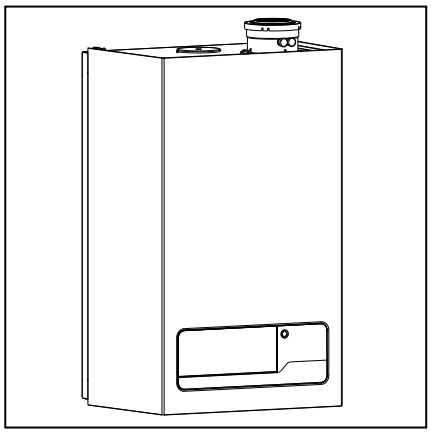
THISION L ECO



(GB) Operating Manual
authorized technicians only

(F) Notice d'exploitation
pour le personnel autorisé

(PL) Instrukcja obsługi
tylko dla upoważnionych serwisantów

(RU) Руководство по эксплуатации
только для авторизованного технического специалиста

(TR) Kullanım Kılavuzu
yalnızca yetkili teknisyenler için

(HU) Kezelői kézikönyv
csak szakképzett szervizpartnereink számára

(RO) Manual de operare
doar pentru tehnicieni autorizaţi

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Version:
from sv 4.2
02-2016

Safety regulations

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General regulations
This document contains important information with regard to safety and reliability of the installation, its commissioning and the operation of the THISION L ECO boiler. All described activities must be carried out exclusively by authorized technicians.

Only OEM parts of the boiler manufacturer may be used; in contrary cases, our warranty and guarantee provisions are excluded.

Intended use
The THISION L ECO is a condensing and modulating gas boiler, which is suspended from walls and is delivered with a pre-mix burner. The maximum target temperature of the boiler is 85°C.

Standards and regulations
All applicable standards (both European and national) must be observed during the installation and operation of the THISION L ECO boiler, including:
- Local building regulations, with regard to the installation of heating facilities and waste gas exhaust systems;
- Regulations about a connection to the electrical utility network (mains);
- Regulations of the local gas utility;
- Standards and regulations concerning safety facilities for heating systems;
- Additional local laws/regulations, which are applicable to the installation and operation of heating systems.
- See the chapter “Commissioning”, for those regulations applicable to heating water and warm water quality.

The THISION L ECO boiler is CE-certified and conforms to the following European directives and standards:
- 92 / 42 / EEC (Efficiency of hot water heating systems)
- 2009 / 142 / EEC (Gas consuming facilities)
- 2006 / 95 / EEC (Safety of electrical operating resources)
- 2004 / 108 / EEC (EMC compatibility)
- EN 15420 (Requirements for gas-fired systems – type C boiler 70 kW – 1000 kW)
- EN 15417 (Special requirements for condensing gas-fired boilers 70 kW – 1000 kW)
- EN 50165
  Electrical equipment for non-electric appliances, intended for household use and similar purposes - safety requirements
- EN 15502-1 (Requirements for gas-fired systems – Part 1: General requirements and tests)
- EN 55014-1 (2000) EMC – Requirements for household appliances, electrical tools and similar equipment – Part 1: Emissions
- EN 55014-2 (1997) EMC – Requirements for household appliances, electrical tools and similar equipment – Part 2: Safety - product family standard
- EN 61000-3-2 (2000) Electromagnetic compatibility (EMC) - Part 3-2: Framework conditions - framework conditions for current fluctuations (current drain 16 A per phase)
- EN 61000-3-3 (2001) Electromagnetic compatibility (EMC) - Part 3-3: Framework conditions for voltage fluctuations, voltage loss and flicker in public low-voltage networks, for equipment with a nominal 16 A current per phase, which are not subject to any special connection regulations.
- EN 60335-1 (2002) Household and similar electrical equipment - Safety - Part 1: General requirements
- EN 60335-2-102 (2006) Household and similar electrical equipment - Safety - Part 1: Special requirements for gas, oil and solid fuel-fired equipment with electrical connections

It is necessary that the currently valid local normatives will be observed.

UK:
- Gas Safety Installation & Use Regulations
- BS 5440-1:2008
- BS 5440-2:2009
- BS 6798:2014

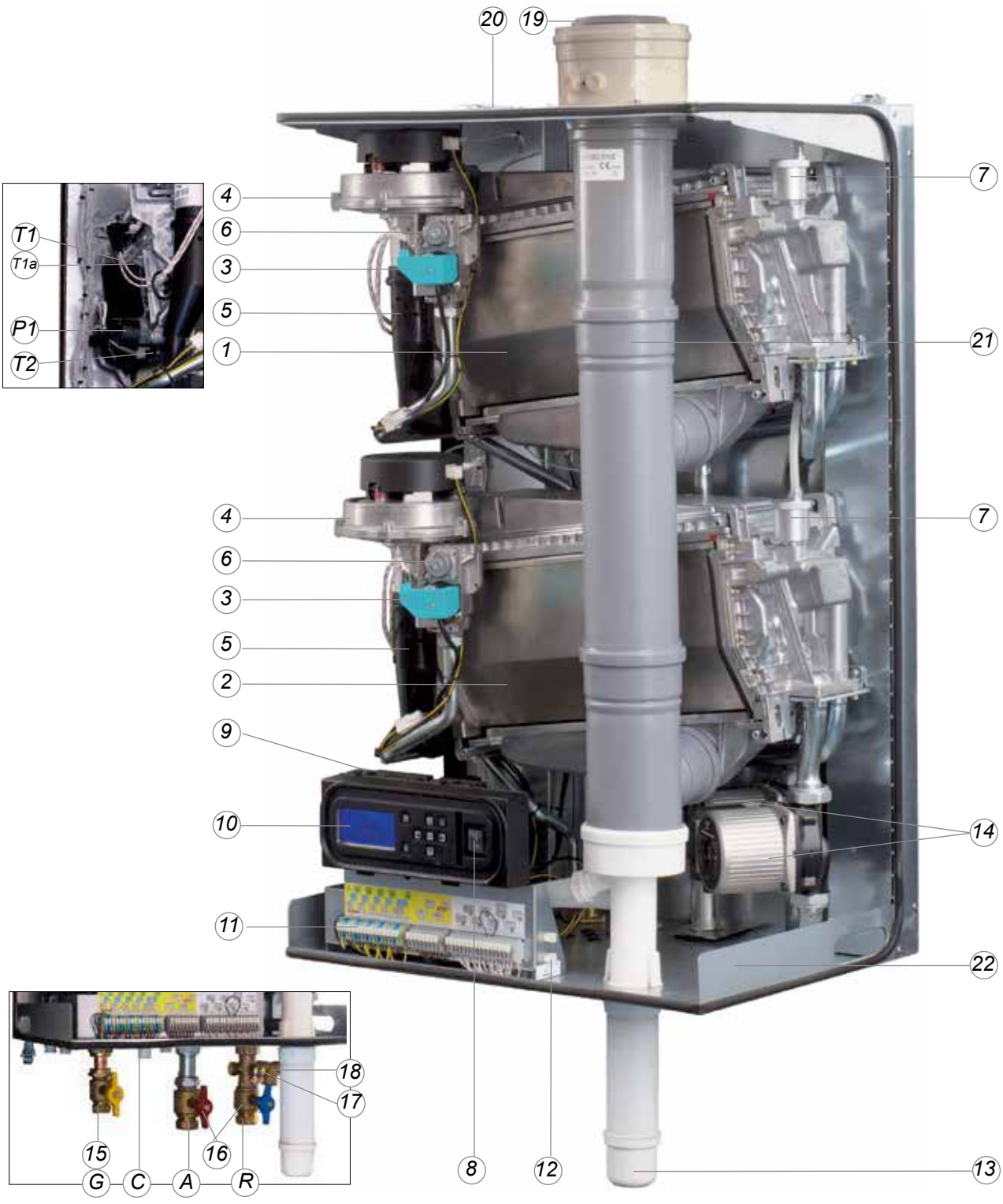
This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

Children shall not play with the appliance.

Cleaning and user maintenance shall not be made by children without supervision.

If changes are made to the boiler construction the boiler no longer complies with the CE requirements.

THISION L ECO



THISION L ECO

Legend:

1 heat exchanger 1 (All types OSS4)
2 heat exchanger 2 (THISION L ECO100: OSS2, THISION L ECO120: OSS4)
3 ignition unit
4 fan unit
5 silencer
6 gas valve
7 automatic air vent
8 main switch 230V
9 boiler control unit
10 control unit MMI
11 connection terminal
12 connection terminal cascade bus communication
13 siphon
14 circulation pump
15 gas isolation valve (in optional boiler connections set)
16 service valves flow/return (in optional boiler connections set)
17 fill and drain valve (in optional boiler connections set)
18 safety valve (in optional boiler connections set)
19 flue connection (concentric)
20 air supply (for parallel flue connection)
21 collective flue pipe
22 information plate
T1 flow sensor
T1a secondary flow sensor (only OSS4)
T2 return sensor
P1 water pressure sensor
G gas pipe
A flow pipe CH
R return pipe CH
C condensate drain pipe

Product description

The THISION L ECO is a condensing and modulating gas boiler with one or two pre-mix burners, which is attached to a wall. It is characterized by the following features:

- A large modulation range that guarantees a long burner service life, while minimizing standby losses, start-up emissions and material wear-and-tear.
- Flue gas temperature below 80°C
- Flue gas temperature fuse
- Also suitable for room sealed conditions
- Control panel with all operational elements
- Microprocessor, with multi-functional display
- Automated ignition, with repetition and ionization monitoring
- Water pressure monitoring
- Energy-saving pump
- Stainless steel heat exchanger with smooth tube condenser
- Very maintenance-friendly
- Ready for weather-compensated control (accessory)
- Cascadecontroller up to 8 boilers
- External controls (accessory) by on/off, OpenTherm or 0-10V
- Modern metal panelling, stove-enamelled

Functional description

The control unit modifies the heating performance to the current heating requirements, by changing the default values of the fan rotating speed. In this regard, the boiler flow temperature is continually measured via a sensor. In case of a deviation of the actual temperature from the target temperature, the control unit reacts immediately and adjusts the RPM of the fan, and with that the boiler performance via the gas armature. A deviation can be due to:

- A changed default value of the boiler temperature, via the SITT heating control unit
- A change on the outdoor temperature
- Request for warm water
- Changed heating curve

By means of the integration of the individual components in a system, and within the control range of the equipment, it is ensured that the boiler performance always corresponds to the actual heating requirements.

Delivery scope

The boiler, which has been assembled at the factory and is ready to use, is delivered in cardboard packaging. The following is contained in the delivery scope of the THISION L ECO:

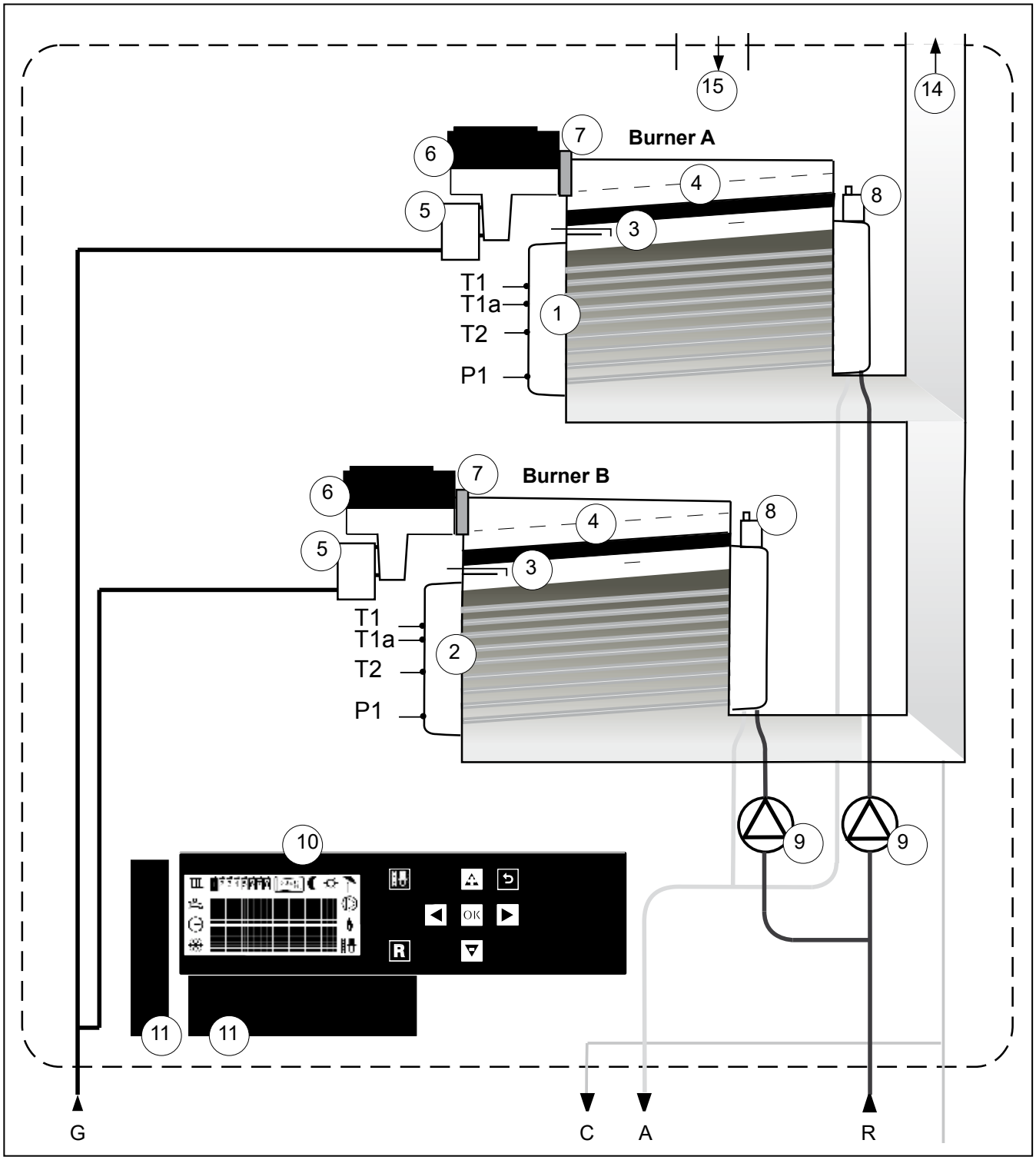
- Modulating high efficiency gas-fired boiler, 8,8 to 120kW
- High efficiency pump(s)
- Boiler/Cascade controller

Accessories:

- Boiler connection fittings
- Headers for 2 and 3 boilers
- Low loss headers up to 960kW
- Insulation packs
- Boiler frames for free standing units

For detailed information see pages 11-12.

THISION L ECO hydraulic circuit diagram



Legend:

1 heat exchanger 1 (All types OSS4) = burner A
2 heat exchanger 2 (THISION L ECO100: OSS2, THISION L ECO120: OSS4) = burner B
3 ignition unit
4 ceramic burner
5 gas valve
6
6 fan
7 flue non-return valve
8 automatic air vent
9 circulation pump
10 control unit MMI
11 burner control unit

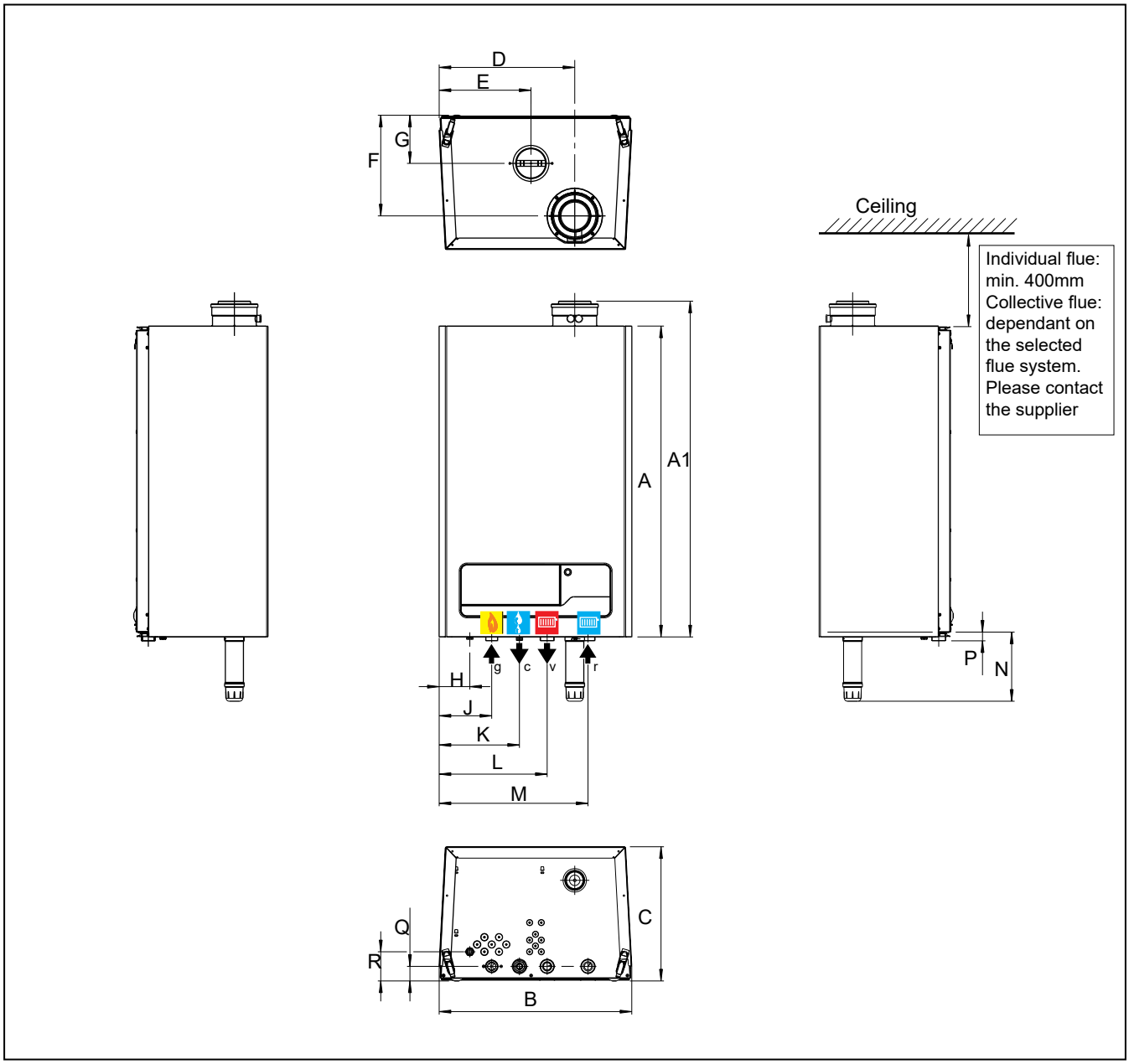
T1 flow sensor
T1a secondary flow sensor (only OSS4)
T2 return sensor
P1 water pressure sensor
G gas pipe
A flow pipe CH
R return pipe CH
C condensate drain pipe

Technical data
ErP data

Type THISION L ECO					70	100	120
Permit Category					CE0063CM3648 II2ELL3B/P		
Heat exchanger type					OSS4	OSS4 OSS2	OSS4 OSS4
Output	G20	Full load	80/60°C	kW	60,1	95,0	120,0
			40/30°C	kW	65,0	102,3	129,3
		Low load	80/60°C	kW	8,8	14,8	17,6
			40/30°C	kW	9,9	16,6	19,6
	G31	Full load	80/60°C	kW	60,1	95,0	120,0
			40/30°C	kW	65,0	102,3	129,3
		Low load	80/60°C	kW	30,2	46,8	62,5
			40/30°C	kW	34,0	52,4	69,7
Input	G20	Full load		kW	61,8	97,3	123,0
		Low load		kW	9,0	15,2	18,0
	G31	Full load		kW	61,8	97,3	123,0
		Low load		kW	31,0	48,0	64,0
Gas consumption	G20	Full load		m^3/h	6,54	10,30	13,02
		Low load		m^3/h	0,95	1,61	1,90
	G31	Full load		m^3/h	2,53	3,98	5,03
		Low load		m^3/h	1,27	1,96	2,62
Boiler efficiency		Full load	80/60°C	%	97,3	97,6	97,6
		Low load	40/30°C	%	109,8	109,2	108,9
Gas type					Natural gas or Propane gas		
CO_2 natural gas		min./max.		Vol. %	8,8 / 9,2		
CO_2 propane gas		min./max.		Vol. %	10,5		
O_2 natural gas		min./max.		Vol. %	4,6 / 5,4		
NOx class					5	5	5
Max. flue gas temperature				80/60°C	76	73	77
Mass flow of flue gas		max.		g/s	28,2	43,4	56,2
Overpressure at boiler output		max.		Pa	175	195	195
Water volume in heating circuit				l	7	12	15
Weight				kg	54	72	76
Gas flow pressure - standard				mbar	20		
Gas flow-pressure min./max.				mbar	17 / 25		
Operating pressure of heating unit		min./max.		bar	0,7 / 4		
Voltage/frequency		min./max.		Volt/Hz	230 / 50		
Max. power consumption				W	161	250	322
Power consumption part load				W	44	86	88
Power consumption stand by				W	2,5	3,7	3,7
Width / depth / height				mm	660 / 460 / 1065		
External thread of gas connection				R	1 1/4"	1 1/4"	1 1/4"
Flow/return external thread				R	1 1/2"	1 1/2"	1 1/2"
Flue gas connection PPS		Diameter		DN	100	100	100
Outdoor air connection		Internal		Ø mm	100	100	100
Condensate connection PVC		External		Ø mm	26	26	26

Elco					
Type THISION L ECO			**70**	**100**	**120**
ErP data according to 2010/30/EU					
Seasonal room-heating energy efficiency class			**A**		
Nominal heat output	P_n (kW)		60	92	120
Seasonal room-heating energy efficiency class	η_s (%)		94	94	94
Annual energy consumption	Q_{HE} (GJ)		20	30	39
Noise output level, inside	L_{WA} (dB)		51	52	53
At rated heat output and high-temperature regime (80/60°C)	P4 (kW)		60,1	92,5	112,9
At 30 % of rated heat output and low-temperature regime (36/30°C)	P1 (kW)		20,6	31,6	38,6
At rated heat output and high-temperature regime (GCV)	η4 (%)		87,7	87,8	87,8
At 30 % of rated heat output and low-temperature regime (GCV)	η1 (%)		99,3	99,4	99,4
At full load	elmax (kW)		0,161	0,250	0,250
At part load	elmin (kW)		0,004	0,009	0,009
In standby mode	Psb (kW)		0,003	0,003	0,005
Standby heat loss	Pstby (kw)		0,110	0,110	0,110

Dimensions of THISION L ECO



	Type THISION L ECO		70	100	120
A	Boiler height	mm	1066	1066	1066
A!	Boiler height with flue connection	mm	1151	1151	1151
B	Boiler width	mm	660	660	660
C	Boiler depth	mm	460	460	460
D	Flue gas nozzle	mm	465	465	465
E	Air intake parallel	mm	315	315	315
F	Flue gas nozzle	mm	345	345	345
G	Air intake parallel	mm	165	165	165
H	Feedthrough power supply cable 230V	mm	105	105	105
J	Gas connection	mm	180	180	180
K	Condensate connection	mm	275	275	275
L	Boiler flow connection	mm	370	370	370
M	Boiler return connection	mm	510	510	510
N	Length siphon	mm	237	237	237
P	Pipe lenght of g, v, c and r	mm	30	30	30
Q	Boiler connections g, v, c and r	mm	50	50	50
R	Feedthrough power supply cable 230V	mm	100	100	100

	Boiler connections				
	Type THISION L ECO		70	100	120
	Flue gas nozzle concentric	mm	100	100	100
	Air supply connector concentric	mm	150	150	150
	Parallel connection	mm	2x 100	2x 100	2x 100
g	Gas connection		1 1/4"	1 1/4"	1 1/4"
c	Condensate connection	mm	26	26	26
v	Boiler flow connection		1 1/2"	1 1/2"	1 1/2"
r	Boiler return connection		1 1/2"	1 1/2"	1 1/2"

Delivery scope

Standard version
Accessories and Cascade

Standard version
The delivery scope of a boiler consists of the following components:

Components		Packaging type
Completely assembled and tested boiler	1	In cardboard box
Mounting rail	1	In boiler packaging
Operating manual THISION L ECO technician	1	In document bag in boiler packaging
Operating manual THISION L ECO operator	1	
Replacement part list	1	
ERP label (only THISION L ECO 70)	1	

Accessories
The following accessories can be ordered:

- Flue gas pipes
- Cascade hydraulics (see following pages)
- Boiler frames (see following pages)
- 3-way valve set
- Outdoor sensor
- T10 flow sensor

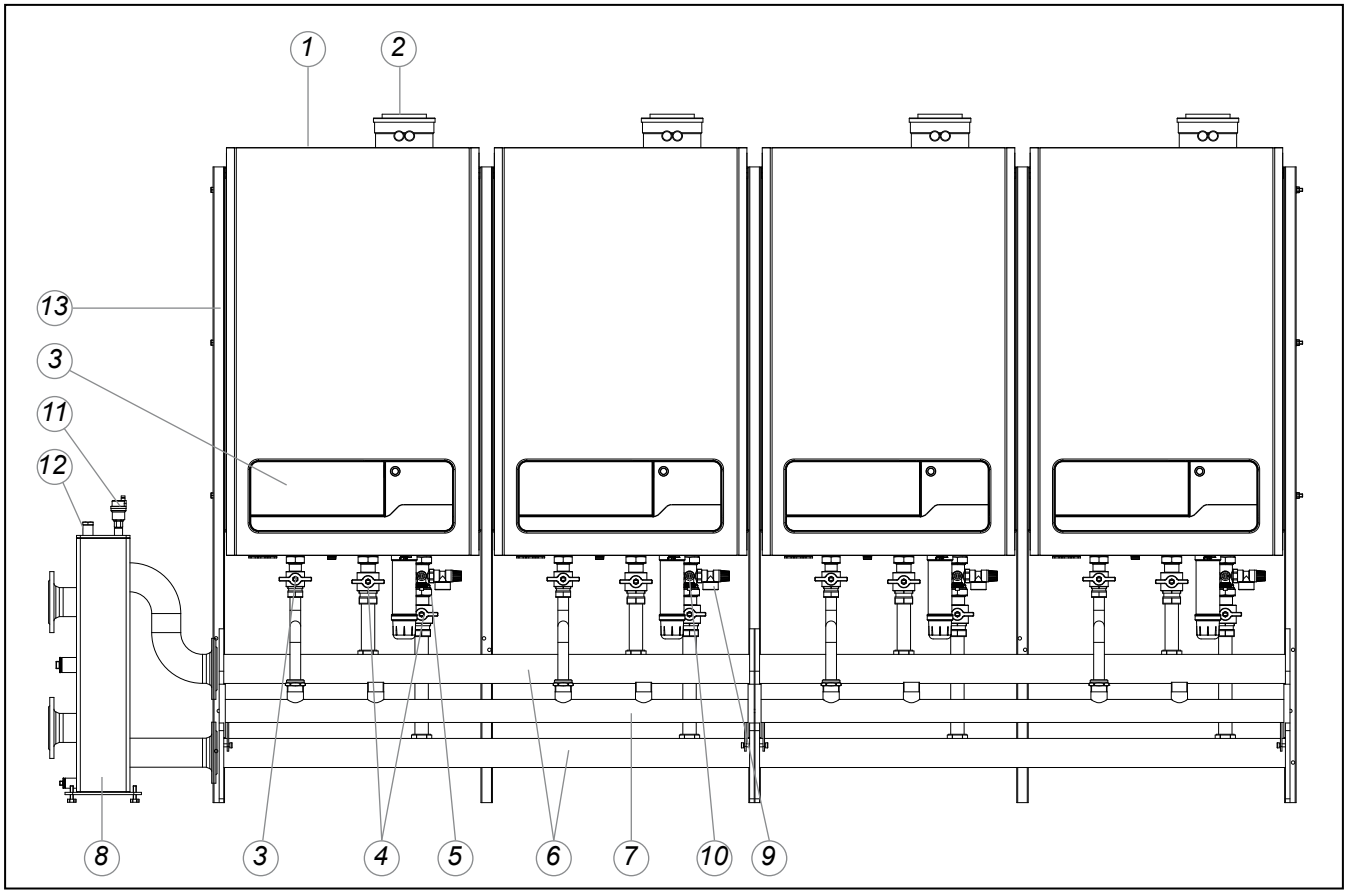
Listed accessory parts have been a specially constructed or selected for the THISION L ECO boiler, which means they are very easy to install (plug and play). You can compose your own system solution, by selecting the accessory combination that fits your needs. For details and prices, please contact ELCO.

Cascade
In principle any combination is possible. Based on the requested capacity, you can choose either the most efficient or the most compact solution yourself.

The capacity of the hydraulic pipes, gas line and low loss header are adjusted to the selected overall demand.

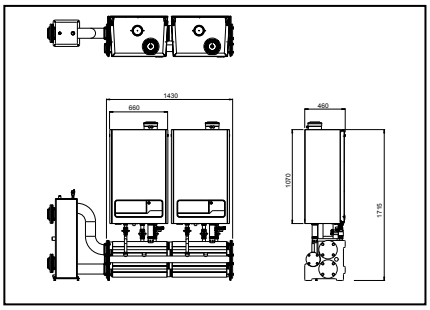
When installing a single THISION L ECO boiler or cascaded THISION L ECO boilers, you should always use a low loss header adjusted to the set demand. ELCO supplies 3 low loss header versions, which are suitable for a maximum demand of either 200kW, 452 kW or 960kW (80/60°C) respectively.

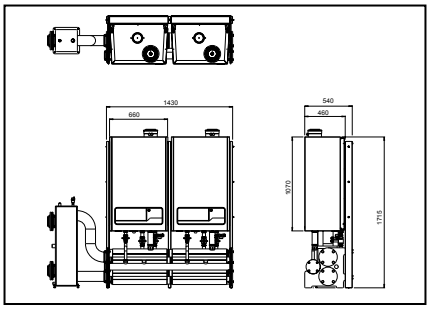
THISION L ECO Cascade

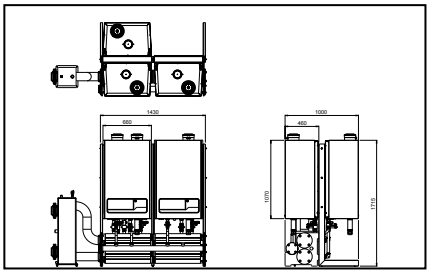


Legend:

1 Air supply (for parallel flue connection)
2 Flue/Air supply (concentric)
3 Cascade manager
Accessories:
3 Gas isolation valve
4 Service valves flow and return
5 Non-return valve
6 Flow/return header
7 Gas line
8 Low loss header
9 Safety valve 4 bar
10 Fill and drain valve
11 Automatic air vent low loss header
12 Pocket for temperature sensor T10
13 Frame







Cascade possibilities
The ELCO THISION L ECO cascade can be mounted in 3 ways:

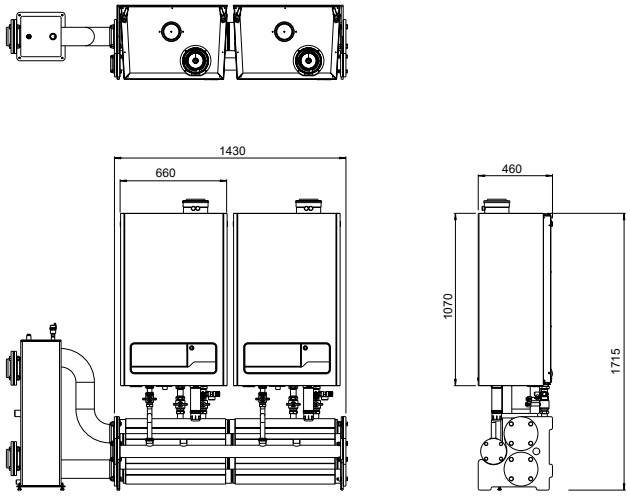
- Wall-mounted in line
  All boilers alongside one another on the wall
  (Example 2 boilers wall-mounted in line)

- Free-standing in line.
  All boilers hanging alongside one another on a free-standing frame
  (Example 2 boilers free-standing in line)

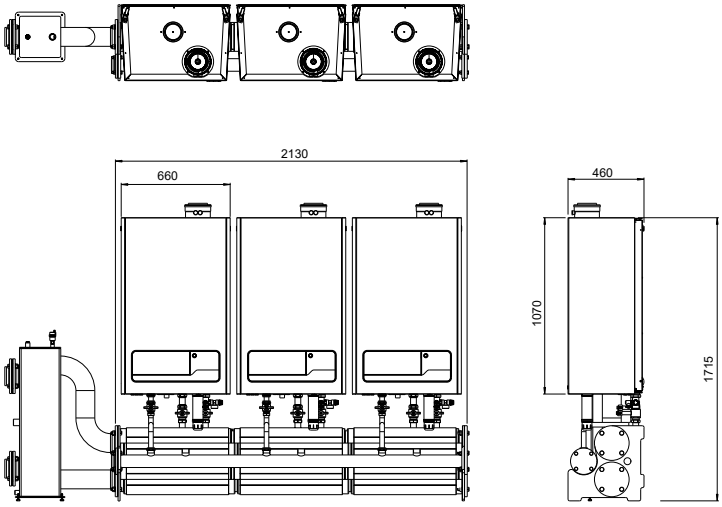
- Free-standing back-to-back.
  All boilers hanging back-to-back on a free-standing frame
  (Example 4 back-to-back)

THISION L ECO Cascade exampless wall-mounted

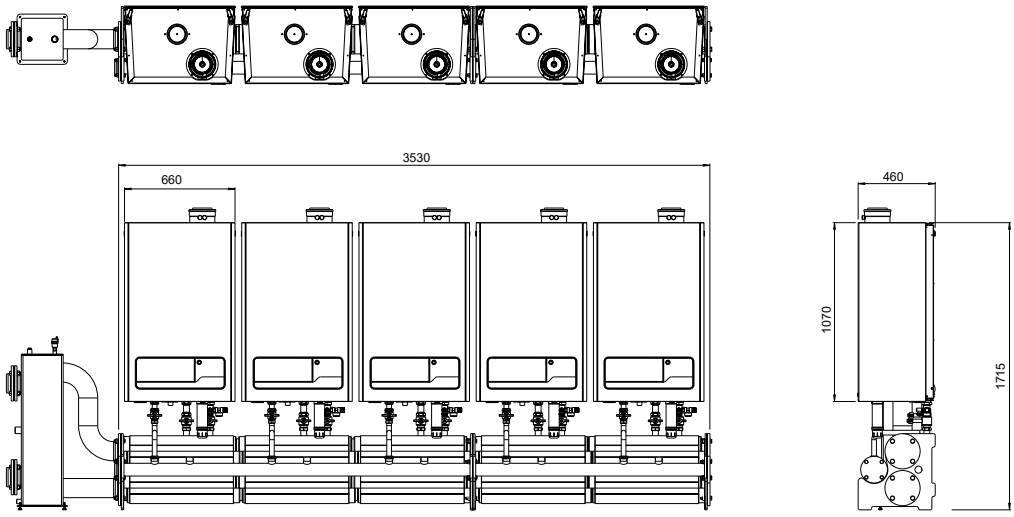
THISION L ECO 2 boilers wall-mounted in line



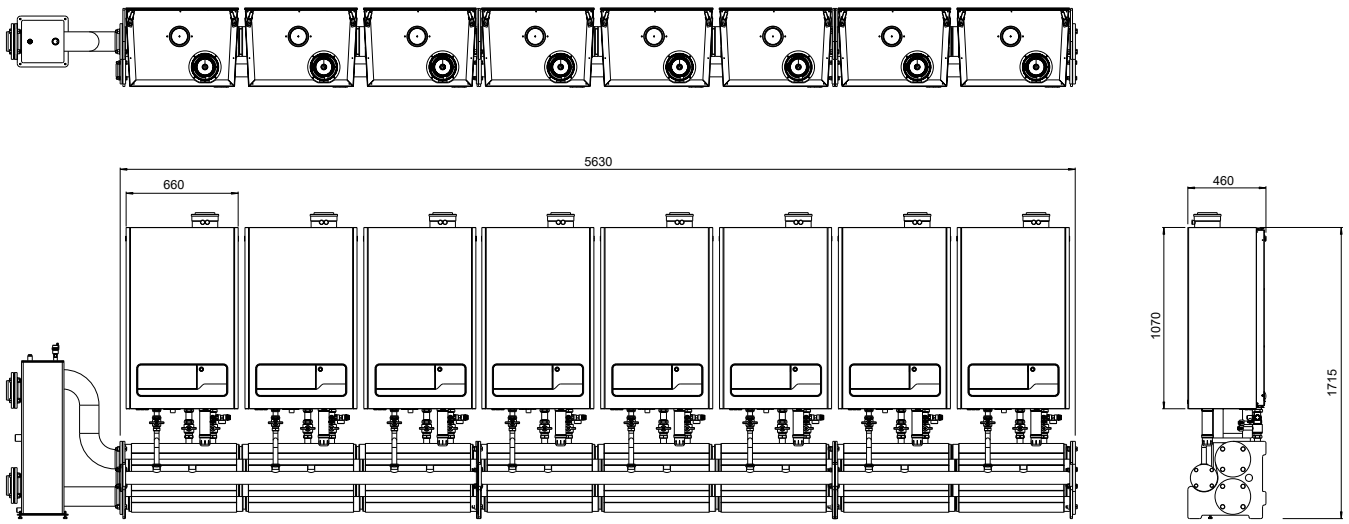
THISION L ECO 3 boilers wall-mounted in line



THISION L ECO 5 boilers wall-mounted in line

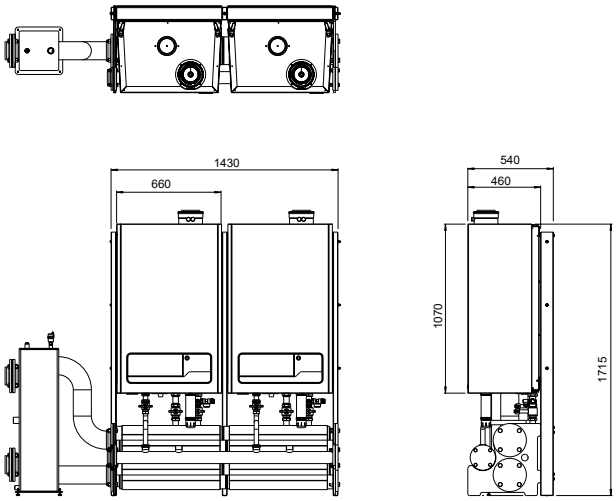


THISION L ECO 8 boilers wall-mounted in line

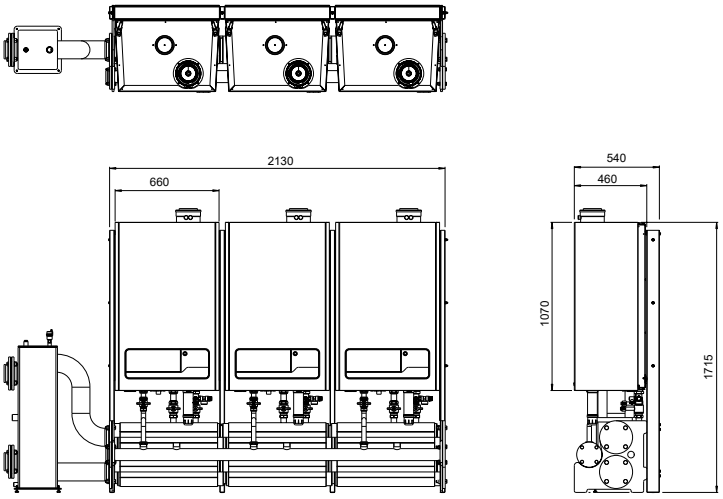


THISION L ECO Cascade exampless free-standing in line

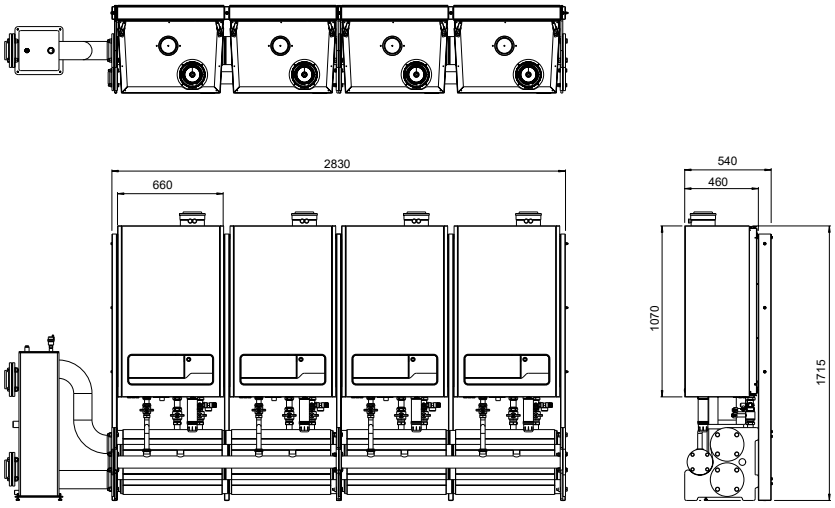
THISION L ECO 2 boilers free-standing in line



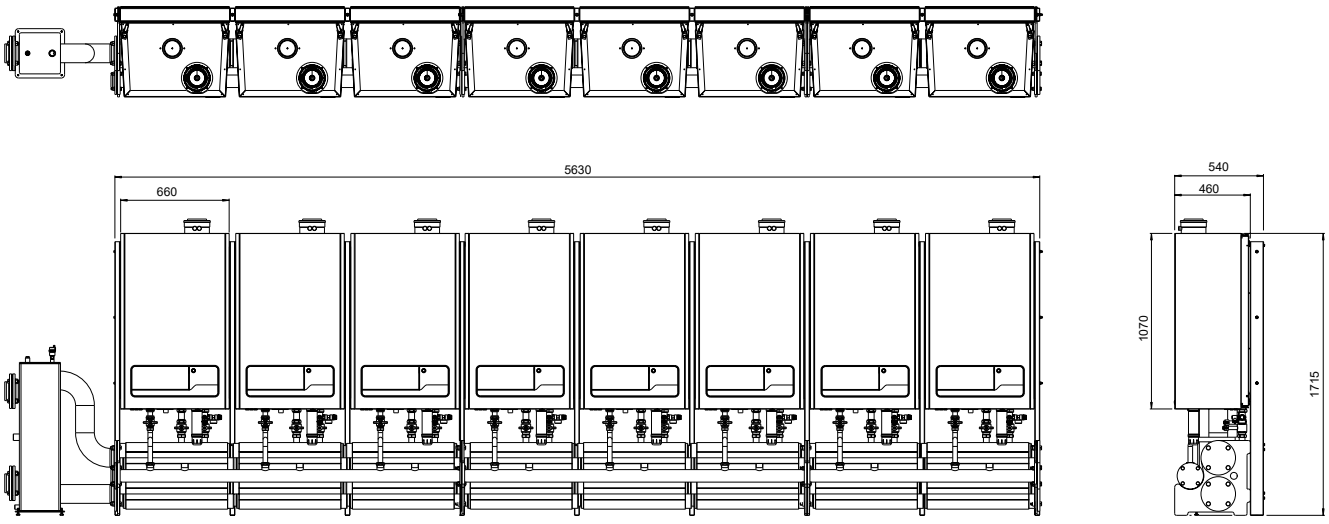
THISION L ECO 3 boilers free-standing in line



THISION L ECO 4 boilers free-standing in line

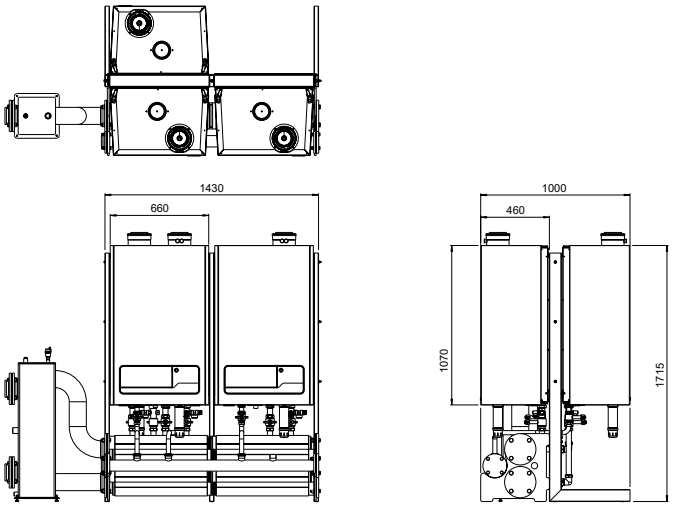


THISION L ECO 8 boilers free-standing in line

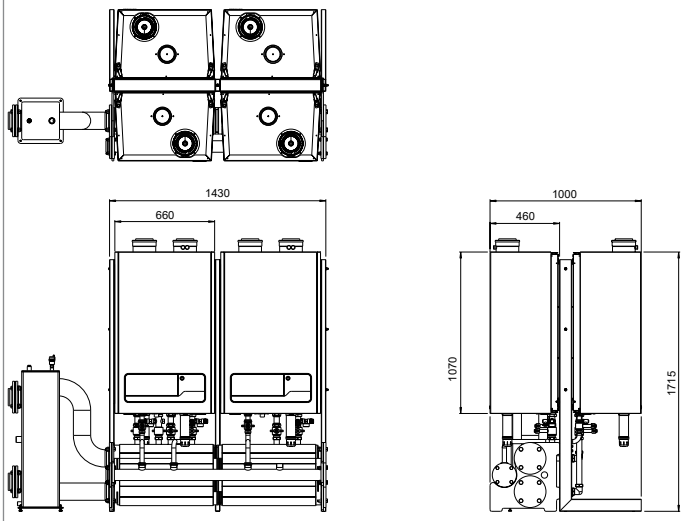


THISION L ECO Cascade exampless free-standing back-to-back

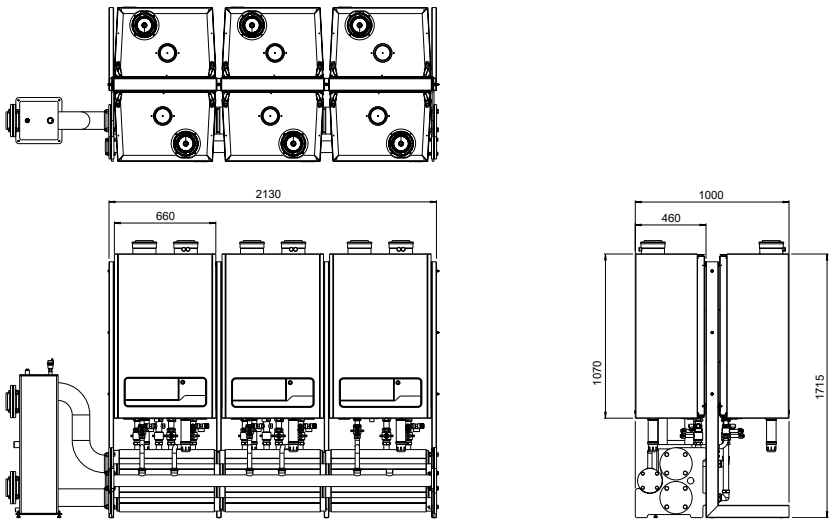
THISION L ECO 3 boilers free-standing back-to-back



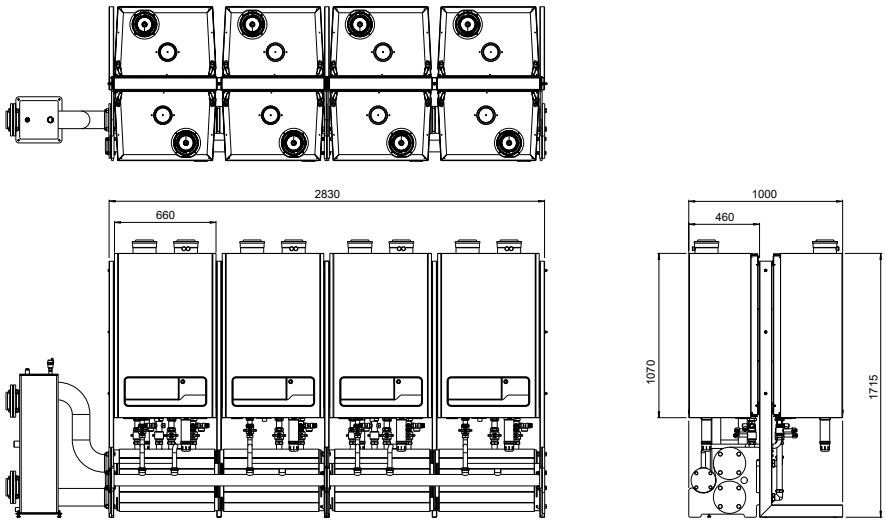
THISION L ECO 4 boilers free-standing back-to-back



THISION L ECO 6 boilers free-standing back-to-back



THISION L ECO 8 boilers free-standing back-to-back



THISION L ECO Cascade accessories

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THISION L ECO Cascade accessories

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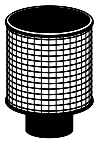

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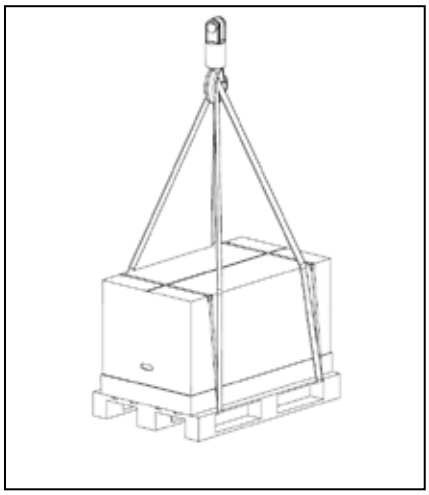
	Type THISION L ECO	Part no.	70	100	120
1	Wall mounting rail for 2 boilers	3905023	x	x	x
	Wall mounting rail for 3 boilers	3905024	x	x	x
2	L- post	3905022	x	x	x
3	I-post	3905021	x	x	x
4	Boiler frame	3905025	x	x	x
5	Header flow/return DN65 + gas DN50 2/4	3905017	x	x	x
	Header flow/return DN100 + gas DN65 2/4	3905018	x	x	x
6	Header flow/return DN65 + gas DN50 3/6	3905019	x	x	x
	Header flow/return DN100 + gas DN65 3/6	3905020	x	x	x
7	Low velocity header ≤ 452 kW DN65	3905033	x	x	x
	Low velocity header ≤ 960 kW DN100	3905034	x	x	x
8	Low velocity header ≤ 200 kW 1 or 2 boilers	3905048	x	x	x
9	90° bend set flow/return DN65	3905035	x	x	x
	90° bend set flow/return DN100	3905036	x	x	x
10	Blind flanche DN65 F/R 2x	3905026	x	x	x
	Blind flanche DN100 F/R 2x	3905027	x	x	x
11	Blind flanche gas DN50 1x	3905028	x	x	x
	Blind flanche gas DN65 1x	3905029	x	x	x
12	Weld flanche set DN65 F/R 2x + gas DN50 1x	3905037	x	x	x
	Weld flanche set DN100 F/R 2x + gas DN65 1x	3905038	x	x	x
13	Boiler connection set line	3905030	x	x	x
14	Boiler connection set back to back	3905031	x	x	x
15	DHW connection set incl. 3 way valve	3905032	x	x	x
16	Connection set solo	3905049	x	x	x
17	Connection set solo incl. 3 way valve	3905061	x	x	x
18	Three way valve	3905060	x	x	x
19	Insolation set header DN100 (modulair) set of 2	3905039	x	x	x
20	Insolation set low velocity header ≤ 960 kW	3905040	x	x	x
21	Insolation set 90° bend set F/R DN65	3905041	x	x	x
22	Insolation set boiler connection set line	3905042	x	x	x
23	Air filter	3905046	x	x	x
	Cartridge air filter	3905047	x	x	x
24	Bus communication cable	3905043	x	x	x
	Bus communication extension cable	3905044	x	x	x
25	Outside sensor (T4)	171237	x	x	x
26	Temperature sensor low velocity header (T10)	3905045	x	x	x

Boiler transport



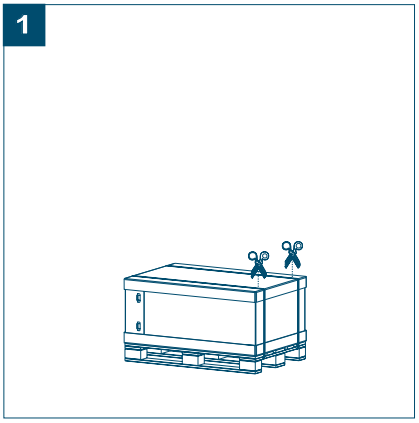
Boiler transport
The THISION L ECO is a fully equipped compact heating system, which has been pre-set and tested at the factory. The dimensions of the packaging are:
- 70, 100, 120:
  1200 x 800 x 670 mm (WxHxD)

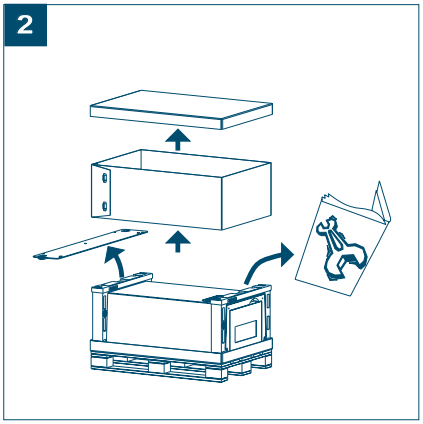
This makes it possible to transport all models in one piece through a normal door. The boiler can be picked up sideways or from the front with a forklift truck for transport.

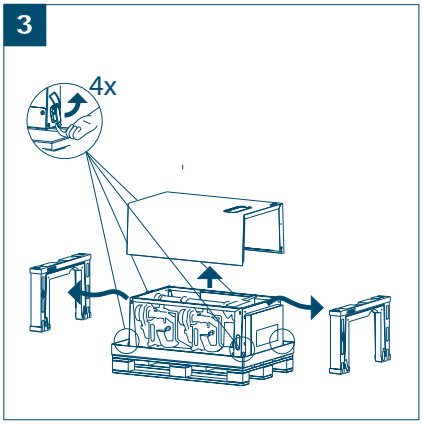
The THISION L ECO can be transported with a crane. However, it must be ensured that the boiler is attached in its packaging to a pallet. Loading belts should be attached to the pallet.

Unpacking instructions are printed on the cardboard box. Please follow the proposed steps.

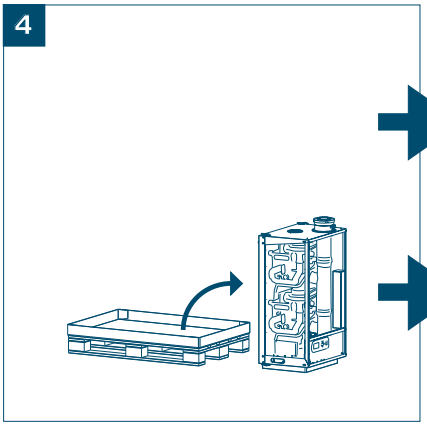
Disassembly of panelling
The panelling has been packed separately from the boiler in the packaging. The panelling of the boiler should be set aside, before the assembly and until the boiler is taken into operation, so as to avoid damage.

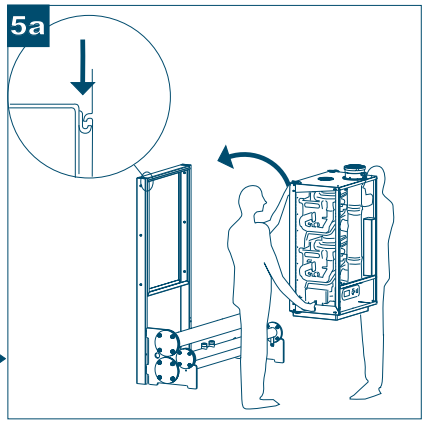


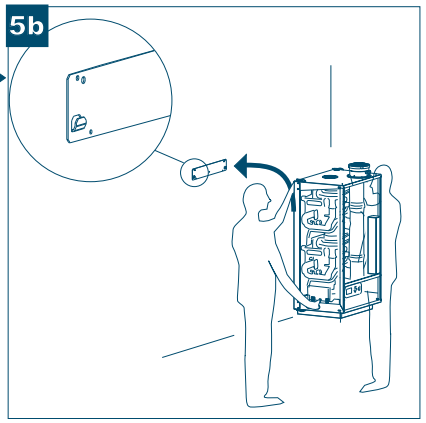


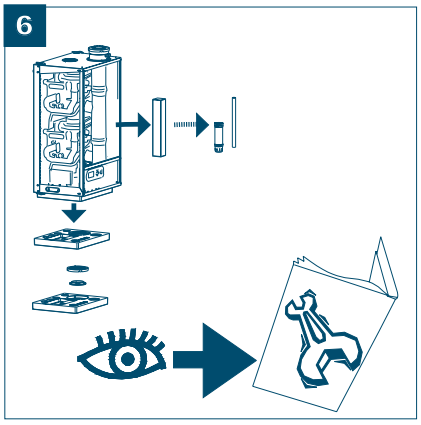


Lifting and carrying precautions:
- Lift only a manageable weight, or ask for help.
- When lifting the boiler, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.





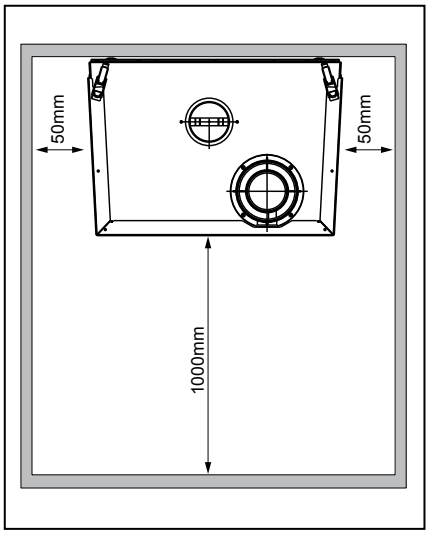


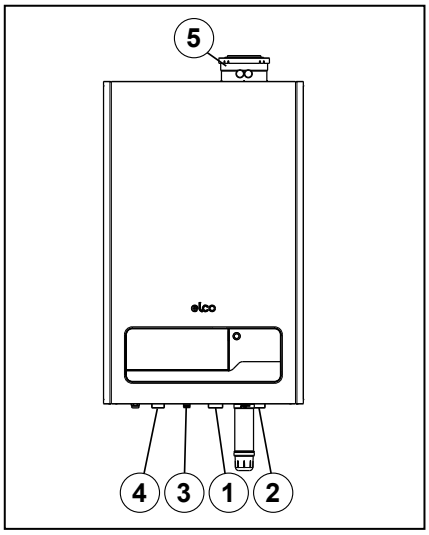


- Lift and carry the boiler close to the body.
- Wear protective clothing and gloves to protect from any sharp edges.

Panelling should be attached and secured with the supplied screw, after assembly of the boiler, or after maintenance works.

Installation
Connections





1 Boiler flow connection
2 Boiler return connection
3 Condensate drain
4 Gas
5 Air supply / flue gas

The installation location of the CH-boiler(s) has to be, and remain, frost-free.
It is NOT necessary to have a purpose provided air vent providing a twin pipe or concentric room sealed flue system is used in the room or internal space in which the boiler is installed. Neither is it necessary to ventilate the compartment in which the boiler is installed, due to the extremely low surface temperature of the boiler casing during operation.

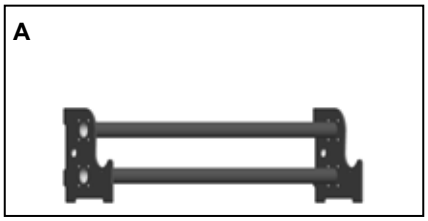
The floor has to be flat and level and have sufficient deadweight capacity for the complete (filled) installation.

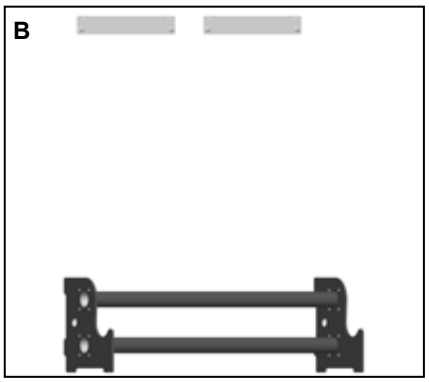
The ELCO THISION L ECO cascade can be mounted in 3 ways:
- **Wall-mounted in line**
  All boilers alongside one another on the wall. Refer to page 15.
- **Free-standing in line**
  All boilers hanging alongside one another on a free-standing frame. Refer to page 16.
- **Free-standing back-to-back.**
  All boilers hanging back-to-back on a free-standing frame. Refer to page 17.

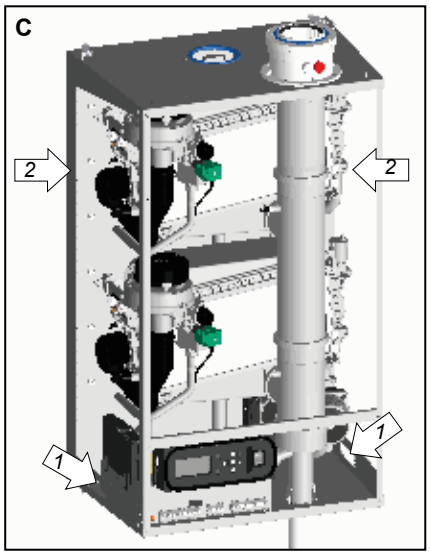
General guidelines:
Pay attention to the minimum distance required between the boilers, walls and ceiling for installing and removing the housing (refer to fig. 5.a.) for commissioning and servicing and installing the flue system (refer to chapter 7).

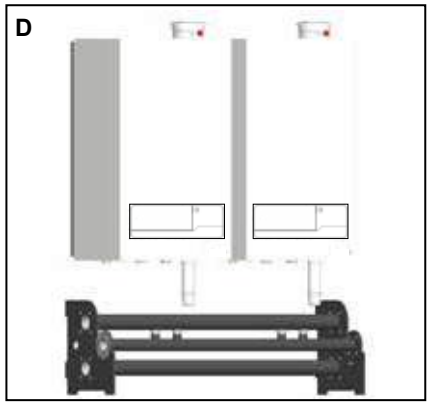
If you have opted to build the hydraulic part yourself, then ELCO recommends using a boiler connection set 3905049 (Connection set THISION L ECO as single boiler) for each boiler. In that case, the connection measurements are:
- Flow and return line:
  ø35mm compression fitting
- Gas line:
  ø28mm compression fitting

Cascade wall mounted in line









A . Position the pipe work header against the wall. When using several pipe work headers: couple the pipe work headers and supplied gaskets, M12 (DN65) or M16 (DN100) bolts, spring washers and nuts. Align the pipe work header(s) horizontally using the adjustable feet.

B. Determine the position of the suspension brackets based on figure B1. The boilers can be fitted on the wall using the supplied suspension brackets and mounting material (minimum of 3 screws for each boiler). The wall has to be flat and strong enough to carry the weight of all boilers including their water contents.

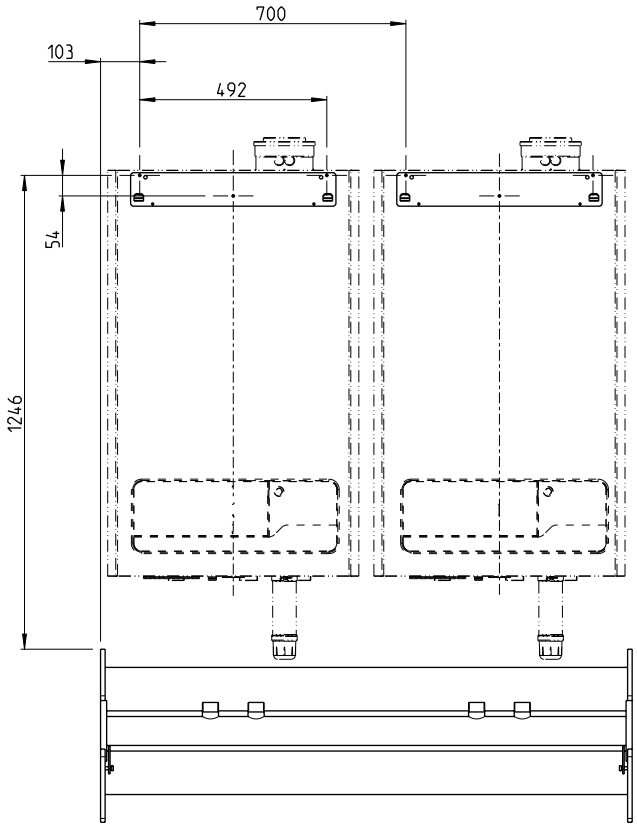
C. Hang the boilers on the suspension brackets.
Lift the boiler only by the special grips on the bottom panel (1) and support the boiler by its rear panel (2).

D. Place the gas line in its intended recess. When using several pipe work headers: couple the gas lines using the supplied DN50/DN65 gaskets, M12 bolts, spring washers and nuts.

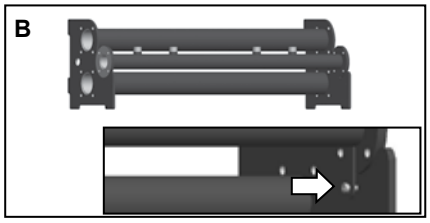
E. **Fasten the gas line with the 2 special close tolerance bolts M6x8x16 on each flange of the pipe work header(s).**

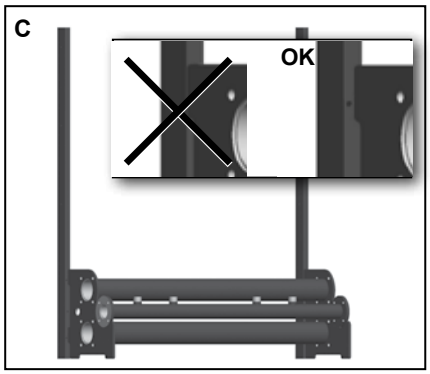
Continue with page 21.

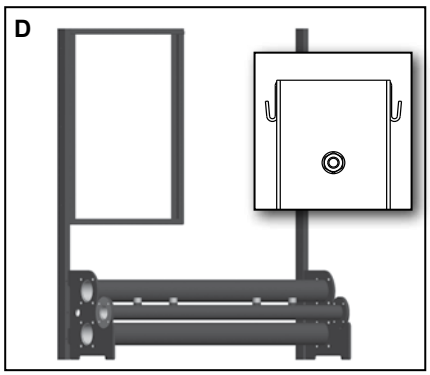
B1

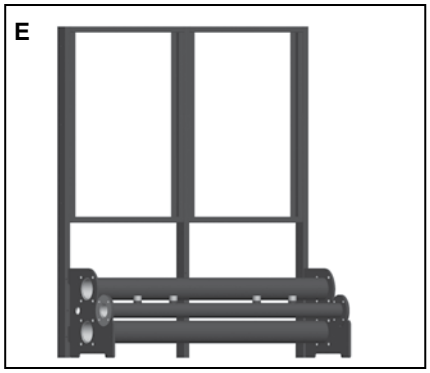


Cascade free-standing in line







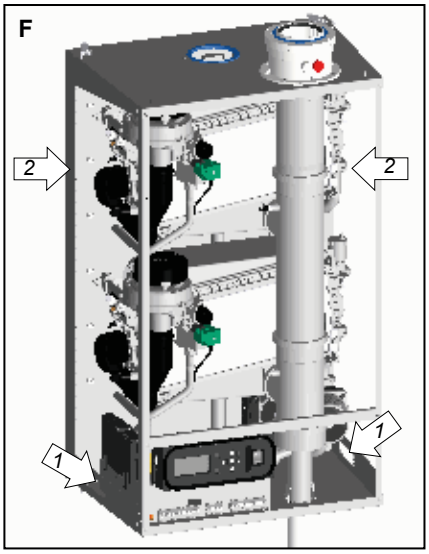


A Position the pipe work header in the required location. When using several pipe work headers: couple the pipe work headers using the supplied gaskets, M12 (DN65) or M16 (DN100) bolts, spring washers and nuts. Align the pipe work header(s) horizontally using the adjustable feet.

B. Place the gas line in its intended recess. When using several pipe work headers: couple the gas lines using the supplied DN50/DN65 gaskets, M12 bolts, spring washers and nuts.

Fasten the gas line with the 2 special close tolerance bolts M6x8x16 on each flange of the pipe work header(s).

C. Fit the I-columns on the flange plate using 2x bolts M8x40x70mm.
Attention: Use the correct holes in the column!
When using a left flange plate: use the right-hand holes in the column.
When using a right-hand flange plate: use the left-hand holes in the column.



D. Fit a mounting frame on the I-column using 3-x bolt M8x50mm.

Attention: mounting rail at the top.

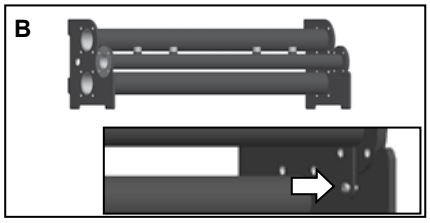
E. Fit a mounting frame on the other I-column using 3-x bolt M8x50mm. If boilers also have to be fitted on the other side of the I-column, then the next mounting frame also has to be fitted straight on it.

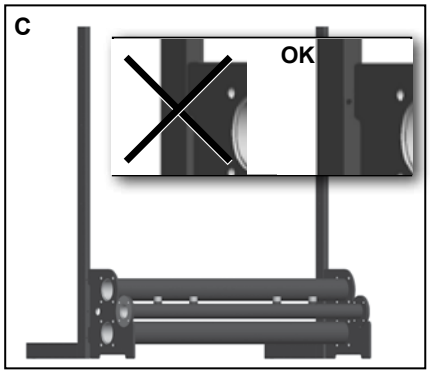
Fit the remaining I-column(s) between the mounting frames using 3x M8x50mm.

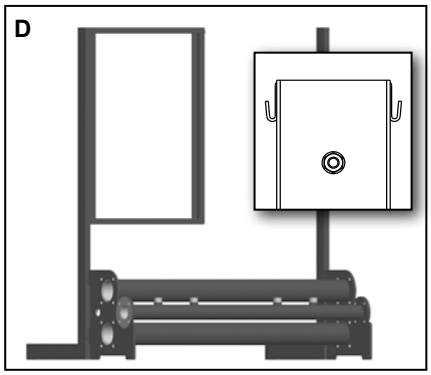
F. Hang the boilers on the mounting rail.
Lift the boiler only by the special grips on the bottom panel (1) and support the boiler by its rear panel (2).

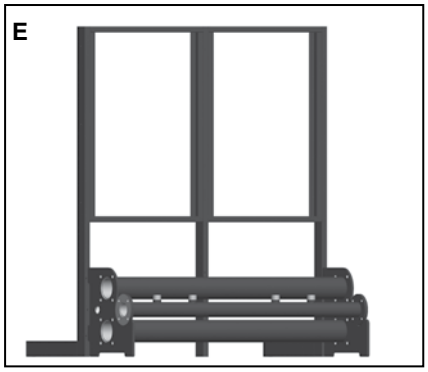
Continue with page 21.

Cascade free-standing back-to-back







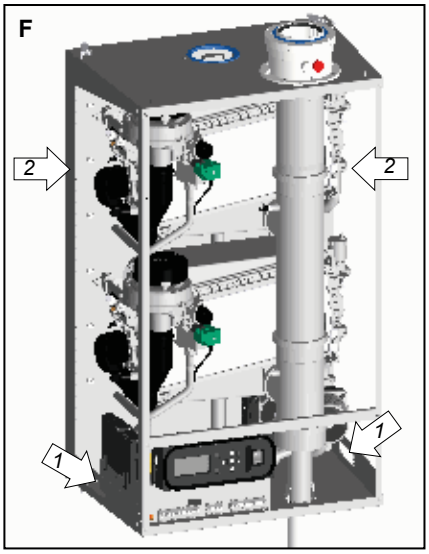


A. Position the pipe work header in the required location. When using several pipe work headers: couple the pipe work headers with the supplied gaskets, M12 (DN65) or M16 (DN100) bolts, spring washers and nuts. Align the pipe work header(s) horizontally using the adjustable feet.

B. Place the gas line in its intended recess. When using several pipe work headers: Couple the gas lines using the supplied DN50/DN65 gaskets, M12 bolts, spring washers and nuts.

Fasten the gas line with the 2 special close tolerance bolts M6x8x16 on each flange of the pipe work header(s).

C. Fit the L-columns on the flange plate using 2 x bolts M8x40x70mm.
Attention: Use the correct holes in the column!
When using a left flange plate: use the right-hand holes in the column.
When using a right-hand flange plate: use the left-hand holes in the column.



D. Fit a mounting frame on the L-column using 3x bolt M8x50mm.

Attention: mounting rail at the top.

E. Fit a mounting frame on the other L-column using 3-x bolt M8x50mm. If boilers also have to be fitted on the other side of the L-column then the next mounting frame also has to be fitted straight on it.

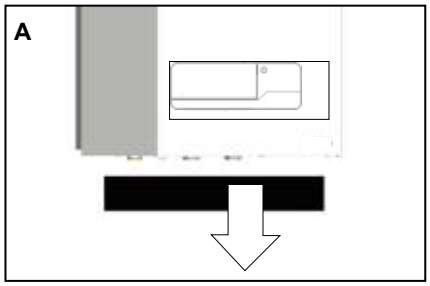
Fit the remaining L-column(s) between the mounting frames using 3x M8x50mm.

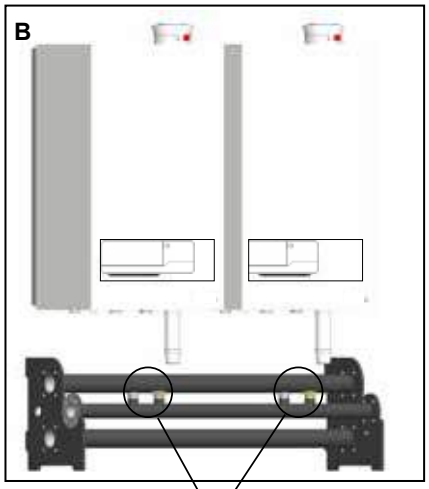
F. Hang the boilers on the front and rear of the frame on the mounting rail.

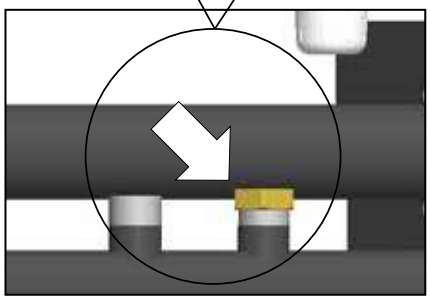
Lift the boiler only by the special grips on the bottom panel (1) and support the boiler by its rear panel (2).

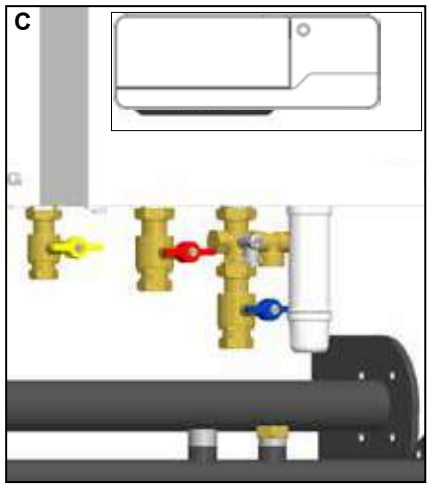
Continue with page 21.

Connecting the boiler









A. Remove the remaining packaging part from the bottom of the boiler.

Note: this packaging part is provided with boiler parts which are needed for mounting the boiler.

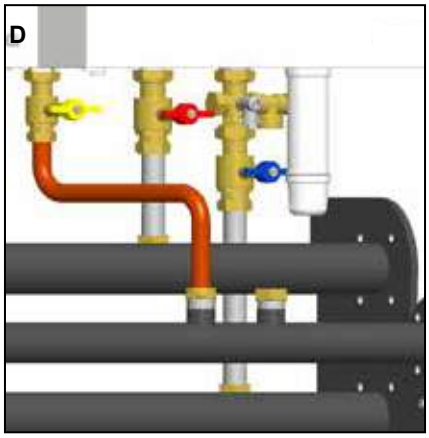
B. Cap the connections that are not used on the pipe work headers:

Flow and return:ø35mm blind compression fitting (2 items/boiler)
Gas: 1 ¼" blind cap with gasket (1 item/boiler)

For connections, use the supplied gaskets. Check all connections for leakage and gas-tightness.

C. Connecting the isolation valves to the boiler:
Flow: 1½" flat coupling x 35mm compression isolation valve with red handle
Return:1½" flat coupling x 35mm compression fitting cross union with fill/drain valve and isolation valve with blue handle
The boiler is supplied with a 3 and 4 bar safety valve.
ELCO recommend fitting the 4 bar safety valve due to the control settings shutting the boiler off at 3.8 bar.
Gas: 1¼" x 28mm gas isolation valve

Polluted test water may be released when removing the plastic caps on the boiler flow and return.



For connections, use the supplied gaskets. Check all connections for leakage and gas-tightness.

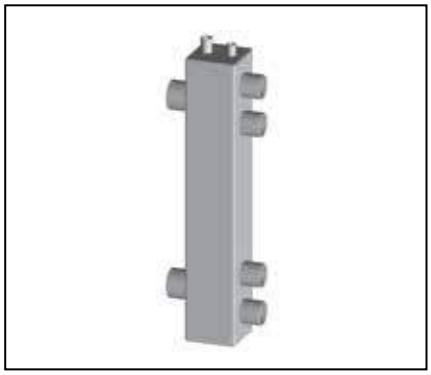
D. Connect the valves to the pipe work headers:
Flow: 35mm pipe pieces with 35mm compression fittings (elbow and socket)
Return: 35mm pipe pieces with 35mm compression fittings (elbow and socket)
Gas: 28mm pipe piece with 1¼" flat and 28mm compression fitting

Back-to-back installation:
Flow: 35mm pipe pieces with 35mm compression fittings (bend and socket)
Return: 35mm pipe pieces with 35mm compression fittings (bend and socket)
Gas: 28mm pipe piece with 1¼" flat and 28mm compression fitting

For connections, use the supplied gaskets. Check all connections for leakage and gas-tightness.

E. Fill the siphon with tap water and fit the siphon cup underneath the boiler.
The siphon cup is supplied separately and can be found behind the housing.

Cascade accessories



The pipe work headers are available in 2 dimensions, i.e. DN65 and DN100 and are connected to one another by the flange couplings and gaskets, M12 or M16x55 bolts, spring washers and nuts. The low loss header and the complete installation can then be connected to it.

Low loss header
There are 3 low loss headers available:

3905048
Low loss header for 1 or 2 THISION L ECO boilers to max. 200kW supplied with automatic air vent, drain valve and pocket for temperature sensor T10 Boiler connections are 4x 1 ½", installation connections are 2x 2". The low loss header MUST be connected between the boiler[s] and the system pumps.

3905033
Low loss headers DN65 to 452kW
3905034
Low loss headers DN100 to 960kW

The low loss headers comes standard with adjustable feet, automatic air vent, drain valve, pocket for temperature sensor T10, M12 or M16x55 bolts, spring washers and nuts. The low loss header can be positioned on either the left or right hand side of the pipe work headers.

3905045
Flow temperature sensor T10

Every system with 1 or more THISION L ECO-boilers must be provided with a flow temperature sensor T10 and must be connected on the master boiler (address 01) to terminal 3, position 5 and 6. The flow sensor must be placed in the pocket of the low loss header.

Set of bends
The low loss header can be positioned at a 90° angle. A set of bends may be used for that purpose.

3905035
Bends set DN65 flow/return
3905036
Bends set DN100 flow/return

Blanking flanges
The ends of the pipe work headers have to be fitted with blanking flanges. The blanking flanges come standard with a fully configured delivery, including bolts, spring washers and gaskets.

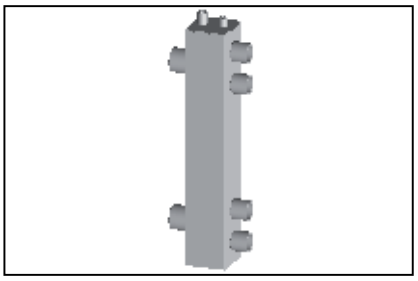
3905026
Blanking flange set DN65 flow/return 2 items
3905027
Blanking flange set DN100 flow/return 2 items

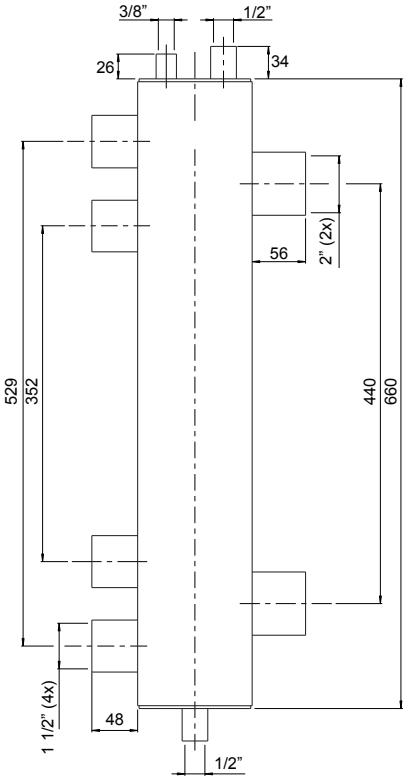
Welded-on flanges
Upon request, welded-on flanges are available to connect CH-pipe lines to the secondary side of the low loss header and to connect the gas line.

3905037
Welded-on flange set DN65 flow/return 2 items + DN50 gas 1 item
3905038
Welded-on flange set DN100 flow/ return 2 items + DN65 gas 1 item

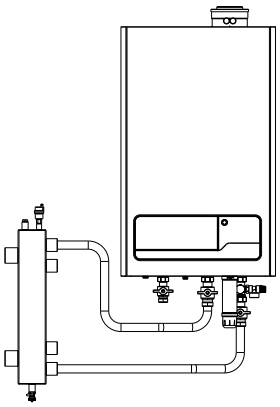
Required components that are not supplied by ELCO:
- The installation pump;
- The condensate discharge system
- The installation water filter;
- Air and dirt separator;
- Gas filter;
- Hot water supply;
- Regulation valve;
- Flue system;
- Expansion vessel(s).

Cascade accessories
Connecting 1 or 2 boiler boilers

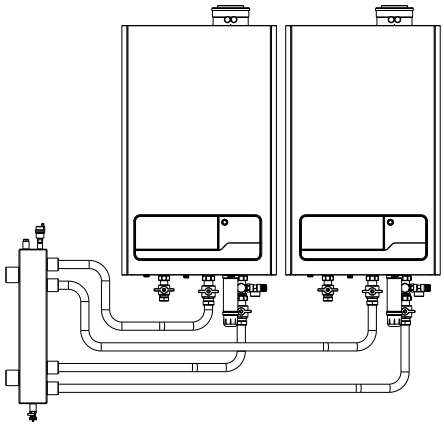




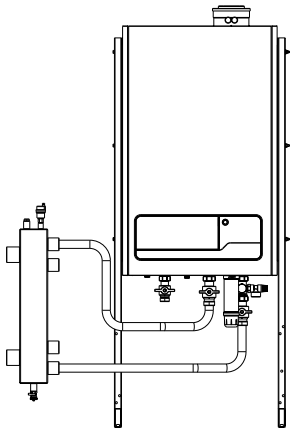
1x THISION L ECO boiler, wall hung



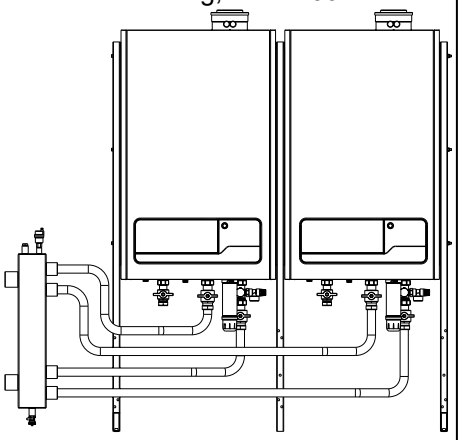
2x THISION L ECO boilers, wall hung, max. 200kW



1x THISION L ECO boiler, free-standing



2x THISION L ECO boilers, free-standing, max. 200kW

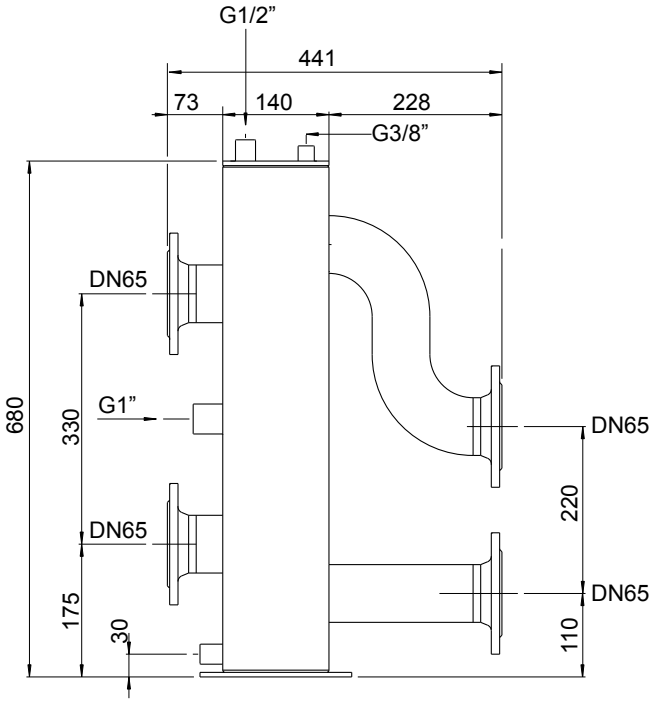


		Wall hung		Free standing	
	Number of THISION L ECO boilers	1	2	1	2
	Necessary articles				
3905022	L-shape frame for back to back alignment			2	2
3905021	I-shape frame for line alignment				1
3905025	Boiler frame			1	2
3905048	Low loss header for 1 or 2 boilers (max. 200 kW)	1	1	1	1
3905049	Boiler connection set for single boiler	1	2	1	2
3905043	Bus communication cable		1		1
3905045	Common flow sensor 10kOhm T3/T10	1	1	1	1

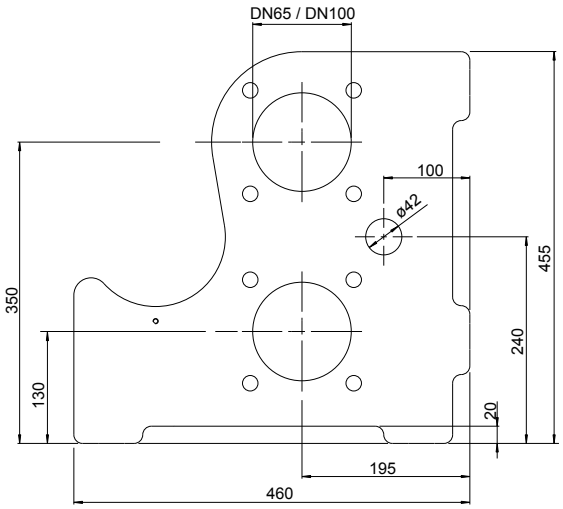
Supply of connection pipes, fittings and brackets by third party.

Cascade accessories
Dimensions headers, low loss headers and bends

Dimensions low loss header DN65 until 452kW

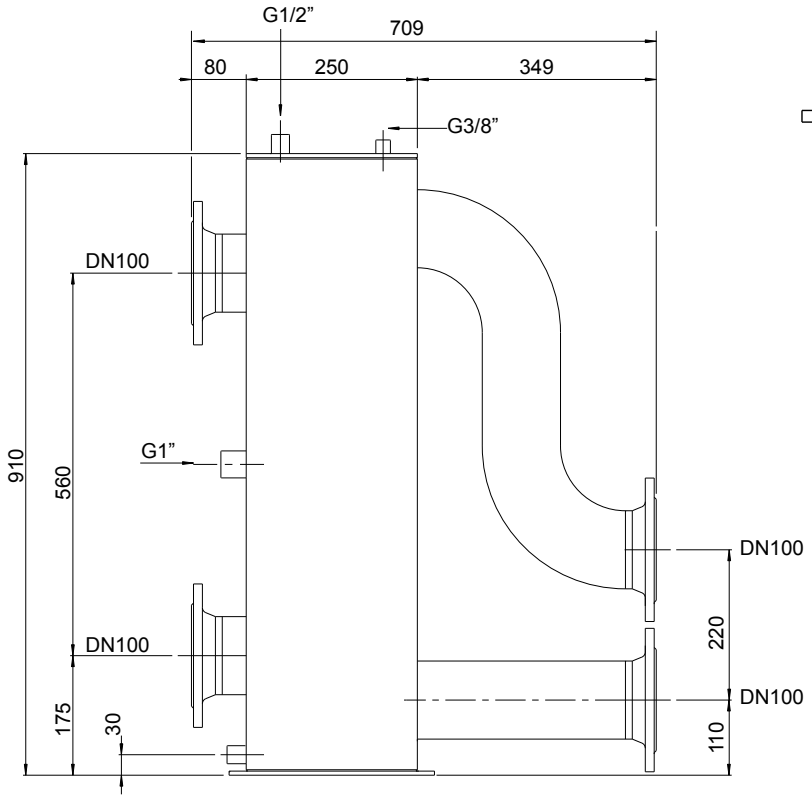


Dimensions main header

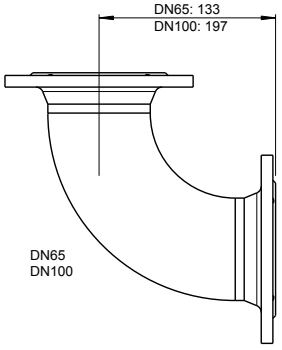


L 2/4 places = 1398mm (DN65/DN100)
L 3/6 places = 2098mm (DN65/DN100)

Dimensions low loss header DN100 until 960kW



Dimensions bend DN65 and DN100



Water and hydraulic system
Heating water quality

Fill the installation with drinking water.

In most cases, a central heating installation can be filled with water according to the nationally valid regulations, whereby a treatment of the water is not necessary.
To avoid problems, the quality of the filling water must conform to the requirements in Table 1.
If the filling water should not conform to these requirements, then it is recommended to treat the water correspondingly (see VDI2035).

Warranty claims become invalid if the system has not been flushed during installation, or if the filling water quality does not conform to the ELCO requirements (see Table 1).
If anything should not be clear, or in case of deviations, always take up contact with ELCO first. The warranties lapse, if any changes are made without an advance agreement/ release by ELCO.

Installation:
- The use of groundwater, demineralized water and distilled water, is not permitted (an explanation of these terms can be found on the next page).
- If the drinking water quality lies within the limits of the values in Table 1, then one can proceed with the installation of the system and the flushing of the equipment.
- Residues of corrosion products (magnetite), assembly materials, cutting oil and other undesirable products, must be removed during the flushing operation.
- Another possibility for removing dirt is the use of a filter. The filter type must conform to the system-specific requirements and the type of contamination. ELCO recommends the use of a filter. In such a case, one should make sure to take the entire piping system into consideration.
- The central heating installation must be de-aerated properly, before it is taken into operation. Please review the Chapter “Commissioning” in this regard.
- If a regular topping up of water is required (> 5% per year), then there is a problem with the system that must be remediated by a certified technician. Regular topping up with fresh water and oxygen adds lime to the system, which leads to deposits.
- If an anti-frost agent or other additives are used, then it must be regularly checked that the filling water quality conforms to the manufacturer requirements.
- Inhibitors may only be used after consultation with ELCO.
- The use of such agents must be protocolled.

Floor heating
When a floor heating system is connected that uses plastic pipes, it must be ensured that it conforms to the standard DIN 4726-4729. If the system does not fulfil the standard, then a system separation must be foreseen.

If the regulations with regard to plastic piping are not observed, then warranty claims become null and void (see the warranty conditions).

Parameters	**Value**
Water type	Drinking water Softened water
pH	6.0-8.5
Conductivity (at 20°C in µS/cm)	Max. 2500
Iron (ppm)	Max. 0.2
Hardness (°dH / °fH)	
Installation volume/performance <20 l/kW	1-12
Installation volume/performance >=20 l/kW	1-7
Oxygen	Oxygen diffusion is not permitted during operations. Max. 5% of the system volumes may be topped up annually.
Corrosion inhibitors	See the Chapter "System water additives (inhibitors)"
pH raising or lowering agents	See the Chapter "System water additives"
Anti-frost additives	See the Chapter "System water additives"
Other chemical additives	See the Chapter "System water additives"
Solid substances	Not permitted
Residues in the heating water, which are not a component of the drinking water are	Not permitted

Table 1

Water and hydraulic system
DHW quality

Definition of water types

Drinking water
- Tap water, in conformity with the European
  Drinking Water Directive: 98/83/EC, dated 3 November 1998.

Softened water
- Water, from which calcium and magnesium ions have been partially removed.

Demineralized water
- Water, from which almost all salts have been removed (very low conductivity).

Distilled water
- Water, in which no more salts are present

Expansion vessel

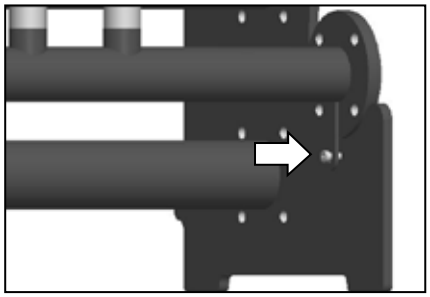
Expansion vessel
The CH-installation has to be fitted with an expansion vessel. The expansion vessel used has to comply with the water contents of the installation.

It is not necessary to install an expansion vessel to each boiler. One single, central installed expansion vessel is sufficient. When using a single expansion vessel the handles of the valves on the flow and return pipes below the boiler have to be removed whilst open.

A boiler expansion vessel can be connected on the cross union inside the return pipe to each boiler, if required. The connection is fitted with a 3/4” outer thread blanking cap.

Expansion DHW cylinder circuit
When applying a DHW cylinder connected directly to the boiler (ELCO cylinder connection with use of 3-way valve) the circuit between the three-way valve and the separation of the DHW cylinder should be provided of an expansion tank. See also page 26.

Gas line



The gas line leading to the installation has to be calculated to the maximum capacity to determine the diameter of the supply pipe.

The gas line has to be placed on the allocated openings of the flange plates of the pipe work headers flow/return and secured on all flange plates by the special M6x8x16 close tolerance bolts.

Pressure loss for a newly installed natural gas line may be 1.7 mbar max. In the case of an extension, this may be 2.5 mbar max. This value is to be measured in between the operational gas meter and the CH-boilers.

For correct functioning of the boilers, it is necessary that the gas dynamic inlet pressure must be at least 19 mbars.

With regard to new lines in particular, ensure that the gas line does not contain any residual pollution.

ATTENTION:
For use with propane gas, the LPG conversion kit has to be installed, see separate conversion instructions.

Following maintenance tasks always check all gas carrying components for leakages by using of leakage detection fluid (LDF).

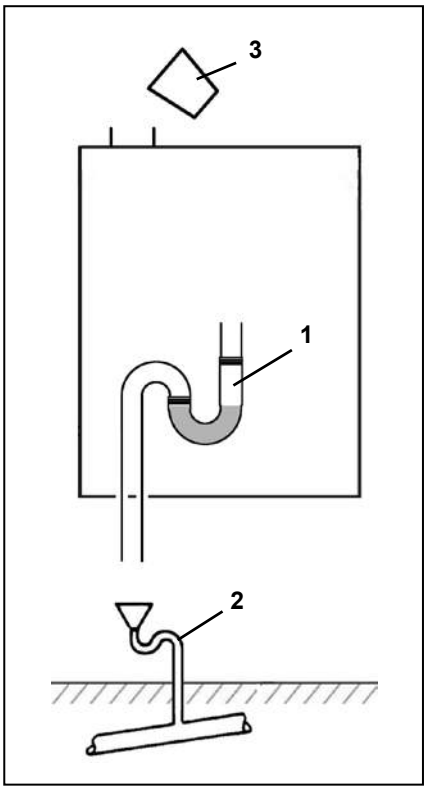
Condensate connection

HAZARD:
Danger of death due to poisoning! If the siphon is not filled with water, or if any connections are open, then escaping waste gas can pose a hazard of death for people.

Condensate connection
For every m3 of natural gas that is burned, between 0.7 and 1.0 litres of water can accumulate, due to a very high energy utilization. Condensate, which accumulates in the boiler, in the waste gas pipe or in the chimney, must be drained to the public sewage system.
In this regard, country-specific regulations must be taken into account. A neutralization of the condensate may be required. It must be possible for the condensate to visibly drain into a funnel-siphon (2) at the installation site. A fixed connection to the public sewer system is not permitted.

For condensate drainage, only corrosion-resistant and certified materials may be used. The drainage must be carried out in a frost-free space. The drainage pipe should have a slope, so as to avoid a backwash of the condensate.

Filling of the siphon
Before the boiler is taken into operation, the equipment siphon (1) must be filled with water, so as to prevent an emission of waste gas from the condensate connection. Filling is carried out most easily by pouring approximately 0.5 litres of water into the waste gas pipe (3); otherwise screw off the siphon to fill it.
The condensate drain should be cleaned during maintenance and inspection works, however at least once each year, whereby the siphon and the waste gas connections are also check for leakproofness and the equipment siphon is filled with water.



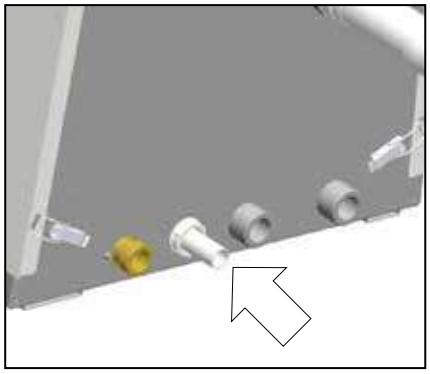
All ELCO wall hung gas fired condensing boilers contain a siphonic condensate trap to collect and release condensate.

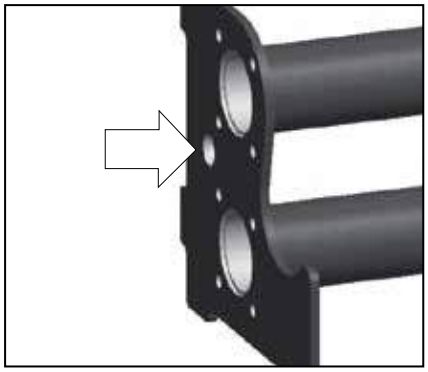
The amount of condensate formed is determined by the type of boilers and the water temperature produced by the boiler.

Condensate pipework.
Press the supplied plastic ribbon tube onto the condensate drain at the bottom of the boiler. Connect the tube to the main condensate drain (minimum diameter= 40mm) by means of an open connection to avoid sewage gasses coming into the boiler.

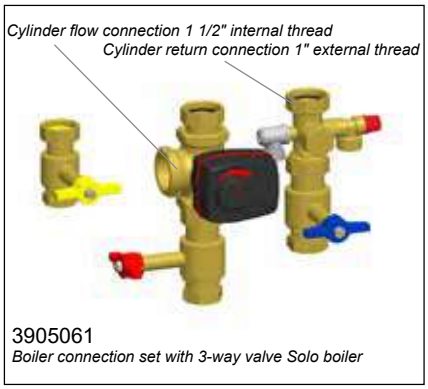
Fit a pipe work header for the condensate drain behind the hydraulic system. For that purpose, the flange plates have holes allowing the installation of a PVC drain of ø40mm max. Use this drain to connect the individual condensate drains of each boiler.

The siphon of a flue gas system can also be connected, if required, by means of an open connection.

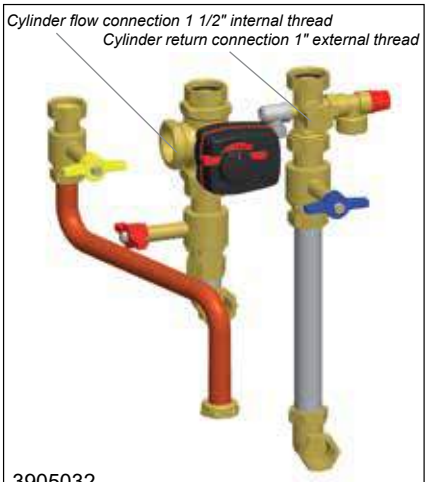




Hot water supply



3905061
Boiler connection set with 3-way valve Solo boiler

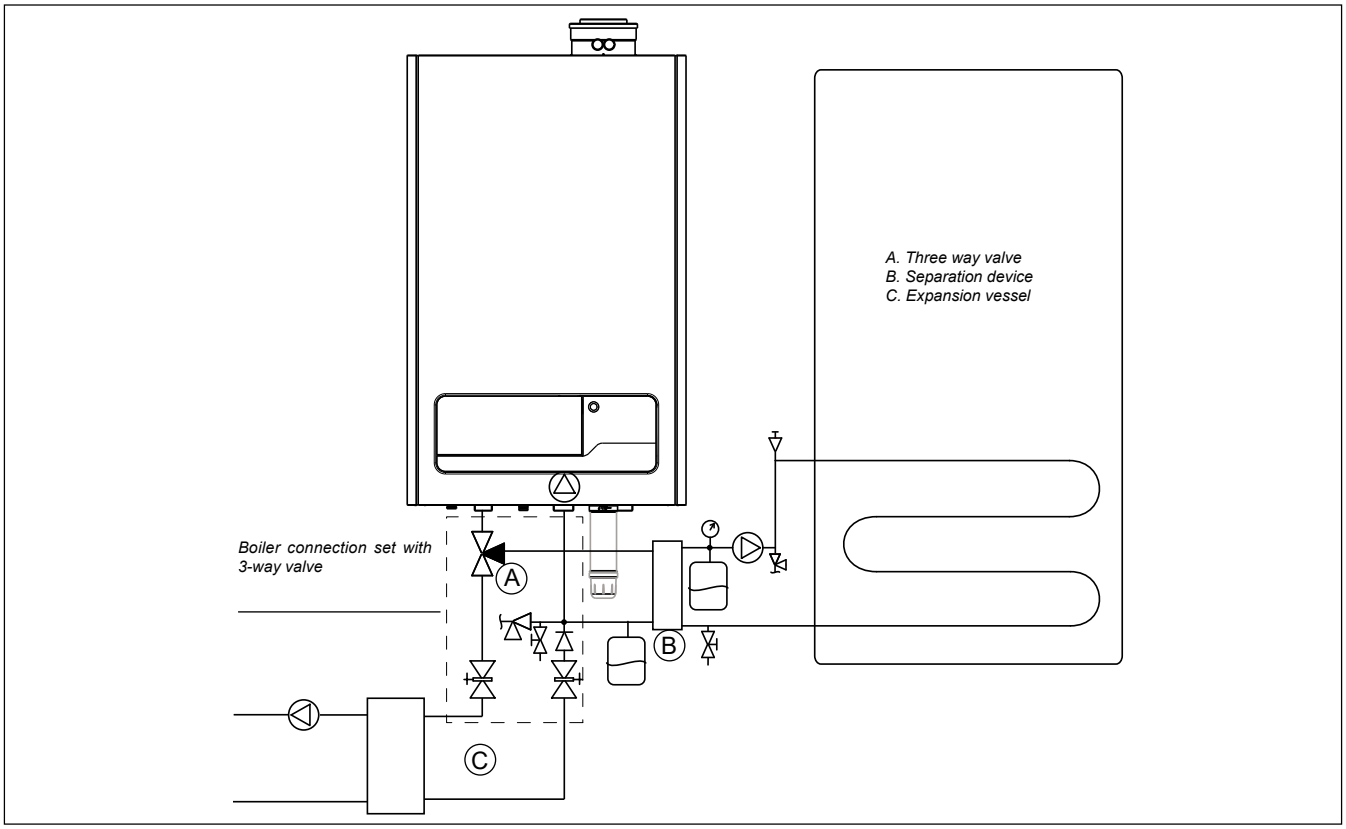


3905032
Boiler connection set with 3-way valve for THISION L ECO in cascade in combination with DN65 and DN100 headers

The hot water supply control can be connected to the ELCO THISION L ECO. For connection and settings refer to the Boiler Control chapter.

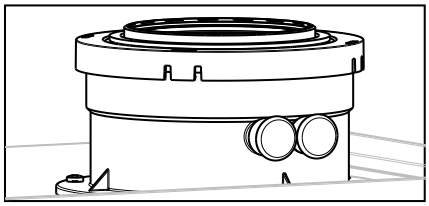
Expansion DHW cylinder circuit
When connecting a DHW cylinder to the boiler before the low velocity header an ELCO three way valve is recommended.
The circuit between the three way valve [A] and the separation device [B] between the boiler and cylinder should be provided with an expansion vessel [C].

Boiler type THISION L ECO	70	100	120
Pump head for DHW (kPa)	25	20	20



Connections
Air- / flue gas ducts for individual boilers

All boiler models have an ø100/150 concentric flue connection.



Flue gas connection
We recommend the use of ELCO's comprehensive range of flue gas components.
For further information, please see the installation instructions:
- ELCO wall terminals
- ELCO roof terminals
- ELCO flue pipe components, both individual pipes and concentric tubes.

Regulations about the construction and installation of flue gas systems are different from country to country.
It must be ensured that all national regulations with regard to chimney systems are observed.

It is not necessary to install a separate condensate drain for the flue gas system, since the condensate will be flushed out via the boiler and into the siphon. Please observe the following recommendations:
- Only use corrosion-resistant material
- The diameter must be calculated and selected according to the national regulations.
- The length of the flue gas system must be kept as short as possible (and must not exceed the maximum permitted length, see the documentation for planners)
- Horizontal flue gas tubes must have an inclination of at least 3° back towards the boiler.

Air supply connection
If required, a separate room sealed air supply tube may be connected via the inclusion of the optional air supply connector fitting. The diameter must be calculated in conformity with national regulations and in combination with the flue gas gas system. The overall resistance of the air supply and flue gas tubes may not exceed the maximum supply pressure of the Fan at any time. (Also see the Chapter "Technical data")

Notes
The tables below give guidance on the maximum lengths of air and flue gas tubes that may be connected. If a room sealed installation is being made utilising separate air and flue gas tubes, the lengths of both tubes must be added together and not exceed the relevant value given in the tables.
In all cases, the concentric flue/air connection on the top of the boiler case is 80/125. When using 100/150 flue components, an allowance for the necessary 80/125 to 100/150 adaptor fitting has been included in the flue lengths indicated in the tables.
The maximum length of any external section of flue pipe must not exceed 5m.

The radius of any bend used in the flue gas system must not exceed 87.5°.

Walls that are sensitive to heat should be insulated.

Construct the flue system in such way that no recirculation may take place.

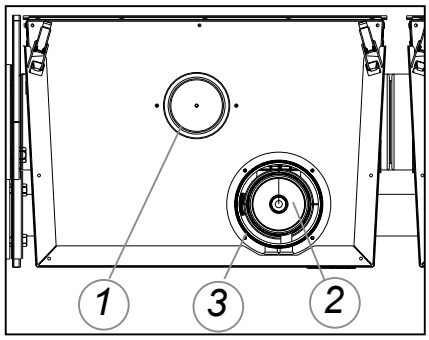
Dimensioning (reference value)

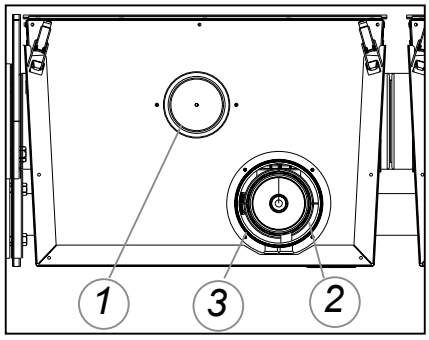
	Maximum length in metres of D100 Ø tubes **(open or parallel tubes room sealed installation)**			
	D 100 mm			
Changes of direction	**0**	**2**	**3**	**4**
70	63	59	57	55
100	35	31	29	27
120	12	8	6	4

	Maximum length in metres for concentric room sealed installations D 100/150			
	D 100/150 mm			
Changes of direction	**0**	**2**	**3**	**4**
70	25	22	20	18
100	15	12	10	8
120	8	5	3	1

Required minimum (flue enclosure) shaft cross-section		
Diameter flue duct	Square shafts	Round shafts
100 mm	140 x 140 mm	160 mm

Connections
Air- / flue gas ducts for individual boilers





Parallel boiler connection
The boiler comes as standard with a parallel connection for the flue gas outlet and air supply system.
The air supply opening (1) has a diameter of ø100mm.
The air supply channel can be connected to it, or, if it involves an “open device” (Drainage category B), an air filter must be fitted.

The air supply (3) of the concentric part is closed by a lid ø150mm.

The flue gas outlet connection (2) has a diameter of ø100mm.

Concentric boiler connection
Carry out the following tasks to convert the boiler to a concentric connection.

- Remove the lid ø150 (3) from the air supply connection of the concentric connection component (2).
- Fit the lid ø100 on the air supply opening (1) and secure it with the screw (all parts are delivered separately in the foam wrapping underneath the boiler)

The air supply opening has a diameter of ø150mm.
The flue gas outlet connection has a diameter of ø100mm.

The flue gas outlet-/air supply system is then connected to the concentric connection component.

The THISION L ECO-boilers can be used both in an “open” and in “closed” system.

Open system
The required combustion air is taken from the immediate environment (boiler room). For this purpose, please comply with the applicable boiler room ventilation regulations.

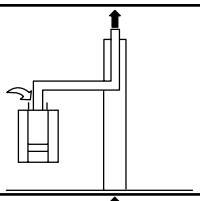
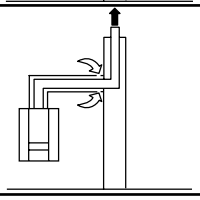
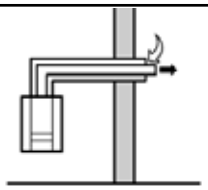
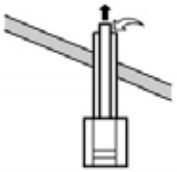
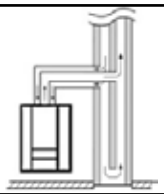
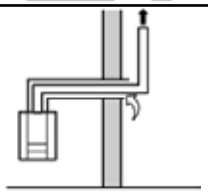
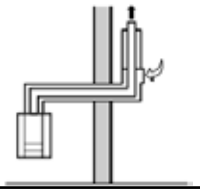
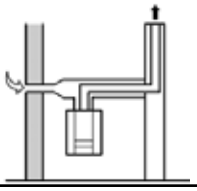
When using boiler category B23 and B33 as an ‘open boiler’, the protection degree of the boiler will be IPX0D instead of IPX4D.
An air filter must be fitted on the air intake of the boiler (available as an accessory with art.nr. 3905046).

Closed system
The required combustion air is sucked in from the outside through a channel. This improves installation possibilities within a building. In general, outside air is cleaner than air from the boiler room.

When the boiler is operational, it produces a white plume of condensation. This condensation plume is harmless but may cause some inconvenience, particularly in the case of wall terminal. As a result, roof terminals are preferred.

In a closed installation, roof terminals should be at the same height preventing flue gas from being sucked in by the other boiler (recirculation). Outlets in recesses and near erected walls may also bring about flue gas recirculation. Recirculation has to be prevented at all times.

Connections
Air- / flue gas ducts - installation variants for individual boilers

Ambient combustion air, ø80 PP		
B23	Flue gas duct into the chimney, aspiration of air from the surroundings. End section of the waste gas duct above the roof.	
B33	Flue gas duct into the chimney, aspiration of air from the surroundings. End section of the waste gas duct above the roof.	
Combustion air taken from the surroundings, ø 80/125 PP/sheet steel white		
C13 C13x	Flue gas duct and suction air over the outer wall, must be in the same square area of: - 50cm for boilers up to 70kW. - 100cm for boilers of 70 to 100kW	
C33 C33x	The flue gas and suction air ducts via the roof terminal, must be in the same square area of: - 50cm for boilers up to 70kW, wherein the difference in height in pipe ends must be less than 50 cm. - 100cm for boilers of 70 to 100kW, wherein the difference in height in pipe ends must be less than 100 cm.	
C43 C43x	Suction air and waste gas duct via the chimney system, which is integrated in the building.	
C53 C53x	Section the air and waste gas exhaust to the outside, in areas with different pressures. Vertical end section of the waste gas duct.	
C63* C63x	Specially developed equipment, for connection to certified air-/waste gas systems that operate separately from one another. * Not permitted in Belgium	
C83 C83x	Air suction on the outside of the building, waste gas duct via the chimney.	
C93 C93x	Air and waste gas piping to the waste gas chimney, via installation in the roof and in a humidity-resistant waste gas chimney. Min. annular gap for waste gas piping: Ø80 = 45mm Ø100 = 50mm Ø110 = 40mm	

Connections
Air- / flue gas ducts - installation variants for multiple boilers

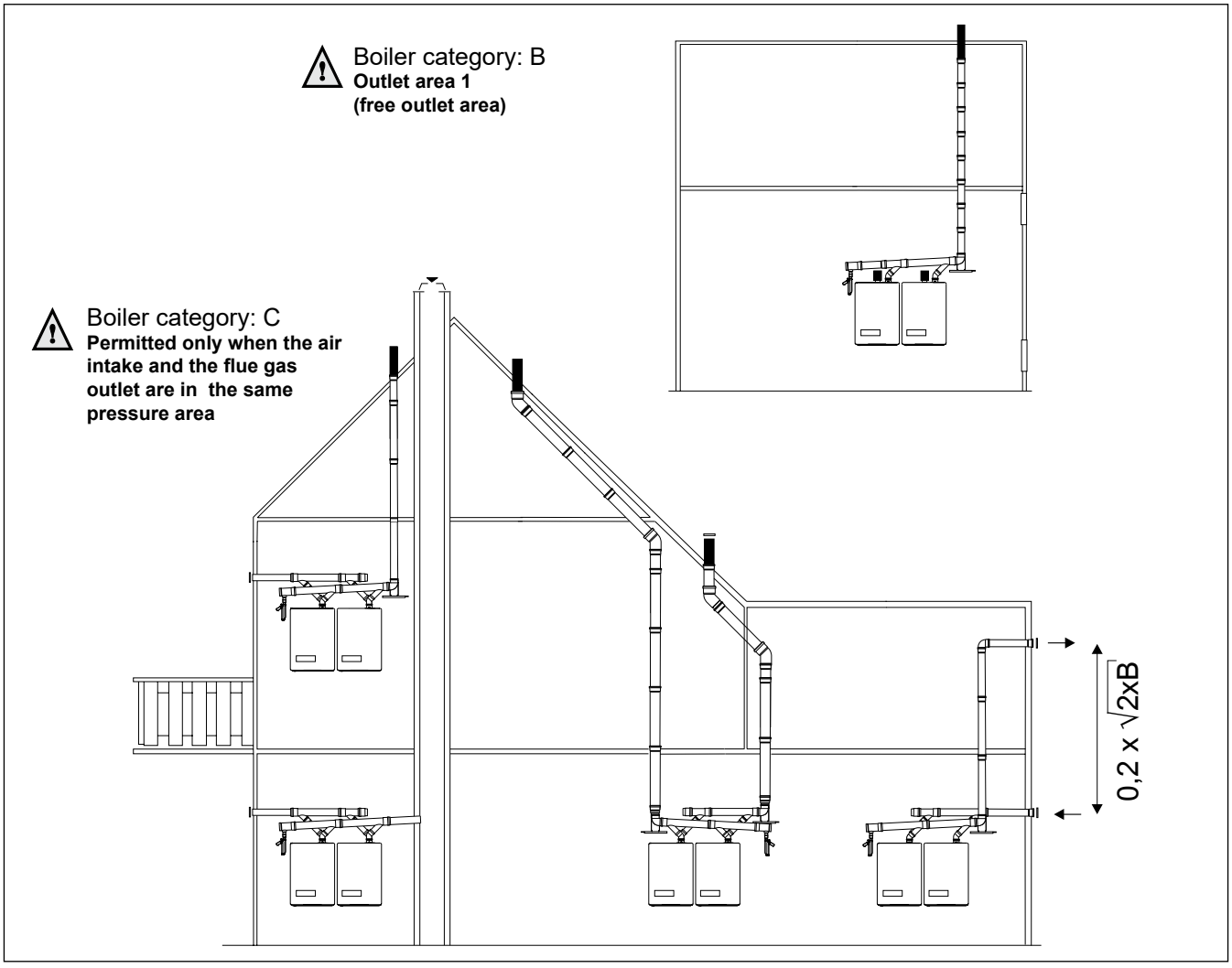
Opting for a collective flue gas outlet is determined by:
- The position of the boilers with regard to their outlet area
- Sufficient space above the boilers
- Large number of boilers

You may opt for:
- Collective flue gas outlet under-pressure
- Collective flue gas outlet over-pressure

In many situations, flue gases cannot be vented individually because the installation is indoors. For such situations, we recommend collective venting by means of under-pressure or over-pressure using a flue gas outlet system. The air supply may also be supplied collectively, but if the boiler room is suitable for that purpose it may also be obtained from this area (`open device` Boiler category B).

In the case of collective venting of flue gases, the flue gas-venting outlet always has to end up in the open area (outlet area 1).

ELCO can supply a collective flue gas outlet system for the ELCO THISION L ECO. Refer to the following chapters with regard to the various possibilities and maximum pipe lengths that can be used.

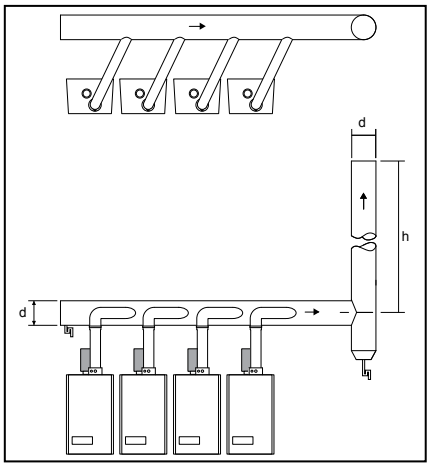


Connections
Collective flue gas outlet under-pressure

Diameter and venting lengths of the flue gas outlet/air supply:
- Open system, with under-pressure (calculated with thermal draft) under atmospheric circumstances.

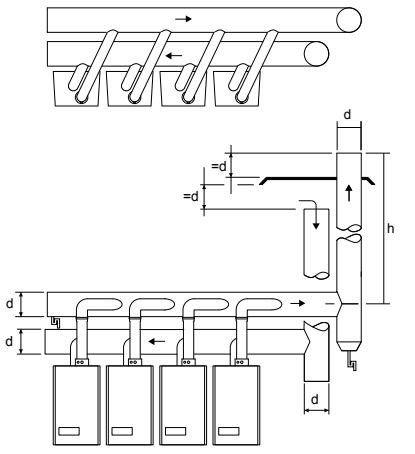
NOTE!

1. IPX0D at flue category B_{23} and B_{33}



Dimensions cascade flue THISION L ECO							
Open system, underpressure							
Output (P) kW at 80/60°C	Type L ECO			d = minimum diameter Ø in mm			
	70	100	120	h = 2 - 5	h = 5 - 9	h = 9 - 13	h = 13 - 17
152	1	1		**210**	**200**	**190**	**190**
180	1		1	**210**	**200**	**190**	**190**
212		1	1	**210**	**200**	**190**	**190**
240			2	**210**	**200**	**190**	**190**
272	1	1	1	**300**	**270**	**260**	**250**
300	1		2	**300**	**270**	**260**	**250**
332		1	2	**300**	**270**	**260**	**250**
360			3	**300**	**270**	**260**	**250**
392	1	1	2	**360**	**330**	**310**	**300**
424		2	2	**360**	**330**	**310**	**300**
452		1	3	**360**	**330**	**310**	**300**
480			4	**360**	**330**	**310**	**300**
512	1	1	3	**440**	**380**	**360**	**340**
544		2	3	**440**	**380**	**360**	**340**
572		1	4	**440**	**380**	**360**	**340**
600			5	**440**	**380**	**360**	**340**
632	1	1	4	**470**	**420**	**400**	**380**
660	1		5	**470**	**420**	**400**	**380**
692		1	5	**470**	**420**	**400**	**380**
720			6	**470**	**420**	**400**	**380**
752	1	1	5	**550**	**470**	**430**	**410**
784		2	5	**550**	**470**	**430**	**410**
812		1	6	**550**	**470**	**430**	**410**
840			7	**550**	**470**	**430**	**410**
872	1	1	6	**600**	**510**	**470**	**440**
900	1		7	**600**	**510**	**470**	**440**
932		1	7	**600**	**510**	**470**	**440**
960			8	**600**	**510**	**470**	**440**

Diameter and venting lengths of the flue gas outlet/air supply:
- Closed system, with under-pressure (calculated with thermal draft) under atmospheric circumstances.



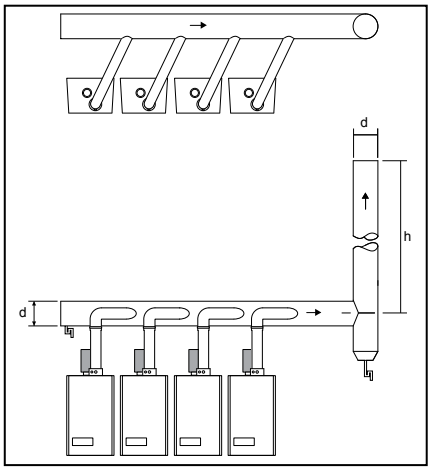
Dimensions cascade flue THISION L ECO							
Closed system, underpressure, parallel							
Output (P) kW at 80/60°C	Type L ECO			d = minimum diameter Ø in mm			
	70	100	120	h = 2 - 5	h = 5 - 9	h = 9 - 13	h = 13 - 17
152	1	1		**240**	**220**	**220**	**220**
180	1		1	**240**	**220**	**220**	**220**
212		1	1	**240**	**220**	**220**	**220**
240			2	**240**	**220**	**220**	**220**
272	1	1	1	**330**	**300**	**290**	**270**
300	1		2	**330**	**300**	**290**	**270**
332		1	2	**330**	**300**	**290**	**270**
360			3	**330**	**300**	**290**	**270**
392	1	1	2	**390**	**370**	**350**	**330**
424		2	2	**390**	**370**	**350**	**330**
452		1	3	**390**	**370**	**350**	**330**
480			4	**390**	**370**	**350**	**330**
512	1	1	3	**460**	**410**	**390**	**380**
544		2	3	**460**	**410**	**390**	**380**
572		1	4	**460**	**410**	**390**	**380**
600			5	**460**	**410**	**390**	**380**
632	1	1	4	**500**	**460**	**440**	**420**
660	1		5	**500**	**460**	**440**	**420**
692		1	5	**500**	**460**	**440**	**420**
720			6	**500**	**460**	**440**	**420**
752	1	1	5	**550**	**500**	**470**	**460**
784		2	5	**550**	**500**	**470**	**460**
812		1	6	**550**	**500**	**470**	**460**
840			7	**550**	**500**	**470**	**460**
872	1	1	6	**600**	**540**	**510**	**490**
900	1		7	**600**	**540**	**510**	**490**
932		1	7	**600**	**540**	**510**	**490**
960			8	**600**	**540**	**510**	**490**

Connections
Collective flue gas outlet over-pressure

An installation with a collective flue gas outlet over-pressure in combination with individually controlled boilers (e.g. 0-10 V control), where no bus cable 3905043 is connected, is NOT allowed.

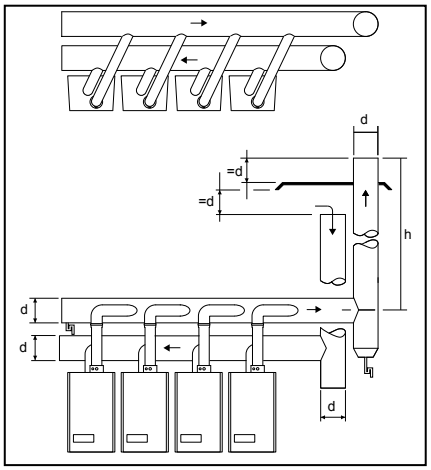
Diameter and venting lengths of the flue gas outlet/air supply:
- Open system with over-pressure.

NOTE!
1. **IPX0D at flue category B_{23} and B_{33}**
2. **Only with bus cable 3905043 connected!**
3. **Adjust parameter 102 to 2**



Diameter and venting lengths of the flue gas outlet/air supply:
- Closed system with over-pressure.

Please contact ELCO.



Dimensions cascade flue THISION L ECO							
Open system, overpressure, parallel							
Output (P) kW at 80/60°C	Type L ECO			d = minimum diameter Ø in mm			
	70	100	120	h = 2 - 5	h = 6 - 10	h = 11 - 15	h = 16 - 20
152	1	1		**100**	**100**	**110**	**110**
180	1		1	**120**	**120**	**130**	**130**
212		1	1	**120**	**130**	**130**	**150**
240			2	**120**	**130**	**150**	**150**
272	1	1	1	**150**	**150**	**180**	**180**
300	1		2	**150**	**180**	**180**	**180**
332		1	2	**180**	**180**	**180**	**180**
360			3	**180**	**180**	**180**	**180**
392	1	1	2	**180**	**180**	**180**	**200**
424		2	2	**200**	**200**	**200**	**220**
452		1	3	**200**	**220**	**220**	**220**
480			4	**200**	**220**	**220**	**220**
512	1	1	3	**200**	**220**	**220**	**220**
544		2	3	**220**	**230**	**230**	**230**
572		1	4	**230**	**230**	**250**	**250**
600			5	**230**	**230**	**250**	**250**
632	1	1	4	**230**	**230**	**250**	**250**
660	1		5	**250**	**250**	**250**	**250**
692		1	5	**260**	**260**	**260**	**260**
720			6	**280**	**280**	**280**	**280**
752	1	1	5	**280**	**280**	**280**	**280**
784		2	5	**280**	**280**	**280**	**280**
812		1	6	**280**	**280**	**280**	**280**
840			7	**280**	**280**	**280**	**280**
872	1	1	6	**280**	**280**	**280**	**280**
900	1		7	**280**	**280**	**280**	**300**
932		1	7	**300**	**300**	**300**	**300**
960			8	**300**	**300**	**300**	**300**

Electrical connection

Electrical connection
Electrical connections must be carried out by an authorized electrical technician, and in conformity with valid national and local standards and regulations.
An insulated mains switch must be used for the power supply, with at least 3 mm contact openings. It must be mounted inside of the boiler room. The mains switch is used for switching off the power supply during maintenance works.

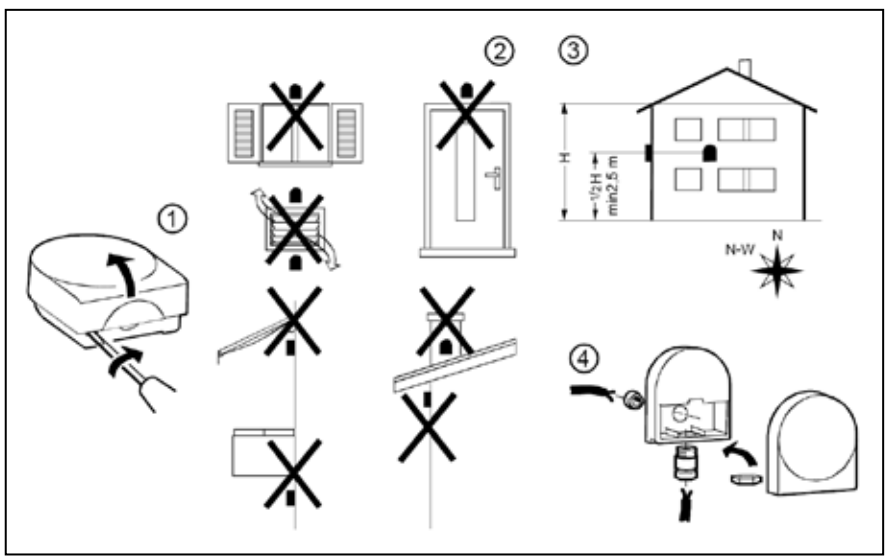
All cables are passed through the cable gland at the bottom of the boiler, and are led to the electronics panel at the front of the boiler.

The electric diagram must be observed during all electrical connection works (see the following pages).

A 230V -50Hz mains electrical supply is required fused externally at 5A.

A deviation on the grid of 230V (+10% or -15%) and 50Hz

The following additional regulations also apply:
- The boiler's wiring is not allowed to be changed;
- All connections have to be made to the terminal block.

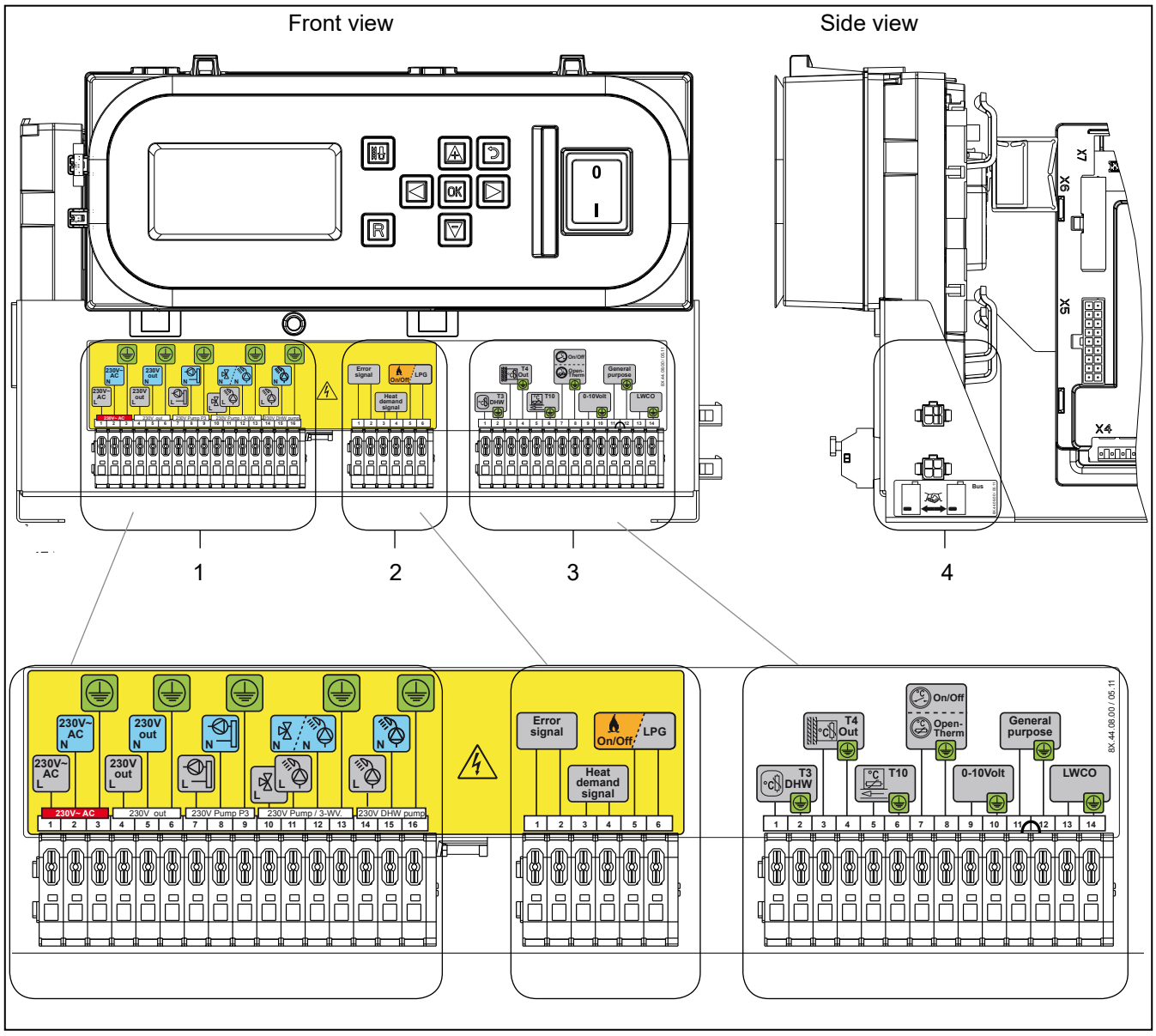


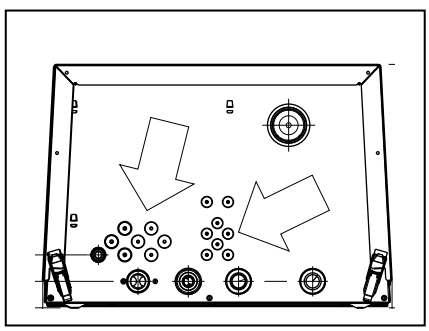
Installation of outdoor sensor
If an outdoor sensor is connected to the boiler, then the sensor must be positioned in conformity with the adjacent drawing.
If an outdoor sensor is NOT connected parameter T-day is the maximum flow temperature. Go to Timeprog. options/ timeprog. CH/T-day (see page 49).

Electrical connection

The boiler has 4 socket blocks for all electrical connections.

1. High voltage supply (230V)
2. Voltage free switches (230V relays)
3. Low voltage sensors
4. Communication bus for cascaded THISION L ECO boilers

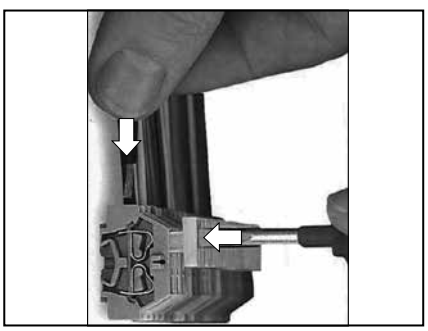




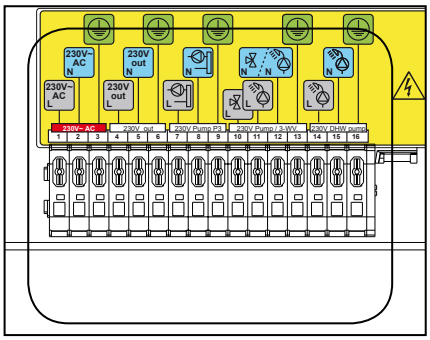
PG glands for cable duct already assembled in the factory. For a few connections, some PG glands are supplied separately.

The maximum cable diameter for the terminals is 2.5mm^2.

Connect the cable by pushing down the control on the terminal strip using a flat screwdriver.

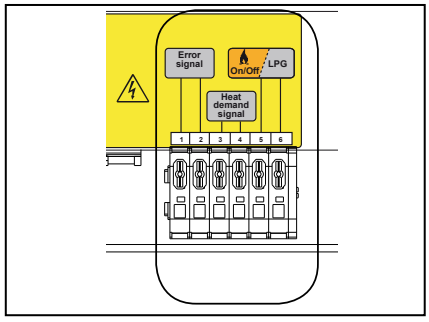


Electrical connection



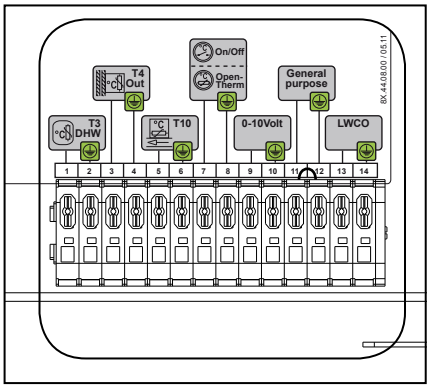
1. High voltage supply: 16 Connections

Position	Connection			Application	PG	Max. V/A
1, 2, 3	Live	Neutral	Earth	Power for boiler. Power cable not supplied	13,5	230V
4, 5, 6	Live	Neutral	Earth	Output	13,5	230V 4A
7, 8, 9	Live	Neutral	Earth	System pump P3	13,5	
10	Live			Three-way valve CH (closed)	13,5	
11	Live			Three-way valve (open) or DHW pump P2		
12		Neutral		Three-way valve or DHW pump P2		
13			Earth	Three-way valve or DHW pump P2		
14	Live			DHW load pump P4	13,5	
15		Neutral		DHW load pump P4		
16			Earth	DHW load pump P4		



2. High voltage switches: 6 Connections

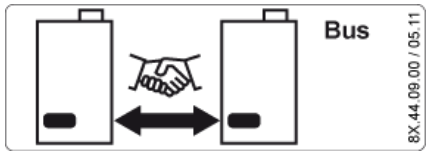
Position	Connection		Application	PG	Max. V/A
1, 2	1	2	Relay output fault signal	13,5	230V 5A
3, 4	3	4	Relay output heat demand	13,5	230V 5A
5, 6	5	6	Relay output external heat source / 2nd propane gas valve	13,5	230V 5A



3. Low voltage sensors: 14 Connections

Position	Connection		Application	Tulles
1, 2	1	2	Hot water sensor T3	IP67
3, 4	3	4	Outdoor sensor T4 (advice)	IP67
5, 6	5	6	Common flow sensor T10** (must be connected)	IP67
7, 8	7	8	On-Off contact** / Open Therm contact (auto detect)	IP67
9, 10	9	10	0 -10 Volt input (temperature or load)	IP67
11, 12	11	12	Blocking contact (bridge mounted)	IP67
13, 14	13	14	Low water pressure switch off contact NO (function not active)	IP67

** If an outdoor sensor is NOT connected T-day is the maximum flow temperature. Go to Timeprog. options/timeprog. CH/T-day (see page 49)

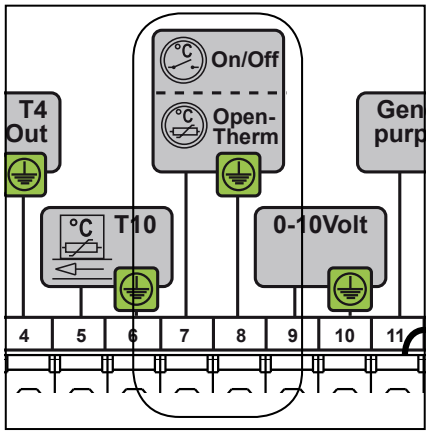


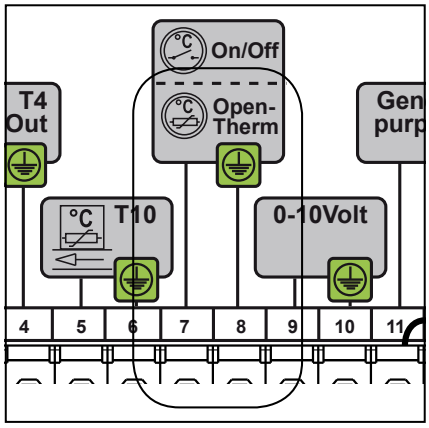
4. Bus communication: 2-pole connector

Position	*Connection*		*Application*	Tulles
			Bus communication cable	*IP67*

The 3905043 bus communication cable mutually connects the cascaded boilers by 4-pole connectors on the side of the connection terminals (2 boilers: 1 cable, 3 boilers: 2 cables etc.) and is fitted with 2 IP67 tulles. A maximum of 8 boilers can be connected by this cable.

Electrical connection
External controls on/off - OpenTherm





NOTE:
- **T10 common flow sensor (supplied) must be connected**
- **T4 outside sensor (optional) is adviced to be connected.**

The ELCO THISION L ECO provides many possibilities to operate the boilers from external controls.

Only 1 type of control can be connected. Connections of the external control must be done in the master boiler (address 01) on terminal 3 and appropriate connections.

Below you will find a description of the possibilities and parameter adjustments to take account of.

1. On-Off contact
An On-Off contact is a volt-free switch to create a heat demand with closed contact.

The On-Off control must be connected to terminal 3, position 7 and 8. This is also the connection for an OpenTherm-control, but it is self-detecting. No specific adjustments are necessary. See page 45 to adjust the flow temperature.

2. OpenTherm-control
An OpenTherm-control is a digital controller which is communicating with the boiler according the OpenTherm-protocol. The controller calculates continuously the desired flow water temperature and sends this to the boiler(s).

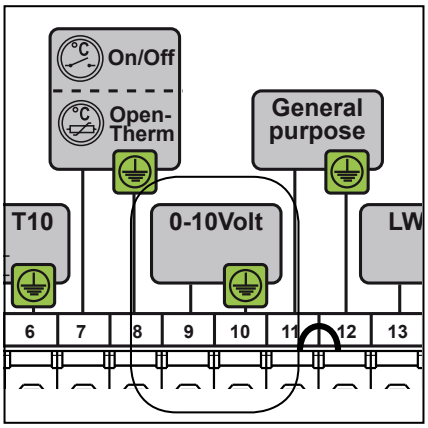
The OpenTherm-control must be connected to terminal 3, position 7 and 8. This is also the connection for an On-Off contact, but it is self-detecting. . After connecting an OpenTherm-control P230 will be visible (Setting level, Param. Chapter, Cascade Param.) where the maximum set point CH can be adjusted.

For control option 1 and 2 counts that the boiler controls its own output (modulating) to achieve the desired temperature. When this is achieved the boiler modulates back to maintain the desired temperature and prevents over shoot.

If an OpenTherm controller of another brand than ELCO is used, it must be ensured that for certain error messages the heat demand is not omitted. This can result in complete loss of heat production.

OpenTherm error messages
The coding of the transmitted Error Messages on a OpenTherm controller is displayed as follows: (E) EB (E = Error Code = B and boiler number)
example: Error Code Ex02SC02 on boiler 6 will appear as (0) 26

Electrical connection
External controls 0-10 Volt



3. 0-10 Volt-control
At a heat demand of the 0-10 Volt controller a signal is sent out and varies from 0-10 Volt. This signal is translated by the ELCO THISION L ECO to a set value (desired flow water temperature or load) which is send via the ELCO data bus to the boiler(s). Depending on the Voltage the set value becomes higher or lower.

The 0-10 Volt-controller must be connected to terminal 3, position 9 and 10.
The choice for temperature or load control can be done by a parameter setting:
- Go to Setting level and Param. Chapter,
- Go to Cascade Param.
- Select P101.

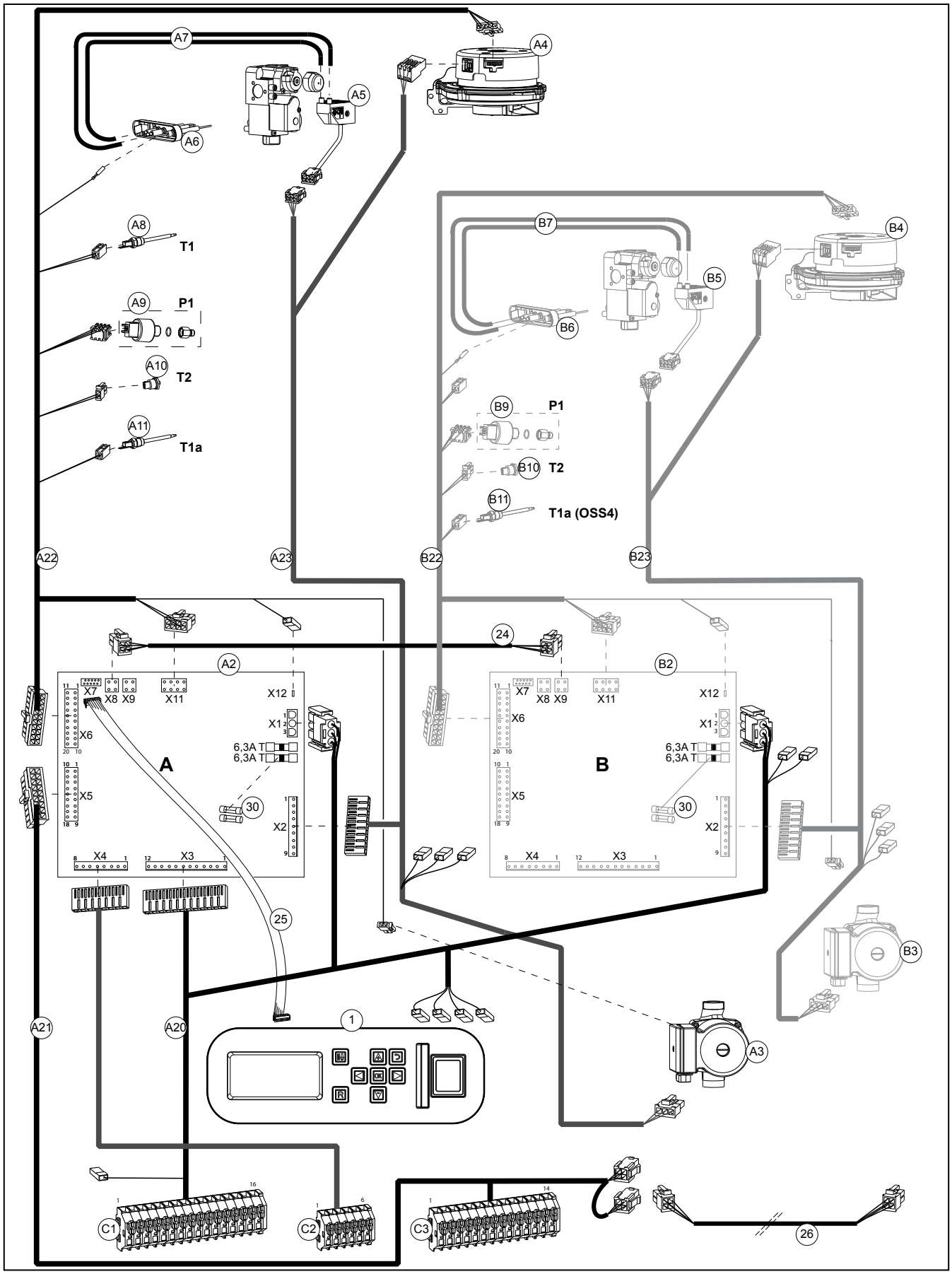
1: When P101 is adjusted to 1 the load control is set. On that moment P205 until P210 in chapter Cascade Param. is released and can be adjusted according to specific requests.
2: When P101 is adjusted to 2 the temperature control is set. On that moment P215 until P220 in chapter Cascade Param. is released and can be adjusted according to specific requests.

See page 50 for the adjustment possibilities.

ADVICE: Choose temperature control for a more balanced boiler control

Behaviour of connected external controls
- When using an OpenTherm or 0-10Volt control and a clock program is selected, the clock program of the THISION L ECO will be ignored.
- When an on/off control is connected and the thermostat is switched on manually before the pre-set switch-on time, the clock program will be ignored and will run on the set day temperature. When switching off manually the clock program will be followed.

Electrical connection
Wiring diagram



Electrical connection
Wiring diagram

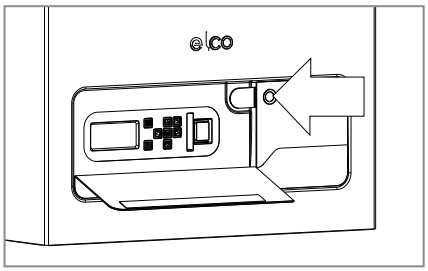
Connections

Item	Art.nr.	Description
		Main components
1		Control unit with screen
Burner A		
A2		Control unit
A3		Circulation pump
A4		Fan
A5		Ignition unit on gas block
A6		Ignition electrode
A7		Ignition cables
A8		Flow sensor T1
A9		Water pressure sensor P1
A10		Return sensor T2
A11		Flow sensor T1a
Burner B		
B2		Control unit
B3		Circulation pump
B4		Fan
B5		Ignition unit on gas block
B6		Ignition electrode
B7		Ignition cables
B8		Flow sensor T1
B9		Water pressure sensor P1
B10		Return sensor T2
B11		Flow sensor T1a (only OSS4)

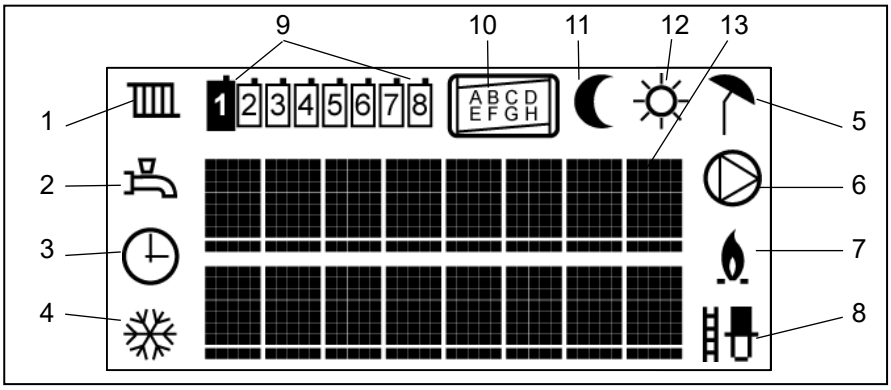
Item	Art.nr.	Description	Conn.	Conn.	Cont.
	64990289	Cable loom complete			
A20		Cable loom conn.terminal 230V+VF	Conn. C1		
			1	Main switch	L
			2	Main switch	N
			3	Earth	
			4	X1-A en X1-B, X4, Main switch	3, 1, L'
			5	X1-A en X1-B, Main switch	2, N'
			6	Earth	"leeg"
				C1	3, 9
			7	X4	2
			8	Main switch	N'
			9	C1	6, 13
			10	X3	8
			11	X3	6
			12	X3	7
			13	C1	9, 16
			14	X3	2
			15	X3	1
			16	C1	13
				X1-A en X1-B, Earth	1
			Conn. C2		
			1	X4	3
			2	X4	4
			3	X4	5
			4	X4	6
			5	X4	7
			6	X4	8
A21		Cable loom conn.terminal LV	Conn. C3		
			1	X5	1
			2	C3	4
			3	X5	2
			4	C3	2, 6
			5	X5	5
			6	C3	4, 8
			7	X5	12
			8	C3	6, 10
			9	X5	16
			10	C3	8, 12
			11	X5	11
			12	C3	10, 14
			13	X5	14
			14	C3	12
				X5	15
			X5		
			1	C3	1
			2	C3	3
			5	C3	5
			8	Bus1	1
			9	Bus1	2
			11	C3	11
			12	C3	7
			14	C3	13
			15	C3	14
			16	C3	9
			17	Bus1	3
			18	Bus1	4

Item	Art.nr.	Description	Conn.	Conn.	Cont.	
A22		Cable loom LV burner A	X6			
			1	T1	1	
			2	T2	1	
			3	T1a	1	
			5	P1	1	
			6	P1	3	
			7	Fan pwm	4	
			8	Fan pwm	2	
			9	X6	19	
			11	T1	2	
			12	T2	2	
			13	T1a	2	
			15	P1	2	
			17	Fan pwm	5	
			18	Fan pwm	1	
			19	X6	9	
			X11			
			3	Pump pwm	1	
			7	Pump pwm	2	
			X12	Ionisation		
B22		Cable loom LV burner B	See A22			
A23		Cable loom 230V burner A	X2			
			1	Fan 230V	3	
				Fan 230V	2	Earth
			2	Fan 230V	1	
			3	Ignition and Gasvalve	1	
			4	Ignition and Gasvalve	4	
				Ignition and Gasvalve	2	Earth
				Pump 230V	3	Earth
			5	Pump 230V	2	
			6	Pump 230V	1	
			7	Ignition and Gasvalve	3	
			8	Ignition and Gasvalve	6	
B23		Cable loom 230V burner B	See A23			
24		Cable loom bus Burner A-B	X8-A	X8-B		
			1	X9	1	
			2	X9	2	
			3	X9	3	
			4	X9	4	
25	64990293	Flat cable MMI				
26	3905043	Communication bus cable				

Description of display



Open the flap by pushing right next of the flap on the round button to reach the display and keybord.



Screen explanation

1. CH-program active
2. DHW-program active
3. Clock program active
4. Pump continuously active or pumps active during frost protection
5. Boiler off at outside temperature
   > T-day (when day temperature is active) or
   > T-night (when night temperature is active)
6. System pump on
7. Burner on. Starts flashing during heat demand, continuous when burner is on
8. Chimney sweep function (100% power for emission measurement)
9. Boiler address:
   1 = Cascade Master
   2.8 = Cascade Slaves
10. Identification burner inside boiler
11. Night temperature active
12. Day temperature active
13. 2 text lines with 8 characters each. The operational status, messages and possible errors are displayed here.

The boiler has a pilot-control. This control takes care of most of the manual settings but also provides numerous settings to adjust the control exactly to the installation and user requirements.

Display
The LCD screen is backlit. The light is activated by pushing one of the buttons.

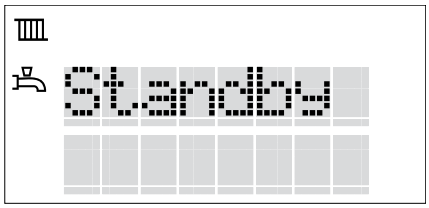
There are 3 light colours available. The various colours indicate the following:

Blue	Basic level
Green	Setting level
Red	Problem display (flashing)

Having pressed a button, the screen light stays on for 2 minutes (blue screen) or 20 minutes (green screen).

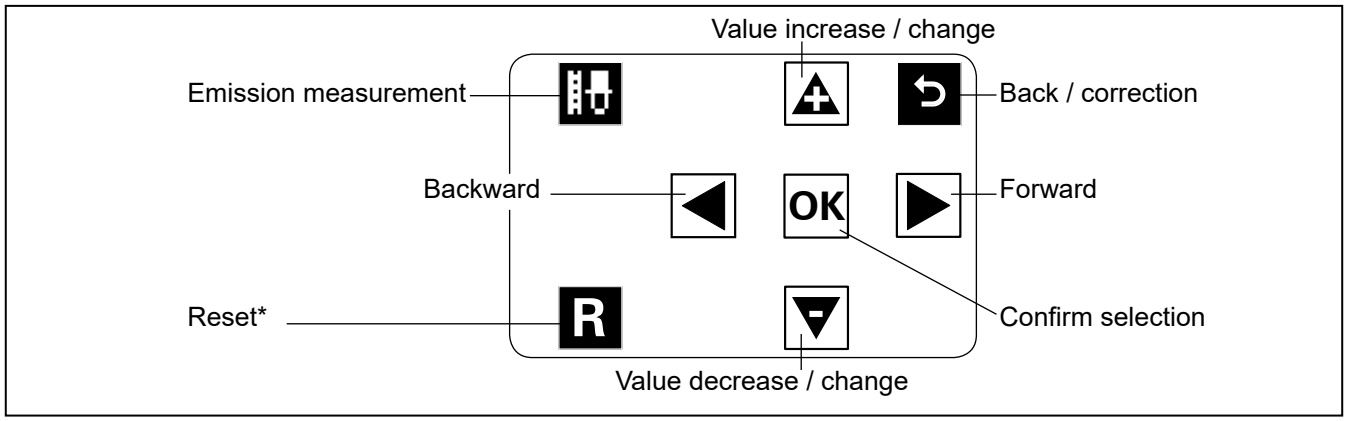
Boiler symbols are not visible in case of a single boiler or when no bus communication cable is connected (Error code M024sc08).

Description of display and keyboard



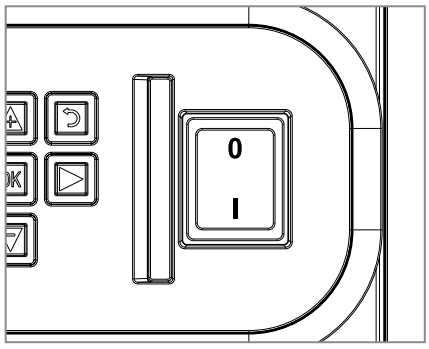
Operational status

- **Standby**	Standby. Boiler is ready for operation.
- **Vent.Phase**	Ventilation stage
- **Ignition phase**	Ignition stage
- **Burner lit CH**	Burner active for heating
- **Burner lit DHW**	Burner active for hot water
- **CH T > Tset**	Burner off on account of too high flow temperature CH
- **Overrun CH**	Overrun time pump over CH
- **Overrun DHW**	Overrun time pump over DHW
- **Service**	Boiler needs maintenance. Contact installer
- **Frost**	Burner active for frost protection



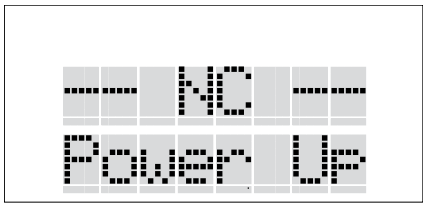
The keyboard consists of a logical button allocation for menu control, confirmation, and correction and emission measurement.

* **Reset only functions in case of an Error or Message. If reset is rapidly pressed over a short period of time, the device will block completely. Only loss of power (unplug) will restart the device completely.**
Recommendation: First identify the fault by finding the fault code in the fault-code list in the problem-shooting chapter and solve the problem.



The main switch is located on the right hand side of the keyboard. This switch controls the 230V power supply (L and N).

Start-up

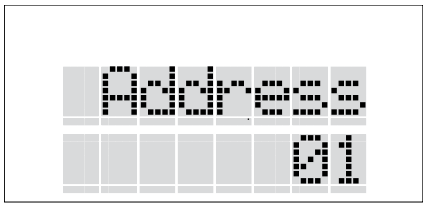


Turn the electrical supply on (heating system does not have to be filled);

During start-up, a blue screen is displayed:

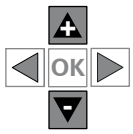
NC
Power Up
(= start-up screen)

Please wait
(under certain circumstances)



Then you see:

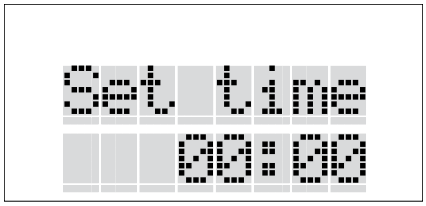
Address
01
(= allocation of boiler address)



In the case of a cascade installation: -
- Select the correct address
- Press OK
- Select for the first boiler 01 (=Master), for the next 02, 03 etc (=Slave)

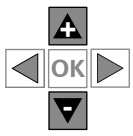
The address can be changed by pushing the + button (increase value) and the – button (decrease value). Once the + or – buttons has been pushed, the value starts flashing.

In the case of a single boiler:
- Confirm address 01 by OK

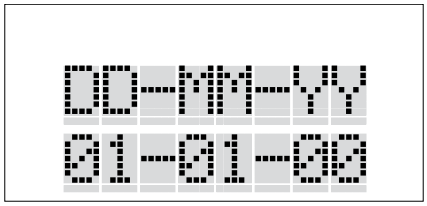


The display shows:

Time Set
00:00
(= setting actual time)
Setting time and day is only required on the Master-boiler. The Slave-boiler will take the time and day settings automatically.



- First set the hours using + and -.
- Press the “right arrow” button to move to the minutes.
- Set the minutes using + and -.
- Confirm by OK



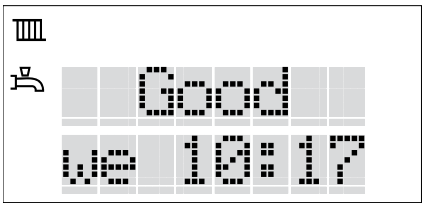
The display shows:

DD-MM-YY
01-01-00
(= setting actual date)

- Change the settings using the + and – button.
- Jump from DD to MM and YY using the arrow button.

After confirmation by OK and after the automatic de-aeration programm has ended, you will see the standard read-out “Good” showing the date and the time after the de-aerating program.

Standard read-out:



Good indicates that the boiler operates normally (burner on or off)
wo 10:17 indicates the actual day and time.

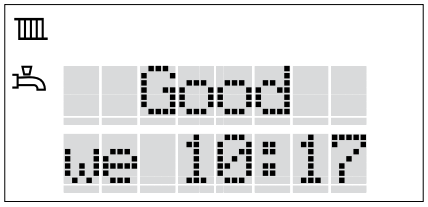
Following a restart (after loss of power): Following a brief loss of power, the control will start-up as described above, but all settings are retained.
In the case of a loss of power lasting more than 2 hours the time and date has to be set again. All other settings are retained.

If the water pressure is below 1.0 bar, the screen will show: FILL. Please refer to the chapter Filling CH-system.

Display read-out
Boiler addresses

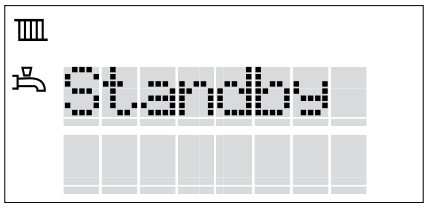
The standard read-out offers 3 information screens.
Switching to different screen scan be found using the + or - button

1



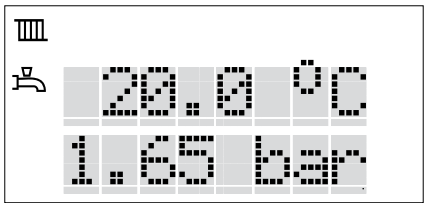
1. **“Good”- read-out**
   Good with actual day and time (see above)

2



2. **Operational status**
   Refer to chapter 9.1 for explanation of texts

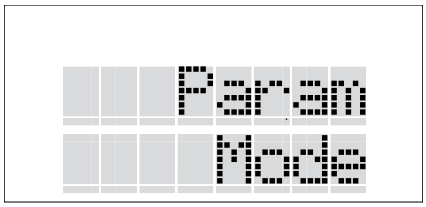
3

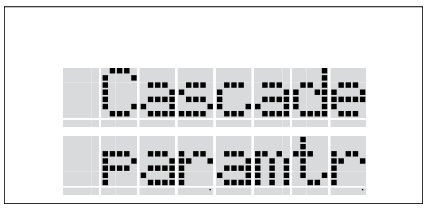


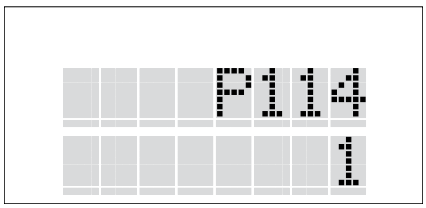
3. **Technical read-out**
   Actual water flow temperature. (T1 in °C) and water pressure (P in bar).

For THISION L ECO boilers in cascade
For THISION L ECO boilers in cascade, the bus communication cables between the boilers must be connected (see section electrical connections).
The master-boiler (address 01) should be set to how many boilers are actually connected.

From the standard display with illuminated display:

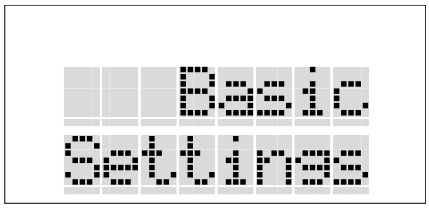


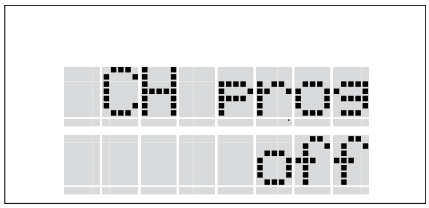


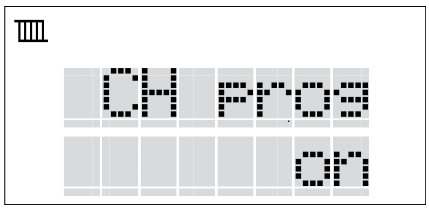


1. Press 2 seconds the arrow buttons simultaneously;
2. Use the right arrow button until: Param Mode;
3. Press the OK button; Cascade param. is shown;
4. Press the OK button again;
5. Push the right arrow button until P114;
6. Press the OK button;
7. Press the + button until the total number of boilers in cascade:
8. Press the OK button;
9. Press the return button until standard read-out

Basic operations
Selecting programs







Switching on the Heating, DHW and Pump program

By switching on the functions (, and/or) the boiler is turned on.

Proceed as follows:
From the standard display with illuminated display:

1. Press the right arrow button:
   The display shows: Basic settings;
2. Press the OK button;
3. Press the right arrow button:
   The display shows: CH prog off;
4. Press the + button:
   The display shows: CH prog on;
5. Press the OK button;
6. Repeat the procedure from point 3.
   In this way the functions DHW and Pump can be switched on.
7. Press the return button to go back to the standard display.

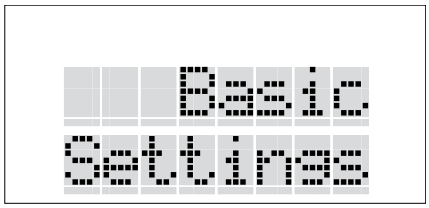
Depending which programs are switched on the corresponding symbols will be shown:

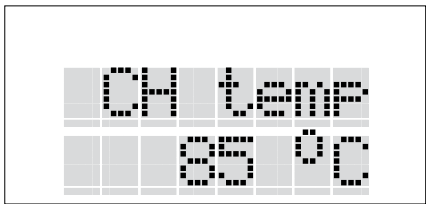
CH

DHW

Pump

Basic operations
Setting the maximum flow temperature with On/Off-control

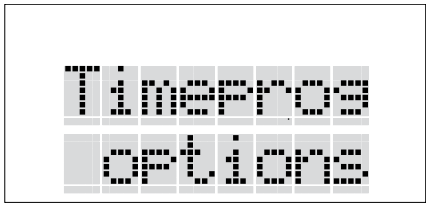


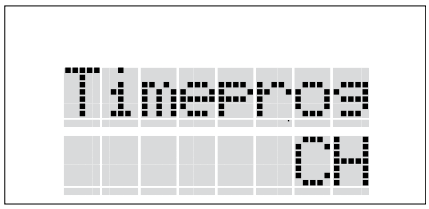


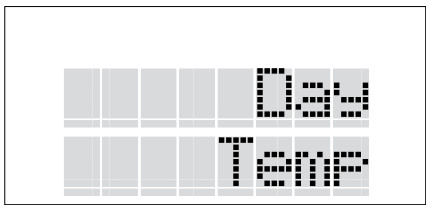
P101 = 0

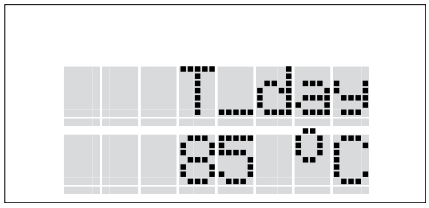
Setting the maximum flow water temperature with connected outdoor sensor T4.
(starting with illuminated display):

1. Press the right arrow button:
   The display shows: Basic Settings;
2. Press the OK button;
3. Press the right arrow button until CH temp:
   The display shows: CH temp 85°C;
4. Press the + or - button to adjust the desired flow temperature and press the OK button.









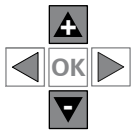
Setting the maximum flow water temperature without outdoor sensor T4.
(starting with illuminated display):

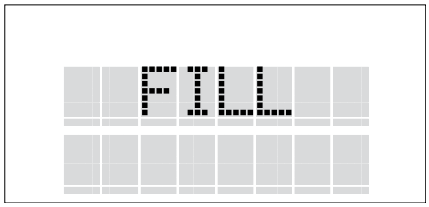
1. Press the right arrow button until Timeprog-options;
2. Press the OK button;
3. Press the right arrow button until Timeprog CH;
4. Press the OK button;
5. Press the right arrow button until Day Temp;
6. Press the OK button;
   The display shows: T_day
7. Press the + or - button to adjust the desired flow temperature and press the OK button.

Filling the heating system

When all boilers have been electrically commissioned as described above, then the heating system can be filled. Each boiler is fitted with a filling and drain valve. The filling hose from the water tap is then connected to it.

Fill the heating system only with drinking water. Refer to the Water Quality chapter for quality requirements of the filling water.





Water pressure

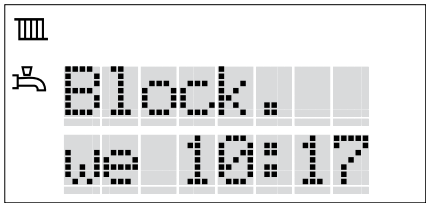
Screen display				
Good Read-out	Operation status	Technical read-out	Description	Action
FILL dd 00:00	FILL Bx12sc03	xx.x°C P0,0	Water pressure is 0 bar, boiler off	Top up water
FILL dd 00:00	FILL Bx12sc03	xx.x°C P≥0,7	Water pressure above 0.7 bar. The boiler is off. The automatic venting program starts	Top up water until approx. 1,7 bar
Block. dd 00:00	Vent Prog.	xx.x°C P≥1,2	Automatic venting program, afterwards (approx. 13 min.) boiler is on standby	Top up water until approx. 1,7 bar
Good dd 00:00	(variable)	xx.x°C P>1,0 <4,0	Water pressure is good. Boiler standby or in normal operation	None
Block. dd 00:00		xx.x°C P≥4,0	Water pressure too high, boiler off due to blocking	Drain water until approx. 1,7 bar
Good dd 00:00	(variable)	xx.x°C P<3,7	Water pressure is good. Boiler operates normally again	None
Message/ Block. dd 00:00	FILL Message Mx24sc14	xx.x°C P<1 >0,7	Water pressure too low. Boiler is limited to 50% load	Top up water until approx. 1,7 bar

Venting program

When, on filling the system, the water pressure rises above 0.7 bar, the venting program will start automatically. The program lasts approx. 13 minutes and in doing so, turns the pump on and off and, if fitted, the three-way valve every 80 seconds to remove the remaining air from the boiler. All venting points still have to be vented when filling the installation. The boiler will be on standby after the venting program.

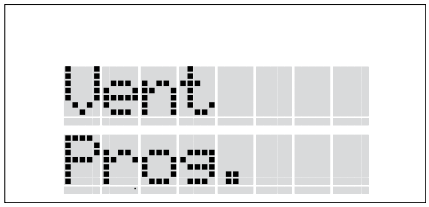
Interrupting the venting program (not recommended) is only possible from the setting level by pressing OK during the venting program.

For boiler checks please refer to the chapter Checks prior to commissioning. For any checks or setting changes, refer to the Basic Settings chapter.



The automatic venting program only vents the boiler and not the rest of the installation.

Read-out 1 (Good status) displays Block. with actual day and time on the screen.



Read-out 2 (operational status) displays Vent Prog on the screen. [From Good press the – button 1x: Vent Prog is now displayed]

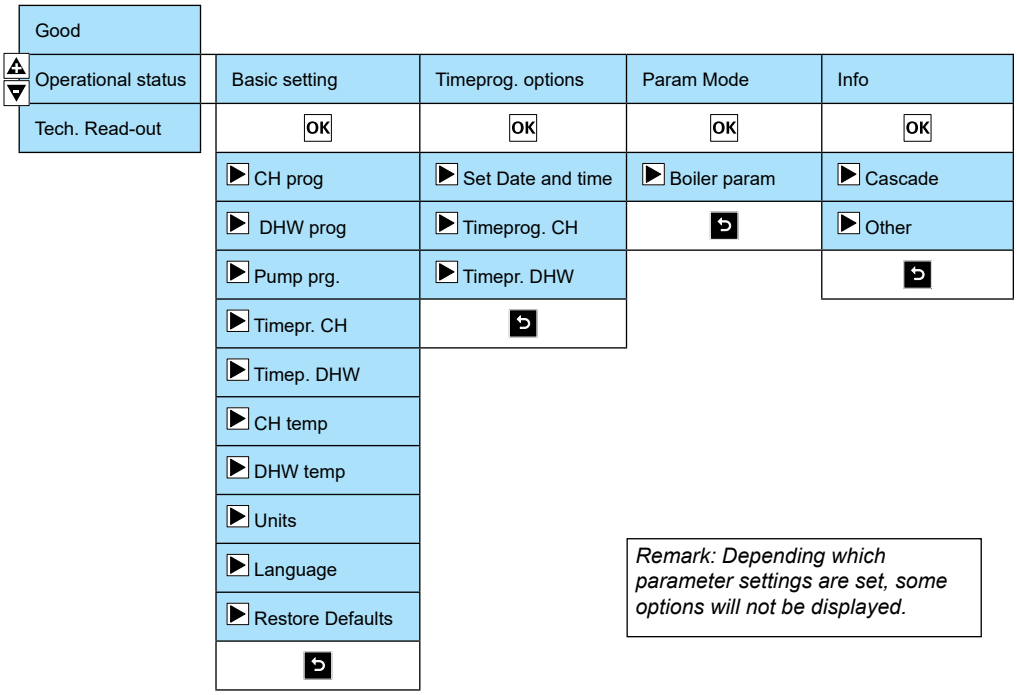
Menu structure at Basic level

Menu structure

There are 2 setting levels
1. Basic level (manager/user):
   Blue screen
2. Setting level (Installer):
   Green screen

With the illumination switched off, first press on one of the buttons to switch the illumination on and then continue with the setting. Having pressed the last button, the blue illumination will switch off after 2 min.

Menu structure at Basic level



Remark: Depending which parameter settings are set, some options will not be displayed.

With the arrow buttons you can go through the different chapters.

Press OK to select or to confirm a change.

With the + and - button you can increase or decrease a selected value.

Back to previous screen or standard read out: Press this 'return-button'.

Refer to the Parameters chapter for all parameters and related settings.

Menu structure at Setting level

Menu structure at Setting level

With the illumination switched off, first press on one of the buttons to switch the illumination on and then continue with the setting. Having pressed the last button, the green illumination will switch off after 2 min.

From the standard read-out, keep both arrow buttons pushed down simultaneously for 2 sec. The screen color will change from blue to green.

Refer to the Parameters chapter for all parameters and related settings.

Clock program Heating line

Clock program (from standard switched off in Basic settings)

The switch times in the pre-set clock programs are detailed in the table on the right. Each clock program can be adjusted to each individual situation. Conditions are:

- Maximum 4 switch points per day;
- Settings for day and night are determined by the settings: Time pr. options/Time prog. CH/Day Temp. and Night temp.;
- The setting OFF switches the heating off during the whole set period. The frost protection is active;
- Setting - - - turns the switch point OFF;
- Switch times can be set in steps of 30 minutes.

Advice:
Keep in mind when setting the switching periods for domestic hot water that it is sufficiently long to ensure that hot water is always available during actual use. In most cases, the pre-set program 1 of the clock program suffices.

Behavior of connected external controls

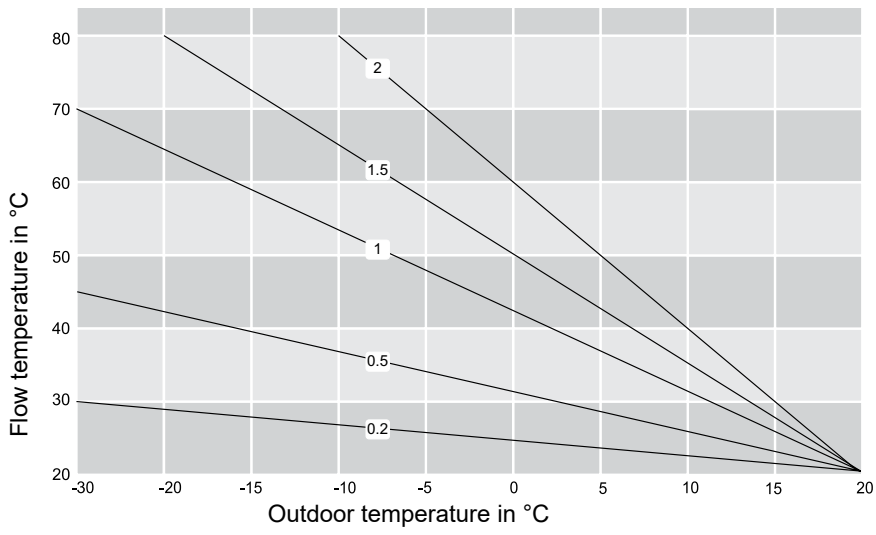
- When using an OpenTherm or 0-10Volt control and a clock program is selected, the clock program of the THISION L ECO will be ignored.
- When an on/off control is connected and the thermostat is switched on manually before the pre-setted switch-on time, the clock program will be ignored and will run on the set day temperature. When switching off manually the clock program will be followed.

Pre-set clock programs

Day	Switch point	CH pre-set 1		CH pre-set 2		DHW pre-set 1*	
		Time	Setting	Time	Setting	Time	Setting
4 switch points per day, adjustable per 30 min.							
mo	1	7:00	day	8:00	day	3:00	on
	2	18:00	night	12:00	night		
	3			17:00	day		
	4			19:00	night		
tu	1	7:00	day	8:00	day		
	2	18:00	night	12:00	night		
	3			17:00	day		
	4			19:00	night		
we	1	7:00	day	8:00	day		
	2	18:00	night	12:00	night		
	3			17:00	day		
	4			19:00	night		
th	1	7:00	day	8:00	day		
	2	18:00	night	12:00	night		
	3			17:00	day		
	4			22:00	night		
fr	1	7:00	day	8:00	day		
	2	18:00	night	12:00	night		
	3			17:00	day		
	4			19:00	night		
sa	1			8:00	day		
	2			12:00	night		
	3			17:00	day		
	4			19:00	night		
su	1						
	2						
	3						
	4					3:00	on

* The clock program for domestic hot water is set on continuous demand to prevent there being no hot water available at starting up. The program can be adjusted to each individual situation.

Heating line (K-factor)



Parameters end users (blue screen)

Basic display “dark”
- Press on one of the buttons to switch the illumination on (blue screen).
- Press the + or - button to go to the “Operational status” read-out
- Press arrow button to the right to go to the required menu (arrow to the low goes back)
- Press OK to select the required menu
- Press the arrow button to the right to go to the required parameter (arrow to the low goes back)
- Use the + and - button to change the value
- Press OK to confirm the new value
- Use the retrun button to go back to menu or standard read-out.

Having pressed the last button, the blue illumination will switch off after 2 min.

Overview of commissioning parameters
The parameter lines with a grey background only become visible at the technician level.
The complete parameter list becomes visible at the technician level.

Basic settings		**Basic settings**	
PARA	**factory setting**	**Description**	**Range**
CH prog	off	CH-program	on/off
DHW prog	off	DHW-program	on/off
Pump prg	off	Pump program (frost protection)	on/off
Timerpr CH	off	Clock program CH	on/off
Timerp DHW	off	Clock program DHW	on/off
CH temp	85	"Adjusted maximum flow temperature in °C (only active with connected outdoor sensor & P101=0)"	10-90
DHW temp	65	Adjusted maximum DHW temperature in °C (only visible when P100>0 and T3 is connected)	10-80
Units	SI	Selection possibility units SI=Europe, Imp(erial)= USA	SI/Imp
Language	GB	Language selection	GB, NL, I, D, F, PL, TR, RUS, UA
Restore defaults		Reset of the factory settings (dependant of selected level)	
Timeprog options		**Clock program options**	
PARA	**factory setting**	**Description**	**Range**
Set date and time			
Set Time	00:00	Actual time setting in hours and minutes	
Set Date	DD-MM-YY	Actual date setting day-month-year	
Daylight saving	Europe	Zone for daylight saving	Off-Eur-USA
12/24hrs	0-24h	12-hour (AM/PM) or 24-hour display	AM/PM-24h.
Date format	DD-MM-YY	Reproduction of date display (DD-MM-YY, MM-DD-YY, YY-MM-DD)	
Time prog CH (only visible when NOT OpenTherm or 0-10V)			
Day temp	T-day 20	Day temperature according heating line in °C (if outdoor sensor is NOT connected: max flow temp.)	"10-30 (10-90)"
Night temp	T-night 15	Night temperature according heating line (Eco) in °C	10-30
Select Preset	Preset 1	Choice for the preselected time programm CH	1 or 2
Adjust Timeprog	mo1 off 03:00	See table time programs CH It is possible to select 4 switch moments (steps of 30 min.) per day. Choice: day temperature, night temperature, off, - - - Copy function to next day: after switch moment 4.	
Store Preset		Store of the adjusted time program for CH	
Timepr DHW (only visible when NOT OpenTherm)			
Select Preset	Preset 1	Choice for the preselected time programm DHW	1 or 2
Adjust Timeprog	mo1 off 03:00	See table time programs DHW It is possible to select 4 switch moments (steps of 30 min.) per day. Choice: on, off, - - - Copy function to next day: after switch moment 4.	
Store Preset		Store of the adjusted time program for DW	
Param Mode		**Parameter chapter**	
PARA	**factory setting**	**Description**	**Range**
Boiler param		**Boiler parameters**	
P132	1	Pump continuously	1-2
		1:Unit pump P1	
		2 Unit pump P1 and installation pump P3	
Info		**Information**	
Cascade		**Information of cascade system**	
T3	xx.x°C	DHW temperature T3 in external cylinder in °C (if connected and P100 is selected for DHW)	
T4	xx.x°C	Outdoor temperature T4 in °C (if connected)	
T10	xx.x°C	Temperature T10 sensor in low velocity header in °C	
Boiler		**Information of the boiler**	
T3	xx.x°C	DHW temperature T3 in external cylinder in °C (if connected and P100 is selected for DHW)	
Others			
Stand-by	xx h	Number of hours stand by	
Burn. On	xx h	Number of running hours with burner on	
Service	xx h	Number of running hours to go for maintenance interval	
Ignition	xx	Number of times ignition	
Faults	xx	Number of times in error	

Parameters technician (green screen)

Basic display “dark”
- Press on one of the buttons to switch the illumination on (blue screen).
- Press both arrow buttons for 2 seconds (green screen)
- Press the + or - button to go to the “Operational status” read-out
- Press arrow button to the right to go to the required menu (arrow to the low goes back)
- Press OK to select the required menu
- Press the arrow button to the right to go to the required parameter (arrow to the low goes back)
- Use the + and - button to change the value
- Press OK to confirm the new value
- Use the retrun button to go back to menu or standard read-out.

Having pressed the last button, the blue illumination will switch off after 2 min.

Overview of commissioning parameters

The parameter lines with a grey background only become visible at the technician level.

The complete parameter list becomes visible at the technician level.

Basic settings		**Basic settings**	
PARA	**factory setting**	**Description**	**Range**
CH prog	off	CH-program	on/off
DHW prog	off	DHW-program	on/off
Pump prg	off	Pump program (frost protection)	on/off
Timerpr CH	off	Clock program CH	on/off
Timerp DHW	off	Clock program DHW	on/off
CH temp	85	"Adjusted maximum flow temperature in °C (only active with connected outdoor sensor & P101=0)"	10-90
DHW temp	65	Adjusted maximum DHW temperature in °C (only visible when P100>0 and T3 is connected)	10-80
Units	SI	Selection possibility units SI=Europe, Imp(erial)= USA	SI/Imp
Language	GB	Language selection	GB, NL, I, D, F, PL, TR, RUS, UA
Restore defaults		Reset of the factory settings (dependant of selected level)	
Timeprog options		**Clock program options**	
PARA	**factory setting**	**Description**	**Range**
Set date and time			
Set Time	00:00	Actual time setting in hours and minutes	
Set Date	DD-MM-YY	Actual date setting day-month-year	
Daylight saving	Europe	Zone for daylight saving	Off-Eur-USA
12/24hrs	0-24h	12-hour (AM/PM) or 24-hour display	AM/PM-24h.
Date format	DD-MM-YY	Reproduction of date display (DD-MM-YY, MM-DD-YY, YY-MM-DD)	
Time prog CH (only visible when NOT OpenTherm or 0-10V)			
Day temp	T-day 20	Day temperature according heating line in °C (if outdoor sensor is NOT connected: max flow temp.)	"10-30 (10-90)"
Night temp	T-night 15	Night temperature according heating line (Eco) in °C	10-30
Select Preset	Preset 1	Choice for the preselected time programm CH	1 or 2
Adjust Timeprog	mo1 off 03:00	See table time programs CH It is possible to select 4 switch moments (steps of 30 min.) per day. Choice: day temperature, night temperature, off, - - - Copy function to next day: after switch moment 4.	
Store Preset		Store of the adjusted time program for CH	
Timepr DHW (only visible when NOT OpenTherm)			
Select Preset	Preset 1	Choice for the preselected time programm DHW	1 or 2
Adjust Timeprog	mo1 off 03:00	See table time programs DHW It is possible to select 4 switch moments (steps of 30 min.) per day. Choice: on, off, - - - Copy function to next day: after switch moment 4.	
Store Preset		Store of the adjusted time program for DW	

Parameters technician (green screen)

Param Mode		Parameter chapter	
PARA	factory setting	Description	Range
Cascade param.		Cascade parameters	
P100	0	Domestic hot water facility 0: no DHW 1: Solo boiler with 3-way valve 2: n.a. 3: Solo boiler with cylinder loading pump P4 and 3-way valve 4: n.a. 5: After low loss header: DHW after LLH with cylinder pump P2 and P3=off 6: After low loss header: DHW after LLH with cylinder pump P2 and P3=on at heat demand CH 7: After low loss header: DHW loading system after LLH with cylinder loading pump P2, P4 and P3=off 8: After low loss header: DHW loading system after LLH with cylinder loading pump P2, P4 and P3=on at heat demand CH	0-8
P101	0	Heating 0: 0÷10V not active 1: 0÷10V= load control (see further P205 until 210) 2: 0÷10V= temperature control (see further P215 until 220) 3: Showroom position	0-3
P104	0	Outside sensor T4 0: autodetect 1: connected	0-1
P105	0	Common flow sensor T10 0: autodetect 1: connected	0-1
P106	20	Min. Setpoint T10	0-60
P107	0	Min.Setpoint function T10 0: off 1: minimum value setpoint at heat demand CH 2: continuously minimum value setpoint	0-2
P109	0	Correction outside sensor	-5 - 5
P111	20	CH-set gradient-reference	0-60
P112	1,0	CH-set gradient in °C/10sec in steps of 0,1°C	0-10
P114	1	Number of boilers in cascade (To be set manually!)	1-8
P121	1	Relay function Propane/External heating source 0: Only propane 1: On/Off external heating source	0-1
P125	1	DHW priority 0:No 1: Yes	0-1
P157	0	OpenTherm error bit selection 0: Only errors 1: Errors and blockings 2: Errors, blockings and messages	0-2
P158	0	Error relay selection 0: Only errors 1: Errors and blockings 2: Errors, blockings and messages	0-2
P170	95	Switch on moment relay external heating source When demand is higher then adjusted value the external heating source will be switched on	0-100%
P171	90	Switch off moment relay external heating source When demand is lower then adjusted value the external heating source will be switched off	0-100%
P203	2	Overrun time secondary pump P3 in minutes	0-60
		At P101 = 1 (Load control):	
P205	2	0-10V, load voltage to have minimum heat demand (P208 power) (If P101=1)	0-10
P206	9,5	0-10V, load voltage to have maximum heat demand (P207 power) (If P101=1)	0-10
P207	100%	0-10V, load maximum power (dynamic range) (If P101=1)	0-100
P208	0%	0-10V, load maximum power (dynamic range; 0% is minimum power) (If P101=1)	0-100
P209	1	0-10V, load heat demand when input voltage> (If P101=1)	0-5
P210	0,5	0-10V, load no heat demand when input voltage< (If P101=1)	0-5
		At P101 = 2 (Temperature control):	
P215	2	0-10V, load voltage to have minimum heat demand (If P101=2)	0-10
P216	9,5	0-10V, load voltage to have maximum heat demand (If P101=2)	0-10
P217	1	0-10V, load heat demand when input voltage> (If P101=2)	0-5
P218	0,5	0-10V, load no heat demand when input voltage< (If P101=2)	0-5
P219	30	0-10V, temperature setpoint at minimum input voltage (If P101=2)	10-90
P220	85	0-10V, temperature setpoint at maximum input voltage (If P101=2)	10-90

NOTE:
Option 6 and 8 not for Low Temerature systems, unless separately controlled

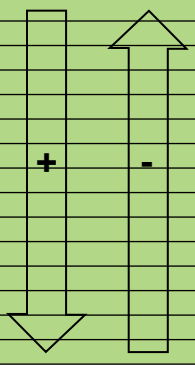
ADVICE for using 0-10V:
Choose option 2 for a balanced behaviour of boiler control.

Parameters technician (green screen)

Param Mode		Parameter chapter	
PARA	factory setting	Description	Range
P252	2	Slope heating line (K-factor)	0,1 - 9,9
P256	2	Hysteresis Summer/Winter in °C (if T4 was detected)	0-10
P266	2	Switch on delay at heat demand in minutes	0-10
P267	168	Boiler sequence for boilers in cascade in hours	1-255
P283	1	Frost protection 0: T10 and P3 not active 1: T10 and P3 active	0-1
P284	0	Switch on temperature frost protection in °C	-40 - 20
Boiler param		**Boiler parameters**	
P100	0	Domestic hot water facility (visible when boiler address is 2 - 8) 0: no DHW 1: Solo boiler with 3-way valve 2: n.a. 3: Solo boiler with cylinder loading pump P4 and 3-way valve 4: n.a.	0-4
P102	0	Cascade flue gas system 0: Flue gas system individual or collective under pressure 1: N.a. 2: Flue gas system collective over pressure 3 N.a.	0-3
P108	0	Kind of gas 0: natural gas 1: propane gas. P121=0: External LPG valve opens at heat demand. 2: propane gas. P121=0: External LPG valve opens at burner start.	0-1
P122	0	DHW temperature sensor T3 0: autodetect 1: connected	0-1
P123	30	Switching time 3-way valve in seconds	0-255
P125	1	DHW priority 0: No 1: Yes	0-1
P132	1	Pump continuously 1:Unit pump P1 2 Unit pump P1 and installation pump P3	1-2
P154	100%	Maximum load CH	0-100
P155	100%	Maximum load DHW	0-100
P160	100%	Maximum pump capacity (only with modulating circulation pump)	30-100
P179	1	Overrun time cylinder pump P2/P4 in minutes (if P100 > 1)	0-60
P181	5	Minimum cool down DHW temperature in °C (if P100 > 0)	0-15
P182	1	Load adjustment due to temperature fall DHW in °C/10sec. (if P100 > 0)	0-10
P183	65	DHW Anti legionella temperature (if P100<>0 and P122=1) in °C	10-80
P184	7	DHW Anti legionella service timer (if P100<>0 and P122=1) in days	1-30
P185	03:00	DHW Anti legionella time of day (if P100<>0 and P122=1)	0:00-23:50
P190	80	Flow temperature T10 at DHW in °C (using cylinder thermostat) (if P100 > 0)	10-90
P801	0%	Local altitude compensation and flue length	0-15%
BurnerA parameter		Burner A parameters When the boiler has 2 heat exchangers Burner B will follow with the same parameters	
P953	OSS4: 65% OSS2: 80%	Minimum pwm-level pump (only with modulating pump).	43-100%
Service chapter		Service chapters	
		Choose burner AB, A or B after selecting one of the functions using arrow buttons. Exchanger symbol will show: AB, A or B	AB-A-B
Throttle	0	Manually burner control. Press OK, then + and - button to increase/decrease the value (0=off, 1%=low load untill 100%=full load)	0-100
Airflush	0	Manually fan control Press OK, then + and - button to increase/decrease the value	0-100
Pumpspeed.	43	Minimum pump speed (only with modulating circulation pump)	43-100%
3-way valve / P2	CH	Manually control of the 3-way valve for DHW. Only for boilers with DHW via 3-way valve	CH-DHW
Pump P3	off	Manually control of the system pump P3. (Only when pump is off). When 'On' pump symbol will be displayed	on-off
Pump P4	off	Manually control of the DHW pump P4	on-off
LPG	off	Manually control of LPG valve (Volt-free)	on-off
Fault	off	Manually control of fault relay for external error signal (Volt-free)	on-off
Heat demand	off	Manually control of heat demand relay for external display heat demand (Volt-free)	on-off
Boiler on-off	off	Manually control of external heating source. On-off contact for control external heating source (not visible in case of LPG)	on-off
Boiler address		Adjusting/changing boiler address	01-08
Reset Counters		Reset of counters after maintenance interval	

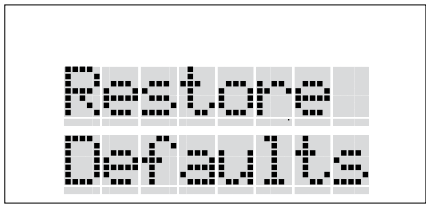
Parameters technician (green screen)

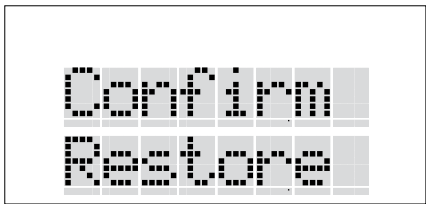
Error	Errors	A-B
Error burner A	The last 10 errors with data will be stored. Choose burner A or B using arrow buttons. Exchanger symbol will show: A or B	
Error 01	Select other error number (02-10) with arrow buttons Every error contains the following info (Press + button for forward, - button for backward)	
	Code Exxscxx	
	Date	
	Time	
	Operational status	
	T1 flow temperature	
	T2 return temperature	
	T1a secondary flow temperature	
	P1 water pressure	
	P2 cylinder pump	
	P3 system pump	
	P4 cylinder load pump	
	Damper on/off (no function)	
	Fan on/off	
	Gas valve open/closed	
	Ignition on/off	



Info		Information	
Cascade		**Information of cascade system**	
T3	xx.x°C	DHW temperature T3 in external cylinder in °C (if connected and P100 is selected for DHW)	
T4	xx.x°C	Outdoor temperature T4 in °C (if connected)	
T10	xx.x°C	Temperature T10 sensor in low velocity header in °C	
OT sp	x.x°C	OpenTherm setpoint room temperature in °C (visible when OT is selected)	
Req Load	xx%	Requested load of the cascade system in %	
Req Temp	xx.x°C	Actual requested flow temperature according gradient line of the cascade system in °C	
Req Temp	xx.x°C	End value of the requested flow temperature of the cascade system in °C	
Error	off	Status relay external error signal	on-off
0-10V	xx.xV	Tension on 0-10V contact (visible whenP101=1 or 2)	
P3	off	Status system pump P3	on-off
P2	off	Status DHW pump P2 (visible when P100=5-8)	on-off
P4	off	Status cylinder loading pump P4	on-off
Heatdmnd.	off	Heat demand yes/no	on-off
LPG / Extra B	off	Status relay external heating source	on-off
Boiler		**Information of the boiler**	
T1-ave	xx.x°C	Actual average flow temperature of the boiler in °C	
T2-ave	xx.x°C	Actual average return temperature of the boiler in °C	
T3	xx.x°C	DHW temperature T3 in external cylinder in °C (if connected and P100 is selected for DHW)	
Req Load	xx%	Requested load of the boiler in %	
Req Temp	xx.x°C	Requester flow temperature of the boiler in °C	
3WV	closed	Status 3-way valve	open-closed
P2	off	Status DHW pump P2 (visible when P100=1-4)	on-off
P4	off	Status cylinder loading pump P4	on-off
BurnerA		"Information of burner/heat exchanger A Select burner A or burner B using + and - button. Symbol heat exchanger will show: A or B"	A-B
T1	xx.x°C	Actual flow temperature	
T1a	xx.x°C	Actual flow temperature secondary sensor	
T2	xx.x°C	Actual return temperature	
Req Load	xx%	Requested load in %	
Flame	x.xx uA	Actual ionisation in µA	
Water Pr	x.xx bar	Actual water pressure	
FanSpeed	xx	Actual fan speed in revolutions per minute	
Fan PWM	x.x%	Actual fan capacity in %	
Fan	off	Status fan	on-off
Gas	off	Status gas valve	on-off
Ign.	off	Status ignition	on-off
P1 PWM	x.x%	Actual pump speed in % (only with modulating circulation pump)	
P1	off	Status pump	on-off
Others			
Stand-by	xx h	Number of hours stand by	
Burn. On	xx h	Number of running hours with burner on	
Service	xx h	Number of running hours to go for maintenance interval	
Ignition	xx	Number of times ignition	
Faults	xx	Number of times in error	
Safety	02017005		
Regul.	01018003		
MMI	03018003		
OEM par.	00018xxx	xxx: 020 = THISION L ECO 70, 080 = THISION L ECO 100, 140 = THISION L ECO 120	

Activate factory settings





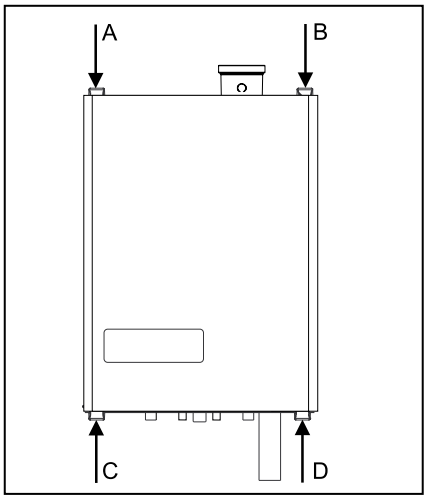
Do the following to reactivate factory settings (any changed settings, except from P108 and P121, will be lost):

Activating the factory settings from user level only:
From the standard blue screen display:
1. Select using the right arrow button: Basic settings;
2. Press the OK button;
3. Press the right arrow button until: Restore Defaults
4. Press OK
   Screen displays: Restore OK
5. Press OK again
   Screen displays: Restore Defaults
   This has now restored the factory settings.

Activating the factory settings from installer level:
From the standard blue screen display:
1. Press down the arrow buttons simultaneously for 2 seconds;
2. Continue with the same instructions from point 1 to 5 described above.

The procedure can take about 20 seconds and shows a blank screen followed by the text Please Wait.

Inspection and maintenance



Boiler maintenance is only to be carried out by qualified staff with calibrated equipment.

When replacing spare parts only original ELCO Service parts are to be used. For this purpose, please refer to the Service parts list to find article numbers and exploded views. Please contact ELCO.

Maintenance intervals
Maintenance has to be carried out after 16,000 operational hours max. or every 4 years, whatever comes first. Depending on the intensive use of the device, maintenance intervals will have to be decreased accordingly. For other situations, maintenance intervals may also have to be decreased. In such cases, please contact ELCO for additional advice.

Inspection and maintenance tasks have to be carried out in accordance with the maintenance instructions at all times. Some tasks are described in these maintenance instructions. For complete inspection and maintenance instructions, see pages 61 - 65.

When carrying out maintenance on the boiler, the gas tap has to be closed and secured against opening.

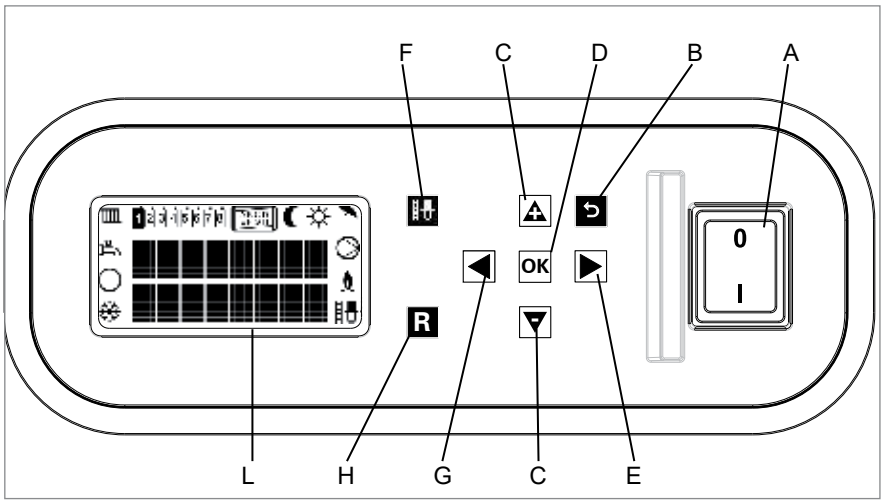
The housing has to be removed in order to carry out maintenance jobs on the boiler. The housing has been secured by 4 quick-lock nuts. First, remove the screws from the quick-locks, open the quick-locks, lift up the housing from below and move it away to the front.

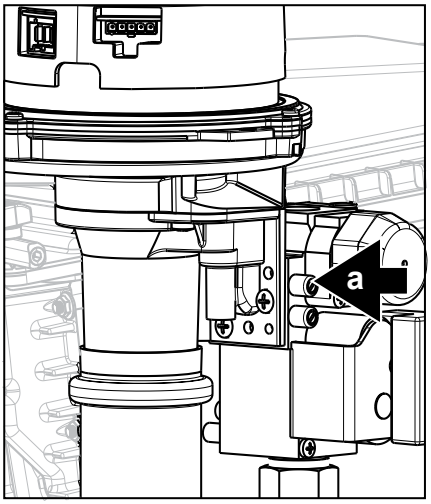
Checks prior to commissioning
Changing settings such as burner pressure and setting the amount of air is not necessary. Only in the case of failures or replacement of the gas unit, venturi and/or ventilator, does one have to check and adjust the O_2 / CO_2 percentage accordingly.

Following maintenance tasks always check all gas-conducting components on leakages by use of leakage detection fluid (LDF).

Emission check

Legend:
A On/Off switch
B Back button (ESC)
C Plus button (value increase/change)
D Confirmation button (OK)
E Arrow button right (forward)
F Chimney sweep function button
G Arrow button left (backward)
H Reset button
I Minus button (value decrease/ change)
L Display





Legend:

a Gas pressure

In order to be able to check on the boiler's emission during its years of operation, it is recommended to measure the maximum air displacement of the boiler on commissioning. This value may be different for each boiler type.

This measuring is only worthwhile if the value is known on commissioning.

The following tasks have to be carried out to enable measuring this value:

- Press down the arrow buttons simultaneously for 2 seconds. The screen turns green;
- Press the right arrow button until you see Service chapter.;
- Press OK;
- Press the right arrow button until Airflush is displayed;
- Press OK;
  The screen displays Airflush off;

Only for THISION L ECO 110 and THISION L ECO 140:
- Press the right arrow button to select burner A.
  The exchanger symbol displays the selected burner (AB, A or B)
- Open the top test nipple
- Connect the hose of the digital pressure meter to the top test nipple of the gas valve.

Measuring is only allowed using the top test nipple (refer to arrow).

- Press on the + button until the maximum value (100%).
  The ventilator will start running up to its max. revolutions per minute RPM (burner stays on)
- Measure the under-pressure and record the value.
  During the next boiler check, the under-pressure value may have decreased by 20% max. compared to the value on commissioning. If this value has decreased less than 20% the boiler does not require any maintenance.
- Press the – button until off is displayed (keep pushed down)

This ends the procedure for burner A.

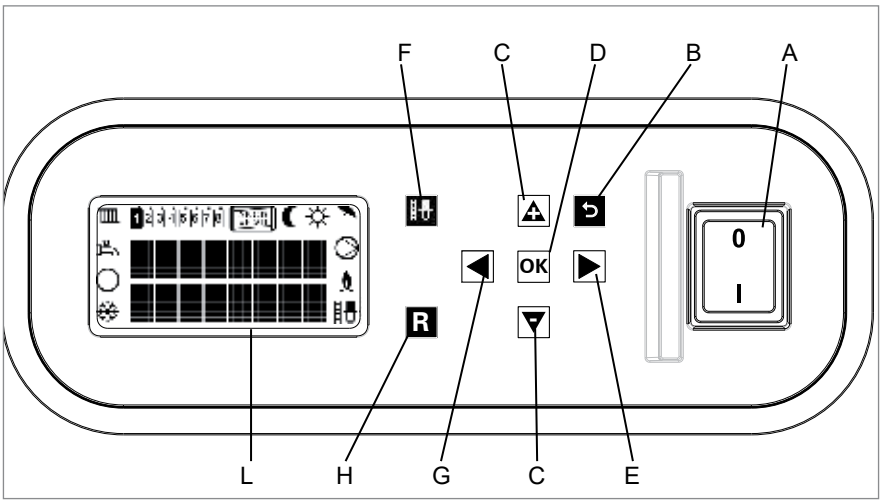
Only for THISION L ECO 110 and THISION L ECO 140:
- Press the return button 1x
- Press the right arrow button to select burner B.
  The exchanger symbol displays the selected burner (AB, A or B)

Repeat the procedure for burner B.

- Press the return button to return to the original read-out.

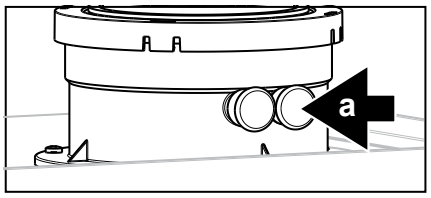
Combustion analysis
Full load (Step 1/3)

Legend:
A On/Off switch
B Back button (ESC)
C Plus button (value increase/change)
D Confirmation button (OK)
E Arrow button right (forward)
F Chimney sweep function button
G Arrow button left (backward)
H Reset button
I Minus button (value decrease/ change)
L Display



The O_2 / CO_2 check consists of 2 steps or, if necessary, 3 steps:

Step 1: Check on full load
Step 2: Check on low load
Step 3: Adjustment (if necessary).



Legend

a Measuring point of the flue gas probe.

Step 1: O_2 / CO_2 check on full load
The O_2 or CO_2 setting is preset at the factory to E, namely natural gas, for all equipment units. A calibrated O_2 or CO_2 control measurement must be carried out during commissioning.

- Ensure that the boiler is in operation and that the heat, which it produces, can be discharged.

Set the full load
You can set the full load of the boiler as follows:
- Press down the arrow buttons simultaneously for 2 seconds.
  The screen turns green;
- Press the right arrow button until you see Service chapter.;
- Press OK;
  The screen displays Throttle;
- Press OK;
  The screen displays Throttle off;

Only for THISION L ECO 110 and THISION L ECO 140:
- Press the right arrow button to select burner A.
  The exchanger symbol displays the selected burner (AB, A or B)
- Calibrate the O_2/CO_2 meter ;
- Position the lance of the O_2/CO_2 meter into the flue outlet test point;
- Press on the + button until the maximum value (in kW) has been reached;
  The boiler will be burning at the rated full load (value on display in %)
- Leave measuring O_2/CO_2 to the measuring equipment.
  Check whether the O_2/CO_2 values that are listed below correspond to the measured value.

After this setting has been made, once more test the O_2/CO_2 value at low load (see Step 2 on page 62). If there are any changes in the result, then these must be corrected (see Step 3 on page 63).

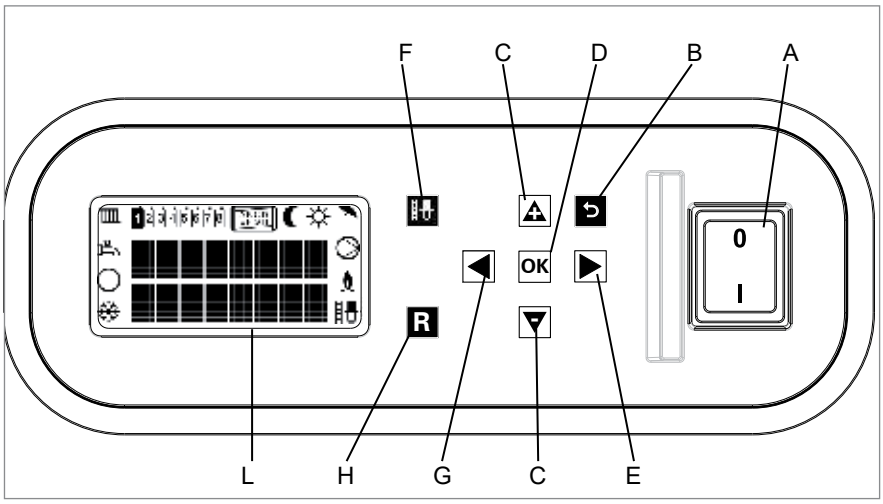
*** Only possible if LPG conversion kit is installed!**

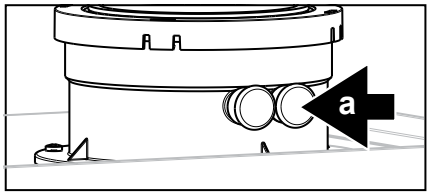
O_2 / CO_2 check		
Full load	**Natural gas E (G20), LL (G25)**	**Propane (G31)***
O_2	Nominal 4,7%	Nominal 5,1%
	Minimum 3,6%, maximum 5,5%	Minimum 4,1%, maximum 5,8%
CO_2	Nominal 9,0%	Nominal 10,3%
	Minimum 8,6%, maximum 9,6%	Minimum 9,9%, maximum 11,0%

Values are valid with closed cover/air box.

Combustion analysis
Low load (Step 2/3)

Legend:
A On/Off switch
B Back button (ESC)
C Plus button (value increase/change)
D Confirmation button (OK)
E Arrow button right (forward)
F Chimney sweep function button
G Arrow button left (backward)
H Reset button
I Minus button (value decrease/ change)
L Display





Legend

a Measuring point of the flue gas probe.

Step 2: O_2 / CO_2 check on low load

Setting the low load
The low load of the boiler can be set by you as follows:
- Press on the - button until the value1 has been reached.
  The boiler will be burning at low load (value on display in %).
- Use the measuring tool to carry out a O_2/CO_2 control measurement.
  The detected values must lie in the measuring range shown below.

The O_2 value at low load must lie higher than the O_2 value at full load. The measuring procedure must be carried out, until a constant measuring result is achieved. Please take up contact with ELCO, if the values should lie outside of the applicable tolerances.

End of measuring:
- Press the – button until off is displayed (keep pushed down).

This ends the procedure for burner A.

Only for THISION L ECO 110 and THISION L ECO 140:
- Press the return button 1x
- Press the right arrow button to select burner B.
  The exchanger symbol displays the selected burner (AB, A or B)

Repeat the procedure for burner B.

- Press the return button to return to the original read-out.

End of measuring:
- Press the – button until off is displayed (keep pushed down).

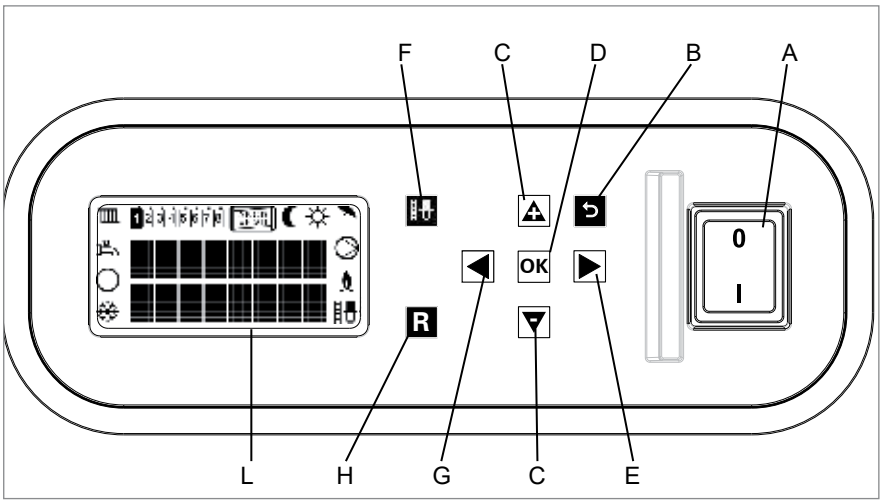
*** Only possible if LPG conversion kit is installed!**

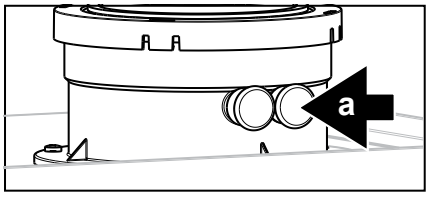
Low load	Natural gas E (G20), LL (G25)	Propane (G31)*
O_2	Minimal 0,5% higher than measured on full load	Minimal 0,2% higher than measured on full load
	Maximum 7,5%	Maximum 7,3%
CO_2	Minimal 0,3% lower than measured on full load	Minimal 0,1% lower than measured on full load
	Minimum 7,5%	Minimum 8,9%

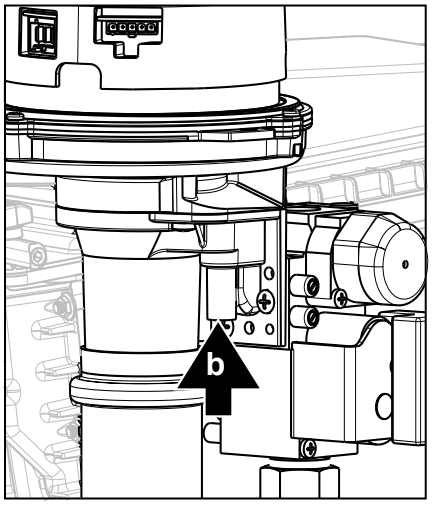
Values are valid with closed cover/air box.

Combustion analysis
Settings on the gas valve (Step 3/3)

Legend:
A On/Off switch
B Back button (ESC)
C Plus button (value increase/change)
D Confirmation button (OK)
E Arrow button right (forward)
F Chimney sweep function button
G Arrow button left (backward)
H Reset button
I Minus button (value decrease/ change)
L Display







Legend

a Measuring point of the waste gas probe
b Set screw for O_2/CO_2

Step 3: Adjustment on the gas valve

Only if the measured values are outside the range of the table on the previous page.

- Open de boiler as described on page 59;
- The O_2/CO_2 values are set by using an Allen key (4 mm), or a large flat head screwdriver, on the screw “B”. Please observe the following rotating direction:
  - Clockwise means less O_2/ more CO_2
  - Counterclockwise means more O_2/ less CO_2

The adjustment is for each individual burner. Adjust the gas valve of burner A for burner A and gasvalve of burner B for burner B.

After this setting has been made, once more test the O_2/CO_2 value at full load and low load. See Step 1 and 2.

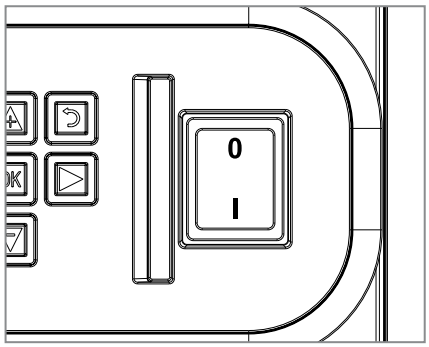
*** Only possible if LPG conversion kit is installed!**

Adjustment of the gas valve in case the measured values lies out of range of the values on full load		
Full load	**Natural gas E (G20), LL (G25)**	**Propane (G31)***
O_2	4,7%	5,1%
CO_2	9,0%	10,3%

Values are valid with closed cover/air box.

Decommissioning and maintenance works
Inspection and maintenance interval

Maintenance works
- Switch the boiler to stand-by operating mode;
- Use the ON/OFF switch (A) to turn the boiler off;



- Interrupt the power supply to the boiler, by operating the mains circuit breaker in the boiler room.
- Interrupt the gas supply to the boiler.

During emptying of the boiler, it is possible that a part of the heating water stays behind. Make sure that any remaining heating water cannot freeze, in case of a frost hazard.

Decommissioning
In some cases it might be necessary to put the complete boiler out of operation. The boiler is put out of operation by switching off the three functions (, and/or).

Proceed as follows:
From the standard blue screen display:
1. Press the right arrow button:
   Screen displays: Basic setting;
2. Press OK;
   Screen displays: CH prog on;
3. Press the - button:
   Screen displays: CH prog off;
4. Press OK;
5. Repeat procedure from point 3 onward.
   This switches off the functions DHW prog and Pump prog respectively.
6. Press the return button to return to the standard display.

ELCO recommends leaving the power switch switched on to ensure that the boiler pump(s) and three-way valve (if fitted) are automatically activated to prevent them from sticking. The frost protection remains active. Leave gas supply open.

If frost, during the period when the boiler is out of operation, is likely, then you are advised to remove the power from the boiler and drain the boiler(s) and installation. In this case: close the gas valve.

Maintenance
Please observe the following safety instructions:

All works on the boiler and the heating facility (assembly, maintenance, repairs) may only be carried out by authorized technicians, by using suitable tools and calibrated measuring instruments. The exchange of components requires original ELCO replacement parts.

The main stopcock for gas must be closed and secured against reopening.

The panelling must first be removed, to be able to carry out maintenance on the boiler. The panelling is secured by a screw behind the door. After loosening the screw, the panelling can be removed by shortly lifting and pulling it forward.

All equipment is preset at the factory. An O_2 / CO_2 control measurement must be carried out during commissioning.

No change should be made on the zero-point setting. The zero-point setting must only be checked after a malfunction, or after an exchange of the gas valve, the venturi or the ventilator motor.

The zero-point setting does not serve for setting up the combustion-technical characteristic values. These are made exclusively through the O_2 / CO_2 setting.

All gas pipes and screws must be tested for leakproofness, using a leak-detecting spray, whenever maintenance or repair works have been carried out on the boiler.

In this regard, please observe all of the individual maintenance steps documented on page 56 ff., as well as the overview of inspection and maintenance procedures provided on page 60 to 61.

Inspection interval
An inspection must be carried out after every 4,000 boiler operating hours, however at least once every year.

An inspection consists of a visual check, of the general condition of the boiler and the installation.

The objectives of an inspection is an assessment of the condition of the equipment, and an evaluation as to when maintenance works are required. A visual inspection can lead to a maintenance procedure.
No tools are required during an inspection (except for tools for removing the panelling). If necessary, the corresponding individual maintenance steps must be carried out, which are listed as of page 56.

Maintenance interval
An inspection of the burner must be carried out after every 8,000 operating hours, however at least once every 2 years.

Maintenance consists of control and cleaning, or a possible exchange of components of the equipment or installation, which are subject to contamination and wear and tear.

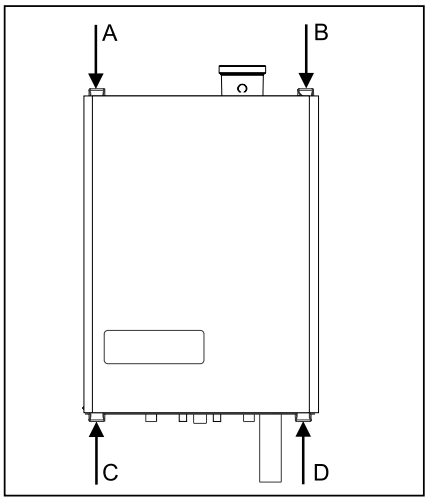
The objective of maintenance is to ensure a long-term functional security and a cost-effective operation of the equipment. Through a reduction of emissions that are due to the production of heat, primary energy requirements and a burdening of the environment can be substantially reduced.
A visual inspection must always precede the carrying out of maintenance works. In this regard, also see the inspection interval above.

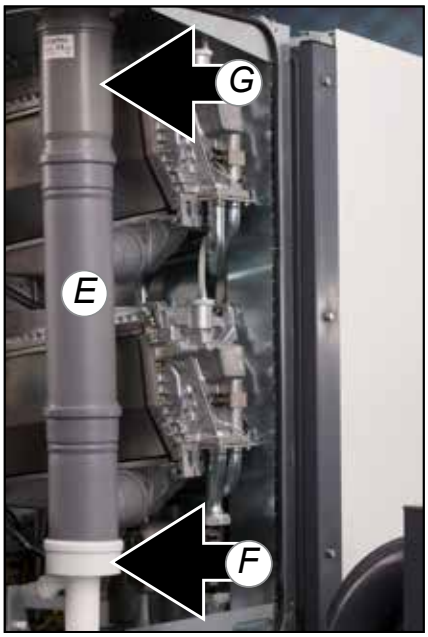
All gas pipes and screws must be tested for leakproofness, after maintenance or repair works have been carried out on the boiler.

Both the gas connection and the pressure on the connection must be checked.

Check at each maintenance intervention the flue gas system on leaks and repair or replace when flue gas leaks are detected.

Maintenance details





Removal of panelling
The panelling must first be removed, to be able to carry out maintenance on the boiler.

- Unscrew the 4 screws of quick-locks A, B, C and D
- Open the 4 quick-locks A, B, C and D and remove the housing (= air box) from the front.

The panelling of the equipment consists of metal and plastic parts, which can be cleaned with a mild (non-aggressive) cleaning agent.

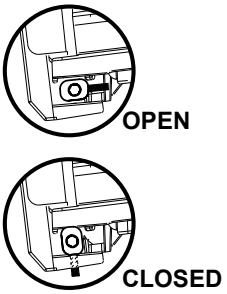
When carrying out maintenance works, only original ELCO replacement parts may be used.

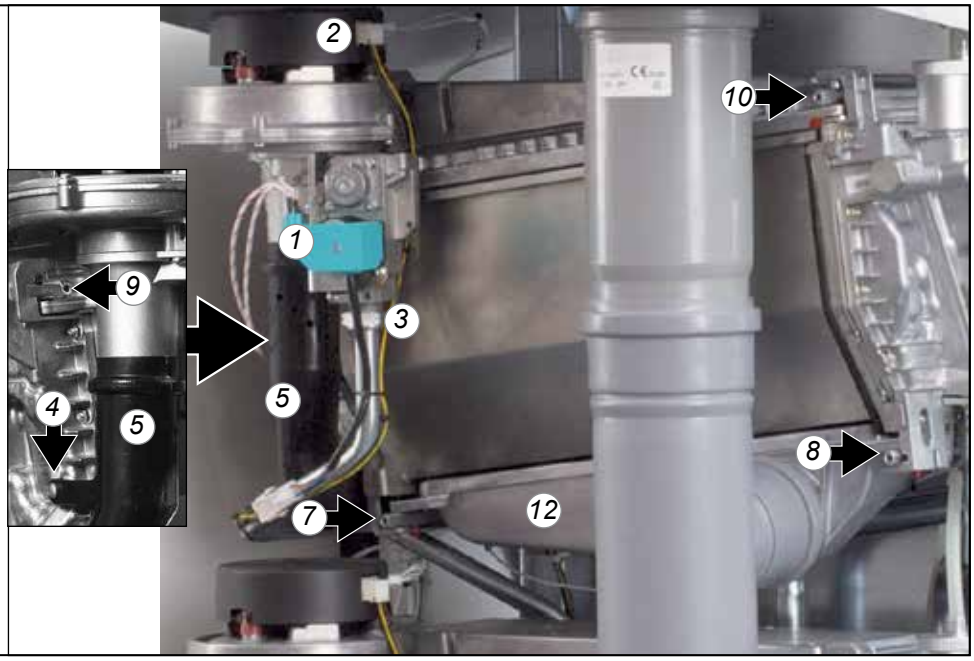
CAUTION:
Always interrupt the power supply, before carrying out maintenance or repair works on the boiler.

- Dismantle the internal flue gas pipe as follows:
- Unplug the flue gas sensor if fitted;
- Press the 2 clips of the siphon adapter (F) and push that part of the flue gas vent pipe (E) down. Leave the siphon adapter (F) hanging on the bottom plate
- Slide the slider (G) in the upper part of the flue gas pipe upward.
- Pull the flue gas pipe (E) forward (both exchangers simultaneously).

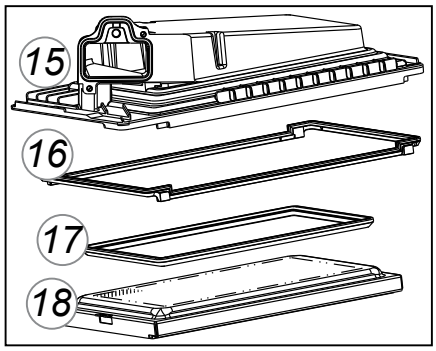
Ventilator unit and burner cassette

- Remove the plug connections of the gas valve (1) and ventilator (2);
- Unscrew the coupling (3) of the gas unit;
- Replace the gas valve gasket with a new one;
- Unscrew the front cross-slotted screw (4) of the air suction damper (5);
- Loosen the left (9) and right (10) clamp bar a quarter of a turn with the hex key and pull it out in a forward direction. In doing so, pay attention to the turning direction (red check cams);

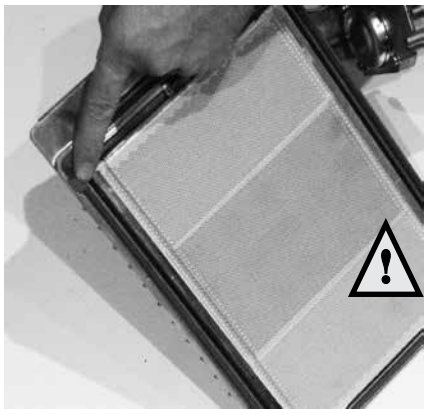




Maintenance details



- Pull the complete ventilator unit and heat exchanger's gas valve forward;
- Remove the burner cassette (18) from the ventilator unit;
- Check the burner cassette for wear and tear, pollution and any breakages. Clean the burner cassette with a soft brush and vacuum cleaner. In the case of breakages, always replace the complete burner cassette (18);
- Replace the gasket (17) between the burner (18) and upper casing (15) ;
- Replace the gasket (16) between the upper casing (15) and exchanger:

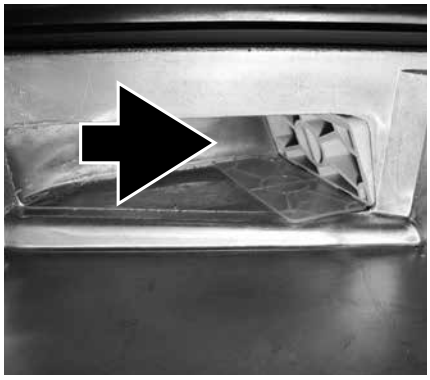


Checking the non return valve in the upper casing, venturi and fan

- Loosen the 2 screws out of the upper casing with a cross head screwdriver to release the gas air dividing plate. Take out the gas air dividing plate

The following operations must be performed carefully in relation to the vulnerability of the non return valve.

- After removing the gas air dividing plate the non return valve becomes visible. Check that the non return valve entire circumference closes / seals completely. The valve should be able to move freely from fully open to fully closed. Replace the non return valve if the valve does not seal properly. Follow the instructions supplied with the new part.
- Check the venturi and gas air dividing plate for pollution and clean them with a soft brush in combination with a vacuum cleaner, if necessary.



If the cover/air box is heavily polluted with dust, it is likely that the fan impeller is also polluted. To clean the fan, it has to be removed from the upper tray and the venturi. Clean the impeller with a soft brush and a vacuum cleaner. Replace the gasket and take care that the new gasket is installed properly when reassembling the fan parts.

Reassembly takes place in reverse order.

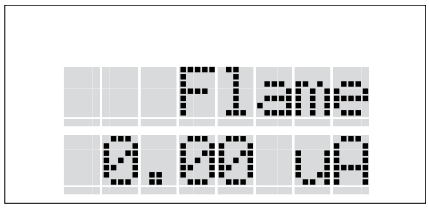
<u>Heat exchanger</u>

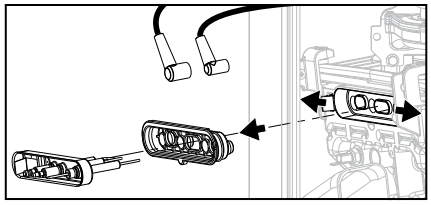
- Check the heat exchanger for pollution. Clean it, if necessary, with a soft brush and vacuum cleaner. Prevent any dirt from dropping down.
  Rinsing the exchanger with water from the top is not allowed.

Assembly is done in reverse order.

Ensure during assembly that the clamping bars are properly positioned. They have to be in a vertical position.

Maintenance details





Ignition electrode
Replace the ignition electrode when necessary, but certainly every 4 years. This can be checked by reading out the ionization current. The minimum ionization current has be greater than 2,0 µA at full capacity.
To read out the ionization current follow the instructions:
From the standard blue screen display:
1. Press down the arrow buttons simultaneously for 2 seconds;
2. Continue with point 3.

From the setting level with a green screen:
3. Select using the right arrow button: Info;
4. Press the OK button;
5. Press the right arrow button until: Burners
6. Press the OK button;
7. Press the right arrow button until: Flame.
   The ionization current is shown here in µA. With the + and - button the value of burner A and B can be shown (heat exchanger symbol turns from A to B).

If the sight glass is damaged, the complete ignition electrode has to be replaced.
Replace as follows:
- Remove the plug connections of ignition electrode;
- Push the clips on either side of the electrode to the outside and remove the electrode;
- Remove and replace the gasket;

Assembly is done in reverse order.

Condensate container

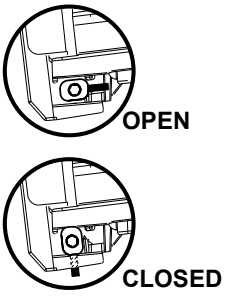
Take precautions to prevent condensate falling on electronics and other boiler parts during dismantling to avoid damage of these parts.

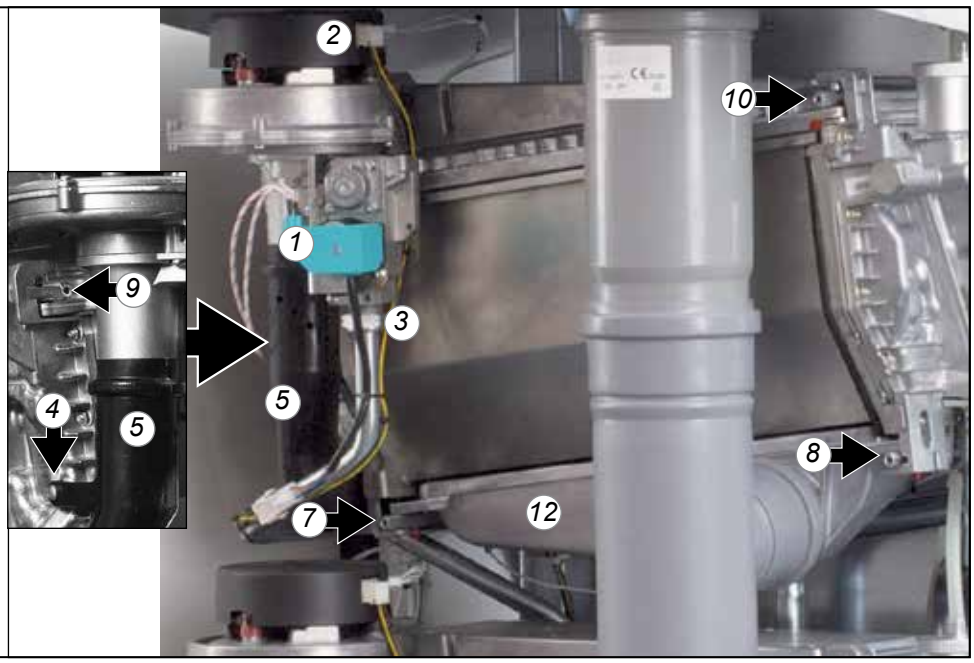
- Remove the short clamping bars (7 and 8) by loosening them a quarter of a turn with the hex key. In doing so, pay attention to the turning direction (red check cams).
- Pull the clamping bars forward and away from underneath the condensate container.
- Carefully push the condensate container (12) down and remove it from the front;
- Replace the condensate container gasket by a new one.
- Clean the polluted condensate container with water and a hard brush.
- Check the condensate container for any leakages.

Assembly is done in reverse order. Ensure proper all around sealing of the gasket when installing the condensate container.

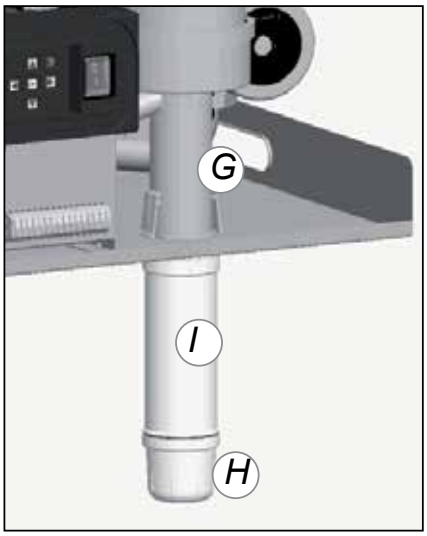
Ensure during assembly that the clamping bars are properly positioned. They have to be in a vertical position.

During maintenance always replace the gaskets of dismantled parts.





Maintenance details
Counter running hours



Siphon

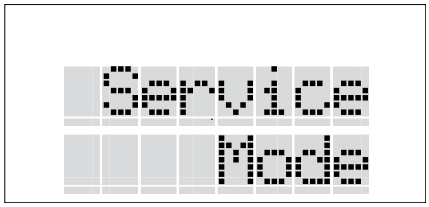
Place a collector (i.e. a bucket) under the siphon to collect the dirty and aggressive condensate water. Wear protective clothing like latex gloves and safety glasses.

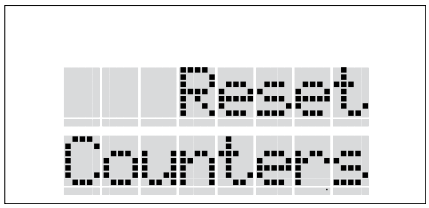
- Dismantle the siphon by unscrewing the siphon cup (H).
  Check the siphon cup (H), siphon adapter (G) and siphon pipe (I) for pollution.
- Clean these parts by rinsing them with water.
- Re-grease the O-rings with acid-free O-ring grease to facilitate easy assembly.
- If the siphon shows any leakage, the whole siphon has to be replaced:

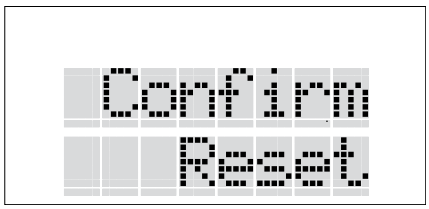
Take the device back into operation and conduct a flue gas analysis (refer to chapter Check O_2/CO_2).

Counter running hours

From factory a fixed number of running hours is set for service interval. The number of running hours cannot be changed. After expiring of the number of running hours the message “Service” (when read-out is on “Good”) or Mx24sc11 (when read-out is on boiler status) is displayed on the screen.







There is no message when the boiler is set to the operational status read-out. During the messages “Service”and “Mx24sc11” the boiler remains fully operational.
If the maintenance activities, as described hereinbefore, have been carried out, the counter has to be reset. To reset the counter, the following procedure has to be followed (starting from a blue screen):

- Press down the arrow buttons simultaneously for 2 seconds.
  The screen turns green;
- Press the right arrow button until you see Service chapter.;
- Press OK;
- Press the right arrow button until you see Reset Counters;
- Press OK;
  The screen displays Confirm Reset;
- Press OK to confirm the reset function;
  The screen displays Confirm Reset;

The counter is reset to the same number of hours as set from factory. The message “SERVICE” or “Mx24sc11” is no longer displayed.

Inspection overview

Pos. Nr.:	Inspection check list - THISION L ECO	Every 4.000 hrs. or at least once a year	Activity done	Remarks
	Switch off power supply to the boiler and close the gas valve!	√		
1	**Air box/Boiler cover**			
1.0.1	Remove boiler cover	√		
1.0.2	Check boiler cover/air box sealing on wear	√		
1.0.3	Necessary cleaning	√		
2	**Gas pipes**			
2.0.1	Check all gas pipes on leaks	√		
2.0.2	Check all gas fittings on leaks	√		
2.0.3	Check all gas pipes and parts on corrosion and damage	√		
2.0.4	Check static and dynamic gas pressure	√		
3	**Pressure parts**			
3.0.1	Check fill and drain valve on its function	√		
3.0.2	Check system pressure (Plausibility check)	√		
3.0.3	Check pre-pressure of expansion vessel and adjust if necessary	√		
4	**Checking parts on damage, corrosion, function and leaks:**			
4.0.1	Gas valve / Venturi	√		
4.0.2	Automatic de-aerator	√		
4.0.3	Hydraulic connections	√		
4.0.4	Siphon and condensate drain	√		
4.0.5	Ignition and ionisation block	√		
4.0.6	OSS heat exchanger	√		
4.0.7	Condensate tray	√		
5	**Boiler/Burner in operation without air box/boiler cover:**			
5.0.1	Check flame	√		
5.0.2	If flame is not stable - check adjustments and burner	√		
5.0.3	Commissioning O_2/CO_2 and Ionisation current	√		
6	**Additional checks:**			
6.0.1	Check all parts under over-pressure	√		
6.0.2	Check combustion air intake	√		
6.0.3	Check gas flow (Plausibility check)	√		
6.0.4	Check O_2/CO_2	√		
6.0.5	In case of multiple units - All activities should be carried out on all units!	√		
6.0.6	Reassemble boiler cover	√		
7	**Boiler/Burner in operation with air box/boiler cover:**			
7.0.1	Check function central heating	√		
7.0.2	Check function DHW	√		
7.0.3	Check desired temperature and actual flow temperature (Plausibility check)	√		
7.0.4	Write down running hours from MMI and reset counter	√		

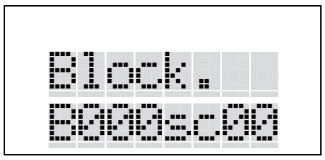
Maintenance overview

Pos. Nr.:	Maintenance check list - THISION L ECO	Every 16.000 hrs. or at least every four year	Activity done	Remarks
	Switch off power supply to the boiler and close the gas valve!	√		
1	**Air box/Boiler cover**			
1.0.1	Check cover on impurence and damage	√		
1.0.2	Necessary cleaning	√		
1.0.3	Check the sealing and replace if necessary	√		
2	**Fan unit / Burner cassette**			
2.0.1	Check and clean fan unit	√		
2.0.2	Check and clean top part heat exchanger	√		
2.0.3	Check non return valve and replace if necessary	√		
2.0.4	Check and clean burner cassette	√		
2.0.5	Check and clean venturi	√		
2.0.6	Check gas valve on corrosion and damage	√		
2.0.7	Replace all gaskets from gas system which are disassembled	√		
3	**OSS heat exchanger**			
3.0.1	Check heat exchanger on corrosion and damage	√		
3.0.2	Check heat exchanger on impurence and clean	√		
3.0.3	Replace gasket between heat exchanger and burner cassette	√		
3.0.4	Replace gasket between heat exchanger and top part	√		
	Top-flushing the exchanger with water is not allowed!			
4	**Insolation pipe plate**			
4.0.1	Check insolation plates on pipe plates and replace if worn	√		
5	**Checking parts on damage, corrosion, function and leaks and replace if necessary:**			
5.0.1	Safety valve	√		
5.0.2	Ignition and ionisation block	√		
5.0.3	Replace gasket ignition and ionisation block	√		
5.0.4	Automatic de-aerator	√		
5.0.5	Hydraulic connections	√		
6	**Siphon/Condensate drain**			
6.0.1	Clean siphon and condensate drain	√		
6.0.2	Check siphon and condensate drain on leaks	√		
6.0.3	Replace gaskets of siphon and condensate drain	√		
7	**Condensate tray**			
7.0.1	Check condensate tray on corrosion and damage	√		
7.0.2	Clean condensate tray	√		
7.0.3	Replace gasket condensate tray	√		
8	**Circulation pump**			
8.0.1	Check circulation pump functions	√		
8.0.2	Check pump on external damage and check noise	√		
8.0.3	Check pump on leaks	√		
9	**Additional activities:**			
9.0.1	In case of multiple units - All activities should be carried out on all units!	√		
9.0.2	After complete maintenance follow inspection check list	√		
9.0.3	Open gas valve, switch on power supply	√		
9.0.4	Check function central heating	√		
9.0.5	Check function DHW	√		

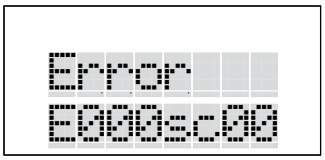
Errors (red screen)

On the display, errors found are shown in the form of a message or blocking on a blue screen or an error on a red screen.

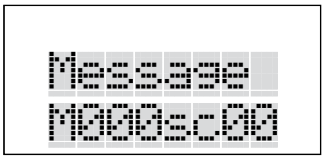
- Blocking
  This is a temporary error that will sort itself out, or it will block the boiler after several attempts (error) (Except: Bx01sc01 = reset)



- Error
  Error implies a blocking of the boiler and can only be solved by a reset and/or intervention of a service engineer.



- Message
  Implies a message such as low water pressure, but the device will remain operational.
  Point of attention requiring short-term intervention.



The code consists of a Main Code and a Subcode

Main code Blocking = **B**
Main code Error = **E**
Main code Message = **M**
Followed by a character **0** = boiler
1 = burner A
2 = burner B
Subcode always starts with **sc**

Bx01sc01	Fan does not run on correct speed (Reset necessary). Fan defective.
Bx03sc01*	Flow sensor T1 open
Bx03sc02*	Flow temperature T1 too high
Bx03sc03*	Flow sensor T1a open
Bx03sc04*	Flow temperature T1a too high
Bx05sc01*	Return sensor T2 open
Bx05sc02*	Return temperature T2 higher than flow temperature
Bx08sc01*	General purpose contact open
Bx12sc01*	Water pressure sensor open
Bx12sc02*	Water pressure sensor closed
Bx12sc03*	Water pressure lower than 0.7bar. Top up
Bx12sc04*	Water pressure too high. Decrease pressure
Bx12sc05*	No pressure increase on pump start
Bx13sc01*	ΔT between T1 and T2 too high
Bx15sc01*	Communication error between controls

Ex01sc01*	Fan does not run on correct speed. Fan defective.
Ex02sc01*	No flame after 4 start attempts
Ex02sc02*	Insufficient ionisation
Ex04sc01*	Flow temperature T1 too high
Ex04sc02*	Flow sensor T1 closed
Ex04sc03*	Flow temperature T1a too high
Ex04sc04*	Flow sensor T1a closed
Ex06sc01*	Return temperature T2 higher than flow temperature
Ex06sc02*	Return sensor T2 closed
Ex18sc01*	Flame detected when burner should not be operating
Ex14sc01*	ΔT not fast enough
Ex14sc02*	ΔT between T1 and T2 > 35°C

M024sc01	DHW sensor T3 open (when P122=1)
M024sc02	DHW sensor T3 closed (when P122=1)
M024sc03	Outside sensor T4 open
M024sc04	Outside sensor T4 closed
M024sc05	Common flow sensor T10 open
M024sc06	Common flow sensor T10 closed
M024sc08	Bus communication: Possibly no bus communication cable connected
Mx24sc09	Temperature increase (Gradient) not fast enough after burner start
Mx24sc10	ΔT between T1 and T2 > 35°C when gas valve opened
Mx24sc11	Service required

** When this code is shown with an M instead of a B or E then a reset with the reset button is possible.*

OpenTherm error messages
The coding of the transmitted Error Messages on a OpenTherm controller is displayed as follows:
(E) EB (E = Error Code = B and boiler number)
example: Error Code Ex02SC02 on boiler 6 will appear as (0) 26

Sensor resistance

Sensor resistance
In the adjacent table contains a list of values for all boiler sensors, and for the optional sensors that are contained in the accessory kits.
These tables show average values, since all sensors are subject to fluctuations.

When measuring resistance values, he boiler should always be switched off. Carry out measurements near to the sensor, so as to avoid deviations from the values.

Heating flow sensor Heating return sensor DHW sensor Flue gas sensor	
NTC10k (25°C)	
Temperature [°C]	Resistance [Ohm]
-10	55.047
0	32.555
10	19.873
12	18.069
14	16.447
16	14.988
18	13.674
20	12.488
22	11.417
24	10.449
26	9.573
28	8.779
30	8.059
32	7.406
34	6.811
36	6.271
38	5.779
40	5.330
42	4.921
44	4.547
46	4.205
48	3.892
50	3.605
52	3.343
54	3.102
56	2.880
58	2.677
60	2.490
62	2.318
64	2.159
66	2.013
68	1.878
70	1.753
72	1.638
74	1.531
76	1.433
78	1.341
80	1.256
82	1.178
84	1.105
86	1.037
88	974
90	915

Outdoor temperature sensor	
NTC1k (25°C)	
Temperature [°C]	Resistance [Ohm]
-10	4.574
-9	4.358
-8	4.152
-7	3.958
-6	3.774
-5	3.600
-4	3.435
-3	3.279
-2	3.131
-1	2.990
0	2.857
1	2.730
2	2.610
3	2.496
4	2.387
5	2.284
6	2.186
7	2.093
8	2.004
9	1.920
10	1.840
11	1.763
12	1.690
13	1.621
14	1.555
15	1.492
16	1.433
17	1.375
18	1.320
19	1.268
20	1.218
21	1.170
22	1.125
23	1.081
24	1.040
25	1.000
26	962
27	926
28	892
29	858
30	827
35	687
40	575

System water additives

The system water additives, which are listed in the table, have been released by the manufacturer and take into consideration the indicated dosage quantities.

In case of a wrong use, and if the maximum concentration quantities are exceeded, then the guarantee for all components that come in contact with heating water are null and void.

Additive type	Supplier and specifications	Max. concentration	Application
Corrosion inhibitors	Sentinel X100 Corrosion resistant protection agent of CH systems Kiwa certified	1-2 l/100 litres CH water content	Aqueous solution of organic and inorganic agents preventing corrosion and scale forming
	Fernox F1 Protector Corrosion resistant protection agent of CH systems Kiwa certified KIWA-ATA K62581, Belgaqua certified Cat III	500 ml can or 265 ml Express / 100 litres CH water content	Preventing corrosion and scale forming
Anti-freeze	Kalsbeek Monopropyleneglycol / propane-1,2-diol + inhibitors AKWA-Colpro KIWA-ATA Nr. 2104/1	50% w/w	Anti-freeze
	Tyfocor L Monopropyleneglycol / propane-1,2-diol + inhibitors	50% w/w	Anti-freeze
	Sentinel X500 Monopropyleneglycol + inhibitors Kiwa certified	20-50% w/w	Anti-freeze
	Fernox Alphi 11 Monopropyleneglycol + inhibitors Kiwa certified KIWA-ATA K62581, Belgaqua certified Cat III	25-50% w/w	Anti-freeze in combination with F1 Protector
System cleaners	Sentinel X300 Solution of phosphate, organic heterocyclic compounds, polymers and organic bases Kiwa certified	1 litre / 100 litres	For new CH installations Removes oils/grease and flow control agents
	Sentinel X400 Solution of synthetic organic polymers	1-2 litres / 100 litres	For cleaning existing CH-installations Removes sediments.
	Sentinel X800 Jetflo Aqueous emulsion of dispersants, moistening agents and inhibitors	1-2 litres / 100 litres	For cleaning new and existing CH-installations Removes iron and lime-related sediments.
	Fernox F3 Cleaner Liquid pH neutral universal cleaner for pre-commissioning new systems	500 ml / 100 litres	For cleaning new and existing CH-installations Removes sludge, limescale and other debris.
	Fernox F5 Cleaner, Express pH neutral universal cleaner concentrate for pre-commissioning new systems	295 / 100 litres	For cleaning new and existing CH-installations Removes sludge, limescale and other debris.

Declaration of Conformity

We, ELCO GmbH, Hohenzollernstrasse 31, D-72379 Hechingen
declare under our responsibility that the product

THISION L ECO 70-100-120

is in conformity with the following standards:

Gas Appliance Directive	2009/142/EC	EN483: 2005 EN15420;2010 EN15417; 2007 EN 60335-2-102 :2006
Boiler Efficiency Directive	92/42/EEC	EN677: 1998 EN132031/2:2014
Low Voltage Directive	2006/95/EG	EN 60335-2-102 :2010 EN 60335-1: 2010 EN 60335-2 :2010
EMC Directive	2004/108/EG	EN 61000-3-2: 2006 EN 61000-3-3: 2005 EN 55014-1:2006 EN 55014-2 :2008
Ecodesign Directive	2009/125/EC	EN 15036-1:2006 EN 13203-2:2014 EN 15502-1:2012
Labelling Directive	2010/30/EU	

This product is designated with CE number:

CE – 0063CM3648

Hechingen, 05.12.2017

ELCO GmbH

i.V. Stefan Salewsky

Service: