

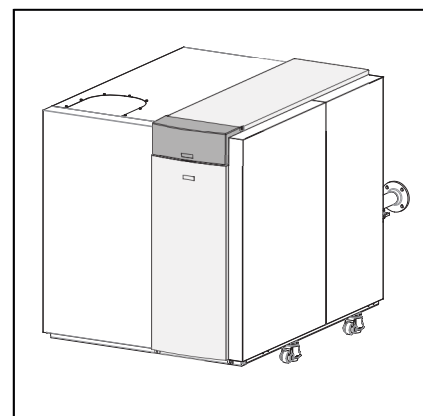
(EN) Installation and Operation manual
for authorised technicians only

(DE) Betriebsanleitung
für die autorisierte Fachkraft

(NL) Bedienings- en Installatiehandleiding
alleen voor bevoegde vakmensen

(FR) Notice d'installation et d'emploi
réservée à l'usage des techniciens agréés

(IT) Istruzioni per l'uso
solo per il tecnico autorizzato

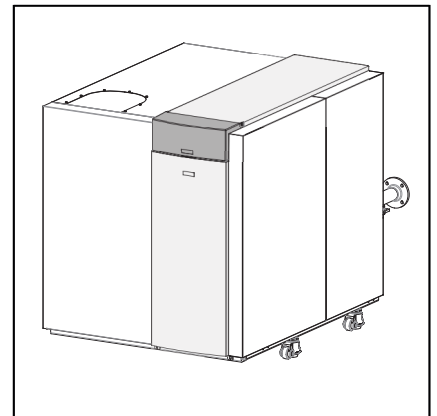


Operation and Installation manual
for authorized technicians only

elco

TRIGON XXL

Original Instructions



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General regulations

General regulations

This documentation contains important information, which is a base for safe and reliable installation, commissioning and operation of the TRIGON XXL boiler. All activities described in this document may only be executed by authorized companies.

Changes to this document may be effected without prior notice. We accept no obligation to adapt previously delivered products to incorporate such changes.

Only original spare parts may be used when replacing components on the boiler, otherwise warranty will be void.

Application

The TRIGON XXL boiler may be used for heating and hot water production purposes only. The boiler should be connected to closed systems with a maximum temperature of 100°C (high limit temperature), maximum setpoint temperature is 90°C.

Norms and regulations

When installing and operating the boiler, all applicable norms (european and local) should be fulfilled:

- Local building regulations for installing combustion air and flue gas systems;
- Regulation for connecting the boiler to the electrical appliance;
- Regulations for connecting the boiler to the local gas network;
- Norms and regulations according to safety equipment for heating systems;
- Any additional local laws/regulations with regard to installing and operating heating systems.

This boiler is CE approved and applies to the following Following international / European norms:

- **2016/426/EEC** Gas appliances regulation.
- **1992/42/EEC** Efficiency directive.
- **2014/30/EU** EMC directive.
- **2014/35/EU** Low voltage directive.
- **EN 15502-1** Gas-fired central heating boilers - Part 1: General requirements and tests.
- **EN 15502-2-1** (Gas-fired central heating boilers - Part 2-1: Specific standard for type C appliances and type B2, B3 and B5 appliances of a nominal heat input not exceeding 1000 kW).
- **EN 55014-1** Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission.
- **EN 55014-2** Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard.
- **EN 61000-3-2** Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current 16 A per phase).
- **EN 61000-3-3** Electromagnetic compatibility (EMC) - Part 3-3: Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current 16 A per phase and not subject to conditional connection.
- **EN 60335-1** Household and similar electrical appliances - Safety - Part 1: General requirements.

- **EN 60335-2-102** Household and similar appliances - Safety - Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections.
- **EN 50165** Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.
- **EN 12828 / DIN 4751-2** Heating systems in buildings - Design for water-based heating systems / Medium temperature hot water systems (mthws) with a boiler flow temperature up to 120 °C - specification for sealed systems using thermostatic control - safety equipment.

Additional national standards

Switzerland:

SVGW

Germany:

RAL - UZ 61 / DIN 4702-8, Energieeinsparverordnung (EnEV DIN 4701-10), BimSchV

Austria:

Kurzgutachten 15a V-BG

Belgium:

NOx certification

France:

Arrête du 02 Aout 1977 - 300mbar gas pressure with Accessory kit

Italy:

Italy: Star level certification "Legge 10" 1991

Informations for installer and maintenance service



The use of the appliance for purposes other than those specified is strictly forbidden.

The manufacturer cannot be held responsible for any damage caused by improper, incorrect and unreasonable use of the appliance or by the failure to comply with the instructions given in this manual.



Installation, maintenance and all other interventions must be carried out in full

conformity with the governing legal regulations and the instructions provided by the manufacturer. Incorrect installation can harm persons, animals and possessions; the manufacturing company shall not be held responsible for any damage caused as a result.



The boiler is delivered with protection packaging.

Once you have removed all the packaging, make sure the appliance is intact and that no parts are missing. If this is not the case, please contact your supplier.



Keep all packaging material (clips, plastic bags, polystyrene foam, etc.)

out of reach of children as it may present a potential hazard.



Before any maintenance or repair work is performed on the boiler, make sure you have

disconnected it from the electricity supply by switching the external bipolar switch to the OFF position.



All repairs, should only be performed using original spare parts.

Index:



= Danger for health



= Danger for equipment

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.



This product conforms to Directive WEEE 2012/19/EU.

The symbol of the crossed waste paper basket on the appliance indicates that at the end of its working life the product should be disposed of separately from normal domestic household rubbish, it must be disposed of at a waste disposal centre with dedicated facilities for electric and electronic appliances or returned to the retailer when a new replacement product is purchased.

The user is responsible for the disposal of the product at the end of its life at an appropriate waste

Information for the User

Inform the user on the mode of operation of the system. Specifically deliver to the user the instruction manuals, informing him that they must be stored with the appliance.

Also, remind the user to:

Periodically check the water pressure system and instruct him on how to reintegrate and bleed.
How to set the temperature and the adjusters for a correct and more economical management of the system.
To perform, according to legislation, periodic maintenance system.
Do not change, in any case, the settings for supply of air for combustion and gas combustion.
Pay attention to the warnings contained in the user manual.

disposal centre.

The waste disposal centre (which using special treatment and recycling processes effectively dismantles and disposes of the appliance) helps to protect the environment by recycling the material from which the product is made.

For further information about waste disposal systems visit your local waste disposal centre or the retailer from which the product was purchased.

Construction

Data Plate Operating principle

Symbols used on the data plate

- 1 Brand
- 2 Country of origin
- 3 Boiler model - Serial number
- 4 Commercial reference
- 5 Certification number
- 6 Destination country - Gas category
- 7 Gas setting
- 8 Installation type
- 9 Electrical data
- 10 Factory settings
- 11 Maximum water pressure
- 12 Boiler type
- 13 NOx class / Efficiency
- 14 Input rating nominal heating
- 15 Power output heating
- 16 Gases which may be used
- 17 Ambient operating temp.
- 18 Max. central heating temp.

1				2			
S/N 3			4 10		5		
6							
7							
8				MAX		MIN	
9		12		Q(Hi)		14	
		13		P _{60/80C}		15	
				P _{30/50C}			
11		$\eta = 100\%$		$\eta = \text{min.}$			
gas							
mbar							17
gas				16			
mbar							18
gas							
mbar							

Operating principle

The TRIGON XXL is a fully modulating boiler.

The control unit of the boiler adapts the modulation ratio automatically to the heat demand requested by the system.

This is done by controlling the speed of the fan. As a result, the mixing system will adapt the gas ratio to the chosen fan speed, in order to maintain the best possible combustion figures and therewith the best efficiency.

The flue gases created by the combustion are transported downwards through the boiler and leave at the back side into the flue system.

The return water from the system enters the boiler in the lower section, where is the lowest flue gas temperature in the boiler. In this section condensation takes place.

The water is being transported upwards through the boiler, leaving the boiler at the top (burner) section.

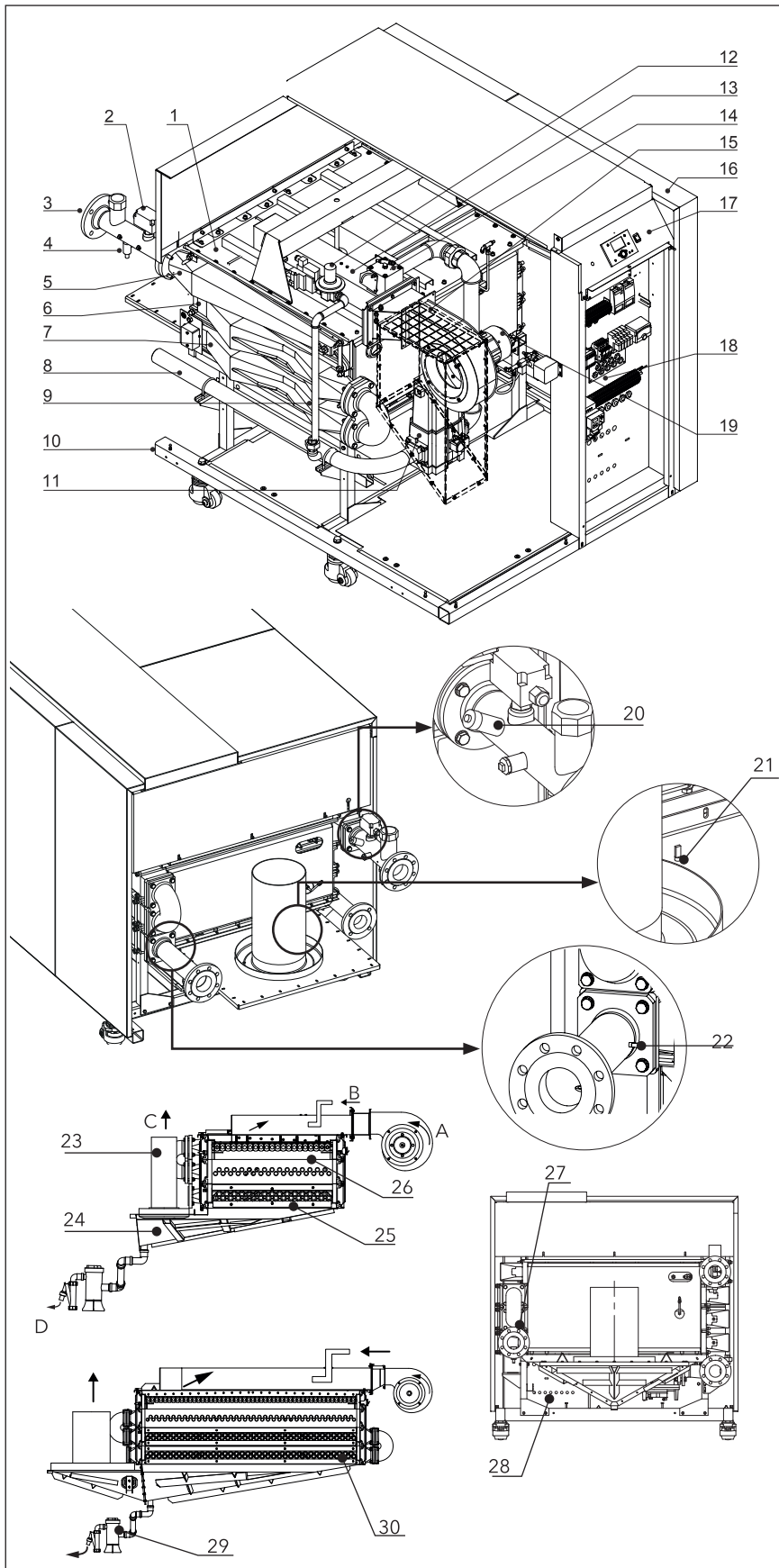
The cross flow working principle (water up, flue gas down) ensures the most efficient combustion results.

The LMS14 control unit can control the boiler operation based on:

- fixed flow temperature (stand alone operation);
- weather compensated operation (optional outdoor sensor);
- 0-10V external influence (temperature or capacity) from a building management system.

Construction

Layout of boiler



Layout of boiler

The TRIGON XXL boiler consists of the following main components:

- 1 Top plate
- 2 Water flow switch
- 3 Flow water connection
- 4 Filling/draining valve
- 5 Burner
- 6 1st Heat exchanger
- 7 2nd Heat exchanger
- 8 Gastrain
- 9 Pilot mixing channel
- 10 Frame
- 11 Main gas valve
- 12 Pilot gas valve
- 13 Main mixing channel
- 14 Butterfly valve
- 15 Air inlet box
- 16 Casing
- 17 Control panel
- 18 Electrical box
- 19 Fan
- 20 Pressure sensor
- 21 Flue gas temperature sensor (on condense tray)
- 22 Flow and Return temperature sensors (on water pipes)
- 23 Compensator
- 24 Flue gas connection
- 25 Condensate receptacle
- 26 Combustion chamber
- 27 Return water connection
- 28 Entry electrical connections
- 29 Syphon
- 30 3rd Heat exchanger (only EVO models)

- A Air
 B Gas
 C Flue gasses
 D Condensate

Technical data

TRIGON XXL SE 650 - SE 1200

		SE 650	SE 750	SE 850	SE 1000	SE 1100	SE 1200	
Nominal heat output at 80-60°C max/min	kW	650/164	726/183	849/213	961/242	1073/270	1184/298	
Nominal heat output at 40-30°C max/min	kW	657/183	733/204	858/238	971/270	1084/301	1196/332	
Nominal heat input Hi max/min	kW	702/176	784/196	917/229	1038/260	1159/290	1279/320	
Efficiency at 80-60°C	%	92,6						
Efficiency at 40-30°C	%	93,5						
Annual efficiency (NNG 40-30°C)	%	103,3						
Standstill losses (50°C)	%	0,1						
Max. condensate flow	l/h	3,2	3,6	4,2	4,8	5,3	5,9	
Gas consumption G20 max/min (10,9 kWh/m ³)	m ³ /h	64,4/16,1	71,9/18	84,1/21	95,2/23,9	106,3/26,6	117,3/29,4	
Gas consumption G25 max/min (8,34 kWh/m ³)	m ³ /h	84,2/21,1	94/23,5	110/27,5	124,5/31,2	139/34,8	153,4/38,4	
Gas consumption G31 max/min (12,8 kWh/kg)	kg/h	54,8/13,8	61,3/15,3	71,6/17,9	81,1/20,3	90,5/22,7	99,9/25	
Gas pressure G20	mbar	20		35				
Gas pressure G25	mbar	25		35				
Gas pressure G31	mbar	30	30	50	50	50	50	
Maximum gas pressure	mbar	100						
Flue gas temperature at 80-60°C max/min	°C	182/66						
Flue gas temperature at 40-30°C max/min	°C	167/65						
Flue gas quantity max/min	m ³ /h	1438/286	1606/318	1878/372	2126/422	2374/471	2619/519	
CO ₂ level main burner G20/G25 max/min	%	10,0/9,3						
CO ₂ level main burner G31 max/min	%	11,0/11,0						
CO ₂ level pilot burner G20/G25 max/min	%	10,0/10,2						
CO ₂ level pilot burner G31 max/min	%	11,0/11,2						
NO _x level max/min	mg/kWh	45/16						
CO level max/min	mg/kWh	7 / 3						
Max. permissible flue resistance	Pa	150						
Water volume	l	50	53	70	75	80	85	
Water pressure max/min	bar	8/1,5						
Max. ΔT	K	20						
Max. water temperature (High limit thermostat)	°C	100						
Maximum temperature setpoint	°C	90						
Nominal water flow at ΔT=20K	m ³ /h	28	31	36	41	46	51	
Hydraulic resistance at nominal water flow	kPa	38	43	34	40	51	62	
Electrical connection	V	400						
Frequency	Hz	50						
Mains connection fuse	A	16						
Power consumption boiler	W	900	900	1270	1270	1270	1270	
Power consumption standby	W	14						
Weight (empty)	kg	770	844	958	1084	1221	1369	
Sound Power Level (LWA)	dB	72,7						
Ionisation current minimum	μA	0,52						
PH value condensate	-	3,2						
CE certification code	-	0063CR3158						
Water connections	-	DN65 PN16			DN80 PN16			
Gas connection	-	R2"				DN65 PN16		
Flue gas connection	mm	300	350		400			
Air intake connection (for room sealed use)	mm	250	355					
Condensate connection	mm	40						

Technical data

TRIGON XXL SE 1300 - SE 1900

		SE 1300	SE 1500	SE 1700	SE 1900
Nominal heat output at 80-60°C max/min	kW	1296/326	1481/373	1666/419	1851/466
Nominal heat output at 40-30°C max/min	kW	1309/363	1496/415	1684/467	1871/519
Nominal heat input Hi max/min	kW	1400/350	1600/400	1800/450	2000/500
Efficiency at 80-60°C	%	92,6			
Efficiency at 40-30°C	%	93,5			
Annual efficiency (NNG 40-30°C)	%	103,3			
Standstill losses (50°C)	%	0,1			
Max. condensate flow	l/h	6,4	7,4	8,3	9,2
Gas consumption G20 max/min (10,9 kWh/m ³)	m ³ /h	128,4/32,1	146,8/36,7	165,1/41,3	183,5/45,9
Gas consumption G25 max/min (8,34 kWh/m ³)	m ³ /h	167,9/42	191,8/48	215,8/54	239,8/60
Gas consumption G31 max/min (12,8 kWh/kg)	kg/h	109,4/27,3	125/31,3	140,6/35,2	156,3/39,1
Gas pressure G20	mbar	50			
Gas pressure G25	mbar	50			
Gas pressure G31	mbar	50	50	50	50
Maximum gas pressure	mbar	100			
Flue gas temperature at 80-60°C max/min	°C	182/66			
Flue gas temperature at 40-30°C max/min	°C	167/65			
Flue gas quantity max/min	m ³ /h	2867/568	3277/649	3686/730	4096/811
CO ₂ level main burner G20/G25 max/min	%	10,0/9,3			
CO ₂ level main burner G31 max/min	%	11,0/11,0			
CO ₂ level pilot burner G20/G25 max/min	%	10,0/10,2			
CO ₂ level pilot burner G31 max/min	%	11,0/11,2			
NO _x level max/min	mg/kWh	45/16			
CO level max/min	mg/kWh	7 / 3			
Max. permissible flue resistance	Pa	150			
Water volume	l	97	109	116	123
Water pressure max/min	bar	8/1,5			
Max. ΔT	K	20			
Max. water temperature (High limit thermostat)	°C	100			
Maximum temperature setpoint	°C	90			
Nominal water flow at ΔT=20K	m ³ /h	56	64	72	80
Hydraulic resistance at nominal water flow	kPa	92	80	108	197
Electrical connection	V	400			
Frequency	Hz	50			
Mains connection fuse	A	16			
Power consumption boiler	W	2330	2330	2770	2770
Power consumption standby	W	14			
Weight (empty)	kg	1380	1740	1899	1991
Sound Power Level (LWA)	dB	72,7			
Ionisation current minimum	μA	0,52			
PH value condensate	-	3,2			
CE certification code	-	0063CR3158			
Water connections	-	DN80 PN16			
Gas connection	-	DN65 PN16		DN80 PN16	
Flue gas connection	mm	450		500	
Air intake connection (for room sealed use)	mm	450			
Condensate connection	mm	40			

Technical data

TRIGON XXL ECO 650 - ECO 1050

		ECO 650	ECO 750	ECO 850	ECO 950	ECO 1050
Nominal heat output at 80-60°C max/min	kW	615/175	719/204	814/231	909/258	1003/285
Nominal heat output at 40-30°C max/min	kW	625/195	732/227	828/257	925/287	1021/318
Nominal heat input Hi max/min	kW	653/187	764/218	865/247	966/276	1066/305
Efficiency at 80-60°C	%	94,1				
Efficiency at 40-30°C	%	95,8				
Annual efficiency (NNG 40-30°C)	%	103,7				
Standstill losses (50°C)	%	0,1				
Max. condensate flow	l/h	7,8	9,1	10,3	11,5	12,7
Gas consumption G20 max/min (10,9 kWh/m ³)	m ³ /h	59,9/17,2	70,1/20	79,4/22,7	88,6/25,3	97,8/28
Gas consumption G25 max/min (8,34 kWh/m ³)	m ³ /h	78,3/22,4	91,6/26,1	103,7/29,6	115,8/33,1	127,8/36,6
Gas consumption G31 max/min (12,8 kWh/kg)	kg/h	51/14,6	59,7/17	67,6/19,3	75,5/21,6	83,3/23,8
Gas pressure G20	mbar	20				
Gas pressure G25	mbar	25				
Gas pressure G31	mbar	30	30	30	30	30
Maximum gas pressure	mbar	100				
Flue gas temperature at 80-60°C max/min	°C	153/65				
Flue gas temperature at 40-30°C max/min	°C	134/64				
Flue gas quantity max/min*	m ³ /h	1252/303	1465/353	1659/400	1852/447	2044/493
CO ₂ level main burner G20/G25 max/min	%	10,0/9,3				
CO ₂ level main burner G31 max/min	%	11,0/11,0				
CO ₂ level pilot burner G20/G25 max/min	%	10,0/10,2				
CO ₂ level pilot burner G31 max/min	%	11,0/11,2				
NO _x level max/min	mg/kWh	37/15				
CO level max/min	mg/kWh	4 / 3				
Max. permissible flue resistance	Pa	150				
Water volume	l	53	70	75	80	85
Water pressure max/min	bar	8/1,5				
Max. ΔT	K	30				
Max. water temperature (High limit thermostat)	°C	100				
Maximum temperature setpoint	°C	90				
Nominal water flow at ΔT=20K	m ³ /h	26	31	35	39	43
Hydraulic resistance at nominal water flow	kPa	39	24	29	35	42
Electrical connection	V	400				
Frequency	Hz	50				
Mains connection fuse	A	16				
Power consumption boiler	W	900		1270		
Power consumption standby	W	14				
Weight (empty)	kg	844	958	1084	1221	1369
Sound Power Level (LWA)	dB	68,7				
Ionisation current minimum	μA	0,52				
PH value condensate	-	3,2				
CE certification code	-	0063CR3158				
Water connections	-	DN65 PN16	DN80 PN16			
Gas connection	-	R2"			DN65 PN16	
Flue gas connection	mm	350		400		
Air intake connection (for room sealed use)	mm	355				
Condensate connection	mm	40				

Technical data

TRIGON XXL ECO 1150 - ECO 1600

		ECO 1150	ECO 1300	ECO 1450	ECO 1600
Nominal heat output at 80-60°C max/min	kW	1097/311	1255/356	1411/400	1568/445
Nominal heat output at 40-30°C max/min	kW	1117/347	1277/397	1436/446	1596/496
Nominal heat input Hi max/min	kW	1166/333	1333/381	1499/428	1666/476
Efficiency at 80-60°C	%	94,1			
Efficiency at 40-30°C	%	95,8			
Annual efficiency (NNG 40-30°C)	%	103,7			
Standstill losses (50°C)	%	0,1			
Max. condensate flow	l/h	13,9	15,9	17,9	19,9
Gas consumption G20 max/min (10,9 kWh/m ³)	m ³ /h	107/30,6	122,3/35	137,5/39,3	152,8/43,7
Gas consumption G25 max/min (8,34 kWh/m ³)	m ³ /h	139,8/39,9	159,8/45,7	179,7/51,3	199,8/57,1
Gas consumption G31 max/min (12,8 kWh/kg)	kg/h	91,1/26	104,1/29,8	117,1/33,4	130,2/37,2
Gas pressure G20	mbar	35			
Gas pressure G25	mbar	35			
Gas pressure G31	mbar	50	50	50	50
Maximum gas pressure	mbar	100			
Flue gas temperature at 80-60°C max/min	°C	153/65			
Flue gas temperature at 40-30°C max/min	°C	134/64			
Flue gas quantity max/min	m ³ /h	2236/539	2556/616	2874/692	3194/770
CO ₂ level main burner G20/G25 max/min	%	10,0/9,3			
CO ₂ level main burner G31 max/min	%	11,0/11,0			
CO ₂ level pilot burner G20/G25 max/min	%	10,0/10,2			
CO ₂ level pilot burner G31 max/min	%	11,0/11,2			
NO _x level max/min	mg/kWh	37/15			
CO level max/min	mg/kWh	4 / 3			
Max. permissible flue resistance	Pa	150			
Water volume	l	97	109	116	123
Water pressure max/min	bar	8/1,5			
Max. ΔT	K	30			
Max. water temperature (High limit thermostat)	°C	100			
Maximum temperature setpoint	°C	90			
Nominal water flow at ΔT=20K	m ³ /h	47	54	61	67
Hydraulic resistance at nominal water flow	kPa	68	54	77	107
Electrical connection	V	400			
Frequency	Hz	50			
Mains connection fuse	A	16			
Power consumption boiler	W	2330		2770	
Power consumption standby	W	14			
Weight (empty)	kg	1380	1740	1899	1991
Sound Power Level (LWA)	dB	68,7			
Ionisation current minimum	μA	0,52			
PH value condensate	-	3,2			
CE certification code	-	0063CR3158			
Water connections	-	DN80 PN16			
Gas connection	-	DN65 PN16		DN80 PN16	
Flue gas connection	mm	450		500	
Air intake connection (for room sealed use)	mm	450			
Condensate connection	mm	40			

Technical data

TRIGON XXL EVO 700 - EVO 1100

		EVO 700	EVO 800	EVO 900	EVO 1000	EVO 1100
Nominal heat output at 80-60°C max/min	kW	639/182	747/212	846/241	945/269	1043/297
Nominal heat output at 40-30°C max/min	kW	682/205	798/239	904/271	1009/303	1114/334
Nominal heat input Hi max/min	kW	653/187	764/218	865/247	966/276	1066/305
Efficiency at 80-60°C	%	97,8				
Efficiency at 40-30°C	%	104,5				
Annual efficiency (NNG 40-30°C)	%	109,1				
Standstill losses (50°C)	%	0,1				
Max. condensate flow	l/h	42,4	49,6	56,1	62,7	69,1
Gas consumption G20 max/min (10,9 kWh/m ³)	m ³ /h	59,9/17,2	70,1/20	79,4/22,7	88,6/25,3	97,8/28
Gas consumption G25 max/min (8,34 kWh/m ³)	m ³ /h	78,3/22,4	91,6/26,1	103,7/29,6	115,8/33,1	127,8/36,6
Gas consumption G31 max/min (12,8 kWh/kg)	kg/h	51/14,6	59,6/17	67,6/19,3	75,5/21,6	83,3/23,8
Gas pressure G20	mbar	20				
Gas pressure G25	mbar	25				
Gas pressure G31	mbar	30	30	30	30	30
Maximum gas pressure	mbar	100				
Flue gas temperature at 80-60°C max/min	°C	69/59				
Flue gas temperature at 40-30°C max/min	°C	51/32				
Flue gas quantity max/min	m ³ /h	1005/297	1176/346	1332/393	1487/439	1641/485
CO ₂ level main burner G20/G25 max/min	%	10,0/9,3				
CO ₂ level main burner G31 max/min	%	11,0/11,0				
CO ₂ level pilot burner G20/G25 max/min	%	10,0/10,2				
CO ₂ level pilot burner G31 max/min	%	11,0/11,2				
NO _x level max/min	mg/kWh	37/15				
CO level max/min	mg/kWh	4 / 2				
Max. permissible flue resistance	Pa	150				
Water volume	l	73	97	104	110	117
Water pressure max/min	bar	8/1,5				
Max. ΔT	K	30				
Max. water temperature (High limit thermostat)	°C	100				
Maximum temperature setpoint	°C	90				
Nominal water flow at ΔT=20K	m ³ /h	27	32	36	41	45
Hydraulic resistance at nominal water flow	kPa	74	40	55	67	83
Electrical connection	V	400				
Frequency	Hz	50				
Mains connection fuse	A	16				
Power consumption boiler	W	900		1270		
Power consumption standby	W	14				
Weight (empty)	kg	1136	1328	1468	1634	1800
Sound Power Level (LWA)	dB	68,7				
Ionisation current minimum	µA	0,52				
PH value condensate	-	3,2				
CE certification code	-	0063CR3158				
Water connections	-	DN65 PN16	DN80 PN16			
Gas connection	-	R2"			DN65 PN16	
Flue gas connection	mm	300	350		400	
Air intake connection (for room sealed use)	mm	250	355			
Condensate connection	mm	40				

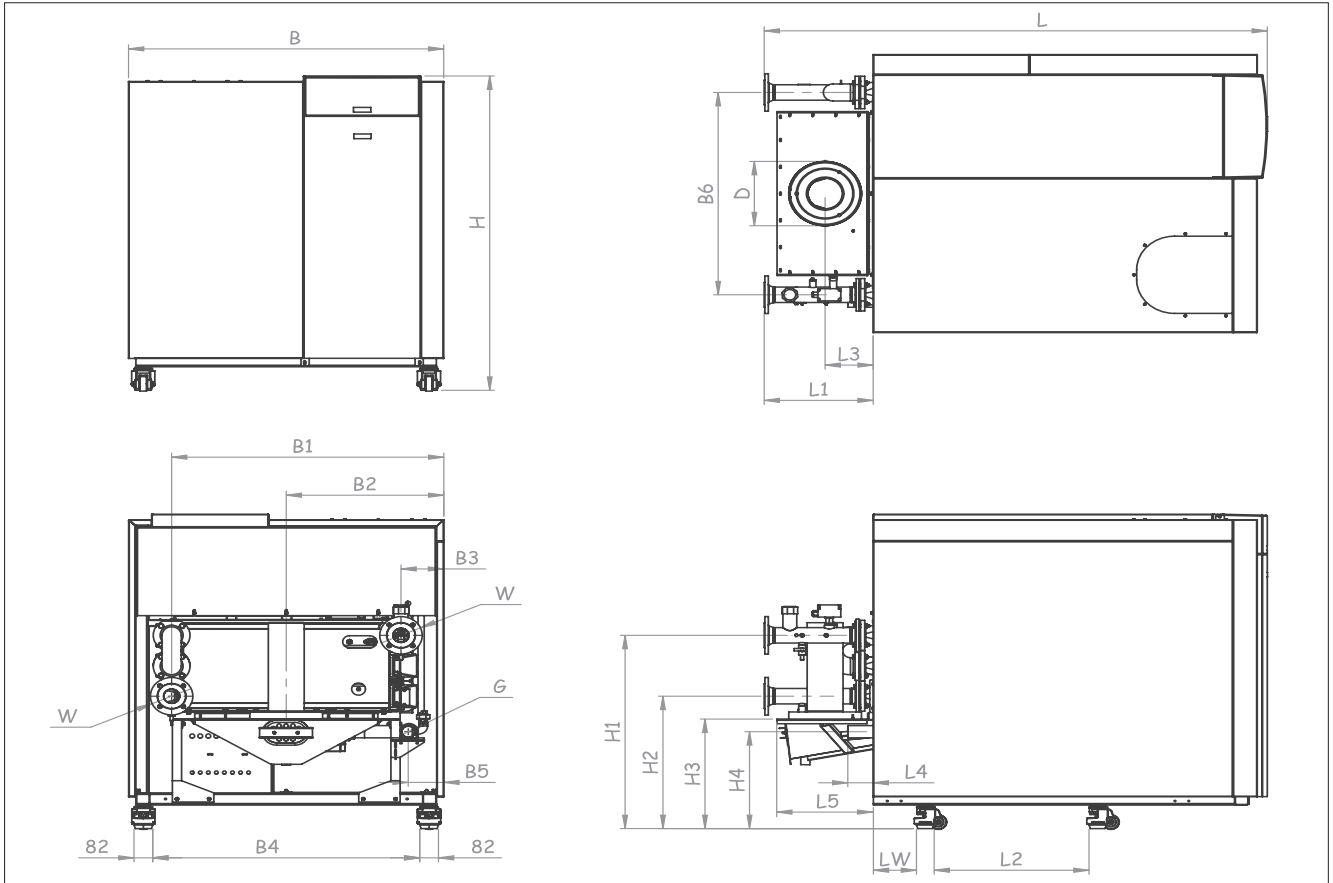
Technical data

TRIGON XXL EVO 1200 - EVO 1700 - EVO 2000

		EVO 1200	EVO 1400	EVO 1550	EVO 1700	EVO 2000
Nominal heat output at 80-60°C max/min	kW	1141/324	1304/371	1467/417	1630/464	1953/487
Nominal heat output at 40-30°C max/min	kW	1218/365	1393/418	1566/469	1741/522	2087/548
Nominal heat input Hi max/min	kW	1166/333	1333/381	1499/428	1666/476	2000/500
Efficiency at 80-60°C	%	97,8				97,7
Efficiency at 40-30°C	%	104,5				104,4
Annual efficiency (NNG 40-30°C)	%	109,1				
Standstill losses (50°C)	%	0,1				
Max. condensate flow	l/h	75,6	86,5	97,2	108,1	129,6
Gas consumption G20 max/min (10,9 kWh/m ³)	m ³ /h	107/30,6	122,3/35	137,5/39,3	152,8/43,7	183,5/45,9
Gas consumption G25 max/min (8,34 kWh/m ³)	m ³ /h	139,8/39,9	159,8/45,7	179,7/51,3	199,8/57,1	239,8/60,0
Gas consumption G31 max/min (12,8 kWh/kg)	kg/h	91,1/26	104,1/29,8	117,1/33,4	130,2/37,2	156,3/39,1
Gas pressure G20	mbar	35				50
Gas pressure G25	mbar	35				50
Gas pressure G31	mbar	50	50	50	50	50
Maximum gas pressure	mbar	100				
Flue gas temperature at 80-60°C max/min	°C	69/59				73/59
Flue gas temperature at 40-30°C max/min	°C	51/32				54/32
Flue gas quantity max/min	m ³ /h	1795/529	2052/605	2307/680	2565/756	3115/795
CO ₂ level main burner G20/G25 max/min	%	10,0/9,3				
CO ₂ level main burner G31 max/min	%	11,0/11,0				
CO ₂ level pilot burner G20/G25 max/min	%	10,0/10,2				
CO ₂ level pilot burner G31 max/min	%	11,0/11,2				
NO _x level max/min	mg/kWh	37/15				32/14
CO level max/min	mg/kWh	4 / 2				7 / 4
Max. permissible flue resistance	Pa	150				150
Water volume	l	131	147	157	166	209
Water pressure max/min	bar	8/1,5				
Max. ΔT	K	30				
Max. water temperature (High limit thermostat)	°C	100				
Maximum temperature setpoint	°C	90				
Nominal water flow at ΔT=20K	m ³ /h	49	56	63	70	84
Hydraulic resistance at nominal water flow	kPa	92	83	128	160	216
Electrical connection	V	400				
Frequency	Hz	50				
Mains connection fuse	A	16				
Power consumption boiler	W	2330		2770		
Power consumption standby	W	14				
Weight (empty)	kg	1900	2000	2100	2201	2500
Sound Power Level (LWA)	dB	68,7				72,7
Ionisation current minimum	μA	0,52				
PH value condensate	-	3,2				
CE certification code	-	0063CR3158				
Water connections	-	DN80 PN16				
Gas connection	-	DN65 PN16		DN80 PN16		
Flue gas connection	mm	450		500		
Air intake connection (for room sealed use)	mm	450				
Condensate connection	mm	40				

Technical data

Dimensions SE 650 - SE 1200 ECO 650 - ECO 1050 EVO 700 - EVO 1100

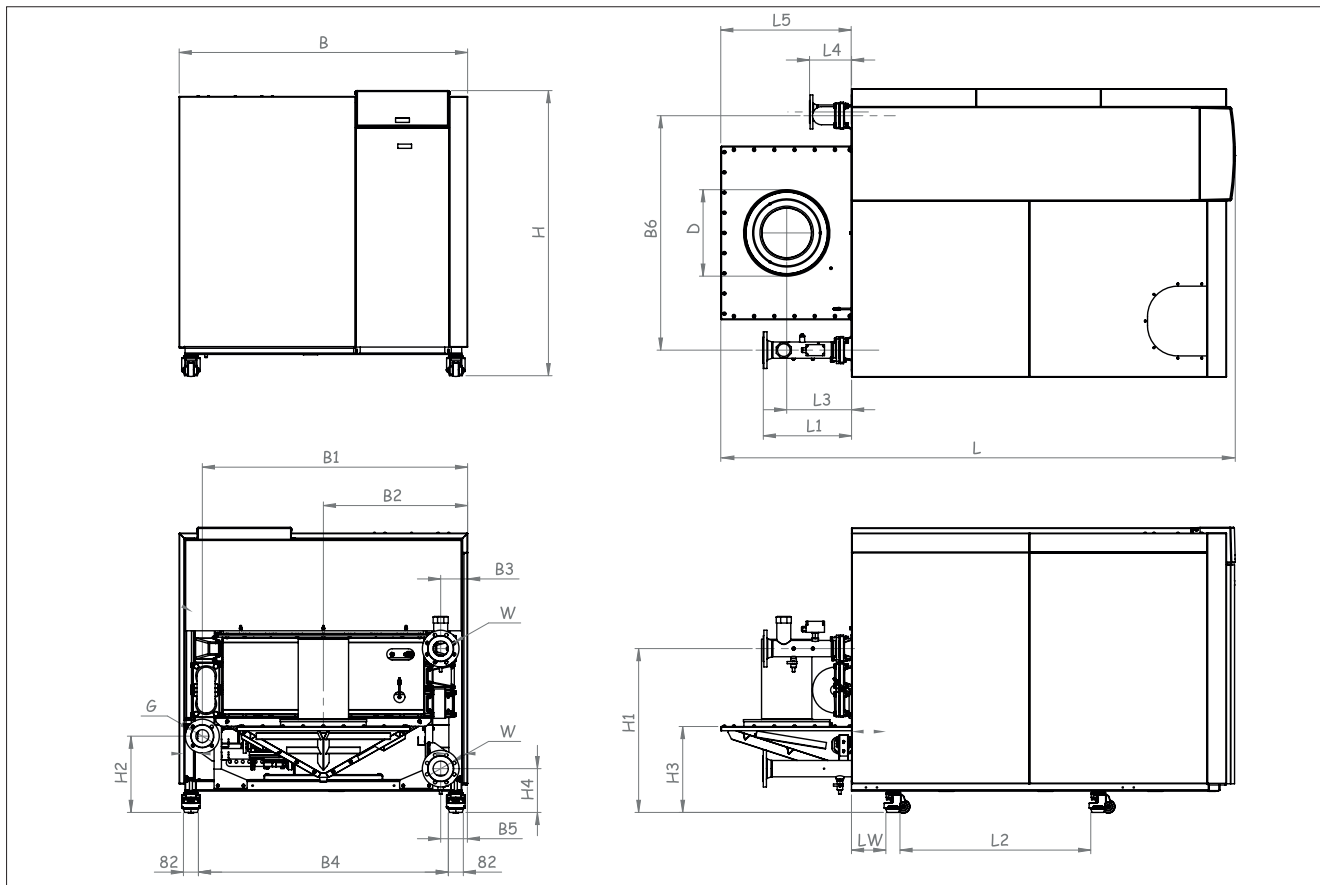


B is not the maximum width of the boiler as for some models B6+flange connection are wider as B.

Dimensions		SE 650	SE 750	SE 850	SE 1000	SE 1100	SE 1200	EVO 700	EVO 800	EVO 900	EVO 1000	EVO 1100
		ECO 650	ECO 750	ECO 850	ECO 950	ECO 1050						
L	mm	2185	2185	2565	2565	2565	2565	2185	2565	2565	2565	2565
L1	mm	475	475	480	480	480	480	475	480	480	480	480
L2	mm	660	660	1030	1030	1030	1030	660	1030	1030	1030	1030
L3	mm	210	260	260	260	260	260	260	260	260	260	260
L4	mm	110	110	110	110	110	110	110	110	110	100	100
L5	mm	420	550	550	550	550	550	550	550	550	550	550
LW	mm	185	185	185	185	185	185	185	185	185	185	185
H	mm	1555	1555	1555	1555	1555	1555	1555	1555	1555	1555	1555
H1	mm	960	960	960	960	960	960	1110	1110	1110	1110	1110
H2	mm	660	660	660	660	660	660	660	660	660	660	660
H3	mm	540	530	530	530	530	530	530	530	530	530	530
H4	mm	480	480	500	500	500	500	460	460	480	480	480
B	mm	1370	1370	1170	1170	1370	1370	1370	1170	1170	1370	1370
B1	mm	1185	1235	1025	1075	1225	1275	1235	1025	1075	1225	1275
B2	mm	685	685	585	585	685	685	685	585	585	685	685
B3	mm	185	135	145	95	145	95	135	145	95	145	95
B4	mm	1160	1160	960	960	1160	1160	1160	960	960	1160	1160
B5	mm	150	100	150	100	150	100	100	150	100	150	100
B6	mm	1000	1100	880	980	1080	1180	1100	880	980	1080	1180
D	mm	300	350	350	400	400	400	300	350	350	400	400
W	DN	DN65PN16	DN65PN16	DN80PN16	DN80PN16	DN80PN16	DN80PN16	DN65PN16	DN80PN16	DN80PN16	DN80PN16	DN80PN16
G	DN	R2"	R2"	R2"	R2"	DN65PN16	DN65PN16	R2"	R2"	R2"	DN65PN16	DN65PN16

Technical data

Dimensions SE 1300 - SE 1500 ECO 1150 - ECO 1300

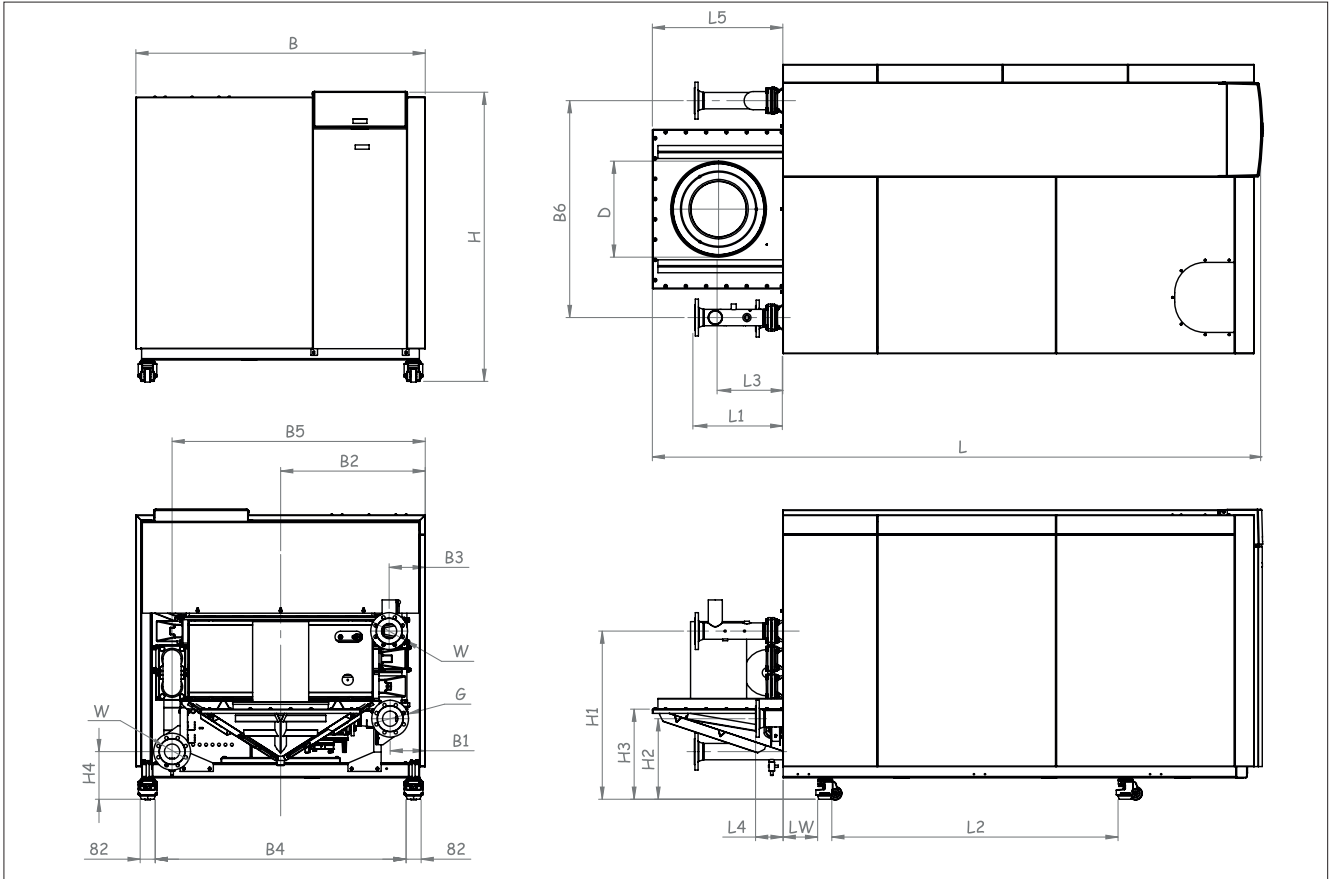


B is not the maximum width of the boiler as for some models B6+flange connection are wider as B.

Dimensions		SE 1300	SE 1500
		ECO 1150	ECO 1300
L	mm	2795	3310
L1	mm	480	480
L2	mm	1030	1550
L3	mm	350	350
L4	mm	230	230
L5	mm	710	710
LW	mm	185	185
H	mm	1555	1575
H1	mm	895	915
H2	mm	420	435
H3	mm	470	490
H4	mm	240	260
B	mm	1570	1370
B1	mm	1445	1250
B2	mm	785	685
B3	mm	145	145
B4	mm	1360	1160
B5	mm	145	145
B6	mm	1300	1105
D	mm	450	450
W	DN	DN80-PN16	DN80-PN16
G	DN	DN65-PN16	DN65-PN16

Technical data

Dimensions SE 1700 - SE 1900 ECO 1450 - ECO 1600

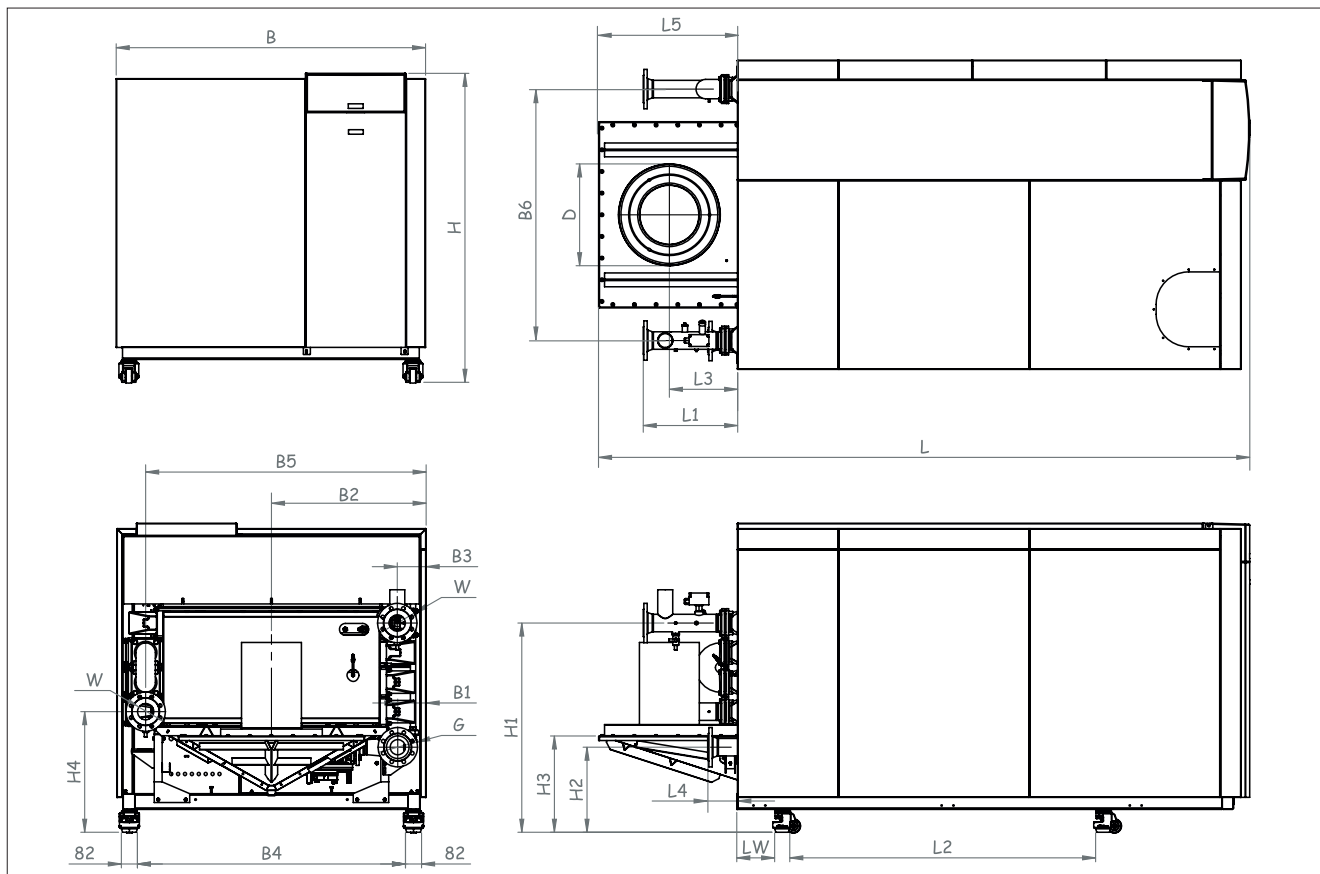


B is not the maximum width of the boiler as for some models B6+flange connection are wider as B.

Dimensions		SE 1700	SE 1900
		ECO 1450	ECO 1600
L	mm	3310	3310
L1	mm	480	480
L2	mm	1550	1550
L3	mm	350	350
L4	mm	150	150
L5	mm	710	710
LW	mm	185	185
H	mm	1575	1575
H1	mm	915	915
H2	mm	440	440
H3	mm	490	490
H4	mm	260	260
B	mm	1570	1570
B1	mm	190	140
B2	mm	785	785
B3	mm	195	145
B4	mm	1360	1360
B5	mm	1375	1425
B6	mm	1180	1280
D	mm	500	500
W	DN	DN80-PN16	DN80-PN16
G	DN	DN80-PN16	DN80-PN16

Technical data

Dimensions EVO 1200 - EVO 1700

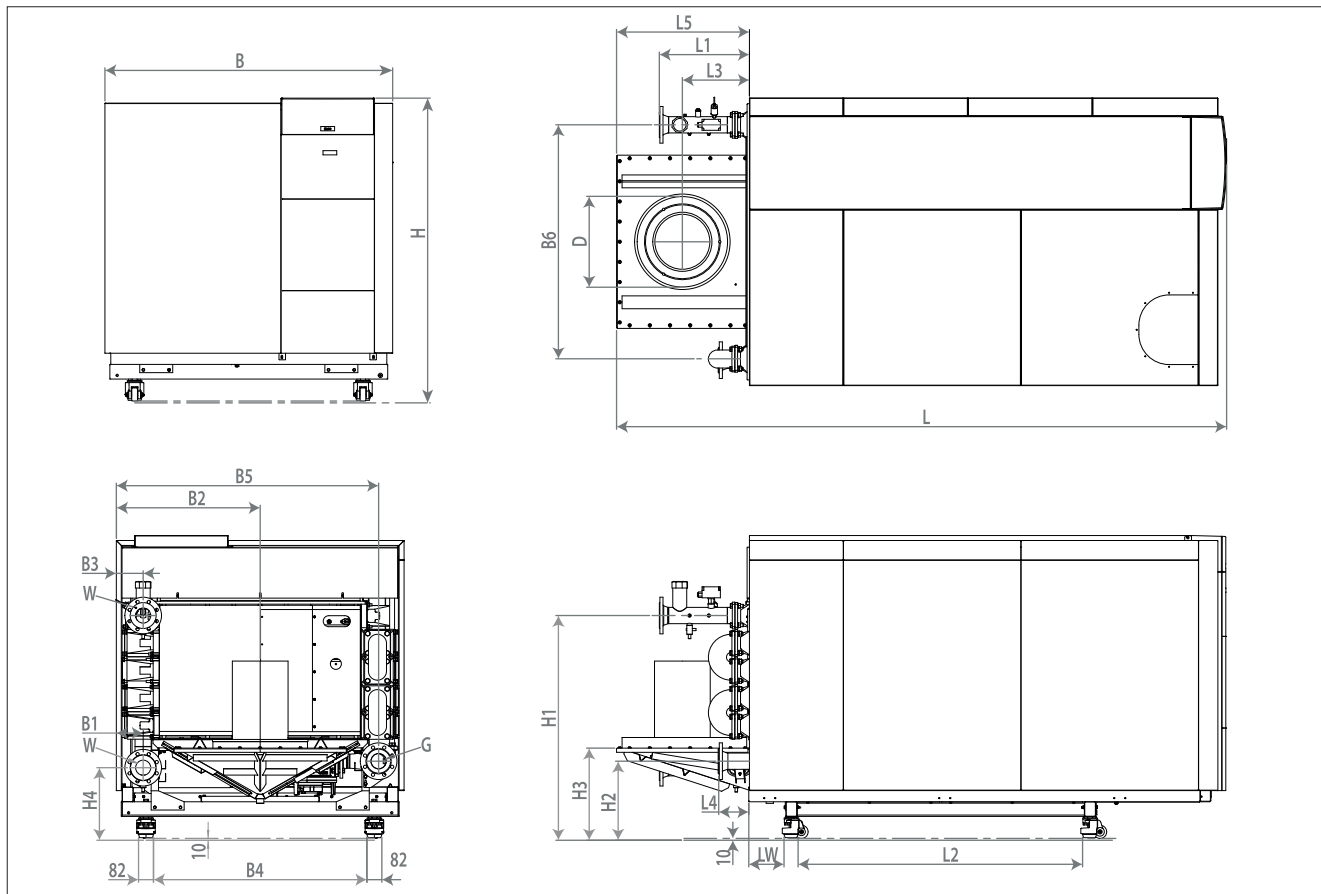


B is not the maximum width of the boiler as for some models B6+flange connection are wider as B.

Dimensions		EVO 1200	EVO 1400	EVO 1550	EVO 1700
L	mm	2795	3310	3310	3310
L1	mm	480	480	480	480
L2	mm	1030	1550	1550	1550
L3	mm	350	350	350	350
L4	mm	230	165	150	150
L5	mm	710	710	710	710
LW	mm	185	185	185	185
H	mm	1555	1575	1575	1575
H1	mm	1045	1065	1065	1065
H2	mm	395	415	435	435
H3	mm	470	490	490	490
H4	mm	595	615	615	615
B	mm	1570	1370	1570	1570
B1	mm	150	140	190	140
B2	mm	785	685	785	785
B3	mm	145	145	195	145
B4	mm	1360	1160	1360	1360
B5	mm	1425	1225	1375	1425
B6	mm	1280	1080	1180	1280
D	mm	450	450	500	500
W	DN	DN80-PN16	DN80-PN16	DN80-PN16	DN80-PN16
G	DN	DN65-PN16	DN65-PN16	DN80-PN16	DN80-PN16

Technical data

Dimensions EVO 2000



B is not the maximum width of the boiler as for some models B6+flange connection are wider as B.

Dimensions		EVO 2000
L	mm	3310
L1	mm	480
L2	mm	1550
L3	mm	350
L4	mm	165
L5	mm	710
LW	mm	185
H	mm	1665
H1	mm	1225
H2	mm	435
H3	mm	505
H4	mm	395
B	mm	1570
B1	mm	140
B2	mm	785
B3	mm	145
B4	mm	1145
B5	mm	1425
B6	mm	1280
D	mm	500
W	DN	DN80-PN16
G	DN	DN80-PN16

Extent of delivery

Standard boiler Accessories

Standard boiler

A boiler delivery package contains the following components:

Component	Pcs.	Package
TRIGON XXL Boiler fully assembled and tested	1	Wooden border, sealed in PE foil
Syphon and dirt collector for condensate connection	1	Cardboard box on top of heat exchanger (under casing)
Operation and Installation manual	1	Positioned in the electrobox

Accessories

On request it is possible to get various options and/or accessories.

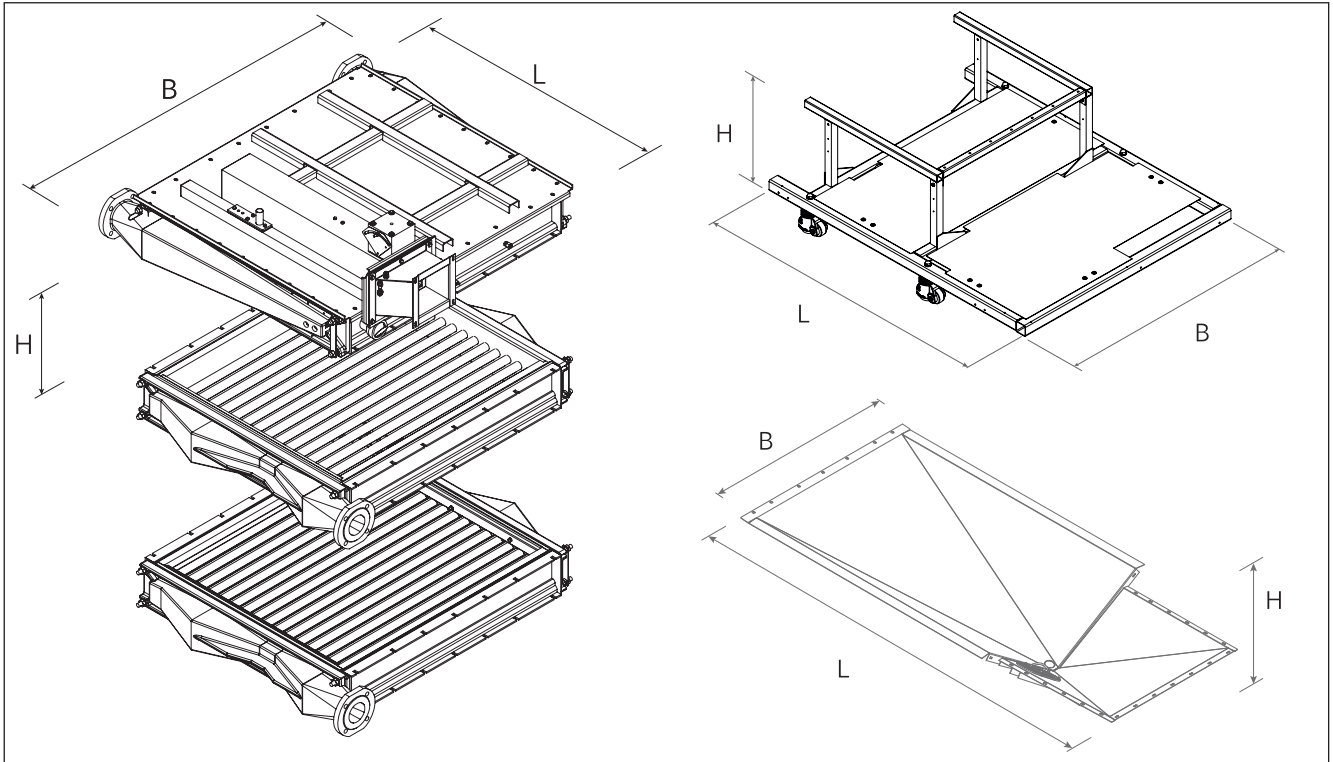
Legend:

Not available	available
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TRIGON XXL	SE	ECO		EVO		
DESCRIPTION	650-1900	650-1050	1150-1600	700-1100	1200-1700	2000
MONO HEADER						
DUO HEADER						
SAFETY VALVE 3 BAR						
SAFETY VALVE 6 BAR						
SAFETY VALVE 3 BAR TUV						
SAFETY VALVE 6 BAR TUV						
PUMP STANDARD						
SPEED CONTROL PUMP						
BYPASS PUMP						
MAX GAS PRESSURE SWITCH						
MIN WATER PRESSURE SWITCH						
MAX WATER PRESSURE SWITCH						
GAS FILTER 2 INCH						
GAS VALVE LEAKAGE TESTER						
EXTERNAL HIGH LIMIT THERMOSTAT						
DISASSEMBLY KIT						
PRESS REG. NAT GAS 300/10-30MBAR R2"						
EXTENSION MODULE AVS75.390/101						
RVS63.283/360 CONTROLLER + WALL HUNG BOX						
OUTDOOR SENSOR QAC34.101						
HEADER/HOT WATER SENSOR QAZ36 CABLE 2M						
HEADER/HOT WATER SENSOR QAZ36 CABLE 6M						
ZONE SENSOR QAD36.201 WITH 4M CABLE						
ROOM FAN + EXT. GAS VALVE TRXXL						
ROOM CONTROLLER QAA75.610/101						
ROOM CONTROLLER QAA78.610/301 WIRELESS						
RECEIVER AVS71.390/109 WIRELESS						
OUTDOOR SENSOR AVS13.399.201 WIRELESS						
CASCADE KIT MASTER LMS						
CASCADE KIT SLAVE LMS						
2ND RETURN TRXXL						
AIR FILTER TRXXL						
ROOM SEALED KIT TRXXL						
FLUE DAMPER TRXXL						

Installation

Transport



Component		SE 650	SE 750	SE 850	SE 1000	SE 1100	SE 1200	SE- 300	SE 1500	SE 1700	SE 1900	
			ECO 650	ECO 750	ECO 850	ECO 950	ECO 1050	ECO 1150	ECO 1300	ECO 1450	ECO 1600	
			EVO 700	EVO 800	EVO 900	EVO 1000	EVO 1100	EVO 1200	EVO 1400	EVO 1550	EVO 1700	EVO 2000
Burner	m [kg]	135	140	210	215	220	225	230	385	390	395	395
	L [mm]	1030	1030	1505	1505	1505	1505	1505	2020	2020	2020	2020
	B [mm]	1160	1260	1025	1125	1225	1325	1425	1255	1355	1455	1455
	H [mm]	416	416	416	416	416	416	445	445	465	465	445
1st Heat exchanger	m [kg]	120	135	180	185	190	195	200	325	330	335	335
	L [mm]	1030	1030	1505	1505	1505	1505	1505	2020	2020	2020	2020
	B [mm]	1160	1260	1025	1125	1225	1325	1425	1255	1355	1455	1455
	H [mm]	150	150	150	150	150	150	150	150	150	150	150
2nd Heat exchanger	m [kg]	135	150	200	200	210	210	220	365	370	375	335
	L [mm]	1030	1030	1505	1505	1505	1505	1505	2020	2020	2020	2020
	B [mm]	1160	1260	1025	1125	1225	1325	1425	1255	1355	1455	1455
	H [mm]	150	150	150	150	150	150	150	150	150	150	150
3rd Heat exchanger (only EVO models)	m [kg]		150	200	200	210	210	220	365	370	375	375
	L [mm]		1030	1505	1505	1505	1505	1505	2020	2020	2020	2020
	B [mm]		1260	1025	1125	1225	1325	1425	1255	1355	1455	1455
	H [mm]		150	150	150	150	150	150	150	150	150	150
4rd Heat exchanger	m [kg]											375
	L [mm]											2020
	B [mm]											1455
	H [mm]											150
Frame	m [kg]	84	84	91	112	101	104	92	115	120	122	147
	L [mm]	1630	1630	2005	2005	2005	2005	2005	2520	2520	2520	2520
	B [mm]	1310	1310	1110	1110	1310	1310	1510	1310	1510	1510	1510
	H [mm]	460	460	460	460	460	460	400	420	420	420	420
Condensate receptacle	m [kg]	<25	<25	<35	<35	<35	<35	<40	<55	<55	<55	<55
	L [mm]	1320	1450	1910	1910	1910	1910	2075	2580	2580	2580	2580
	B [mm]	990	1070	770	870	970	1070	1175	975	1075	1175	1175
	H [mm]	300	320	340	340	340	340	350	350	350	350	350

Installation

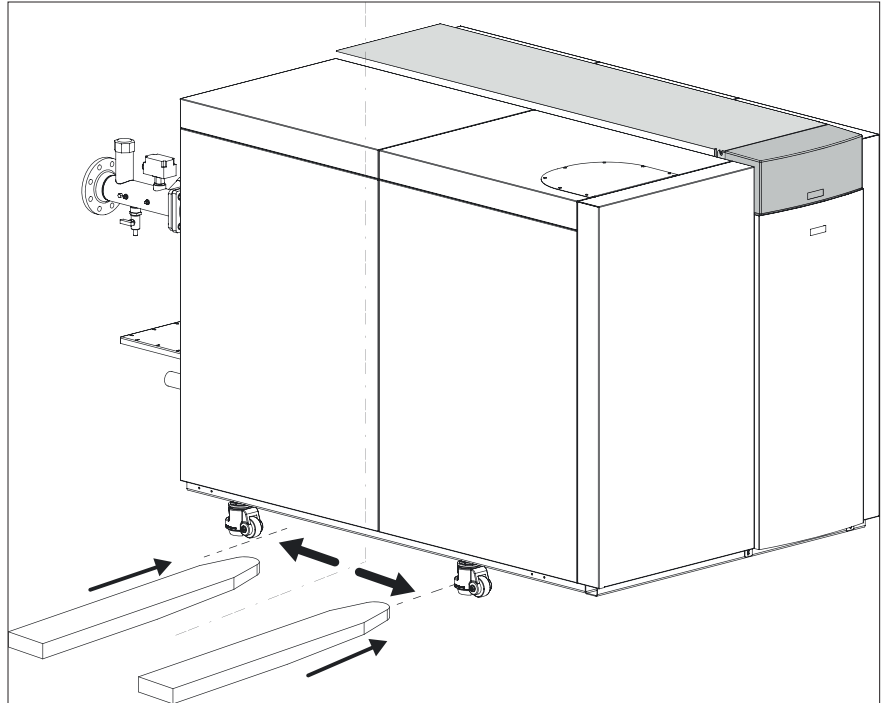
Transport

Boiler transport

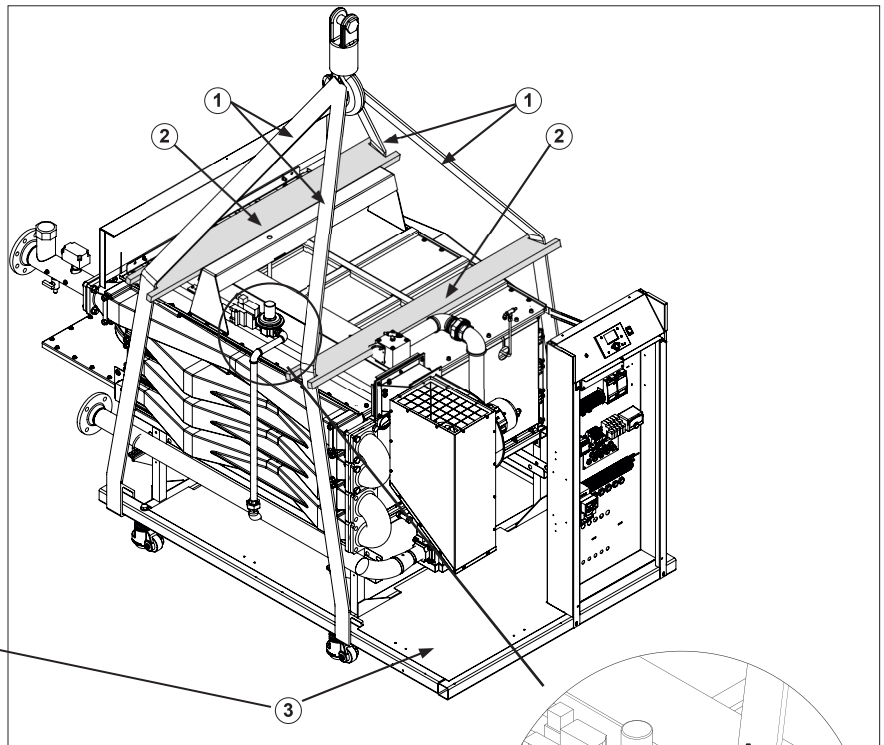
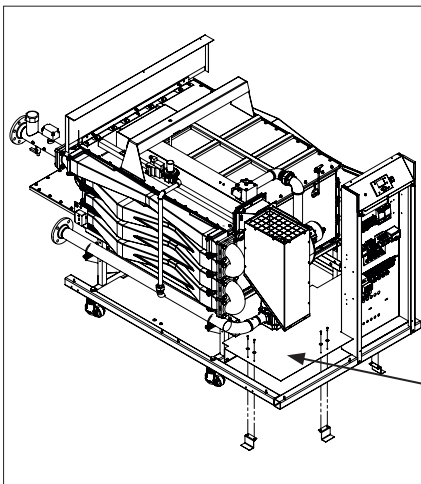
The TRIGON XXL boiler will be supplied as a complete unit being fully assembled and pre-tested.

The boiler can be transported with a forklift, just make sure that the center of gravity of the boiler is at the center of the forks, positioning the forks as closer as possible to the wheels (see picture below).

Whenever necessary, the boiler can be dismantled into smaller parts for easier transport inside the building. The table on the previous page shows the main dismantled parts with their weight and dimensions.

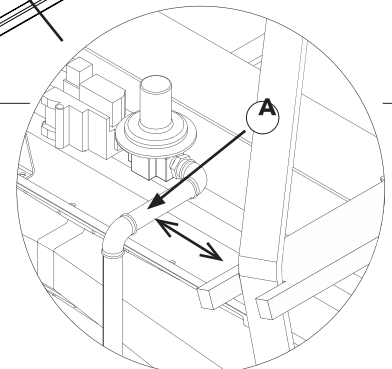


When the TRIGON XXL boiler has to be transported with a crane, it is necessary to remove the casing before connecting the boiler to the crane. Always connect the crane to the frame of the boiler using straps. To easily access to the frame we suggest to remove the bottom plate (3).



- 1 Strap(4x)
- 2 Wooden retaining beam (2x)

Caution:
Do not damage the
gas pipe (A).

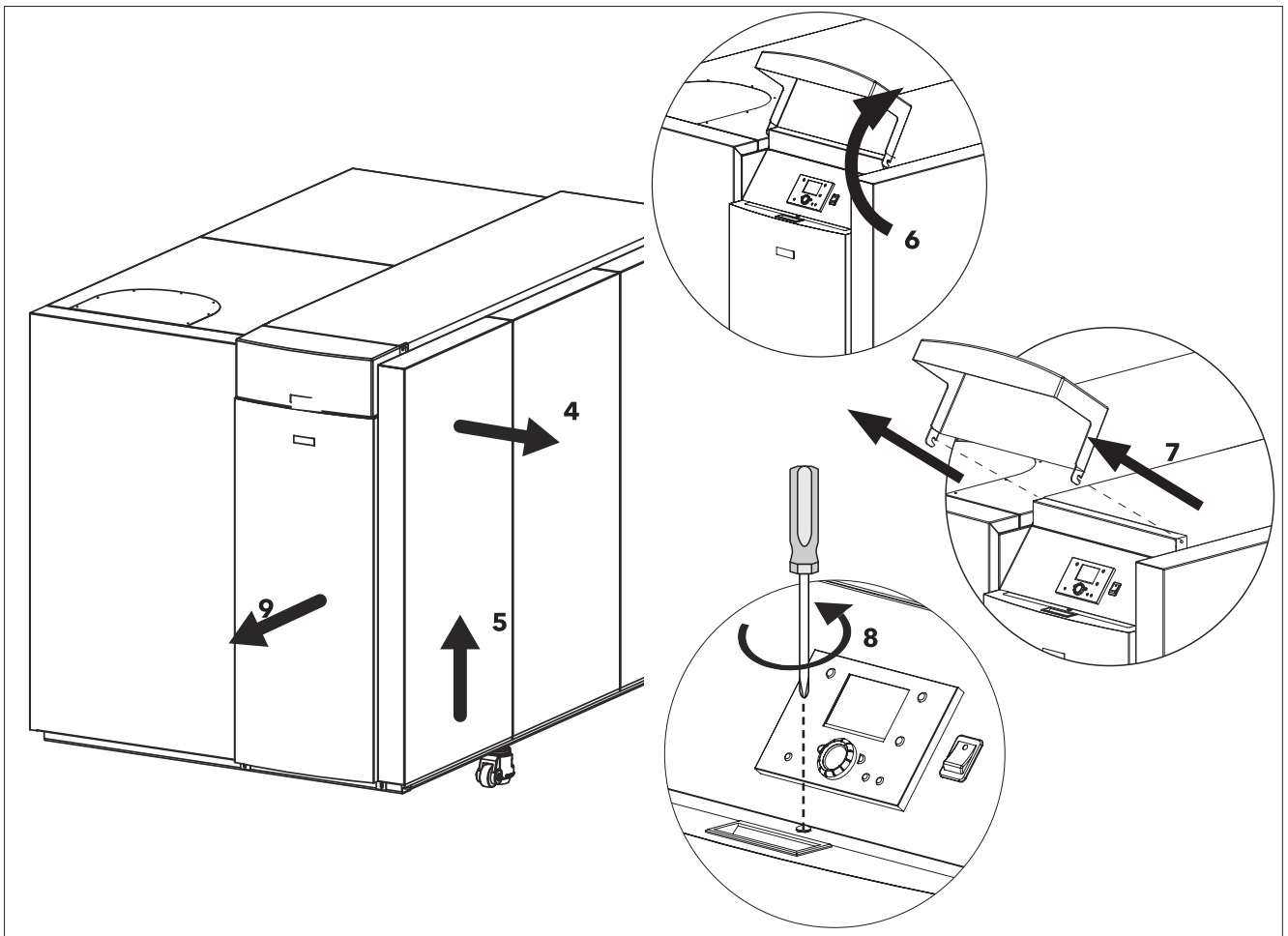
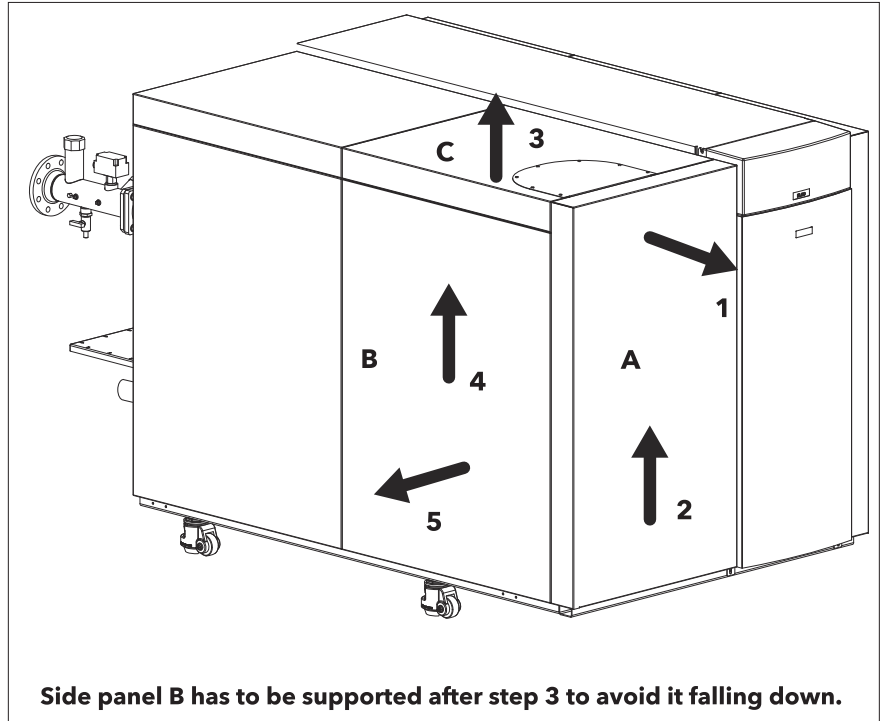


Installation

Removing the casing

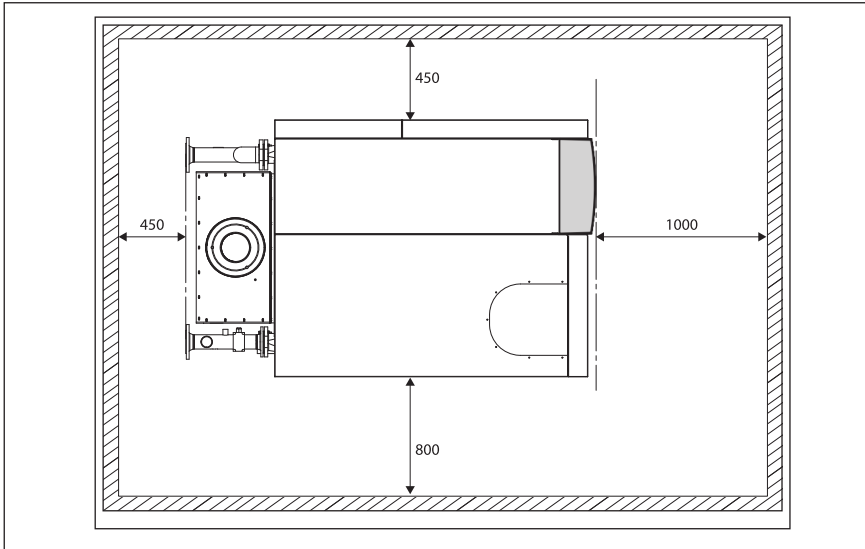
Removing the casing

Remove the casing before transporting the boiler, in order to avoid damage to the casing parts during transportation. Removing the casing is done as follows:



Installation

Boiler installation

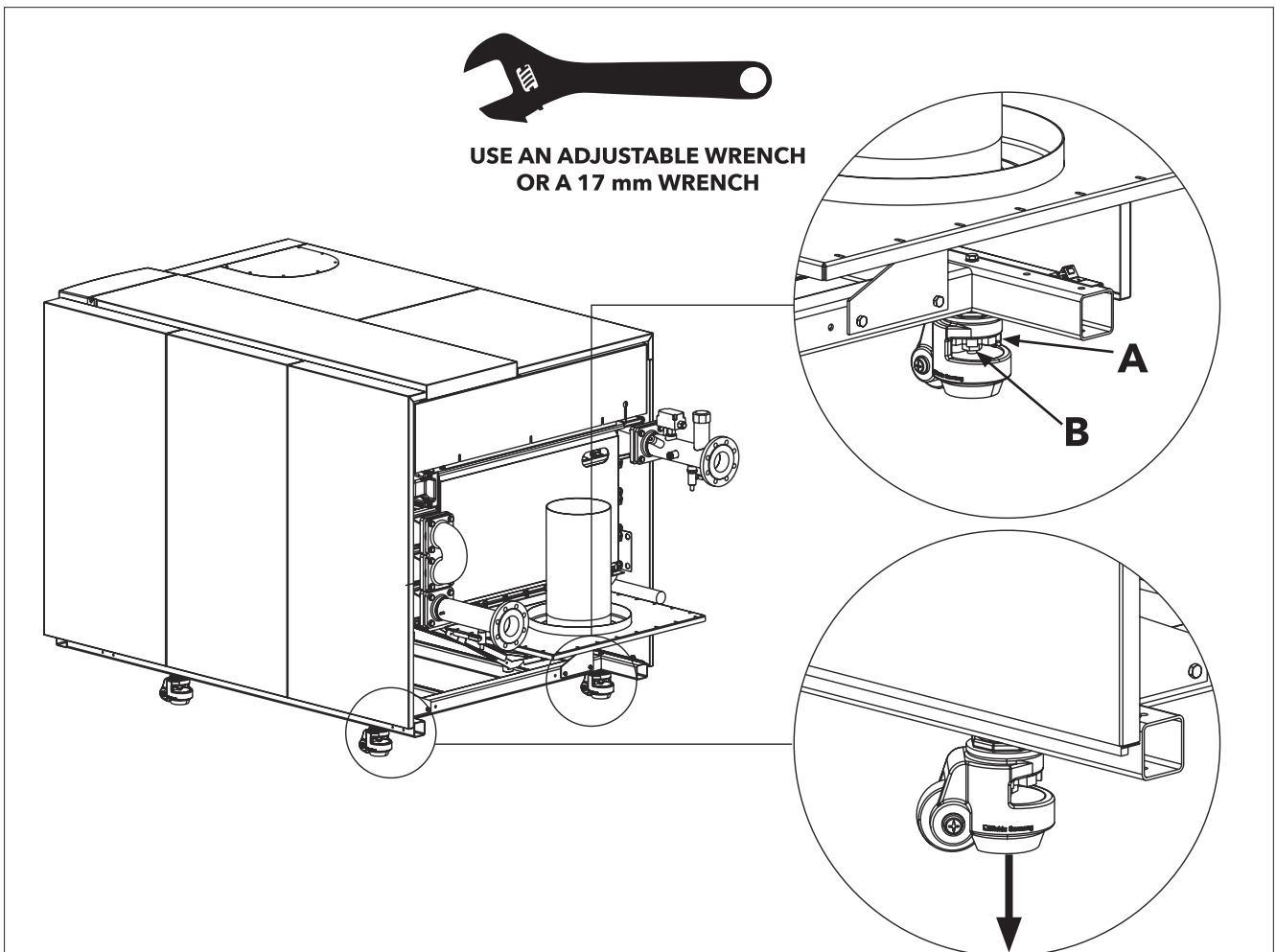


Boiler installation

The boiler should be positioned in a frost-free boiler room. If the boiler room is on the roof, the boiler itself may never be the highest point of the installation.

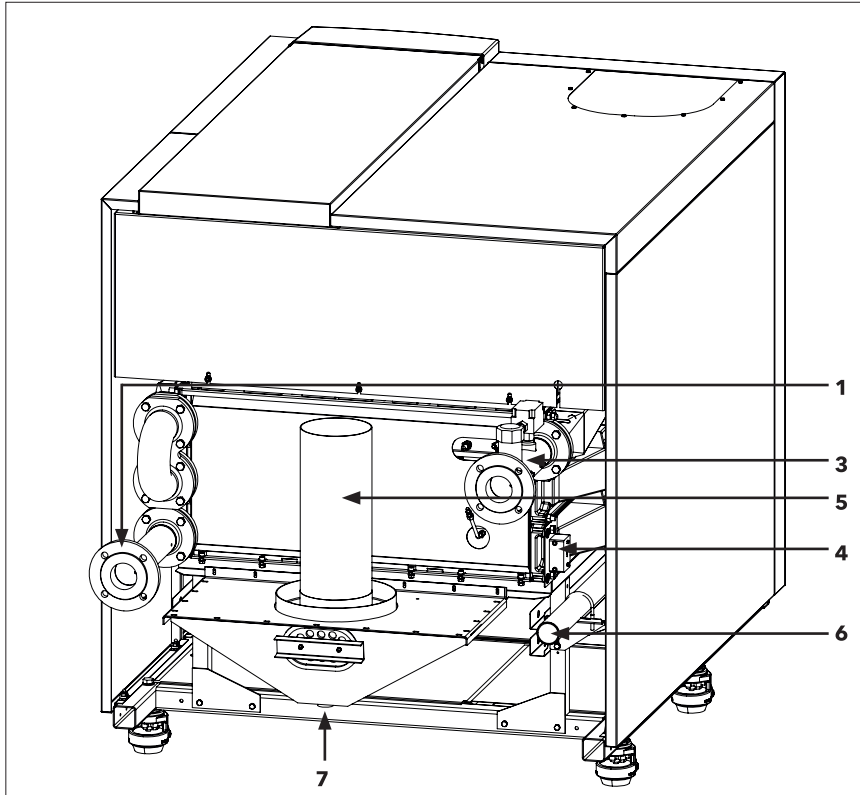
When positioning the boiler, please note the recommended minimum clearance in the picture. When the boiler is positioned with less free space, maintenance activities will be more difficult.

Once the boiler is in the correct position, turn anti-clockwise the regulator (A) or the nut (B) to let the feet out, till the boiler is set in the right height. Water and gas connections should be done after adjusting the right height, as this effects the exact height of all connections.



Installation

Connecting the boiler



Connecting the boiler

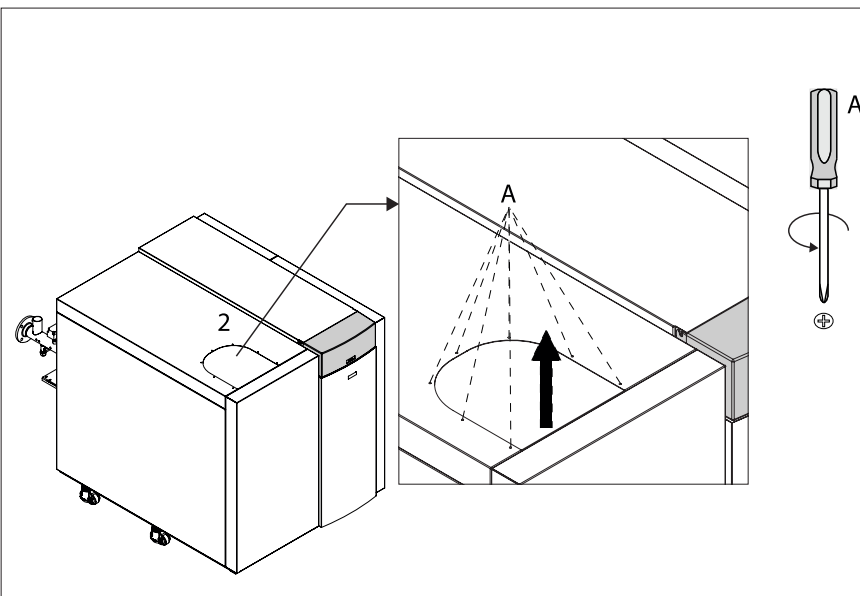
This chapter will explain how to make all connections to the boiler with regard to:

- Hydraulic connections (1, 3);
- Condensate drain connection (7);
- Gas connection (6);
- Flue gas connection (5);
- Air intake connection (2);
- Electrical connection (4);
- Dirt collector (see next page).

The boiler should always be connected in such a way, that the system is in accordance with all relevant standards and regulations (European, national and local). It's the responsibility of the installer to ensure that all standards and regulations are respected.

Hydraulic connections

The boiler should always be connected in such a way, that water flow through the boiler can be ensured at all times. Connect the flow (3) and return (1) connection of the system tension free to the boiler connections.



Accessory (Room Sealed kit TRXXL) required to make the air intake connection (2)

The air intake can be connected if the boiler is used as room sealed. The diameter should be calculated according to the national regulations, together with the flue gas system. The total resistance of both systems should never overcome the maximum permissible resistance of the fan inside the boiler (see also chapter: Technical data).

To open the air intake cover, remove the screws (A) with a screwdriver and then remove the cover.

Check whether the air intake systems are made according to the national and local regulations.

Installations which do not comply with the regulations, should not be commissioned.

Make sure that all connections are tension-free.

The diameter of the flue gas and air intake pipes must not be reduced.

Installation

Connecting the boiler

Mounting the syphon and the dirt collector

Mount the pre-assembled dirt collector and syphon (included in the package) before first ignition or when the boiler is completely shut-off and follow the instruction below:

- Remove the cap A from the syphon and the gasket C.
- Connect the hose (E) to the syphon as explained in the picture on the right, turning anti-clockwise the cap (B).
- Connect the input (H) of the dirt collector to the pipe (L).

WARNING!
Syphon and dirt collector, must be completely filled with water. Make sure there is no residual air inside, before connect them to the boiler.



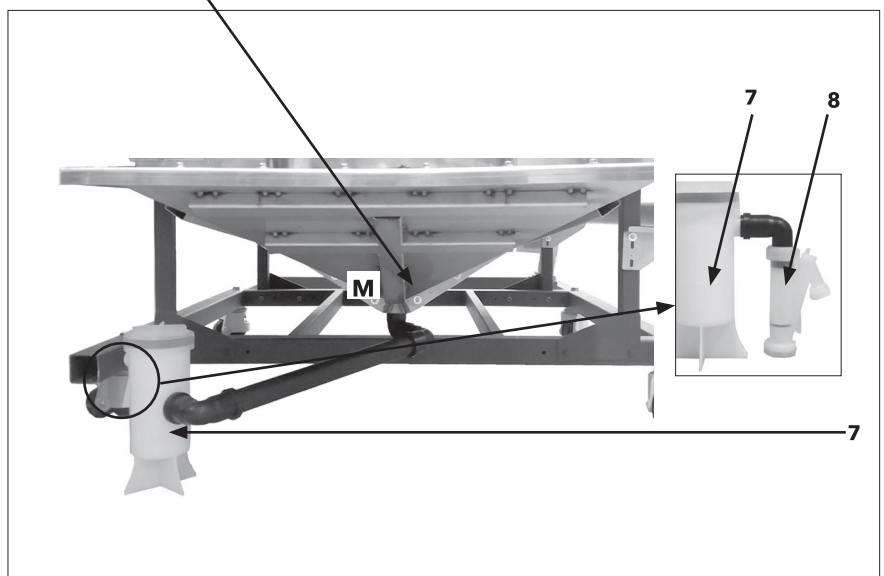
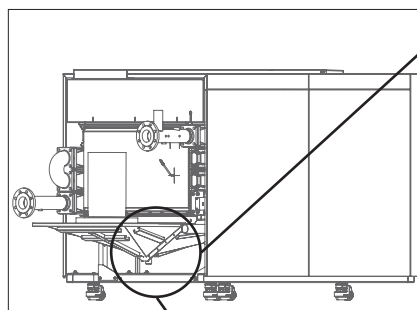
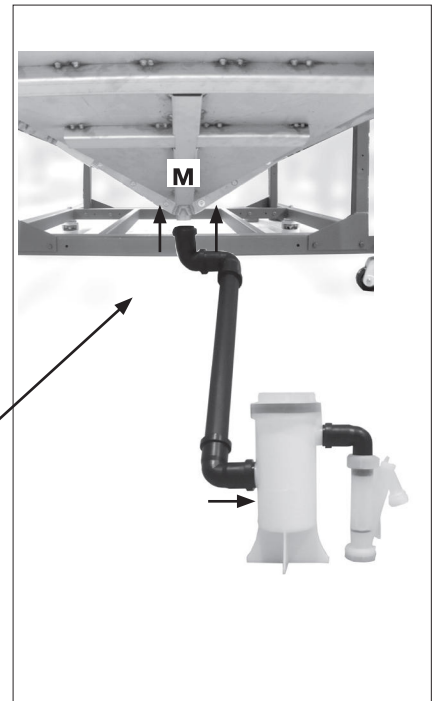
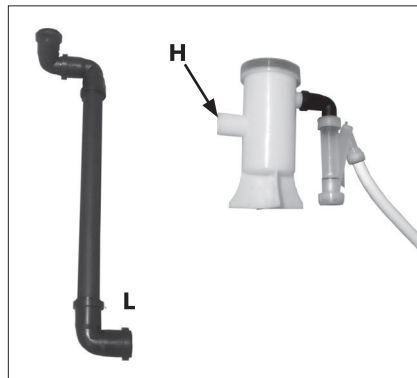
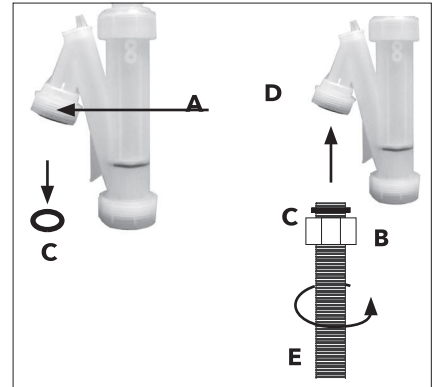
- Connect the pipe (L) to the bottom of the condensate receptacle (M).
- The connection to the draining system should always be done with an open connection, in order to avoid a flooding of the boiler in case of a blocked drain.
- Perform an inspection and cleaning regularly

WARNING!
SAFETY INSTRUCTION

Do not remove or re-position the metal ring (N) in the dirt collector .

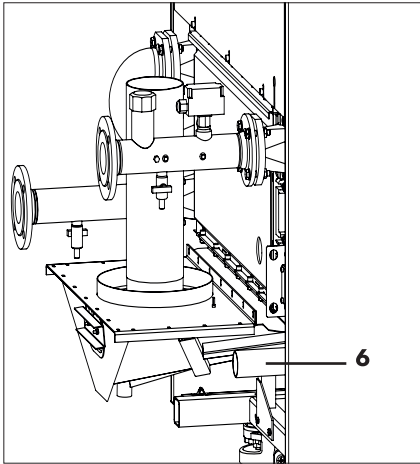


WARNING:
Do not remove the metal ring for any reason.
If the ball of syhone (N) is in the dirt collector (7) shut off the boiler and call an authorized technical center.



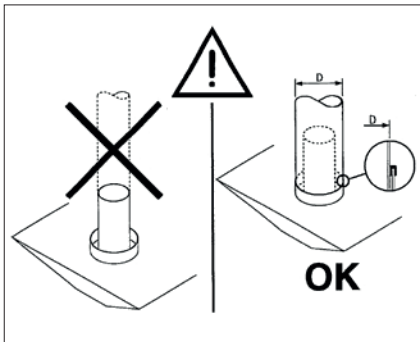
Installation

Connecting the boiler



Gas connection (6)

The gas connection must be made by an authorized installer in accordance with the applicable national and local standards and regulations. Connect the gas line from the system tension free to the gas connection (6) of the boiler. A gas shut off valve should be mounted directly behind the boiler. A gas filter can be mounted directly on the gas connection of the boiler.



Flue gas system is not to be connected to the compensator!

Electrical connection (4)

The electrical connection must be made by an authorized installer in accordance with the applicable national and local standards and regulations.

To access the electrical part, located under the front panel, follow the instructions on page 24.

WARNING!

Do not connect boiler electrical supply to earth leakage control devices.



In case of selecting other pumps take in account the following points:

- The hydraulic resistance/flow of the boiler and the installation! See "Technical data" for the resistance/flow of the boiler (see page 10).
- Respect the data of electrical connections (max. currents) as mentioned in the table "Electrical connections" (see page 48 / 50).
- Take in account the installation and operating instructions of the pump manufacturer and their regulations!

IMPORTANT:

- **SE version, all types: no modulating pump possible!**
- **Pump with a power consumption >1,5kW must have an external power supply.**

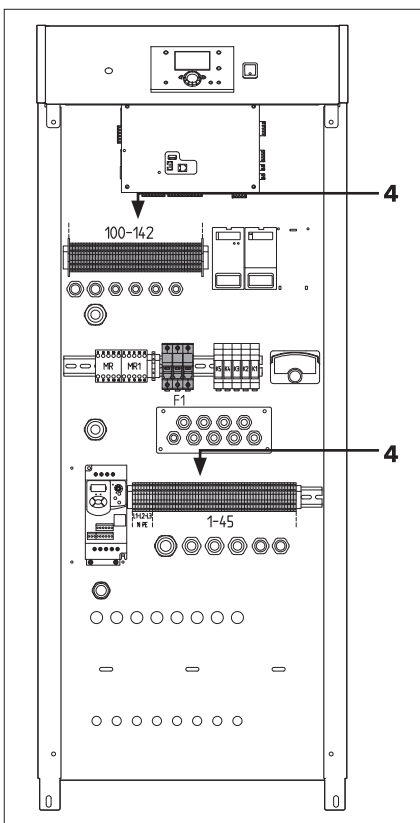


Gas supply

Check the gas supply connection to the boiler for tightness. If any leakage is found, reseal the leakage before starting the boiler!

Bleed any air from the gas pipe. This can be done at the test point (1) at the gas pressure switch. Don't forget to close the test point afterwards!

Check the gas type and values with the local gas company, in order to know for which gas type the boiler should be commissioned.



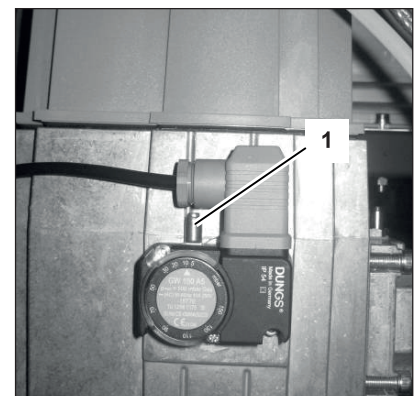
For the power supply it's necessary to use a mains isolator switch with a contact opening of at least 3 mm within the boiler room. This switch can be used to switch off the power supply for maintenance purposes.

Cables can be inserted through the cable trays and glands at the back of the electrical panel at the front of the boiler.

Connect all wires to the terminals according to the wiring diagram of the boiler (See Wiring diagram pag. 50).

Pump requirements

To ensure a proper working of the boiler you have the possibility to order one of our accessories. Contact your local dealer for more information.



Installation

Air / Flue gas connection

Requirements and regulations

Regulations for the construction of flue gas systems are very different for each country. It should be ensured that all national regulations with regard to flue gas systems are respected.

Pay attention to the following recommendations when dimensioning a flue gas system.

Only approved flue gas material may be used.

The flue gas system must be properly calculated to ensure a safe functioning of the system.

Flue gas system components should be removable for maintenance purposes.

The installer is responsible to apply the correct diameter, length and type of flue gas system. If any questions arise during the calculation contact your local manufacturer office for more information.

You have to take in consideration the following material requirements.

	Pressure class	Temperature class	Condensate resistant	Corrosion class	Fire resistant
Flue resistance <200Pa	P1	Min: T120	W	V1, V2 or Vm	E or higher
Flue resistance >200Pa <5000Pa	H1	Min: T120	W	V1, V2 or Vm	E or higher

Flue gas connection

Connect the flue gas system to the flue gas connection (5) of the boiler, use flue gas systems with seamless connections only. It's not necessary to make a separate condensate drain for the flue gas system, as the condensate will be drained via the syphon of the boiler. Please note the following issues:

- We recommend using the flue gas connection diameter as the minimum diameter for the flue system.
- The diameter of the flue gas system must be chosen by calculation according to the national regulations.
- Construct the flue gas system as short as possible (for maximum length see page 31).
- Construct horizontal ways with a minimum angle of 3°.

Connecting the flue

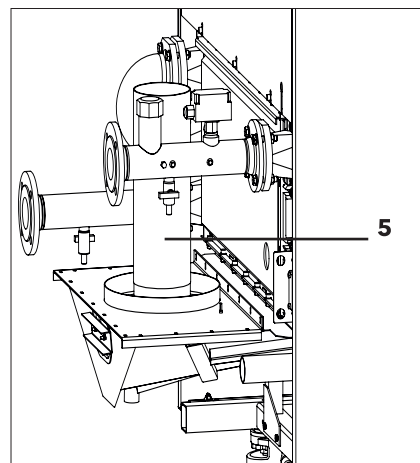
The flue gas system must not be in contact with or placed near flammable materials, and must not cross building structures or walls made using flammable material.

This boiler has an integrated high limit thermostat function for the flue gases. When the max. flue gas temperature is exceeded, the burner is switched off. With this function, an additional (external) safety device is not necessary.

When replacing an old boiler, the ventilation and flue gas exhaust system must always be replaced.

The flue gas system should be created using a male/female coupling and a seal. Couplings should always be arranged so that they go against the direction of the condensate flow.

The table in the next page shows the maximum permissible flue resistance were the boiler is still working within specifications. Nominal heat input -5%.



Installation

Air / Flue gas connection

Boiler Type	Nominal heat Output		Nominal heat input		Flue Gas Connection	Co ₂ Level		Flue gas temperature		Flue gas Quantity		Max Permissible flue Resistance
	max	min	max	min		max	min	max	min	max	min	
TRIGON XXL	kW		kW		mm	%		°C		g/s		Pa
SE 650	656	164	702	176	300 ±1	10.0 ± 0.2	9.3 ± 0.2	182 ± 2	66 ± 2	309,9	84,4	150
SE 750	733	183	784	196	350 ±1					346,1	94,0	
SE 850	857	213	917	229	350 ±1					404,8	109,8	
SE 1000	971	242	1038	260	400 ±1					458,2	124,7	
SE 1100	1084	270	1159	290	400 ±1					511,6	139,1	
SE 1200	1196	298	1279	320	400 ±1					564,6	153,5	
SE 1300	1309	326	1400	350	450 ±1					618,0	167,9	
SE 1500	1496	373	1600	400	450 ±1					706,3	191,8	
SE 1700	1683	419	1800	450	500 ±1					794,6	215,8	
SE 1900	1870	466	2000	500	500 ±1					882,9	239,8	
ECO 650	613	175	653	187	300 ±1	10.0 ± 0.2	9.3 ± 0.2	153 ± 2	65 ± 2	288,3	89,9	150
ECO 750	717	204	764	218	350 ±1					337,3	104,8	
ECO 850	811	231	865	247	350 ±1					381,9	118,8	
ECO 950	906	258	966	276	400 ±1					426,5	132,7	
ECO 1050	1000	285	1066	305	400 ±1					470,7	146,7	
ECO 1150	1093	312	1166	333	450 ±1					514,8	160,1	
ECO 1300	1250	357	1333	381	450 ±1					588,6	183,2	
ECO 1450	1406	401	1449	428	500 ±1					661,9	205,8	
ECO 1600	1562	446	1666	476	500 ±1					735,6	228,9	
EVO 700	639	182	653	187	300 ±1	10.0 ± 0.2	9.3 ± 0.2	69 ± 2	59 ± 2	295,1	89,9	150
EVO 800	747	212	764	218	350 ±1					345,3	104,8	
EVO 900	846	241	865	247	350 ±1					390,9	118,7	
EVO 1000	945	269	966	276	400 ±1					436,6	132,7	
EVO 1100	1043	297	1066	305	400 ±1					481,8	146,6	
EVO 1200	1093	312	1166	333	450 ±1					527,0	160,1	
EVO 1400	1250	357	1333	381	450 ±1					602,5	183,2	
EVO 1550	1406	401	1449	428	500 ±1					677,5	205,8	
EVO 1700	1562	446	1666	476	500 ±1					753,0	228,8	
EVO 2000	1953	487	2000	500	500±1			73 ± 2	902,4	240,4		

Installation

Dimensioning single

Type	Max flue gas length * [m]					
	Ø250mm	Ø300mm	Ø350mm	Ø400mm	Ø450mm	Ø500mm
SE 650	23	50	50			
SE 750		49	50	50		
SE 850		35	50	50		
SE 1000			50	50	50	
SE 1100			41	50	50	
SE 1200			34	50	50	
SE 1300				48	50	50
SE 1500				37	50	50
SE 1700					47	50
SE 1900					38	50

*Based on straight pipe, open outlet

Type	Max flue gas length * [m]					
	Ø250mm	Ø300mm	Ø350mm	Ø400mm	Ø450mm	Ø500mm
ECO 650		50	50			
ECO 750		50	50	50		
ECO 850			50	50		
ECO 950			50	50	50	
ECO 1050			50	50	50	
ECO 1150				50	50	50
ECO 1300				50	50	50
ECO 1450					50	50
ECO 1600					50	50

*Based on straight pipe, open outlet

Type	Max flue gas length * [m]					
	Ø250mm	Ø300mm	Ø350mm	Ø400mm	Ø450mm	Ø500mm
EVO 700	35	50	50			
EVO 800		50	50	50		
EVO 900		50	50	50		
EVO 1000			50	50	50	
EVO 1100			50	50	50	
EVO 1200			50	50	50	
EVO 1400				50	50	50
EVO 1550				50	50	50
EVO 1700					50	50
EVO 2000					48	50

*Based on straight pipe, open outlet

Dimensioning single

The flue gas system has to be designed and calculated to guarantee that the correct materials are used and that the boiler can work correctly. In order to choose the correct flue material, the maximum flue pressure has to be calculated. Below table shows the different pressure classes and their limits.

The used material must comply with the following standards:
 EN1856 for metal materials (Stainless steel and aluminum)
 EN14471 for plastic materials

Commissioning

Water and hydraulic system

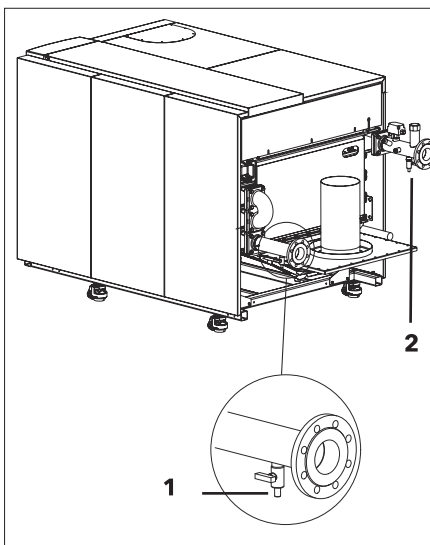
Commissioning of the boiler should be carried out by authorized personnel only. Failure to respect this condition makes the guarantee void. A protocol of the commissioning should be filled out (see end of this chapter for example of commissioning protocol). This chapter explains the commissioning of the boiler with the standard boiler controller. When an additional system controller is installed, please refer to its manual for commissioning the controller.

Water pressure

Open the valves to the system. Check the water pressure in the system. If the water pressure is too low (see table below), increase the pressure up to at least the minimum required water pressure in the table. Filling can be done via the fill and drain valve on the return connection (1) of the boiler.

Hydraulic system

Check if the boiler is hydraulically connected to the system in such way, that water flow can be secured at all times during burner operation. The water flow is supervised by the water flow switch in the boiler and a lack of flow will lead to a direct burner stop and lockout of the boiler.



Water quality

(refer to tab. 1 and 2)
Damage to the heat exchanger because of oxygene diffusion will not be taken under warranty. In installations with higher water volumes, it's necessary to respect the maximum filling and additional volumes with corresponding hardness values as stated in the german VDI2035 standard.

In the table you can find the nominal values for filling and refilling water for the TRIGON XXL according to the the VDI2035.

The table gives an indication of the relation between the water quality and the maximum water filling volume during the lifetime of the boiler. Consult the original text of the VDI2035 for more detailed information.

Tab. 1	Central Heating	
	System water	Filling water
Working temperature	10 - 90°C	10 - 25°C
Minimum operating water pressure	1,5 bar	-
pH water	8,2 - 10,0	7,0 - 9,5
Water hardness	"Actual table from VDI2035 (see sheet ""CH hardness"")"	"Actual table from VDI2035 (see sheet ""CH hardness"")"
Electrical conductivity	<100µS/cm	<100µS/cm
Oxygen content	<0,05mg/l	<0,05mg/l
Chlorides content	<50 mg/l	<50 mg/l
Sulphides content	<50 mg/l	<50 mg/l
Nitrides content	<50 mg/l	<50 mg/l
Iron content	<0,2mg/l	<0,2mg/l

TOTAL HEATING OUTPUT [kW]	Tab. 2 Accepted hardness related to specific volume of installation		
	SPECIFIC VOLUME		
	< 20 l/kW	≥ 20 l/kW - < 50 l/kW	≥ 50 l/kW
50kW - ≤ 200kW	≤ 11.2°dH ≤ 19,9 °f (2.0 mol/m ³)	≤ 8.4°dH ≤ 15,0 °f (1.5 mol/m ³)	≤ 5.6°dH ≤ 10,0 °f (1.0 mol/m ³)
200kW - ≤ 600kW	≤ 8.4°dH ≤ 15,0 °f (1.5 mol/m ³)	≤ 5.6°dH ≤ 10,0 °f (1.0 mol/m ³)	≤ 2.8°dH ≤ 5,0 °f (0.5 mol/m ³)
600kW - ≤ 1200kW	≤ 5.6°dH ≤ 10,0 °f (1.0 mol/m ³)	≤ 2.8°dH ≤ 5,0 °f (0.5 mol/m ³)	≤ 0.11°dH ≤ 0,20 °f (0.02 mol/m ³)
> 1200kW	≤ 2.8°dH ≤ 5,0 °f (0.5 mol/m ³)	≤ 0.11°dH ≤ 0,20 °f (0.02 mol/m ³)	≤ 0.11°dH ≤ 0,20 °f (0.02 mol/m ³)

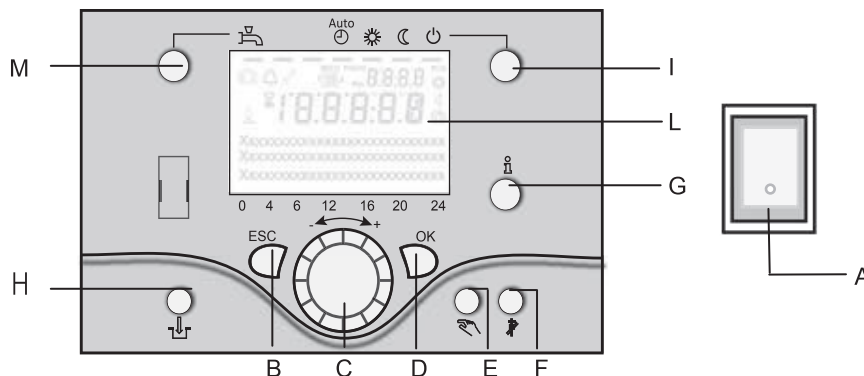
Use water softening in case maximum values are exceeded (mandatory for warranty!)

Commissioning

Prepare boiler for first startup

Legend:

- A On/off switch
- B Return (ESC)
- C Room temperature control
- D Confirmation (OK)
- E Manual mode
- F Chimney sweeper mode
- G Info mode
- H Reset button
- I Operation mode heating zone(s)
- L Display
- M Operation mode DHW



Initial procedures

To guarantee safety and the correct operation of the appliance, the boiler must be prepared for operation by a qualified technician

Electricity supply

- Check that the voltage and frequency of the electrical supply correspond to the data shown on the boiler data plate;
- Make sure that the earthing connection is efficient.

Filling the hydraulic circuit

Proceed in the following manner:

- Open the system filling point and vent the hydraulic system. Continue filling the system until the minimum required pressure (see technical data)

Gas supply

Proceed as follows:

- Make sure that the gas supply delivers the same type of gas as indicated on the boiler data plate;

ATTENTION:
The Boiler is set for G20 gas type. To operate with G31 gas type use the procedures described on "LPG settings"



- Open all doors and windows;
- Make sure there are no sparks or flames in the room;
- Make sure that the gas connections are sound.

Preparation for first startup

- Open the gas supply;
- Enable the power supply to the boiler;
- Switch on the boiler with the on/off switch (A);
- Make sure the boiler is in standby mode (⏻);
- Check the pump operation: make sure the pump runs in the right direction;
- Release all air from the pump motor.

It's recommended to put the boiler on 50% load after the first startup, as this is the best starting point to do a proper combustion analysis. This can be done with the following procedure:

- Push button I >3 Secs, the boiler goes into controller Stop mode;
- Push the Info button (G), the actual boiler load (%) appears in the display;
- Choose „set up“ (confirm with OK button), now the boiler load can be changed by rotating the wheel (C) and confirming the 50% setting with the OK button.

LPG (G31) Settings

In order to operate with G31 gas type reaching the related parameters (9524 min. rpm and 9529 max. rpm) on the display. Values of rpm are listed on annex A.

- Push **OK** button
- Push **I** (G) for 3 seconds
- choose **installer** with wheel (C)
- Push **OK** button
- choose **burner control** with wheel (C)
- Push **OK** button
- choose **parameter nr** you want to change with wheel (C)
- **OK** (parameter is blinking)
- change value with wheel (C)
- **OK** (parameter is stored)

After checking the combustion values (see next page), the controller Stop mode can be switched off by pushing the control mode button (I) >3 Secs.

Operation mode DHW (M)

For switching on the DHW operation (indication in display below DHW symbol).

Operation mode heating zone(s) (I)

For setting 4 different heating modes:

Auto (clock): Automatic operation by time program.

Comfort (sun): 24/7 heating in comfort mode.

Reduction (moon): 24/7 heating in reduced mode.

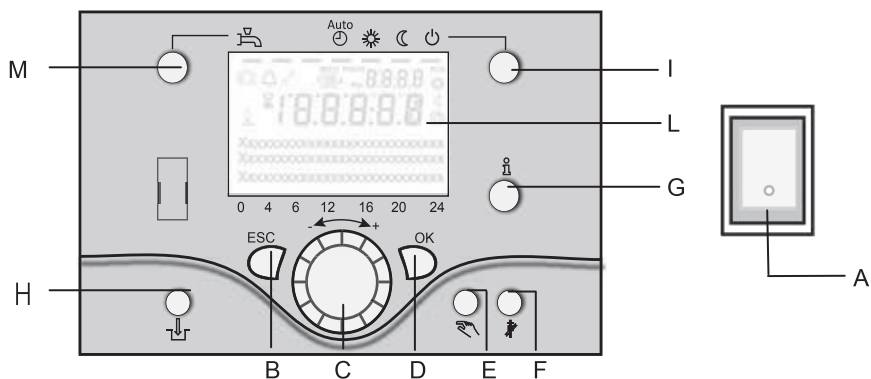
Standby: heating off, frost protection activated.

Commissioning

Prepare boiler for first startup

Legend:

- A On/off switch
- B Return (ESC)
- C Room temperature control
- D Confirmation (OK)
- E Manual mode
- F Chimney sweeper mode
- G Info mode
- H Reset button
- I Operation mode heating zone(s)
- L Display
- M Operation mode DHW



Controller Stop mode

For setting the controller stop mode and insert setpoint press (⊕) > 3 sec. Press (⊕) >3 sec. again for setting combustion parameters.

Display (L)

Info mode (G)

Display possibility of following info without influence on boiler control: temperatures, operation mode Heating / DHW, error code.

Confirmation (OK) (D)

Return (ESC) (B)

These buttons are used for programming in combination with the wheel.

By pressing the ESC button it is possible to go back one level, changed values are not taken over by the controller.

By pressing the OK button it's possible to arrive in the next level or confirm changed values.

Manual mode (E)

This button is used for switching the boiler into manual mode. In manual mode all pumps will run and the mixing valves are no longer controlled, the burner setpoint is adjustable (60°C factory setting) (indicated by spanner symbol).

On/off switch (A)

Position 0:

Boiler and connected electrical components are not powered. Frost protection is not secured.

Position I:

The boiler and connected electrical components are powered and standby for operation.

Deaeration mode (E)

By pressing the manual mode button longer than 3 seconds, the automatic hydraulic deaeration is activated.

During deaeration the system is put in standby mode. The pumps are switched on and off for several times. After deaeration, the boiler automatically returns to normal operation.

Chimney sweeper mode (F)

Used for combustion analysis.

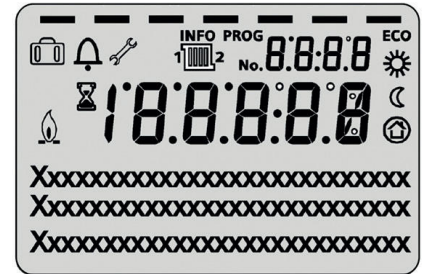
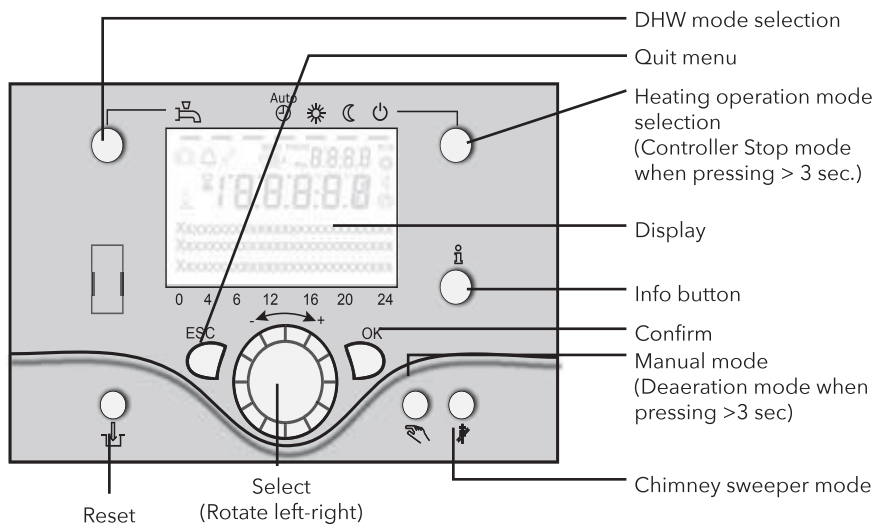
By pressing the button once again, or automatically after 15 minutes, the chimney sweeper mode will be deactivated (indicated by spanner symbol).

Reset button (H)

By shortly pressing the reset button a burner lockout can be cancelled.

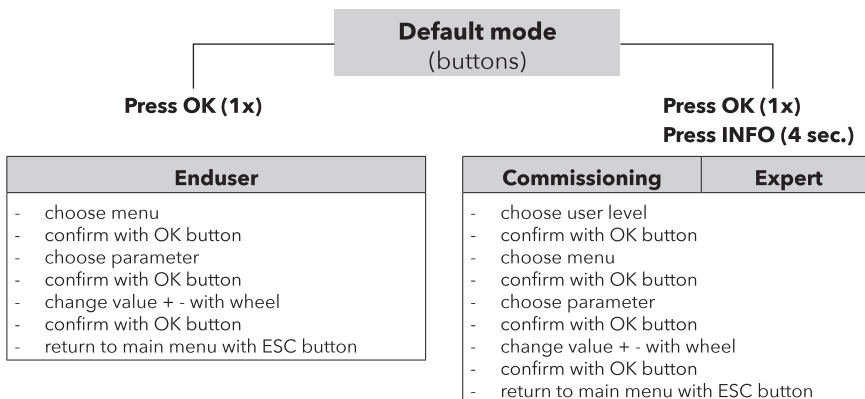
Commissioning

Display/programming



	Heating to comfort setpoint Info level activated
	Heating to reduced setpoint Programming activated
	Heating for frost protection setpoint Heating temporarily switched off
	Process running - please wait ECO function active
	Burner operating
	Error messages
INFO	Info level activated
PROG	Programming activated Heating temporarily switched off
ECO	ECO function active
	Holiday function active
	Reference to heating circuit
	Maintenance / special operation
No.	Parameter number

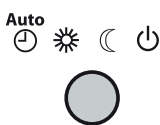









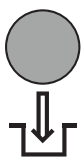
Programming



Button	Action	Procedure	Display / Function
	Set room temperature	Zone 1 and zone 2 Actuate wheel left/right Turn wheel Confirm with OK button or wait 5 sec. or press	Comfort setpoint with blinking temperature Blinking temperature in 0,5 °C steps from 10 to 30 °C Comfort setpoint saved Comfort setpoint cancelled - after 3 sec. Main menu appears
	Set room temperature for zone 1 or zone 2	Zone 2 independent from zone 1 Actuate wheel left/right Confirm with OK button Actuate wheel left/right Confirm with OK button or wait 5 sec. or press	Choose heating zone Heating zone is chosen Blinking temperature in 0,5 °C steps from 10 to 30 °C Comfort setpoint saved Comfort setpoint cancelled - after 3 sec. Main menu appears
	Switch on /off DHW operation	Press button	DHW mode on / off (see indication below DHW symbol) - On: DHW mode by time programm - Off: no DHW operation - Safety functions activated

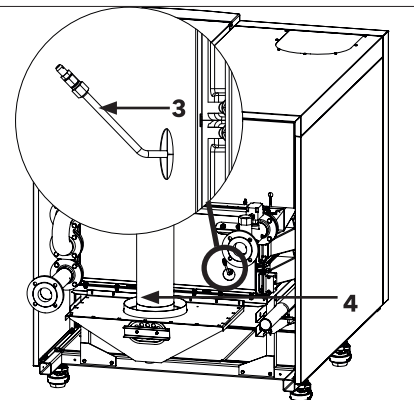
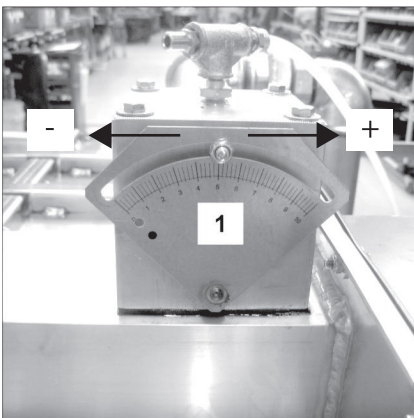
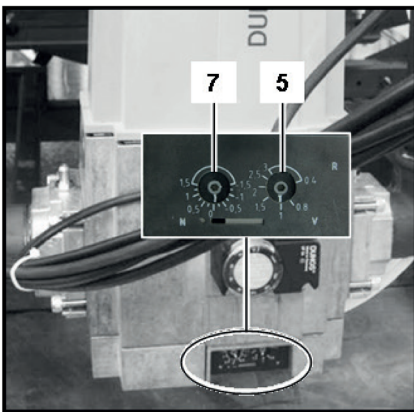
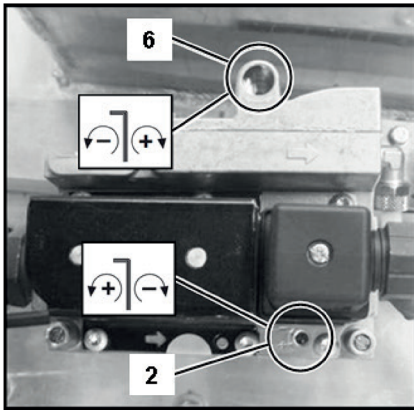
Commissioning

Controls

Button	Action	Procedure	Display / Function
	Change heating operation mode	Factory setting	Automatic mode on, with: - Heating by time programm - Temperature setpoint by heating program - Safety functions activated - Summer/Winter automatic switching activated - ECO-functions activated (see indication below operation symbol)
		Press button 1x	Continuous COMFORT heating on, with: - Heating without time program by comfort setpoint - Safety functions activated
		Press button 1x again	Continuous REDUCED heating on, with: - Heating without time program by reduced setpoint - Safety functions activated - Summer/Winter automatic switching activated - ECO-functions activated
		Press button 1x again	Standby on, with: - Heating off - Temperature by frost protection - Safety functions activated
	Controller Stop mode	Press button > 3 sec. Press button > 3 sec. again	304: Controller Stopp mode insert setpoint after 3 sec. Main menu appears
	Info display	Press button 1x Press button 1x again Press button 1x again	INFO Segment displayed - Status Boiler - Status DHW - Status zone 1 - Status zone 2 - Time / Date - Error indication - Maintenance indication
			(Info display depends on configuration) Back to main menu; INFO Segment disappears
	Operation by manual setpoint Change factory setting boiler temperature	Press button 1x Press button  Press button  Turn wheel -/+ Press button  Press button  Press button 	Manual mode on (spanner symbol appears) - Heating by fixed setpoint (factory setting = 60 °C) 301: Manual mode insert setpoint? blinking temperature set value Status boiler Manual mode off (spanner symbol disappears)
	Deaeration	Press button > 3 sec. Press button > 3 sec. again	312: Deaeration on Deaeration off
	Activate chimney sweeper mode	Press button (< 3 sec.) Press button again (< 3 sec.)	Chimney sweeper mode on Chimney sweeper mode off
	Temporary reduction of reduced temperature on QAA75	Press button Press button again	Heating by reduced setpoint Heating by comfort setpoint
	Reset button	Press button (< 3 sec.) Press button again > 3 sec.	Boiler manually blocked, no release Boiler released, Alarm symbol disappears

Commissioning

Combustion analysis



Combustion check at full load

Start the boiler in controller stop mode and go to 50% load. Now the boiler operates at 50% load. Allow the boiler to stabilise the combustion for 3 minutes. Then increase the boiler load step by step up to 100%.

First check the combustion values of the pilot burner using the measuring tube on the back of the boiler (3). The values can be corrected with the adjustment screw on the pilot gas valve (2). Then check the combustion values of the main burner using a measuring point in the flue (4). The values can be corrected with the adjustment screw on the main gas valve (5).

ATTENTION:

When changing between gas types G20/G25/G31 the main burner full load adjustment is done on the butterfly valve (1). The adjustment is very sensitive, make tiny adjustments! Lower number on the butterfly means more gas, higher number means less gas.



Combustion check at minimum load

Switch the boiler to minimum load (0%). Check the combustion settings the same way as described for full load. The combustion settings for the pilot burner can be adjusted using the adjustment screw on the pilot gas valve (6). The combustion settings for the main burner can be adjusted using the adjustment screw on the main gas valve (7).

Combustion check at 50% load

An additional reference check of combustion values at 50% load is recommended in order to check if the gas valve is set in such way, that the modulating behaviour is normal. The CO₂ value should be in between the settings of full load and minimum load. CO value should be equal to full load and minimum load values.

Make sure that the boiler is set to automatic operation and controller stop mode is disabled after the combustion test is finished.

Pilot burner		
Combustion settings for natural gas G20 / G25		
All boilers		
CO ₂ max	%	10.0 ± 0.2
CO max	ppm	< 1000
CO ₂ min	%	10.2 ± 0.2
CO min	ppm	< 1000

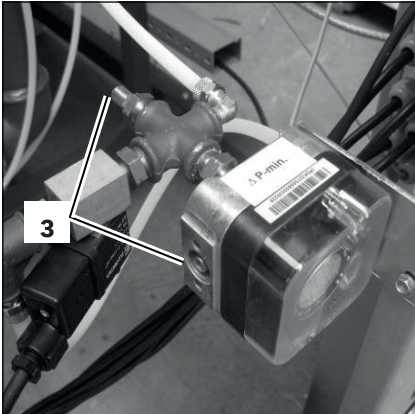
Pilot burner		
Combustion settings for LPG G31		
All boilers		
CO ₂ max	%	11.0 ± 0.2
CO max	ppm	< 1000
CO ₂ min	%	11.2 ± 0.2
CO min	ppm	< 1000

Main burner		
Combustion settings for natural gas G20 / G25		
All boilers		
CO ₂ max	%	10.0 ± 0.2
CO max	ppm	< 30
CO ₂ min	%	9.3 ± 0.2
CO min	ppm	< 30

Main burner		
Combustion settings for LPG G31		
All boilers		
CO ₂ max	%	11.0 ± 0.2
CO max	ppm	< 30
CO ₂ min	%	11.0 ± 0.2
CO min	ppm	< 30

Commissioning

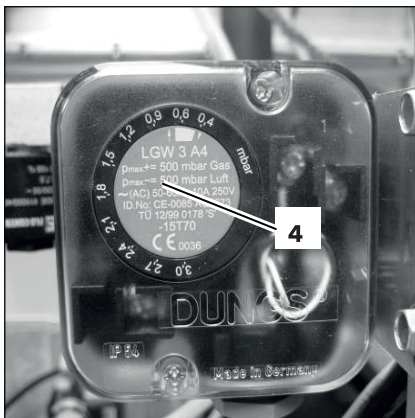
Air pressure switch



Adjustment Air pressure switch

Connect a pressure gauge to the indicated measuring points on the switch (3). Start the boiler to minimum load (0%). Measure the pressure differential across the switch during the start up. The measured pressure should be 0,8 mbar or higher. To set the pressure turn the dial on the switch (4).

The difference between the measured pressure and the set pressure should be minimum 0,4 mbar.



Check water flow

The water flow through the boiler can be checked with two different methods shown below.

ΔT measurement

Check the temperature difference over the boiler (ΔT flow-return) when the boiler is running on 100% load.

To ensure correct operation of the boiler, the ΔT should not exceed the max. ΔT as indicated in the technical data.

An indication of the actual flow rate can be found with the following calculation:

$$q_{\text{actual}} = (\Delta T_{\text{nominal}} / \Delta T_{\text{measured}}) * q_{\text{nominal}} \quad [\text{m}^3/\text{h}]$$

Δp measurement

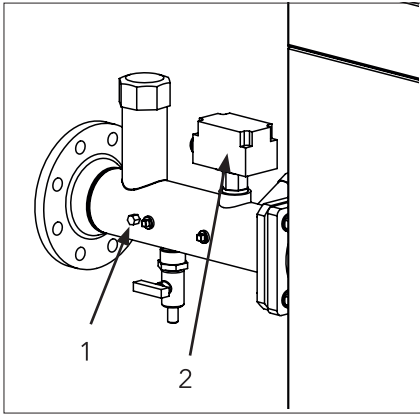
Check the pressure difference over the boiler (Δp flow-return) when the boiler pump is running (burner on is not required). The nominal Δp for each boiler type can be found in the Technical data.

An indication of the actual flow rate can be found with the following calculation:

$$q_{\text{actual}} = \sqrt{(\Delta p_{\text{measured}} / \Delta p_{\text{nominal}})} * q_{\text{nominal}} \quad [\text{m}^3/\text{h}]$$

Commissioning

Check functionality of safety devices

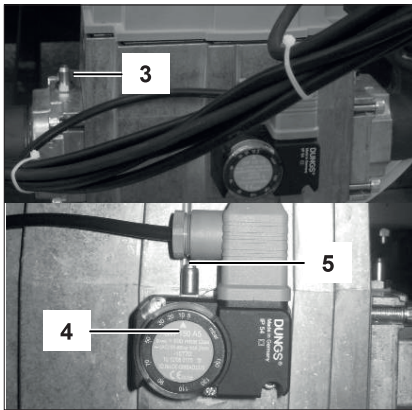


Check functionality of safety devices

All safety devices have to be checked on good functioning. Safety devices on a standard boiler are a water flow temperature sensor, water flow switch, minimum gas pressure switch and ionisation electrode. These devices can be checked as described below.

Water flow temperature sensor (1)

Disconnect the plug from the sensor while the boiler is switched on. This should result in a lockout no. 20. The lockout should disappear as soon as the plug is placed back in position, the boiler will restart.

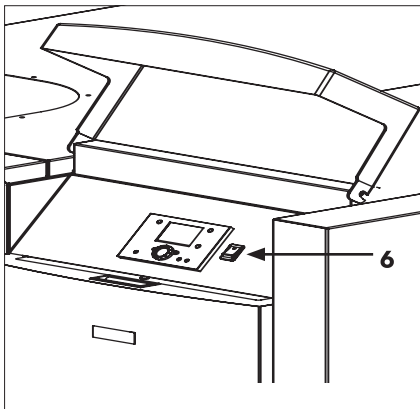


Water flow switch (2)

Close (slowly!) the valve in the flow connection to the system while the boiler is running on minimum load. When the valve is almost closed and the water flow is insufficient, the water flow switch will switch off and the boiler will go in lockout 164. Open the valve. A manual reset is necessary.

Minimum gas pressure switch (4)

Close the gas shut off valve when the boiler is in standby position (⏻). Open the test point on the gas valve (3) while measuring the gas pressure on the test point of the gas pressure switch (5). The boiler will go in lockout no. 132 when the switch off setting is achieved. Close both test points and open the gas cock.



Ionisation electrode (7)

Disconnect the plug from the ionisation electrode while the boiler is running, the boiler will go in lockout no. 128. The boiler will try to restart. With the plug removed, the restart will result in lockout no. 133. When the plug is already mounted, the restart will be successful.

Measuring the ionisation current can be done by mounting a multi-meter (set to μA) in between the ionisation electrode and its electrical connection. The ionisation current should always be above $1.51 \mu\text{A}$, in normal conditions it will be $8 \mu\text{A}$ and above.

Gas tightness check

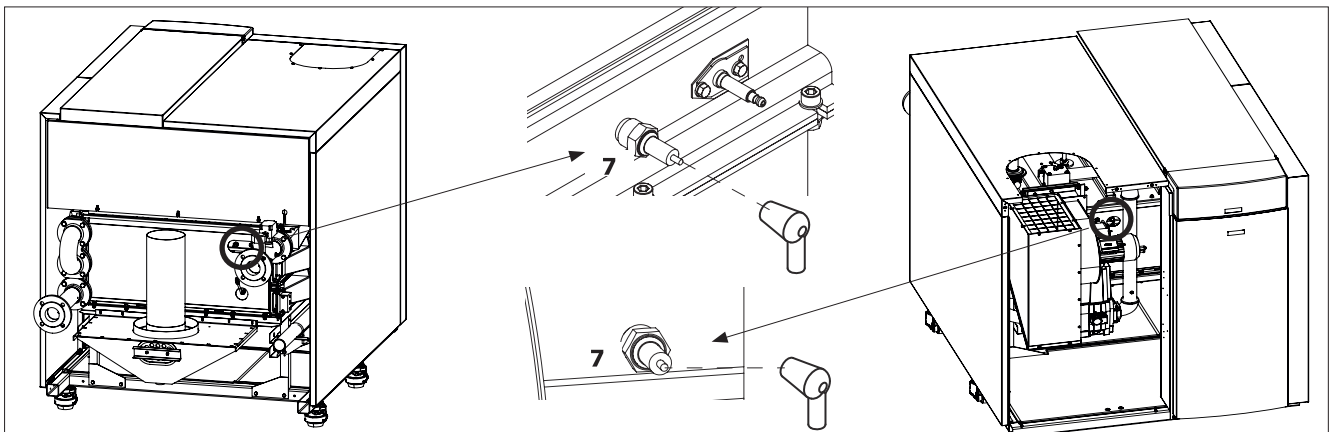
Check the gas tightness of all sealed connections with an approved soap or electronic gas analyzer, for example:

- Test points
- Bolt connections
- Gaskets of mixing system, etc.

Boiler shut down

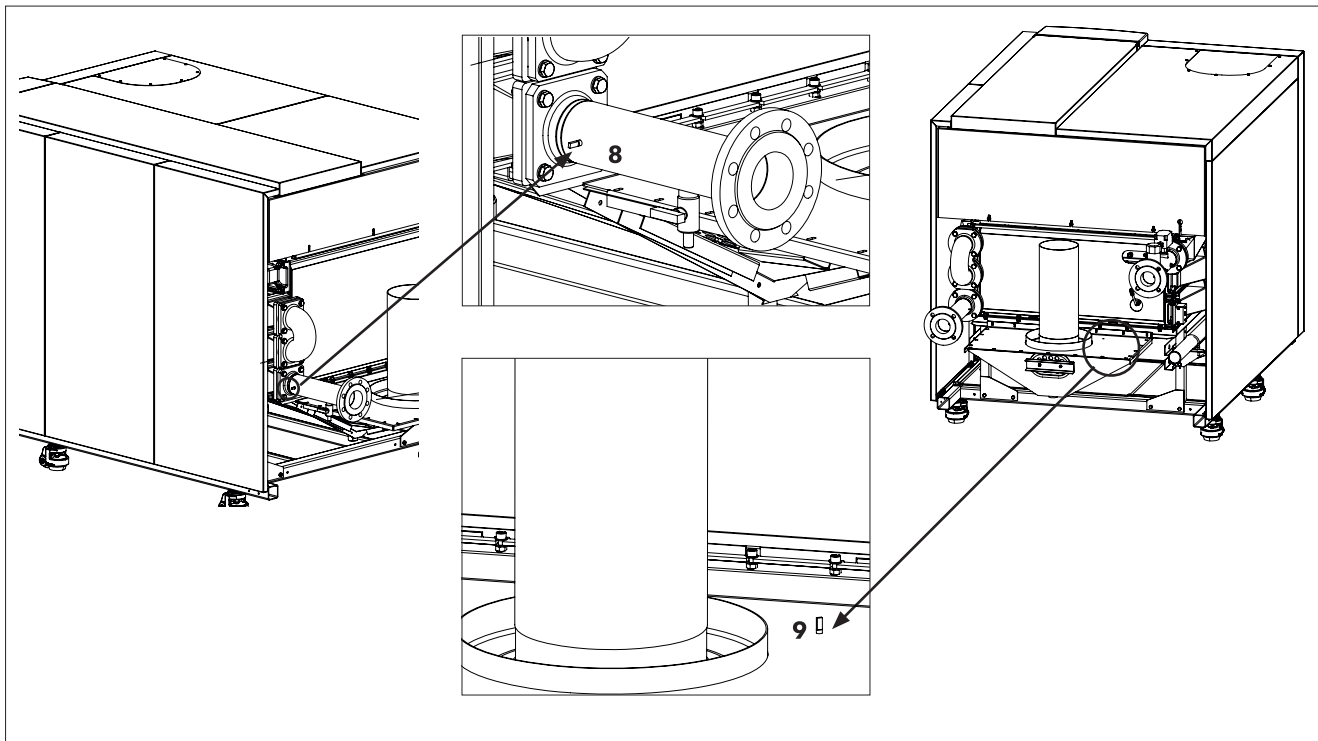
When the boiler will not be used for longer periods, shut down the boiler by following procedure:

- Switch the boiler in standby operation (⏻)
- Switch off the boiler with the on/off switch (6)
- Disable power supply to the boiler by deactivating the mains isolator switch in the boiler room
- Close the gas supply to the boiler.



Commissioning

Check functionality of safety devices



Return temperature sensor (8)

Disconnect the plug from the sensor while the boiler is switched on. This should result in a lockout no. 40. The lockout should disappear as soon as the plug is placed back in position, the boiler will restart.

Flue gas temperature sensor (9)

Disconnect the plug from the sensor while the boiler is switched on. This should result in a lockout no. 28. The lockout should disappear as soon as the plug is placed back in position, the boiler will restart.

Commissioning

Commissioning protocol

Commissioning Protocol TRIGON XXL				
Project				
Boiler type	Project			
Serial number	Address			
Year	City			
Nominal load (Hi)	[kW]	Date		
Nominal output	[kW]	Engineer		
System				
Water pressure	[bar]	Installation:	Roof top	<input type="checkbox"/>
Water pH	[-]		Ground floor	<input type="checkbox"/>
Water hardness	[°dH]		Basement	<input type="checkbox"/>
Water chloride	[mg/l]		Other:	<input type="checkbox"/>
Water ΔT full load	[°C]	Hydraulics:	Low velocity header	<input type="checkbox"/>
Water Δp _{boiler}	[kPa]		Plated heat exchanger	<input type="checkbox"/>
Pump setting	[-]		Other:	<input type="checkbox"/>
Safety devices				
High limit setting	[°C]	Flow temp. sensor	<input type="checkbox"/>	
Temp. limiter setting	[°C]	Return temp. sensor	<input type="checkbox"/>	
Min. gas pressure switch setting	[mbar]	Fluegas temp. sensor	<input type="checkbox"/>	
Ignition time burner	[sec]	Air pressure switch	<input type="checkbox"/>	
Combustion analysis				
	100% load	50% load	Min. load	
Gas consumption	[m ³ /h]	[m ³ /h]	[m ³ /h]	
Gas pressure	[mbar]	[mbar]	[mbar]	
CO ₂ pilot burner	[%]	[%]	[%]	
O ₂ pilot burner	[%]	[%]	[%]	
CO pilot burner	[ppm]	[ppm]	[ppm]	
NOx pilot burner	[ppm]	[ppm]	[ppm]	
CO ₂ main burner	[%]	[%]	[%]	
O ₂ main burner	[%]	[%]	[%]	
CO main burner	[ppm]	[ppm]	[ppm]	
NOx main burner	[ppm]	[ppm]	[ppm]	
T atmospheric	[°C]	[°C]	[°C]	
T fluegas	[°C]	[°C]	[°C]	
T water, flow	[°C]	[°C]	[°C]	
T water, return	[°C]	[°C]	[°C]	
Ionisation current	[μA]	[μA]	[μA]	
P fan	[mbar]	[mbar]	[mbar]	
P top panel	[mbar]	[mbar]	[mbar]	
P combustion chamber	[mbar]	[mbar]	[mbar]	
Remarks				

Maintenance

Checklist

Maintenance of the boiler should be carried out by authorized personnel only.

In order to ensure continued good and safe operation of the boiler, it should be inspected at least once per year. A maintenance protocol should be filled out (see end of this chapter for example of maintenance protocol).

Checklist

The following activities must be carried out, see following paragraphs for an extensive description of the main activities:

- Replace the ignition and ionisation electrodes;
- Clean the condensate receptacle;
- Clean and refill the syphon and the dirt collector;
- Check the water pressure of the system;
- Check the water quality of the system water as well as supply water;
- Check the water flow rate through the boiler;
- Check/correct the combustion values at full and minimum load with a combustion analyzer;
- Check the gas pressure to the boiler;
- Check the tightness of all sealed connections and test points;
- Check the functionality of all safety devices;
- Fill out a maintenance protocol.

WARNING:

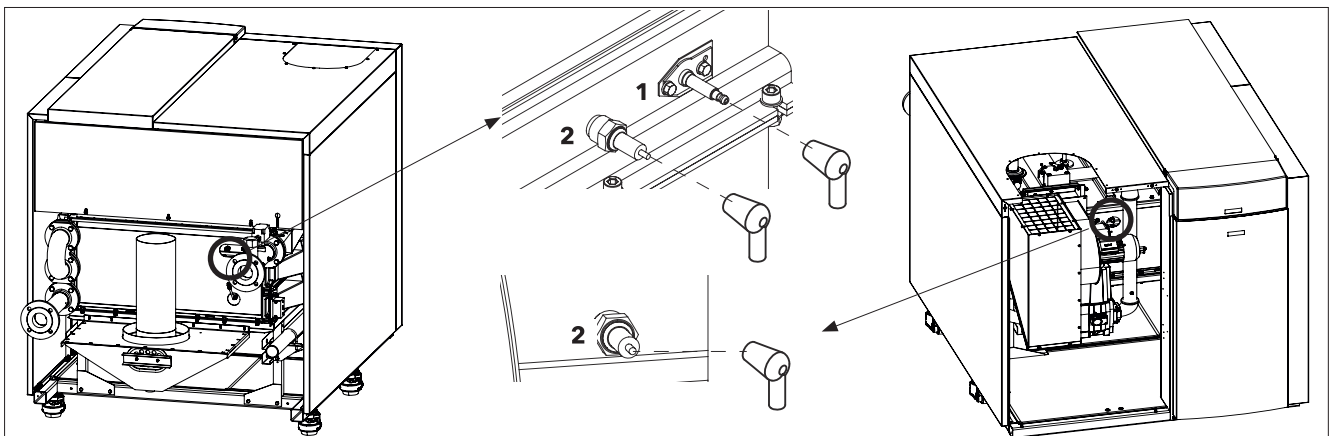
In case of necessary maintenance activities involving disassembling of gas pipes, gas pipes re-assembly must be free of internal tension.



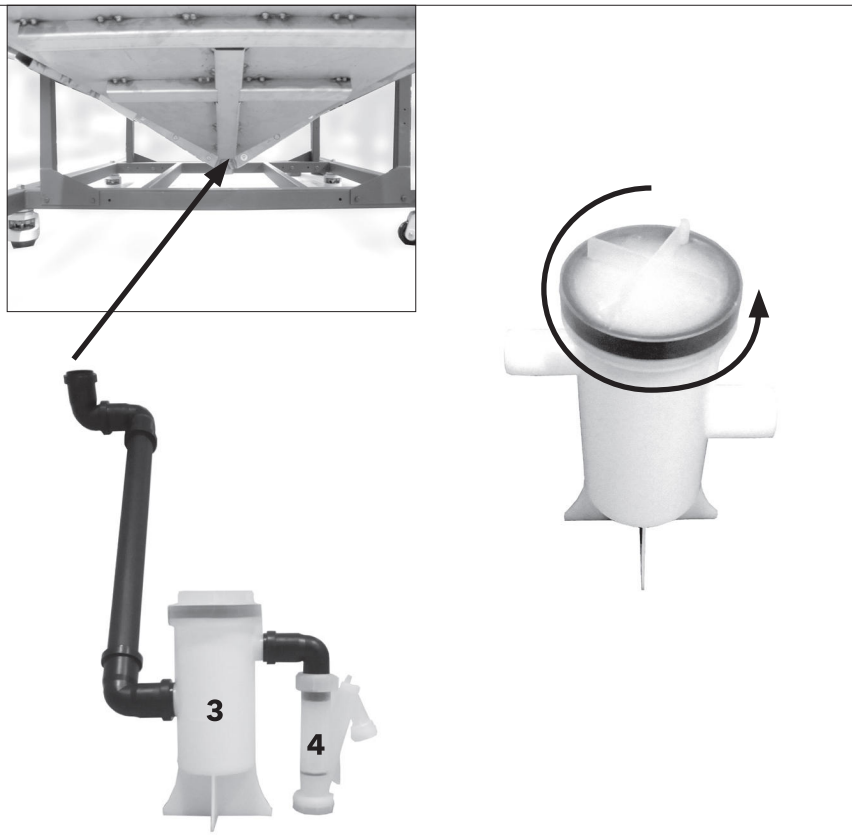
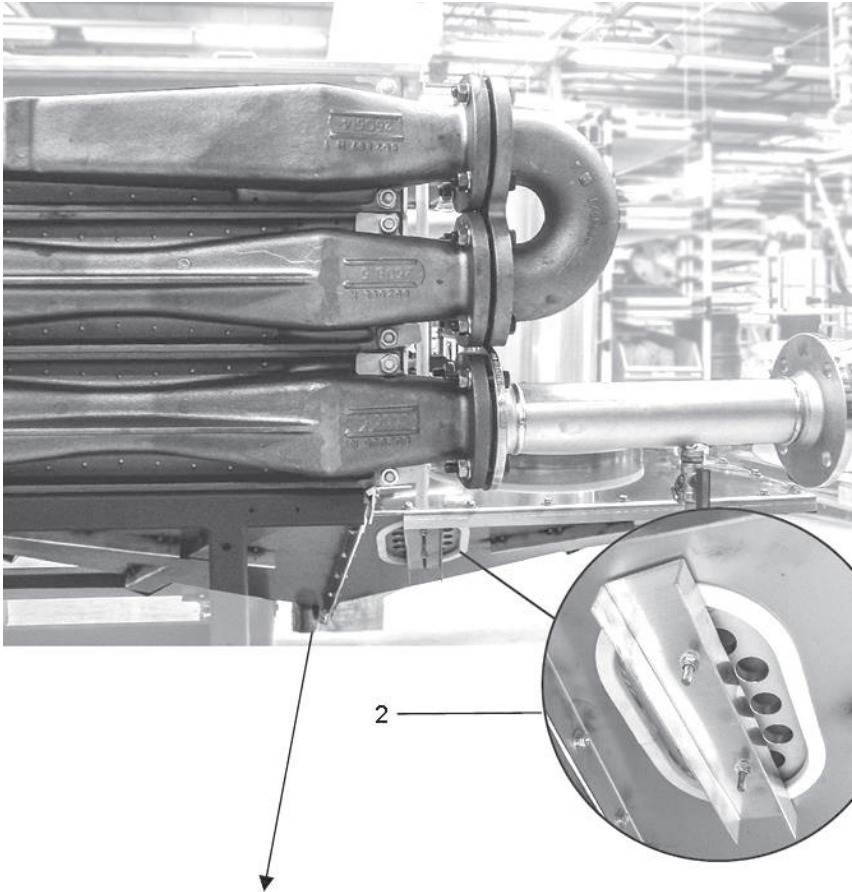
Replacing the electrodes

The electrodes are positioned: Ignition Electrode (1) and a ionisation electrode (2), on the right side of the back panel of the boiler.

The second Ionisation electrode, under the casing, on the left panel of the front side of the boiler.



Checklist



Water pressure and quality

Check if the water pressure and quality meet the requirements. Consult the chapter "commissioning: water and hydraulic system" for more detailed information.

Water flow rate

Check if the water flow rate through the boiler is within the limits. Consult the chapter "commissioning: water and hydraulic system" for more detailed information.

Combustion analysis

Check the combustion at full load and minimum load, correct the settings if necessary. An additional reference check at 50% load is recommended. Consult the chapter "commissioning: combustion analysis" for more detailed information.

Gas pressure

Check the dynamic pressure of the gas supply to the boiler, when the boiler is running at full load. In case of a boiler cascade, all boilers should be running at full load. See technical data for required values.

Gas tightness control

Check the tightness of all fittings Sealed with an approved soap or one Electronic analyzer, for example on:

- Test points
- Threaded fittings
- Sealings of the Mixing, etc.

Safety devices

Check the functionality and the rule of all the connected safety devices. For more information, See chapter "Comissioning"

Function: Functional Control of Safety devices "

Cleaning the condensate receptacle

- Remove the inspection hatch (2) to access the inside of the condensate receptacle;
- Clean the receptacle;
- Mount the inspection hatch.

Cleaning and refilling the syphon and the dirt collector

- Remove the dirt collector (3) and the syphon (4) from the condensate connection;
- Open the dirt collector turning anti-clockwise the cap.
- Clean and fill them with fresh water.
- Mount the syphon and the dirt collector back in the original position.

Maintenance

Maintenance Protocol

Maintenance Checklist Protocol TRIGON XXL				
Project				
Boiler type	Project			
Serial number	Address			
Year	City			
Nominal load (Hi)	[kW]	Date		
Nominal output	[kW]	Engineer		
System				
Water pressure	[bar]	Installation:	Roof top	<input type="checkbox"/>
Water pH	[-]		Ground floor	<input type="checkbox"/>
Water hardness	[°dH]		Basement	<input type="checkbox"/>
Water chloride	[mg/l]		Other:	<input type="checkbox"/>
Water ΔT full load	[°C]	Hydraulics:	Low velocity header	<input type="checkbox"/>
Water Δp _{boiler}	[kPa]		Plated heat exchanger	<input type="checkbox"/>
Pump setting	[-]		Other:	<input type="checkbox"/>
Safety devices				
High limit setting	[°C]	Flow temp. sensor	<input type="checkbox"/>	
Temp. limiter setting	[°C]	Return temp. sensor	<input type="checkbox"/>	
Min. gas pressure switch setting	[mbar]	Fluegas temp. sensor	<input type="checkbox"/>	
Ignition time burner	[sec]	Air pressure switch	<input type="checkbox"/>	
Combustion analysis				
	100% load	50% load	Min. load	
Gas consumption	[m ³ /h]	[m ³ /h]	[m ³ /h]	
Gas pressure	[mbar]	[mbar]	[mbar]	
CO ₂ pilot burner	[%]	[%]	[%]	
O ₂ pilot burner	[%]	[%]	[%]	
CO pilot burner	[ppm]	[ppm]	[ppm]	
NOx pilot burner	[ppm]	[ppm]	[ppm]	
CO ₂ main burner	[%]	[%]	[%]	
O ₂ main burner	[%]	[%]	[%]	
CO main burner	[ppm]	[ppm]	[ppm]	
NOx main burner	[ppm]	[ppm]	[ppm]	
T _{atmospheric}	[°C]	[°C]	[°C]	
T _{fluegas}	[°C]	[°C]	[°C]	
T _{water, flow}	[°C]	[°C]	[°C]	
T _{water, return}	[°C]	[°C]	[°C]	
Ionisation current	[μA]	[μA]	[μA]	
P _{fan}	[mbar]	[mbar]	[mbar]	
P _{top panel}	[mbar]	[mbar]	[mbar]	
P _{combustion chamber}	[mbar]	[mbar]	[mbar]	
Remarks				

Lockouts

Error code list

In case of a lockout, a warning symbol (⚠) and a flashing error code appear on the display. The cause of a fault should first be determined and eliminated before the boiler is being reset. The table below shows all possible lockouts with indication of possible cause. In order to reset a possible error on

the frequency converter, the boiler must be completely switched off. Wait before switching on the power again, until the display of the frequency converter is completely blank. If the power is switched on too fast, the error will remain.

Error code list

The LMS14... supports a 16-bit error code. Older types of operator units might display 8-bit error codes. If different from the 16-bit error code, the corresponding 8-bit error code is indicated in parentheses.

Error code	Description of error
0	No error
10	Outside temperature sensor error
20	Boiler temperature 1 sensor error
26	Common flow temperature sensor error
28	Flue gas temperature sensor error
30	Flow temperature 1 sensor error
32	Flow temperature 2 sensor error
38	Flow temperature primary controller sensor error
40	Return temperature 1 sensor error
46	Return temperature cascade sensor error
47	Common return temperature sensor error
50	DHW temperature 1 sensor error
52	DHW temperature 2 sensor error
54	DHW primary controller sensor error
57	DHW circulation temperature sensor error
60	Room temperature 1 sensor error
65	Room temperature 2 sensor error
70	Buffer storage tank temperature 1 sensor error
71	Buffer storage tank temperature 2 sensor error
72	Buffer storage tank temperature 3 sensor error
73	Collector temperature 1 sensor error

Error code	Description of error
74	Collector temperature 2 sensor error
82	LPB address collision
83	BSB wire short-circuit
84	BSB address collision
85	BSB RF communication error
91	EEPROM error lockout information
98	Extension module 1 error (collective error)
99	Extension module 2 error (collective error)
100	2 clocktime masters (LPB)
102	Clocktime master without reserve (LPB)
103	Communication error
105	Maintenance message
109	Boiler temperature supervision
110	SLT lockout
111	TL cutout
121	Flow temperature 1 (HC1) supervision
122	Flow temperature 2 (HC2) supervision
125	Pump supervision error
126	DHW charging supervision
127	Legionella temperature not reached
128	Loss of flame during operation
129	Fan error or LP error
130	Flue gas temperature limit exceeded
131	Burner fault
132	GP or LP error
133	No flame during safety time
146	Configuration error collective message

Error code	Description of error
151	Internal error
152	Parameterization error
153	Unit manually locked
160	Fan error
162	LP error, does not close
164	Boiler flow switch contact open
166	LP error, does not open
171	Alarm contact H1 or H4 active
172	Alarm contact H2 (EM1, EM2 or EM3) or H5 active
173	Alarm contact H6 active
174	Alarm contact H3 or H7 active
178	Limit thermostat heating circuit 1
179	Limit thermostat heating circuit 2
183	Unit in parameterization mode
193	Pump supervision error after flame on
216	Fault boiler
217	Fault sensor
241	Flow sensor solar sensor error
242	Return sensor solar sensor error
243	Swimming pool temperature sensor error
270	Limit function
317	Mains frequency outside permissible range
320	DHW charging temperature sensor error
324	BX same sensors
325	BX / extension module same sensors
326	BX / mixing group same sensors

Lockouts

Error code list Maintenance code

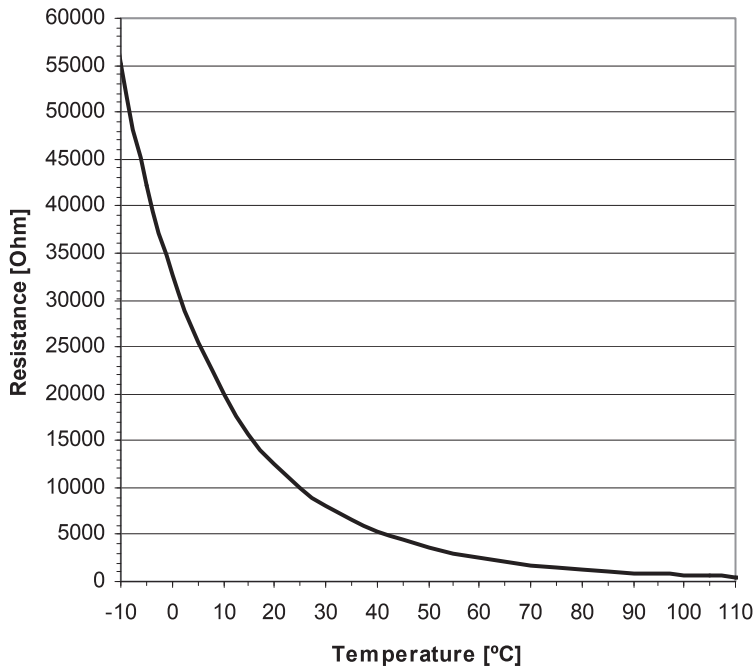
Error code	Description of error
327	Extension module same function
328	Mixing group same function
329	Extension module / mixing group same function
330	Sensor BX1 no function
331	Sensor BX2 no function
332	Sensor BX3 no function
333	Sensor BX4 no function
334	Sensor BX5 no function
335	Sensor BX21 no function (EM1, EM2 or EM3)
336	Sensor BX22 no function (EM1, EM2 or EM3)
337	Sensor BX1 no function
338	Sensor BX12 no function
339	Collector pump Q5 not available
340	Collector pump Q16 not available
341	Solar Collector sensor B6 not available
342	DHW sensor B31 not available
343	Solar integration not available
344	Solar controlling element buffer K8 not available
345	Solar controlling element swimming pool K18 not available
346	Solid fuel boiler pump Q10 not available
347	Solid fuel boiler comparison sensor not available
348	Solid fuel boiler address error
349	Buffer return valve Y15 not available
350	Puffer address sensor
351	Primary controller / system pump address error
352	Pressureless header address error
353	Common flow sensor B10 not available
371	Flow temperature 3 (heating circuit 3) supervision

Error code	Description of error
372	Limit thermostat heating circuit 3
373	Extension module 3 error (collective error)
386	Fan speed has lost valid range
388	DHW error no function
426	Feedback flue gas damper
427	Configuration flue gas damper
431	Sensor primary heat exchanger
432	Functional earth not connected
433	Temperature primary heat exchanger too high

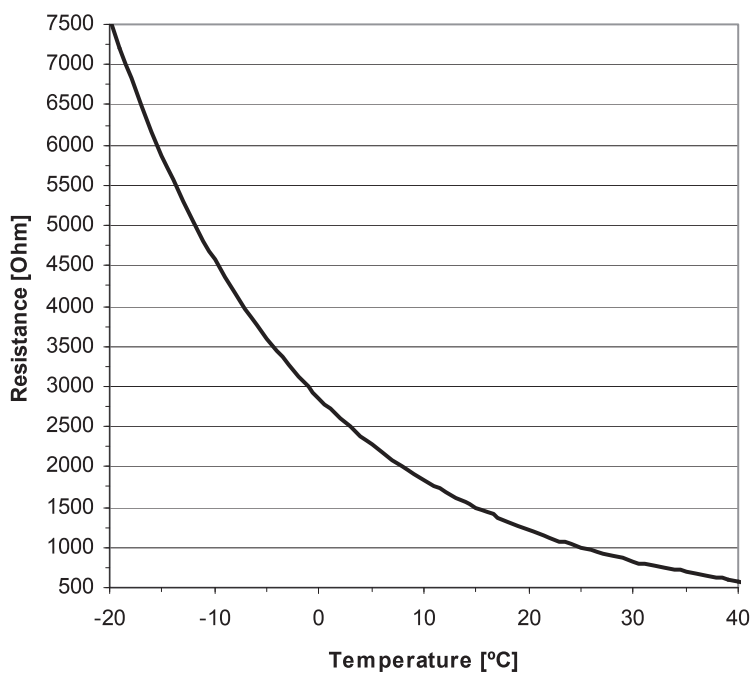
Maintenance code	
code	Description of maintenance
1	Number of burner hours run exceeded
2	Number of burner starts exceeded
3	Maintenance interval exceeded
5	Water pressure heating circuit too low (dropped below lower pressure limit 1)
10	Change batteries of outside sensor
18	Water pressure 2 heating circuit too low (dropped below lower pressure limit 2)
22	Water pressure 3 heating circuit too low (dropped below lower pressure limit 3)
25	Automatic filling of water activated

Sensor values

**NTC 10k Ω temperature sensor
(flow, return, flue gas, DHW and header sensor)**



**NTC 1k Ω temperature sensor
(outdoor sensor)**

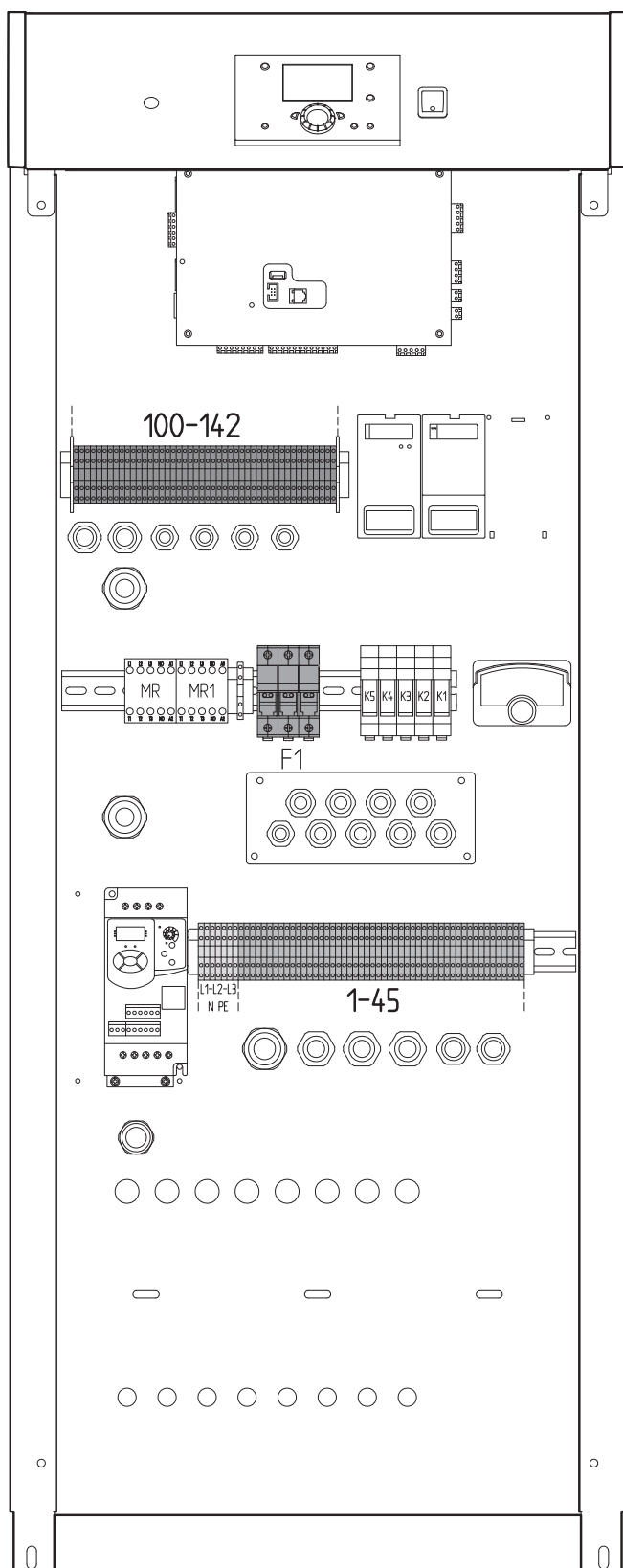


The diagrams show the sensor values for all boiler sensors and optional sensors available in accessory kits. The diagrams contain average values, as all sensors are liable to tolerances.

When measuring the resistance values, the boiler should always be switched off. Measure close to the sensor, in order to avoid value deviations.

Wiring diagram

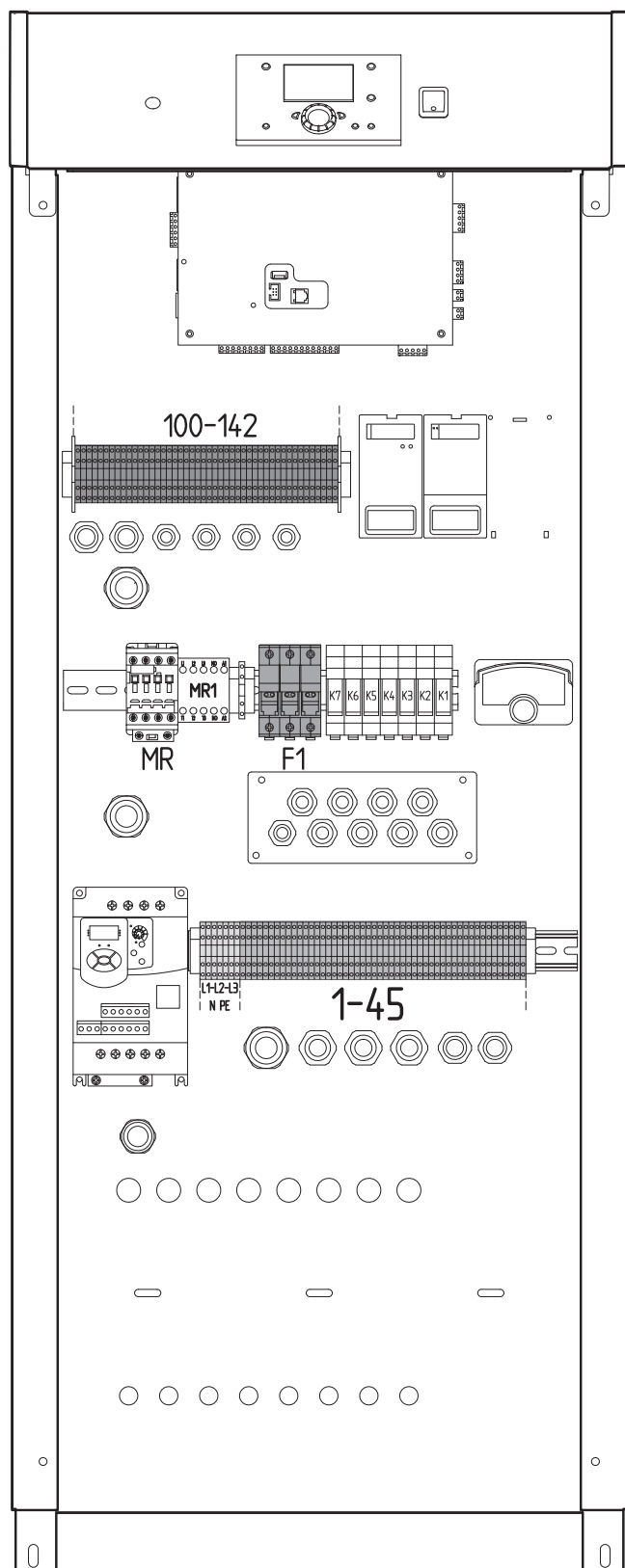
Electrical connections SE 650 - SE 1200 ECO 650 - ECO 1050 EVO 700 - EVO 1000



Electrical connections	
connections	Description
L1 / L2 / L3 / N / PE	Power supply boiler 230VAC +10% -15% 50Hz 16A
9	QX2 Reserved
10 (N)	
13 / 14 / 15 / 16 / 17 / 18	Lockout input 230VAC 5mA...1A, $\cos \varphi > 0,6$
29 (Common)	OK/Alarm signal (potential free)
30 (Alarm)	230VAC +10% -15%
31 (OK)	Max. 10mA...1A
32 (Common)	Operating signal (potential free)
33 (ON)	230VAC +10% -15%
34 (OFF)	Max. 10mA...1A
102	BX1, free programmable
103 (GND)	$I \leq 120 \text{ m NTC } 10\text{K}\Omega$
104	BX2 Header temp. Sensor
105 (GND)	$I \leq 120 \text{ m NTC } 10\text{K}\Omega$
108	B3/B38 DHW thermostat/temp. sensor
109 (GND)	(Parameter) $I \leq 10 \text{ m } 5\text{VDC}$
110	B9 Outside temp. sensor
111 (GND)	$I \leq 120 \text{ m NTC } 1\text{K}\Omega$
112	H1 External influence
113 (GND)	0,15-10VDC $I \leq 10 \text{ m } R_i > 100\text{K}\Omega$
114	H4, free programmable
115 (GND)	
116	H5 Boiler enable
117 (GND)	$I \leq 120 \text{ m } 5\text{VDC}/2\text{mA}$
118	Speed control pump
119 (GND)	0-10VDC $I_{\text{max.}} 2.7 \text{ mA SELV}$
120	Boiler capacity indication
121 (GND)	0-10VDC $I_{\text{max.}} 2.7 \text{ mA SELV}$
130 (CL+)	QAA75
131 (CL-)	Room unit
132 (G+)	
137	PWM pump
138 (GND)	
139 (DB)	LPB-bus
140 (MB)	
141	Start/Stop
142	Speed control pump
MR (Relay)	Boiler/bypass pump
2 T1	AC3 380/400VAC 4KW Max.
4 T2	
6 T3	
14 N0	
F1 (fuse)	6A CC, 500V (10.3mm x 38mm) Type SE 650 - SE 750 Type ECO 650 - ECO 750 Type EVO 700 - EVO 800
	10A CC, 500V (10.3mm x 38mm) Type SE 850 - SE 1200 Type ECO 850 - ECO 1050 Type EVO 900 - EVO 1000

Wiring diagram

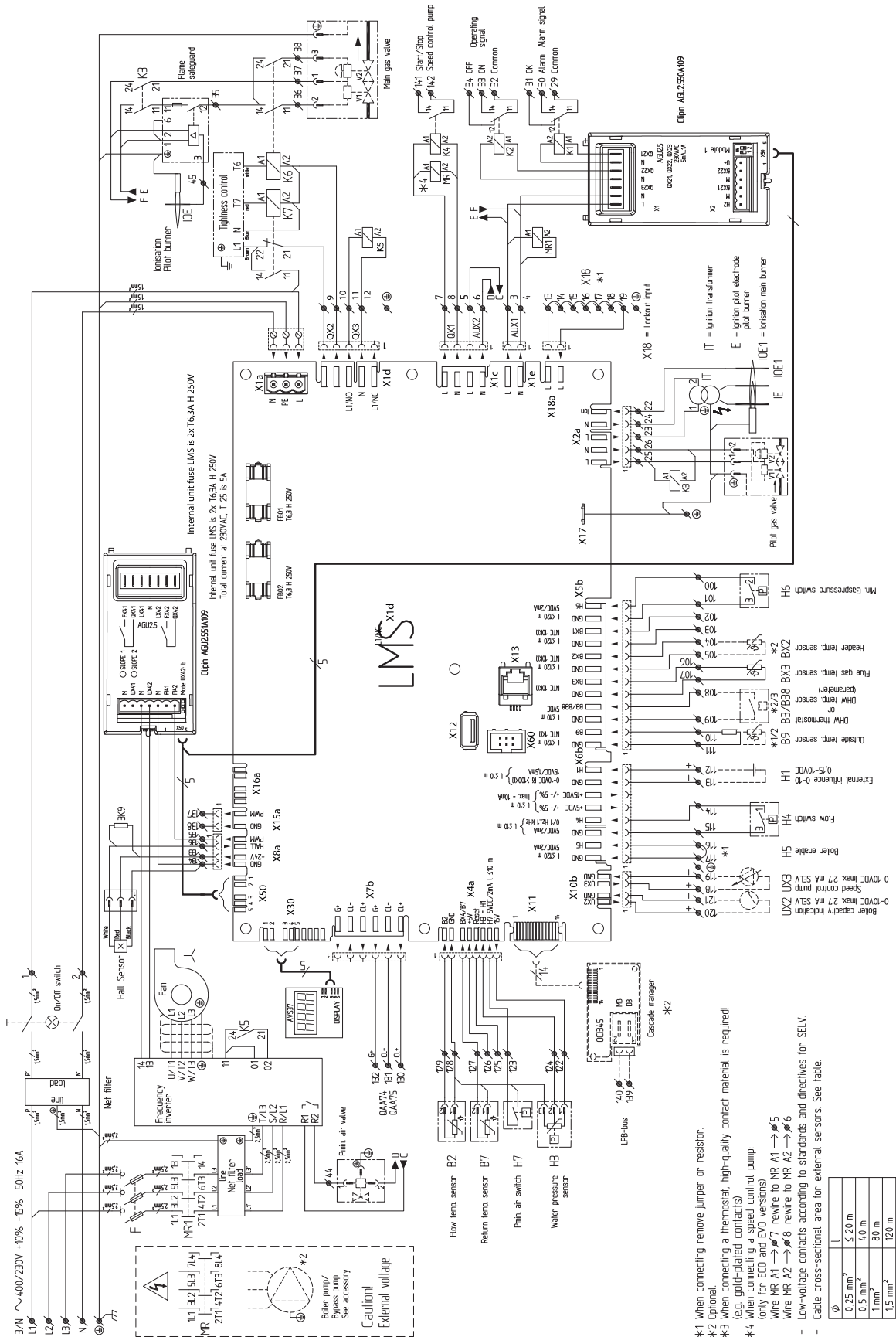
Electrical connections SE 1300 - SE 1900 ECO 1150 - ECO 1600 EVO 1100 - EVO 2000



Electrical connections	
connections	Description
L1 / L2 / L3 / N / PE	Power supply boiler 230VAC +10% -15% 50Hz 16A
9 10 (N)	QX2 Reserved
13 / 14 / 15 / 16 / 17 / 18	Lockout input 230VAC 5mA...1A, cos φ>0,6
29 (Common)	OK/Alarm signal (potential free)
30 (Alarm)	230VAC +10% -15%
31 (OK)	Max. 10mA...1A
32 (Common)	Operating signal (potential free)
33 (ON)	230VAC +10% -15%
34 (OFF)	Max. 10mA...1A
102	BX1, free programmable
103 (GND)	I ≤ 120 m NTC 10KΩ
104	BX2 Header temp. Sensor
105 (GND)	I ≤ 120 m NTC 10KΩ
108	B3/B38 DHW thermostat/temp. sensor
109 (GND)	(Parameter) I ≤ 10 m 5VDC
110	B9 Outside temp. sensor
111 (GND)	I ≤ 120 m NTC 1KΩ
112	H1 External influence
113 (GND)	0,15-10VDC I ≤ 10 m Ri >100KΩ
114	H4, free programmable
115 (GND)	
116	H5 Boiler enable
117 (GND)	I ≤ 120 m 5VDC/2mA
118	Speed control pump
119 (GND)	0-10VDC I _{max} . 2.7 mA SELV
120	Boiler capacity indication
121 (GND)	0-10VDC I _{max} . 2.7 mA SELV
130 (CL+)	QAA75
131 (CL-)	Room unit
132 (G+)	
137	PWM pump
138 (GND)	
139 (DB)	LPB-bus
140 (MB)	
141 142	Start/Stop Speed control pump Max. 24VAC, Max. 10mA...1A
MR (Relay)	Boiler/bypass pump
2 T1	AC3 380/400VAC 11KW Max.
4 T2	
6 T3	
14 N0	
F1 (fuse)	10A CC, 500V (10.3mm x 38mm) Type SE 1300 - SE 1500 Type ECO 1150 - ECO 1300 Type EVO 1100 - EVO 1400
	15A CC, 500V (10.3mm x 38mm) Type SE 1700 - SE 1900 Type ECO 1450 - ECO 1600 Type EVO 1550 - EVO 2000

Wiring diagram

SE 1300 - SE 1900 ECO 1150 - ECO 1600 EVO 1200 - EVO 2000



- *1 When connecting remove jumper or resistor.
- *2 Optional.
- *3 When connecting a thermostat, high-quality contact material is required (e.g. gold-plated contacts).
- *4 When connecting a speed control pump:
Wire MR A1 → 7 (rewire to MR A1 → 5)
Wire MR A2 → 8 (rewire to MR A2 → 6)
- Low-voltage contacts according to standards and directives for SELV.
- Cable cross-sectional area for external sensors. See table.

Ø	l
0.25 mm ²	≤ 20 m
0.5 mm ²	40 m
1 mm ²	80 m
1.5 mm ²	120 m

Declaration of Conformity

Elco BV, Hamstraat 76, 6465 AG Kerkrade (NL),
Declares that the product

TRIGON XXL

are in conformity with the following standards:

EN 15502-1
EN 15502-2-1
EN 55014-1 / -2
EN 61000-3-2
/-3
EN 60335-1/ -2

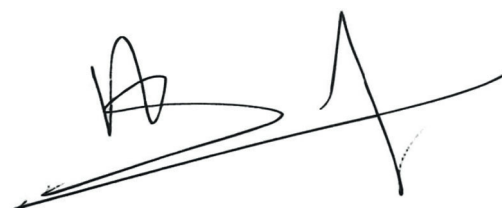
And in accordance with the guidelines of directives:

1992 / 42 / EEC (boiler efficiency directive)
2016 / 426 / EEC (gas appliances regulation)
2014 / 35 / EU (low voltage directive)
2014 / 30 / EU (EMC directive)

This product is designated with CE number:

CE 0063CR3158

Kerkrade, 30-07-2018



A.J.G. Schuiling
Plant Manager



Service:

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ELCO Austria GmbH

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ELCOTHERM AG

CH - 7324 Vilters

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