- "Machine Directives" in compliance with directive 98/37/ EC
- "Efficiency Directive" in compliance with directive 92/42/EEC in conjunction with EN 267/issue 10.91

5. Technical data

	GB2020-M16	GB2020-M20	GB2025-M25
Burner output in kg/h	1.3 - 1.9		1.7 - 2.2
in kW	15.5 - 22		20 - 26
Voltage	1 / N / PE ~ 50 Hz / 230 V		
Power consumption in W (max.) Start/operation	520 / 245		520 / 255
Weight in kg	11.7		

6. Installing flange and burner

Slide in the burner with the burner tube holder, raise the burner and tighten down the flange screw. Open the boiler door and snap the burner tube into place with the bayonet catch in the burner tube holder.



The recirculation slots in the burner pipe must not be covered by the door refractory. If required, cut out the door refractory in a conical shape.



1

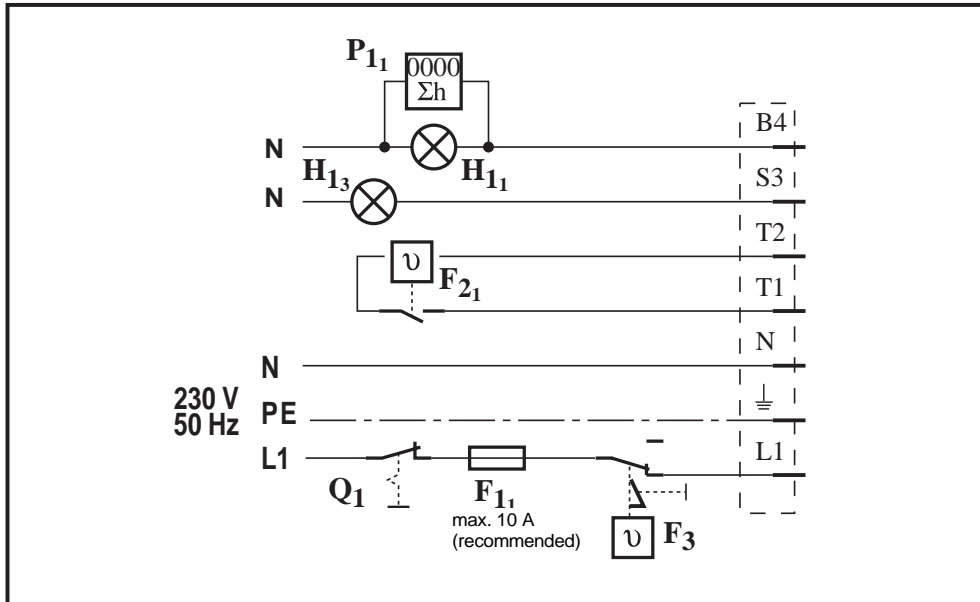


2

7. Establishing electrical connection of boiler control system

Establish the electrical connection in the supplied plug element in accordance with the wiring diagram while complying with local regulations. Protect the supply line with a 10 A fuse. It is expedient to use a flexible cable. If the plug element is already wired, check the connections in accordance with the wiring diagram below.

For explanation of switching symbols, see page 11

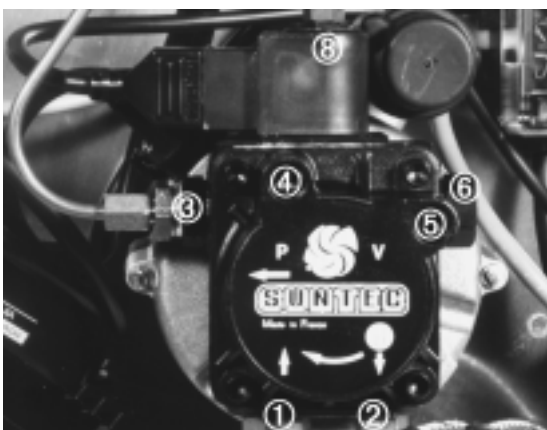


8. Oil pump

The pump pressure must be set for the appropriate power output (see separately supplied table of settings). The specified pump pressures are only guide values and may deviate depending on plant conditions. To do so:

- Unscrew sealing plug for pressure measurement connection ④ .
- Screw in pressure gauge and adjust pump pressure with pressure adjuster ⑥ in accordance with table of settings.

Suntec oil pump:



- ① = Feed line
- ② = Return line
- ③ = Pressure pipe connection
- ④ = Pressure measurement connection
- ⑤ = Vacuum measurement connection
- ⑥ = Pressure adjuster
- ⑧ = Solenoid valve

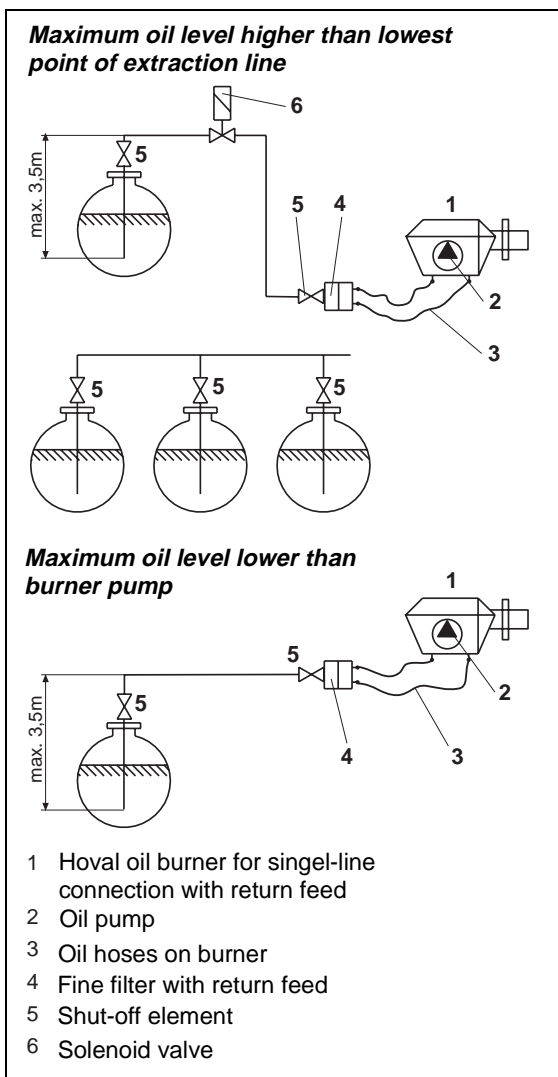
9. Installing oil lines

- In Switzerland, the oil fan burners may only be connected to single-line oil lines. Max. suction height without intermediate pump 3.5 m.
- Arrange the lines in such a way that the boiler door can be tilted out with the burner 90°.
- Install a shut-off element at the end of the rigid oil line ahead of the flexible oil lines (already installed in the »Oventrop filter«).
- Install a single-line fine filter with return feed and sintered plastic element (20-75 µm) (e.g. Oventrop type) ahead of the burner.
- The highest point of the oil line may be max. 3.5 m above that of the tank intake line.
- Install product pipes in such a way that no fluid can escape from the tank of its own accord (Art. 38 TTV).
- If the highest point of the oil level in the oil tank is above the burner oil pump, install a solenoid valve at the highest point of the oil line, as close as possible to the oil tank.

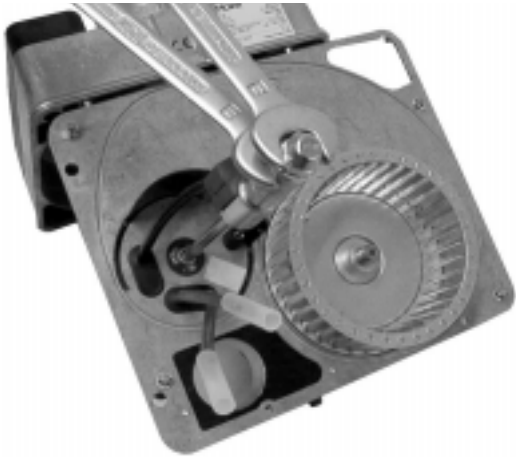
SINGLE-LINE SYSTEM BOILER POWER OUTPUT

Boiler power output	H* = 0 m	H* = 1 m	H* = 2 m	H* = 3 m
16 kW	30	30	30	20
20 kW	30	30	29	16
25 kW	30	30	23	13

*H = maximum suction height in m (heating oil EL, oil temperature > 10°C, up to 700 m above sea level, 1 filter, 1 non-return valve, 6 bends 90°)



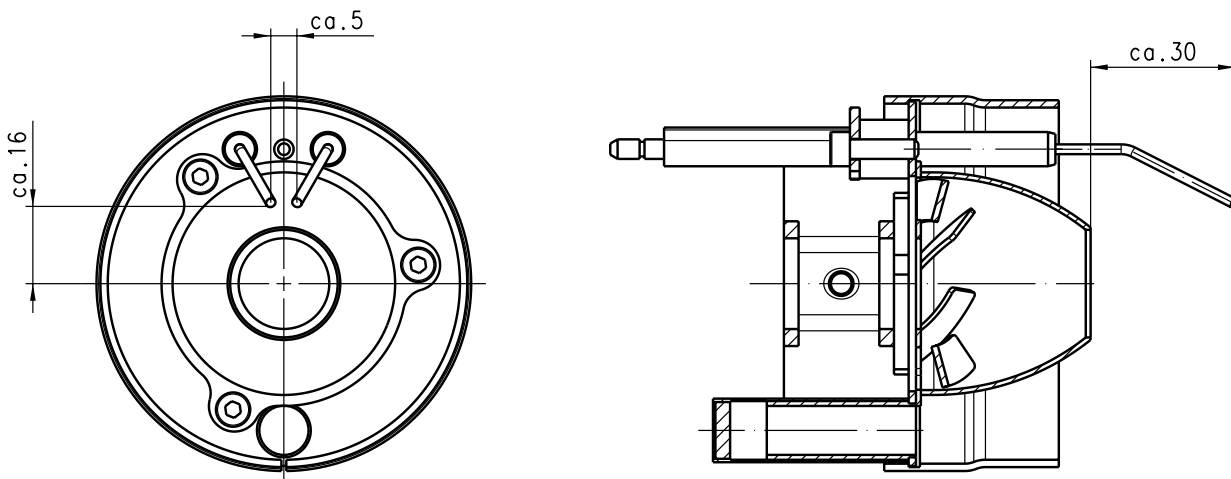
10.Changing nozzles



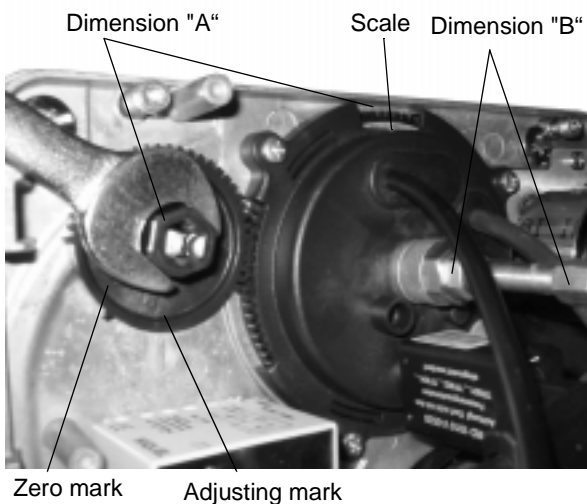
- Hook the mounting plate in service position.
- Release the ignition cable from the ignition electrode.
- Detach the air sleeve upwards.
- Release the oil nozzle (16 mm A/F engineer's wrench), securing the nozzle connection against turning with a 19 mm A/F engineer's wrench in the process. (illustrated)
- Replace the oil nozzle.

11.Adjusting ignition electrodes

The electrodes have been set ex-works. The specified dimensions are for checking purposes.



12.Adjusting air quantity



The scale serves as an orientation aid to facilitate adjustment of the air quantity. The air quantity is adjusted (depending on the power output) with a wrench (17 mm A/F) in accordance with the table of settings, dimension "A". The values in the table of settings can be read off directly at the scale. In the event of excess pressure in the combustion chamber, increase the value; in the event of vacuum pressure, reduce the value. Readjustment is necessary in any case on account of the type of plant.

In order to achieve uniform combustion values, we recommend that you install a draught regulator or a supplementary air device.

13.Adjusting recirculation



Recirculation gap

The recirculation dimension has been preset ex-works but can be adapted to the different plant conditions. It is possible to check the correct setting of the recirculation rate by measuring the emission values (NO_x, CO) while taking into account the starting performance.

To adjust, release the lock nut (13 mm A/F), gripping the knurled nut (15 mm A/F) in the process (see fig., Sec.12). The recirculation rate can be adjusted with the knurled nut (dimension "B"). Dimension "B" is measured at the free thread surface.

Small dimension = less recirculation
Large dimension = more recirculation

14.Run-on relay TRRG (for down firing burner)

In the case of a down firing burner, the fan run-on time is controlled with a run-on relay. The run-on time is 90 seconds.

15. Operability check of the flame monitoring control device

The DKO 974 control box has a microprocessor-controlled programme sequence which produces exceptionally stable cycles regardless of fluctuations in the power supply and the ambient temperature. The built-in visual information system enables continuous monitoring of the current status and also indicates the reasons for automatic cut-outs.

The cause of the last fault to occur is stored on the unit and thus makes it possible to trace a fault when the appliance is switched on again even after a power failure. The control box is designed to be proof against low voltages. Following a mains power failure a restart takes place in any case.

Information system

The information system indicates the operations associated with the burner control and monitoring systems. In addition to indicating the programme status it also enables the immediate location of faults during start-up or normal running without the use of additional equipment.

The information system communicates with the outside world by means of an LED display. The messages are represented visually by a flashing code.

Programme sequence display

The integral microprocessor controls both the programme sequence and the information system. The individual phases of the programme sequence are indicated by flashing codes.

Message	Flashing Code
Wait for release thermostat to close	.
Pre-ignition phase	.
Safety and post-ignition phase	■ .
Normal operation	.
Mains voltage low	■ ■ .
Printed conductor fuse faulty > device faulty	■ .

Description:

| = Short pulse

■ = Long pulse

. = Short interval

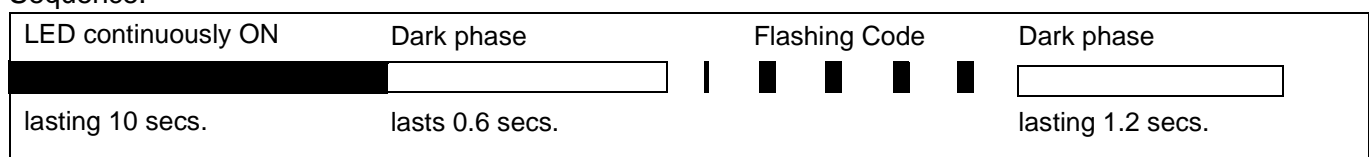
— = Long interval

Fault cause diagnosis

In the event of a fault, the LED remains continuously lit. Every 10 seconds, this is interrupted by the flashing code indicating the fault that has occurred.

Thus the following sequence can be observed which repeats itself continually until the fault is acknowledged, i.e. the appliance is reset.

Sequence:



Fault Indication	Flashing Code	Cause of defect
Automatic cut-out	■ ■ ■ ■	No flame detection within the safety time
Extraneous light fault	■ ■ ■	Extraneous light during monitored phase, possibly faulty sensor
Release thermostat timeout	■ ■	RT contact does not close within 400 secs.

Operability check

A safety check of the flame failure system must be carried out when the appliance is first commissioned and after any inspections or long periods of inactivity.

Startup attempt with darkened flame sensor:

The burner must switch to fault after the end of the safety period.

Startup with lit flame sensor:

The control device must switch to fault, see IRD operability check.

Normal startup; if burner in operation, darken flame sensor:

New startup attempt, the control device must switch to fault after the end of the safety period.

Safety and switching functions

In the event of a flame failure during operation the fuel supply is immediately switched off and the device makes a new startup attempt with pre-ventilation and post-ignition. If no flame has formed, upon expiry of the safety period the device switches over to fault. The control device also switches to fault in the event of extraneous light during the pre-ventilation time. The device remains in fault mode and the cause of the fault itself indicated until the automatic firing control device is unlocked again (fault cleared) by means of internal or external fault clearance.



The control box may only be connected up or disconnected when the master switch is in the "OFF" position or the 7-pin connector is disconnected. Incidence of extraneous light on the flame failure controller (e.g. due to an inspection glass) must be avoided. Only then is fault-free plant operation ensured. The flame failure controller must be adjusted in such a way that it is not affected by the incidence of light (e.g. due to an inspection glass or afterglowing dead-burned fireclay).

Satronic:	DKO 974 Mod. 05
t_{v1} = purge time	15 secs.
t_{vz} = pre-ignition time	5 secs.
t_f = extraneous light monitoring	5 secs.
t_s = safety time	5 secs.
t_n = post-ignition time	7 secs.
Post-ventilation after flame cut-off	-
Delay after switching-off fault	-
Photoelectric cell	IRD 1010 white

IRD operability check

Carry out the following checks after commissioning and each time after the burner has been serviced:

1. Set max. sensitivity at the flicker detector and start the burner:
No LED must light up during pre-ventilation after the start pulse.
2. Pull out the sensor during operation and cover well:
Both LEDs must go out. The control device makes a new startup attempt and switches to fault on expiry of the safety period.
3. New startup with covered sensor:
There must be no indication. The control device must switch to fault upon expiry of the safety period.
4. Burner startup with extraneously lit sensor, e.g. fluorescent lamp, cigarette lighter, light bulb (daylight not sufficient!). The extraneous light must cause the control device to switch to fault during the pre-ventilation time after 22 secs.
5. During normal burner operation carefully turn the potentiometer back from the max. setting until LED 1 flickers. Then increase again until both LEDs light up. If LED 1 does not flicker up to min. position 1: leave the potentiometer in position 1-2.

Important:

Burner in operation = both LEDs on

Burner in pre-ventilation = both LEDs off

Adjust the LED display so that both LEDs light up safely in both cold and hot burner condition after the ignition is switched off.

16.Boiler/burner matching

Precise boiler/burner matching is necessary for low-emission and energy-saving combustion. For this purpose a burner is assigned to the boiler in accordance with the working ranges and in consideration of the furnace resistance. Via the sliding flange set the insertion depth of the burner tube to suit the relevant burner chamber.



It is absolutely essential to ensure that the recirculation openings of the burner tube are not covered over and are not positioned in the door refractory. If required, cut out the door bricking in a conical shape.

17.Smokestack connection

The prerequisite for perfect operation of the furnace is a correctly dimensioned smokestack. Dimensioning is performed in accordance with DIN 4705 and in compliance with DIN 18160 or local regulations and on the basis of the boiler/burner power output.

Refer to the technical information and installation instructions of the heat generator for further information.

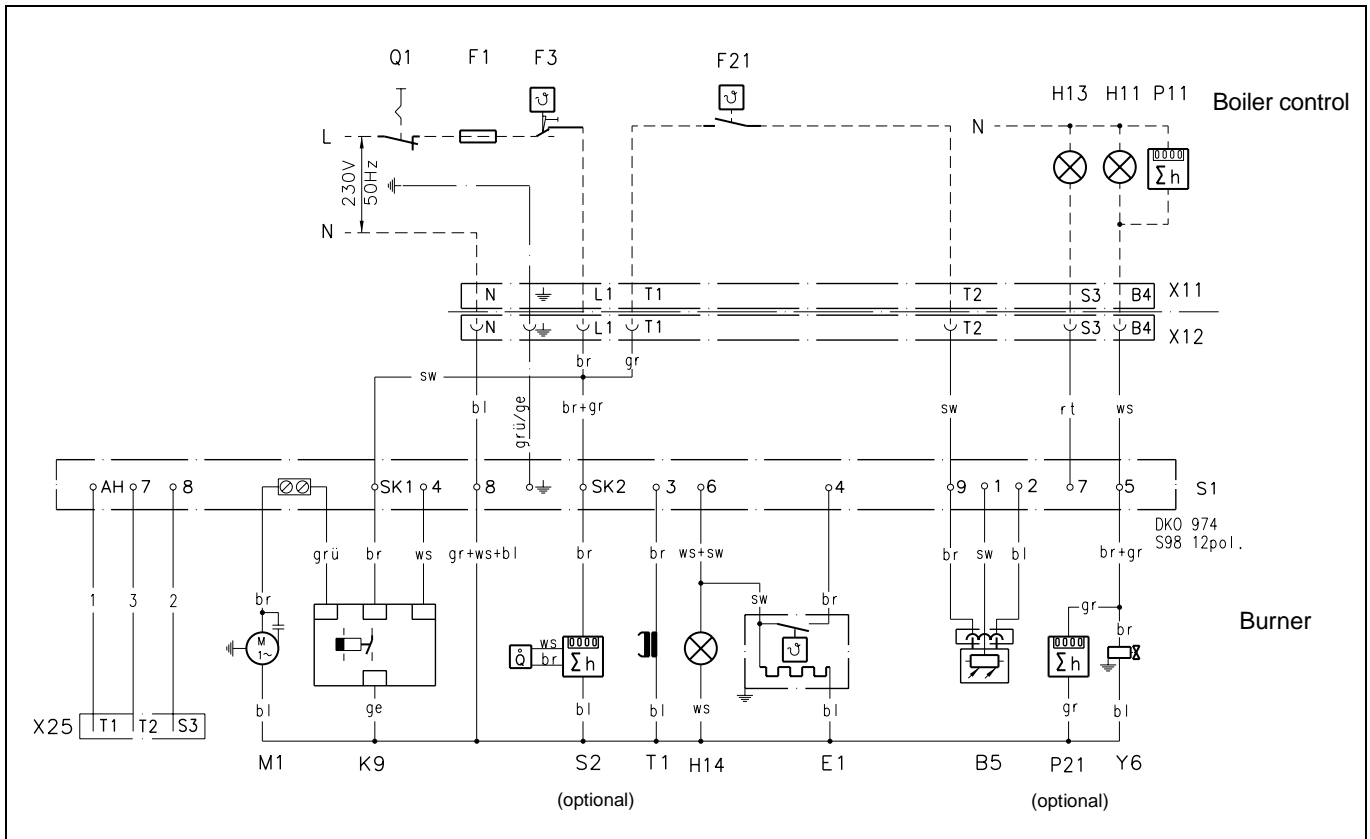
For condensation operation (MultiJet), pressure- and condensate-resistant exhaust gas systems are required and draught limiters must not be used.

18.Exhaust gas thermometer

For exhaust gas temperature monitoring the heating system should be equipped with an exhaust gas thermometer. The higher the exhaust gas temperature, the greater the exhaust gas loss. Rising exhaust gas temperatures indicate increasing deposits that will reduce the degree of combustion efficiency.

In the event of an increasing exhaust gas temperature have the heating plant cleaned and readjusted by a suitably skilled person.

19. Circuit diagram



- B5 Flame failure controller
- E1 Preheater
- F1 Ext. fuse (recommended: max. 10 AF)
- F21 Ext. temp. controller
- F3 Ext. safety temperature limiter
- H11 Ext. operating lamp
- H13 Ext. lamp, fault message
- H14 Oil preheater, indicator lamp
- K9 Run-on relay
- M1 Burner motor
- P11 Ext. time meter
- P21 Burner time meter (optional)
- Q1 Main heating switch
- S1 Control device TF 834 / S98
- S2 Oil control (optional)
- T1 Ignition transformer
- X11 Plug element, boiler control
- X12 Socket element, burner
- X25 Plug element, remote unlocking
- Y6 Oil solenoid valve
- PE PE conductor

Key to colours:

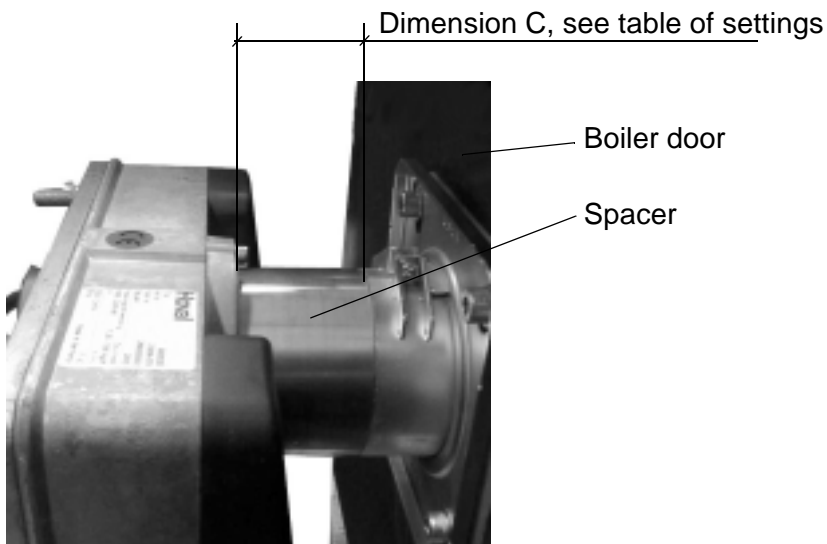
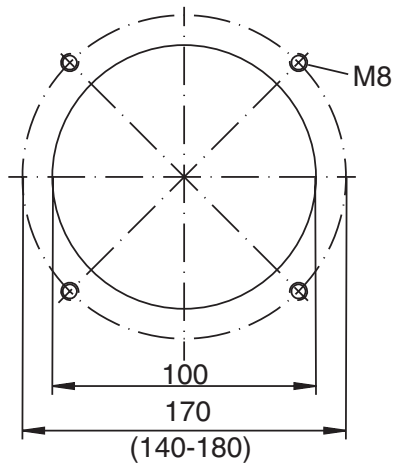
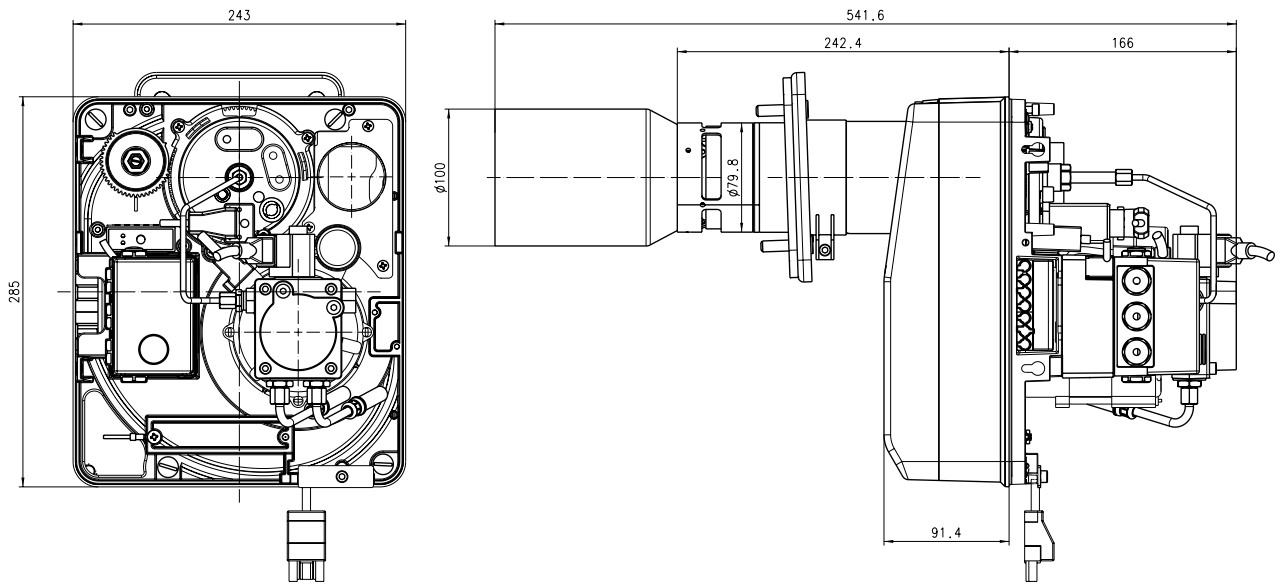
- bl = blue
- br = brown
- ge = yellow
- gr = grey
- grü = green
- rt = red
- sw = black
- ws = white

20. Troubleshooting

Fault	Cause	Remedy
Burner motor not operating	Fuse faulty Safety thermostat locked Temperature of controller setting exceeded Control box faulty Motor faulty	Replace Unlock Renewed start attempt after temperature drop Replace Replace
Burner starts up (does not start up) and after expiry of the safety period switches to fault	a) with flame formation: Flicker detector contaminated, faulty, not correctly connected or not correctly adjusted Air sleeve not correctly positioned Control device faulty Recirculation rate too high b) without flame formation: No ignition Burner not receiving any oil: Valves, oil line closed Oil tank empty Filter contaminated Oil line leaking Pump faulty Foot valve leaking Nozzle soiled or defective. Solenoid valve faulty Extraneous light Motor pump clutch faulty	Clean, replace, connect correctly or adjust sensitivity Correct position Replace Reduce recirculation rate Check ignition electrode and setting, ignition transformer and cable Open Replenish oil Clean Seal Replace Seal Replace nozzle Replace Refer to Operability check of control device Replace
Flame extinguishes during operation	Oil supply used up Nozzle filter clogged Oil filter or oil feed lines contaminated Inclusions of air Solenoid valve faulty	Replenish oil Replace nozzle Clean filter and lines Check suction line and fittings Replace
Mixer heavily oiled up or coked up	Incorrect setting Incorrect nozzle size Combustion air quantity not correct Combustion chamber insufficiently ventilated Incorrect setting or recirculation dimension (dimension "B")	Correct setting dimensions Replace Readjust burner Ensure sufficiently large ventilation openings Adapt recirculation dimension
Radio and TV interference	Ignition sparkover to nozzle or air sleeve Weak aerial/antenna power	Correct ignition electrode Check/replace ignition cable Have aerial/antenna checked Install suppression capacitor or suppression resistors

21. Burner structural dimensions / boiler connecting dimensions

All dimensions in mm.



Switzerland

CH-8706 Feldmeilen,
General-Wille-Strasse 201
Tel. 01/925 61 11,
Fax 01/923 11 39
Hotline outside business hours:
Tel. 0848 848 464
www.hoval.ch

Basel, Schneckelerstr. 9,
CH-4414 Füllinsdorf
Tel. 0848 640 640,
Fax 0848 640 641
kc.basel@hoval.ch

Zurich, Postfach, CH-8706 Feldmeilen
Tel. 0848 81 19 30,
Fax 0848 81 19 31
kc.zuerich@hoval.ch

Eastern Switzerland, Postfach,
CH-8706 Feldmeilen
Tel. 0848 81 19 20,
Fax 0848 81 19 21
kc.ostschweiz@hoval.ch

French-speaking Switzerland,
Ch. de Cloalet 12, CH-1023 Crissier
Tel. 0848 848 363,
Fax 0848 848 767
kc.suisse.romande@hoval.ch

Ventilation and Systems Engineering,
Postfach, CH-8706 Feldmeilen
Tel. 0848 81 19 50,
Fax 0848 81 19 51
kc.umwelt-energien@hoval.ch

Berne, Aemmenmattstr. 43,
CH-3123 Belp
Tel. 031/818 66 30,
Fax 031/818 66 31
kc.bern@hoval.ch

Central Switzerland, Postfach,
CH-8706 Feldmeilen
Tel. 0848 81 19 40,
Fax 0848 81 19 41
kc.zent.schweiz@hoval.ch

Vaduz, Austrasse 70, FL-9490 Vaduz
Tel. +423 399 28 00,
Fax +423 399 28 01
kc.vaduz@hoval.ch

Ticino, Via Cantonale 34A,
CH-6928 Manno
Tel. 091/610 43 60,
Fax 091/610 43 61
kc.ticino@hoval.ch

Austria

A-4614 Marchtrenk, Hovalstrasse 11
Tel. 07243/550-0,
Fax 07243/550-15
Tel. Sales 07243/550-300,
Fax 07243/550-16
Aftersales Service 07243/550-400,
Fax 07243/550-17
www.hoval.at
kc.marchtrenk@hoval.at

A-6845 Hohenems,
Franz-Michael-Felder Strasse 6
Tel. 05576/77 499,
Fax 05576/77 499 96
kc.hohenems@hoval.at

A-6020 Innsbruck,
Etrichgasse 34
Tel. 0512/36 40 50,
Fax 0512/36 40 50 25
kd.innsbruck@hoval.at

A-8041 Graz, Messendorfer Strasse 6
Tel. 0316/47 25 36,
Fax 0316/47 20 50
kd.graz@hoval.at

A-1220 Vienna, Percostrasse 26
Tel. 01/278 06 74,
Fax 01/278 06 74 29
kd.wien@hoval.at

Germany

Dipl. Ing. Karl Hagenberger GmbH
Bayern
Karl-Hammerschmidt Strasse 45
D-85609 Aschheim-Dornach
Tel. 089/92 20 97-0,
Fax 089/92 20 97-77
www.hoval.de
info.de@hoval.com

Vertriebsbüro Baden-Württemberg
Freiherr vom Stein Weg 15
D-72108 Rottenburg / Neckar
Tel. 07472 - 163- 0,
Fax 07472 - 163 - 50

Hoval Vertriebs- und Servicesenter Ost
Fa. Jentzsch
Tauernstrasse 53
D-01279 Dresden
Tel. 0351 - 2523108,
Fax 0351 - 2523873

Hoval Vertriebs- und Servicesenter Nord
Fa. Hormann
Danziger Strasse 10
D-27243 Harpstedt
Tel. 04244 - 9275 - 0,
Fax 04244 - 9275 - 20

Fa. Niwek
Wachtelberg 15
D-97273 Kürnach
Tel. 09367 - 9944 - 40,
Fax 09367 - 9944 - 41

United Kingdom

Hoval Limited
Northgate, Newark, Notts. NG24 1JN
Telephone 01636 672711
Fax 01636 673532
boilersales@hoval.co.uk

Hoval

Responsibility for Energy and the Environment