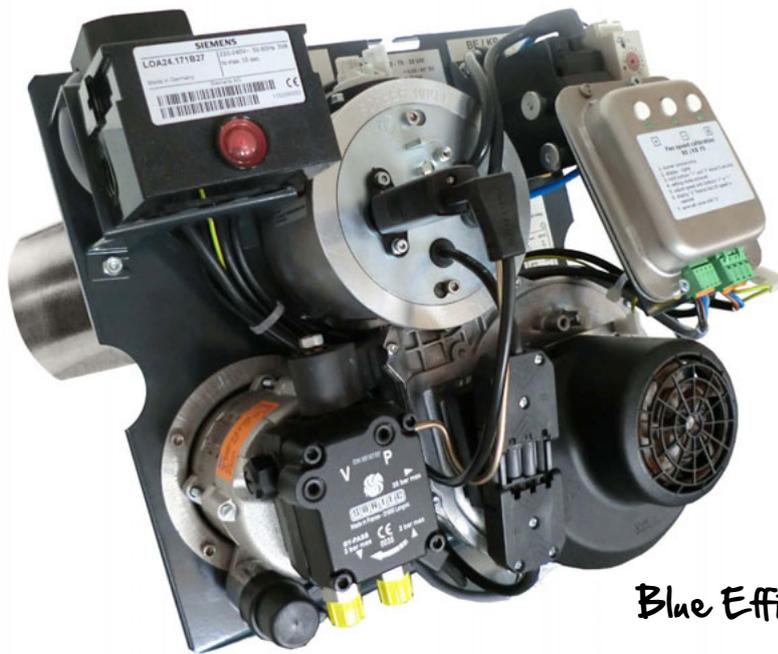


# Installation and Service Instructions

## BLUE BURNER for Kabola Heating System by SCHEER



BE - KB 20

BE - KB 40

BE - KB 45

BE - KB 50

BE - KB 75

*Blue Efficiency®*

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## 1. Safety

### About these instructions

These commissioning and servicing instructions contain important information regarding the safe and proper installation, commissioning and servicing of the Blautherm DUO BE-KB blue-flame burner.

These start-up and maintenance instructions are designed for specialists, who – through their vocational training and experience – are knowledgeable in handling heating systems and installing oil-fired systems.

The Blautherm DUO BE\_KB blue-flame burners are referred to throughout this manual simply as "the burner".

Please follow these instructions for your safety.

### Intended use

The burner may only be fitted in a Kabola KB boiler. The burner may only be operated when properly installed in the boiler.

The burner is heat-tested at the factory and preset for the specified nominal boiler output (see label on burner). This means that it is only necessary to check the burner settings at initial start-up and adjust them for the local conditions if necessary.

### CAUTION!

Before commissioning the burner, read and follow the safety instructions in this commissioning and servicing manual.

### WARNING!

If installation, adjustment, modification, operation or maintenance of the heating system is carried out by an unqualified person, this may result in product damage or personal injury. The instructions given in this commissioning and servicing manual must be followed precisely. If you require assistance or further information, contact a qualified installer or an appropriate service provider.

### CAUTION!

This instruction manual forms part of the technical documentation that is to be handed to the heating system operator. Discuss the instructions in this manual with the owner or operator of the heating system to ensure that they are familiar with all information required for operation of the heating system.

### Comments

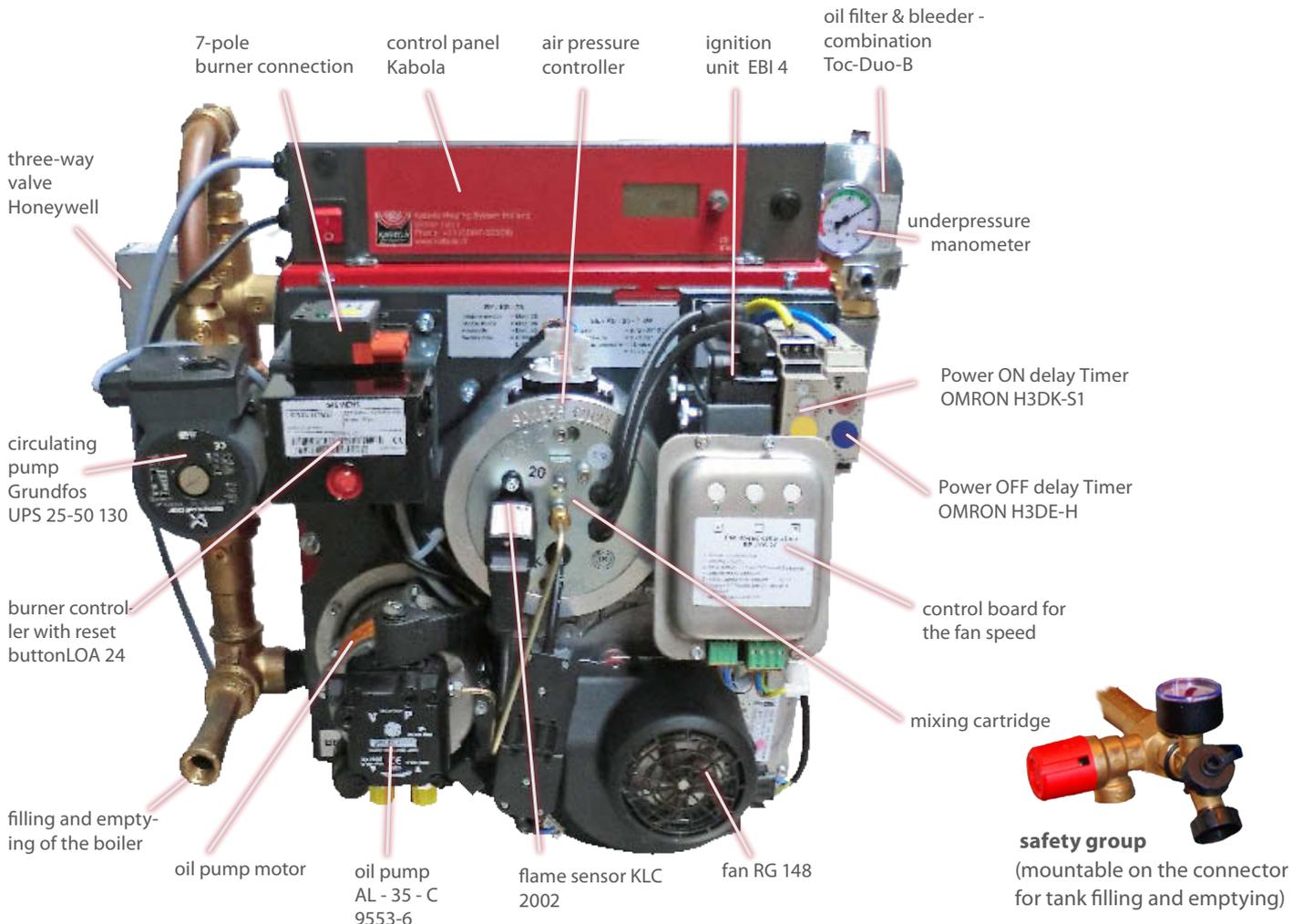
The burner must be operated with the specified fuel only.

The system must be cleaned and serviced at least once a year. The operation of the complete system must be tested at the same time. Any faults must be corrected immediately.

## 2. Product description

- The burner is controlled and monitored by the fully automated primary burner controller LOA 24.
- The burner must be properly connected to the burner controller LOA 24 by means of a connector (7-pin burner connector). A flashing green light indicates correct connection.
- After a demand for heat has been generated by the heating system control, the burner is switched on and the oil is heated prior to entering the nozzle. The process may take a maximum of three minutes when starting a cool engine.
- After the oil has been heated, the fan and pump are on, the solenoid valve opens, and power is supplied to the igniter.
- This combustion system vaporizes the oil using recirculation of hot gases, mixing them homogenously with the combustion air and burning them inside the burner tube.
- A blue flame is visible immediately after ignition.
- The flame sensor must send a flame detected signal before the safety period expires; otherwise the system will be switched off.
- At the end of the heat demand, all components are power off. Only the fan is keeps on working for a period of 120 sec.

represented by KB 20 / 7 kW with a connection storage tank



### 3. Initial burner start-up

This chapter describes how to start the burner for the first time. The burner has been factory fire-tested and has passed functional performance tests under full working conditions.

Please verify whether the factory settings are acceptable for the intended installation, and adjust only if required due to system requirements.

#### 3.1 Checking electrical plug connections

- Check that all electrical plug connections are correctly installed.

#### 3.2 Checking and connecting the oil lines

Before connecting the oil supply to the burner, check that all oil lines and the oil filter are clean and tightly connected.

- Inspect the oil line and clean or replace it if necessary.
- Check the oil filter and replace it if worn out.
- Check the oil supply system.
- Connect the burner oil hoses to a Tiger loop.

Use the oil filter Tiger loop for **single line systems**.

#### ATTENTION!

**Oil filters are generally installed at least 30 cm above the level of the oil pump!**

**The oil-pipe-length has to be installed with an 50 % ascending slope respect to the oil filter.**

**Don't interchange the circulation and recirculation!**

**We advise for the use of a manometer!**



**Toc-Duo-B**  
Typ: 214 28  
Art.-Nr. 040513



**Manometer  
level indicator**  
Art.-Nr. 040126

#### 3.3 Bleeding the oil line

To ensure the burner operates safely and reliably you must check the oil supply system. Check the suction resistance and check for leaks, particularly in older systems.

**Use an oil suction pump** – this will prevent damage to the oil pump caused by operation without oil.

Check that the oil drawn in is free of air bubbles!

### 3.4 Starting the burner

Before starting the burner, you have to be sure that the oil is clean and dense up to the oil burner pump.

- Open the oil shut-off valve in the oil filter.
- Turn on the electric power for the heating system and boiler.
- Generate a heat demand on the dashboard.
- The burner can start after the oil pre-heating period

#### 3.4.1 Recording measured values

The boiler water temperature has a significant influence on the flue gas temperature. Therefore, if possible you should take the readings at a boiler water temperature of at least 60°C and after the burner has been running for approx. 20 minutes.

The burner has to be switch "on" and "off" three times in a row (allowing for the 120 sec when the fan is running after powering-off) in order to make sure that no air can be found in the nozzle head.

#### 3.4.2 Establishing the CO<sub>2</sub> content

- Insert the testing probe into the flue socket testing point so as to reach into the center of the flue gas flow (center of the flue pipe – highest flue gas temperature) and measure the CO<sub>2</sub> content.
- Close all measurement openings.

**Record the readings taken in the commissioning log on the burner !**

- If necessary you can adjust the air supply with the control board of the fan.



#### Fan speed calibration

1. burner commissioning
2. display - lights
3. hold buttons "+" and "s" about 5 seconds
4. setting mode achieved
5. adjust speed with buttons "+" or "-"
6. display "s" flashes fast till speed is reached
7. save set value with "s"

The fan is in permanent contact with the control board. Through an easy and ergonomic operation of the control board an ideal combustion can be realized.

- If all data is correct, the commissioning is completed.

## 4. Burner service and maintenance

Please pay attention to the following facts concerning the maintenance of the burner:

The operating values must be measured at the start of each inspection or maintenance. The heating system must be shut down for the inspection and maintenance work.

If the burner is in operation, the demand for heat must be stopped. Wait until the fan has stopped, then you can disconnect the contact to the 7-lines plug and disconnect the burner.

### 4.1 Recording and correcting measured values

The boiler water temperature has a significant influence on the exhaust temperature. Therefore, if possible you should take the readings at a boiler water temperature of approx. 60°C and after the burner has been running for more than twenty minutes.

- Insert the testing probe so as to reach into the center of the gas flow (center of the flue pipe – highest flue gas temperature).

#### **ATTENTION!**

**Take the readings of the commissioning log on the burner!**

**The fan pressure is a start pressure - re-adjust the fan - the CO<sub>2</sub> value is important!**

- If the readings differ from the required levels, re-adjust the burner.
- Close all measurement openings.

### 4.2 Inspection of the burner and burner cover

- Inspect the burner cover and burner for exterior contamination and damage.
- Look for dust, corrosion, defective oil lines or power cables and defective cover or panels.

### 4.3 Checking burner motor operation

- Check the function of the burner motor and monitor for operating noise. An operating noise indicates damaged bearings.
- Replace burner motor.
- Check the capacitor at each burner inspection. If the capacitance value deviates more than 5% (minimum 2,85 µF) the capacitor has to be replaced.

#### **ATTENTION!**

The motor is made of an stator with a double-sided varnished wire which is suitable for the maritime industry.

Only use original spare parts!

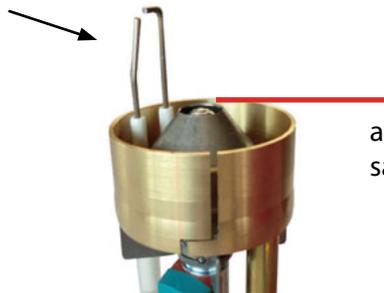
#### 4.4 Checking ignition electrode, mixing system and nozzle

- Disconnect the mixing systems by a turn into the left.
- The ignition electrodes should be free of deposits. Electrodes have to be replaced on every inspection!
- It is essential that the electrode and gap dimensions are as specified.

**Check the position of the mixing box and nozzle!**

**Keep an electrode gap of min.3 and max. 6 mm!**

electrode gap min. 3 - max. 6 mm



air tube and nozzle at same level



No axial twist! Please be careful!

- The oil nozzle must be replaced as part of the annual service. Use the correct nozzle as specified (see Chapter „spare parts“.)

#### 4.5 Checking burner tube

- Open the burner door.
- Inspect the burner tube.
- Clean the burner tube carefully, replace if necessary .
- Close the burner door and tighten the burner door bolts.

#### 4.6 Checking the oil pump and fan

- Don't open or clean the oil burner pump! In case of oil burner pump malfunction, please replace with an original spare part.
- The paddle wheels of the blower have to be cleaned after a few operating years.
- Check that all electrical connections are correctly installed.

### 4.7 multiservice plug connector for KABOLA 1-stage burner

checking and setting up



- ① indicator light for the correct phase position
- ② direct connection to the oil pump motor and the blower fan for checking the function
- ③ direct connection to the oil pump motor for sucking in the oil  
attention: just for short oil lines



- ④ setting the control board for fan speed
  - connect the fan with the control board and correct the speed if necessary
  - setting the fan speed after a replacement



- ⑤ direct connection to the ignition unit EB14 for checking the function (audible)
- ⑥ if the complete nozzle holder is pulled out you can see the ignition spark

## 5. Burner components

### 5.1 SCHEER Nozzles

SCHEER nozzles are specially configured and tested with a tolerance of 5 %.

#### ATTENTION !

A correct operation can only be guaranteed with the use of original SCHEER-nozzles!



SCHEER nozzles  
Art. Nr.: see 7.1 under Positon Nr. 28

### 5.2 Fan with speed calibration

The Blower fan RG 148 is a powerful two-stage fan for the KB-series from model KB20 up to KB 75.

The fan is in permanent contact with the control board. Through an easy handling of the control board an ideal combustion can be realized.



fan RG 148  
Art. Nr.: 015112

control board



control board  
Art. Nr.: see 7.1  
Position Nr. 37

#### Fan speed calibration

1. burner comissioning
2. display - lights
3. hold buttons "+" and "s" about 5 seconds
4. setting mode achieved
5. adjust speed with buttons "+" or "-"
6. display "s" flashes fast till speed is reached
7. save set value with "s"

### 5.3 Oil pump AL - 35 - C 9553-6

hydraulic data AL - 35 - C 9553-6

pressure range	<b>4 - 25 bar</b>
oil temperature	0 - 60° C
flow pressure	2 bar max
return pressure	2 bar max

#### ATTENTION!

The use of the oil pump AL-35-C9553-6 is mandatory!



Oil pump AL - 35 - C 9553-6  
Art. Nr.: 011236

## 5.4 The Oil pump motor

type	EB95C35/2
power	70 Watt
power rating	2810 / 50Hz 3200 / 60Hz
capacitor	3 $\mu$ F (heat resistant to 100° C)
power consumption	0,54 A



ACC EB95C35/2  
Art. Nr.: 015138

### electrical mains of 220V - 250 V and 50 Hz / 60 Hz

Check the capacitor at each burner inspection. If the capacitance value deviates more than 5% (minimum 2,85  $\mu$ F) the capacitor has to be replaced.

Mains voltage below 200V may result in motor shut-off!

#### **ATTENTION!**

The motor is made of an stator with a double-sided varnished wire which is suitable for the maritime industry.

Only use original spare parts!

## 5.5 Delay Timer

OMRON H3DE-H 120 seconds (L Series)

Power OFF delay Timer  
Art.-Nr. 070553

- The power ON delay (marked by a yellow dot) delays the burner start-up for 120 seconds after a voltage interruption (switching over from on-board electricity to mains electricity).

OMRON H3DK-S1 120 seconds

Power ON delay Timer  
Art.-Nr. 070555

- The power OFF delay (marked by a blue dot) enables at the end of the heat demand includes a post-purge period of the blower fan for 120 seconds.



## 5.6 Ignition Unit EBI 4

The EBI4 series is an electronic ignition unit for intermittent ignition between 2 electrodes .

Low weight and small dimensions, due to the high operating frequency, makes the EBI4 series very suitable for modern compact burners.

Connections with a plug on the primary side and secondary side make installation and service quick and simple.



ignition unit EBI 4  
Art. Nr.: 010276

### 5.7 Flame detector KLC 2002

The wide band flame detector KLC 2002 is a compact flame detector, which is specially designed for blue flame combustion systems. The patented evaluation of the flame signal is based on the flicker frequencies of the flame. A RISC-Processor enables the evaluation and conversion of the flame signal into digital information to provide an output signal for burner control boxes. All flames will be detected by an automatic sensitivity control. Adjustments during commissioning and maintenance are not necessary!



Flame detector KLC 2002  
Art. Nr.: 020064

Due to international standards the flame detector KLC 2002 will only detect signals caused by the flicker of the flame and no signal from continuous radiation and all kinds of constant frequency. Signals caused by disturbing light sources, e.g. fluorescent tubes or background radiation from hot refractories will be cut off, so that unwanted influences are not possible. A special magnetic holder is not necessary.

#### Display operating state

LED off	KLC is not active
LED flashing	security test starts, KLC is active, no flames detected
LED on	security test starts, KLC is active, flame detected

#### Safety guidelines

Switch off the system before starting the service or replacement.

### 5.8 Oil burner controller LOA - 24.171. B27

#### Application

The burner controller initiates starts up and monitors the burner at all times. In this burner the flame is monitored by the blue-flame detector. The burner controller receives a heat demand from the heating system.

If a fault occurs, the reset button allows for troubleshooting!

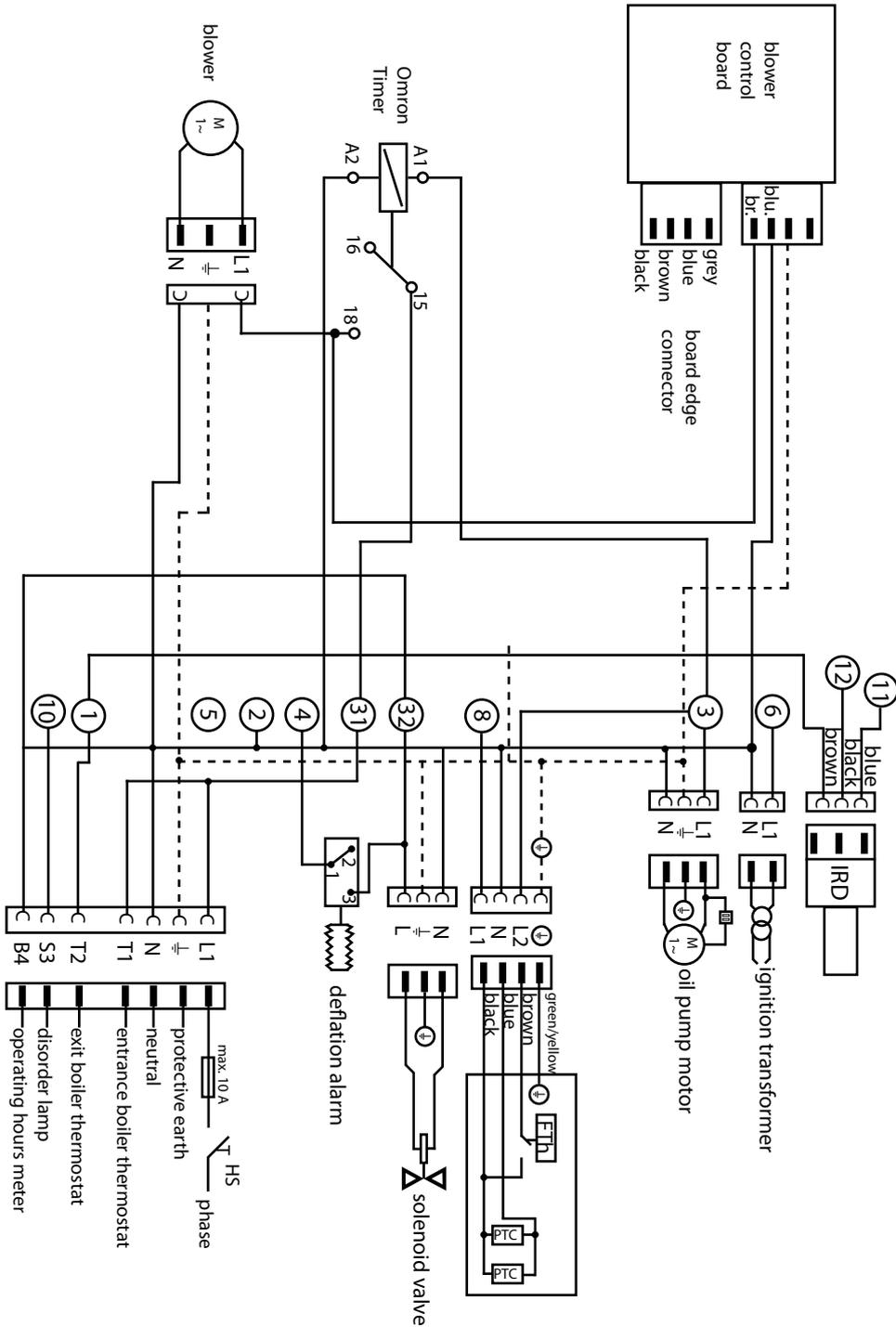


Oil burner controller LOA 24  
Art. Nr.: 020100

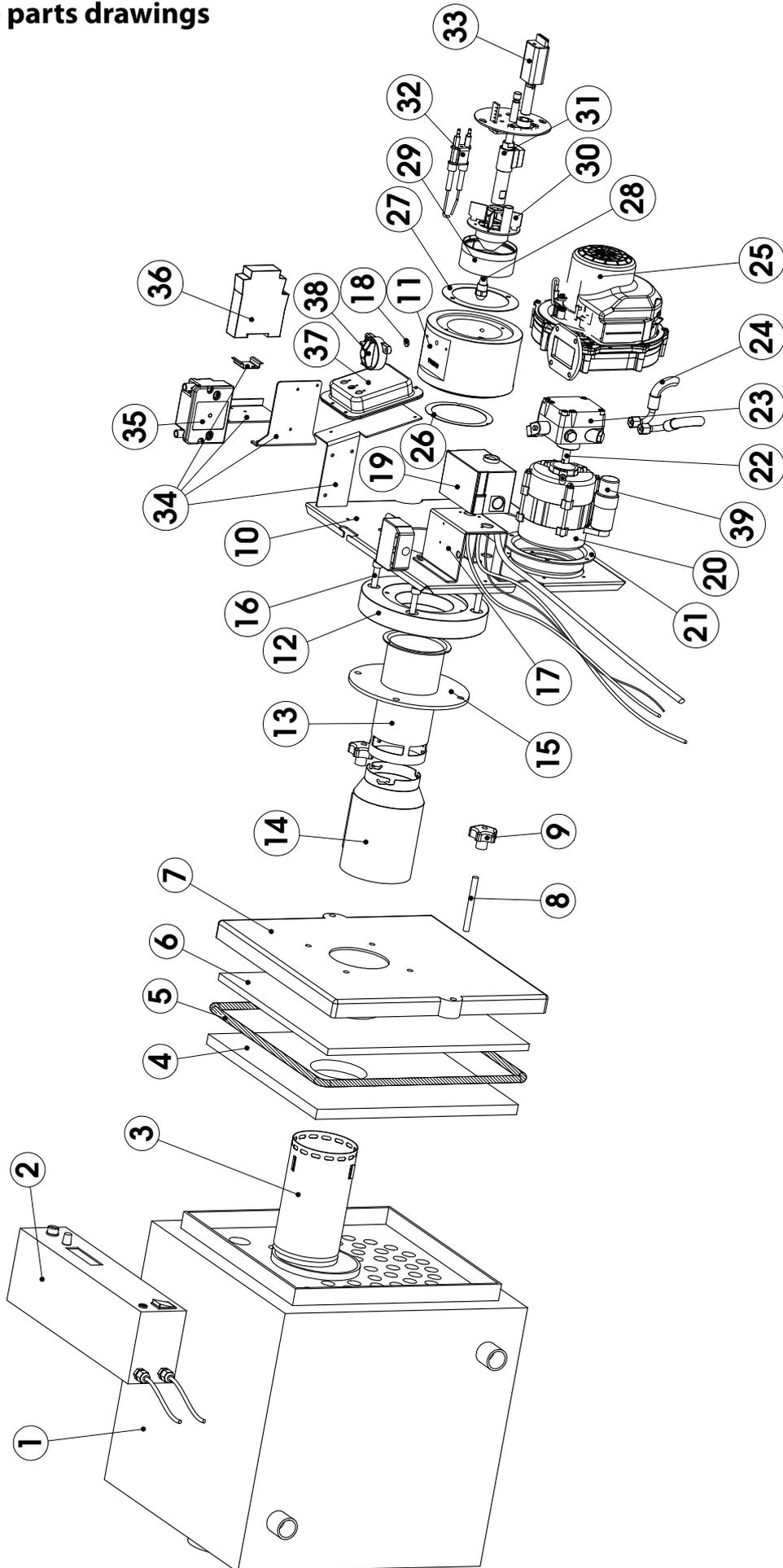
Cause:	Response:
Mains voltage failure	New Start
Ambient light at burner start	Lockout*
No flame at the end of "TSA"	Lockout*
Loss of flame during operation	Repetition

\* After lockout, the burner control can be reset after 60 to 90 seconds.

## 6. Wiring diagram



7. Spare parts drawings



## 7.1 Spare parts

Nr.	Description	KB 20	KB 40	KB 45	KB 50	KB 75
1	Boiler KB complete	44-001	46-001	47-001	48-001	49-001
2	Dashboard KB-series	9-1080	9-1080	9-1080	9-1080	9-1080
3	Stainless steel efficiency tube					
4	Insulation boiler	44-004	46-005	47-005	48-005	49-005
5	Door gasket cord	13-M084	13-M084	13-M084	13-M084	13-M084
6	Insulation door	44-003	46-004	47-004	48-004	49-004
7	Door	-	-	-	-	-
8	Bolt	-	-	-	-	-
9	Door mounting nod KB-series	9-1089	9-1089	9-1089	9-1089	9-1089
10	Bearing Plate for Burner	015958	015958	015958	015958	015958
11	Burner Block module (26+27 incl.)	015966	015966	015966	015966	015966
12	Ring adapter	015967	015967	015967	015967	015967
13	Adapter tube Ø 80 x 1,5 x 109 mm	015179	015179	015179	015179	015179
14	Burner tube	015110	015110	015110	015111	015111
15	Seal for burner	031430	031430	031430	031430	031430
16	Door bolt with shim	015365	015365	015365	015365	015365
17	Distribution board	015968	015968	015968	015968	015968
18	Seal air pressure controller	015181	015181	015181	015181	015181
19	Oil burner controller LOA 24.171.B27	020100	020100	020100	020100	020100
20	Oil pump motor 70 Watt	015138	015138	015138	015138	015138
21	Bearing plate for oil pump motor	015366	015366	015366	015366	015366
22	Oil pump clutch	010292	010292	010292	010292	010292
23	SCHEER oil pump AL - 35 - C	011236	011236	011236	011236	011236
24	Oil line	041411	041411	041411	041411	041411
25	Fan RG 148	015112	015112	015112	015112	015112
26	Seal for adapter tube	015170	015170	015170	015170	015170
27	Seal for nozzle stem retaining plate	015172	015172	015172	015172	015172
28	Nozzles	022276	022277	022368	022370	022373
29	Dosage ring	015413	015413	015413	015413	015413
30	Mixing cartridge complete (29, 32 incl.)	015380	015382	015383	015384	015385
31	Nozzle holder complete (nozzle holder with oil heater FPHB 5, KLC holder, cable for pre-heating, ignition cable)	015471	015471	015472	015473	015474
32	Electrodes	015332	015332	015332	015333	015333
33	Flame detector KLC 2002	020064	020064	020064	020064	020064
34	Bearing plates for 36, 35, 37 (screw incl.)	015367	015367	015367	015367	015367
35	Ignition unit EBI4	010276	010276	010276	010276	010276
36	Omron power off delay timer	070553	070553	070553	070553	070553
	Omron power on delay timer	070555	070555	070555	070555	070555
37	Control board for fan speed	015374	015376	015377	015378	015379
38	Air pressure controller	015180	015180	015180	015180	015180
39	capacitor 3 µF /100°C	010294	010294	010294	010294	010294

Typ	motor 70 Watt	fan RG 148	oil pump AL-35C	distributi- on board	control board fan speed code	mixing cartridge code	Nozzle holder code	burner tube Ø 80	burner tube Ø 100	nozzle	electro- des code
<b>KB 20</b>	x	x	x	x	<b>20</b>	<b>20</b>	<b>20</b>	x		0,18/80° SC	<b>40</b>
<b>KB 40</b>	x	x	x	x	<b>40</b>	<b>40</b>	<b>40</b>	x		0,25/80° SC	<b>40</b>
<b>KB 45</b>	x	x	x	x	<b>45</b>	<b>45</b>	<b>45</b>	x		0,40/60° SC	<b>40</b>
<b>KB 50</b>	x	x	x	x	<b>50</b>	<b>50</b>	<b>50</b>		x	0,50/60° SC	<b>60</b>
<b>KB 75</b>	x	x	x	x	<b>75</b>	<b>75</b>	<b>75</b>		x	0,65/60° SC	<b>60</b>

Typ	oil pres- sure gauge line	LOA 24 burner controller	air pressu- re control- ler	Omron timing relays	flame sensor KLC 2000	ignition unit EBI4	capacitor 3µF/100°C	oil pump clutch	seal for nozzle hol- der	seal for ad- apter tube	ignition cable 2x
<b>KB 20</b>	x	x	x	x	x	x	x	x	x	x	x
<b>KB 40</b>	x	x	x	x	x	x	x	x	x	x	x
<b>KB 45</b>	x	x	x	x	x	x	x	x	x	x	x
<b>KB 50</b>	x	x	x	x	x	x	x	x	x	x	x
<b>KB 75</b>	x	x	x	x	x	x	x	x	x	x	x



*EG-Konformitätserklärung*  
**Declaration of Conformity**

*Wir erklären hiermit in eigener Verantwortung, dass das Produkt / We state in our own responsibility that the product*

**Blautherm DUO BE - KB - Serie**

*den Schutzanforderungen entspricht, die in der EG-Richtlinie 89/336/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die Elektromagnetische Verträglichkeit festgelegt sind.*

*/ is in conformity with the E. C. directive 89/336/E.E.C. relating to the Electromagnetic Compatibility.*

*Diese Erklärung gilt für alle Exemplare, die nach den anliegenden Technischen Unterlagen – die Bestandteil dieser Erklärung sind – hergestellt werden. / This declaration is valid for all products which are produced in accordance with the technical documentation which is a part of this declaration.*

*Zur Beurteilung des Erzeugnisses hinsichtlich der Elektromagnetischen Verträglichkeit wurden die folgenden harmonisierten Vorschriften angewendet: / For verification of conformity with regard to Electromagnetic Compatibility the following harmonized standards are applied:*

- EN 50 081-1 (1992): Technical standard emitted interference, living area
- EN 50 082-2 (1995): Technical standard interference immunity, industrial sector
- DIN EN 50 082-1 (1993): Technical standard interference immunity, living area
- EN 61000-3-2 (1995): limit value for harmonic currents
- EN 61000-3-3 (1995): limit value for voltage fluctuation and flicker
- EN 61000-4-2 (1995): interference immunity for ESD
- EN 61000-4-3 (1996): interference immunity for high frequency electromagnetic fields
- ENV 50204 (1995): inspection of the interference immunity for high frequency electromagnetic fields of digital radio telephones
- EN 61000-4-4 (1995): interference immunity for fast transients (Burst)
- EN 61000-4-5 (1995): interference immunity for impulse voltages (Surge)
- EN 61000-4-6 (1996): interference immunity for conducted disturbance variables induced by HF-fields (HF-currents)
- EN 61000-4-11 (1994): interference immunity for voltage dips, short-term interruptions and voltage fluctuation
- EN 60335-1: Low voltage directive 73/23 EWG
- EN 50165: reliability of electronic devices for domestic use and similar purposes
- EN 50165: electronic equipment of non-electrical devices for domestic use and similar purposes

SCHEER  
Heizsysteme & Produktionstechnik GmbH  
Heating Systems & Production Technologies

Dipl.-Kffr. Nicole Schroeter  
manageress

## EG-Baumusterprüfbescheinigung

gemäß der Wirkungsgrad-Richtlinie von neuen  
Warmwasserheizkesseln 92/42/EWG

## EC Type Examination Certificate

according to the EC directive 92/42/EEC  
efficiencies of new hot water boilers



### Produkt-ID-Nummer

Product-ID-number

CE-0032 BP 2688

**Hersteller** : SCHEER Heizsysteme & Produktionstechnik GmbH  
*manufacturer* : Chausseestr. 12 - 16, D - 25797 Wöhrden

**Produktart** : Ölzerstäubungsbrenner vom Typ Duoblock  
*product category* : Ölzerstäubungsbrenner vom Typ Duoblock

**Handelsbezeichnung** : Ölgebläsebrenner  
*trade mark* : Ölgebläsebrenner

**Bauart** : Duoblock-Brenner  
*construction type* : Duoblock-Brenner

**Typ, Ausführung** : Blautherm DUO (Mischeinrichtungen I.I bis VII)  
*type, model* : Blautherm DUO (Mischeinrichtungen I.I bis VII)  
(Typenliste s. Seite 2)

**Prüfgrundlagen** : Richtlinie 92/42/EWG, DIN EN 267 (Stand 11.99)  
*basis of type examination* : Richtlinie 92/42/EWG, DIN EN 267 (Stand 11.99)

**Prüflaboratorium** : TÜV NORD Systems GmbH & Co. KG  
*laboratory* : Prüfstelle für Feuerungsanlagen

**Überwachung** : Prüfung der Konformität mit der zugelassenen Bauart  
*surveillance procedure* : Prüfung der Konformität mit der zugelassenen Bauart  
nach Modul B, Anhang III der Richtlinie 92/42/EWG

Hannover, den 25.02.2011

(Der Leiter)

TÜV NORD Systems GmbH & Co. KG  
Große Bahnstraße 31, D-22525 Hamburg  
1818101 (URL) 8007-11 - Fax (URL) 8007-2200

TÜV NORD Systems GmbH & Co. KG

Benannte Stelle für die Module B, C, D und E der Richtlinie 92/42/EWG  
(Notifiziert, bei der EU-KOM, unter Nr. 0048)  
Prüf-, Überwachungs- und Zertifikatsstelle nach den Landesbestimmungen



installation and operating instructions for the Blautherm®DUO BE - KB