ECONOTWIN KTx21-37
WELDED STEEL BOILER

INSTALLATION, OPERATION & MAINTENANCE
DOCUMENTATION

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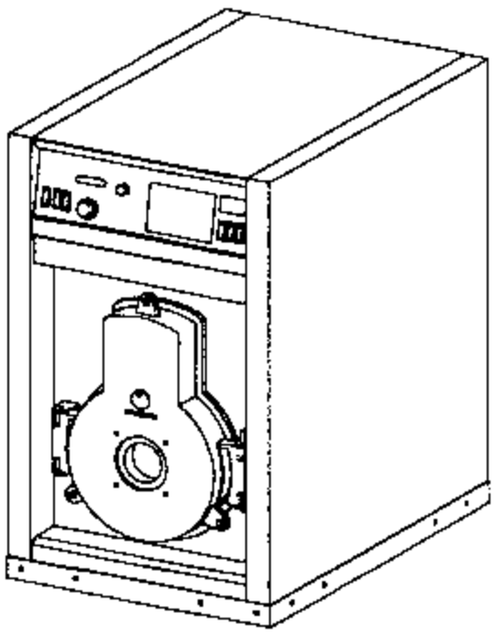
Technical information
-Installation instructions-

Econotwin KTx

Low temperature boiler with dual circuit system



Safety instructions - Please observe!

Before commencing the installation, please read these installation instructions through carefully.No responsibility or liability is accepted for any damage or injury resulting from failure to observe these installation instructions!

Work which is incorrectly carried out represents a risk to both person and property!

Work on the heating installation

- *Installation, commissioning, repair and maintenance work on the boiler and on the heating installation should only be undertaken by an authorised and qualified heating installer.*

When working on the boiler

- *Switch off at the mains and take precautions to ensure that no-one switches on again.*
- *Turn off the main gas cock or the valve in the oil feed pipe as appropriate and again take precautions to ensure that no-one turns them on again.*

Contents

Installation instructions

The Econotwin boiler meets the requirements of DIN 4702 and EN 303.

In installing and operating the installation, the appropriate building regulations and legal requirements must be observed. The boiler room regulations and the regulations governing the installation of gas appliances must also be observed.

The installation of the boiler, the initial commissioning, the servicing and the maintenance must only be carried out by a properly qualified installer. Only genuine manufacturer's replacement parts should be used.

For commercial installations all appropriate authorisations should be displayed.

The relevant gas supply company should be informed of the intention to install a gas unit and their authorisation obtained if necessary

In making the electrical connection, all appropriate regulations including any of the electricity supply undertaking, must be observed.
Work on electrical equipment must only be carried out by a properly qualified and authorised person.

The following requirements must be met by the heating water :

- Inhibitors or anti frost additives should not be used without a manufacturer's guarantee that their use is safe.
- The inward diffusion of oxygen, e.g. by through insufficiently diffusion resistant underfloor heating or too small an expansion vessel, must be prevented by suitable measures.

Both for old and new installations, the heating plant must be flushed out before being put into service.

Work on the gas part of the installation may only be carried out by properly qualified and authorised installers. Confirm to the plant operator that the plant has been tested for gas-tightness.

Chimney requirements
Modern heating units such as the Econotwin KTx operate with low flue gas losses, i.e. with low flue gas temperature and with low excess air (= higher CO_2-Content).
For new plants, provision is made for the appropriate modern flue gas systems which are suitable for the heating unit.
Where the plant is being modernised, there is often a reduction in the output of the heating unit as well as the reduction in the flue gas loss. The lower flue gas loss, the lower flue gas mass flow rate and the shorter „off" periods can lead to problems with existing chimneys.

The replacement of elderly boilers by modern heating units therefore requires a careful examination of the suitability of the chimney.
In many cases an up-dating of the chimney is impractical. In borderline cases the following measures can be taken to improve matters:

- the shortest possible flue pipe with the minimum resistance to flow, and avoiding bends, leading to the chimney
- Insulation of the flue pipe
- Installation of a secondary air unit (draught limiter)

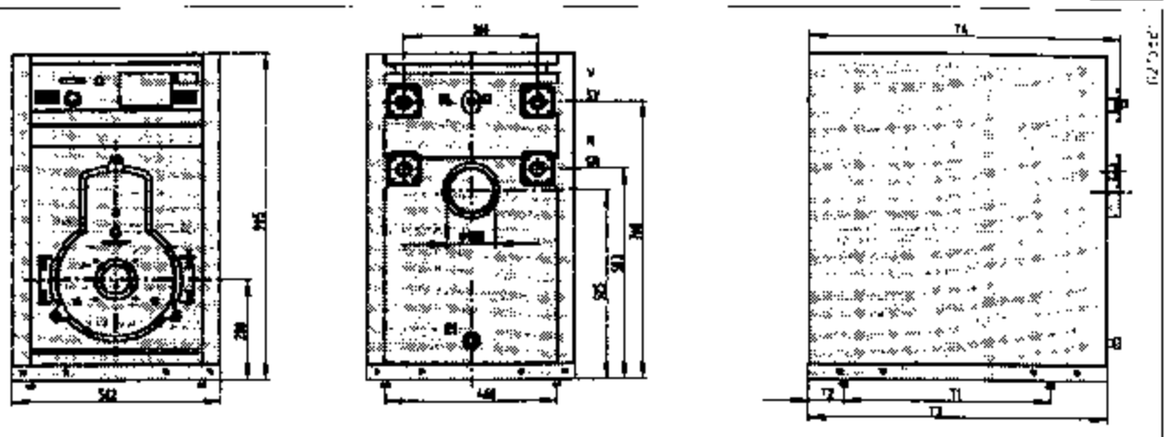
Service
The operator of the installation should arrange for a regular servicing and cleaning to be carried out by a specialist firm (annually)
Servicing should be carried out as laid down in these installation instructions (see page 19).
We recommend that a servicing contract should be signed.

Boiler room
The Econotwin should be installed in a frost-free space which can be adequately ventilated. Installation in spaces with a high dust level or high humidity, e.g. laundry or drying rooms, is not acceptable. It must not be installed in spaces where solvents, chlorinated cleaning fluids, dyes, adhesives, etc are stored. Vapours from such materials can lead to corrosion of the boiler. Damage to the boiler resulting from such causes nullifies the guarantee

Technical information
Please give this technical information to the plant operator. It must be displayed in a readily seen position in the boiler room. Instruct the operator in the starting-up and operation of the plant.
Please pay attention both to the operating instructions and to the instructions for the other components of the heating installation.

If everything is done according to these instructions and the boiler is correctly installed, a reliable, economical and environmentally friendly operation of the heating plant is assured.

KTx



SV Safety flow
SR Safety return
E Air vent
S Safety valve ½"BSP
E1 Filling and draining connections ½"BSP
V Boiler flow connection
R Boiler return connection

Fig. 1: Dimensions of the Econotwin KTx

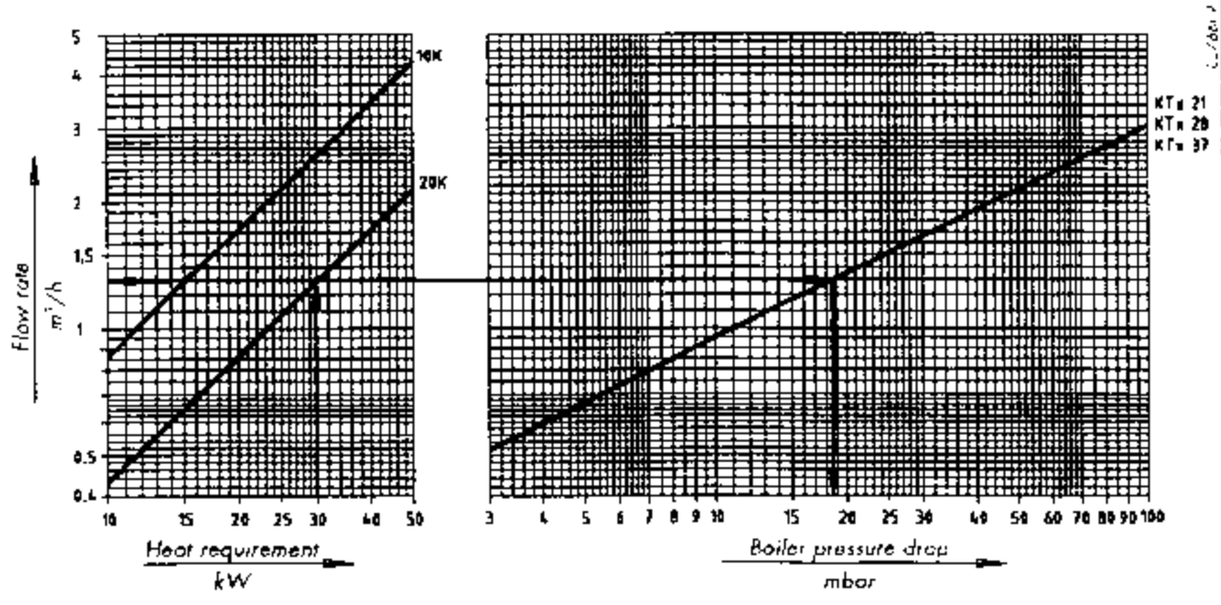


Fig. 2 Hydraulic resistance KTx

Oil/Gas boiler

- Econotwin low temperature boiler with dual-circuit system with thermal valve
- Output range: 15 to 37 kW
- For a maximum permissible operating temperature up to 100 °C, adjustable to a maximum of 90°C
- Suitable for fully automatic on/off operation in closed heating circuits as laid down in DIN 4751
- Reduced pollutants
- Cylindrical convective heat transfer surface of extruded ribbed profile with stainless steel combustion chamber, water cooled heat pocket in the primary circuit
- Built-in flue gas regulator
- Cast iron hinged door for left and right handed mounting
- Stove enamelled boiler casing, fitted
- Colour RAL 9010 yellow
- No lower temperature limiter and can shut off fully when there is no heating demand
- Ready for the installation of Domotronic® OET weather dependent control
- Type certification number: 08-226-248
- The Econotwin is delivered, complete with basic control panel, on a wooden palette with protective packing and shrink wrapped in plastic.
- A cleaning brush, two blank flanges and bolts and seals for four flanges are included in the package.

Accessories

The following accessories are available for the Econotwin:

Ordering-No.	
261674	Transport handles, 4 off
000343	Boiler plinth (Fig 4)
000746	4-Way mixing valve ¾"BSP complete
000747	4-Way mixing valve 1"BSP complete
000748	4-Way mixing valve 1¼" BSP complete
000053	Water storage priority switch
000056	Priority switching for OET 12
000001	Flange 25-32 dia.
000002	Flange 32-40 dia.
000031	Threaded flange 1" BSP
000032	Threaded flange 1¼" BSP
000065	Flue gas acoustic silencer Ø 130
262604	Acoustic hood KTx
000054	Operating hours counter

Weather dependent control

The required operation as a low/very low temperature boiler is possible in conjunction with one of the following controls

000770	Domotronic® OET 10 (Fig. 5)
000774	Domotronic® OET 11
000775	Domotronic® OET 12
272831	Room thermostat RT-0

Transport

- In the sides of the lower frame units of the boiler (Fig. 3) are to be found two pairs (front and back) of holes for the insertion of the transport handles (Accessories).
- Please dispose of the packaging in an environmentally friendly way.

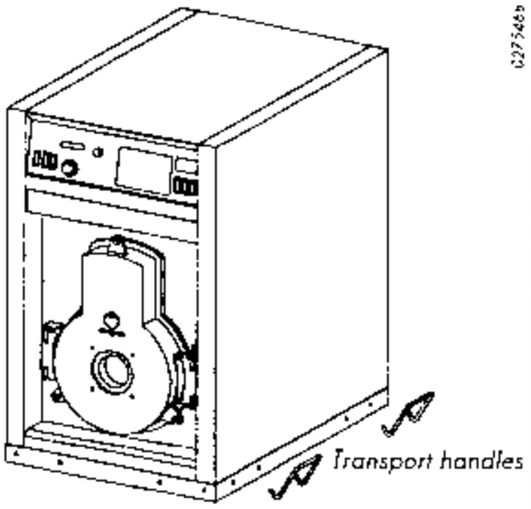


Fig 3 Econotwin KTx

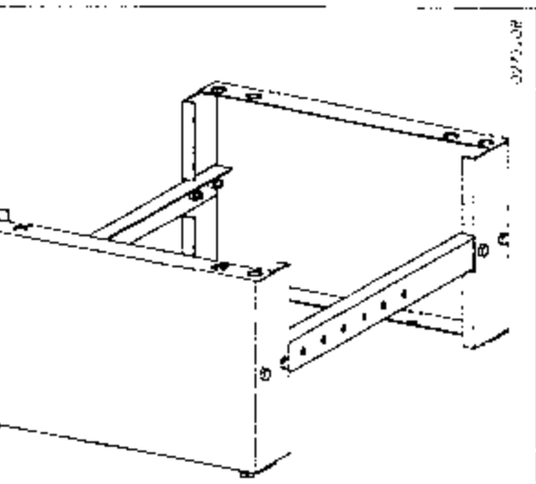


Fig. 4. Boiler plinth

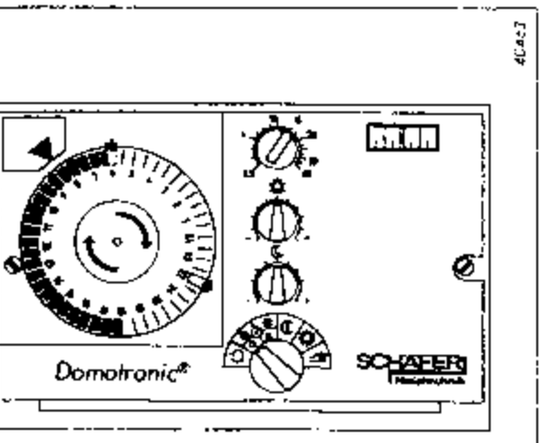


Fig 5 Domotronic® OET 10

Technical data

Econotwin		KTx/KTUx	21	28	37
Model certification number				08-226-248	
Maximum firing rate		kW	22,6	30,1	39,8
Nominal output		kW	21	28	37
Output range		kW	15–21	20–28	26–37
Boiler efficiency*		%		93	
Flue gas loss*		%		6,2	
Stand-by loss*		%	0,85	0,75	0,62
Max. permissible operating temp.		°C		100	
Max. adjustable operating temp		°C		90	
Hydraulik resistance (dt=20 K)		mbar	9	16	27,5
Maximum pressure (gauge)		bar		3	
Water content		Liter	65	72	84
Combustion chamber volume		l	29	35	45
Combustion chamber diameter (Combustion chamber insert)		mm		250	
Combustion chamber length		mm	390	470	600
Gas content		l	40	48	62
Gas side resistance		Pa	3	6	1
Elektrical connection		V~/Hz/A		230/50/10*	
Max. power requirement*		VA		450	
Protection (DIN 40050)				IP 20	
Distance between adjustable feet	T1	mm	380	440	560
Distance between adjustable feet	T2	mm	110	125	130
Depth of boiler	T3	mm	600	680	810
Depth of KTx boiler with flange	T4	mm	645	725	855
Flow and return connection		DN		32	
Transport weight KTx		kg	142	158	185
Values for calculating the chimney requirements					
CO_2-Content		Vol. %		13	
Flue gas temperature		°C		165	
Mass flow of flue gas		kg/h	34,6	46,5	61,2
Mass flow of flue gas		g/s	9,6	12,9	17,0
Draught requirement		Pa	8	11	16

* The values apply for net calorific value, nominal output, CO_2-Content 13 %, Room temperature 20°C

Positioning

When positioning the boiler, please observe any relevant regulations and the installation instructions.

- Recommendation: For a cellar installation, mount the boiler (and the DLT hot water storage unit if appropriate) on a plinth (accessory) or base.
- Remove the cleaning brush from the flue gas passage
- Position the boiler near the chimney - avoid a long run of flue pipe
- Observe the minimum clearances at the sides, front and back (Fig. 7).
- Ensure that the air supply to the boiler room and its ventilation meet the requirements.

Hydraulic connection

The Econotwin - boiler has 2 flow and 2 return connections at the rear of the boiler (see Technical Data p.4 and Dimensions p.5).

→ The Econotwin can be built into the installation without a mixer valve. The dual circuit system makes the boiler independent of the return temperature.

→ For underfloor heating we recommend the use of a mixing valve.

- Before the boiler is connected, thoroughly flush out the heating installation.
- Connect up the heating circuit correctly - Figs 8 to 12 show sample layouts for the hydraulic connection of the Econotwin.
- In selecting a circulating pump, the hydraulic resistance of the boiler (see p.5), of the pipework and of any other items must be taken into account
- Install a suitable by-pass valve in the system - Set the by-pass valve for the hydraulic resistance of the installation - Adjust the by-pass valve so that the water circulation does not drop below 500 l/h .
- Connect a safety valve and automatic bleed valve to the boiler connection „EL/SI", ½"BSP (see Dimensions p.5), - The pipe connection to the safety valve - minimum diameter 15 mm - must not be capable of being closed - The bleed tube - minimum diameter 20 mm, without restrictions or internal projections to lead directly to a waste - the exit should be clear and observable - do not allow the bleed tube to discharge into the open.
- Install an appropriately sized membrane expansion vessel (MAG) and connect to the boiler return - connecting pipe minimum 20 mm diameter - shut-off devices must be protected against accidental closure (e.g. a capped valve).

→ A separate low water level protection is not necessary as the inbuilt controls fulfil this function.

- Install manometer, shut-off valves and the boiler fill/drain cock.
- If a DLT hot water storage vessel is installed fit a suitable pump unit.

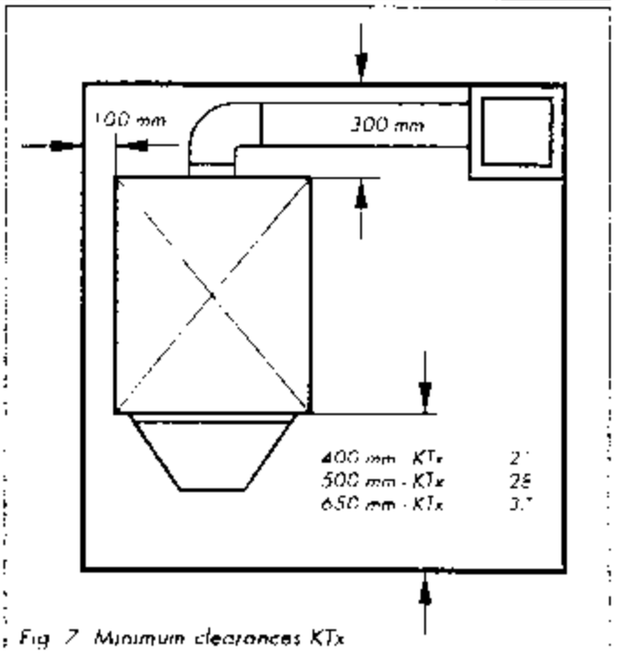


Fig. 7 Minimum clearances KTx

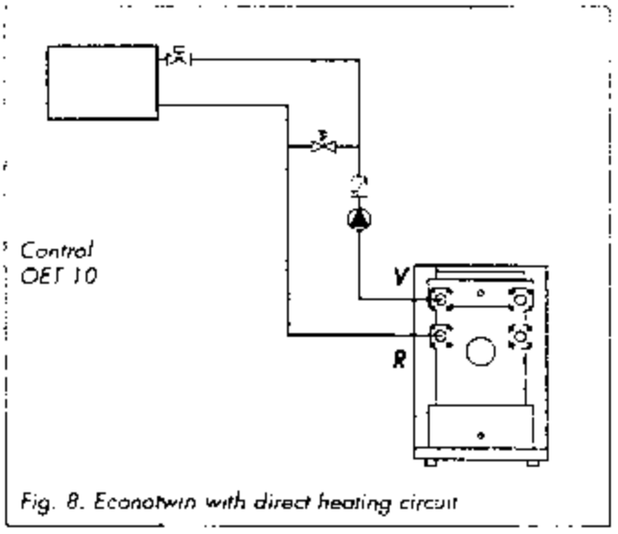


Fig. 8. Econotwin with direct heating circuit

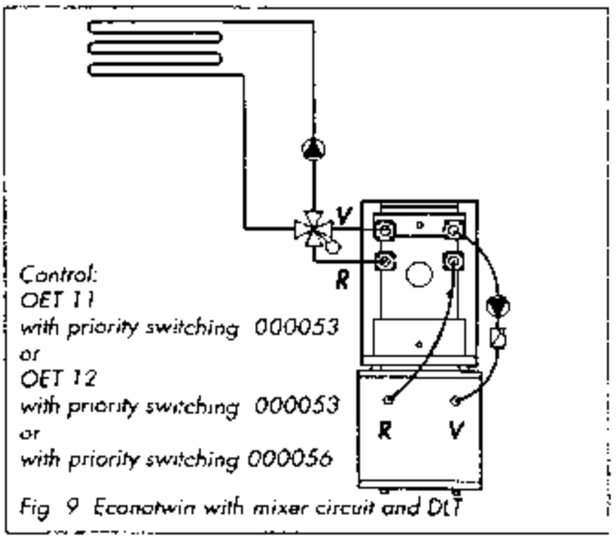


Fig. 9 Econotwin with mixer circuit and DLT

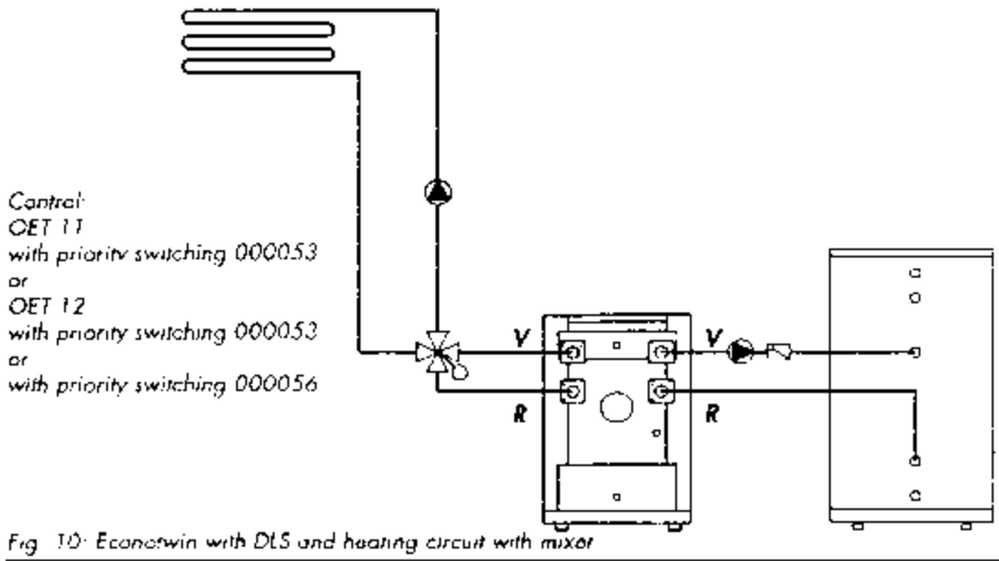


Fig. 10: Econotwin with DLS and heating circuit with mixer

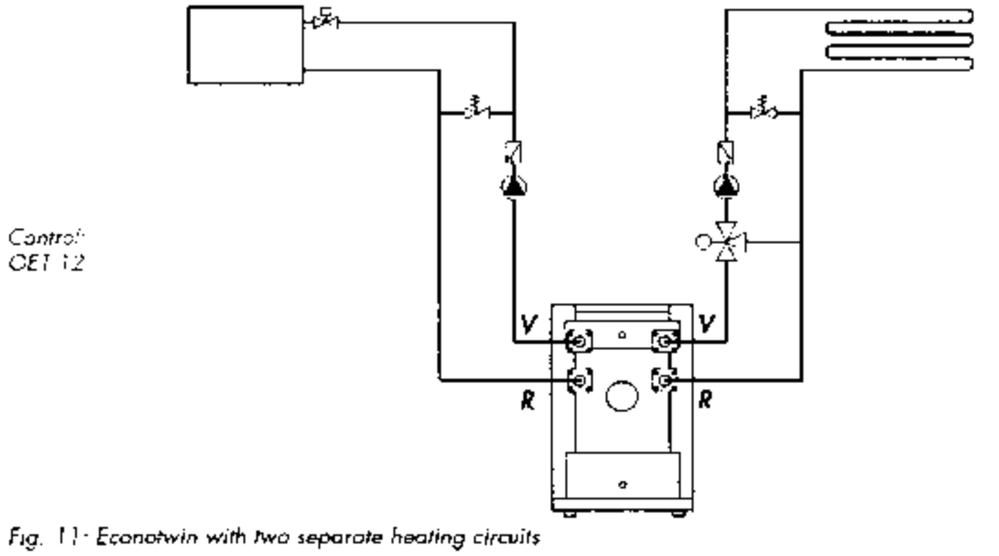


Fig. 11: Econotwin with two separate heating circuits

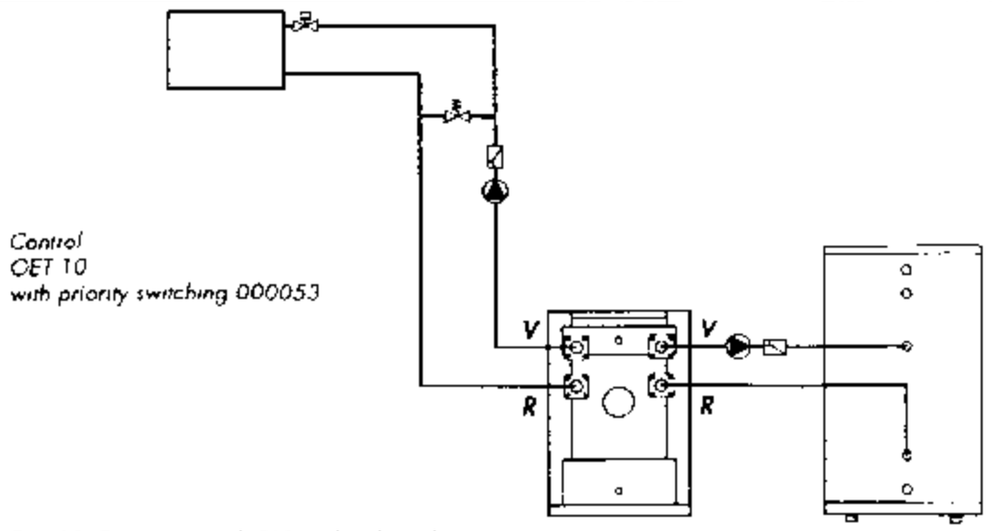


Fig. 12: Econotwin with DLS and a direct heating circuit

Fitting the burner to the KTx

KTx model with boiler door prepared for the burner.

→ *Burner connecting dimensions as given in DIN 4789 for oil pressure jet and blown gas burners (Fig. 13)*

- *Fit the burner as laid down in the burner manufacturer's installation and maintenance instructions.*

⚠ ***Only tested and approved oil or gas burners without their own flue gas recirculation to reduce emissions may be fitted.***

- *After installing the burner, make the oil or gas connection correctly.*
- *Test for leaks.*

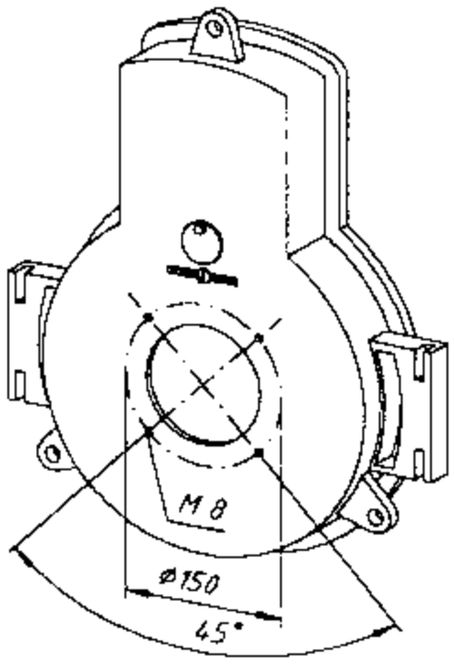


Fig. 13: Dimensions for burner installation

Flue gas connection *(Fig. 14)*

- *Select a diameter of flue gas pipe to match the diameter of the flue gas connection on the boiler - reductions in the cross section are not permissible.*
- *Fit the flue pipe tightly to the boiler flue gas connection.*
- *Lead the flue pipe to the chimney by the shortest route and with an upward gradient - keep bends to a minimum.*
- *Provide openings to permit cleaning.*
- *Fit protective pipe into the chimney seal the flue pipe into the protective pipe with sealing cord.*
- *Check that the flue pipe is sufficiently supported - if necessary fit pipe brackets.*
- *Insulate the flue pipe.*
- *Make a 12 mm diameter opening for the measurement of emissions - 3 x flue pipe diameter after the boiler connection - Close the opening.*
- *Fit the chimney draught limiter*

Advisory note: *The flue gases should be led to the chimney exit and protected against overcooling in such a way that flue gas condensation in the chimney will not lead to problems. Special measures to avoid flue gas condensation are particularly necessary in the renovation of old buildings.*

We recommend the fitting of a flue draught limiter. It offers the following advantages:

- *Even chimney draught*
- *It is possible to adjust for a high CO_2 content*
- *Reduction of the flue gas losses*
- *Good chimney ventilation*
- *Protection against sooting up of the chimney*
- *Reduction of stand-by losses*

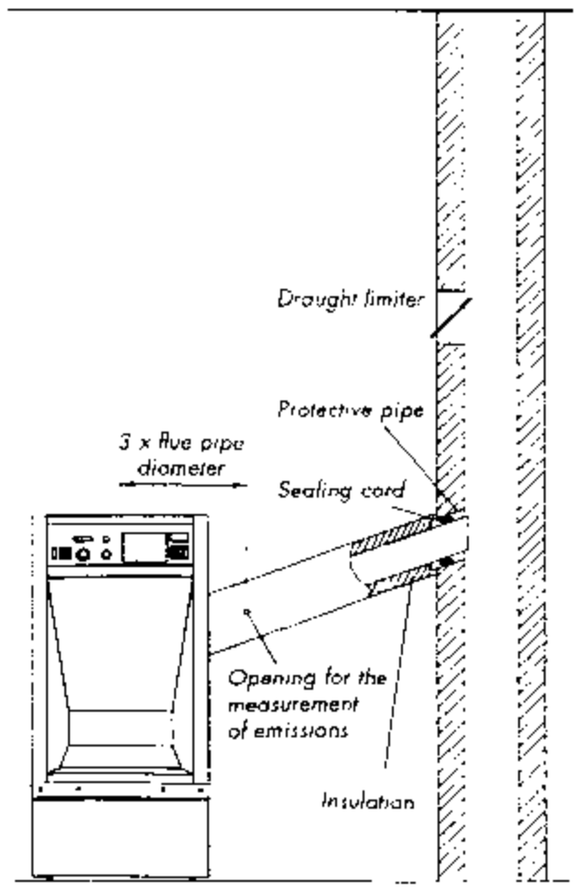


Fig. 14: Flue gas connection KTx

Electrical connection

The electrical connection should only be made by a properly qualified and authorised person. In making the electrical connection, all appropriate regulations, including any of the electricity supply undertaking, must be observed.

When working on the electrical equipment, the voltage should be switched off from all phases.

- Make the mains connection using suitable four-core cable (see Fig. 15)

→ The black wire, separated at the works, is a control phase which operates at voltage in parallel with the circulating pump. Additional pumps or heating controls can be connected here.

- The mains connection must be made through an isolating mains switch .
- Connect the circulating pump to the „ Heizkreispumpe" connections.
- Check that all electrical connections are tight and that all plugs and sockets are firmly connected.
- Carry out operational checks (see page 21)
- If a Domotronic® weather sensitive control unit is to be fitted, install and connect it (see Page 18), and put it into operation as in the operating instructions.

Electrical connection of the burner in the KTx

Please also observe the burner manufacturer's technical information.

→ The Econotwin KTx is fitted with a standard 6-pole burner connector - layout of the burner wiring connections (numbered leads) see Fig. 16.

- Connect the boiler connector to the burner connector and push firmly home.
- If required, fit operating hours meter - change the 6-pole burner connector for a 7-pole burner connector (delivered with the meter) and wire up as shown in the wiring diagram on page 23.

Note: A bridge in the burner connector connects leads **1** and **3**. If this bridge is not in place, power will not reach the burner despite the boiler control being switched on and the correct mains voltage.If the burner operation warning light **2** does not light up on start-up:

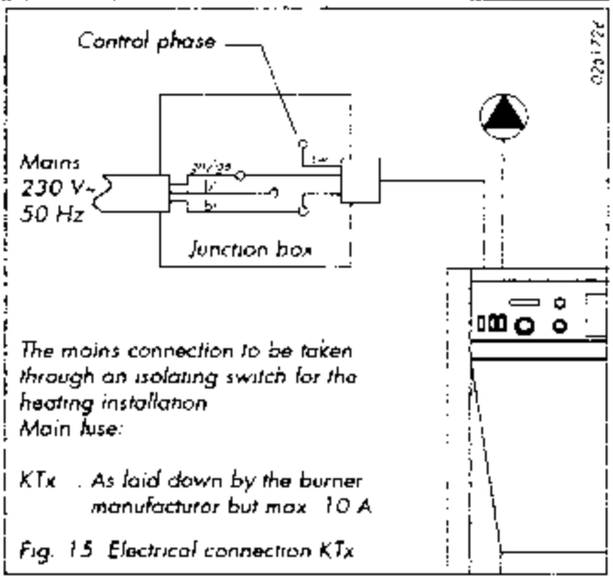
→ Mains wires correctly connected?
→ Boiler controls switched on?
→ Bridge in the burner connector in place?

If there is no burner connector, the following is the customary connection procedure:

- Remove the connector from the burner connection.
- Connect up the burner lead according to the burner manufacturer's instructions, generally:
- Connect wires **1** and **3** to a common connector

→ **4** is the switched phase for the burner.

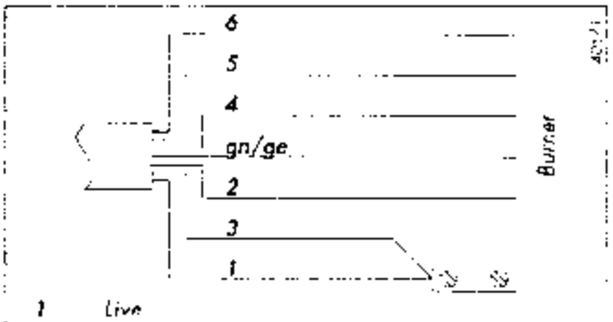
- Connect the remainder of the wiring as in Fig. 16 and the wiring diagram on page 23.



The mains connection to be taken through an isolating switch for the heating installation
Main fuse:

KTx . As laid down by the burner manufacturer but max 10 A

Fig. 15 Electrical connection KTx



1 Live
2 Return
3/4 No voltage, connected via relays with boiler controls, priority switching and with weather dependent controls
5 Indication of burner misoperation
6 Connection for operating hours meter
gn/ge Earth lead

Fig. 16: Burner wiring connections KTx

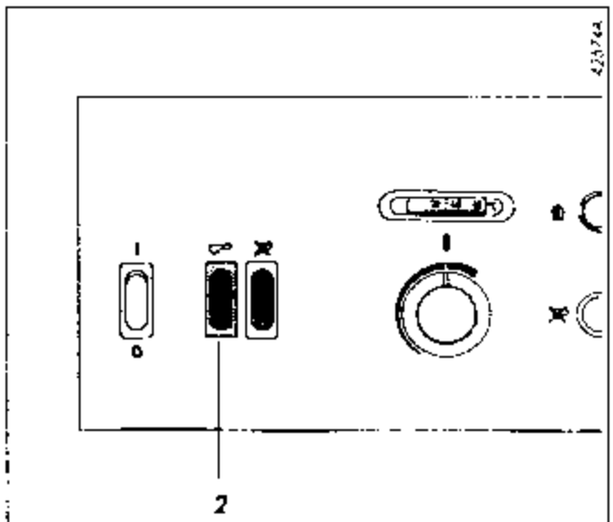


Fig. 17 Burner operation lamp

Basic control panel

The Econotwin is fitted with a basic control panel which incorporates all necessary indication, control and safety functions. It is wired for the additional fitting of a weather dependent Domotronic® OET control (see also Domotronic® OET® technical information).

Functions

1 Operating switch
Main switch for the boiler and the weather dependent control
I = On - normal position
0 = Off - the entire control unit is disconnected, only for service work

2 Burner operation lamp
Gives optical indication that burner should be operating.
Note: The burner only starts after the oil pre-heating by the jet block heater.

3 Burner fault lamp
Indicates that the burner has shown a fault and gone to lockout.

4 Boiler thermostat
For setting the maximum boiler temperature, range of operation 25-90°C, limited to 75°C at the factory. Can be set to 90°C by pulling out the control knob.
- *Without weather sensitive control: Set the desired boiler temperature - For water heating, the boiler will be heated to a stand-by temperature of 90°C.*
- *With weather sensitive control: Set the desired maximum temperature for heating and hot water*

5 Boiler thermometer
Shows the actual boiler temperature (secondary circuit) in °C.

7 Safety thermostat (STB)
Shuts the burner down and locks it out if a temperature of 120°C is reached in the primary circuit. To restart unscrew the protective cap and depress the safety button.
Note: Different temperatures can arise in the primary (STB measuring point) and secondary (shown by the thermometer) circuits as a result of the dual system operation. The STB also locks out at ca. -20°C (e.g. during storage , transport)

8 Installation openings for the Domotronic®
For installing the weather dependent control Domotronic® OET

9 Summer-/Winter switch
Burner, circulating pump, mixer operational. Water heating possible.
Burner, circulating pump and mixer shut down for heating . Mixer remains in its current position. Water heating possible
Exception: No water heating if the weather dependent control Domotronic® OET 12 is fitted together with the priority switching 0056

10 Measurement switch
For flue gas measurements - With the switch depressed the boiler reaches the temperature set on the thermostat - Summer /Winter switch to be switched off - if necessary open the mixer by hand

11 Test switch for the safety thermostat (STB)
Cuts out the STB - Only for test purposes.
Note: The sensor for the safety thermostat is situated in the primary circuit of the boiler - Differences from the thermometer reading possible - To check the temperature accuracy of the STB, measure the temperature by means of a thermostat in the STB pocket

12 Installation opening for operating hours meter
(accessories)

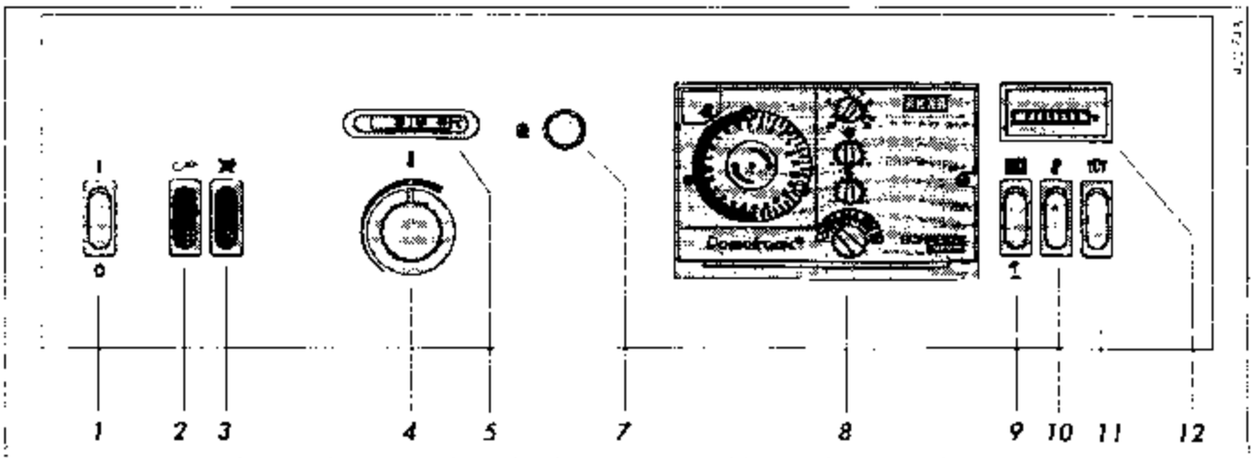


Fig. 13 Econotwin KTx — Basic control panel with Domotronic® OET 10 and operating hours meter

Preparations

Commissioning should only be done by an approved firm of installers.

- Check the pre-pressurisation of the pressure expansion vessel - see the manufacturer's instructions.
- Connect a hose between the water source and the boiler filling/drain cock
- Fill the installation and vent it - The circulating pump should be off while this is being done Set the operating switch to „0".
- Check the pressure in the installation on the manometer - if necessary top up with water and revent.
- Close the boiler filling/drain cock - remove the filling hose.

Gas burner

- Open the gas main cock.
- De-aerate the gas pipe.
- Check the supply gas pressure and compare it with the gas burner manufacturer's specification

Oil burner

- Check that there is oil available and open the oil supply pipe
- Vent the suction pipe (single pipe systems only)

Commissioning

All the work involved in commissioning the plant must be carried out by the installer of the plant or by his nominated deputy. A commissioning form must be completed.

- Check the electric plugs.
- Switch on the main heating switch.
- Set the operating switch to „1".
- Set the summer/winter switch to ⊡ .
- Set the boiler thermostat to the required maximum boiler temperature (we recommend 75°C).
- If room thermostats are connected, set these to heat requirement.
- If a Domotronic® control is installed, set this according to the instructions for use.

Econotwin KTx

→ Boiler starts up - „Burner operation" lamp illumines - starting process dependent on the burner installed - Delays e.g. for oil heating or leakage controls are possible.

- Carry out the adjustment of the burner in accordance with the burner manufacturer's instructions.
- Set the oil or gas throughflow so that the boiler is operating inside of its declared operating range and that the nominal output of the boiler is not exceeded - Check that the chimney is suitable for the flue gas temperature (see Fig. 19).

→ As an aid to adjustment and burner choice, a technical advice sheet „Trying to match the oil burner" is enclosed with the boiler.

- Gently tighten the fastening bolts in the boiler door when warm.
- Complete the commissioning form (Page 27).

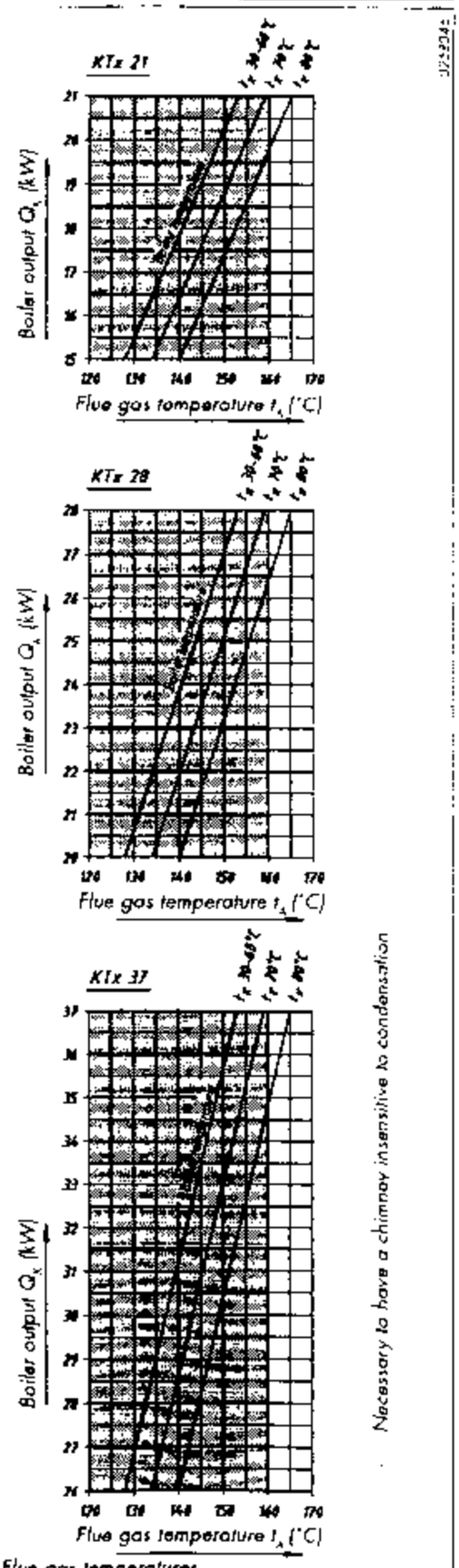


Fig. 19 Flue gas temperatures

Adjusting the combustion chamber insert

The Econotwin is equipped with an adjustment to the combustion chamber insert. This permits it to accept different burner types as well as to match the requirements of plant and chimney (e.g. stainless steel flue). The position of the combustion chamber insert determines the proportion of the flue gas which is recirculated and mixed in with the combustion air.

→ *The combustion chamber insert is a recirculation unit specific to the boiler and the use of burners with their own in-built recirculation is not possible.*

→ *The combustion chamber insert is factory adjusted. A re-adjustment is not necessary in most installations.*

- *Start up the boiler*
- *Carry out flue gas measurements.*
- *If the operation is free from problems and the flue gas values are acceptable, leave the setting as it is.*

If an adjustment is necessary:

- *Shut down the boiler.*
- *Open the boiler door. Undo the bolts* **1** *to* **3** *and swing out the boiler door complete with burner.*
- *Undo the bolts* **4** *of the insert adjustment.*
- *Insert both bolts in the slots*
- *Adjust the combustion chamber insert to the required distance* **A** *= (combustion chamber insert to boiler door):*
  Reduced **A** *= Reduced flue gas recirculation*
  Increased **A** *= Increased flue gas recirculation*
- *Tighten the adjustment bolts*
- *Push the combustion chamber insert up to the stop on the adjustment - Turn the insert so that the viewing port is situated top centre.*
- *Shut the boiler door and tighten the fastening bolts by hand.*
- *Carry out flue gas measurements.*
- *If necessary, correct the adjustments.*
- *Complete the commissioning form noting the changes in settings.*

Decommissioning

- *Switch off the main and operating switches.*
- *Close the main oil or gas valve.*
- *If to be out of commission for long, e.g. for boilers not supplying hot water out of the heating season, clean the boiler - see under service*
- *If out of commission when there is a risk of frost, drain the installation - drain the boiler at the drain cock* **E1** *(Fig. 28).*

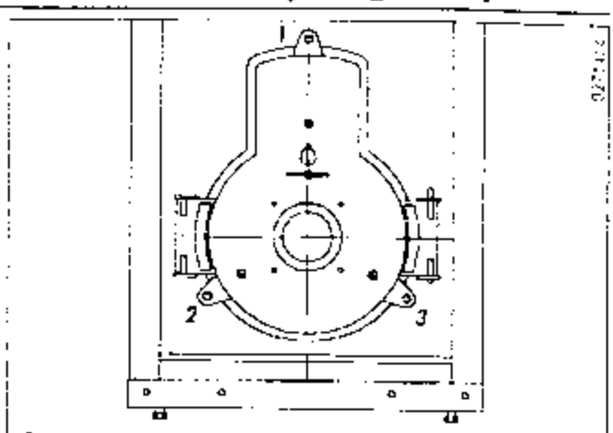


Fig. 26. Boiler door

Factory adjustment of the combustion chamber

Type	KTx	21	28	37
A	mm	14	39	39

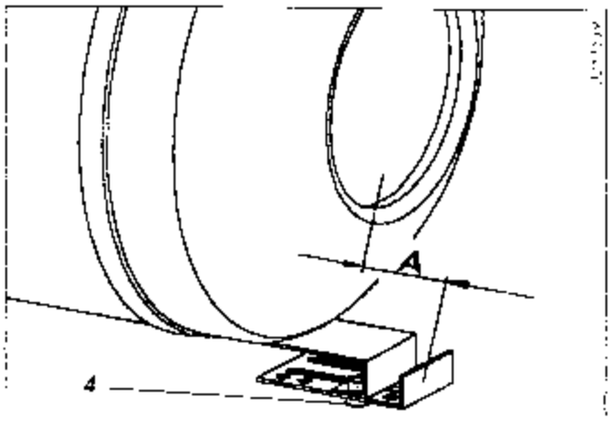


Fig. 27. Adjustment of the combustion chamber insert

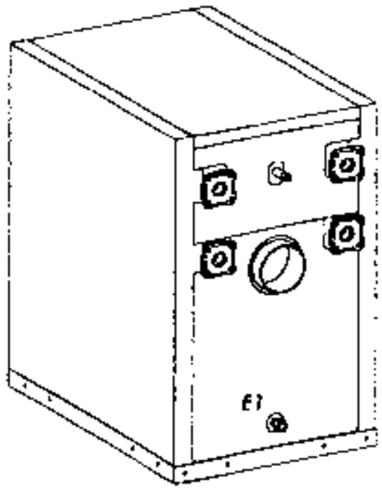


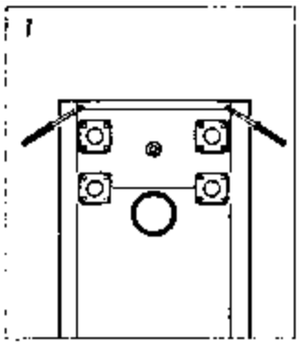
Fig. 28 Boiler drain

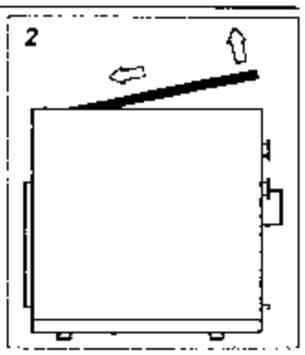
Installation

The electrical connection should only be made by a properly qualified and authorised person.

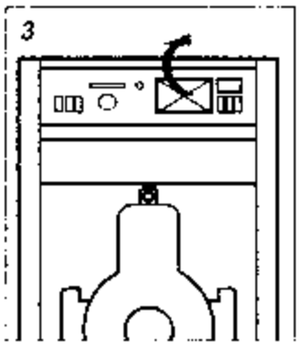
Before beginning the installation, switch off all power from the installation.

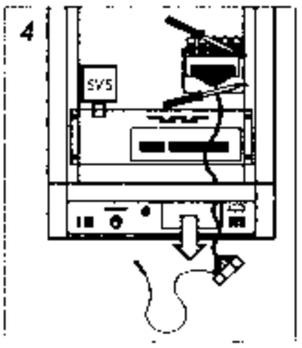
- *Operating switch at „0".*
- *At the rear of the boiler remove both screws from the top of the casing* **1**
- *Remove the top of the casing* **2**.



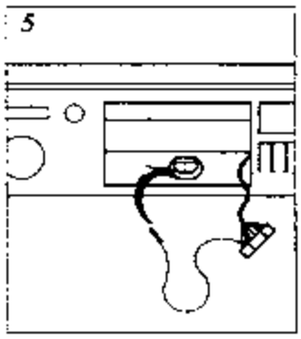


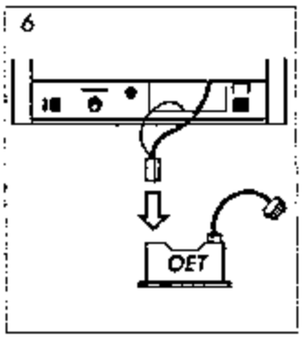
- *Remove the blanking piece from the mounting hole* **3**
- *Mount the sensor box bracket on the upper corner of the side casing - Insert the sensor box and fasten under the boiler side panel - lead the connector through the mounting hole* **4**. *If required install the water storage priority switching, Ordering-No. 0053,* **4**, *and connect according to its installation instructions.*



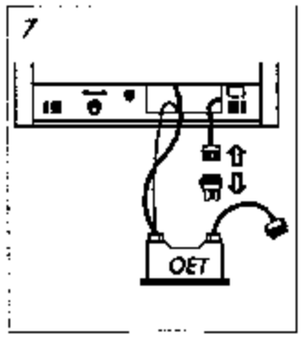


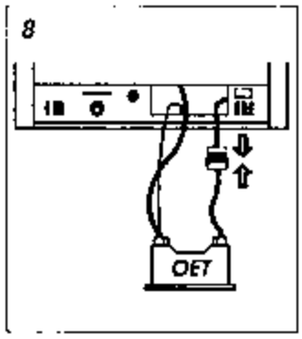
- *Lead the boiler sensor through the mounting hole and insert in a free position the sensor pocket* **5** - *Clamp the sensor in position.*
- *Plug in the sensor connector to the Domotronic® 6.*



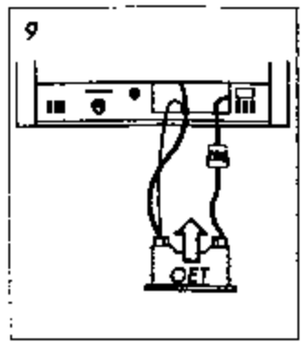


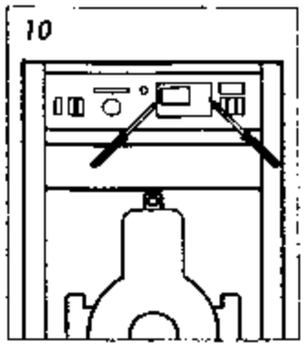
- *Remove the 15-pole bridging connector from the cable harness in the boiler control panel* **7** - *Place the bridging connector in the control panel.*
- *Make the mains connection* **8**.





- *Place the Domotronic® in the mounting hole* **9**.
- *Tighten the mounting screws* **10**.
- *Connect all necessary sensors, and additional units if required, to the sensor connector box - Tighten the cable clamps.*
- *Replace the boiler top casing and fasten with the two screws.*
- *Set up the Domotronic® as laid down in its operating instructions and put it into operation.*





The boiler must be serviced regularly (at least once a year). This service should only be carried out by a qualified installer.
We recommend taking out a maintenance contract.
Neglecting the servicing introduces a safety risk and also the optimal operation can no longer be guaranteed.
Only the manufacturer's original replacement parts should be used.

Service

- *Before the service carry out and record flue gas measurements - Operate the measurement switch - Bring the boiler to operating temperature.*

Boiler cleaning

- *Switch the boiler off - Main and operating switches „OFF" and secured against accidental switching on*
- *Close the gas or oil supply valve.*
- *If an acoustic hood fitted, remove it - Remove the fixing bolts at the front - Tip the hood forward and remove upwards.*
- *Undo the boiler door bolts - Swing out the boiler door complete with burner - If necessary dismount the boiler door, to do this remove the rod from the door hinge (Fig. 29).*
- *Remove the combustion chamber insert 1 and flue gas diverter 2 (Fig. 30).*
- *With the cleaning brush (delivered with the boiler) clean the ribbed profile 3 of the combustion chamber, combustion chamber insert 1 and secondary heating surface 4 - do not use cleaning chemicals!*
- *Remove the dirt from the combustion chamber, secondary heating surface and flue pipe (through the cleaning port) - Use a vacuum cleaner.*
- *Check that the flue gas passages are unobstructed.*
- *Replace the combustion chamber insert with its adjuster downwards and the flue gas diverter - Re-hang the boiler door, close and gently tighten the bolts.*

Burner cleaning

KTx

- *Carry out the cleaning servicing and adjustment of the burner according to the manufacturer's instructions.*

→ *Please also observe the notes about burner preparation in its operating instructions.*

- *Carry out flue gas measurements.*
- *Complete the service record form (Page 30).*

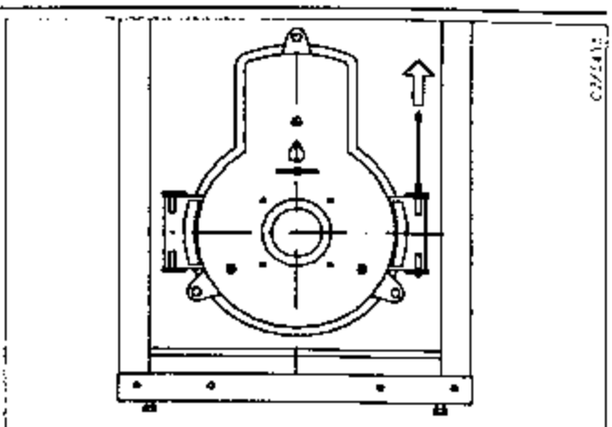


Fig. 29 Boiler door mounting

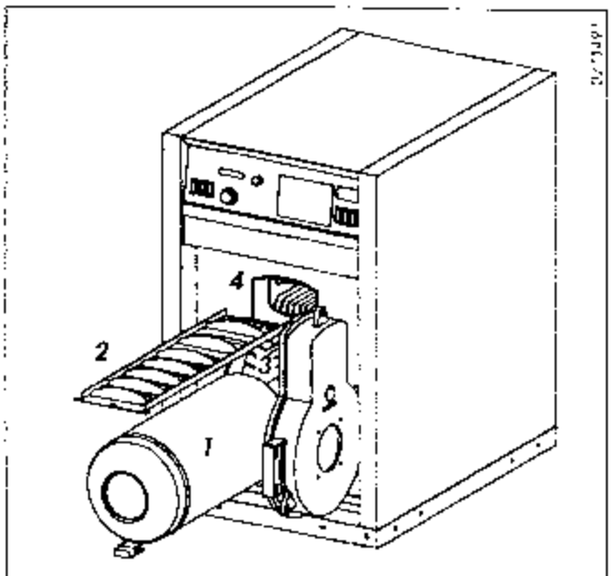


Fig. 30: Combustion chamber

Check the installation

- *Check for water leaks - check the servicing cover of the thermal valve for leaks.*
- *Check the water level*
- *Check the pressure expansion vessel as laid down in its own operating instructions.*
- *Check the action of the safety valve*

Should a defective thermal valve be diagnosed (see under „Problem solving").

- *Drain the boiler - Remove the top of the boiler casing and its insulation - open the servicing cover - remove the distributor cap, thermostat insert and O-ring seal - fit a new thermostat insert and O-ring - clean and replace the distributor cap- close the cover - renew the cover seal - tighten the nuts - fill the boiler - Check the servicing cover for leakage - replace the insulation and casing top.*

Operational checks

- *Start the boiler up.*
- *Check all control and safety components for their operation.*
- *Check the switching point of the thermostat - turn the control knob down till the burner switches off - Re-adjust the thermostat to the desired maximum boiler temperature.*
- *Carry out a safety thermostat (STB) test - Turn the thermostat up until it meets the stop - if the burner switches off, press the TÜV test switch until the STB locks out - reset the STB after the boiler temperature has dropped by ca. 20 K - Return the thermostat to its original setting.*

  Note: *As a result of the dual circuit system different temperatures can arise in the primary (STB measuring point) and secondary (thermometer reading) circuits. The position of the STB sensor pocket is shown in Fig. 37. The sensor is accessible after removing the rear panel and insulation from the boiler.*

KTx

- *Check the operation of the burner as laid down in the burner manufacturer's instructions.*

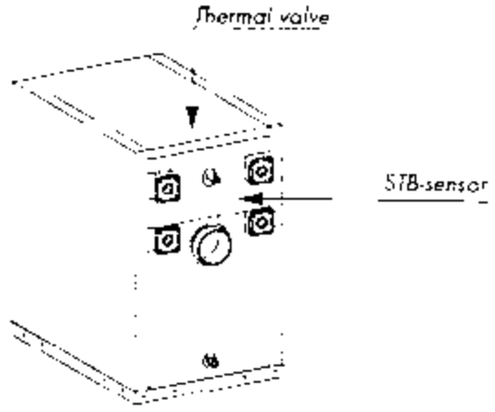


Fig. 36 Positions of thermal valve and STB sensor

Servicing position of boiler control panel

For servicing and repair work, the boiler control panel of the Econotwin can be moved into the servicing position

- *Switch off the mains switch and operating switch.*
- *Remove the acoustic hood if fitted*
- *At the back of the boiler undo the fastening screws for the top of the casing* **1** *(see Page 18).*
- *Remove the top of the casing* **2** *(see Page 18).*
- *Undo the two upper fixing screws of the control panel cover - hinge down the control panel cover (Fig. 39).*
- *After completing the service work, replace the control panel cover and the casing in the reverse order*

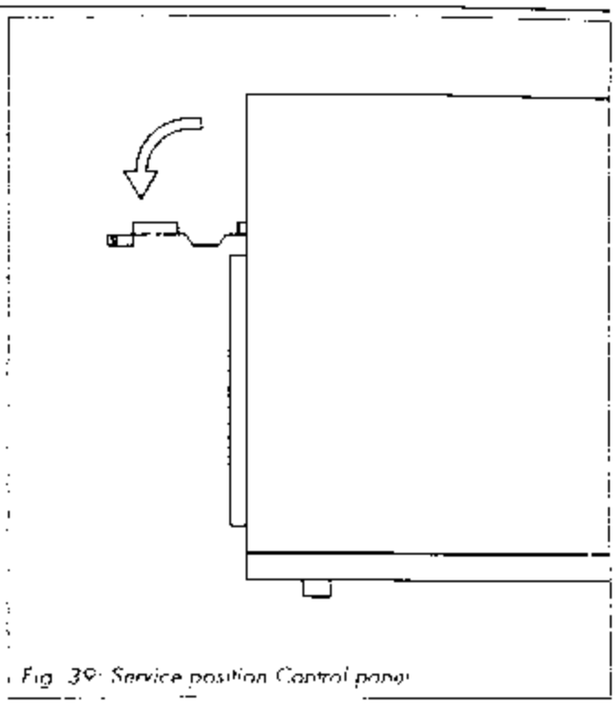
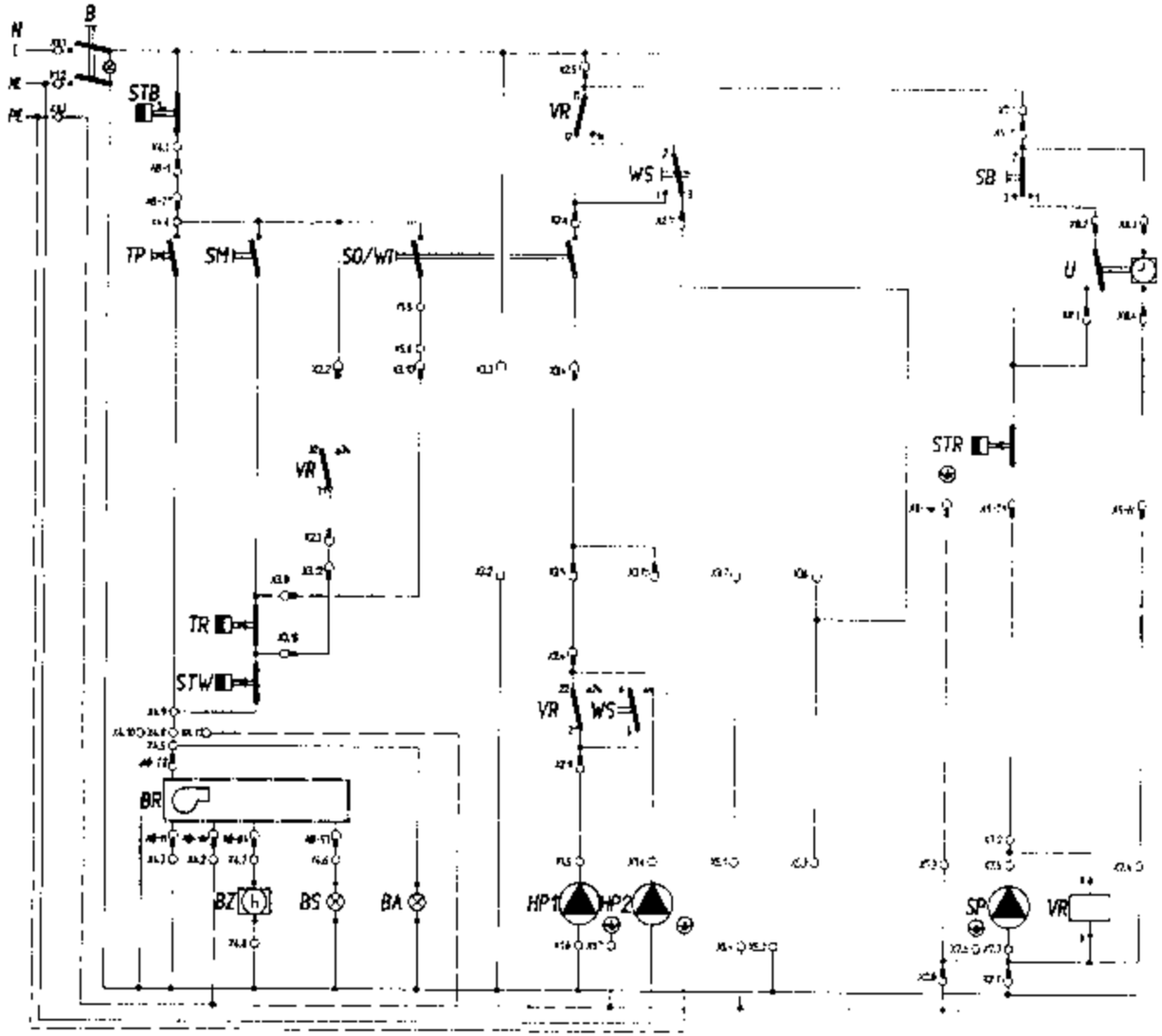


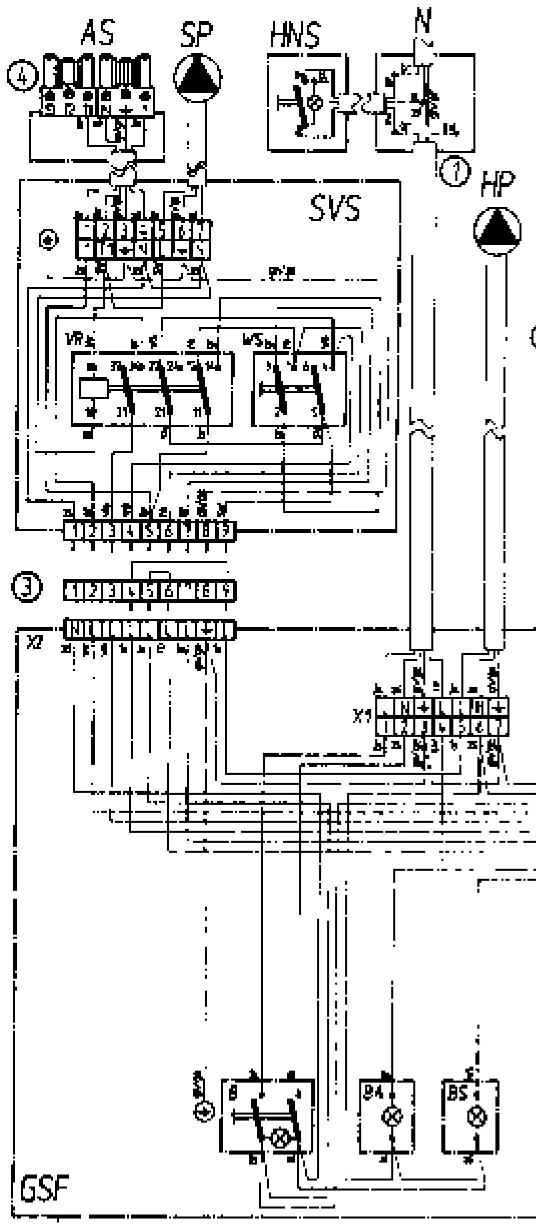
Fig. 39: Service position Control panel

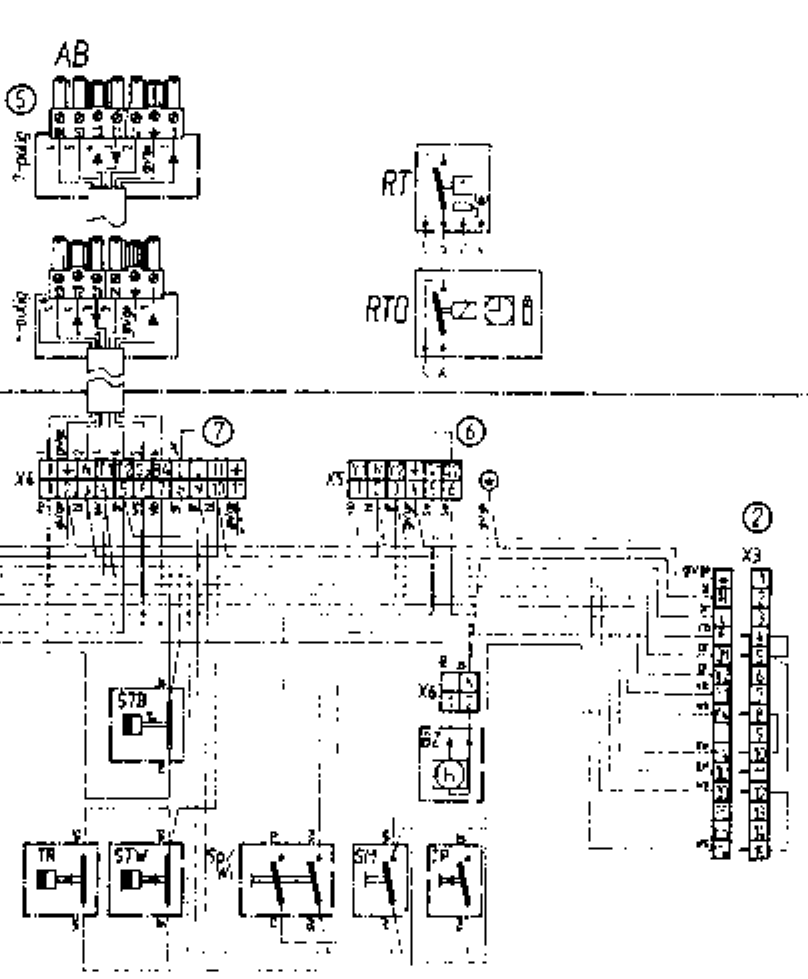
Current flow diagram KTx



AB	Burner connector
AS	Connector for water storage controls
B	Operating switch
BA	Burner operating
BS	Burner lock out
BZ	Operating hours counter (Ord. No. 0034)
HP1	Heating circulating pump 1
HP2	Heating circulating pump 2
L	Line
N	Mains 230V~/50 Hz
NL	Neutral
PE	Earth
SB	Water operating switch
SM	Measurement switch
SO/WI	Summer/Winter switch
SP	Water storage pump
STB	Safety thermostat
STR	Water temperature controller
STW	Safety temperature monitor
SWS	Water storage priority switching
TP	Test switch
TR	Thermostat
U	Clock
VR	Priority relays
WS	Selector switch

Subject to technical change without notice!
As at: 08.1995





The electrical connection is to be made in accordance with legal and other requirements including those of the electricity supply company!

1. The black lead in the main connecting lead is an additional cord of allows of the connection of circulating pumps
   The black lead is insulated at the factory. Only remove the insulating cap if the lead is needed.
   The boiler control panel is set up for a maximum of four pumps ≤ 0.5 Amps. A switching relay must be interposed for more than four pumps.
2. Connector for a weather dependent controller Sonotronic® CS1
3. Connector for water storage priority switching. After removing the planning connector, plug in priority switching SO53
4. Take note of the wiring diagram on the water storage vessel!
5. If an operating hours meter is being fitted, wire the 7-pole burner connector as indicated. Connection of the operating hours meter is through the 2-pole clamping block Xa
6. Remove the bridge if an room temperature controller RTO or a room thermostat is to be fitted
7. Connection for burner shut out (e.g. flue gas thermostat)

Subject to technical change without notice!
As of 08 1995

AB	Burner connector
AS	Connector for water storage controls
B	Operating switch
B4	Burner operating
BS	Burner lock out
BZ	Operating hours counter (Ord. No. 0054)
GSF	Basic control panel
HNS	Mains isolating switch
HP	Heating circulating pump
N	Mains 230V~/50 Hz via the mains isolating switch, fuse max. 10 A, Take note of the burner data!
RT	Room thermostat
RT D	Room temperature controller RT D (Ord. No. 272831)
SM	Measurement switch
SO/Wi	Summer/Winter switch
SP	Water storage pump
STB	Safety thermostat
STW	Safety temperature monitor
SVS	Water storage priority switching
TP	Test switch
TR	Thermostat
VR	Priority relays
WS	Selection switch

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As appropiate, put a cross opposite work carried out or enter the values measured			
Date			
Installer			
Installation			
Check the fuel supply/feed pipes			
Check all flue gas passages			
Tighten the fastening bolts for the burner door			
Check the electrical connections			
Carry out flue gas measurements		*Control*	*Actual*
Boiler temperature	°C		
Flue gas temperature	°C		
Room temperature	°C		
Flue gas temperature	°C		
Measure the carbon dioxide content of the flue gas	*Vol. %*		
Measure the carbon monoxide of the flue gas	*ppm*		
Measure the smoke number (Bacharach)			
Measure the chimney draught	*mbar*		
Calculate the flue gas loss	%		
Carry out operational checks			
Adjust the boiler thermostat			
Adjust the water storage thermostat			
Adjust weather dependent control or room thermostat as applicable			
Instruct the operator of the installation in its use and hand over the technical information			
Signature/Company stamp			

Problem solving

Problem	Possible cause	Remedial action
Burner does not operate	No electric power	Check the main and operating switches, the electrical connections and the fuse
	Combustion control at lock-out	Reset combustion control
	Safety thermostat at lock-out	Reset safety thermostat
	Oil pre-heat thermostat not closing	Change the oil pre-heater
	Combustion controller defective	Check the controller with a test instrument and change if necessary
	Motor defective	Change motor
Burner runs - no ignition - oil pressure present - goes to lock-out	Ignition electrode wrongly adjusted or ignition cable defective	Adjust the ignition electrode, check the ignition cable and its connections at the combustion controller and at the electrode
	Defective insulation on the ignition electrode or ignition electrode clamp, dirty or worn out	Change the ignition electrode
	Ignition tranformer defective	Change the ignition transformer
	Combustion controller defective	Change the combustion controller
Burner runs - ignition operates - sight glass on the oil filter remains empty or no oil pressure - goes to lock-out	Suction pipe locked, oil hose blanking pieces not removed	Check the suction pipe, remove the blanking pieces, check the connections, check the non return valve
	Hose wrongly connected, non return valve wrongly installed	Check the connections, check the non return valve
	Oil tank empty, valve in the suction pipe at the tank or at the filter closed	Check the oil level, open the valves
	Pre-filter or pump filter blocked	Check the filter and clean or change if necessary
	Airlock in the oil pipe, oil pipe not properly vented and filled on comissioning	Vent the oil pipe at the manometer connection
	Oil pump does not deliver, oil pump defective, pump coupling defective	Check the electrical connections. If necessary change the pump-/ -coupling
	Suction pipe leaks	Check for leakage
	Vacuum too high on the suction side (> 0,35 bar)	Check the sizing of the oil pipe, clean the filter or change if necessary
Burner runs - ignition operates - oil pressure present - no oil ignition - goes to lock-out	Jet/jet filter blocked, oil supply pipe to jet block or pre-heater blocked	Change the jet, oil supply pipe and pre-heater if necessary
	Magnetic valve does not open	Change the coil of the magnetic valve

Problem	Possible cause	Remedial action
Burner runs - ignition operates - oil pressure present - no oil injection	Jet/jet filter, oil supply pipe to burner block, pre-heater blocked	Change the jet, oil supply pipe, pre-heater if necessary
	Magnetic valve does not open	Change the coil of the magnetic valve
Burner runs - ignition operates - oil injected but not ignited	Mixture setting wrongly adjusted	Correct the adjustment
	Mixing system dirty	Clean burner
	Burner wrongly adjusted	Correct the burner adjustment
Burner starts up without problems but goes to lock-out after the safety interval	Photocell dirty or defective	Clean, or change the photocell if necess.
	Flame detector defective	Change the flame detector
	Combustion controller defective	Change the combustion controller
	Electric connection between flame detector and combustion controller defective	Chech the electric wiring and change if necessary
	Too litle light falling on photocell	Clean the mixing unit
Burner started very sharply, explosive misfiring	Ignition to the swirl plate or jet, electrode or mixing unit wrongly adjusted	Adjust the mixing unit and the ignition electrodes
	Magnetic valve not open properly	Change the valve/coil as necessary
	Unsuitable draught conditions	Check the flue passages and chimney
Pulsating flame	Combustion chamber insert wrongly adjusted	Readjust the combustion chamber insert and carry out flue gas measurements
Flame lifts off during operation	Burner wrongly adjusted	Correct the burner adjustment
	Jet defective	Change the jet
	Mixing unit dirty	Clean the burner
	Air in the suction pipe	Check the oil supply, seal if necessary
Ignition while burner firing	Photocell, swirl plate dirty	Clean burner
Unsatisfactory smoke formation	Shortage of air	Clean and adjust the burner, check the air supply to the boiler room
	Combustion chamber insert adjustment	Adjust the combustion chamber insert
	Jet defective	Change the jet
Carbon dioxide content too low	Burner adjustment incorrect	Correct the burner adjustment
	Inwards air leakage	Seal the fuel pipe, tighten the boiler door fastenings
Too high a flue gas temperature	Too high an oil troughput	Adjust the troughput to the boiler output
	Boiler dirty	Clean the boiler
Burner sart-up does not commence although boiler temperature too low	Thermostat too low	Raise the setting
	STB goes to lock-out	Reset STB
	SO/WI-switch on summer	Switch to Winter
	Boiler thermostat defective	Change the thermostat
	Thermal valve defective	Change the thermal valve

Service record form

Please complete the service form carefully and confirm the service				
Day serviced	Date			
Carry out flue gas measurements before the service (chimney draught <0,1 mbar)	Boiler temperature	°C		
	Flue gas temperature	°C		
	Carbon dioxide content	%		
	Carbon monoxide content	ppm		
	Smoke number (Bacharach)			
	Chimney draught	mbar		
	Flue gas losses	%		
Clean the boiler				
Check flue gas passages				
Clean the burner				
Change the burner jet				
Check the ignition electrodes				
Check the electrical connections				
Check the fuel supply system				
Carry out operating checks				
Check the installation				
Carry out flue gas measurements after the service (chimney draught <0,1 mbar)	Boiler temperature	°C		
	Flue gas temperature	°C		
	Carbon dioxide content	%		
	Carbon monoxide content	ppm		
	Smoke number (Bacharach)			
	Chimney draught	mbar		
	Flue gas losses	%		
Signature/Company stamp				

Please complete the service form carefully and confirm the service