–weishaupt–

manual

Installation and operating instructions

Condensing boilers Weishaupt Thermo Condens WTC 45-A / WTC 60-A

83240702 - 1/2008

Conformity Certification to ISO/IEC Guide 22

Manufacturer: Max Weishaupt GmbH

Address: Max Weishaupt Straße
D-88475 Schwendi

Product: Gas Condensing Boiler
Type: WTC 45-A, WTC 60-A

The products described above conform to Document No.:

EN 483, EN 677, EN 50 165, EN 60 335,
EN 61 000-6-1, EN 61 000-6-4, LRV 92:2005

In accordance with the directives:

GAD	90/396/EC	Gas Appliance Directive
LVD	2006/95/EC	Low Voltage Directive
EED	92/42/EC	Efficiency Directive
EMC	2004/108/EC	Electromagnetic Compatibility Directive

these products are labelled as follows

CE 0085 BO 6112

The product complies with the prototype tested by the Notified Body 0085.

Schwendi 30.01.2008

ppa.
Dr. Lück

ppa.
Denkinger

Manufacturer certification to 1. BImSchV
This is a declaration that the condensing wall hung gas boiler WTC 15/25/32 complies with the requirements of 1. BImSchV.

Comprehensive Quality Assurance is ensured by a certified Quality Management System to ISO 9001.

EnEV System calculation

For the calculation basis to EnEV product characterisitics please see Ch. 11

Your information package
This is user information included with the unit. You can find answers to your questions in the following brochures:

Info for the user:
❑ Operating instructions for the operator
WTC 45-A/60-A (These instructions can be stored in the pocket in the lower unit cover.)

Info for the installer:
❑ Installation and operating instructions
WTC 45-A/60-A

These installation and operating instructions WTC 15-A/25-A and WTC 32-A

- are an integral part of the equipment and must be kept permanently on site
- are to be used by qualified personnel only
- contain the relevant information for the safe assembly, commissioning and servicing of the equipment
- are for the attention of all personnel working with the equipment.

Explanation of notes and symbols

This symbol is used to mark instructions, which, if not followed, could result in death or serious injury.

This symbol is used to mark instructions, which, if not followed, could result in damage to, or the destruction of the equipment and environmental damage.

This symbol is used to mark instructions, which, if not followed, could result in life threatening electric shock.

☞ This symbol is used to mark procedures, which you should follow.

1. Procedures with more than one step are
2. numbered.
3.

❑ This symbol is used when you are required to carry out a test.

• This symbol is used to list points

⇨ This symbol indicates detailed information

Abbreviations
Tab. Table
Ch. Chapter

Hand over and operating instructions
The contractor is responsible for passing the operating instructions to the plant operator prior to hand-over. He should also inform the plant operator that these instructions should be kept with the heating appliance. The address and telephone number of the nearest service centre should be entered on the reverse of the operating instructions. The plant operator must note that an agent of the contractor or other suitably qualified person must inspect the plant at least once a year. To ensure regular inspections, -weishaupt- recommends a service contract.

The contractor should instruct the plant operator in the use of the equipment prior to hand-over and inform him as and when necessary of any further inspections that are required before the plant can be used.

Guarantee and liability
Weishaupt will not accept liability or meet any guarantee claims for personal injury or damage to property arising as a result of one or more of the causes below:

- Failure to use the equipment as intended.
- Improper assembly, commissioning, operating or servicing of the equipment.
- Operating the appliance with defective safety equipment, or with non-recommended or non-functioning safety and protection devices.
- Failure to follow the information in the Installation and Operating Instructions.
- Alterations made to the construction of the equipment by the plant operator.
- Fitting additional components not tested or approved for use with the equipment.
- Alterations to the combustion chamber are not permitted.
- Inadequate monitoring of parts liable to wear and tear.
- Improperly executed repairs.
- Acts of God.
- Damage caused by continued use despite the occurrence of a fault.
- Use of incorrect fuel.
- Obstruction or damage of the supply lines.
- Use of non-original -weishaupt- spare parts.

2 Safety instructions

Dangers when using the equipment
Weishaupt products are manufactured in accordance with the relevant existing standards and guidelines and the recognised safety laws. However, improper use of the equipment could endanger life of the user or a third party, or result in damage to the plant.

To avoid unnecessary danger, the equipment is only to be used:
- for its intended purpose
- under ideal safety conditions
- with reference to all the information in the installation and operating instructions
- in accordance with inspection and service work

Faults, which could affect safe operation should be rectified immediately.

Installation in agreement with the district chimney sweep
In accordance with German state law the installation of a heating system has to be notified and/or a permit has to be obtained.
Prior to installation please consult your district chimney sweep with regards to:
- Layout of air supply and flue gas system
- Fuel supply
- Condensate discharge into the waste water system
- Platform in the area of cleaning aperture to DIN 18160-Part 5

Installation in garages
Only Gas units in version C may be installed in garages. The distance between floor and bottom edge of the WTC must be a minimum of 50 cm. The WTC must be protected from mechanical damage. A suitable metal frame should therefore be installed around the WTC. The operating
instructions should be placed into a clearly visible position
and should be protected against atmospheric exposure.

Personnel training
Only competent personnel may work on the appliance. Competent personnel according to this operating manual are persons who are familiar with the installation, mounting, setting and commissioning of the product and have the necessary qualifications such as:-
- Training, instruction or authorisation to switch electrical circuits and electrical devices on and off, to earth them and to mark them in accordance with the safety standards.
- Training, instruction or authorisation to carry out installation, alteration and maintenance work on gas fired plant.

Organisational measures
- Everyone working on the equipment should wear the necessary protective clothing.
- All safety devices should be checked regularly.

Informal safety measures
- In addition to the installation and operating instructions, local codes of practice should also be adhered to. Special attention should be paid to the relevant installation and safety guidelines given.
- All safety and danger notices should be kept in a legible condition.

Safety measures in normal operation
- Only use the equipment when all safety devices are fully functional.
- At least once a year the equipment, including the safety
  devices, should be checked for signs of visible damage
  and to ensure that the safety devices are operating correctly.
- More frequent safety checks may be required depending on plant conditions.

Electrical safety
- Before starting work - isolate plant and protect against reactivation, check voltage is isolated, the unit is earthed, and protected from adjacent equipment that might still be under voltage!
- Work on the electrical supply should be carried out by a qualified electrician.
- Electrical components should be checked during servicing. Loose connections and heat damaged cables should be dealt with immediately.
- Should it be necessary to carry out work on live parts, the Regulation for the Prevention of Accidents BGV A3 and/or country specific safety regulations must be observed and tools to EN 60900 must be used. A second person should be present to switch off the mains supply in an emergency.

Maintenance and fault rectification
- Necessary installation, service and inspection work should be carried out at the specified time.
- Inform the operator before beginning any service work.
- For all service, inspection and repair work, electrically isolate the equipment and ensure the mains switch cannot be accidentally switched back on. Cut off the fuel supply.
- If, during servicing or testing, control seal joints have to be opened, these have to be thoroughly cleaned to ensure tight sealing when re-assembling.
  Damaged seals must be replaced. Carry out soundness test.
- Flame monitoring devices, limit controls, correcting elements and all other safety devices must be commissioned by, and may only be replaced by, the manufacturer or an authorised agent.
- Screwed connections, which have been loosened, must be re-tightened without cross-threading.
- Following service work, all safety devices should be tested to ensure they are functioning correctly.

Alterations to the construction of the equipment
- No alterations to the equipment are to be made without the approval of the manufacturer.
  All conversions require written confirmation from Max Weishaupt GmbH.
- Any parts not in perfect working order should be replaced immediately.
- No additional components may be fitted, which have not been tested for use with the equipment.
- Use only -weishaupt- replacement and connection parts. Parts from other manufacturers are not guaranteed to be suitable to meet the necessary operational and safety requirements.

Cleaning of the equipment and waste disposal
- All materials used should be handled and disposed of correctly, with due regard to the environment.

General information for gas operation
- When installing a gas combustion system, regulations and guidelines must be observed (i.e. Local Codes of Practice and Regulations).
- The subcontractor responsible for the installation or changes to the gas system must inform the gas supplier of the type and extent of the installation planned and the intended work. The subcontractor must ascertain that an adequate gas supply to the installation is ensured.
- Installations, alterations and maintenance work on gas systems in buildings and below ground must only be carried out by installers who have a contract with the gas supplier.
- The gas pipe work must be subject to a preliminary and main test or the combined loading test and soundness test, according to the pressure range intended.
- The inert gas used for the test must be expelled from the pipe work. The pipe work must be completely purged.

Safety measures when gas can be smelled
- Avoid open flames and spark generation (e.g. switching lights and electric units on and off, including the use of mobile phones).
- Open windows and doors.
- Close gas shut off valve.
- Warn all occupants and evacuate the building.
- Inform heating company/installer and gas supplier from outside of the building.

Gas characteristics
The following information must be obtained from the gas supplier:
- Type of gas
- Calorific value in MJ/m^3 or kWh/m^3
- Max. CO_2 content of flue gas
- Gas supply pressure

Pipe thread connection
- Only tested and approved sealing material should be used. Please observe the prevailing user instructions!

Soundness test
☞ Check connection joints with foam forming or similar media, which do not cause corrosion.

Gas supplier

_____

_____

Date Signature

Type of gas: _____

Calorific value Hi: _____ kWh/m_n^3

max. CO_2: _____ %

Connection pressure: _____ mbar

Conversion to other types of gas
The WTC is type tested for Natural gas and Liquid Petroleum Gas.
It is factory pre-set for Natural gas operation.
A setting to 2E or 2LL is not required.
The conversion from Natural Gas to Liquid Petroleum Gas is described in the appendix. When operating with Liquid Petroleum Gas we recommend the use of Propane.

☞ When converting from Natural Gas to Liquid Petroleum Gas or visa versa please check the O_2 content, the unit loading (values see Technical data) and the designation on the name plate. Furthermore a calibration is required (procedure see Ch. 5.5: Notes for special parameters).

-weishaupt-

Max Weishaupt GmbH D-88475 Schwendi

Nominal heat loading (heating)

reduced to max._____kW

3 Technical description

3.1 Permissible application

The Weishaupt Thermo Condens WTC 45-A/60-A is a condensing wall mounted heating appliance for sliding setback operation without lower temperature limit with a a minimum flow of 400l/h through the heat exchanger.

- For wall mounting in enclosed rooms (installation outdoors is not permitted)
- For heating DHW heating circuits in sealed systems to DIN EN 12828.
- For flue gas ducting in chimneys / flue gas ducts or directly via wall and roof flue gas systems
- For combustion air supply from the room air or with room air independent systems.
- For gas families Natural gas E/LL and Liquid Petroleum Gas B/P.

3.2 Function

3.2.1 General notes

Condensate drain
The condensate created by the condensing boiler technology is fed into the waste water system via a siphon built into the unit. The ATV data sheet A251 should be observed.

Combustion air
Depending on the type of operation, the combustion air is supplied either from the room where the unit is installed (room air dependent operation) or via a concentric pipe system (room air independent operation).

Flue gas system

Once the cooled flue gas exits the heat exchanger it flows through a flue gas duct made from Polypropylene (PP) to the unit exit, from where a number of different ducting systems from the Weishaupt flue gas / air system WAL-PP are available.

☞ Observe installation and operating instructions WAL-PP!

Safety equipment
An internal flue gas temperature limiter (max. 120 °C) and a safety temperature limiter switch off the unit at excess temperature.

3.2.2 Important components

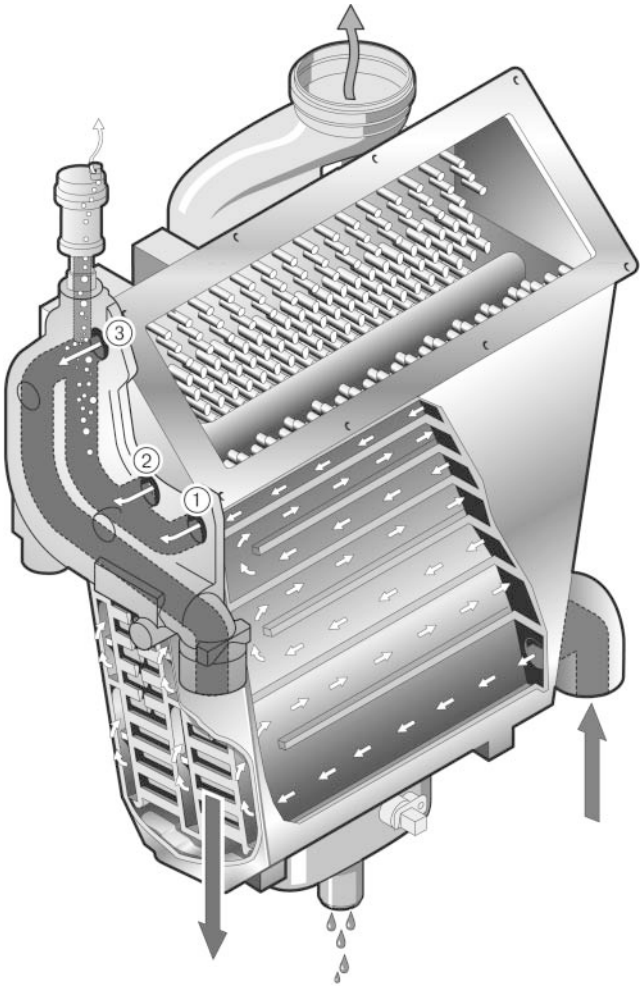
Heat exchanger
The heat exchanger is made from corrosion proof aluminium alloy.

The flow through the WTC is from bottom to top through three parallel segments ① – ③ . The water flow is distributed between the three segments by the return distributor and is combined again by the supply distributor once it has circulated the heat exchanger. An automatic de-aerator is fitted in the supply collector.

The heat exchanger is designed in such a way that the flue gas is cooled to below the flue gas dewpoint if the system temperature is adequately low.
It is surrounded by water and has no additional insulation. Due to the utilisation of the latent flue gas heat the unit operates with very high efficiency.

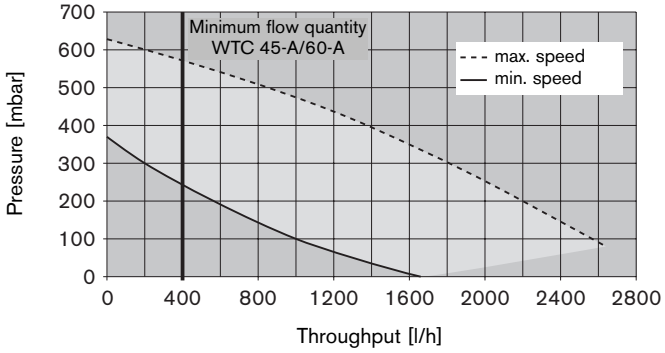
Premix burner
The overheat proof radiant burner is made from a highly stressable metal mesh (FeCr Alloy). Flame monitoring and the regulation of the gas quantity are carried out by a SCOT® monitoring electrode in conjunction with the fully electronic compound regulation and the Weishaupt Condens Manager (WCM).

Heat exchanger operating mode



Version - H with PWM-pump
The condensing boiler is fitted with a modulating heating circuit pump as standard.
The maximum modulation range of the pump in its factory presetting is 20 - 100%. The modulation range can be adjusted in the heating engineer level using parameter P42 and P43. This pump matches the unit throughput to the rating and reduces electrical consumption. The resulting supply pressure within the modulating range can be determined using the diagram on the right.
⇨ For a detailed description of the controller function see Ch. 7.4.1.

Diagram resulting supply pressure
WTC 45-A/60-A with PWM pump

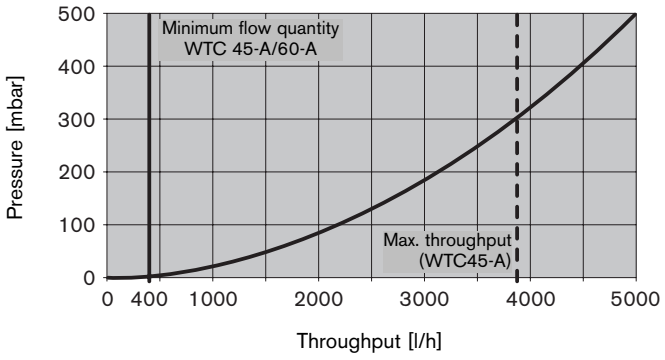


Pressure loss unit -H-0
The diagram on the right shows the pressure loss of the WTC unit without integrated pump needed to carry out the hydraulic operation of the installation.

Throughput limits

Size	Min. throughput	Max. throughput
WTC 45-A	400 l/h	3875 l/h
WTC 60-A	400 l/h	5160 l/h

Diagram pressure loss
WTC 45-A/60-A, version H-0 without pump

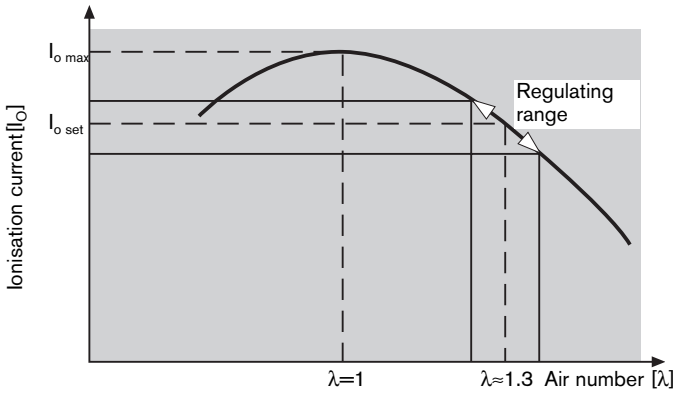


Fully electronic compound regulation
The WTC 45-A/60-A is equipped with fully automatic compound regulation. This regulates the gas quantity depending on the measured ionisation current. The regulation of the air quantity is carried out via the speed controlled fan. The basis for the regulation is the diagram on the right. The maximum of the ionisation current occurs with all gas types at $\lambda = 1.0$. This maximum is redetermined from time to time during recalibration. Calibrations are carried out
- after every power outage
- after 100 hours of burner operation
- after 500 burner starts
- after certain faults have occurred (e.g. F21, W22, …)

The maximum value determined is used to calculate the setpoint value.
Calibration can also be initiated manually.
This is necessary if the following parts are replaced during servicing or repair:
- Gas valve
- Burner
- SCOT electrode
- WCM electronic

(procedure see Ch. 5.5:
Fine tuning the O_2 value)

Diagram ionisation current control

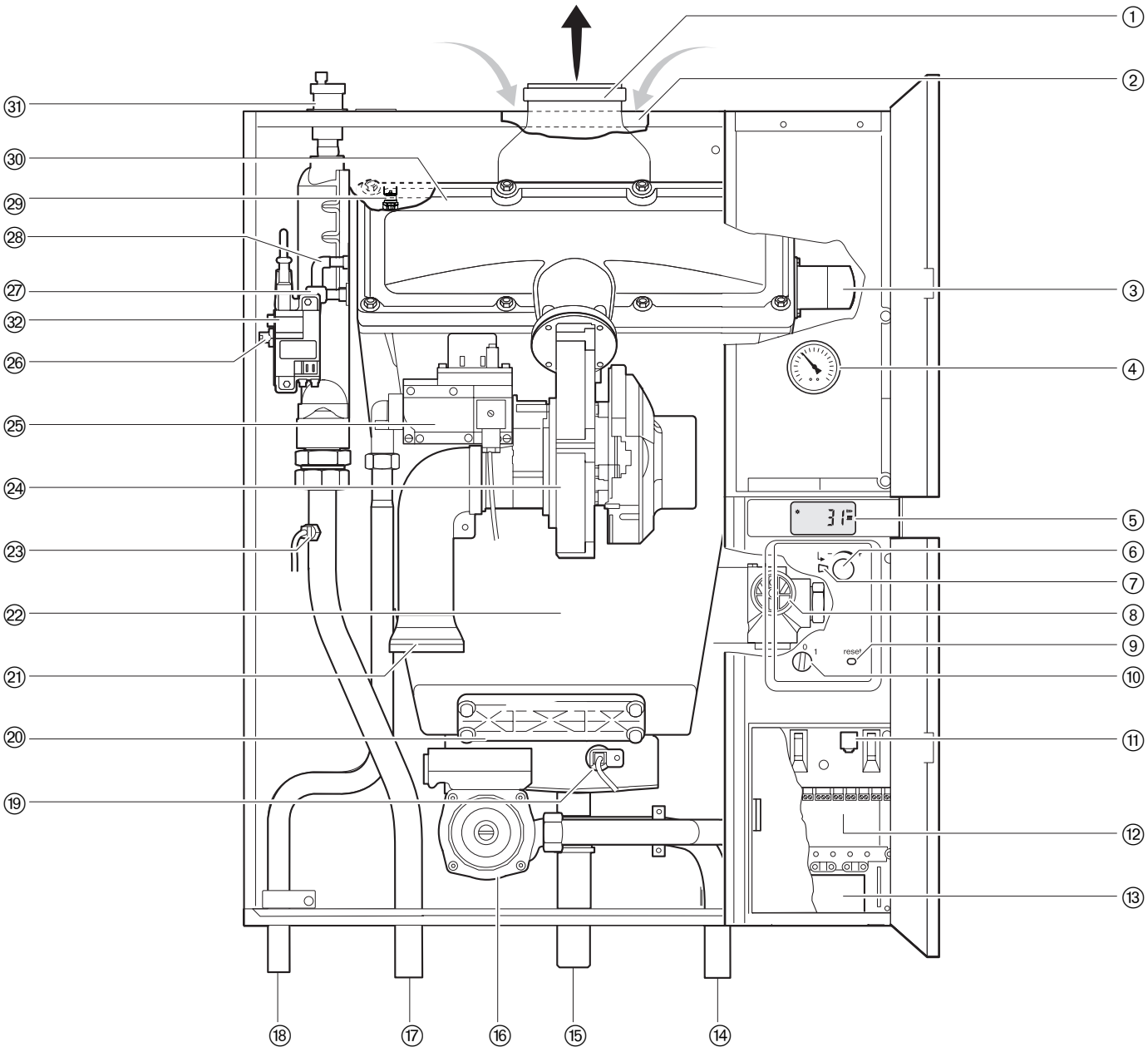


ATTENTION

During calibration, CO emissions above 1000 ppm occur for a short time (approx. 2 sec.).

3.3 Basic construction and variations

3.3.1 Components



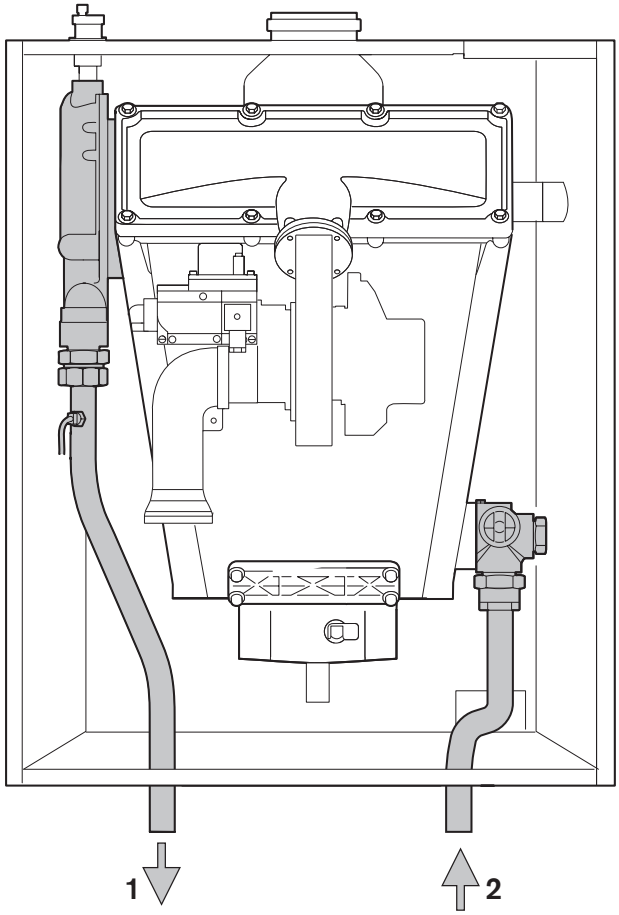
① Flue gas outlet DN80
② Air inlet DN125
③ View port with integrated mirror
④ Pressure gauge
⑤ LCD display
⑥ Dial knob
⑦ Enter key
⑧ Water pressure switch
⑨ Reset key
⑩ On/off switch
⑪ PC connection
(Software accessory WCM diagnostic)
⑫ Electrical installation area
⑬ Electrical installation duct
⑭ Heating return Ø 28 mm
⑮ Condensate outlet (for connection of siphon included in delivery)
⑯ PWM pump (version H only)
⑰ Heating flow Ø 28 mm
⑱ Gas pipe Ø 22 mm
⑲ Flue gas sensor (NTC 5kΩ)
⑳ Inspection opening heat exchanger
㉑ Air intake damper (only on WTC 45-A)
㉒ Heat exchanger made of AlMgSi
㉓ Flow temperature sensor (NTC 5kΩ)
㉔ Fan
㉕ Gas mixture preparation
㉖ Safety temperature sensor STL (NTC 5kΩ)
㉗ Ignition electrode
㉘ SCOT electrode
㉙ Temperature switch heat exchanger
(with manual reset)
㉚ Burner cover
㉛ Automatic de-aerator
㉜ Ignition unit

3.3.2 Version - H-0

Version H-0 is a heating unit without integrated pump. The heating pump is fitted on site. When installing the pump on site it should be ensured that a minimum installation pressure of 1 bar is maintained if the pump is fitted in the flow.

The pressure loss diagram from Ch. 3.2.2 should be used when sizing the pump. Weishaupt recommend the pump is installed in the return of the heating system of the unit.

When designing the hydraulic installation please observe that the WTC requires a minimum circulation of 400l/h. This should be safeguarded by using a hydraulic de-couple or overflow valve.



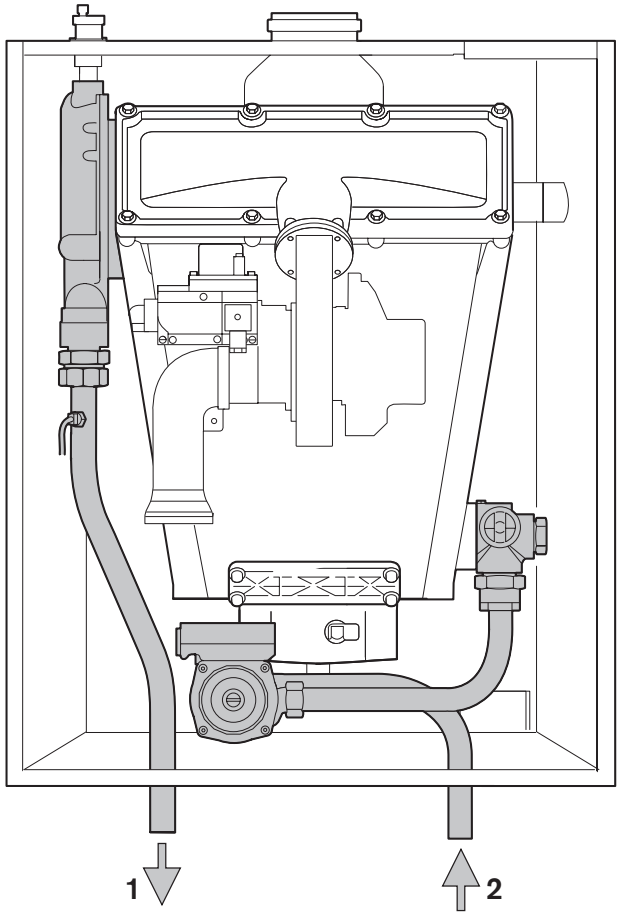
1 Heating flow
2 Heating return

3.3.3 Version - H

Version -H is a heating unit with integrated pump. The unit is designed for use with the directly mountable hydraulic de-couple (Order No.: 409 000 05 80 2).

In conjunction with the de-couple sensor (B11) fitted, the pump rating can be controlled in such a way that the volume flow through the WTC is just sufficient so that an increase in the return temperature is not possible within the modulation limit of the pump.

For operation without the mounted hydraulic de-couple, the diagram *Resulting supply pressure* from Ch. 3.2.2 should be observed when designing the installation. Furthermore a minimum circulation of 400l/h through the heat exchanger should be ensured.



1 Heating flow
2 Heating return

3.4 Prerequisites

Included in delivery
The ready-to-use unit is delivered in a cardboard box. The following parts are enclosed loose:

- End user documents
- Wall bracket
- Screw set with wall plugs
- Spacer
- Siphon with hose for condensate drainage

Application instructions
When transporting and storing the unit, the following should be avoided:
- mechanical impact, such as: distortion, warping, scratching
- Contamination of any kind, e.g.: water, oils, greases, solvents, dust, debris, aggressive steam, etc.
- electrical impact, e.g.: through electrostatic discharge or unnaturally large electric fields, see DIN EN 100 015 Part 1 and "Instruction for handling electrostatically sensitive components" (techn. information 821005 from Valvo)
- climatic exposure, such as: temperatures outside of the range -10°C...+60°C, condensation caused by dew, rel. humidity above 75% as annual average.

Requirements relating to the installation location
The installation location, which should be frost free and protected from humidity, must comply with local regulation (combustion by-law, fire regulations).
Observe special regulations:
- DVGW-TRGI (Germany)
- SVGW-Guidelines (Switzerland)

Requirements relating to combustion air
The combustion air must be free from aggressive compounds (Halogene, Chloride, Fluoride, etc.) and from contaminants (dust, building material, steam, etc.). The unit should not be operated until all building work in the installation location has been completed.

Important - Warranty for boiler replacement!
Supply air ducts, which have previously been used as a chimney for solid fuel or oil firing plants, must only be used as supply air duct once they have been thoroughly cleaned. Thoroughly clean means that dust, sulphur, soot, dirt and any diffused gases have been removed from the duct material (e.g. paint, render, insulation). If unsure, the internal sides of the duct should be sealed or concentric flue gas pipes (accessory) should be used.
If the WTC is integrated into an existing heating system, it must be ensured that rust, dirt and sludge have been removed.
Non oxygen diffusion resistant plastic pipes must only be connected via a separate heat exchanger, otherwise deposits can cause damage and lead to operational influences (localised overheating, noise or similar).

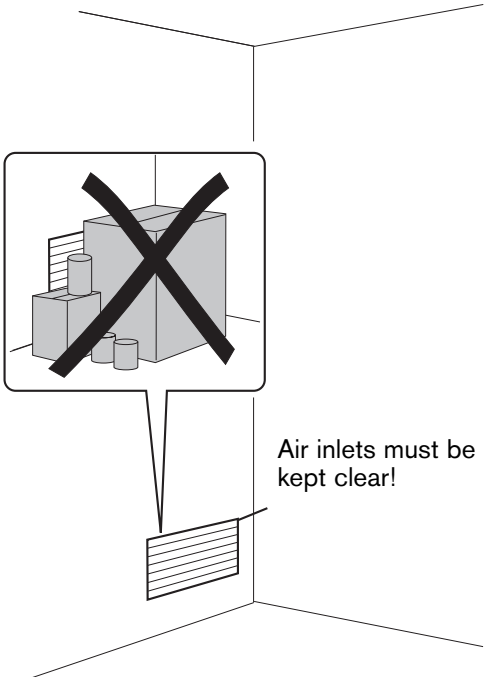
☞ If necessary fit sludge strainer in the return

Flue gas connection to chimneys
Due to the water vapour content in flue gases with low temperature and the additional condensation created in the chimney, condensing boilers can only be connected to moisture resistant house chimneys. The flue gas ducts must comply with local authority regulations and country specific requirements:

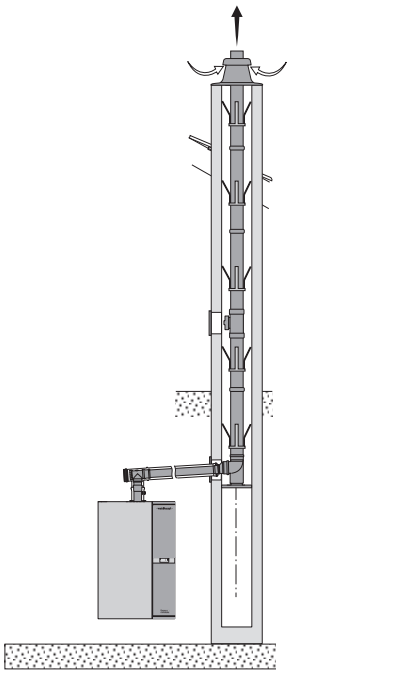
- (DE) DVGW (TRGI)
- (AT) ÖVGW
- (CH) SVGW, VKF Guidelines, Number 3.4.8 (Issue 1993)

Building regulation approved flue gas duct
The flue gas duct should have the same diameter as the boiler flue gas socket.
- Consultation with the appropriate district master chimney sweep
- Flue gas duct soundness test must be carried out

Unimpeded combustion air



Flue gas duct



3.5 Demands on the heating water

Note: In accordance with VDI-Guideline 2035 the following demands must be met by the heating water.

- The untreated fill and top up water must be of domestic water quality (colourless, clear, without scaling),
- the fill and top up water must be pre-filtered (mesh width max. 25 µm),
- the pH value must be 8.5 ± 0.5,
- avoid oxygenation of the heating water (max. 0.05 mg/l),
- if any system components are not diffusion resistant the unit should be separated from the heating circuit using a system separator.

3.5.1 Permissible water hardness

The permissible water hardness is determined relative to the fill and top up water quantity.

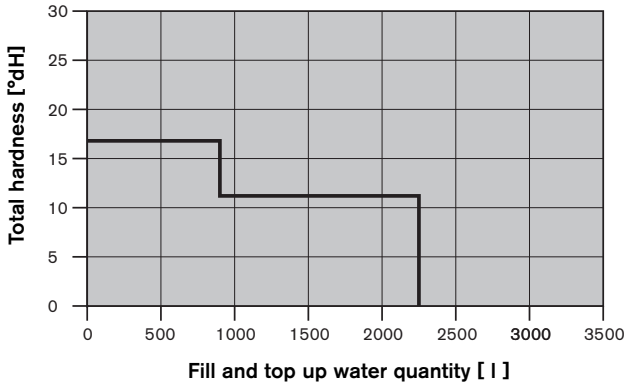
☞ Determine if measures for water treatment are necessary using the diagram.

If the fill and top up water lies in the range of the upper limit curve:
☞ Treat fill and top up water.

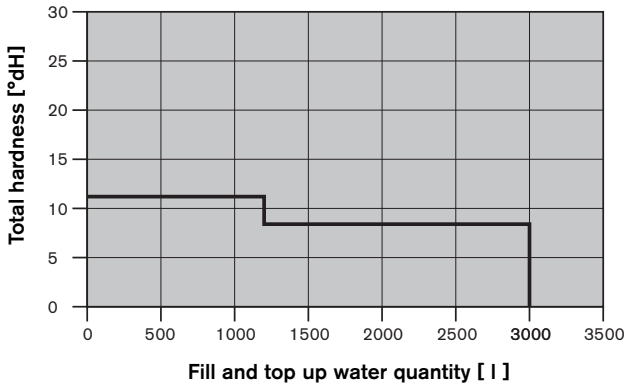
If the fill and top up water lies in the range of the lower limit curve, the water does not need to be treated.

Note: Document fill and top up water quantity in the system log book.

Max. total hardness of heating water for WTC 45-A



Max. total hardness of heating water for WTC 60-A



3.5.2 Fill water quantity

If information about the fill water quantity is not available, the following table can be used to estimate the quantity. On calorifier systems the calorifier content must be taken into consideration.

Heating system	Estimated fill water quantity(1	
	55/45 °C	70/55°C
Pipe and steel radiators	37 l/kW	23 l/kW
Cast iron radiators	28 l/kW	18 l/kW
Panel radiators	15 l/kW	10 l/kW
Air conditioning	12 l/kW	8 l/kW
Convectors	10 l/kW	6 l/kW
Underfloor heating	25 l/kW	25 l/kW

(1 based on the heating requirements of the building.

3.5.3 Treatment of fill and top up water

Demineralisation (recommended by Weishaupt)

☞ Fill and top up water should be demineralised (Recommendation: mixer bed treatment)

When the heating water has been completely demineralised, up to 10% of the system content can be topped up with untreated water. Higher quantities of top up water must be demineralised.

☞ Check pH value (8.5 ± 0.5) of demineralised water:
- following commissioning,
- after approx. 4 weeks of operation,
- during the annual service.

☞ If necessary, adjust pH value of heating water by adding Trisodium Phosphate.

Softening (cation exchanger)

Damage to the unit due to raised pH value:
Corrosion could damage the system.

☞ Following softening by cation exchanger the pH value must be stabilised due to the self-alkalisation of the heating water.

☞ Soften the fill and top up water.
☞ Stabilise pH value.
☞ Check pH value (8.5 ± 0.5) during annual service.

Stabilisation of hardness

Damage to the unit due to unsuitable inhibitors:
Corrosion and lime scale could damage the system.

☞ Only use inhibitors if the manufacturer can guarantee the following:
the requirements relating to the heating water are met,
the heat exchanger of the unit will not corrode,
no sludge will form within the heating system.

☞ Treat the fill and top up water with inhibitors.
☞ Check pH value (8.5 ± 0.5) according to the instructions of the inhibitor manufacturer.

4.1 Safety notes on installation

Electrically isolate the system

DANGER

Prior to installation switch off the unit and safety switch, as well as the mains switch. Failure to comply could cause death or serious injury by electric shock.

Only valid for Switzerland:
When installing and operating a -weishaupt- gas burner in Switzerland the regulations of SVGW and VKF as well as local and cantonal regulations must be observed.

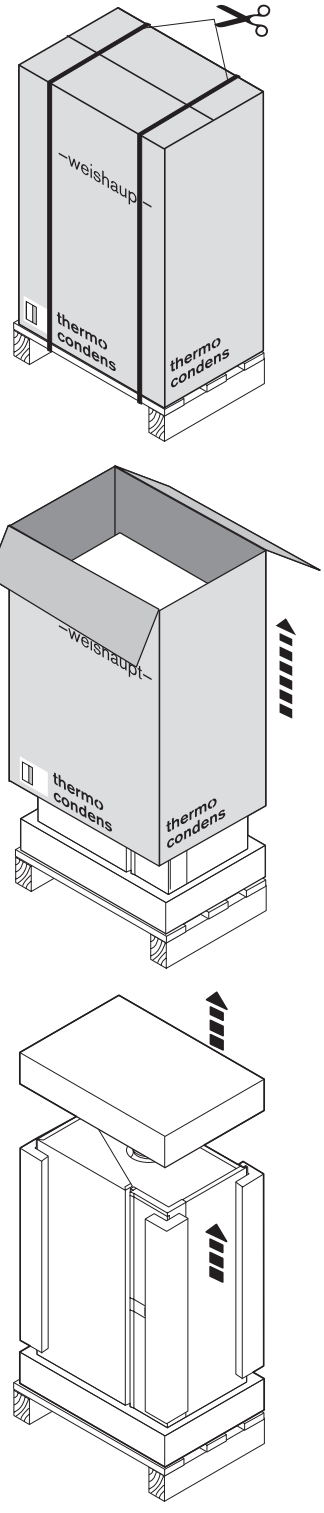
Furthermore, the EKAS guideline (Guideline for Liquid Petroleum Gas, part 2) must be observed.

4.2 Delivery, transport, storage

Packaged in shipment box
The WTC is delivered complete with accessories packaged in one strong shipment box.
The shipment packaging is best removed with the unit upright.

- ☞ Only transport in shipment box.
- ☞ Observe shipment instructions on box.
- ☞ Do not place WTC onto gas or water connections without polystyrene pad.

Packaging



4.3 Wall mounting

Fit wall bracket

☞ Fit wall bracket ① enclosed to the wall with the fixing screws supplied.

❑ The suitability of the wall plugs enclosed should be checked depending on the construction of the wall.

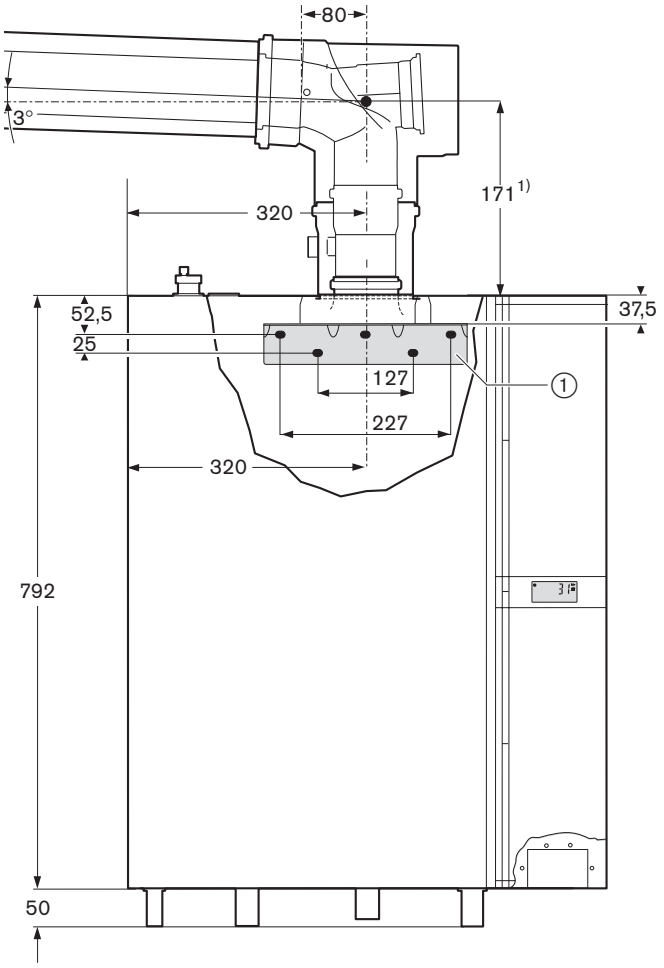
❑ A gradient of 3° towards the unit should be provided for the flue gas ducting (at 1metre this is equal to approx. 5.5 cm).

❑ There should be sufficient space available below the unit for the hydraulic connection assembly.

❑ For servicing purposes, a distance of approx. 30 mm to wall units or similar should be maintained.

Further unit dimensions see Ch. 11.5.

Fit wall bracket



1) Boiler connection piece new
Order No. 480 000 05 32 2
Dimension 234 mm is valid for old boiler connection pieces
Order No. 480 000 10 01 2 or
Order No. 480 000 06 52 7

Fit and align unit

☞ Fit spacers provided to the left and right of the rear of the unit, as low as possible.

☞ Place unit into the wall bracket ①. Check safe overlap in the wall bracket.

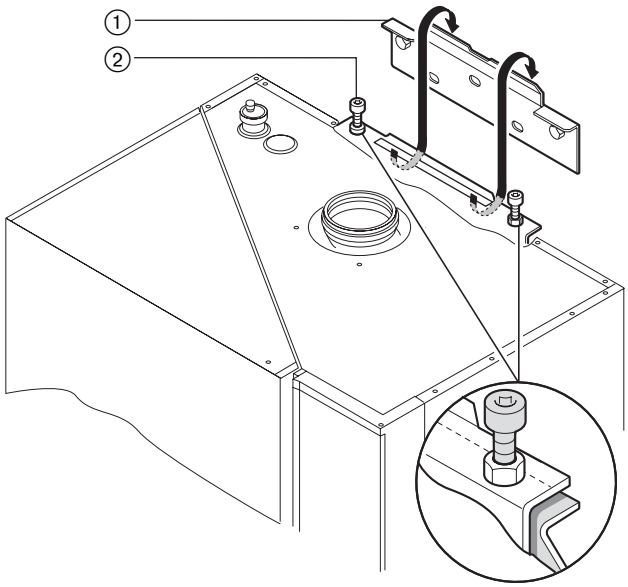
☞ Once fitted, horizontally align the unit with the 2 setting screws ②.

☞ Fit flue gas connection (accessory).

☞ It is recommended to remove the cover of the WTC before continuing with the installation. Remove the locking screw on the clamp fastener on the underside of the unit, open clamp fastener and remove cover upwards.

The cover of the WTC is protected from accidental opening with screws.
Re-secure the lid once it has been refitted using the screw.

Fit and align unit

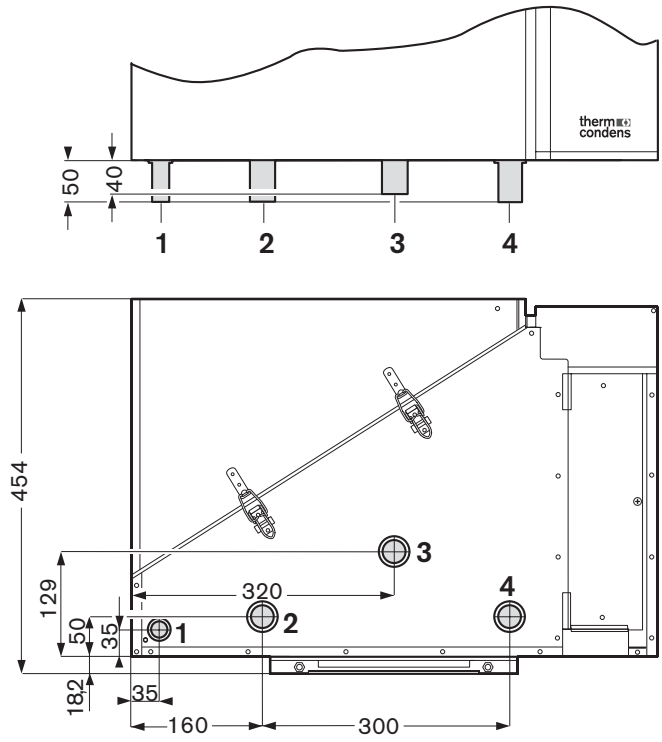


4.4 Mains water connection

Application in sealed heating systems

- ☞ Connect flow and return (pipes should be rinsed thoroughly before connecting).
- ☞ Install boiler, inlet and outlet valves (available as an accessory).
- ☞ Install safety valve (available as accessories).
- ☞ Fit expansion tank.
- ☞ Fit sludge trap in return pipe (if required).

Hydraulic connection



1 Gas Ø 22 mm
2 Heating flow Ø 28 mm
3 Condensate outlet Ø 32 mm
4 Heating return Ø 28 mm

4.5 Filling with water

When filling the heating system, the requirements for the heating system water (see also Ch. 3.5) should be observed.

ATTENTION

Unsuitable water results in scaling and corrosion formation and can cause damage to the condensing boiler.

- ☞ Check pre-pressure of the diaphragm expansion vessel.
- ☞ Prior to first commissioning, the heating system should be flushed with at least twice the amount of the system content to remove contaminants. Swarf, rust, scale, sludge etc. can influence the operational safety.
- ☞ Open all thermostatic valves in the system.
- ☞ Loosen cap of quick action vent valve.
- ☞ Open service cocks for heating flow and return.
- ☞ Slowly fill heating system from tap connected to the heating return (minimum system pressure >1.0 bar). Observe all relevant regulations.
- ☞ Vent all radiators.
- ☞ Once the system has been vented, check system supply pressure, if necessary repeat fill procedure.
- ☞ Seal joints and screwed unions should be checked to ensure they are tight.

Note: The unit and any separately fitted pumps must be switched off during filling.

4.6 Electrical connection

Electrical installation by qualified personnel only!

DANGER

Local regulations and codes of practice, as well as regulations from the energy supplier must be observed.

Mains and emergency switch

The external mains switch for the heating system must have at least 3 mm contact distance.

☞ Connection to plug assignment, Ch. 4.6.1.

Electrical connection

The gas condensing boiler WTC is wired ready for connection. The cover of the electrical installation duct must be removed for the electrical installation.

Insert the cable from the rear through the recess into the unit.

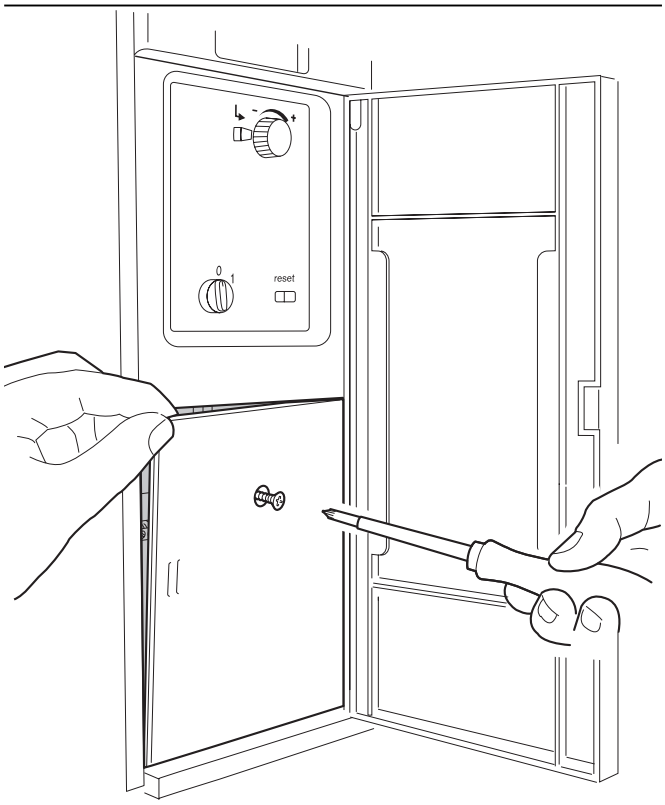
The electrical connection must be carried out by a qualified electrician. Changes to the internal boiler wiring are not permitted.

ATTENTION

Shell clamps should be used if flexible cables are connected.

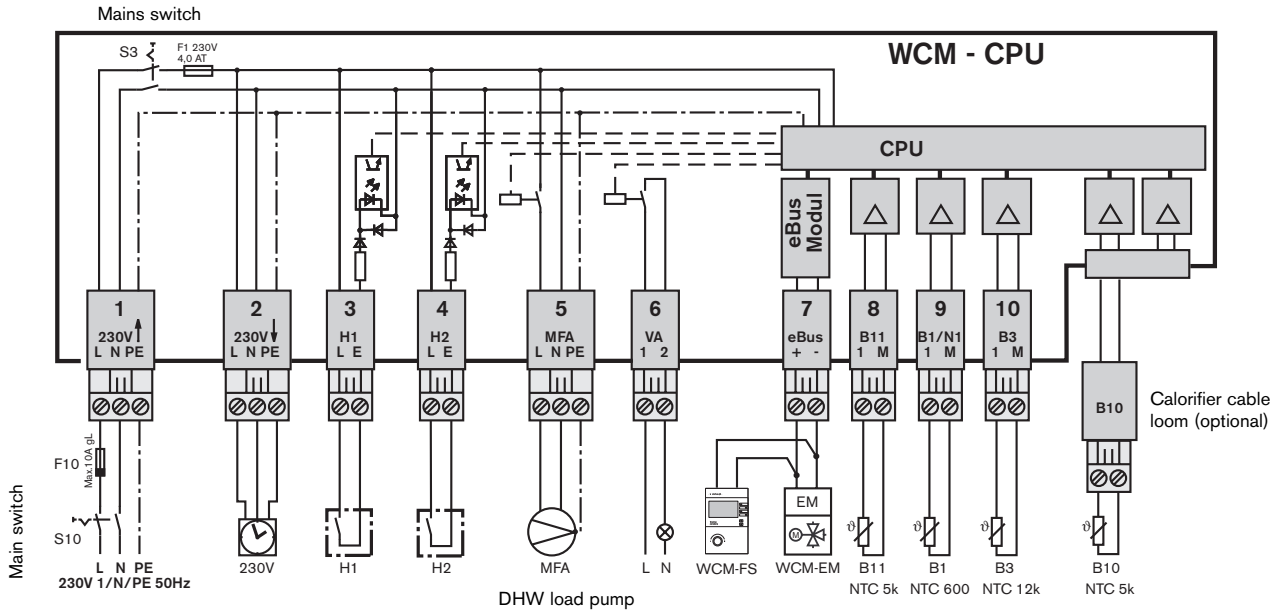
Approved sleeve cable should be used for all other connection lines.

Plug cover



4.6.1 External connection WCM

Wiring diagram WCM



The external connection is made in the electrical installation duct

Plug	Number/ colour	Connection	Operating range
Mains, 230V	**1/**black	230 VAC supply input	
230V	**2/**grey	230 VAC supply output	max. 250 VA
H1	**3/**turquoise	H1 Opto input 230VAC 0.002A	function dep. on configuration
H2	**4/**red	H2 Opto input 230VAC 0.002A	function dep. on configuration
MFA, 230V	**5/**lilac	MFA relay output: 230 VAC	max. 150VA,
VA	**6/**brown	VA potential free relay output	230VAC 8A / DC 60V 5A function dep. on configuration
eBUS	**7/**blue	Connection of add. control components	WCM - FB, - EM, - KA
B11	**8/**white	De-couple sensor (variation: P2/P3) ⇨ Ch. 7.4.5-7.4.7	0…99°C
B1	**9/**green	External sensor type QAC 31 (Order No. 660 186), NTC 600 Ohm,	-40…50°C
N1		4-20 mA remote load control ⇨ Ch. 4.6.4	4…20 mA
B3	**10/**yellow	Tank sensor NTC 12kOhm	0…99°C
Optional: calorifier cable loom	B10	DHW calorifier control sensor NTC 5kOhm ⇨ Ch. 4.6.5	0…99°C

Note:

ATTENTION

- Local regulations must be observed when connecting the boiler to the 230 VAC mains supply, to ensure safe disconnection from the mains is possible.
- The sum of all consumer load currents on plugs 2 and 5 must not be more than 2 A continuous current.
- The function of inputs and outputs H1, H2, MFA and VA depend on the configuration (⇨ Chapter 7.4.4).
- Internal boiler wiring see appendix.
- Consumers of other power circuits (external voltage) must not be switched directly with the VA output.

4.6.2 Connecting a 3 way change-over valve

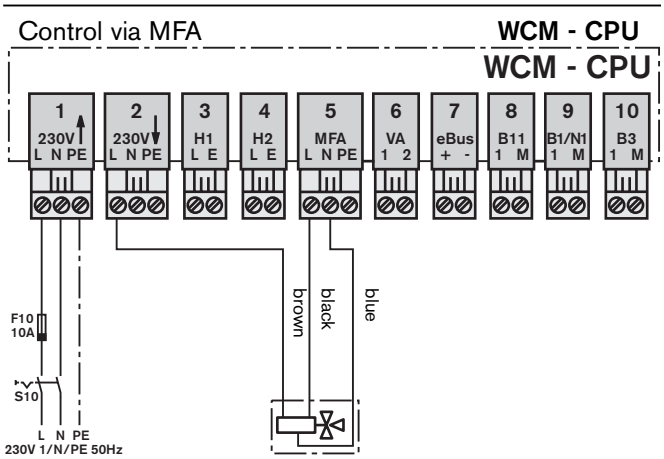
For DHW operation, the 3 way change-over valve is connected to the 230V output and either the MFA or VA. To enable the 3 way change-over valve to function, the MFA or VA must be configured accordingly.
To do this, parameter P13 or P14 (see Ch. 6.3.3) should be set to parameter value 4.

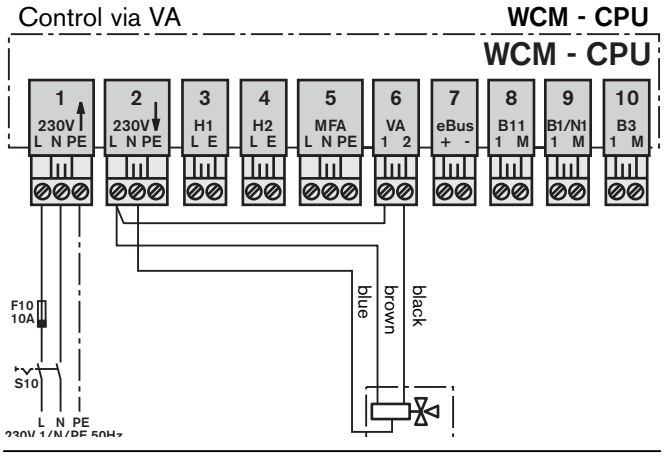
Control via MFA: P13 = 4
Control via VA: P14 = 4

3 way change-over valve
(Order No.: 409 000 05 73 2)

Servomotor with connection cable
(Order No.: 409 000 05 71 2)

Connect 3 way change-over valve



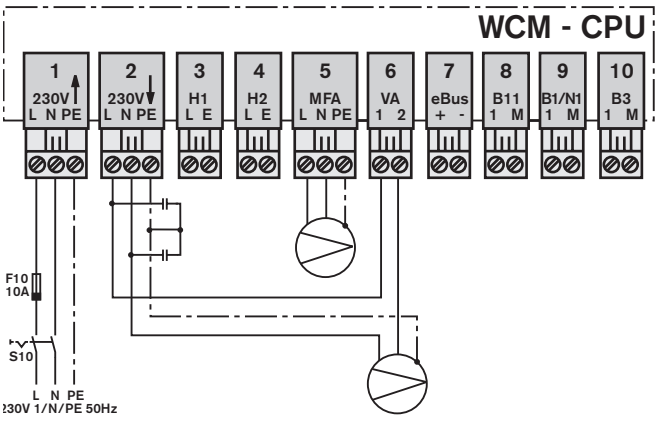


4.6.3 Connecting an external boiler pump

The external boiler pump can be controlled via output MFA or VA.
To achieve the required function of the pump (DHW or heating) parameter P13 or P14 need to be configured accordingly (see Ch. 6.3.3).

Note: When connecting an electronically controlled pump (E pump) the replacement of the suppressor element is recommended (-w- Order No. 713 404).

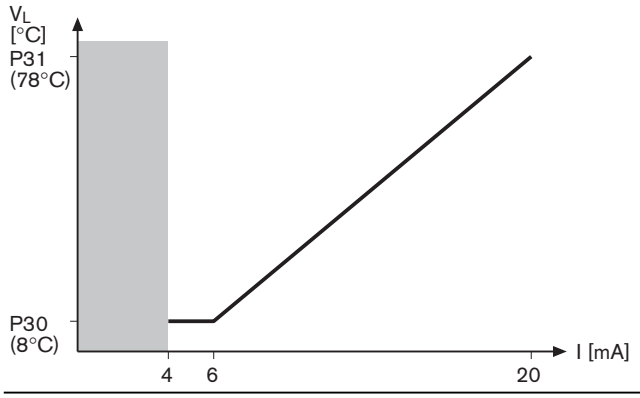
Connecting an external boiler pump



4.6.4 Remote load control

The control cable (4…20 mA) is connected to input B1/N1 (plug 9) independent of polarity.
The WCM automatically recognises the signal and displays configuration _t _ when it is switched on.
The available signal is interpreted as supply setpoint, which is incorporated into the setpoint formation parallel to other heat demands from the heating circuits, whereby 4 mA is equal to the minimum supply setpoint set in parameter P30. 20 mA is equal to the maximum supply setpoint set in parameter P31. The range of 4 - 6 mA switches the unit off.
If a control signal is switched on input B1/N, no more than 6 extension modules (addresses #2 to #7) can be installed.

Diagram



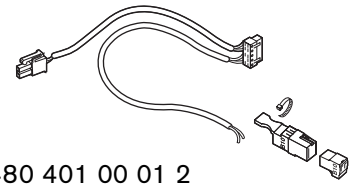
4.6.5 Connecting temperature sensors for calorifier control (variations P1 and P2)

Connection calorifier sensor B10)

Prior to starting work electrically isolate the unit and protect from accidental reconnection.
Failure to comply could cause serious injury or death by electric shock.

To be able to install the calorifier sensor B10, the existing sensor line on plug slot ST20 (⇨ Appendix; internal boiler wiring) must be replaced with the accessory line.

Scope of delivery calorifier sensor connection



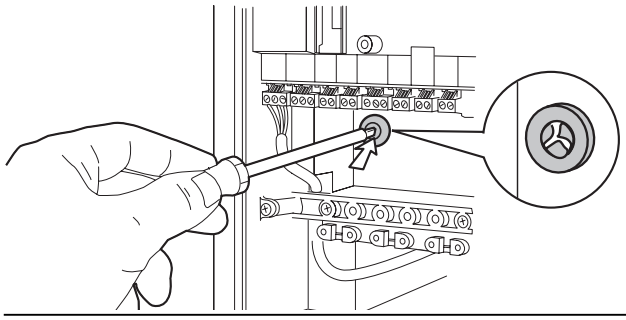
Order No.: 480 401 00 01 2

1. Open cover of WTC.

The cover of the WTC is protected from accidental opening by a screw.
Ensure this screw is refitted when refitting the cover.

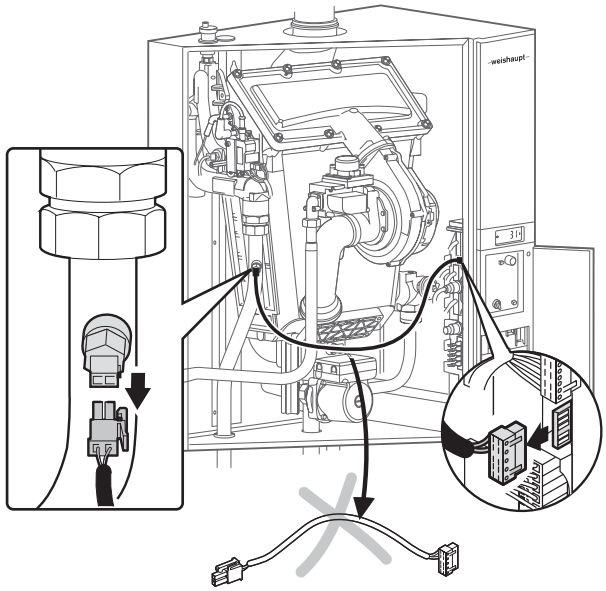
2. Open cover of electrical installation area (see Ch. 4.6) and puncture through the diaphragm grommet.

Push through diaphragm grommet in installation area



3. Unplug and remove existing sensor lines on circuit board (plug slot ST20) and on flow temperature sensor.

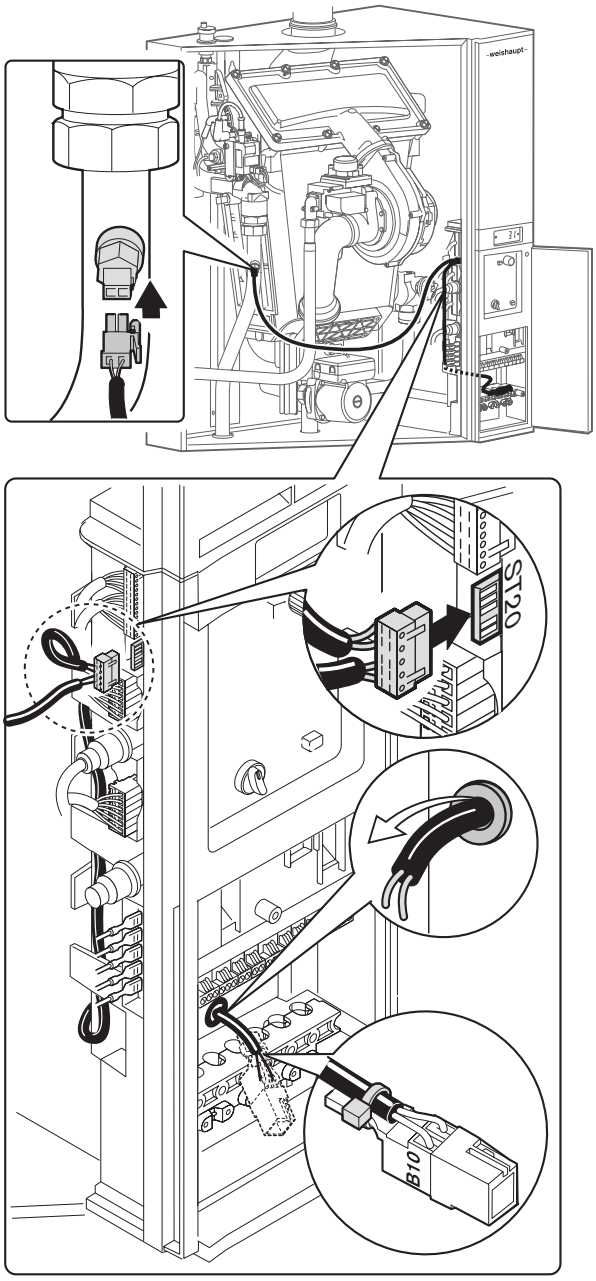
Remove flow sensor line

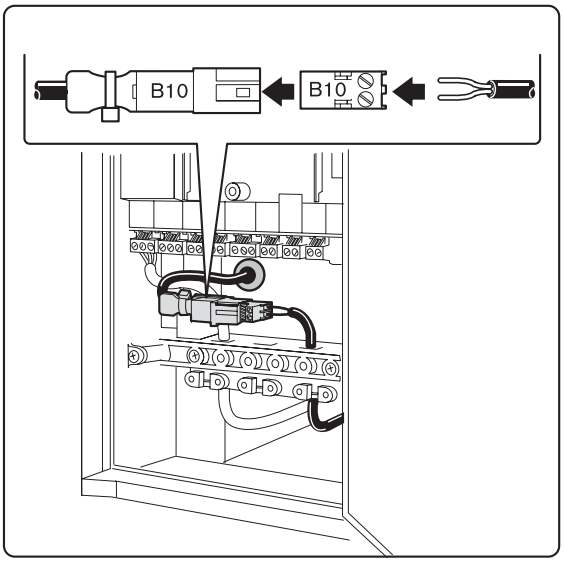


4. Plug in circuit board plug (Rast 2.5) at plug slot ST20.
5. Fit new flow sensor line to the unit and plug into sensor.
6. Install the cable for the calorifier sensor down towards the cable entry and pass it through the diaphragm grommet.
7. Connect wire ends to plug part B10 and secure with tension relief (cable ties).
8. Connect calorifier sensor to socket B10 and plug in.
9. When retro-fitting to an existing installation, the unit has to be reconfigured via parameter P10 (Ch.: 6.3.3).

Note: Detailed description for the control of calorifier tanks see Ch. 7.4.5 and Ch. 7.4.6.

Connecting calorifier cable loom





4.7 Gas side connection

Gas installation by qualified personnel only!
Local regulations and codes of practice, as well as regulations from the local gas board must be observed.

Venting the gas supply line
The local gas board or their appointed sub-contractor are responsible for venting the gas line. If work such as replacing components, valve train or gas meter, has been carried out on the gas supply line, recommissioning may only be carried out once the appropriate components have been vented by the gas board or their appointed sub-contractor.

Unit connection
Use the elbow or straight gas connection cock available as an accessory, to connect the unit to the gas supply.

The gas board will also inform you if you require an approved gas filter or thermal shut off valve required to comply with some regional building laws.

Note: Due to the fully automatic compound regulation the setting to a gas type within a gas family is not required.

Gas characteristics
The gas characteristics should be obtained from the gas board. The Wobbe index W_S should be checked according to the valid gas groups. The gas connection pressure must lie within the following ranges:

- Natural Gas 17...30 mbar
- Liquid Petroleum Gas 25...57.5 mbar

ATTENTION

For higher gas connection pressures the WTC should be fitted with an additional gas pressure switch.
If the gas pressure is lower, contact the gas board. Do not commission the WTC.

Liquid Petroleum Gas safety valve
For liquid petroleum gas operation below ground level it is recommended to fit an additional safety solenoid valve in the gas supply line to avoid the accumulation of gas near the boiler room.

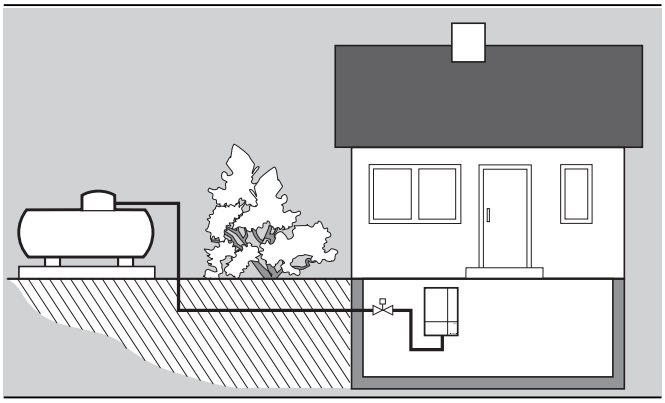
☞ Connection to plug configuration Ch . 4.6.1, plug MFA (5) or VA (6).

☞ Parameter setting of output MFA or VA to LPG safety valve. Set parameter P13 or P14 (see Ch. 6.3.3) to parameter value 0.

Control via MFA: P13 = 0
Control via VA: P14 = 0

☞ Conversion of type of gas Natural Gas - Liquid Petroleum Gas, see appendix.

Safety solenoid valve



4.8 Condensate - installing siphon

Fill siphon supplied with water and install to WTC as shown.

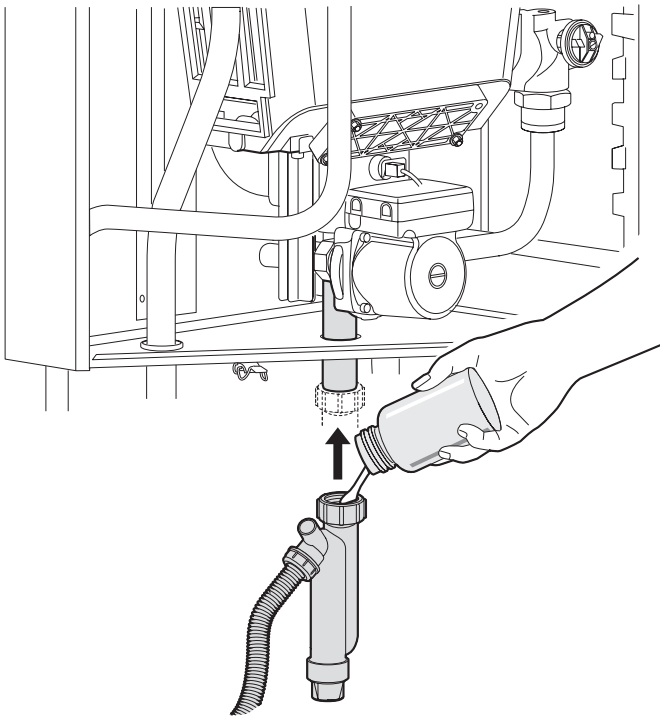
Condensate discharge into the waste water system
The condensate of the WTC complies with the requirements as stipulated in the ATV data sheet A 251for condensate discharge into the waste water system of the property. Neutralisation is usually not required.
If necessary, the water board should be informed about the discharge.
If the boiler is mainly operated in the non-condensing range, the internal siphon must always be filled with water. If the siphon is empty, flue gas can escape.

☞ Fill siphon with water - top up if flue gas can be smelled.

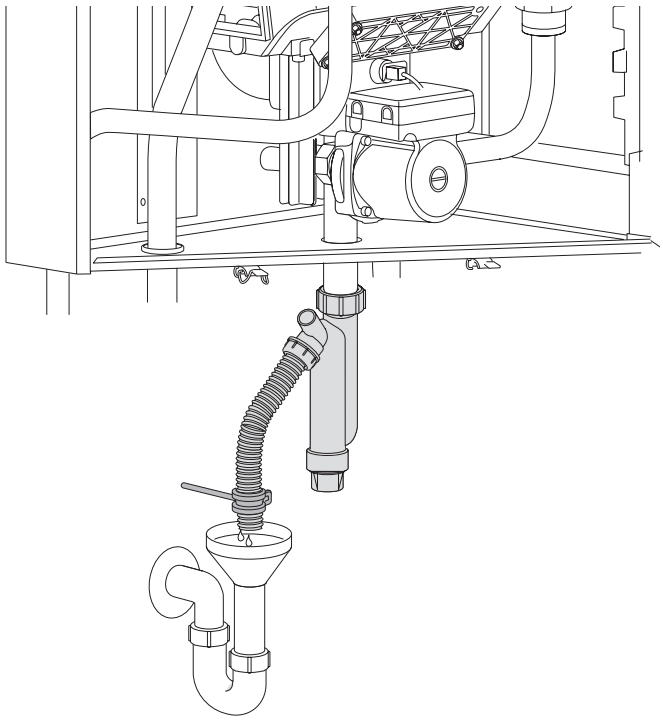
DANGER

If the siphon is empty, flue gas will escape into the boiler room. During prolonged shutdown or if operating the installation with high return temperatures (> 55°C) the water level of the siphon should be checked.

Installing and filling siphon



Note: When installing the siphon ensure that the condensate is expelled completely, as a blockage in the condensate line will cause operational problems. Therefore do not connect the condensate hose permanently to the waste pipe, but mount it free-flowing (e.g. into an outlet hopper).



4.9 Flue gas connection

Flue gas lines approved by planning law
The WTC is equipped with a concentric flue gas connection Ø 125/80 located at the top of the unit. The flue gases should be extracted via temperature and corrosion resistant flue gas duct:

- in vertical ducting
- via external wall connections
- for roof heating centres with vertical flue gas duct
- air-flue gas chimney

The combustion air can be introduced:

- from the boiler room (room air dependent operation)
- by concentric pipe systems (room air independent operation)
- by non-closing supply air ducts

Only CE certificated or locally tested and approved flue gas systems must be used.

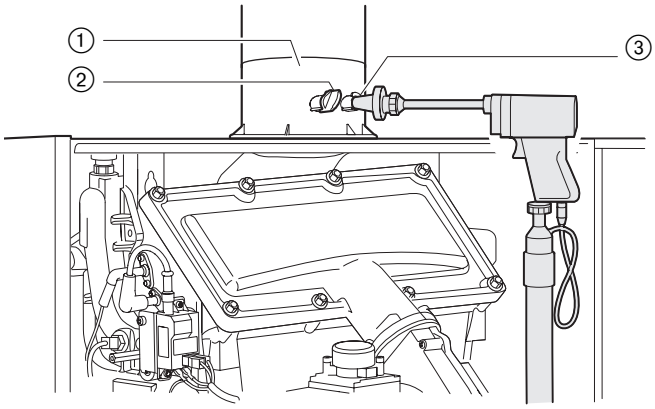
The Weishaupt Flue gas - air - system WAL-PP, see installation and operating manual WAL-PP, offers approved kits and individual components.

The flue gas duct must be gas tight.

☞ Carry out soundness test.

Note: If a **plastic** flue gas system is connected, which is approved for flue gas temperatures up to 80°C, the maximum flue gas temperature must be set to 80°C. Use parameter P33 (see Ch. 6.3.3). The Weishaupt flue gas-air system WAL-PP is approved for temperatures up to 120°C.

Flue gas connection

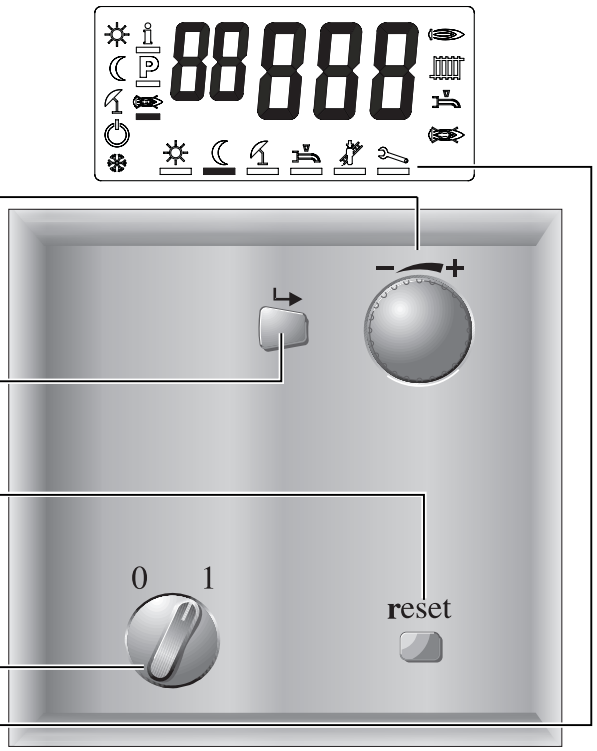


① Boiler connection piece
② Test point in the supply air aperture
③ Flue gas sampling point

5.1 Operating controls

Four operating controls are located below the front flap.

Operating elements



Dial knob
This is used to change values and settings by rotation.

Clockwise turn:
• Values are increased
• Markings are moved to the right or down

Rotation to the left:
• Values are reduced
• Markings are moved to the left or up

Enter button
This is used to select menus and to confirm entries

Reset button
Pressing this button resets lockouts.
If there is no lockout, this button is used to initiate a restart of the system.

On/Off switch

Symbol bar
This appears, when the dial knob is rotated.

5.2 Safety notes on initial commissioning

The initial commissioning must only be carried out by the supplier, manufacturer or their appointed agent. At this time, all the control and safety equipment must be checked to ensure correct operation and – if any item can be adjusted – it should also be checked that it has been set correctly.

Furthermore the correct fusing of the circuits and the measures for contact protection of electrical equipment and of wiring must be checked.

Checklist for initial commissioning

Please tick the work carried out and enter the relevant measurement values.

Commissioning protocol	Remarks/ Measurement value
✔ Heating system flushed, filled and vented (see Ch. 4.5.).	.....bar
✔ Radiators and mixer open.	❑
✔ Combustion air ducts, flue gas ducts checked.	❑
✔ Unit siphon filled.	❑
✔ condensate hose connected.	❑
✔ Gas soundness test carried out.	❑
✔ Automatic configuration saved (see Ch. 5.4.1).	❑
✔ O_2 content checked.	.....%O_2
✔ Gas connection pressure (flow pressure) define at nominal load.	.....mbar
✔ Nominal load determined.	.....kW
✔ Heat rating set in % of nominal load.	.....%
✔ DHW rating set in % of nominal load (only version -W, -C).	.....%
✔ End user instructed, documentation handed over. Confirmation by end user in appendix completed and signed.	❑

5.3 Soundness test with air

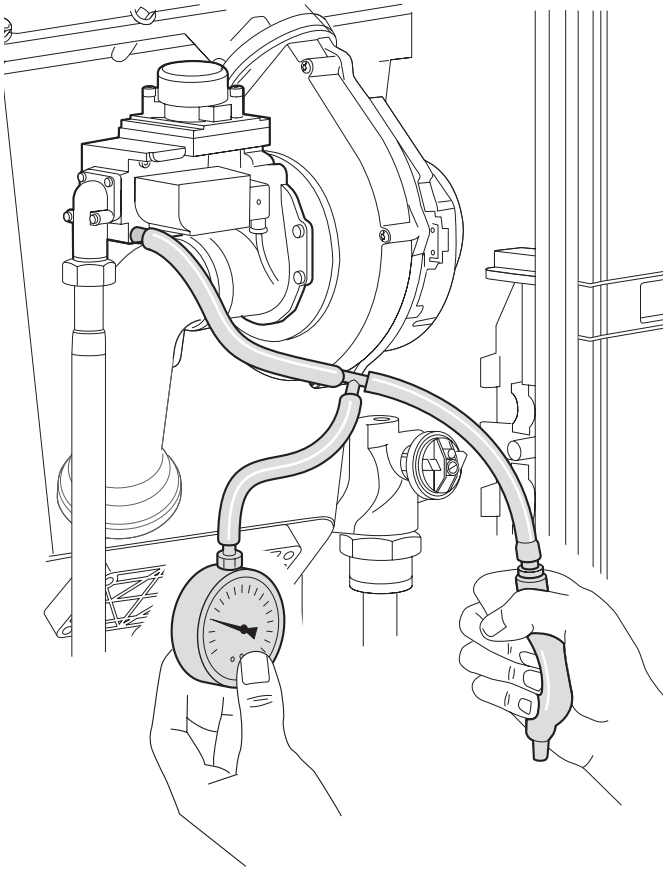
During the soundness test, the gas ball valve and gas combi valve must be closed.
A soundness test must be carried out at every service.
The result of the soundness test must be certified on the engineers report.

- ☞ Open closing screw on test point Pe by approx. 1 rotation.
- ☞ Connect pressure measuring device to Pe.
- ☞ Connect aspirator with T piece.

Create test pressure:
- ☞ The test pressure should be 100 mbar.
- ☞ Pressure loss within 5 minutes max. 1 mbar.

Only non-corrosive solutions must be used to locate leaks.
The gas ball valve should be included in the soundness test.

Soundness test



5.4 Function test without gas

5.4.1 Automatic configuration

☞ The gas ball valve must be closed.
☞ All electric wiring should have been tested.
☞ There must be water pressure available in the heating system (> 1bar).
☞ Apply voltage supply and switch on unit.

Unit type	Sensors required/ action and/or configuration	Display
Version -H-0	-	H – –
Version -H	Internal PWM boiler pump	H – P
Options:		
External sensor	Connection QAC 31 on plug B1	– A –
Remote temp. control	4-20mA Signal am plug - slot N1 (B3)	– t –
With water heater	Connection of tank sensor NTC 12kΩ to plug B3	W – –

Switch on WTC at the mains switch.
During the first 10 seconds an analysis of the sensors and actuators connected is carried out.

The WCM-CPU displays the configuration detected in flashing codes.
If a calorifier or de-couple sensor has been detected by the WCM-CPU the relevant control variation will be displayed after approx. 7 seconds instead of the boiler type.

The configuration detected is displayed flashing for approx. 20 seconds.

By pressing the button during this time the configuration is saved.

☞ If the button is not pressed, an automatic backup is carried out after 24 hours. If there is a power failure before this time has elapsed, the sequence starts again.

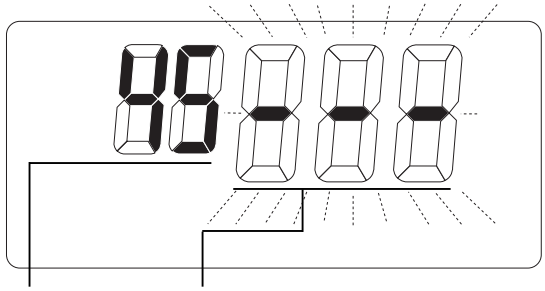
☞ The configuration can be changed manually (description in Ch. 6.3.3; parameter P10).

☞ Complete detection is only carried out when the unconfigured unit is turned on.
A configured unit shows its saved configuration when switched on.

If, for example, an external sensor is fitted at a later stage, the WCM shows this new configuration with flashing codes when switched on.
The continuing procedure corresponds to that of an unconfigured unit.

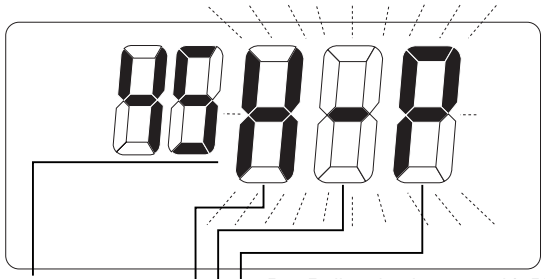
The Weishaupt Condens Manager (WCM) automatically recognises the type of unit connected and carries out the necessary parameter settings. Equipment used:

Display "Boiler type recognised"



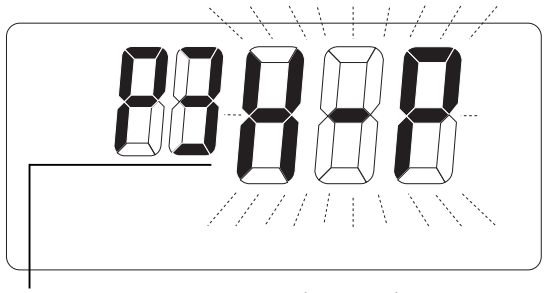
45 = WTC 45-A
60 = WTC 60-A
– – – = unconfigured unit

Display "Unit configured"



45 = WTC 45-A
60 = WTC 60-A
P = Boiler circuit pump with PWM control
– = no internal pump
External sensor available
t = Temperature remote control 4 - 20 mA (N1)
- = Connection B3/N1 not used
H = Version H, H-0
W = with water heater

Display control variation

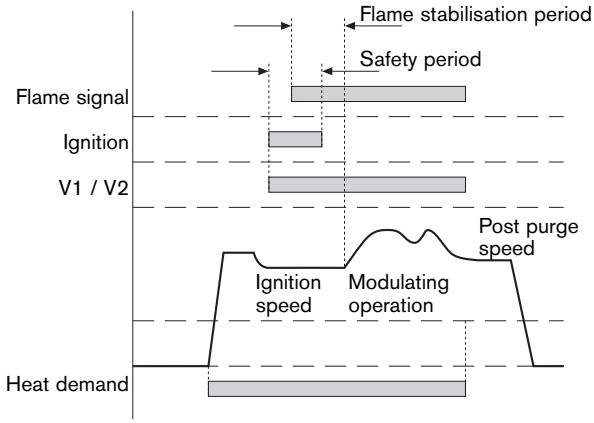


P1 = Control with one calorifier sensor (Ch. 7.4.5)
P2 = Control with two calorifier sensors (Ch. 7.4.6)
P3 = Control for hydraulic de-couple (Ch. 7.4.7)

5.4.2 Continued program sequence

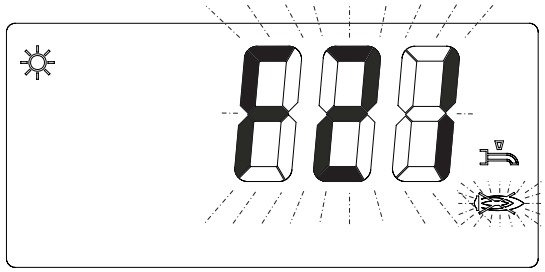
The continued sequence can be found in the sequence diagram on the right.

Sequence diagram



The unit carries out 5 ignition attempts.
After the fifth unsuccessful attempt the display shows the code F21. Initiate a restart by pressing the reset button.

Display



5.5 Commissioning

Notes on initial heating up of the system
- The commissioning and purging of the system should be carried out immediately after the system has been filled.
- When first heating up the system, ensure that the maximum possible water flow through the condensing unit is guaranteed. To do this all radiator valves should be fully opened.
- The heat up should be carried out with low supply temperatures and at low load.
- On multi-boiler systems all units should be commissioned at the same time at low load.

❑ Open gas isolating valve
❑ The electrical wiring must have been tested.
❑ Water pressure is available, cocks are open, sufficient heat demand is ensured.

The WTC has been factory preset.
Due to its fully automatic compound regulation an adaptation to various gases from one gas family is not required.
Therefore the values set during first commissioning have to be checked only once. The values set can be found in the technical data.

The following checks should be carried out:
- measuring the O_2 content at nominal load and partial load (conversion table O_2 – CO_2 see appendix).

O_2 setpoint:	Natural Gas	LPG
	$O_2 = 5.3\%$	$O_2 = 5.1\%$

The rating is set as detailed in Ch. 5.5.2.
If the value deviates by more than ± 0.6%, a correction is required.

- Ratings measurement at nominal load (see Ch. 5.6).

Adapting nominal load
- Using parameter P37 the heat rating can be reduced in percentage values (see Ch. 6.3.3).
- Using parameter A10 the maximum fan speed can be increased (see Ch. 6.4.1).
  A PC with Software WCM Diagnostic is required to be able to set parameter A10 (see Ch. 6.4.1).

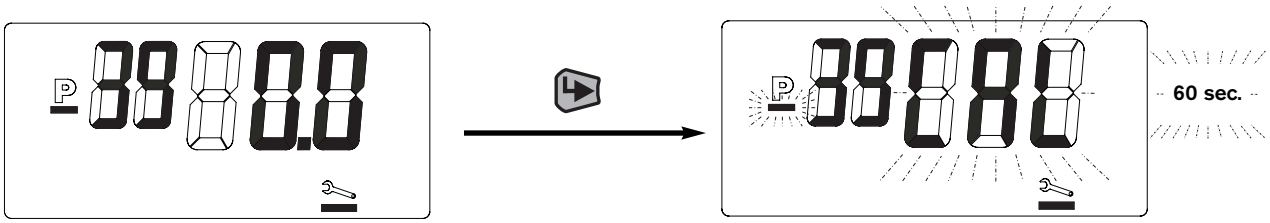
Once a correction has been made re-check nominal and minimum load.

Note: The rating set may deviate from the burner rating given on the name plate by a maximum ± 5%.

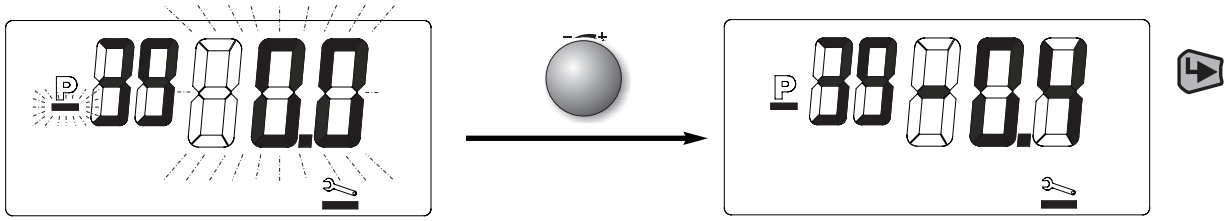
Fine tuning the O_2 value
Fine tuning the O_2 value is included in an automatic function sequence with 3 steps.
This sequence allows the combustion to be optimised on site using parameters P39 and P72.

Procedure

1. Select parameter 39 in the heating engineer level and call up the entry mode by pressing the key, the unit carries out a calibration (duration approx. 60 sec). This calibration creates a new SCOT® base value.

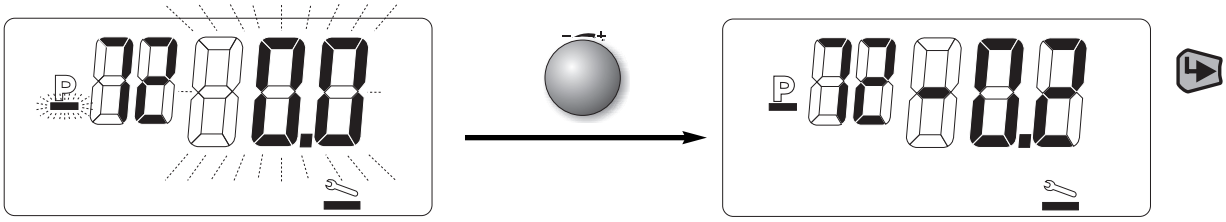


2. Following the calibration, the O_2 value can be adjusted, whereby the value displayed is almost equal to the percentage value of the O_2 adjustment. The new value can be saved by pressing the key.

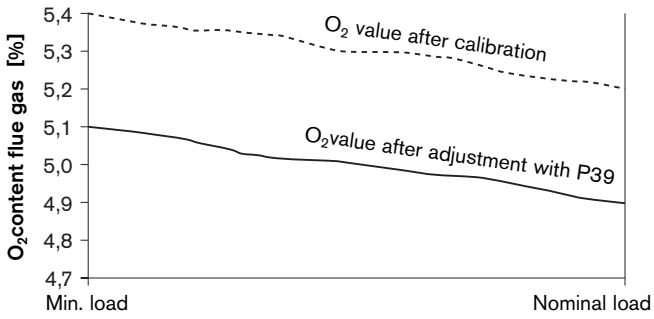


3. The WTC now modulates to the minimum rating, where possible deviations in the lower ratings range can be equalised by adjusting P72.
The entry is carried out, as for P39, as O_2 adjustment value.

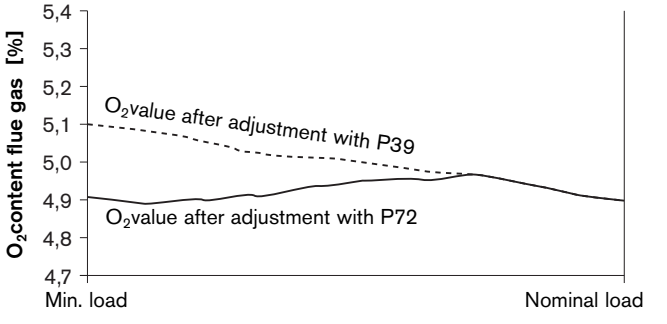
Note Following an adjustment with P39 (adjustment effective across the total modulating range) and/or P72 (adjustment effective across minimum load range of 27–50% rating) the O_2 content at maximum and minimum rating **must** be checked.



O_2 fine tuning with P39



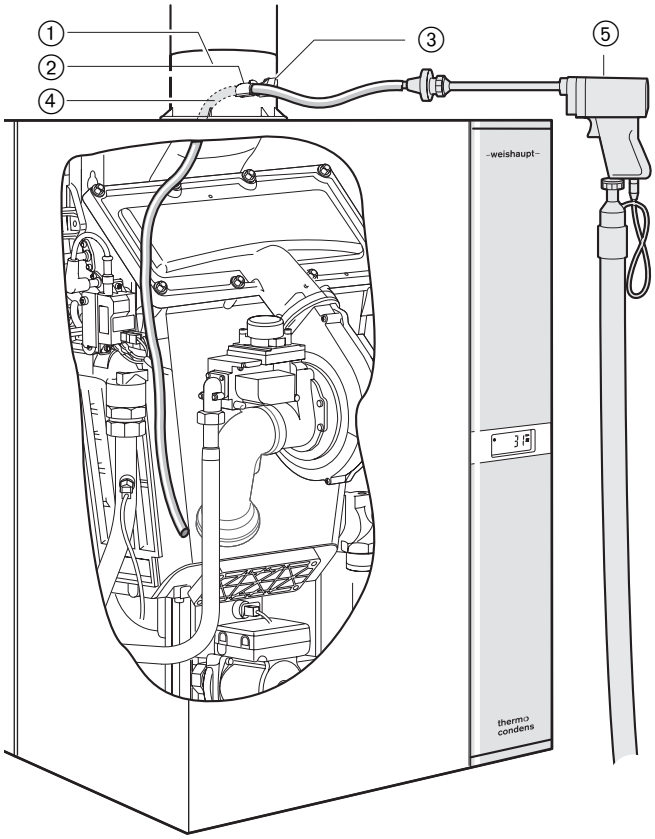
O_2 fine tuning with P72



Soundness test of flue gas system
For room air independent operation, a soundness test of the flue gas system via an O_2 measurement within the internal space of the condensing boiler is required.

- ☞ Fit hose ④ through the test point in the supply air aperture ② into the condensing boiler.
- ☞ Seal test point in the supply air aperture ②.
- ☞ Connect test sensor ⑤ to the hose ④.
- ☞ Close cover of condensing boiler.
- ☞ Start condensing boiler in chimney sweep mode and carry out O_2 measurement at 100% load.
  The test should last at least 5 minutes, the O_2 content must not fall more than 0.2% below the measured value of the ambient air.

Soundness test of flue gas system



① Boiler connection piece (Accessory No. 480 000 06 53 7)
② Test point in supply air aperture
③ Flue gas test point
④ Hose
⑤ Test sensor

5.5.1 Gas inlet pressure at nominal load

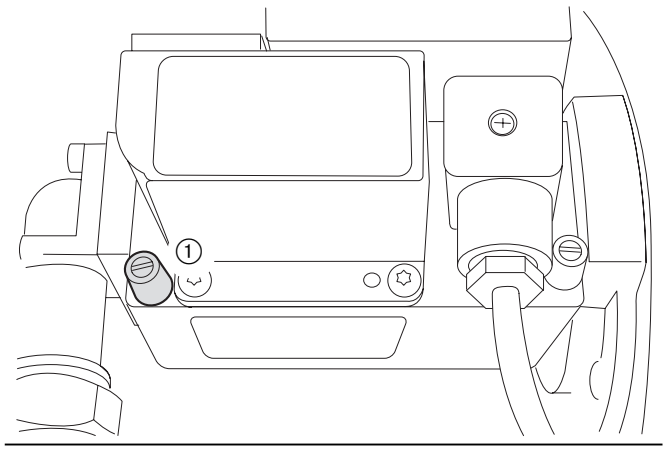
Pressure measuring device at test nipple Pe
The correct gas inlet pressure is a prerequisite for the following measurements.

- ☞ Open gas isolating valve.
- ☞ Remove boiler cover.
- ☞ Open closing screw ① on test point Pe by approx. 1 rotation.
- ☞ Connect hose from pressure measuring device.
- ☞ Close closing screw once measurement has been taken.

Note: The gas inlet pressure across the whole ratings range must lie within the values stipulated.

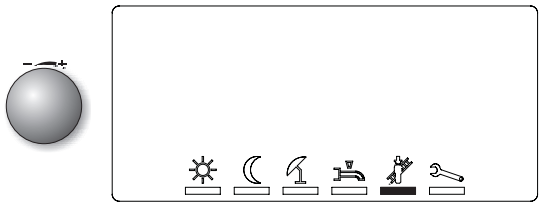
- Natural Gas 17...30 mbar
- LPG 25...57.5 mbar

Gas inlet pressure

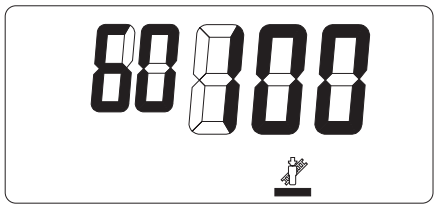


5.5.2 Variable ratings setting

Move the selection cursor below the “Chimney sweep” symbol by turning the dial knob.

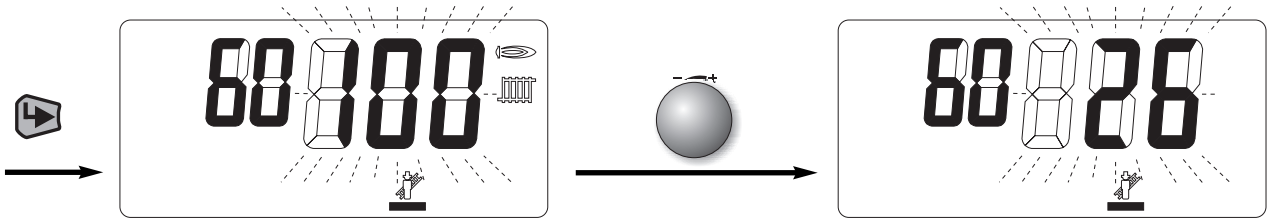


Change over to chimney sweep mode by pressing the key. The 3 large numbers show the current rating and the 2 smaller number show the current boiler temperature.

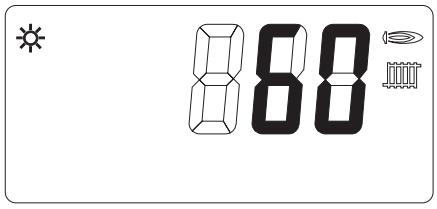


By pressing the key again the setting level, in which the variable heat rating can be changed from maximum heat rating to minimum heat rating, is activated.

Turn the dial knob anticlockwise until the desired ratings setting is reached. The value shown is that of the current burner rating (in % of the maximum burner rating).



Press the key to exit the setting level. The WTC remains in operation for 2 minutes with the rating last set. Within these 2 minutes the time sequence can be restarted in the heating engineer menu using the dial knob. This offers the possibility to call up information in the Info level (see Ch. 6.3.2).



Note:

- To exit the chimney sweep function, select ESC using the dial knob and confirm with key.
- If the heat rating is reduced in the heating engineer level (parameter P37), the percentage ratings setting range is also modified, that means, as the min. rating of the boiler is predetermined, the percentage value displayed increases accordingly.

5.6 Ratings measurement

The burner rating for nominal load has to be determined.
Proceed as follows:

- Gas quantity to operating volume $\dot{V}_B$
- Conversion factor to standard volume **f**
- Gas quantity to standard volume $\dot{V}_N$
- Burner rating $\dot{Q}_{Br}$

Legend:
$\dot{Q}_{Br}$ = Burner rating in kW
$P_{Baro.}$ = Barometric air pressure [mbar] to table
P_{Gas} = Gas pressure at meter [mbar]
t_{Gas} = Gas temperature at meter [°C]
$H_{i,n}$ = Calorific value [kWh/m³]
$\dot{V}_B$ = Operating volume [m³/h]
$\dot{V}_N$ = Standard volume [m³/h]
f = Conversion factor operating/standard volume

Operating volume at gas meter $\dot{V}_B$

$$\dot{V}_B = \frac{\text{Gas qty (m}^3\text{)}}{\text{M. time (sec.)}} \cdot 3600 = \frac{[\_\_\_]}{[\_\_\_]} \cdot 3600 = [\_\_\_]\text{m}^3/\text{h}$$

Nominal load [___] m³/h Min. load [___] m³/h

to f

Conversion factor to standard volume f

$$f = \frac{P_{Baro.} + P_{Gas}}{1013} \cdot \frac{273}{273 + t_{Gas}} = \frac{[\_\_\_] + [\_\_\_]}{1013} \cdot \frac{273}{273 + [\_\_\_]} = [\_\_\_]$$

or conversion factor to table

Nominal load [___] m³/h Min.-Last [___] m³/h

Standard volume V_N

$\dot{V}_N = \dot{V}_B \cdot f = [\_\_\_] \cdot [\_\_\_] = [\_\_\_]$ m³/h

Nominal load [___] m³/h Min.-Last [___] m³/h

Burner rating $\dot{Q}_{Br}$

$\dot{Q}_{Br} = \dot{V}_N \cdot H_{i,n} = [\_\_\_] \cdot [\_\_\_] = [\_\_\_]$ kW

Determination of conversion factor f

Average yearly air pressure $P_{Baro.}$

Average altitude of supply area	*from* / *to*	0	1 / 50	51 / 100	101 / 150	151 / 200	201 / 250	251 / 300	301 / 350	351 / 400	401 / 450	451 / 500	501 / 550	551 / 600	601 / 650	651 / 700	701 / 750
Average yearly air pressure	*mbar*	1016	1013	1007	1001	995	989	983	977	971	965	959	953	947	942	936	930

Total pressure = $P_{Baro.}$ + P_{Gas} [mbar] = [ ] + [ ] = [ ] [mbar]

↓ Gas temperature t_G [°C]	950	956	962	967	973	979	985	991	997	1003	1009	1015	1021	1027	1033	1036
0	0.9378	0.9437	0.9497	0.9546	0.9605	0.9664	0.9724	0.9783	0.9842	0.9901	0.9961	1.0020	1.0079	1.0138	1.0197	1.0227
2	0.9310	0.9369	0.9427	0.9476	0.9535	0.9594	0.9653	0.9712	0.9770	0.9829	0.9888	0.9947	1.0006	1.0064	1.0123	1.0153
4	0.9243	0.9301	0.9359	0.9408	0.9466	0.9525	0.9583	0.9642	0.9700	0.9758	0.9817	0.9875	0.9933	0.9992	1.0050	1.0079
6	0.9176	0.9234	0.9292	0.9341	0.9399	0.9457	0.9514	0.9572	0.9630	0.9688	0.9746	0.9804	0.9862	0.9920	0.9978	1.0007
8	0.9111	0.9169	0.9226	0.9274	0.9332	0.9389	0.9447	0.9504	0.9562	0.9619	0.9677	0.9734	0.9792	0.9850	0.9907	0.9936
10	0.9047	0.9104	0.9161	0.9209	0.9266	0.9323	0.9380	0.9437	0.9494	0.9551	0.9609	0.9666	0.9723	0.9780	0.9837	0.9866
12	0.8983	0.9040	0.9097	0.9144	0.9201	0.9257	0.9314	0.9371	0.9428	0.9484	0.9541	0.9598	0.9655	0.9711	0.9768	0.9796
14	0.8921	0.8977	0.9033	0.9080	0.9137	0.9193	0.9249	0.9306	0.9362	0.9418	0.9475	0.9531	0.9587	0.9644	0.9700	0.9728
16	0.8859	0.8915	0.8971	0.9017	0.9073	0.9129	0.9185	0.9241	0.9297	0.9353	0.9409	0.9465	0.9521	0.9577	0.9633	0.9661
18	0.8798	0.8854	0.8909	0.8955	0.9011	0.9067	0.9122	0.9178	0.9233	0.9289	0.9344	0.9400	0.9456	0.9511	0.9567	0.9594
20	0.8738	0.8793	0.8848	0.8894	0.8949	0.9005	0.9060	0.9115	0.9170	0.9225	0.9281	0.9336	0.9391	0.9446	0.9501	0.9529
22	0.8679	0.8734	0.8788	0.8834	0.8889	0.8944	0.8998	0.9053	0.9108	0.9163	0.9218	0.9273	0.9327	0.9382	0.9437	0.9464
24	0.8620	0.8675	0.8729	0.8775	0.8829	0.8883	0.8938	0.8992	0.9047	0.9101	0.9156	0.9210	0.9265	0.9319	0.9373	0.9401

1 mbar = 1 hPa = 10.20 mm WG 1 mm WG = 0.0981 mbar = 0.0981 hPa

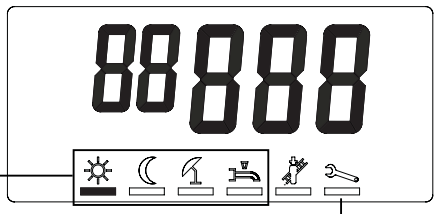
The heating and DHW ratings (on version -W) can be reduced.
Procedure see Ch. 6.3.3

6.1 Operating levels

The operation is divided into two operating levels. Level 1 is the end user level, and can be accessed directly. If an FS (remote control station) is fitted, only the chimney sweep function can be called up in level 1.

Level 2, The heating engineer level is protected by a CODE.

Operating elements



Note: On systems with additional (FS/EM) the functions of the menu are not active and are therefore faded out.

6.2 End user level

6.2.1 Display mode

① Normal temperature setpoint active

② Night setback temperature setpoint active

③ Summer time operation active

④ System in Standby operation

⑤ Frost protection

⑥ Burner in operation (flame signal)

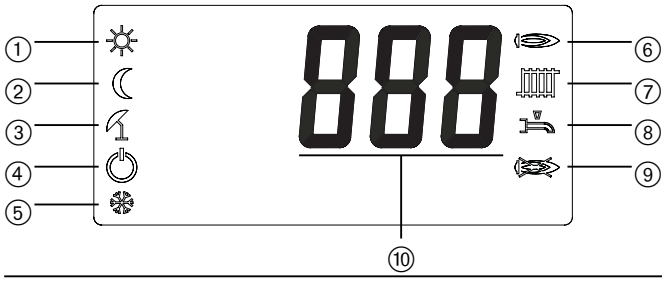
⑦ Heating operation active

⑧ DHW operation active

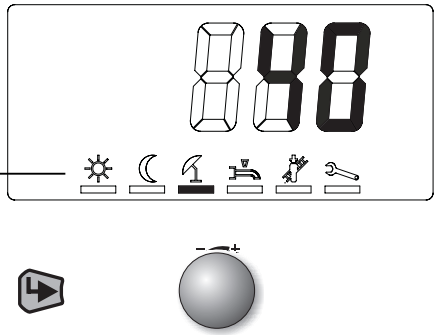
⑨ Burner lockout, restart only possible via reset key

⑩ Flow temperature
– or –
flashing display for a warning or lockout with relevant identification code
– or –
current burner rating in chimney sweep function

Display mode



6.2.2 Setting mode



Setting of setpoints and display of other system values.

Procedure:

- The symbol line is displayed by turning the dial knob.
- By turning the dial knob again, the selection cursor can be placed under the relevant symbol.
  If the selection cursor is moved beyond the left or right positions, the display mode is shown.
  The display mode also appears, if the enter key has not been used for 20 seconds.
- By pressing the enter key, the relevant symbol is activated and the value set is flashing in the display. The other symbols are faded out.
- The value can be changed by turning the dial knob.
- The value is confirmed by pressing the enter key and the selection is exited. All symbols of the symbol line are displayed again.

	Display /Enter	Range	Factory pre-setting	Note
①	Normal temperature setpoint (– – – = Standby operation)	Setback temperature – Max. flow temperature	60°C	☞ **No external sensor connected to B1** Limit value adjustable by Parameter P30, P31 heating engineer level
	Room temperature setpoint (– – – = Standby operation)	15° C – 35° C	22°C	☞ External sensor connected to B1
①	Setback temperature setpoint (– – – = Standby operation)	8° C – Normal temp. setpoint	30°C	☞ **No external sensor connected to B1**
	Setback room temperature setpoint (– – – = Standby operation)	10° C – Room temp. setpoint	15°C	☞ External sensor connected B1
①	S = Summer operation W= Winter operation	S W	W	☞ **No external sensor connected to B1**
	Current / external temp. Change-over temperature Summer/Winter	10° C – 30° C	20°C	☞ External sensor connected to B1
①	DHW setpoint (– – – = DHW operation off)	30°C – 65°C	50°C	☞ Version -W (B3 connected)
	Chimney sweep operation variable ratings setting	Min. rating – Max. rating	– – –	☞ Ch. 10.3 ☞ Ch. 5.5.2
	CODE input Entry into heating engineer level	0 – 254	– – –	☞ Ch. 6.3.1

① If the WTC is controlled remotely (via N1 see Ch. 4.6.4) or if an external controller (WCM-FB and/or WCM-EM) is connected, the menu points are faded out as the settings are carried out on the controllers.
If communication fails the symbols for emergency operation are faded in.

6.3 Heating engineer level

6.3.1 Entry into the level

- Turn dial knob until selection cursor under “Spanner” symbol.
- Press enter key.
- Set Service CODE (11).

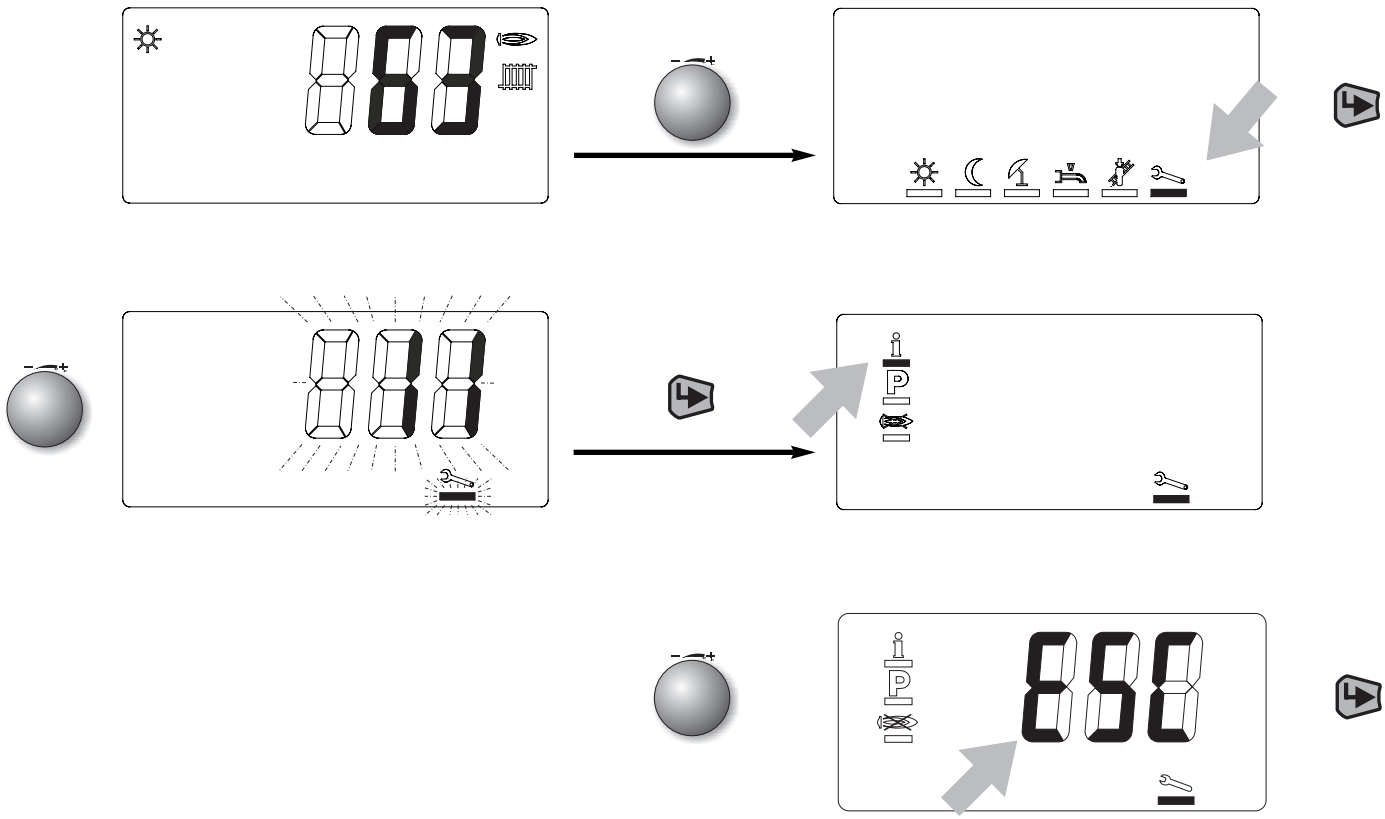
☞ If an incorrect code is entered, the entry level is exited!

- Press enter key.

The heating engineer level symbol line is displayed.

i = Info mode
P = Parameter mode
= Error memory

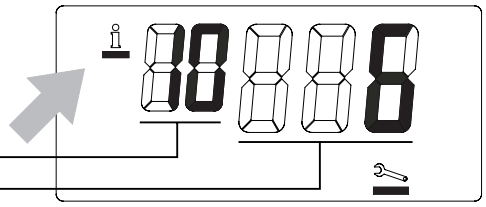
By turning the dial knob, the selection cursor can be placed under a symbol.
The selection is activated by pressing the enter key.



Note: **Exiting the heating engineer level**
Turn dial knob until ESC is displayed, then press enter key.

6.3.2 Info mode

Here, specific system values can be displayed.
By turning the dial knob, the individual operating status values can be interrogated.
Each value can be assigned to the next list via a row number.



Code	Process value	*Limited display*	Unit
	System		
I10	Operating phase (see also ⇨table operating phases Ch. 6.3.2)		
I11	Load setting		[%]
I12	Damped external temperature of weather compensation	**B1**	[°C]
I13	Heat demand	**FS/EM heat circuit**	[°C] or [%]
I14	SCOT® base value		[Point]
I15	Temperature setpoint remote control operation 4…20 mA	**N1**	[mA]
	Actuators		
I21	Start signal gas correcting element		[%]
I22	Set speed PWM pump	**PWM pump**	[%]
I23	Fan speed		[x10 RPM]
	Sensors		
I30	Flow temperature (safety temperature sensor)		[°C]
I31	Flue gas temperature		[°C]
I32	Ionisation signal (SCOT® actual value)		[Point]
I33	External temperature B1	**B1**	[°C]
I34	DHW temperature (versions -W/-C)	**B3/-C**	[°C]
I37	Throughput value (version -C)	**-C**	[l/min]
I38	Temperature calorifier sensor B10	**P1/P2**	[°C]
I39	Temperature calorifier B11	**P2 / P3**	[°C]
	System info		
I40	Daily switch cycle counter burner 0...999		
I41	Daily operating hours counter burner 0...255		h
I42	Switch cycle counter burner		[x 1000]
I43	Operating hours counter burner		[h x 100]
I44	Software version (v = Version; r = Revision)		v.r
I45	Time since last service		[h x 10]
	ESC = exit menu		

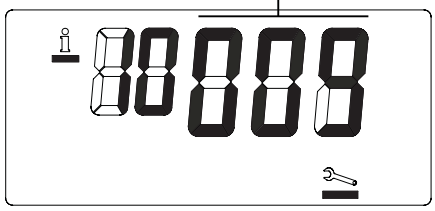
⇨ Entries in column “Limited display” show the relevant configuration or the relevant features, for which the value is displayed.

Resetting temporary information

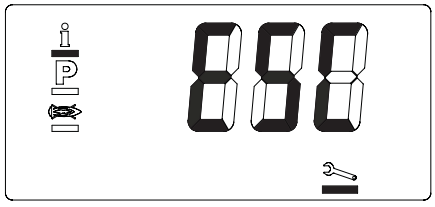
☞ The daily counters I40, I41, the damped external temperature I12 and the time since last service I45 when displayed are reset by pressing the key (approx. 2 seconds) .
Once I45 has been reset, the flashing spanner symbol goes out.

Table of operating phases

Display	Phase	description
1	1	Standby control fan
2	2	prepurge speed achieved
Tv...0	3	Countdown of prepurge in secs.
4	4	Ignition speed achieved
0...Tz	5	Flame formation time in 0.1 x secs.
6	6	Burner in operation, control active
7	7	Gas valve control V1
8	8	Gas valve control V2
9	9	Post-purge speed achieved and post-purge
0	0	Burner off

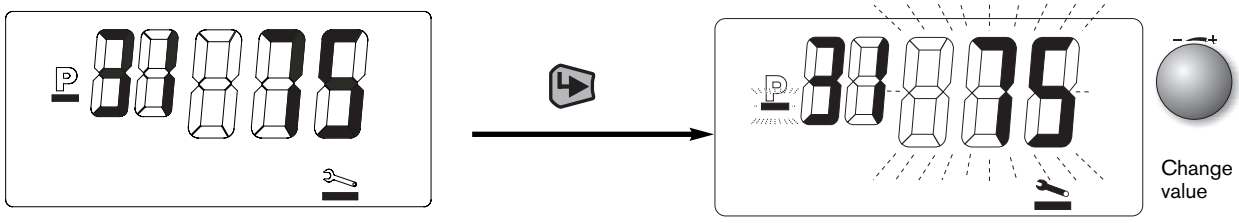


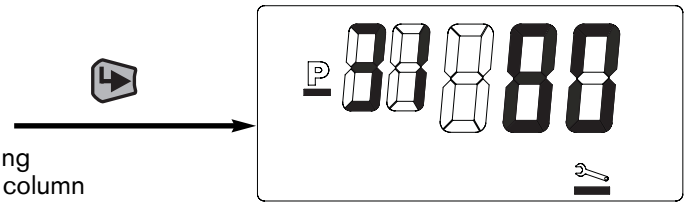
Note: Exiting the Info level:
Turn dial knob until ESC is displayed and confirm with key.



6.3.3 Parameter mode

By turning the dial knob, the parameter list can be reviewed and changed if required.
If a parameter value is to be changed, press the key. The P symbol and the value of the parameter flash. To exit without changing the parameter value press key again, to change the value, turn the dial knob. To save and exit press key.
Exit parameter mode by turning the dial knob until ESC is displayed. Then press key.





The setting parameters can be found in the following table. The table also shows the factory settings in column WTC 45/60.

Des.	Limited display	Parameter value	Factory presetting	Unit	Explanation	Special features
Basic configuration						
P10		*3 digit*	**H A P**		Current configuration (⇨ Ch. 5.4.1)	1. Character: H = heating unit W = DHW unit
		Code	*xyz*		Save configuration (⇨ Ch. 5.4.1)	2. Character: A = Ext. sens. fitted t = Temp. remote control
			---		Delete configuration (⇨ Ch. 6.3.3)	3. Character: P= PWM pump
P11		*E / F / EA*	**E**		Nat. Gas / LPG / Nat. Gas-flue gas damper	EA f. operation w. flue gas shut off dev.
P12		*1, A…E*	**1**		Boiler address	
		1			Single unit operation	1 : eBus supply active
		A…E			Multiple boiler operation (cascade), or remote controlled operation via DDC sytem	A : eBus supply active B…E : switchable eBus supply ⇨ parameter P71
P13		*0 ... 7*	**4**		Function variable output **MFA**	⇨ Ch. 7.4.4
		0			Liquid petroleum gas pre-valve	
		1			Forward reporting of lockout	
		2			Feeder pump in front of hydr. de-couple	
		3			Heating circuit pump	
		4			DHW load pump, 3 way change-over valve	
		5			DHW circulation pump	
		6			Program controlled via FS, Addr. #1 Circulation program	
		7			Heating circuit pump, remotely controlled via WCM-FS with address #1	
P14		*0 ... 7*	**4**		Function variable output **VA**	⇨ Ch. 7.4.4
		0			Liquid petroleum gas pre-valve	
		1			Forward reporting of lockout	
		2			Feeder pump in front of hydr. de-couple	
		3			Heating circuit pump	
		4			DHW load pump, 3 way change-over valve	
		5			DHW circulation pump	
		6			Program controlled via FS, Addr. #1 Circulation programme	
		7			Heating circuit pump, remote controlled via WCM-FS with address #1	
P15		*0, 1, 3*	**1**		Function input H1	⇨ Ch. 7.4.4
		0			Heating circuit release	
		1			Heating circuit setback / normal	
		3			Standby function w. frost protection	
P17		*0 ... 3*	1		Function input H2	⇨ Ch. 7.4.4
		0			DHW release	
		1			DHW setback / normal	
		2			Heating operation with special level	
		3			Floor thermostat: Emergency-Off	
P18	x	*8 ... (P31)*	**60**	°C	Special level heating operation	Only if P17 = 2
Weather compensated						**Only if external sensor fitted!**
P20	x	*-4 ... 0 ... 4*	**0**	K	Temperature correction external sensor	
P21	x	*0 / 1*	**0**	-	Evaluation building	These settings are only active,
		0			light construction	if no WCM-FS (accessory)
		1			heavy construction	is fitted or if this fails
P22	x	*2,5 ... 40.0*	**12.5**		Heating reference line gradient	
		– – –			Deactivation	
P23	x	*-10 ... 10*	**5**	°C	System frost protection	

Des.	*Limited display*	*Parameter value*	*Factory presetting*	*Unit*	*Explanation*	*Special features*
Heat exchanger						
P30		*8 ...* *(P31- P32)*	**8**	°C	Minimum flow temperature setpoint	
P31		*(P30 + P32)* ... 85	**78**	°C	Maximum flow temperature setpoint	
P32		*(±) 1 ... 7*	**(±) 3**	K	Flow temperature switch differential	
P33		*80 ... 120*	**120**	°C	STB switch off temperature flue gas duct	⇨ Ch. 4.9
P34		*1 ... 15* ---	**5**	min	Burner rapid cycle interlock, Deactivated	
P35		*5 ... 31*	**16**	%	Start gas quantity at ignition	12 with WTC 45
P36		*26(27)...100*	**26/27**	%	Minimum boiler rating	27 with WTC 45
P37		*26(27)...100*	**100**	%	Max. rating heating	
P38	x	*26(27)...100*	**100**	%	Max. rating DHW operation	**DHW sensor connected**
P39		-0.5 ... +1	**0**	%-p.	O_2 correction ⚠ **Important note: Check alteration O_2 content with flue gas analysis**	**Value is equal to ≈ change O_2** ⇨ Ch. 5.5
Boiler circuit pump						
P40		*0 / 1* *0* *1*	**0**		Pump type of operation HC operation ->PU lag HC operation ->PU continuous run	⇨ Ch. 7.4.3
P41	x	1 --- 60	**3**	min	Pump lag time of heating operation (for DHW operation 3 min)	when P40 = 0 With calorifier control no lag for DHW
P42	x	*12 ...(P43)*	**20**	%	minimum pump rating	**Only on version -H with**
P43	x	*(P42)...100*	**100**	%	maximum pump rating	**internal PWM pump** ⇨ Ch. 7.4.1
P44	x	*0...7* ---	**4**	K	Volume flow control in conjunction with hydr. de-couple, adjustable control differential Deactivated	**Only on version -H with internal PWM pump and hydraulic de-couple.** ⇨ Ch. 7.4.7
P45	x	*20...100*	**60**	%	Pump rating domestic hot water	**Only with internal PWM pump**
Domestic hot water operation vers. W						
P50	x	*10 ... 30*	**20**	K	Flow temperature overload at domestic hot water loading	The max. flow temperature is limited to 85 °C!
P51	x	*-1 ... -10*	**-3**	K	Switch differential domestic hot water	
P52	x	*10 ... 60* ---	**30**	min	max. DHW load time Deactivated	Once time span has elapsed the unit switches over into heating operation for the same amount of time
P53	x x	*-5 ... -20*	**-15**	K	Reduction value tank temperature in setback operation	**P53 is only display if P17 = 1** ⇨ Ch. 7.3
System + service						
P70		*100 ... 500*	**300**	h x10	Time until next service	Once time set has elapsed the display shows a flashing screwdriver. The service can be reset in Info mode. ⇨ Ch. 6.3.2
P71	x	0 /1	1		eBus supply active	⇨ Available if P12 = B...E
P72		-0.5 ... +0.5	**0**	% point	O_2 correction in partial load range (25...50%) ⚠ **Important note: When changing O_2 content check with flue gas analysis !**	**Value equal to ≈ change O_2 content** ⇨ Ch. 5.5
ESC					Exit menu	

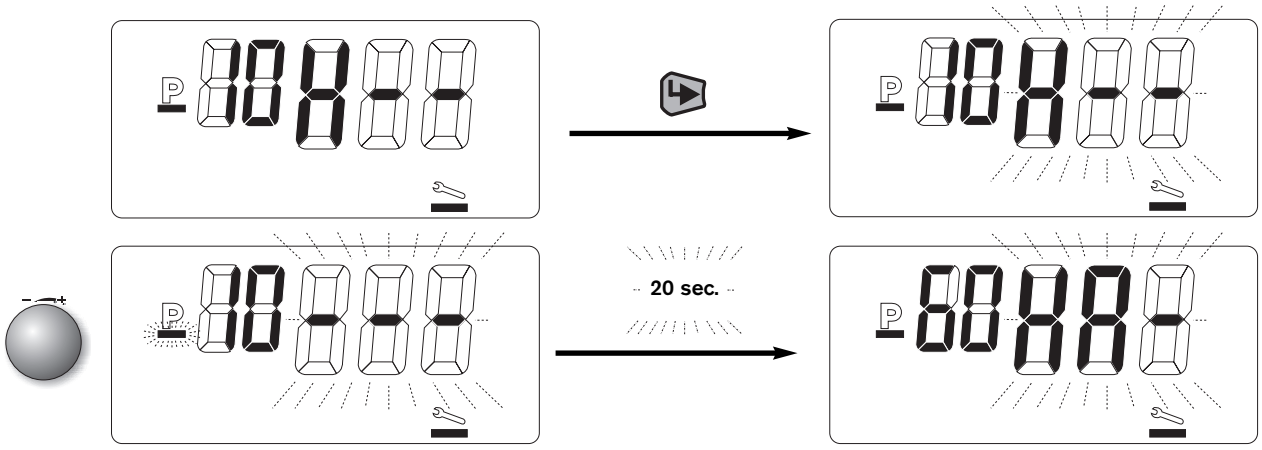
☞ In the parameter level only the parameters required are displayed (compare column *'Limited display'*).

These depend on the respective unit configuration (⇨ Ch. 5.4.1 Automatic configuration).

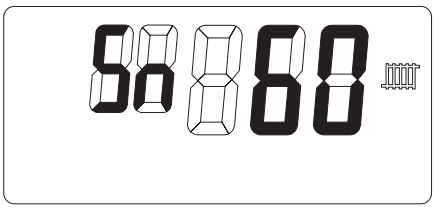
Notes for special parameters

P10 - WTC configuration
This parameter is used to reset the configuration manually. This is important, if the system is extended at a later stage, e.g. if an external sensor is fitted.

Procedure:
- Call up entry mode by pressing key.
- Turn dial knob until --- is displayed.
  To cancel, select ESC with dial knob and confirm with key.
- To start a new configuration press key. After approx. 10 seconds, the new configuration is displayed flashing. It is automatically saved after 24 hours or by pressing key whilst the display is flashing.

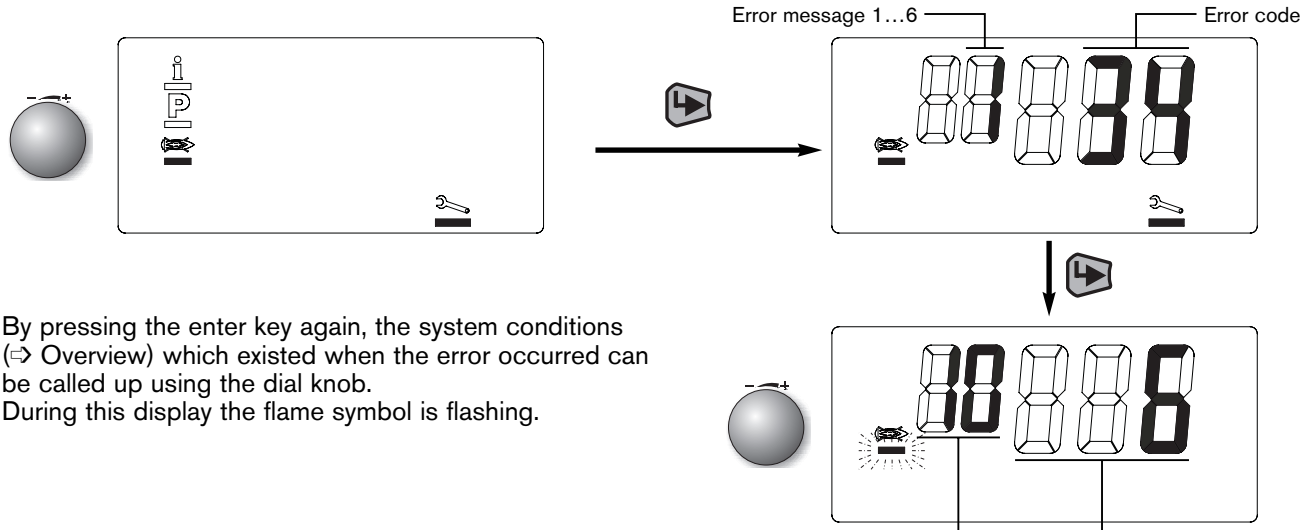


P17/P18 special level
If parameter P17 has been programmed for the function Special level with the setting 2, the WTC can provide an additional temperature level. If contact H2 is closed, the boiler heats up to the temperature level defined in parameter P18. Other heat demands are not considered, however, DHW operation has priority. If the contact is open, the boiler
setpoint temperature is defined depending on the control variation available (⇨ Ch. 7). This function can be activated in summer and winter operation.



6.3.4 Error memory

Here, the last 6 error messages can be called up in the form of an error code (see Ch. 9) of the WTC using the dial knob.



By pressing the enter key again, the system conditions (⇨ Overview) which existed when the error occurred can be called up using the dial knob.
During this display the flame symbol is flashing.

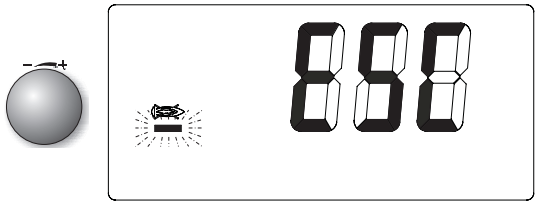
Overview system conditions

Des.	Unit	Process value *display*	*Limited*
	Burner, system		
10	Operating phase (⇨ Ch. 6.3.2)		
11	Load setting		[%]
16	Burner run time up to time of lockout (from value > 255 sec. the counter starts at beginning)		[sec]
	Type of operation		
20	H = Heating W = DHW		
21	Start signal gas setting elem.		[%]
	Sensors		
30	Flow temperature at safety temperature sensor		[°C]
31	Flue gas temperature		[°C]
32	Ionisation signal		[p.]
33	External temperature B1	**X**	[°C]
34	DHW temperature B3	**X**	[°C]
ESC	Exit menu		

⇨ **Table of warning and error messages, cause and rectification of lockouts see Ch. 9.**

Exiting the level

Turn the dial knob until ESC is displayed and confirm with key.



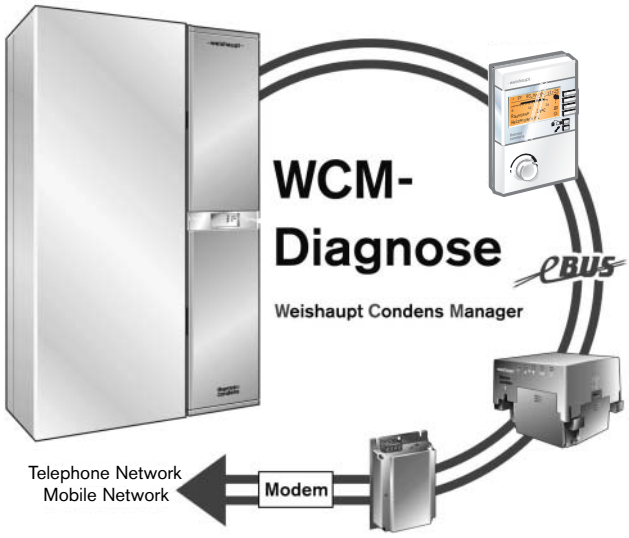
6.4 Service functions via PC interface

The Weishaupt Condens Manager (WCM) is equipped with an interface for PC connection. Data transfer is carried out via Weishaupt eBUS adapter (W-EA) from eBUS via RS 232 interface to PC.
The W-EA, as well as the Service Software WCM Diagnostic are available as accessories.

Your PC should meet the following requirements:
- Processor from 400 MHZ
- Operating system WINDOWS 95 or higher
- RAM ≥ 64 MB
- Resolution (screen/grafics card): 800 x 600 Pixel

The software makes the following functions available:
- Display of operating conditions of burner, fan, pump and gas valve.
- Display of temperatures, speeds, ionisation current, as well as other setpoints and actual values.
- Graphic display of boiler and system data for longer periods of time.
- Evaluation of system records with error statistics.
- Parameter setting of special system parameters.

Service software WCM diagnostic



6.4.1 Special system parameters

Most of the control and limit value parameters relating to the system can be set via the heating engineer level. In rare cases it may be necessary to adapt the condensing boiler to the heating system using these system parameters.

The Software WCM Diagnostic is required to carry out this process. The use of the Software and a detailed description of the system parameters can be found in the user instructions of the Software.

Des.	Parameter	WTC 45	WTC 60	Unit
A1	Heating controller P ratio	130	130	x0.25
A2	Heating controller I ratio	3	3	x0.125s
A3	Heating controller D ratio	32	32	x0.032s
A4				
A5				
A6				
A7 ⚠	Max. temperature range ⇨ Ch. 8.1 Safety temperature (STL) flue gas temperature	45	45	K
A8	Boiler rating at ignition	73	73	%
A9 ⚠	Max. temperature gradient flow	3,0	3,0	K/s
A10	Max. fan speed	5460 –	– 4950	rpm
A11	Boiler rating delayed heating operation ⇨ Ch. 7	27	26	%
A12 ⚠	Water pressure monitor	1	1	
A13 ⚠	Max. differential temperature ⇨ Ch. 8.1 Flow temperature - safety temperature (STL)	28	28	K

Parameters marked in this way are safety relevant for the operation of the system. Changes are only permitted following discussions and approval from Weishaupt service department.

The WCM not only carries out the regulating and control functions for the boiler, but also the control of the heating systems and domestic hot water operation.
The heating controller contains basic functions which have an effect in all the following variations:

- The boiler flow temperature is limited upwards by the max. flow temperature (⇨ P31) and downwards by the min. flow temperature (⇨ P30).
- The WCM is equipped with a burner rapid cycle interlock, which inhibits frequent burner shutdowns (⇨ P34, setting --- deactivates this function).
- When switching on the burner, the rating of the WTC in heating operation is limited for 60 secs to the value set in parameter A11.
  Furthermore, during this time the switch differential (⇨ P32) is doubled. This leads to longer burner run times.

The following variations are possible:

7.1 Constant flow temperature control

The simplest control, without additional sensors or thermostats, controls the flow temperature to the value set in the end user level (⇨ Ch. 6.2.2). With increased heat demand the flow temperature should be increased, with less heat demand it should be reduced accordingly.

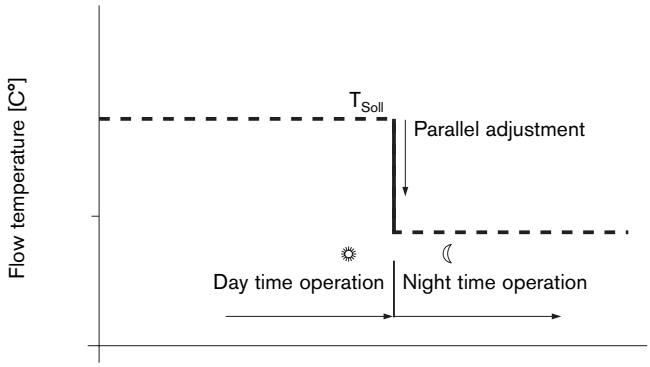
Note: If day/night time change-over is required to comply with local regulation, a digital clock (WCM-DU) is required for this regulating variation.

The clock is connected to the following plugs in the installation area:
- Supply to clock = plug 2.
- Channel for heating program = plug 3.
- Channel for DHW program = plug 4 (see Ch. 7.5)

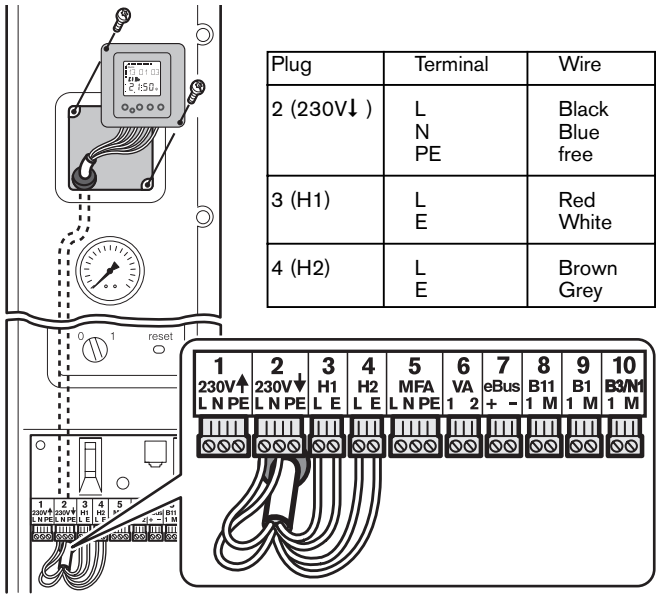
☞ Observe installation and operating manual WCM-DU.

Parameter setting (in heating engineer level):
- ❑ Heating program for setback/normal temperature ⇨ P15 = 1.
  Heating program for standby/normal temperature ⇨ P15 = 0 (boiler cools to min. flow temperature P30).
- ❑ Pump on lag ⇨ P40 = 0.
- ❑ Enter Summer/Winter change-over via end user level (symbol Ch. 6.2.2)
- ❑ Domestic hot water program for setback/normal operation ⇨ P17 = 1.

Diagram flow temperature



Connection for the clock



Plug	Terminal	Wire
2 (230V↓)	L N PE	Black Blue free
3 (H1)	L E	Red White
4 (H2)	L E	Brown Grey

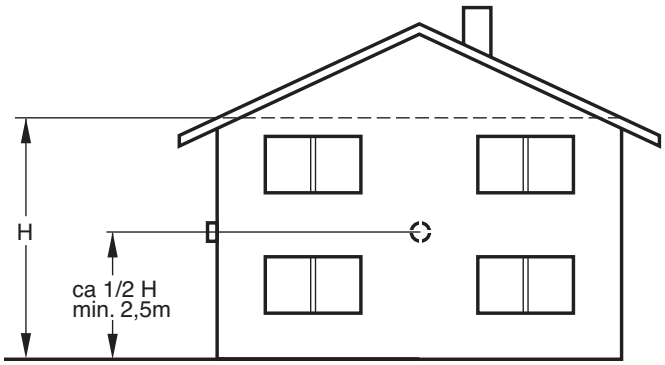
7.2 External temperature dependent flow temperature control

An external sensor QAC 31is required for this variation. The sensor should be fitted to a north or northwest facing wall.

Avoid the following unfavourable factors:
- Direct exposure to the sun.
- Installation below a balcony, eaves or similar
- Extraneous heat sources (chimney, through windows, through ventilation openings).
- Do not paint sensor housing.

Note: If day/night time change-over is required to comply with local regulation, a digital clock (WCM-DU)or WCM-FS is required for this regulating variation.

Installation example



The temperature measured by the external sensor is averaged over time by a mathematical function (⇨ reset the average determination see Ch. 6.3.2). The current flow temperature is calculated under consideration of the type of building (⇨ heating engineer level P21) and the gradient set (⇨ heating engineer level P22)(see diagram heating reference line).

The room temperature setpoint, adjustable in the end user level, is also considered (see diagram influence room temperature setpoint).
If using an inbuilt digital clock (WCM-DU) different room temperature setpoints are possible for day/night.

☞ When fitting a WCM remote control FS (accessory) the setting of the room temperature setpoints is carried out by remote control station. (⇨ see installation and operating manual WCM-FS).

Parameter setting:
- ❑ P15 = 1 (When using a digital clock)
- ❑ P20 = -4...0...4 (Temp. correction external sensor)
- ❑ P21 = 0/1 (Evaluation building)
- ❑ P22 = 12.5 (Heating reference line gradient for radiator heating circuit)
  = 8 (Heating reference line gradient for underfloor heating circuit)

Diagram heating reference line

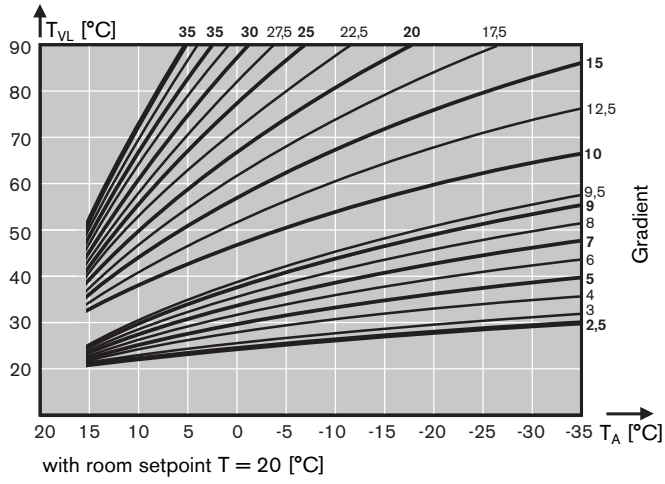
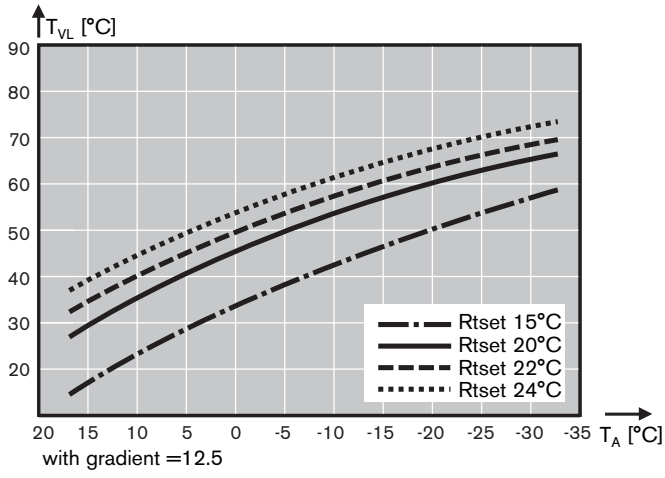


Diagram influence room temperature setpoint



7.3 DHW function

The WTC can control an external DHW circuit. To do this, the DHW sensor B3 must be connected.
The WCM-CPU recognises this modification and indicates the configuration in parameter P10 with a W.

A change-over valve or a separate DHW pump can be driven via outputs VA and MFA (electrical connection see Ch. 4.6.2 and Ch. 4.6.3).
The speed of the internal boiler pump for DHW operation can be defined with parameter P45.

The domestic hot water operation has priority over the heating operation. DHW operation is carried out when the temperature in the water heater is $T_{DHW} < T_{DHW}set$ - P51 (P51 ⇨ heating engineer level).
Modulation is carried out to the flow temperature of the WTC, which is increased by temperature increase P50.
DHW operation is switched off, when the DHW sensor has reached the setpoint T_{DHW}. Following this the pump continues to run for 3 minutes, the 3 way valve is set for DHW operation. DHW operation can also be limited in time (P52 ⇨ heating engineer level). It is possible to set a setback level for the DHW temperature using a subtraction value (P53 ⇨ heating engineer level).

A heat up procedure is initiated in setback operation, if the DHW minus the subtraction value is not maintained.
This requires either the digital clock WCM-DU (connection of second channel to plug 4 [H2]) or the remote control station WCM-FS, both available as accessories.

Setting both temperatures:
- Normal temperature in end user level, symbol
- Setback temperature in heating engineer level: normal temperature - P53

Parameter settings:
- ❑ Normal temperature, end user level symbol
- ❑ P45 Pump rating DHW
- ❑ P50 Flow temperature overload (recommended 20 K)
- ❑ P51 Switch differential DHW
- ❑ P52 max. DHW operating time
- ❑ P53 Setback temperature (only when using WCM-DU)

7.4 Special functions

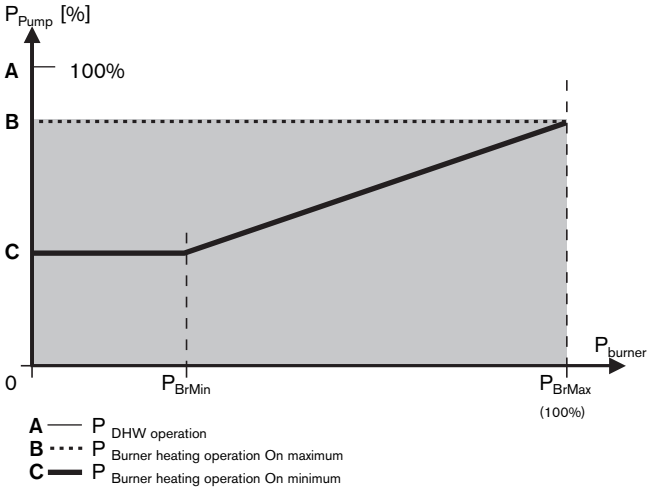
7.4.1 Standard regulation of the PWM pump

The PWM pump has variable speed and is controlled by the Weishaupt Condens Manager. The pump rating of the boiler circuit is assigned to the required burner rating.
The modulating limits for the pump can be adjusted (⇨ P42, P43 heating engineer level).
The pump is operated at minimum rating when the burner is switched off.
During the first minute in heating operation the pump is operated at the rating defined in P43.

Parametere settings:
- ❑ P42 = minimum pump rating (C)
- ❑ P43 = maximum pump rating (B)
- ❑ P45 = pump rating DHW operation (A)

Note: The minimum circuation quantity (400 l/h) must be maintained.

Diagram regulating range PWM pump



7.4.2 Regulation of the PWM pump

For this type of application a de-couple sensor has to be fitted to input B11 of the WCM-CPU and the de-couple regulation P3 must be activated in the WCM-CPU (see Ch. 4.6.1 and Ch. 5.4.1).
The regulation of the pump rating is then carried out depending on the temperature differential between the de-couple sensor B11 and the flow temperature sensor. This stops a return temperature increase. The function can be optimised or deactivated via parameter P44.

7.4.3 Pump control logic in heating operation

The following pump control logic is only valid for the internal PWM pump.
Depending on the type of operation set (⇨ P40 heating engineer level) the pump functions for the 3 different operating conditions, Standby, Summer and Winter operation are shown in the control matrix.
The pump run on time (ROT) can be set in P41..

Overview of function of internal pump

Type of operation	**Standby or Summer**			
Control variation	with external sensor		without external sensor	
Setting P40	P40 = 1	P40 = 0	P40 = 1	P40 = 0
Pump operation	ROT ⇨ Off	ROT ⇨ Off	Cont. run	ROT ⇨ Off

Type of operation	**Winter**			
Control variation	with external sensor		without external sensor	
Setting P40	P40 = 1	P40 = 0	P40 = 1	P40 = 0
Pump operation	Cont. run	ROT ⇨ Off[1)]	Cont. run	Cont. run

[1)] The functions stated for the pump control are valid for setback operation. In normal operation the pump runs continuously independent of P40.

7.4.4 Freely selectable inputs and outputs

Using the two freely selectable outputs MFA (plug 5) and VA (plug 6) a multitude of applications can be realised. The MFA is a potential linked relay output with a connection
rating of 150 W. The VA output is potential free. Both outputs can be parameterised for the same functions. to do this use P13 (for output MFA) and P14 (for output VA).

- **Liquid Petroleum gas pre-valve (P13, P14=0)**
  As soon as the burner starts due to a heat demand, the contact is closed. This allows the control of an additional liquid petroleum gas valve.
  This option cannot be used on installations with gas pressure switch.

- **Lockout and warning transmission (P13, P14=1)**
  The contact is open if the installations is operating without fault. As soon the WCM recognises a warning which has been present for at least 4 minutes, the contact is closed. Lockout faults immediately initiate the switching process.

- **Feeder pump of hydraulic de-couple with unit version -H-0 (P13, P14=2)**
  The external pump is controlled in the same way as an internal heating circuit pump. That means in DHW operation as well as heating operation.

- **External heating circuit pump (P13, 14=3)**
  The external heating circuit pump is only activated during the heating operation.

- **DHW load pump or 3 way change-over valve – only available if DHW sensor is fitted (P13, P14=4)**
  The relay contact is closed depending on the domestic hot water demand.
  The external DHW load pump supplies a water heater after a hydraulic de-couple.

- **DHW circulation pump – only available when a DHW sensor is fitted (P13, P14=5)**
  The relay contact is closed depending on the DHW circuit release.

- **DHW circulation pump, controlled by WCM-FS, address #1 (P13, P14=6)**
  The relay contact is closed depending on the switch times of the circulation program of the WCM-FS.

- **Heating circuit pump, direct pump circuit, controlled by the heating program of the WCM-FS #1 or #1+2 (P13, P14=7)**
  Using this programming, it is possible to operate a pump heating circuit with the pump connected to output MFA or VA of the heating program of the WCM-FS. That means the type of operation of the pump is independent of the boiler pump fitted.

Variable digital input H1 (heating release)

- **Heat exchanger release in heating operation (P15=0)**
  Heating operation is released with the activation of the digital input. If the contact is open the WTC is blocked for heating operation. Heating circuits which are controlled via extension module (WCM-EM) continue to operate.

- **Heating circuit setback/normal setpoint (P15=1)**
  If the contact is closed the normal setpoint becomes effective. If the contact is open, the setback setpoint becomes effective. The function is not available with WCM-FS/WCM-EM heating circuits.

- **Type of operation Standby for heating operation (P15 = 3)**
  If the contact is closed, the WTC and all heating circuits controlled by WCM-EM/WCM-FS are driven to Standby operation. In the standby mode of heating operation frost protection and DHW operation contiue to be active.

Variable digital input H2 (DHW release)

- **Heat exchanger release in DHW operation (P17=0**)
  DHW operation is released with the activation of the digital input. If the contact is open the WTC is blocked for DHW operation.

- **DHW setback/normal setpoint (P17=1)**
  If the contact is open, the reduced DHW setpoint (version -W) is given. This function is only given without FS.
  Note:
  If a WCM-FS is integrated into the system, H2 (P17) has no effect on the DHW setpoint. It is possible to switch output VA in function DHW circulation pump (P14=5) depending on H2.

- **Heating operation with special level (P17=2)**
  If the contact is closed the current supply setpoint switches over to the setpoint defined with parameter P18. This function is also effective in Summer operation. Higher setpoints of additional heating circuits are also considered, DHW operation takes priority.

- **Lockout function (P17=3)**
  This function is intended for the connection of a underfloor heating thermostat.
  If the contact of the thermostat is closed, the unit and pump switch off, frost protection is not activated. At the same time warning F24 is displayed.
  If the contact opens, the warning automatically terminates.

7.4.5 Regulation with one calorifier sensor

For this type of regulation a calorifier sensor (NTC 5kΩ, Order No.: 660 228) has to be connected to sensor input B10 (⇨ Ch. 4.6.5).
Input B11 is not connected.
This type of operation makes sense, if only the top part of the calorifier is to be loaded by the WTC.
The loading of the lower part of the calorifier area is carried out via external heat source.

Switch on criteria for the WTC (DHW and heating operation):
B10 < (system setpoint − hysteresis)

Switch off criteria for the WTC (DHW and heating operation):
B10 > (system setpoint + hysteresis)

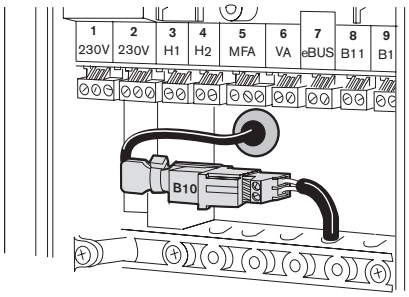
Note: The hysteresis can be set in the heating engineer level under parameter P32.

Temperature control is carried out with the flow sensor inbuilt in the WTC.
DHWrelease is given by sensor B3, the release for heating operation is given by sensor B10.
In DHW operation the 3 way valve connected to MFA output is also activated.
The boiler pump is controlled without run on.

Note: The switch off criteria flow STL > 85°C as described in chapter 8.1 (Boiler circuit), does not apply to installations with calorifier control (P1, P2).

Sensor connection variation P1

P1:



Note:
- To operate the direct pump heating circuit after the calorifier, an FS with address #1or #1 + 2 must be connected to the system.
  Programming WCM CPU:
  Pump on MFA output P13 = 7 or
  Pump on VA output P14 = 7
- The operation of a separate DHW circuit before the calorifier is not possible.
- If the MFA/VA is operated in function DHW pump (P13/P15 = 4), the pump does not run on after DHW operation is completed.

7.4.6 Regulation with two calorifier sensors

For this type of regulation calorifier sensors (NTC 5kΩ, Order No.: 660 228) must be fitted to both sensor inputs B10/ B11(⇨ Ch. 4.6.5).
This type of regulation should be selected if full loading of the total calorifier by the WTC is required.

Switch on critereia for the WTC (DHW and heating operation):
B10 < (system setpoint − hysteresis)
and
B11 < (system setpoint − hysteresis)

Switch off criteria for the WTC (DHW and heating operation):
B11 > (system setpoint − hysteresis)

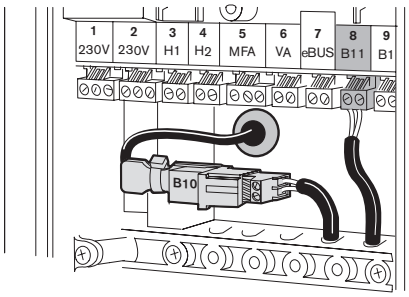
Note: The hysteresis can be set in the heating engineer level under parameter P32.

Temperature control is carried out with the flow sensor inbuilt in the WTC.
DHW release is given by sensor B3, the release for heating operation is given by sensor B10.
In DHW operation the 3 way valve connected to MFA output is also activated.
The boiler pump is controlled without run on.

Note: The switch off criteria flow STL > 85°C as described in chapter 8.1 (Boiler circuit), does not apply to installations with calorifier control (P1, P2).

Sensor connection variation P2

P2:



Note:
- To operate the direct pump heating circuit after the calorifier, an FS with address #1or #1 + 2 must be connected to the system.
  Programming WCM CPU:
  Pump on MFA output P13 = 7 or
  Pump on VA output P14 = 7
- The operation of a separate DHW circuit before the calorifier is not possible.
- If the MFA/VA is operated in function DHW pump (P13/P15 = 4), the pump does not run on after DHW operation is completed.

Freely selectable inputs and outputs for calorifier control P1/P2

Using the two freely selectable outputs MFA (plug 5) and VA (plug 6) a multitude of applications can be realised. The MFA is a potential linked relay output with a connection
rating of 150 W. The VA output is potential free. Both outputs can be parameterised for the same functions. to do this use P13 (for output MFA) and P14 (for output VA).

- **Liquid Petroleum Gas pre-valve (P13, P14=0)**
  As soon as the burner starts due to a heat demand, the contact is closed. This allows the control of an additional liquid petroleum gas valve.
  This option cannot be used on installations with gas pressure switch.

- **Lockout and warning transmission (P13, P14=1)**
  The contact is open if the installations is operating without fault. As soon the WCM recognises a warning which has been present for at least 4 minutes, the contact is closed. Lockout faults immediately initiate the switching process.

- **Feeder pump of hydraulic de-couple (P13, P14=2)**
  The external pump is controlled in the same way as an internal heating circuit pump. That means in DHW operation as well as heating operation.

- **DHW load pump (P13, P14=4)**
  The external DHW load pump supplies a water heater after a hydraulic de-couple.

- **DHW circulation pump, controlled by WCM-FS,**
  The relay contact is closed depending on the switch times of the circulation program of the WCM-FS.

- **Heating circuit pump, direct pump circuit, controlled by the heating program of the WCM-FS, address #1 or #2**
  Using this programming, it is possible to operate a pump heating circuit with the pump connected to output MFA or VA of the heating program of the WCM-FS. That means the type of operation of the pump is independent of the boiler pump fitted.

Variable digital input H1 (heating release)

- **Heat exchanger release in heating operation (P15=0)**
  Heating operation is released with the activation of the digital input. If the contact is open the WTC is blocked for heating operation. Heating circuits which are controlled via extension module (WCM-EM) continue to operate.

- **Type of operation Standby for heating operation (P15 = 3)**
  If the contact is closed, the WTC and all heating circuits controlled by WCM-EM/WCM-FS are driven to Standby operation. In the standby mode of heating operation frost protection and DHW operation contiue to be active.

Variable digital input H2 (DHW release)

- **Heat exchanger release in DHW operation (P17=0**)
  DHW operation is released with the activation of the digital input. If the contact is open the WTC is blocked for DHW operation.

- **Heating operation with special level (P17=2)**
  If the contact is closed the current supply setpoint switches over to the setpoint defined with parameter P18. This function is also effective in Summer operation. Higher setpoints of additional heating circuits are also considered, DHW operation takes priority.

- **Lockout function (P17=3)**
  This function is intended for the connection of a underfloor heating thermostat.
  If the contact of the thermostat is closed, the unit and pump switch off, frost protection is not activated. At the same time warning F24 is displayed.
  If the contact opens, the warning automatically terminates.

7.4.7 Regulation with hydraulic de-couple

For this type of regulation, the de-couple sensor (NTC 5kΩ, Order No.: 660 228) has to be connected to input B11.

Heating operation:
The WTC controls the modulation in the heating operation directly with the de-couple sensor.

Switch on criteria for the WTC:
B11 < (system setpoint − hysteresis)

Switch off criteria for the WTC:
B11 > (system setpoint − hysteresis)

Note: The hysteresis can be set in the heating engineer level under parameter P32.

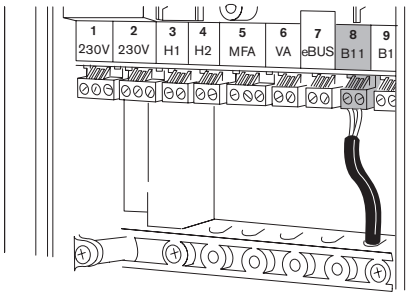
Volume flow control:
Due to the temperature difference between the de-couple sensor (B11) and the flow temperature sensor, the PWM pump integrated into the unit adapts its rating to the hydraulic conditions. Parameter P44 is used for setting (control difference).

DHW operation:
With DHW operation, the modulation control is carried out via the internal flow sensor. Consequently the hydraulic alignment of the DHW circuit before the de-couple using a 3 way valve is also possible.
DHW operation is completed with a pump run on of 3 minutes.

Prerequisites:
- Unit version with integrated PWM pump
- De-couple sensor (B11) installed

Sensor connection variation P3

P3



Direct pump heating circuit after de-couple

1. **With WCM-FS #1 or #1+2:**
   Programming WCM-CPU:
   Pump on MFA P13 = 7
   Pump on VA P14 = 7

2. **With WCM-DU:**
   Programming WCM-CPU:
   Input H1 P15 = 1
   Pump on MFA P13 = 3
   Pump on VA P14 = 3

Operation of circulation pump

1. **With WCM-FS #1 or #1+2:**
   Programming WCM-CPU:
   Pump on MFA P13 = 6
   Pump on VA P14 = 6

2. **With WCM-DU:**
   Programming WCM-CPU:
   Input H2 P17 = 1
   Pump on MFA P13 = 5
   Pump on VA P14 = 5

Freely selectable inputs and outputs for de-couple regulation P3

Using the two freely selectable outputs MFA (plug 5) and VA (plug 6) a multitude of applications can be realised. The MFA is a potential linked relay output with a connection
rating of 150 W. The VA output is potential free. Both outputs can be parameterised for the same functions. to do this use P13 (for output MFA) and P14 (for output VA).

- **Liquid Petroleum gas pre-valve (P13, P14=0)**
  As soon as the burner starts due to a heat demand, the contact is closed. This allows the control of an additional liquid petroleum gas valve.
  This option cannot be used on installations with gas pressure switch.

- **Lockout and warning transmission (P13, P14=1)**
  The contact is open if the installations is operating without fault. As soon the WCM recognises a warning which has been present for at least 4 minutes, the contact is closed. Lockout faults immediately initiate the switching process.

- **Feeder pump of hydraulic de-couple (P13, P14=2)**
  The external pump is controlled in the same way as an internal heating circuit pump. That means in DHW operation as well as heating operation.

- **External heating circuit pump (without WCM-FS) (P13, P14=3)**
  The external heating circuit pump is only activated during the heating operation. The function is not available with WCM-FS.

- **DHW load pump (P13, P14=4)**
  The relay contact is closed depending on the domestic hot water demand.
  The external DHW load pump supplies a water heater after a hydraulic de-couple.

- **DHW circulation pump (without WCM-FS) (P13, P14=5)**
  The relay contact is closed depending on the DHW circuit release.

- **DHW circulation pump, controlled by WCM-FS, (P13, P14=6)**
  The relay contact is closed depending on the switch times of the circulation program of the WCM-FS.

- **Heating circuit pump, direct pump circuit, controlled by the heating program of the WCM-Fs, address #1 or #1 + 2 (P13, P14=7)**
  Using this programming, it is possible to operate a pump heating circuit with the pump connected to output MFA or VA of the heating program of the WCM-FS. That means the type of operation of the pump is independent of the boiler pump fitted.

Variable digital input H1 (heating release)

- **Heat exchanger release in heating operation (P15=0)**
  Heating operation is released with the activation of the digital input. If the contact is open the WTC is blocked for heating operation. Heating circuits which are controlled via extension module (WCM-EM) continue to operate.

- **Heating circuit setback/normal setpoint (P15=1)**
  If the contact is closed the normal setpoint becomes effective. If the contact is open, the setback setpoint becomes effective. The function is not available with WCM-FS.

- **Type of operation Standby for heating operation (P15 = 3)**
  If the contact is closed, the WTC and all heating circuits controlled by WCM-EM/WCM-FS are driven to Standby operation. In the standby mode of heating operation frost protection and DHW operation contiue to be active.

Variable digital input H2 (DHW release)

- **Heat exchanger release in DHW operation (P17=0**)
  DHW operation is released with the activation of the digital input. If the contact is open the WTC is blocked for DHW operation.

- **DHW setback/normal setpoint (P17=1)**
  if the contact is open, the reduced DHW setpoint (version -W) is given. This function is only given without FB.
  Note:
  If a WCM-FS is integrated into the system, P17 = 1 has no effect on the DHW setpoint. It is only possible to switch outputs MFA and VA with this contact, if these have been configured to 5 (DHW circulation pump).

- **Heating operation with special level (P17=2)**
  If the contact is closed the current supply setpoint switches over to the setpoint defined with parameter P18. This function is also effective in Summer operation. Higher setpoints of additional heating circuits are also considered, DHW operation takes priority.

- **Lockout function (P17=3)**
  This function is intended for the connection of a underfloor heating thermostat.
  If the contact of the thermostat is closed, the unit and pump switch off, frost protection is not activated. At the same time warning F24 is displayed.
  If the contact opens, the warning automatically terminates.

8 Safety and monitoring function

8.1 Temperature monitoring

Boiler circuit
The following functions are combined in the safety temperature sensor of the boiler circuit:
• Safety temperature limiter
• Safety temperature monitor
Temperature aquisition for control and display is carried out via the flow temperature sensor.

Safety temperature monitor STM (boiler)
If the programmed switch off temperature (95°C) is exceeded the fuel supply is shut off and the fan and pump run on is initiated (warning display W12).
An automatic restart of the system follows when the temperature has been below the switch off point for a minimum of one minute.

Safety temperature limiter STL (boiler)
If the programmed STL switch off temperature (105°C) for the boiler circuit is exceeded the fuel supply is shut off and the fan and pump run on is initiated (error message F11).
Once the temperature has fallen below the switch off temperature the permanent safety shut off can be reset by pressing the reset key.

Flue gas system
The following functions for flue gas temperature monitoring are combined in one sensor:
• Safety temperature limiter for flue gas
• Temperature measurment for display

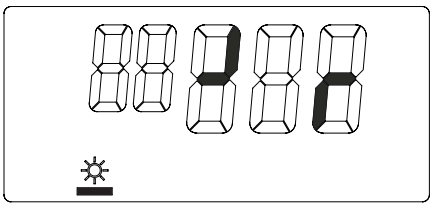
Safety temperature limiter STL (flue gas)
If the programmed STL switch off temperature for the flue gas circuit is exceeded the fuel supply is shut off and the fan and pump run on is initiated (fault display F13).
To increase the availability of the boiler, the boiler rating is reduced step by step when approaching the safety temperature and a difference of 15K (105°C), to switch to minimum rating at an approach of 10K (110°C). At a difference of 5K (115°C) the boiler switches off (warning message W16).

Differential temperature flow/flue gas system
The differential temperature monitoring limits the range between flow and flue gas temperature (warning message W15). if the warning appears 30 times consecutively the boiler goes to lockout with the error
message F15.

Gradient monitoring boiler temperature
If the temperature gradient set is exceeded (system parameter A9) the boiler is switched off.
This only occurs, if the boiler temperature is > 45°C (warning message W14).

8.2 Sensor monitoring

Display of sensor faults



8.3 Heating frost protection function

Boiler frost protection (without external sensor QAC 31)
Tv < 8°C
⇨ Burner on with minimum load
• Pump on

Tv > 8°C + switch differential flow temperature (⇨ P32)
⇨ Burner off
• Pump run on (⇨ P41)

☞ Frost protection also effective on output MFA, if parametered as flow pump (⇨ P13).

System frost protection (with external sensor QAC 31)
$T_{A\ act.} < T_{system\ frost\ protection}$ (⇨ P23)
⇨ Pump starts every 5 hrs., Switch on duration = pump run on time (⇨ P41).

$T_{A\ act.} < T_{system\ frost\ protection} - 5\ K$
⇨ Pump continuous run on
$T_{A\ act.} > T_{system\ frost\ protection}$
⇨ Pump continuous run off
☞ Frost protection is also effective on outputs MFA and VA with function heating circuit pump (⇨ P13, P14).

☞ With calorifier regulation P1/P2 the system frost protection has no effect on the boiler circuit pump (internal or connected to MFA/VA).

8.4 DHW frost protection (version -W)

$T_{DHW} < 8°C$
⇨ Frost protection heating on

$T_{DHW} > 8°C$ + switch differential DHW/2 (⇨ P51)
⇨ Frost protection heating off

With frost protection heating the boiler temperature is regulated to 8°C + DHW temperature increase (⇨ P50), the Tap symbol flashes.

☞ Frost protection is also effective on outputs MFA and VA with function DHW supply pump and circulation pump.

9 Cause and rectification of faults

Most irregularities and faults of the boiler are recognised by the WCM and shown on the display. The display differentiates between faults (boiler lockout) and warnings.

Faults (crossed out flame signal flashes)
Proceed as follows with **faults**:
- Note down the fault displayed (flashing)
- Press reset key

Warning
With **warnings** the boiler does not lock out.
The warning is shown in the display and expires by itself once the cause of the warning no longer exists.

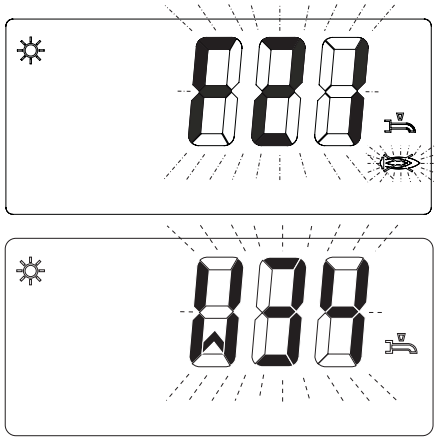


Table of fault and warning message:

CODE	Message	Cause	Possible fault/rectification
	Temperatures		
11	Fault	Boiler temperature ≥ 105°C	• No water in boiler - top up water • Air in boiler - vent boiler • No boiler throughput - check function of pump, clean water side of heat exchanger
12	Warning	Boiler temperature ≥ 95°C	• No water in boiler - top up water • Air in boiler - vent boiler • No boiler throughput - check function of pump, clean water side of heat exchanger
13	Fault	Flue gas temperature ≥ 120°C	• Heat exchanger heavily soiled
14	Warning	Flow temperature gradient too large	• Air in boiler - vent boiler • No boiler throughput • System pressure too low
15	Warning / fault[1)]	Temperature differential between boiler temp. and flue gas temp. too high	• Heat exchanger through flow insufficient
16	Warning	Flue gas temperature ≥ 115°C	• Heat exchanger heavily soiled
18	Warning	Ratio STL/flow	• Heat exchanger through flow insufficient

[1)] After 30 consecutive warnings the boiler goes to lockout.

Continuation of fault and warning message

CODE	Message	Cause	Possible fault/rectification
	Burner		
21	Fault[2)]	No flame formation at burner start	• Contaminated combustion air (dust, soot) ⇨ Clean burner • Gas supply closed • Ignition electrode soiled/incorrect spark gap • Faulty wiring to ignition electrod • Increase flame formation time > 1.4 sec. – P35 step by step • Check the gas flow safety device
22	Warning[3)]	Flame failure during operation	• Ionisation current insufficient • Check wiring to SCOT electrode • Check SCOT electrode, if necessary replace • With room air independent operation carry out soundness test of flue gas system ⇨ Kap. 5.5
23	Fault	Flame simulation	• Check earth connections • Replace WCM circuit board
24	Fault[4)]	Underfloor heating thermostat on input H2 is activated	• Check mixer • Check flow setpoint • Check pump function

2) After 5 unsuccessful start attempts the boiler goes to lockout.

3) The boiler attempts a restart. If this is unsuccessful the boiler goes to lockout with error code F21.

4) If the temperature at the underfloor heating thermostat falls and the contact at input H2 is opened, the WTC restarts automatically.

Continuation of fault and warning message

CODE	Message	Cause	Rectification
	Sensor		
30	Warning	Safety temperature sensor defective	• Check cable + sensor
31	Fault	Flue gas sensor defective	• Check cable + sensor
33	Warning[5)]	External sensor B1 defective	• Check cable + sensor
34	Warning	DHW sensor B3 defective	• Check cable + sensor
35	Fault	Flow sensor defective defekt	• Check cable + sensor
36	Warning	Insufficient water pressure	• Check system pressure Pressure must be more than 1.2 bar
		Temperature switch heat exchanger has reacted	• Reset temperature switch manually (red button) see Ch. 3.3.1 • Check boiler throughput • Clean and descale water side of heat exchanger • Replace heat exchanger
38	Fault	Calorifier sensor B10 defective	• Check cable + sensor
39	Fault	Calorifier sensor B11 defective	• Check cable + sensor
	Actuators		
41	Fault	Gas valve proving	• Electrical connection gas valve faulty, replace • Gas valve leaking, replace gas valve
42	Warning	No PWM control signal available	• Check cable connection PWM pump
43	Fault	Fan speed not achievd	• Check cable connection, replace fan
44	Fault	Fan standby faulty	• Replace fan
	Electronics		
51	Fault	System fault boiler control	• New configuration with P10 • Check all available parameters as per Ch. 6.3.3, if necessary use WCM diagnostic
		Application fault BCC plug	• Plug in BCC • Install BCC of version 3.X
		Invalid unit configuration	• Replace WCM-CPU
52	Fault	System fault combustion control: Invalid configuration data set Application fault BCC plug:	• Replace WCM-CPU • Carry out initialisation of BCC • Check polling of BCC • Plug in BCC and carry out initialisation
53	Fault	Voltage supply insufficient or fuse F2 (24V) defective	• Check fuse • Check fan (WTC 45 only) • Replace WCM-CPU
54	Fault	Faulty electronics	• Short circuit ionisation electrode - burner, check burner fleece for fibres • Inputs H1, H2 are defective • Check ionisation electrode, unplug ionisation electrode/switch control on and off ⇨ Fault gone ⇨ Replace electrode • Replace WCM-CPU
55	Fault	Mains frequency is < 45 Hz or > 55 Hz	• Check mains, avoid unstable mains
56	Fault	Ionisation current measurement faulty	• Reset, if it recurs replace WCM-CPU

[5)] If the external sensor is defective, the regulation continues in emergecy operation. This is based on an external temperature of 5°C.

Continuation of fault and warning message

CODE	Message	Cause	Possible fault/rectification
	Electronic compound regulation		
61	Fault	Deviation of ionisation signal to setpoint too large	• Wrong setting of gas type at gas valve, check setting • Parameter P11 set to wrong gas type • Check resistance ionisation circuit - R > 50 kΩ ⇨ replace cable • Ionisation electrode soild or mechanically deformed • WCM-CPU faulty - replace
62	Fault	The setting signal of the gas setting element exceeds the permissible tolerance range	• As F61 • Check flue gas circulation - flue gas system is gas tight ⇨ Ch. 5.5 • Fan does not achieve min. speed in controlled operation • Flue gas side resistance too high - check condensate outlet • Insufficient gas pressure
64	Fault	New calibration value exceeds factory preset limits	• Check flue gas circulation - flue gas system is gas tight ⇨ Ch. 5.5 • External influences on the unit (supply air) due to flue gas, dust or other contaminants
65	Fault	New calibration value deviates too much from the previous value	• Supply air contaminated by dust and soot • 100% calibration was not carried out following the repalcement of SCOT electrode, WCM-CPU or burner (⇨ Ch. 5.5, P39)
66	Fault	Contrary to requirements calibration was not carried out	• Ignition occurs too late - increase P35 (see F21) • External influences on the unit e.g. by dust, flue gas or on twin flue systems by soot • Deviations in the gas quality - carry out 100% calibration • Follow on fault from F22
67	Fault	The setpoint was incorrectly saved	• Incorrect commissioning with liquid petroleum gas, i.e. P11 was set to natural gas • Replace WCM-CPU • Insufficient gas supply, gas pressure drops

Continuation of fault and warning message

CODE	Message	Cause	Possible fault/rectification
	eBus communication		
80	Warning	WCM cascade manager no longer transmits valid setpoint P12 is set to address #A…E and no setpoint transmitter connected e.g.: WCM cascade manager	• Check Bus connection/Bus supply • Check WCM-KA • Check address setting P12
81	Warning	WCM-FS#1 no longer transmits valid setpoint	• Check Bus connection/Bus supply • FS or EM defective
82	Warning	WCM-EM#2 or -FS#2 no longer transmits a valid setpoint	• Check cable connection • FS or EM defective
83	Warning	WCM-EM#3 or -FS#3 no longer transmits a valid setpoint	• Check cable connection • FS or EM defective
84	Warning	WCM-EM#4 or -FS#4 no longer transmits a valid setpoint	• Check cable connection • FS or EM defective
85	Warning	WCM-EM#5 or -FS#5 no longer transmits a valid setpoint	• Check cable connection • FS or EM defective
86	Warning	WCM-EM#6 or -FS#6 no longer transmits a valid setpoint	• Check cable connection • FS or EM defective
87	Warning	WCM-EM#7 or -FS#7 no longer transmits a valid setpoint	• Check cable connection • FS or EM defectivet
88*	Warning	WCM-EM#8 or -FS#8 no longer transmits a valid setpoint	• Check calbe connection • FS or EM defective

* With remote temperature control via input N1, warning 88 signals when the remote signal of 4-20mA is no longer present.

10.1 Safety notes on servicing

Service only by qualified personnel!

Failure to carry out maintenance and service work properly can have severe consequences including serious injury or the loss of life. Pay close attention to the following safety notes.

Danger of getting burned!
Some parts of the appliance (e.g. burner surface) become hot during operation and could cause burns if touched. The appliance should be allowed to cool prior to service work being carried out.

Qualified personnel
Only qualified and experienced personnel must carry out maintenance and service work.

Prior to all maintance and service work:
1. Switch off mains switch and appliacnce switch and protect from reactivation.
2. Close gas isolating valve.
3. Observe installation and operating instructions.

After all maintenance and service work:
1. Function test.
2. Check flue gas losses as well as O_2/CO values.
3. Carry out gas soundenss test.
4. Complete a test sheet.
5. Complete an inspection card.

☞ Variable rating setting in chimney sweep mode (⇨ Ch. 5.5.2)
☞ To leave chimney sweep mode turn dial knob until ESC appears, then press key.

Service interval
The operator should ensure that the combustion appliance is inspected or serviced at least
– once a year –
by an agent of the manufacturer or other suitably qualified person.

Set service interval
The time between services can be set in the heating engineer level parameter P70 (⇨ Ch. 6.3.3). Once the time set has elapsed, the display of the WTC displays a flashing spanner. If a WCM-FS (accessory) is fitted, the display shows the text Service. The service can be reset in the Info mode (⇨ Ch. 6.3.2).

Shutdown periods
If the appliance is not used for long periods of time, the following measures should be carried out:

1. Close gas isolating valve.
2. Switch off mains and appliance switch.
3. Empty heating system or prepare with frost protection.
4. Empty supply line to the expansion tank inside the appliance.
5. Empty DHW heater, turn off the water.
6. Open shut off and regulating valves.
7. Switch off pumps and control circuits.

10.2 Check list for servicing the WTC

Service task	Carried out on							
	18.07.08							
Read out burner operating hours (⇨ Ch. 6.3.2; I43) **I43 =**	1500							
Read out fault memory (⇨ Ch. 6.3.4) **Fault**	2x F22 1x F42							
Safety and function check including the safety and control components	✔							
Check function and safety of air/flue gas system. Check soundness of flue gas system. (⇨ Ch. 5.5)	✔							
Check soundness of fuel and water carrying system components, carry out visual inspection for corrosion and wear and tear.	✔							
Check requirements of the heating system water are met (⇨ Ch. 3.5) and if necessary check top up water treatment.	✔							
Check gas inlet pressure [mbar]	20							
Carry out O2, CO measurement (⇨ Ch. 5.5) **Max: O_2 =** **CO =** **Min: O_2 =** **CO =**	5.1 % 50 ppm 5.3 % 10 ppm							
Read out SCOT® base value (⇨ Ch. 6.3.2; I14) **I14 =**	85 points							
Determine heat exchanger pressure loss use cleaning kit 481 000 00 26 2.	6 mbar							
Electrically isolate the appliance	✔							
Close gas isolating valve	✔							
Check burner and burner gasket (⇨ Ch. 10.3)	✔							
Clean heat exchanger if pressure loss is > 3.5 mbar (WTC 45), or > 5.0 mbar (WTC 60) (⇨ Service instructions cleaning kit)	cleaned 4 mbar							
Check ionisation electrode, replace if SCOT® base value < 78 points (WTC 45), or < 75 points (WTC 60)	replaced							
Test ignition electrode and check spark gap (3 mm ± 0.3 mm)	✔							
Clean and refill condensate water siphon, check condensate drain	✔							
Reassemble heat exchanger Replace service cover seal and gas seal	✔							
Carry out visual inspection of electrical wiring	✔							
Carry out soundness test gas and water side (⇨ Ch. 5.3)	✔							
Check fill pressure of system [bar]	1.3							
Carry out calibration (⇨ Ch. 5.5; P39)	✔							
Carry out test operation with DHW, if necessary vent, check condensate side soundness	✔							
Check ignition behaviour, if necessary correct via parameter P35 (⇨ Ch. 6.3.3) Ignition time approx. 1.3 sec.	✔							
Carry out O2, CO measurement (⇨ Ch. 5.5) Max: **O_2 =** **CO =** Min: **O_2 =** **CO =**	5.1 % 40 ppm 5.1 % 5 ppm							
Reset service message (I45) (⇨ Ch. 6.3.2)	✔							
WCM-FS or WCM-DU Check date and time and/or time and day	✔							
Comments/Notes (e.g. other parts replaced)								

Continuation checklist for service

Service task	**Carried out on**							
Read out burner operating hours (⇨ Ch. 6.3.2; I43) **I43 =**								
Read out fault memory (⇨ Ch. 6.3.4) **Fault**								
Safety and function check including the safety and control components								
Check function and safety of air/flue gas system. Check soundness of flue gas system. (⇨ Ch. 5.5)								
Check soundness of fuel and water carrying system components, carry out visual inspection for corrosion and wear and tear.								
Check requirements of the heating system water are met (⇨ Ch. 3.5) and if necessary check top up water treatment.								
Check gas inlet pressure [mbar]								
Carry out O2, CO measurement (⇨ Ch. 5.5) **Max: O_2 = CO = Min: O_2 = CO =**								
Read out SCOT® base value (⇨ Ch. 6.3.2; I14) **I14 =**								
Determine heat exchanger pressure loss use cleaning kit 481 000 00 26 2.								
Electrically isolate the appliance								
Close gas isolating valve								
Check burner and burner gasket (⇨ Ch. 10.3)								
Clean heat exchanger if pressure loss is > 3.5 mbar (WTC 45), or > 5.0 mbar (WTC 60) (⇨ Service instructions cleaning kit)								
Check ionisation electrode, replace if SCOT® base value < 78 points (WTC 45), or < 75 points (WTC 60)								
Test ignition electrode and check spark gap (3 mm ± 0.3 mm)								
Clean and refill condensate water siphon, check condensate drain								
Reassemble heat exchanger Replace service cover seal and gas seal								
Carry out visual inspection of electrical wiring								
Carry out soundness test gas and water side (⇨ Ch. 5.3)								
Check fill pressure of system [bar]								
Carry out calibration (⇨ Ch. 5.5; P39)								
Carry out test operation with DHW, if necessary vent, check condensate side soundness								
Check ignition behaviour, if necessary correct via parameter P35 (⇨ Ch. 6.3.3) Ignition time approx. 1.3 sec.								
Carry out O2, CO measurement (⇨ Ch. 5.5) Max: **O_2 = CO =** Min: **O_2 = CO =**								
Reset service message (I45) (⇨ Ch. 6.3.2)								
WCM-FS or WCM-DU Check date and time and/or time and day								
Comments/Notes (e.g. other parts replaced)								

10.3 Cleaning the burner and heat exchanger

Service interval and service tasks
The burner surface should be checked for soiling and if necessary cleaned annually.
The heat exchanger should be checked for flue gas side soiling and if necessary cleaned annually.
A Weishaupt cleaning kit for this task is available, order No.: 480 000 00 26 2.
The check of the degree of soiling is carried out by a differential pressure measurement. The accessory required is included in the cleaning kit.

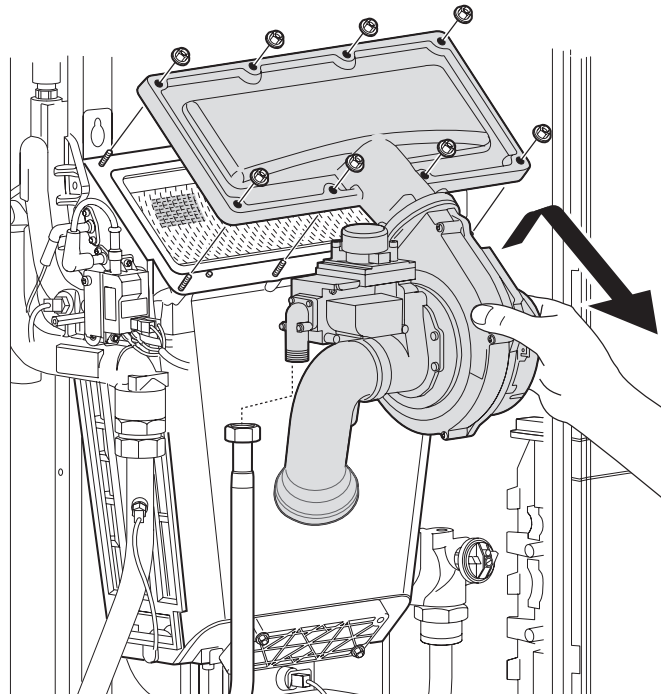
Dis-assembling:
1. Close gas isolating valve, de-energise unit.
2. Undo electrical connections of gas valve, fan and immersion coil.
3. Undo 3/4" screwed union between gas valve and gas pipe.
4. Remove the 8 fixing nuts on the burner cover.
5. Remove burner cover with seal and flange connected gas/air compound unit.
6. Remove burner surface.
7. Remove the 4 fixing screws on the service cover and remove service cover.

Cleaning the burner
If the burner surface is soiled, brush out the burner fleece, a normal domestic brush can be used to do this. Once cleaned, ensure that the fibres of the burner fleece in the vicinity of the ionisation electrode do not stick out so as to cause a short circuit with the ionisation electrode.

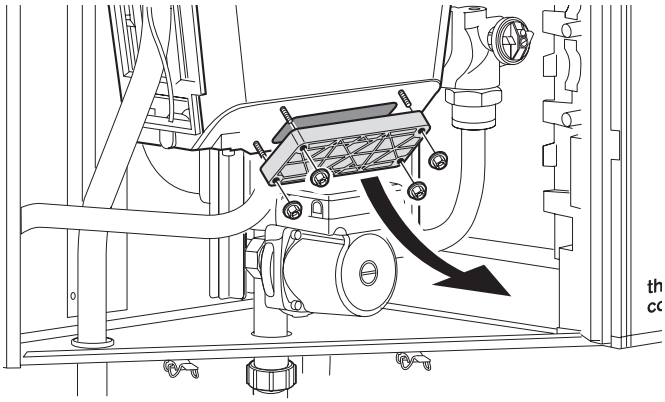
Cleaning the heat exchanger
Flue gas side cleaning of the heat exchanger can be carried out using the cleaning kit available as an accessory
(order No. 481 000 00 26 2).
Remove sediments through service opening, in particular from condensate drain.
Clean siphon. To do this remove cover of cleaning opening on the siphon.

Replacing seals and components
The following seals should be replaced during service:
- Gas seal
- Service cover seal

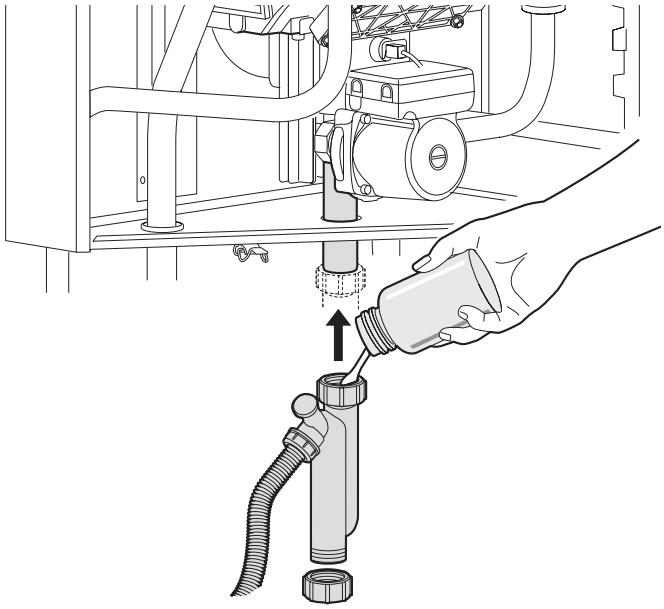
Dis-assembling burner cover



Dis-assembling service cover



Cleaning and filling siphon



Re-assembling following cleaning:

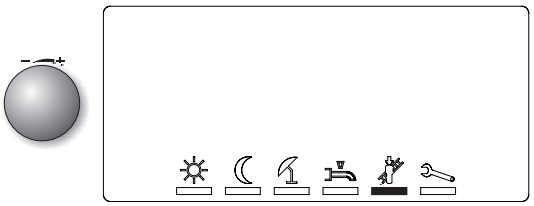
1. Refit cover of cleaning opening on siphone and fill siphon with water (see Ch. 4.8).
2. Fit service cover with new seal and tighten the screws to 4 Nm torque.
3. Install pre-mix burner, ensuring correct alignment on the adjusting struts.
4. Check burner seal for damage prior to fitting the burner cover. Fit burner cover to the stay bolts and tighten the nuts to 4 Nm torque.
5. Connect the gas valve to the gas pipe and tighten the union nut. Fit new gas seal (Order No. 441 076).
6. Reconnect the electrically connection to theappliance and gas valve.

Concluding work

1. Open gas isolating valve.
2. Check soundness of gas connections (Ch. 5.3) and burner cover opening.
3. Switch on the appliance.
4. Carry out soundnes test of all flue gas and condensate carrying components.
5. Check soundness between burner cover and fan.
6. Check O_2 content as per Ch. 5.5.

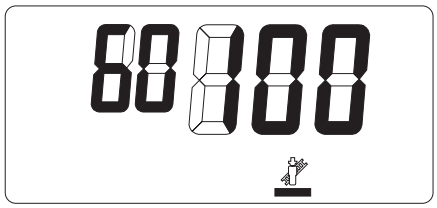
10.4 Chimney sweep function

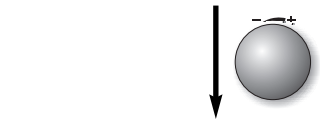
- Activate symbol rail by turning dial knob and place cursor below the chimney sweep symbol.



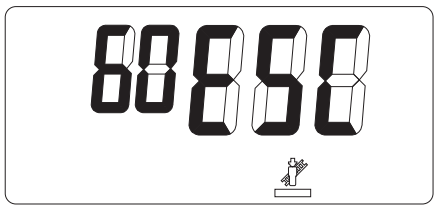
- Activate chimney sweep function by pressing the key.

- The function remains active for 15 minutes.
- The 3 digit display shows the current boiler rate.
- The 2 digit display shows the current boiler temperature.

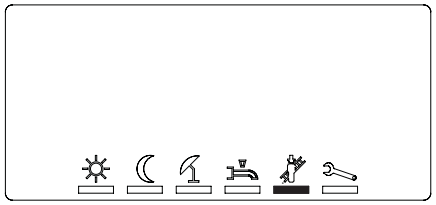




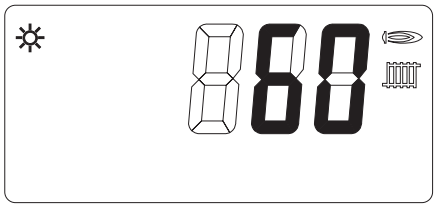
☞ To exit the chimney sweep function, turn dial knob until ESC appears, then press the key.



After approx. 90 seconds the standard display appears.



90 sec.



11.1 Rating, efficiency, emissions

Weishaupt Gas Condensing Unit

Category	(DE): II2ELL3B/P, (AT): II3H3P, (CH): II2H3P
Type of installation	B23/B23P*/B33/C13x/C33x/C43x/C53x/C63x/C83x
CE -No.	0085 BO 6112
SVGW-Reg.-No.	04-023-4
ÖVGW Quality Mark	G2.596

		WTC 45-A		WTC 60-A	
		Min. load	Nominal load	Min. load	Nominal load
Burner rating (Q_C) to EN 483	kW	10	44	13	59
Fan speed Natural Gas/LPG	1rpm	1470/1380	5460/5100	1320/1140	4950/4380
max. boiler temperature	°C	85		85	
Heat rating at 80/60 °C Natural Gas/LPG①	kW	9.8	42.8	12.7	57.4
Heat rating at 50/30 °C Natural Gas/LPG①	kW	10.7	45.1	13.9	60.7
Condensate quantity with Natural Gas	kg/h	1.3	3.1	1.6	4.1
Gas flow pressure Nat. Gas E/H - min...**Standard**...max	mbar	17...**20**...25		17...**20**...25	
Gas flow pressure Nat. Gas LL - min...**Standard**...max	mbar	20...**25**...30		20...**25**...30	
Gas flow pressure LPG B/P - min...**Standard**...max	mbar	42.5...**50**...57.5		42.5...**50**...57.5	
Gas flow pressure LPG B/P - min...**Standard**...max	mbar	25...**37**...45		25...**37**...45	
Standard efficiency at 75/60 °C	%	105.6 (95.1 Hs)		105.5 (95.0 Hs)	
Standard efficiency at 40/30 °C	%	108.3 (97.6 Hs)		108.4 (97.7 Hs)	
Standard emission factors (40/30°C):					
- Nitrous Oxide NO_x	mg/kWh	38		39	
- Carbon Monoxide CO	mg/kWh	16		15	
O_2 Natural Gas②	%	4.9		4.9	
O_2 LPG ②	%	4.7		4.9	
Water content	l	4.5		6.0	
permiss. max. excess operating pressure	bar	3.0		3.0	

① Propane
② Conversion table O_2 – CO_2 see appendix

EnEV product variables

		WTC 45-A	WTC 60-A
Heat rating Q_N at 80/60 °C	kW	9.8 … 42.8	12.7 … 57.4
Boiler efficiency at nominal load and medium boiler temperature 70°C	%	97.2 (87.6 Hs)	97.3 (87.7 Hs)
at 30% partial load and return flow tempemperature 30°C	%	107.5 (96.8 Hs)	107.4 (96.8 Hs)
Standby loss at 50K above room temperature	%	0.47	0.37

(1 only in conjunction with flue gas systems of pressure class P1 or H1 to EN 14471

11.2 Electrical data

Weishaupt Gas Condensing Unit		WTC 45-A	WTC 60-A
Nominal voltage		230 VAC, 1N, 50Hz	230 VAC, 1N, 50 Hz
Nominal load version -H / H-O	W	151 / 62	170 / 85
Max. prefusing	A	G 16	G 16
Unit fuse F 230 V	A	4 AT	4 AT
Unit fuse F2 24 V DC	A	4 AT	4 AT
Type of protection		IP 44	IP 44
Ignition frequency	Hz	50	50
Spark gap	mm	3.5	3.5

11.3 Permissible ambient conditions

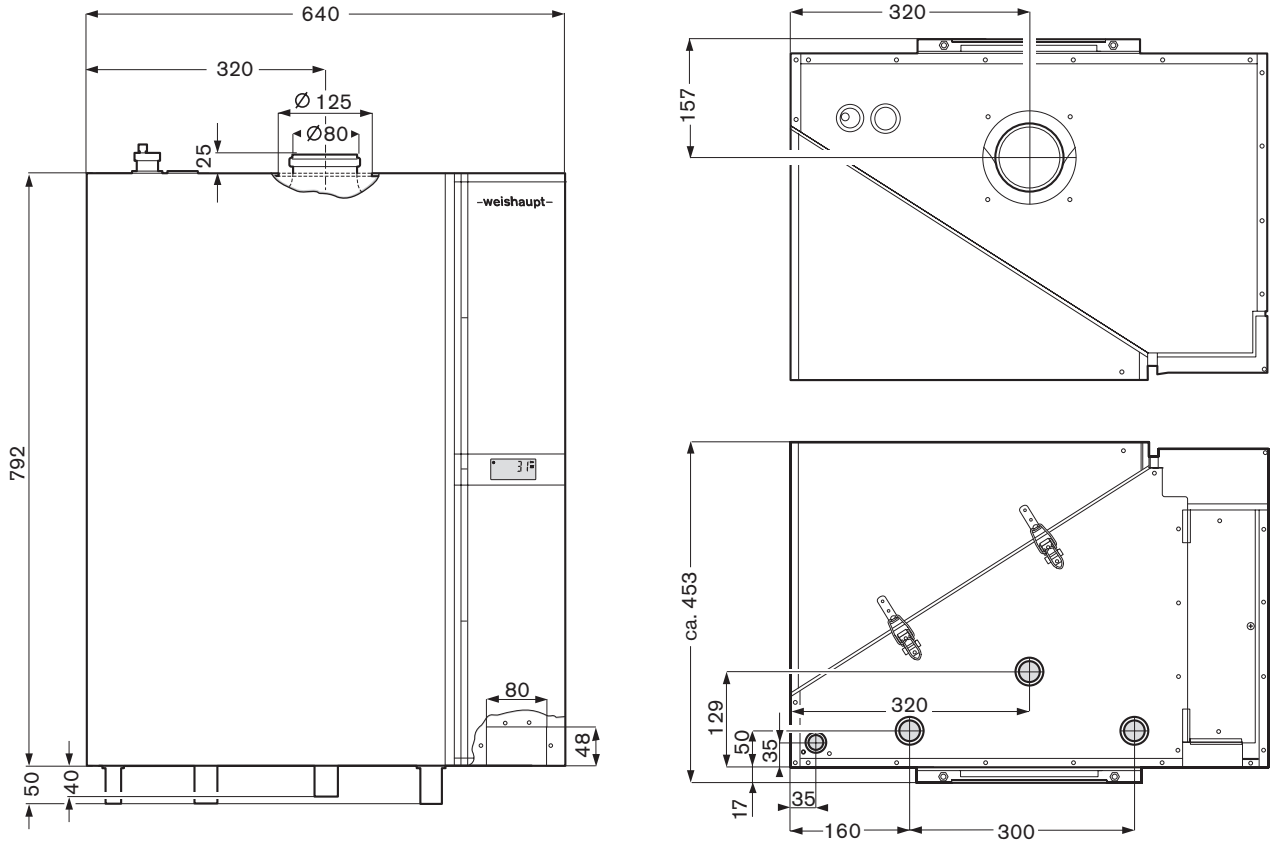
Weishaupt Gas Condensing Unit		WTC 45-A	WTC 60-A
Temperature in installation location	°C	3...30	3...30
Temperature transport / storage	°C	-10...60	-10...60
Humidity	% relative humidity	max. 80 %	max. 80 %

11.4 Design of flue gas system

Weishaupt Gas Condensing Unit		WTC 45-A	WTC 60-A
Residual outlet pressure at flue gas outlet	Pa	73	106
Flue gas outlet		DN 80	DN 80
Flue gas mass flow rate	g/s	4.5 - 19.9	5.9 – 26.7
Max. flue gas temperature at 80/60 °C	°C	57 – 74	57 – 74
Max. flue gas temperature at 50/30 °C	°C	31 – 53	31 – 54

11.5 Weights, dimensions

Weishaupt Gas Condensing unit		WTC 45-A	WTC 60-A
Weight incl. cladding	kg	61	65



A Appendix

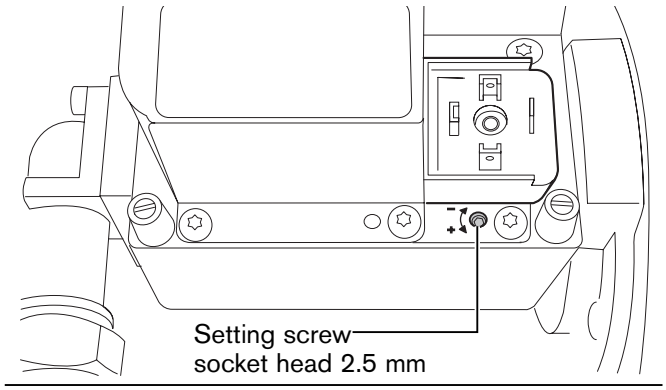
Conversion to Liquid Petroleum Gas

Gas nozzle replacement not required !

The following sequences hould be observed during the conversion:

1. Switch boiler on/off switch to 0.
2. Unscrew plug for voltage supply to gas valve.
3. Turn setting screw (socket head 2.5 mm) on gas valve to right stop. This requires approx. 30 rotations.
   Natural Gas : left stop
   Liquid Petroleum Gas : right stop
4. Retighten plug for voltage supply to gas valve.
5. Switch on boiler.
6. In heating engineer level (⇨ Ch. 6.3) set parameter P11 to F.
7. Carry out calibration using parameter 39 (see page 43).
8. Burner commissioning and O_2 check to Ch. 5.5.
9. Note setting of type of gas on name plate.

Gas type conversion



ATTENTION

Gas line must be vented completely to avoid lockouts caused by the electronic compound regulation when calibrating during operation (messages F61, F62).

Reduction of heat rating

!!Gas rate adjustment!!

Procedure:

☞ In heating engineer level (⇨ Ch. 6.3.3) set parameter P37 accordingly.

☞ Note reduced heat rating on name plate.

-weishaupt-

Max Weishaupt GmbH D-88475 Schwendi

Nominal heat rate loading (heating)

reduced to max. _____kW

Wobbe table

Calorific values and $CO_{2\ max.}$ (guide values) of different types of gas

Gas type	Calorific value H_i MJ/m^3	kWh/m^3	CO_2 max. %
2. Gas family			
Group LL (Natural Gas)	28.48…36.40	7.91…10.11	11.5…11.7
Group E (Natural Gas)	33.91…42.70	9.42…11.86	11.8…12.5
3. Gas family			
Propane P	93.21	25.99	13.8
Butane B	123.81	34.30	14.1

Contact the gas supplier for the various maximum CO_2 contents.

Conversion table O2 – CO2

O_2 content dry [%v]	**CO_2 content [%]** Natural Gas E (11.7% CO_2 max)	Natural Gas LL (11.5% CO_2 max)	Propane (13.7% CO_2 max)
3.9	9.5	9.4	11.2
4.1	9.4	9.3	11.0
4.3	9.3	9.1	10.9
4.5	9.2	9.0	10.8
4.7	9.1	8.9	**10.6**
4.9	**9.0**	**8.8**	10.5
5.1	8.9	8.7	10.4
5.3	8.7	8.6	10.2
5.5	8.6	8.5	10.1
5.7	8.5	8.4	10.0
5.8	8.5	8.3	9.9

Sensor variables

**Boiler (4 core), flue gas (4 core),
DHW sensor version -C (2 core)
and calorifier sensor B10/B11 = NTC 5 kΩ**

ϑ[°C]	R[Ω]	ϑ[°C]	R[Ω]	ϑ[°C]	R[Ω]	ϑ[°C]	R[Ω]	ϑ[°C]	R[Ω]
-20	48380	10	9948	40	2662	70	874	100	337
-15	36382	15	7856	45	2183	75	738	105	291
-10	27609	20	6246	50	1799	80	626	110	253
-5	21134	25	5000	55	1491	85	533		
0	16312	30	4028	60	1241	90	456		
5	12691	35	3265	65	1039	95	391		

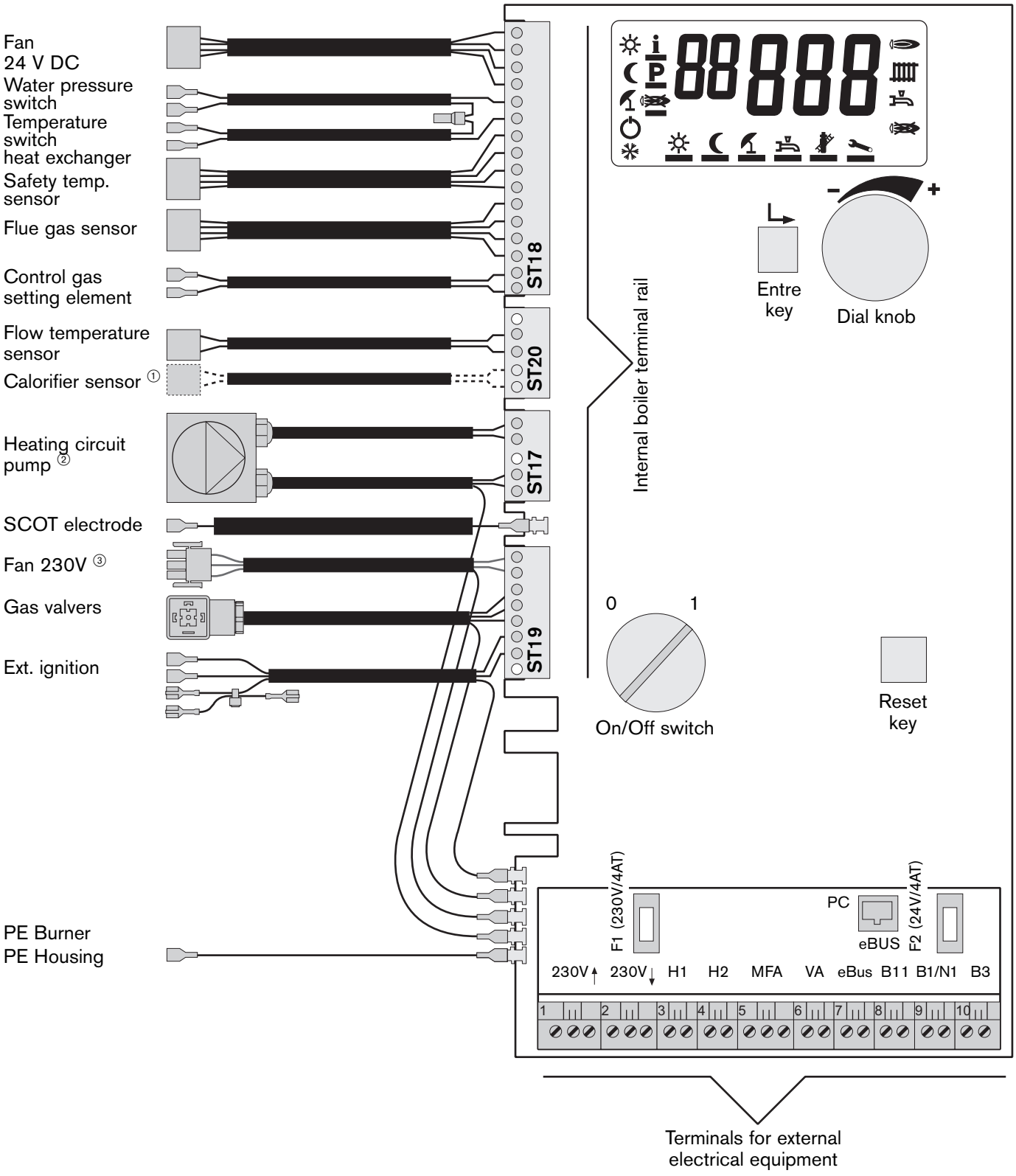
Tank sensor (B3) = NTC 12 kΩ

ϑ[°C]	R[Ω]	ϑ[°C]	R[Ω]
-15	82430	40	6460
-10	63190	45	5310
-5	48820	50	4390
0	37990	55	3640
5	29770	60	3040
10	23500	65	2550
15	18670	70	2140
20	14920	75	1810
25	12000	80	1540
30	9710	85	1310
35	7900	90	1120

External sensor QAC 31(B1) = NTC 600 Ω

ϑ[°C]	R[Ω]	ϑ[°C]	R[Ω]
-35	672	8	605
-30	668	10	600
-25	663	12	595
-20	657	14	590
-15	650	16	585
-10	642	18	580
-8	638	20	575
-6	635	22	570
-4	631	24	565
-2	627	26	561
0	623	28	556
2	618	30	551
4	614	35	539
6	609		

Internal boiler wiring



① The cable loom installed at plug slot ST20 is replaced with the cable loom for calorifier control to enable the connection of calorifier sensor B10 (control variation P1 and P2).

② The heating circuit pump is only available with unit version -H.

③ 230V supply voltage for fan motor is only available with WTC 60-A.

Customer service

Heating systems consist of a number components, which have been installed and tested by experts. This checklist aids fault limitation:

- Voltage supply - specialistd electician
- Gas supply - gas board, specialist heating company
- Flue gas system - specialist heating company
- Heating system - specialist heating company
- DHW system - specialist plumbing / heating company

Time and money saved!
A service agreement prevents problems. Experienced techicians annually check the correct function and economical operation to ensure comfort and to protect the environment.

These faults have occurred prevously:

Date: Fault:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Comments:

Information at the heating installation:

- ❑ Functions (commissioning, faults, shutdown)
- ❑ Operation and service on the display control
- ❑ Poss. control units
- ❑ Poss. test certificate
- ❑ Poss. night setback/summer operation
- ❑ Water pressure/water top-up
- ❑ What to do if gas can be smelled
- ❑ Combustion air supply
- ❑ Condensate outlet into domestic water system

The system operator confirms:

- instruction on correct operation and service
- hand-over and explanation of designated operating instructions
- comprehension of the system for safe operation

Installation:

_____

Type: _____ Serial No: _____ Y. of M.: _____

Type of gas: _____

Supplier: _____

Operator: _____

Date: Signature:

Important telephone numbers:

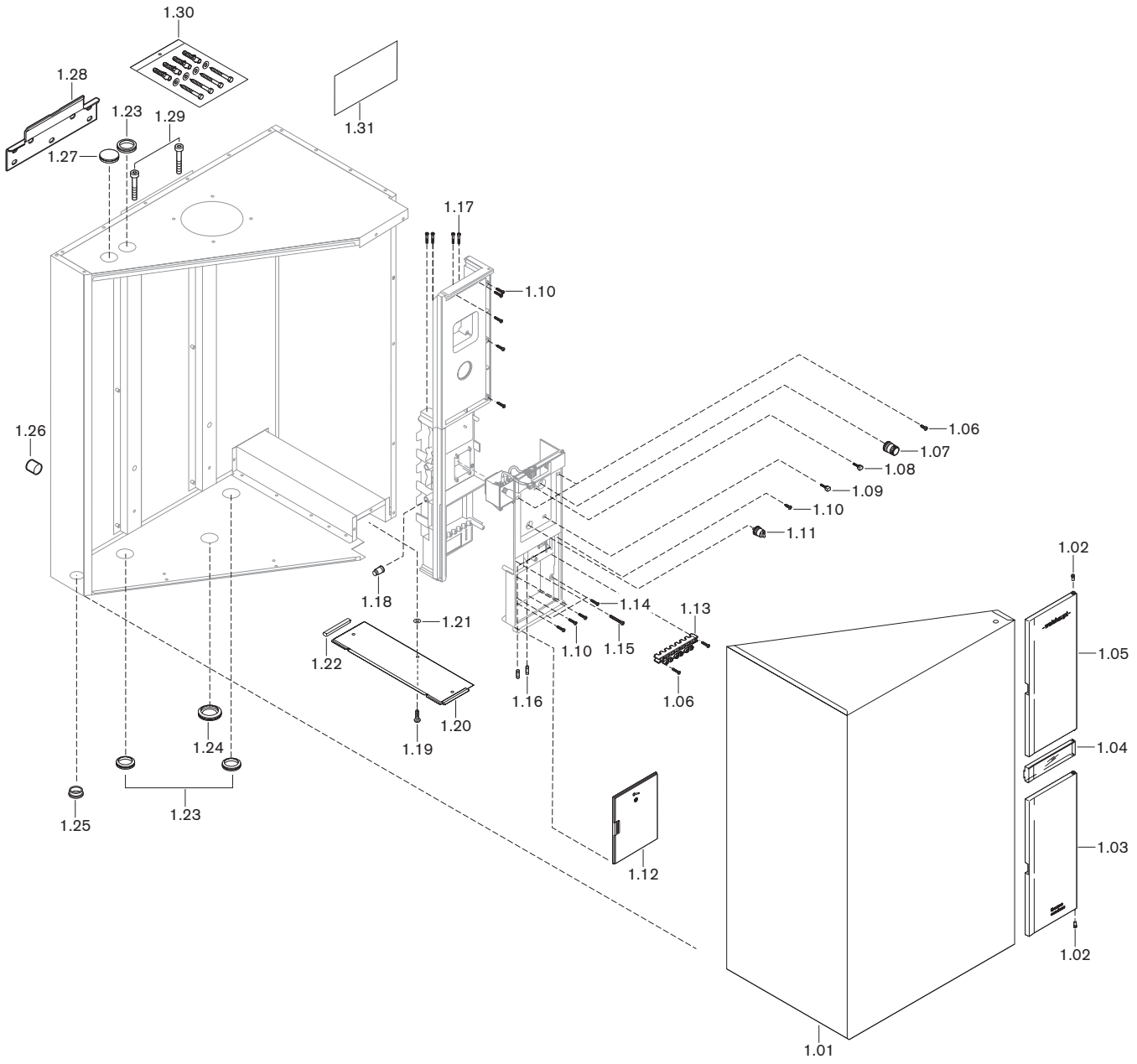
Heating system installer: _____

Plumber: _____

Electrician: _____

District chimney sweep:

_____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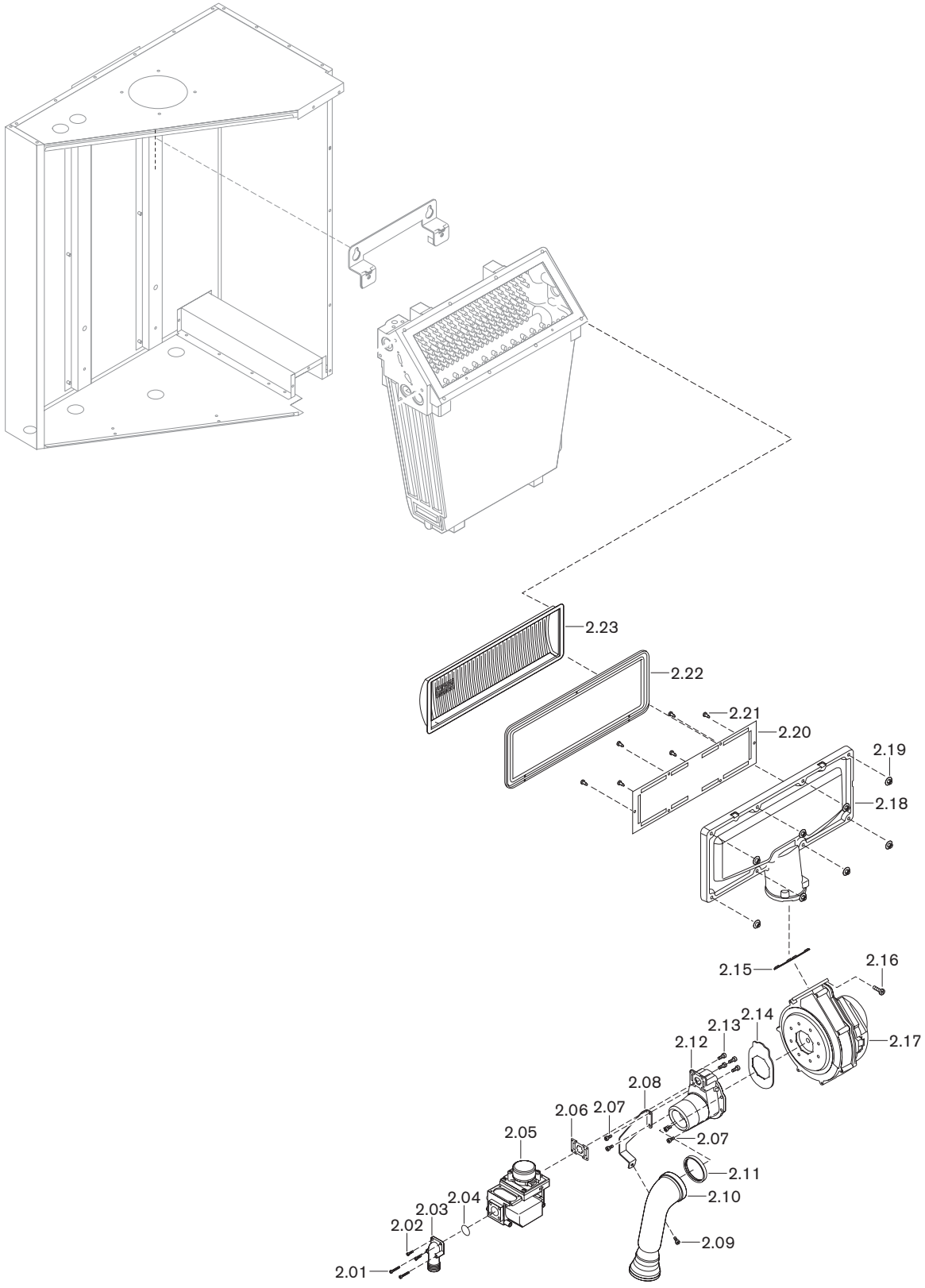
Pos.	Description	Order No
1.01	Cover WTC 45/60-A kompl.	481 401 02 04 2
1.02	Bearing screw WTC 15/25-A	481 011 22 24 7
1.03	Flap boiler control panel cpl. WTC 15-60-A	481 011 22 36 2
1.04	Cover LCD WTC-A	481 011 22 03 7
1.05	Flap operating panel cpl. WTC 15-60-A	481 011 22 38 2
1.06	Screw 4 X 25-WN1412-K40 A2K	409 353
1.07	Button WCM-CPU with seal. ring WTC-A	481 011 22 18 2
1.08	Operating button WCM-CPU WTC-A	481 011 22 20 2
1.09	Reset key WCM-CPU WTC-A with seal. ring	481 011 22 19 2
1.10	Screw M 4 X16 DIN 7500-C	409 208
1.11	Toggle On/Off with seal. ring WTC-A	481 011 22 17 2
1.12	Cover elec. conn. WTC 45/60-A	481 401 22 33 2
1.13	Traction relief WTC-A	481 011 22 32 7
1.14	Screw 4 X 14-WN1412-K40 A2K	409 352
1.15	Screw 4 X 35-WN1412-K40 A2K	409 354
1.16	Fuse 4A (T)	481 011 22 21 7
1.17	Screw 4 X 12-WN1411-K40	409 351
1.18	Closing cap igniton WTC 45/60-A	481 401 22 02 7
1.19	Screw DIN 7981-St4,2x13 -C-Z	409 123
1.20	Cover cable duct WTC 45/60-A	481 401 02 05 2
1.21	Washer 3.5 X 10 X 0.5	430 020
1.22	Corner sheathing 0.8-1.0 mm	756 027
1.23	Grommet Dm.I 24	481 011 02 23 7
1.24	Grommet siphon WTC 45/60-A	481 411 02 16 7
1.25	Grommet Dm.I 22	481 401 02 09 7
1.26	Wall spacer	481 011 02 33 7
1.27	Grommet fast vent valve closed	481 011 02 24 7
1.28	Wall bracket	471 064 02 33 7
1.29	Screw M 6 X 35 DIN 7984	402 406
1.30	Dowel set	481 011 02 05 2
1.31	Sticker chimney sweep function	481 011 00 37 7

Pos.	Description	Order No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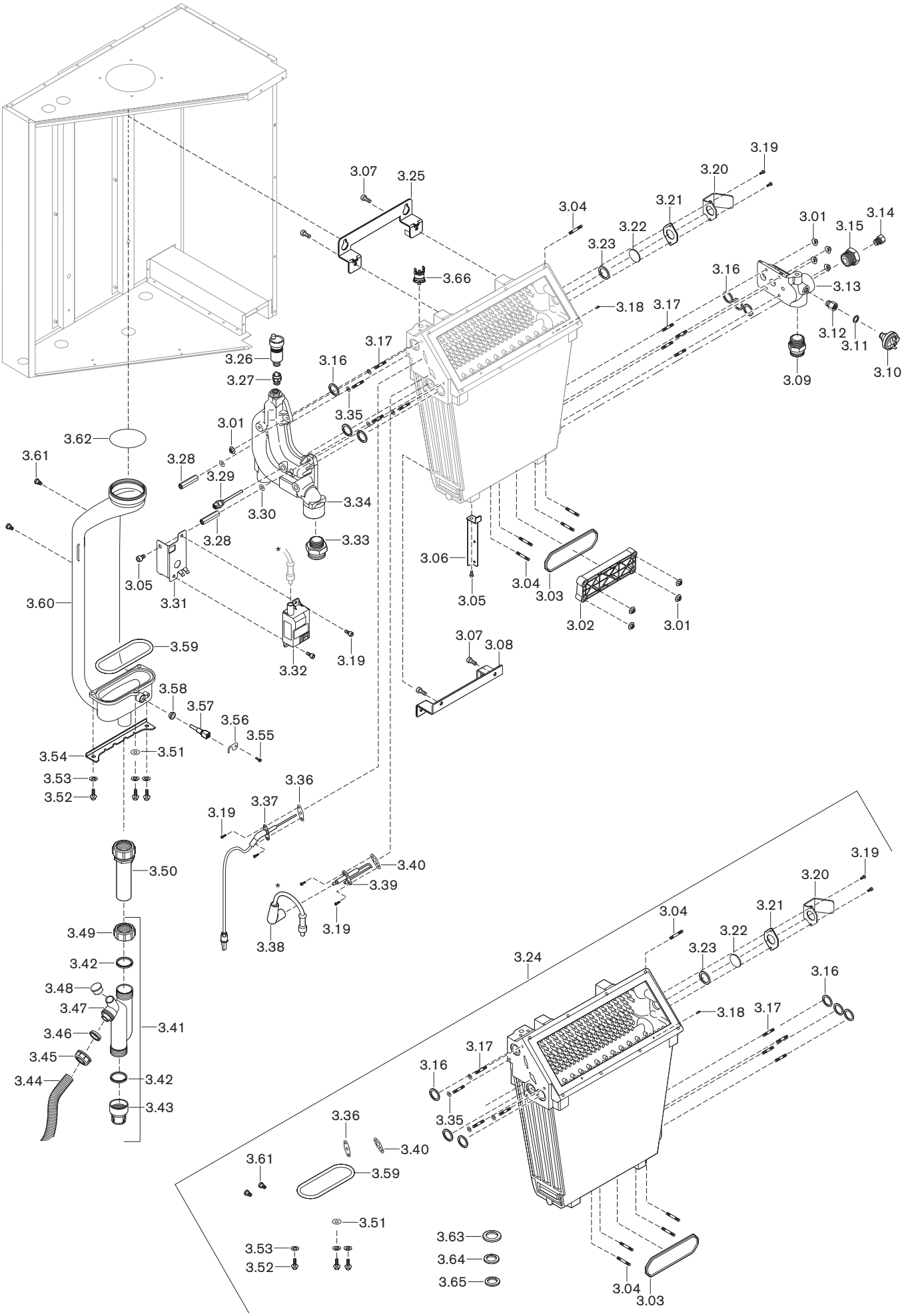
Pos.	Description	Order No
2.01	Screw M4 x 25 Combi-Torx-Plus	409 258
2.02	Screw M4 x 12 Combi-Torx 20	409 257
2.03	Gas connection piece WTC 15/25-A	481 011 30 19 7
2.04	O ring 23 X 2,5	445 136
2.05	Compact gas combi valve	
	WTC 45-A	605 569
	WTC 60-A	605 570
2.06	Gasket gas valve mixer WTC 45/60-A	481 401 30 30 7
2.07	Screw M 5 X 12 DIN 912 8.8	402 207
2.08	Fixing plate intake damper	481 401 30 24 7
2.09	Screw M 4 X 10 DIN 912 8.8	402 150
2.10	Intake damper WTC 45-A	481 401 30 21 7
2.11	Gasket intake damper WTC 45-A	481 401 30 23 7
2.12	Mixer fan	
	WTC 45-A with flange gasket	481 401 30 29 2
	WTC 60-A with flange gasket	481 601 30 29 2
2.13	Screw M 4 X 12 DIN 912 8.8	402 130
2.14	Gasket mixer fan WTC 45/60-A	481 401 30 31 7
2.15	Gasket mixer air outlet WTC-A	481 401 30 32 7
2.16	Screw M 5 X 16-8.8 DIN 6912	403 263
2.17	Fan	
	RG130 WTC 32/45-A	652 235
	RG148 WTC 60-A	652 236
2.18	Burner cover	
	WTC 45-A	481 401 30 07 7
	WTC 60-A	481 601 30 07 7
2.19	Wsaher nut M 6 A2G ISO 4042	412 508
2.20	Air distributor plate WTC 60-A	481 601 30 16 7
2.21	Screw ISO 1485-A2 4,2x 9,5-C	409 127
2.22	Gasket burner cover	
	WTC 45-A	481 411 30 65 7
	WTC 60-A	481 611 30 07 7
2.23	Burner surface	
	WTC 45-A	481 401 30 15 7
	WTC 60-A	481 601 30 15 7

Pos.	Description	Order No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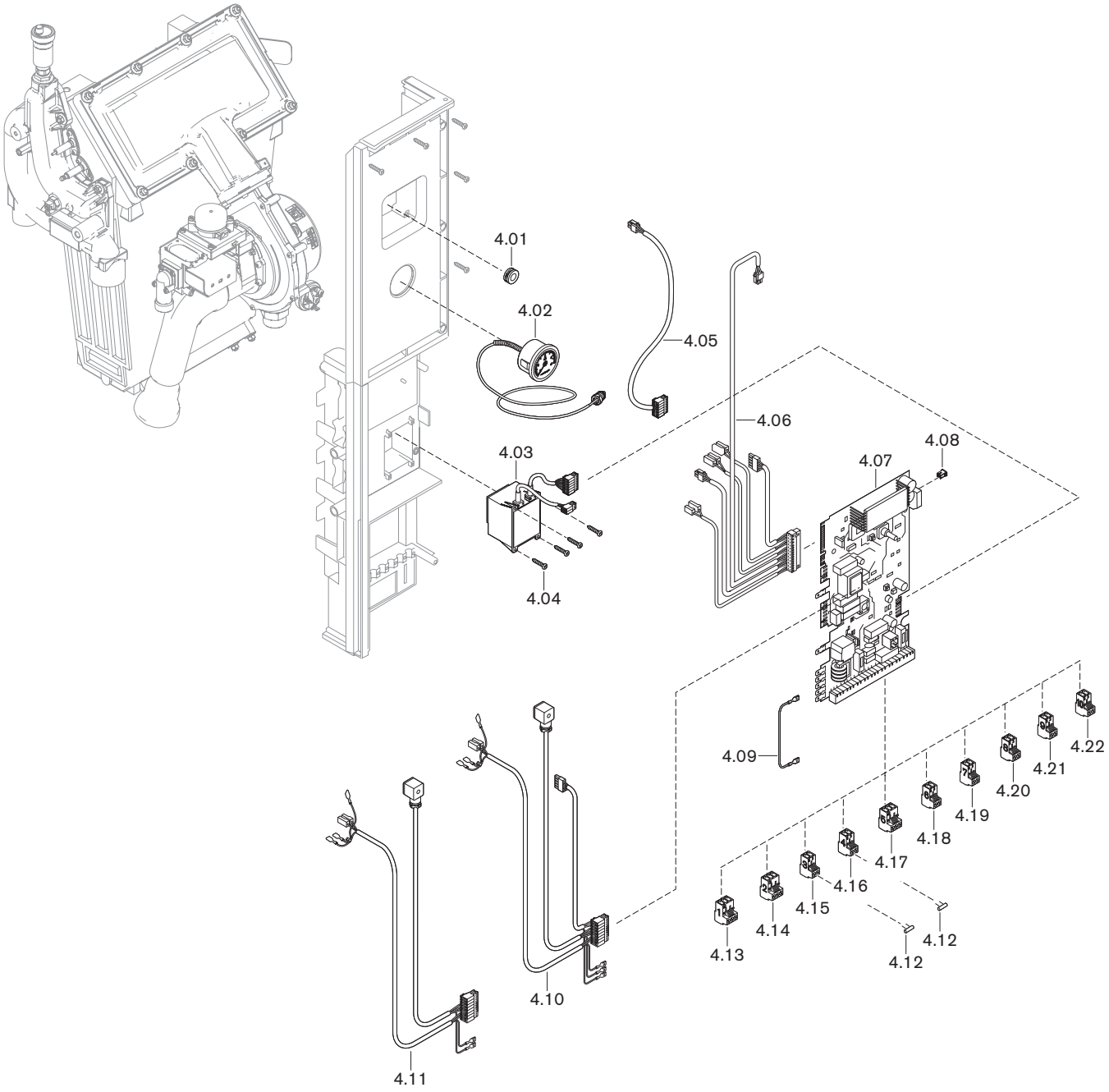
Pos.	Description	Order No
3.01	Washer nut M 6 A2G ISO 4042	412 508
3.02	Service cover WTC 45/60-A	481 401 30 02 7
3.03	Gasket service cover WTC 45/60-A	481 401 30 05 7
3.04	Stud 6 X 30 DIN 949-B MFS	471 230
3.05	Screw M 6 X 10 DIN 912 8.8	402 366
3.06	Fixing plate ret. WTC 45/60-A vers.H	481 401 30 25 7
3.07	Screw M 8 X 16 DIN 912 8.8	402 509
3.08	Bracket heat ex. bottom WTC 45/60-A	481 401 30 17 7
3.09	Double nipple R1A X G1A X 44 (vers. H) R1A X G1 1/4A X 44 (vers .H-0)	 481 401 30 19 7 481 401 30 08 7
3.10	Water level sensor 1/4 WTC 45/60	481 411 40 06 7
3.11	Seal. ring A 13.4X18.9X1.5 DIN 7603 Cu	440 031
3.12	Double nipple G1/4I X R1/4A X 28 SW19	481 401 30 43 7
3.13	Distributor return WTC 45/60-A	481 401 30 10 7
3.14	Test nipple R1/4 press. gauge	481 011 40 15 7
3.15	Reducing bush R1A X Rp1/4I X 26	481 401 30 20 7
3.16	Gasket heat exchanger distrib. pipe	481 411 30 33 7
3.17	Stud 6 X 20 DIN 949-B MFS	471 231
3.18	Socket pin 4x10-A4 ISO8741	422 227
3.19	Screw M 4 X 10 DIN 912 8.8	402 150
3.20	Mirror view port WTC 45/60-A	481 401 30 14 7
3.21	Gasket view port external WTC 45/60-A	481 401 30 12 7
3.22	View port glass WTC 45/60-A	481 401 30 06 7
3.23	Gasket view port internal 26 x 35 x 2	481 401 30 11 7
3.24	Heat cell WTC 45-A WTC 60-A	 481 401 30 05 2 481 601 30 05 2
3.25	Bracket heat exchanger top WTC 45/60-A	481 401 30 48 7
3.26	Quick action vent valve G3/8	662 032
3.27	Shut off valve 3/8I X 3/8A	662 033
3.28	Hexagonal nut M 6 x 45 SW10	481 411 30 52 7
3.29	NTC-ESTB sensor 5 KOhm G1/4	481 401 30 16 7
3.30	Washer A 6.4 DIN 125 St	430 400
3.31	Bracket ignition unit WTC 45/60-A	481 401 30 46 7
3.32	Ign. unit ZAG 1 220-240V 50-60Hz 10VA	603 189
3.33	Double nipple R1A X G1 1/4A X 44	481 401 30 08 7
3.34	Collect. supply WTC 45/60-A compl.	481 401 30 02 2
3.35	Teflon washer 16 x 6.5 x 0.15 WTC 45/60-A	481 401 30 42 7
3.36	Gasket ionisation electrode WTC-A	481 011 30 25 7
3.37	Ionisation electrode WTC 45/60-A	481 401 30 04 2
3.38	Ignition cable WTC 45/60-A	481 401 30 13 2
3.39	Ignition electrode WTC 45/60-A	481 401 30 33 7
3.40	Gasket ignition electrode WTC 15/25-A	481 011 30 23 7
3.41	Siphon WTC 45/60-A compl.	481 401 40 08 2
3.42	Gasket siphon union nut G1 1/4	481 011 40 21 7
3.43	Cover siphon WTC 15/25-A	481 011 40 18 7
3.44	Condensate hose 25 X 3 X 1000 long	481 011 40 23 7
3.45	Union nut G1 siphon	481 011 40 17 7
3.46	Gasket siphon union nut G1	481 011 40 20 7
3.47	Siphon WTC 45/60-A	481 401 40 08 7
3.48	Cap siphon	481 411 30 63 7
3.49	Union nut G1 1/4 siphon	481 011 40 19 7
3.50	Siphon connect. pipe WTC 45/60-A compl.	481 401 40 09 2
3.51	Washer A6.4 x 16 x 1.6 St	430 408
3.52	Screw M 6 X 20-8.8 DIN 6921	409 255
3.53	Spring washer A 6 DIN 137 St	431 615
3.54	Reinforce. plate flue gas duct WTC 45/60-A	481 401 30 44 7
3.55	Screw 4 X 12-WN1411-K40	409 351
3.56	Fixing plate flue gas sensor	481 011 30 27 7
3.57	Flue gas sensor NTC WTC 45/60-A	481 401 30 26 7
3.58	Grommet flue gas sensor WTC 15/25-A	481 011 30 28 7
3.59	Gasket flue gas duct flange WTC 45/60-A	481 401 30 27 7
3.60	Flue gas duct WTC 45/60-A incl. gasket flue gas duct flange (3.59) incl. bracket heat exchanger top (3.25)	481 401 30 47 2
3.61	Screw M 6 X 5-8.8 DIN 923	403 319
3.62	Gasket DN80 for flue gas duct top	481 401 30 13 7
3.63	Gasket 25x38x2	481 401 40 05 7
3.64	Gasket 20x29x2	481 401 40 04 7
3.65	Gasket 17x24x2	441 076
3.66	Temperature switch	481 401 22 12 7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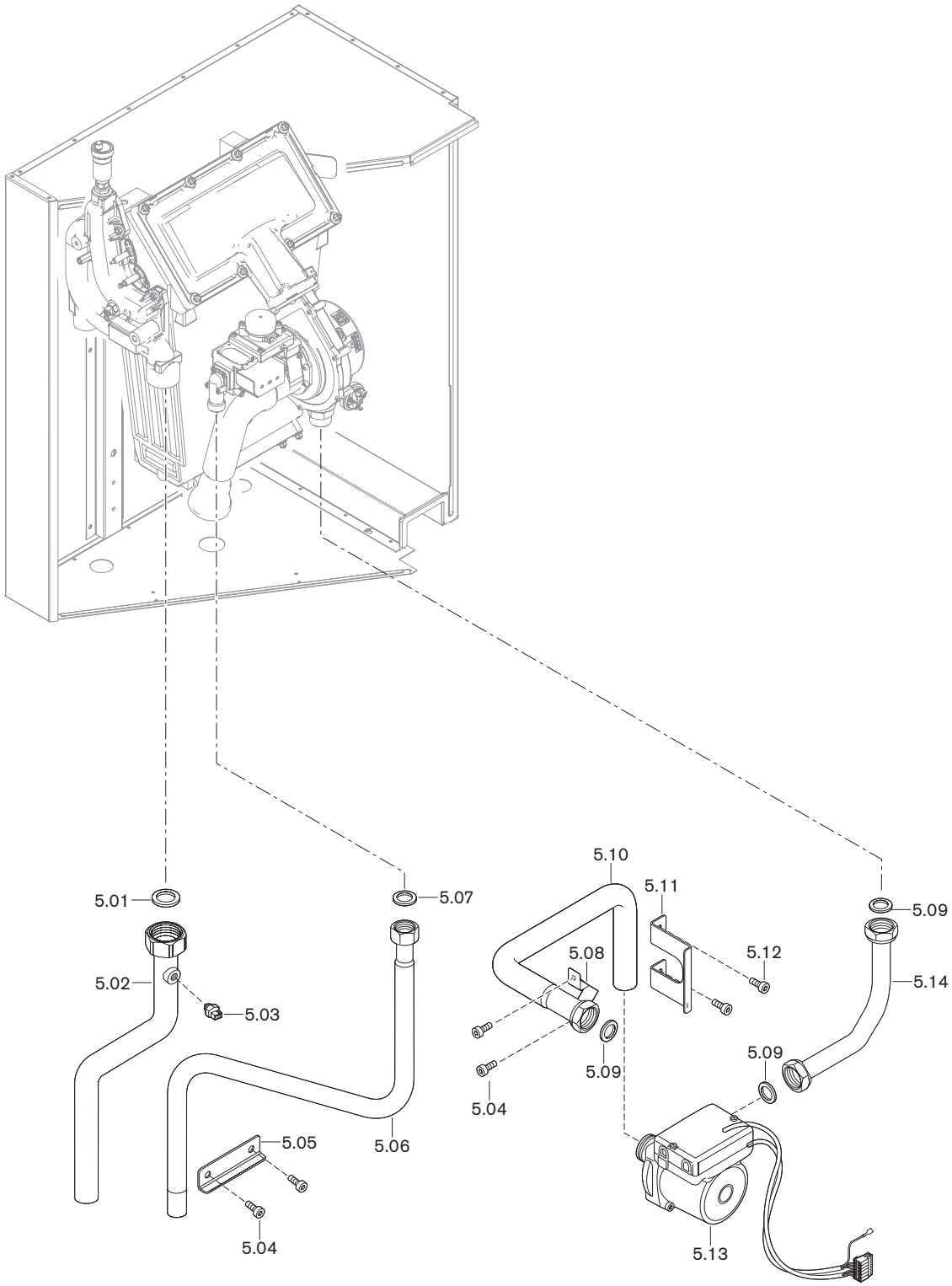
Pos.	Description	Order No
4.01	Grommet timer digital	481 011 22 17 7
4.02	Pressure gauge 0-4 bar	481 011 22 27 7
4.03	Transformer for WCM WTC-A	481 011 22 12 7
4.04	Screw 4 X 14-WN1412-K40 A2K	409 352
4.05	Cable loom flo sensor- flow control	481 401 22 07 2
4.06	Cable loom ST18	481 401 22 16 2
4.07	WCM-CPU, repl. circ. baord w. packaging	481 401 22 15 2
4.08	Coded plug BCC WTC 45-A vers. H/H-O WTC 60-A vers. H/H-O	 481 401 22 11 2 481 601 22 11 2
4.09	Switch wire GNGE 1.0 X 240 Chassis-PE	481 011 22 07 2
4.10	Cable loom ST19c gas valve/fan	481 601 22 10 2
4.11	Cable loom ST19c gas valve WTC45-A	481 401 22 10 2
4.12	Insert bridge 2 pole	716 232
4.13	Plug No. 1 3 pole black Rast 5	716 220
4.14	Plug No. 2 3 pole grey Rast 5	716 221
4.15	Plug No. 3 2 pole turquoise Rast 5	716 222
4.16	Plug No. 4 2 pole red Rast 5	716 223
4.17	Plug No. 5 3 pole violet Rast 5	716 224
4.18	Plug No. 6 2 pole brown Rast 5	716 225
4.19	Plug No. 7 2 pole blue Rast 5	716 226
4.20	Plug No. 8 2 pole white Rast 5	716 236
4.21	Plug No. 9 2 pole green Rast 5	716 228
4.22	Plug No.10 2 pole yellow Rast 5	716 229

Pos.	Description	Order No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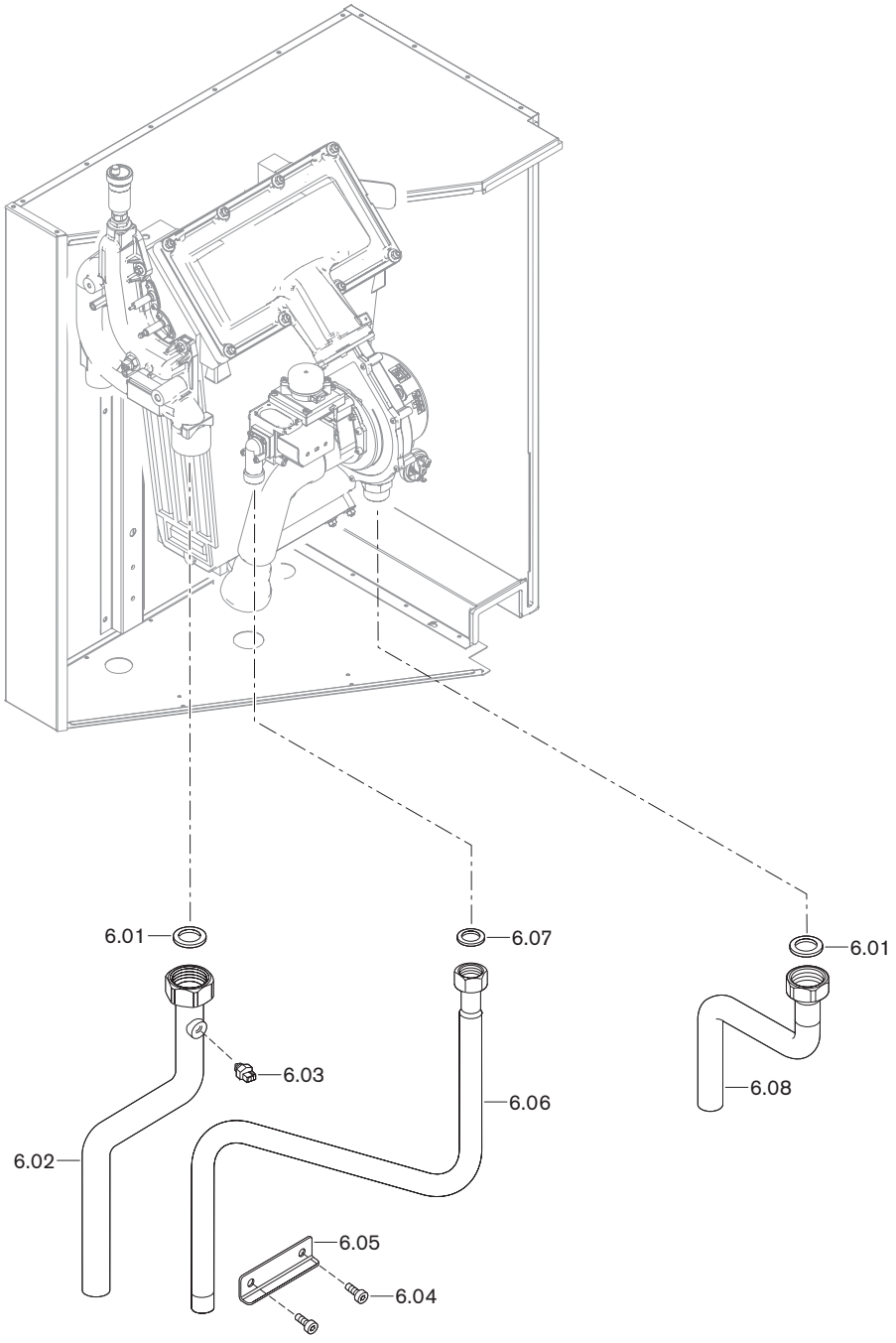
Pos.	Description	Order No
5.01	Gasket 25 x 38 x 2 (11/4)	481 401 40 05 7
5.02	Conn. pipe flow with sensor conn. WTC 45-A WTC 60-A	 481 401 40 02 2 481 601 40 02 2
5.03	NTC sensor G1/8	481 113 40 10 7
5.04	Screw M 5 X 8 DIN 912	402 223
5.05	Gas pipe fixing plate	481 401 02 13 7
5.06	Gas pipe with union nut G3/4 WTC 45-A WTC 60-A	 481 401 30 41 2 481 601 30 41 2
5.07	Gasket 17 X 24 X 2 DIN 2690	441 076
5.08	Fixing bracket RL WTC 45/60-A vers. H	481 401 40 07 7
5.09	Gasket 20 x 29 x 2 (1)	481 401 40 04 7
5.10	Conn. pipe return- pump H	481 401 40 03 2
5.11	Fixing plate ret. pipe to pump WTC 45/60-A	481 401 40 12 7
5.12	Screw M 4 X 10 DIN 912	402 150
5.13	Circulation pump WTC 45/60-A with gasket	481 401 40 10 2
5.14	Conn. pipe flow pump-distributor WTC 45-A WTC 60-A	 481 401 40 04 2 481 601 40 04 2

Pos.	Description	Order No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Pos.	Description	Order No
6.01	Gasket 25 x 38 x 2 (11/4)	481 401 40 05 7
6.02	Conn. pipe flow with sensor connection	
	WTC 45-A	481 401 40 02 2
	WTC 60-A	481 601 40 02 2
6.03	NTC sensor G1/8	481 113 40 10 7
6.04	Screw M 5 X 8 DIN 912	402 223
6.05	Gas pipe fixing plate	481 401 02 13 7
6.06	Gas pipe with union nut	
	G3/4 WTC 45-A	481 401 30 41 2
	G3/4 WTC 60-A	481 601 30 41 2
6.07	Gasket 17 X 24 X 2 DIN 2690	441 076
6.08	Connection pipe return	
	WTC 45-A vers. H-O	481 401 40 05 2
	WTC 60-A vers. H-O	481 601 40 05 2

Pos.	Description	Order No

–weishaupt–

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www.weishaupt.de

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Product		Description	Performance
	**W-Burners**	The compact series, proven millions of times over: Economical, reliable, fully automatic. Gas, oil and dual fuel burners for domestic and commercial applications. The purflam burner gives almost soot-free combustion of oil with greatly reduced NO_x emissions.	Up to 570 kW
	**Monarch and industrial burners**	The legendary industrial burner: Tried and tested, long lived, clear construction. Gas, oil and dual fuel burners for district heat provision.	Up to 10,900 kW
	**multiflam® burners**	Innovative Weishaupt technology for large burners: Minimal emission values particularly at ratings over one megawatt. Oil, gas and dual fuel burners with patented fuel distribution system.	Up to 12,000 kW
	**WK industrial burners**	Modular powerhouses: Adaptable, robust, powerful. Oil, gas and dual fuel burners for industrial plant.	Up to 18,000 kW
	**Thermo Unit**	The Thermo Unit heating systems from cast iron or steel: Modern, economic, reliable. For environmentally friendly heating. Fuel: Gas or oil as desired.	Up to 55 kW
	**Thermo Condens**	The innovative condensing boilers with the SCOT system: Efficient, low in emissions, versatile. Ideal for domestic heating. Floor standing gas condensing boiler with ratings of up to 1200 kW(cascade), for higher heat demands.	Up to 1,200 kW
	**Heat pumps**	The heat pump programme offers solutions for utilisation of heat from air, soil and ground water. The systems are suitable for refurbishment or new builds.	Up to 130 kW
	**Solar systems**	Free energy from the sun: Perfectly coordinated components, innovative, proven. Pleasantly shaped flat roof collectors to support heating and of domestic water	
	**Water heater / energy reservoir**	The attractive domestic water heating range includes classic water heaters which are supplied through a heating system and energy reservoirs which can be fed through solar systems.	
	**Control technology / building management**	From control panels to complete building management systems – at Weishaupt you can find the entire spectrum of modern control technology. Future oriented, economical and flexible.	