IMASS GmbH
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Germany

SERVICE MANUAL

Model
IWH-1.5
and
IWH-1.5-13.5
(Australian Version)

Instantaneous Water heater

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Specifications IWH-1.5 (10 kW)

Gas pressure propane (mbar)	27.5
Nominal max. input in kW (propane)	10.7
Maximum consumption (g/h)	765
Minimum input in kW	3.3
Efficiency (%)	>90
Maximum water pressure (bar)	5.0
Minimum water pressure (bar)	0.5
Minimum starting water flow (l/min)	1.5
Shut down water flow (l/min)	1.3
Selectable water temperature (°C)	35 ….. 60
Temperature rise at 3.3 l/min (°C)	37.7
Precondition for a stable min. temperature of 35°C	water inlet temp. 15°C at 2.7l/min
Power supply voltage VDC	10.5 ….. 15.0
Maximum current consumption (A)	0.44

Gas Consumption & Configuration Data

	Supply Pressure (kPa)	Test Point Pressure (kPa)	Injector Nozzle Main (mm)	NGC
Universal LPG	2.75 kPa	2.3 kPa	4 x Ø0.87	38.5 MJ/h

Specifications IWH-1.5-13.5 (13.5 kW)

Gas pressure propane (mbar)	27.5
Nominal max. input in kW (propane)	13.65
Maximum consumption (g/h)	
Minimum input in kW	5.0
Efficiency (%)	>90
Maximum water pressure (bar)	5.0
Minimum water pressure (bar)	0.5
Minimum starting water flow (l/min)	1.5
Shut down water flow (l/min)	1.3
Selectable water temperature (°C)	35 ….. 60
Temperature rise at 5 l/min (°C)	37.0
Precondition for a stable min. temperature of 35°C	water inlet temp. 15°C at 2.7l/min
Power supply voltage VDC	10.5 ….. 15.0
Maximum current consumption (A)	1.5

Gas Consumption & Configuration Data

	Supply Pressure	Test Point	Injector Nozzle	NGC
Universal LPG		**Pressure (kPa)**	**4 x Ø 1.06 mm**	**49.14 MJ/h**

Description

The 2 water heaters are designed without storage tank and use a finned copper, highly efficient, heat exchanger.

The four-blade burner is controlled by a unique patented modulation valve, which has a very low electrical consumption.

The maximum modulation rate is 1:4.

For a very high operational reliability and high thermal efficiency, even under extreme weather conditions, the water heater is equipped with an exhaust blower and a highly efficient brushless DC motor. Ball bearings and no carbon brushes guarantee a quite operation and a very long lifetime.

The water flow rate is detected by a precise flow rate meter with high resolution.

The hot water temperature can be selected in 1°C steps from 35 to 60°C.

The µ-processor of the electronic control is continuously comparing the cold-water temperature, the hot water outlet temperature and the current water flow rate.

With the combination of these 3 data, the control drives the modulation valve and tries to reach the selected temperature in the shortest possible time without overheating.

Also with using these 3 values, the control is continuously calculating the burner power and is limiting the power with the modulation valve to 10.7 kW (13.65 kW), even if the gas pressure in the RV is through a defect of the pressure regulator up to 60 mbar.

The airflow is detected by a differential air pressure switch in the exhaust blower.

Every value, which is out of the programmed limits, will cause immediately an interruption of the gas flow, or the unit will even not start without correct data.

At the upper end of the heat exchanger, a safety temperature switch will switch of the device in case of overheating, caused may be through a defect sensor.

The flame detection is using the ionization principle.

In case of a high water pressure from the water line, the IWH-1.5 is protected via an overpressure valve with 5.5 bar.

The electronic control is equipped with an unique failure diagnostic software and a special service mode.

With the remote control, the water heater can be switched off completely or it remains in standby mode. In this mode, the display is switched off after one minute in order to save energy and to have no disturbing illumination during night time.

Also selectable on the remote control is the max. outlet temperature of the hot water.

Also on the display is shown a possible error code in case of a failure. With the input of a code, the service technician can recall data in the service mode.

The IWH-1.5-13.5 version is equipped with an additional DC-DC converter, which increases the DC input range and makes it even more stable for critical weather condition like strong wind.

Recommended Test Equipment

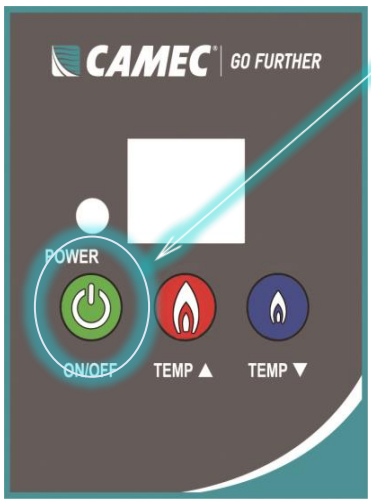
1. Multimeter for voltage and current (DC)

2. Gas pressure meter digital (recommended) or analog

3. Water flow meter

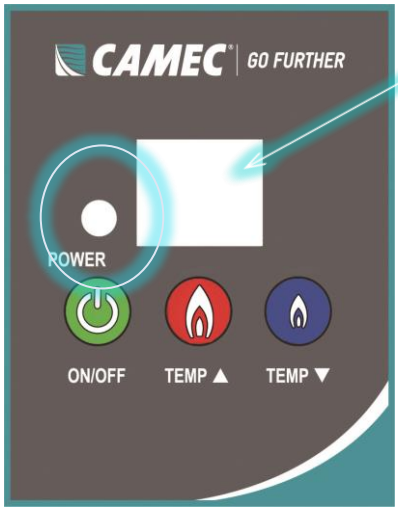
4. Thermometer with external sensor up to 150°C
5. Optional a rev meter and a combustion analyzer

Remote Control



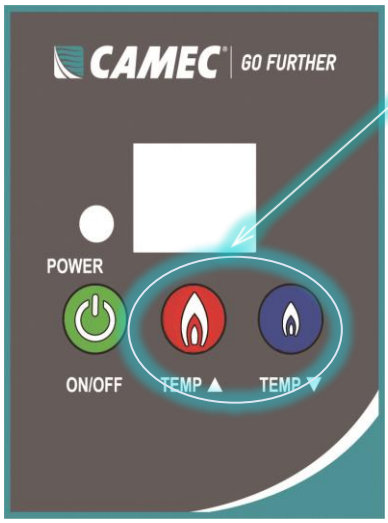
Selectable functions:

1. ON/OFF switch
2. Gas pressure mode
3. Parameters of water heater



Functions:

Operation indicator – green LED



Functions:

1. Temperature setting
2. Adjustment gas pressure mode
3. Selection of inner parameters

Temperature Setting Range

Preset temperature: last selected temperature (also after disconnecting 12V power)

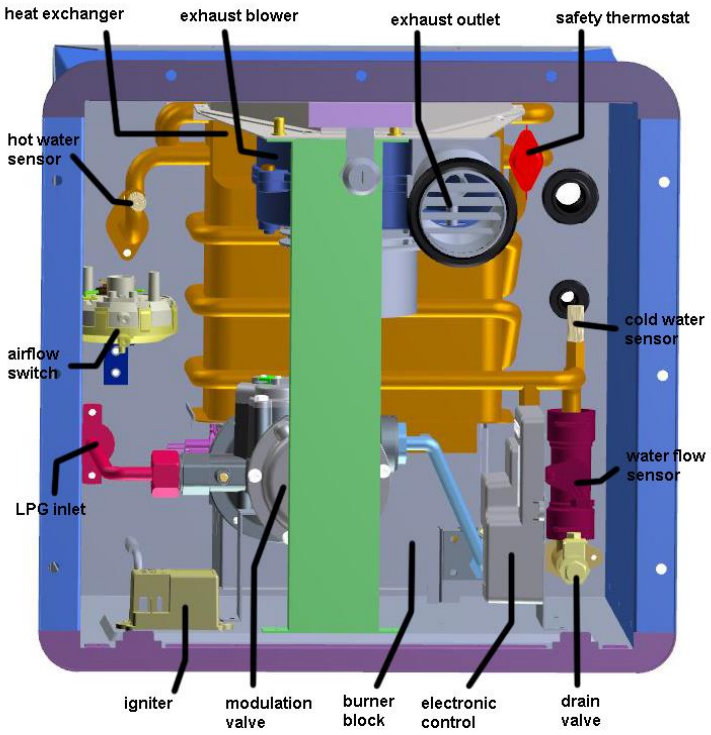
Temperature range: 35° …… 65°C

from 35 … 50°C: 1°C per keystroke

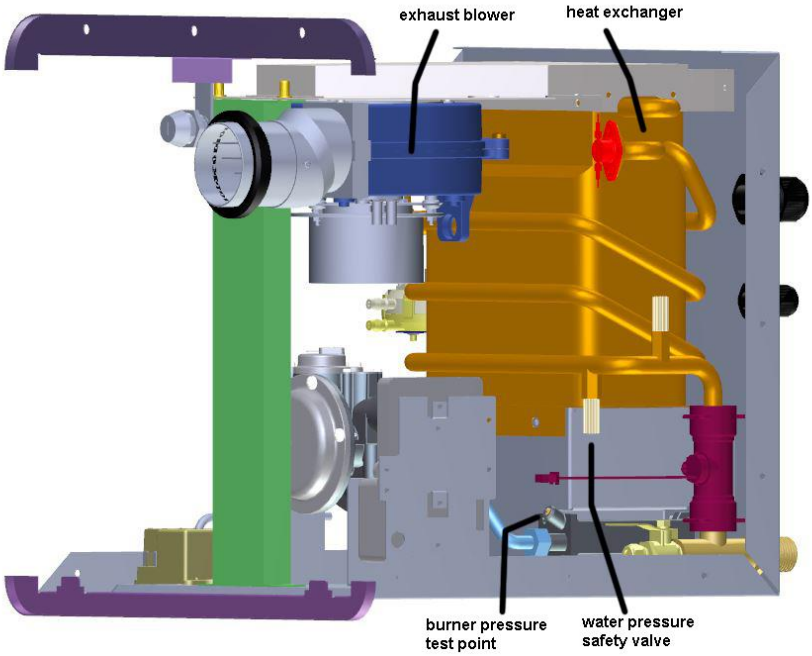
from 50 … 65°C: 5°C per keystroke

Position of components

front view



right side



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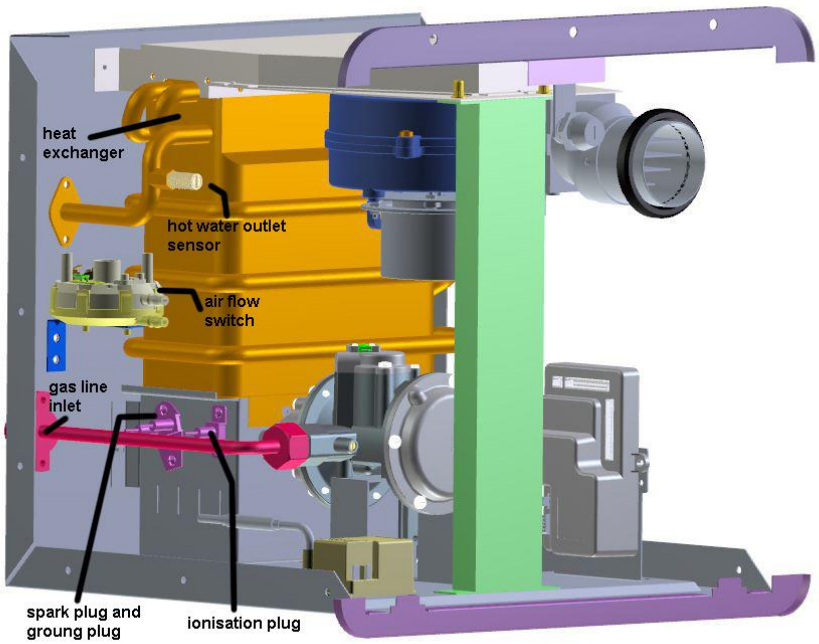
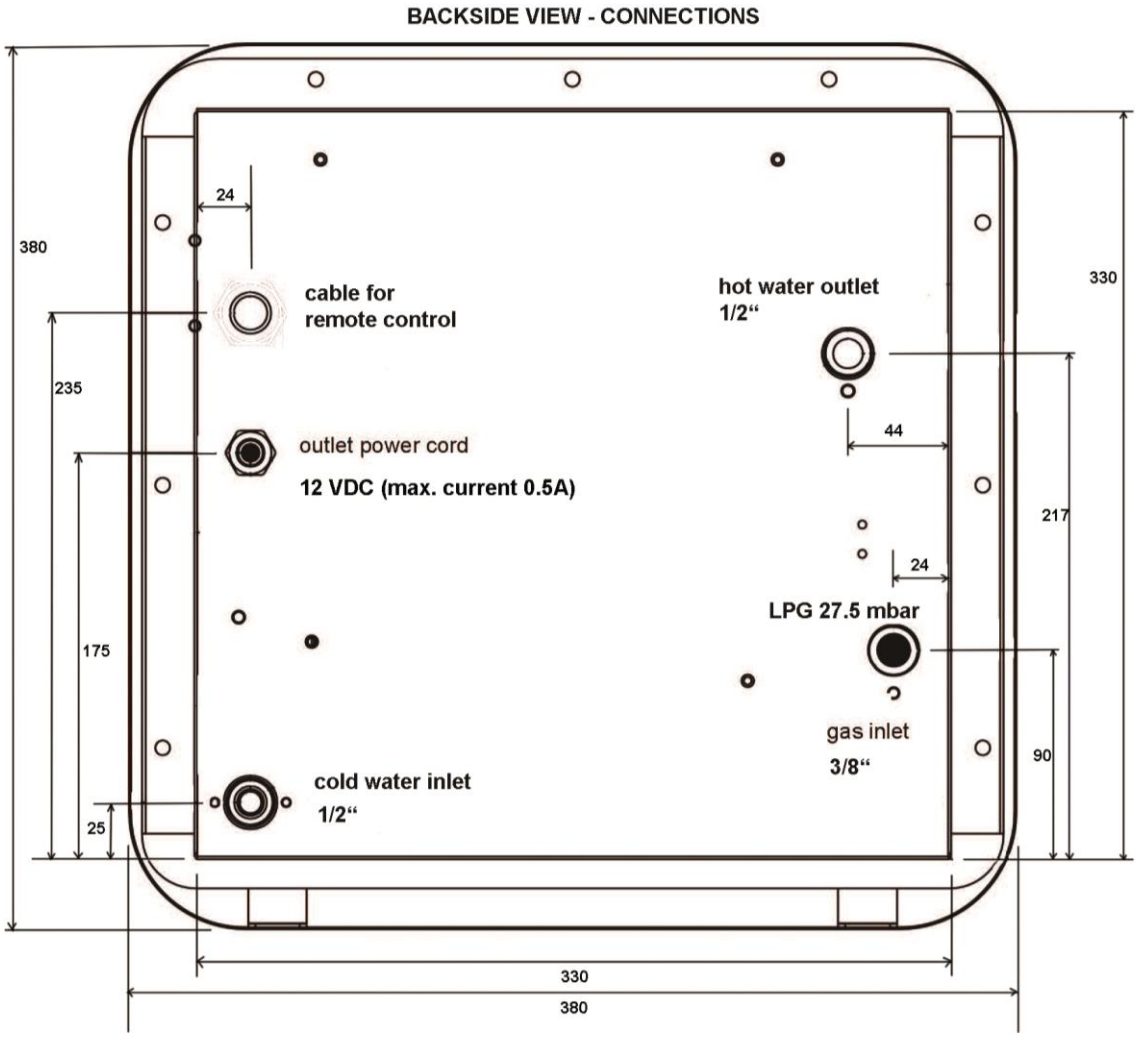
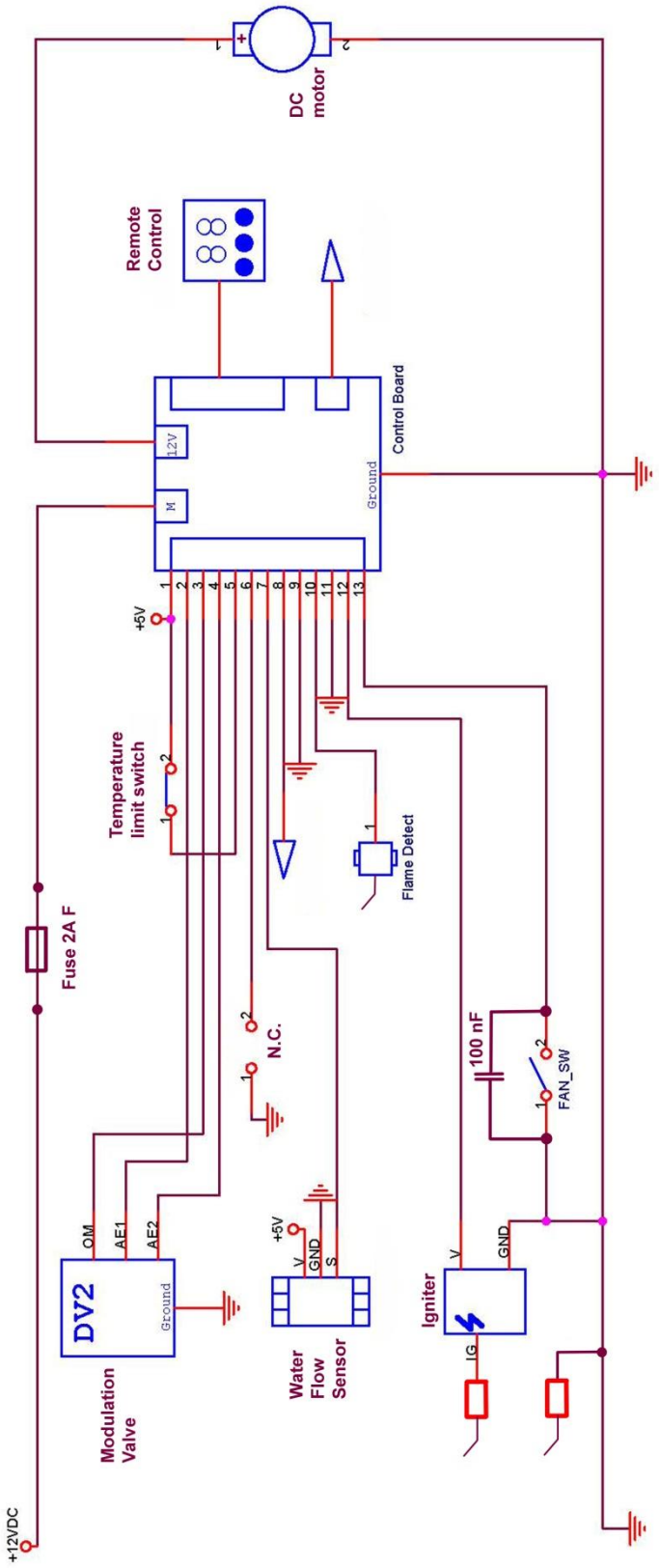


rear view

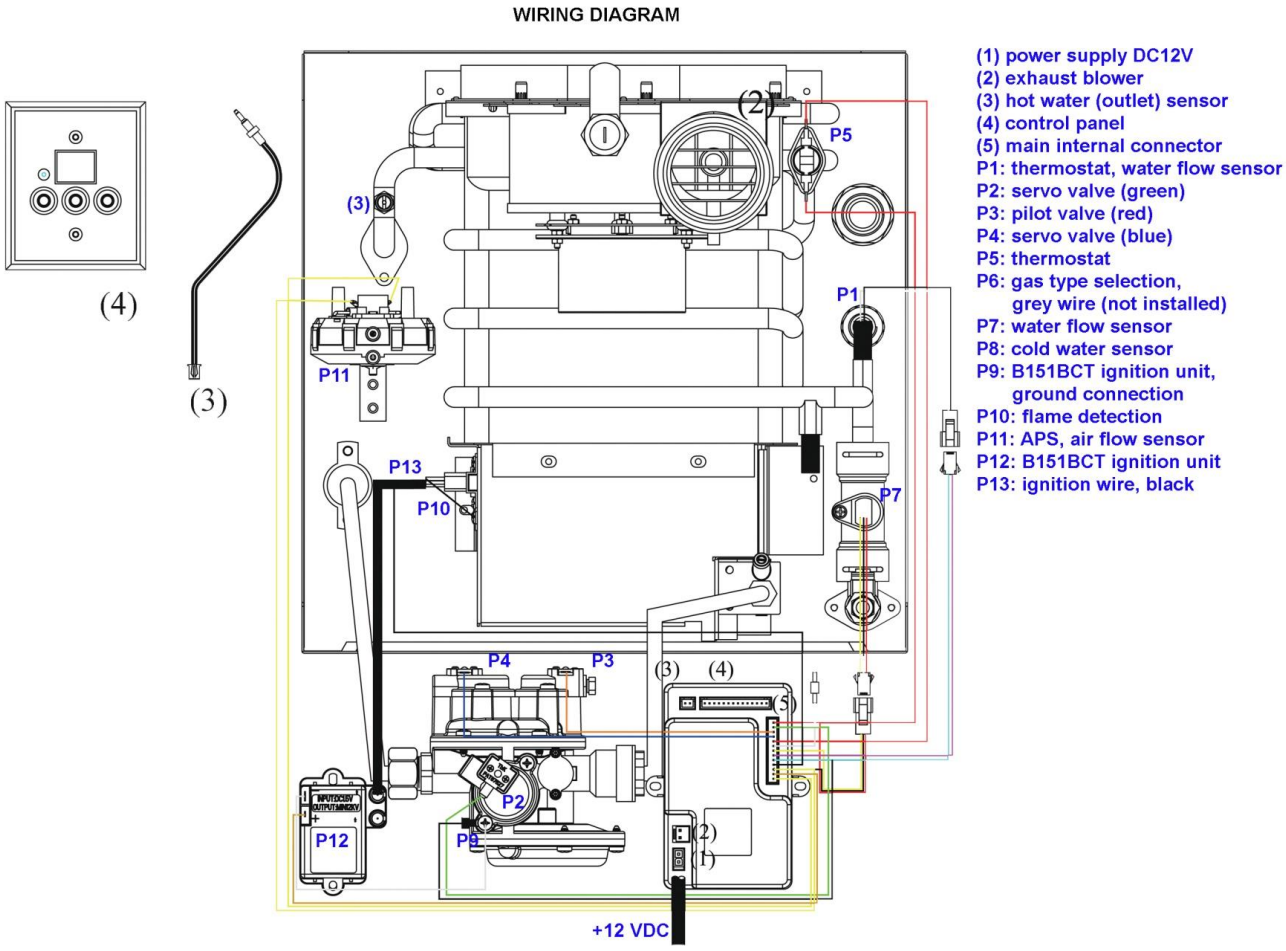


Schematics and Diagrams

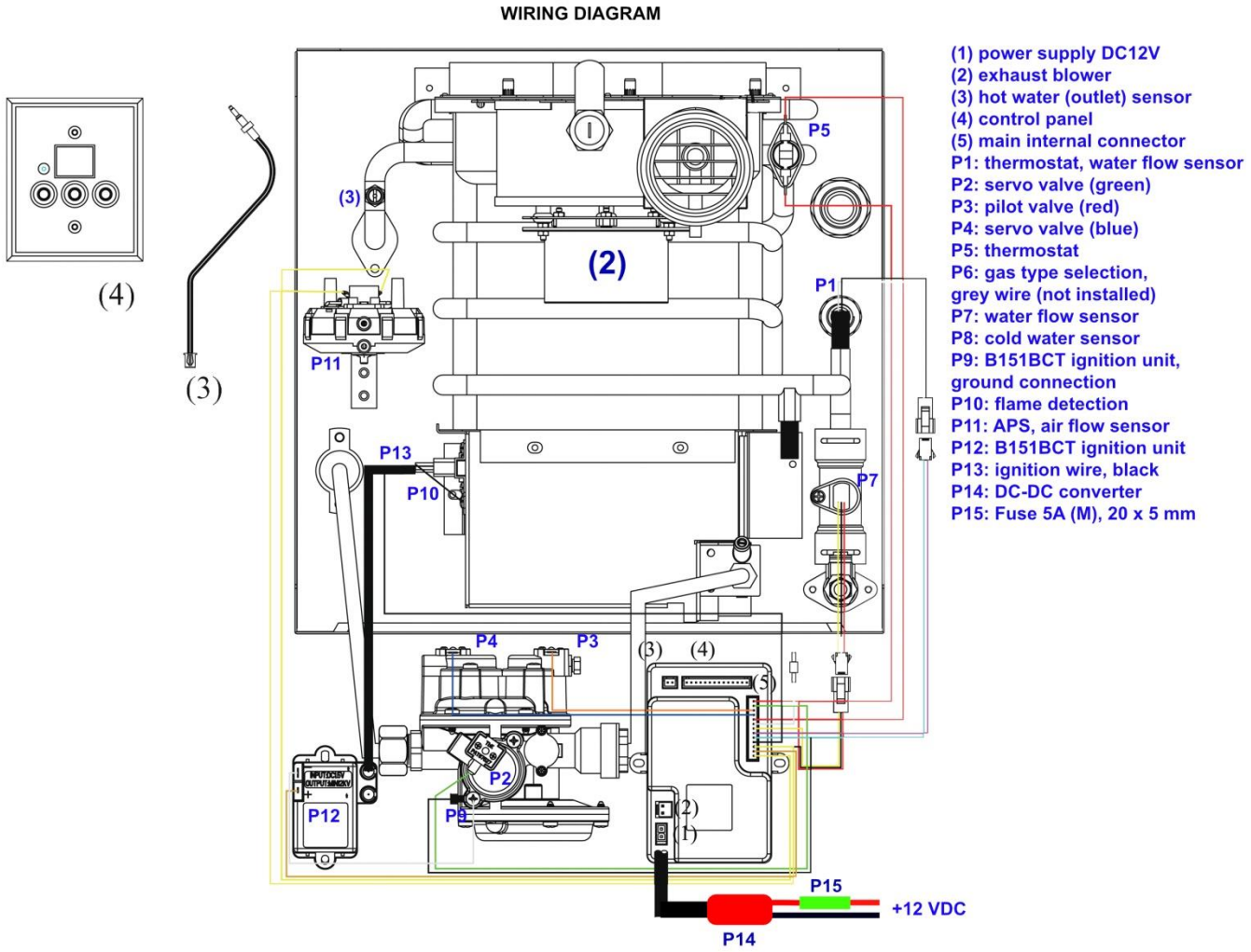
Ladder Diagram - IWH-1.5



Wiring Diagram IWH-1.5



Wiring diagram IWH-1.5-13.5



Trouble Shooting Guide

Notice:

Before starting the trouble-shooting steps suggested below verify that:

- There is power connected to the water heater
- Green ON LED is lighting
- Wiring is not damaged in any way
- All connectors are plugged in
- Water flowing through the unit when you open a hot water faucet
- LPG gas is connected and the gas tank (bottle) is not empty
- exhaust outlet is not blocked through dirt or anything else

First steps

1. No light at the remote control – burner doesn't start
   Check the 12 V of the power supply.
   Check the fuse (2 AT) in the power cord, which is inside the heater close to the control.

2. Green LED of the remote control is burning – burner doesn't start
   Check the water flow.
   If the water flow is low, look also for dirt in the inlet filter of the cold water inlet
   If there is enough water:
   A) Demount the water flow sensor and/or check the sensor cable
   B) Replace the control

3. Water is flowing, you hear the igniter, no flame
   A) Check the gas pressure at the gas inlet
   B) Try to ignite at least 5 times – maybe there is air in the gas line because of a change of the gas bottle
   C) Measure the gas pressure at the pressure test point of the nozzle block
   It should be for start between 15 and 23 mBar

Error Codes (display) and Troubleshooting

Error Code	Trouble	Corrective actions (parts to be checked)
E1	Failed to ignite within 10 seconds.	**Gas supply system**: source of supply **Electrical power supply** : source of supply, power cord / cable, safety fuse **Ignition system** : igniter **Control System :** ionization cable
E2	Continuously operating for 60 minutes	**In normal condition** : overtime operation
E4	Detected signal while turning on the water	**Control system :** control unit
E5	Defect hot water sensor, but water heater still operating	**Detection system** : hot water temperature sensor
E6	Hot water sensor short-circuited or the hot water temperature has reached 85 ℃.	**Detection system** : hot water temperature sensor Through pulsing water supply at low flow rate (membrane pumps), the burner could switch continuously switch and and off, without starting the temperature regulation

E7	Continuously flame out for 15 times	**Gas supply system** : source of supply
E8	Safety (temperature) switch defect	**Detection system** : safety temperature switch
E9	Ventilator, air pressure switch (APS), air flow blocked or operating voltage too low failure	-check the supply voltage - Is the ventilator running smooth, or do you hear any scratching noise ? **- c**heck for dirt or water in the flow sensor (exhaust pipe) and in the 2 transparent wires to the pressure switch
EA	Cold water sensor defect	**Detection system** : cold water temperature sensor
EB	CPU or circuit broken	**Control system: control unit**
EE	Arithmetic-logic calculation abnormal	**Control system: control unit**
ON	ON/OFF Switch	

If all steps above doesn't solve the problem, you should check first all the wiring and plugs.

Especially the plugs in the ECU must be plugged in properly.

As final and last step you could change the ECU. But if see a correct display and you can make a reset, a defect ECU is very unlikely.

NOTE: For a RESET, you must disconnect the el. power for at least 2 min.

<u>Typical failures – mostly caused through operating errors</u>

Failure E9: This is the air pressure switch (APS) and therefore the airflow

Possible reasons:

1. exhaust pipe blocked with dirt or something similar
2. the 2 small silicone tubes from the air flow sensor to the air pressure switch (APS) have a problem (or reversed)
3. air inlet blocked
4. supply voltage too low (measure and increase to 12-13 VDC)
5. blower motor doesn’t work, or blower wheel is loose
6. APS defect or the electrical connection (2 wires)
7. Fuse (2A slow) in the DC power line (ground wire) blown

Failure E6: Defect temperature sensor or overheating

E6 is for shorted hot water sensor or hot water over 85°.

Please check, if the display shows the current outlet water temperature and the temperature rises to 85°C.

Possible reasons:

85° can be normally only be reached, if somebody is “playing” with a real low water flow (up and down) or the water flow is “pulsing”. So best would be to use a higher water flow (<5l/min) to see, if it is caused through overheating (in normal operation not happening).

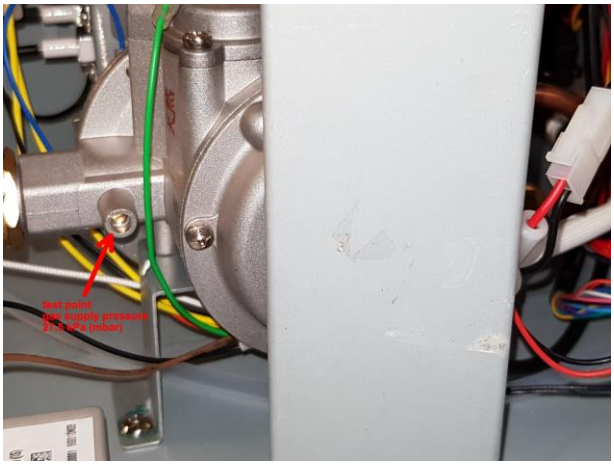
If this doesn’t happen, check with a multimeter, if the sensor is short-circuited (sensor plugged off)

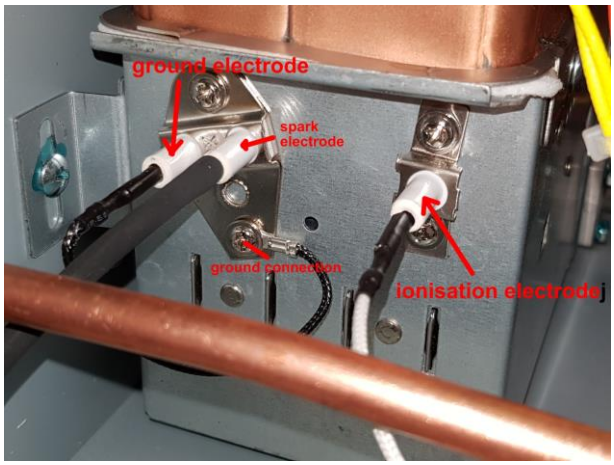
Failure E7: Problem with flame detection

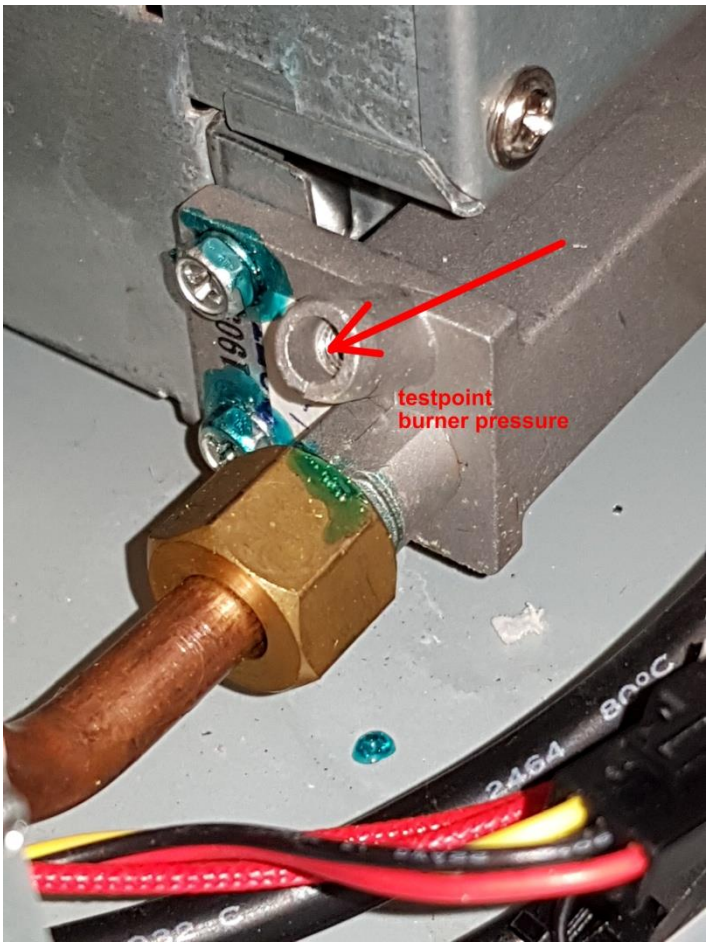
The control detects an inconstant ionisation signal for 15 times during one operation period.

Possible reasons:

1. gas pressure and gas type. Low supply gas pressure can cause the error
2. check ground wire (at the burner) if connected correctly.
3. ionization electrode and wire harness - loose connection, etc. can cause the failure
4. check the gas input pressure and the burner pressure under high water flow condition.
   Input should be at 27 kPa, at the nozzle block of the burner should be around 23 kPa.
5. check gas inlet filter for dirt






testpoint
burner pressure

Hidden function mode (service mode)

To enter laboratory / maintenance mode

1. Power on, water heater standby.
2. Adjust the temperature to 47°C
3. Press and hold “ON/OFF KEY” (green) for > 3 sec.
4. Adjust the temperature to 39°C
5. Press and hold “ON/OFF KEY” (green) for > 3 sec - the unit is now in maintenance / lab. mode.

Between each step a delay (without pressing button) for > 5 sec. is not allowed, otherwise you must start over again from step 1.

With every push on the green button, you move one code position forwards (backwards not possible). The not described codes are only for production. Just go ahead by pressing the green button.

With each keystroke, in the display appears first the code number and afterwards the measured value.

To stop the service mode, remove for 2 min the 12V supply.

Code	Description	Unit
0	Actual outlet / hot water temperature	℃
1	Actual water flow **(remark 5)**	l/min
2	Actual inlet (cold water) temperature	℃
3	None	℃
4	None	
5	Actual outlet / hot water temperature (decimal) **(remark 6)**	℃
6		
7		
8		
9		
A		
b		
C		
d		
E		

Remark 5 Seven segment display; ex. 53 stands for 5.3L, 86 stands for 8.6L.

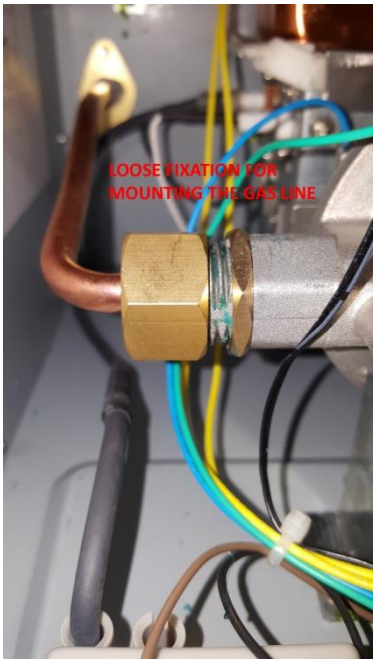
Remark 6 Seven segment display; ex. if you see 45 and flashing 2, it stands for 45.2℃.

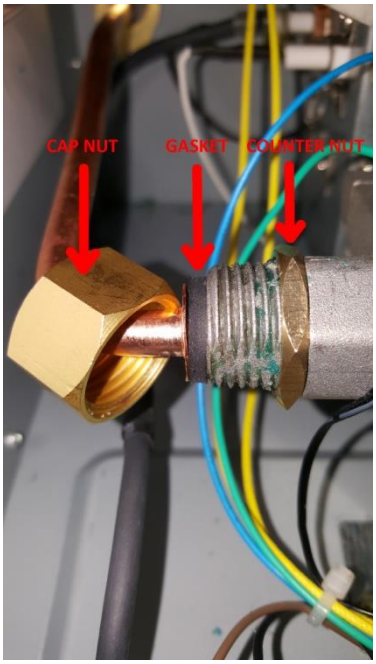
Remark 7 Hexadecimal, seven segment display; ex. 16 stands for 22℃, 1A stands for 26℃.

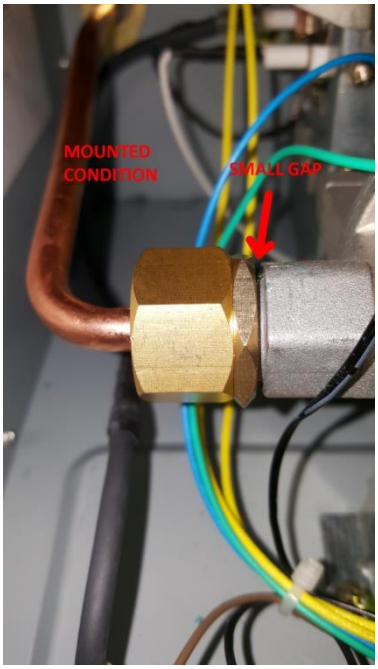
Remark 8 Seven segment display; ex. A4 stands for 10.4L, B4 stands for 11.4L.

Special mounting hints

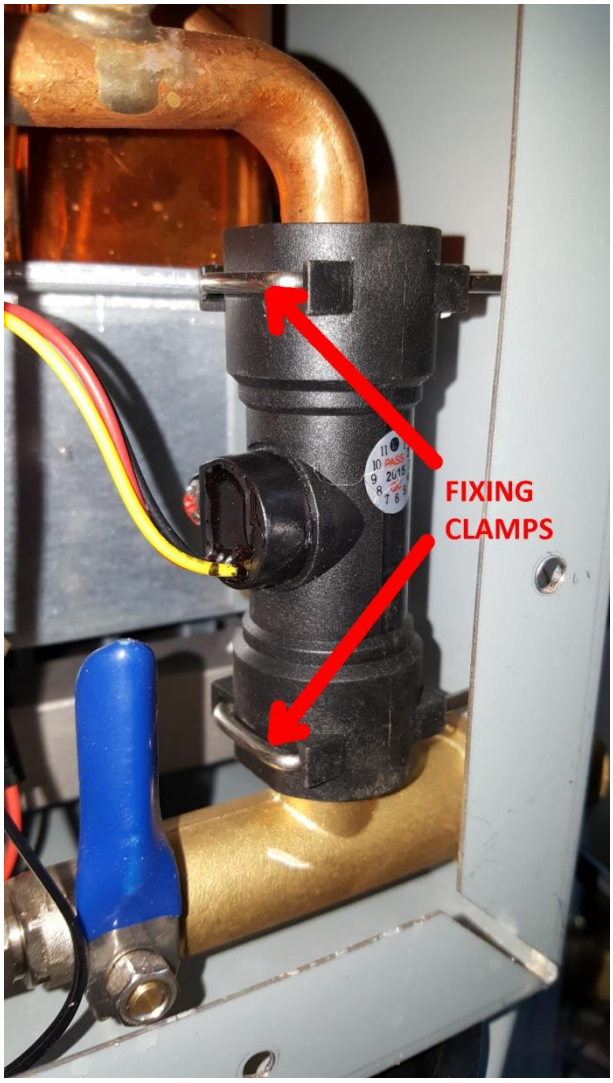
1. Gas connection line
   The gas connection line is fixed inside the housing to the gas valve with a cap nut and a counter nut.
   For the installation insert the outer connection (from inside) through the hole at the backside of the outer housing.
   Connect the cap nut quite loose to the gas valve – just a smart fixation for mounting.
   Now place the 2 screws for fixing the flange to the backside of the housing.
   Remove the cap nut again and place between the thread of the valve and the flange of the copper line the gasket. Be sure, that all components are aligned. Maybe you have to bend the copper pipe a little.
   Fix the cap nut with “sensibility” (around 10 Nm).
   Hold now the cap nut with an open-end wrench in position, and fix the counter cap counterclockwise to the cap nut.
   For additional safety, you can use in a addition a screw locking glue.
   After fixing test the connection for leaks with soap water or leak detector spray.

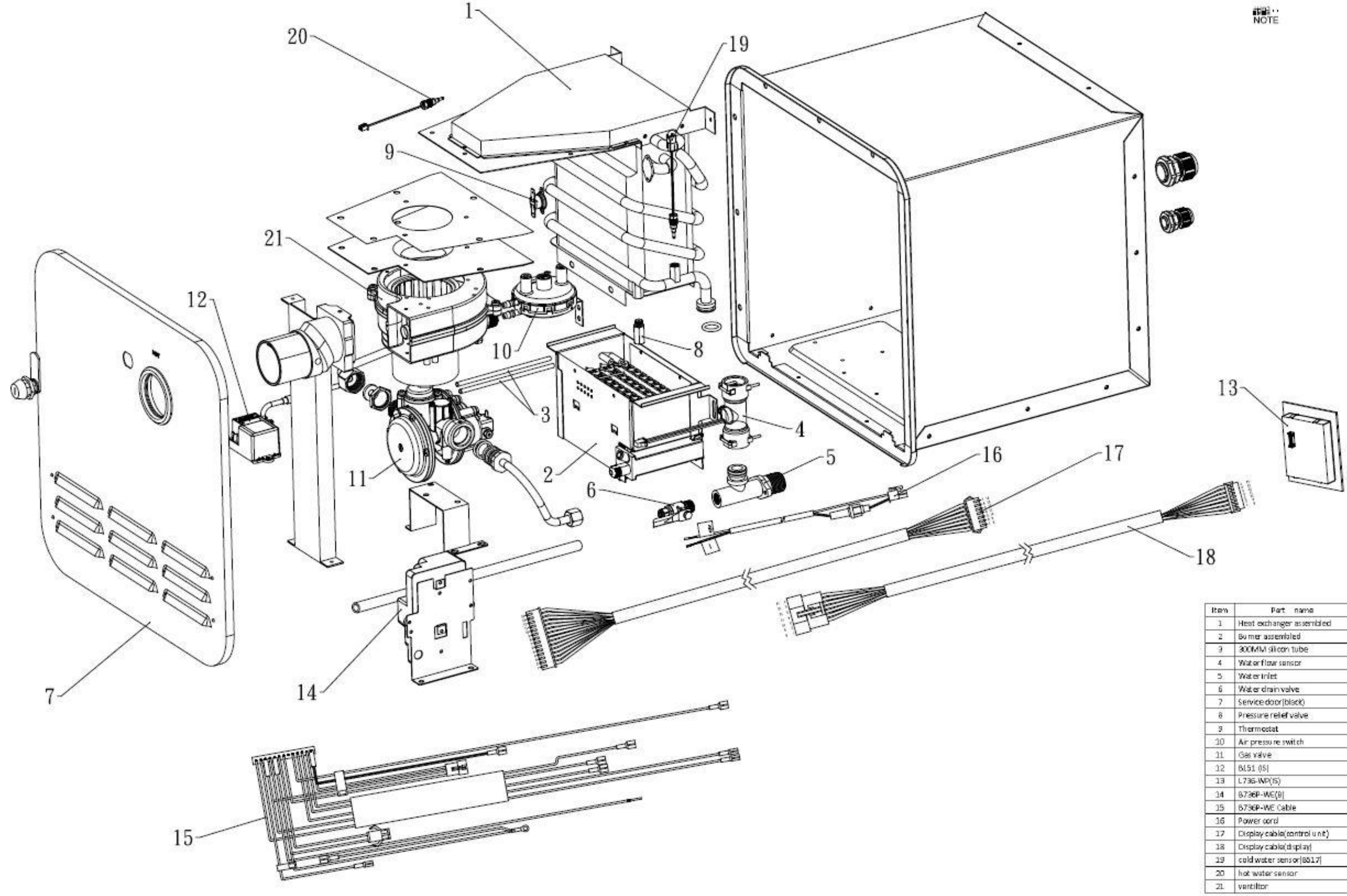






2. Water flow sensor
   For removing the sensor, just pull the 2 clamps, which are shown on the photo below.
   For mounting again, be sure, that the pipes are completely inserted in the sensor, before fixing the clamps.





Item	Part name	Part no
1	Heat exchanger assembled	5PL0064000000
2	Bu mer assembled	5PL0065000000
3	300MM silicon tube	6R8000100001
4	Water flow sensor	5PTD24400014
5	Water inlet	5NC0027000001
6	Water drain valve	5NC0020000001
7	Service door(black)	5PL0060000000
8	Pressure relief valve	5NC0024000001
9	Thermostat	5SW002600000
10	Air pressure switch	6SW0059YP009
11	Gas valve	6DP0158XT001
12	B151 (IS)	6GC011DN009
13	L736-WP(IS)	6FP016900000
14	B736P-WE(B)	6IG0346EQ000
15	B736P-WE Cable	5CT063300000
16	Power cord	5CB082100000
17	Display cable(control unit)	5CT082000000
18	Display cable(display)	5CT082100000
19	cold water sensor(B517)	5RE000200000
20	hot water sensor	5RE001400000
21	ventiltor	6TB005300000

Who to Contact

For service and spares, please contact your selling agent:

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