



Mach Range

Condensing heat generator with high power modulation for outdoor installations



01

Introduction and general features



Condensing heat generator with high power modulation for outdoor installations.

MACH has been designed as a cascade of thermal units managed by a single electronic control, capable of pushing the power modulation up to a maximum ratio of 1/40 and with one of the highest thermal efficiency that can be found in the market to date.

The casing, completely waterproof and resistant to atmospheric agents, allows the generator to be installed outdoors without any protection.

This feature, combined with its lightness and small dimensions, make the MACH generator particularly suitable for installations on the roof of buildings.

Our range consists of 7 generators, certified B23, with a forced air/flue gas circuit and suction at the place of installation:

Mod. 150

Thermal input 142.0 kW – Useful thermal output (50° - 30° C)
148.4 kW – Efficiency > 93 + 2log (Pn)

Mod. 225

Thermal input 213.0 kW – Useful thermal output (50° - 30° C)
222.6 kW – Efficiency > 93 + 2log (Pn)

Mod. 300

Thermal input 284.0 kW – Useful thermal output (50° - 30° C)
296.8 kW – Efficiency > 93 + 2log (Pn)

Mod. 370

Thermal input 355.0 kW – Useful thermal output (50° - 30° C)
371.0 kW – Efficiency > 93 + 2log (Pn)

Mod. 450

Thermal input 426.0 kW – Useful thermal output (50° - 30° C)
445.2 kW – Efficiency > 93 + 2log (Pn)

Mod. 520

Thermal input 497.0 kW – Useful thermal output (50° - 30° C)
519.4 kW – Efficiency > 93 + 2log (Pn)

Mod. 600

Thermal input 568.0 kW – Useful thermal output (50° - 30° C)
593.6 kW – Efficiency > 93 + 2log (Pn)

Code	Product
OMCMFAWA	MACH 150 (WF)
OMCMJAWA	MACH 225 (WF)
OMCMLAWA	MACH 300 (WF)
OMCMMAWA	MACH 370 (WF)
OMCMNAWA	MACH 450 (WF)
OMCMPAWA	MACH 520 (WF)
OMCMQAWA	MACH 600 (WF)

01. GENERAL FEATURES

Performance and efficiency		MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 520	MACH 600
Max. heating thermal input	kW	142	213	284	355	426	497	568
Min. heating thermal input	kW	15.5	15.5	15.5	15.5	15.5	15.5	15.5
Max. heating thermal output (80/60°C)	kW	139.2	208.8	278.4	348.1	417.7	487.3	556.9
Min. heating thermal output (80/60°C)	kW	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Max. heating thermal output (50/30°C)	kW	148.4	222.6	296.8	371	445.2	519.4	593.6
Min. heating thermal output (50/30°C)	kW	15.1	15.1	15.1	15.1	15.1	15.1	15.1
Pmax efficiency (80/60°C)	%	98	98	98	98	98	98	98
Pmin efficiency (80/60°C)	%	97.7	97.7	97.7	97.7	97.7	97.7	97.7
Pmax efficiency (50/30°C)	%	104.5	104.5	104.5	104.5	104.5	104.5	104.5
Pmin efficiency (50/30°C)	%	108.2	108.2	108.2	108.2	108.2	108.2	108.2
Efficiency 30%	%	108.8	108.8	108.8	108.8	108.8	108.8	108.8

Combustion		MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 520	MACH 600
Gas categories		II2HM3B/P (IT) II2H3P (ES) II2ELS3P (PL) II2E3BP (RO) II2H3B/P (TR -RU)						
NOx emission class		6						
Flue gas temperature Pmax (80/60°C)	°C	62	62	62	62	62	62	62
Flue gas temperature Pmin (80/60°C)	°C	60	60	60	60	60	60	60
Flue gas temperature Pmax (50/30°C)	°C	48	48	48	48	48	48	48
Flue gas temperature Pmin (50/30°C)	°C	31	31	31	31	31	31	31
Flue gas flow rate Pmax	g/s	64	96	128	160	192	224	255
Flue gas flow rate Pmin	g/s	7	7	7	7	7	7	7
Max head at flue gas outlet	Pa	200	200	200	200	200	200	200
CO (O2= 0%) Pmax/Pmin	mg/kWh	117/10	117/10	117/10	117/10	117/10	117/10	117/10
Weighted CO (O2= 0%)	mg/kWh	19	19	19	19	19	19	19
NOx (O2= 0%) Pmax/Pmin	mg/kWh	49/18	49/18	49/18	49/18	49/18	49/18	49/18
Weighted NOx (O2= 0%)	mg/kWh	42	42	42	42	42	42	42
Combustion efficiency Pmax	%	98.4	98.4	98.4	98.4	98.4	98.4	98.4
Combustion efficiency Pmin	%	98.7	98.7	98.7	98.7	98.7	98.7	98.7
Flue leakage at Pmax (80/60°C)	%	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Combustion efficiency (50/30°C) Pmax	%	98.8	98.8	98.8	98.8	98.8	98.8	98.8
Combustion efficiency (50/30°C) Pmin	%	99.4	99.4	99.4	99.4	99.4	99.4	99.4
Flue leakage at Pmax (50/30°C)	%	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Condensate production (Pmax/Pmin)	kg/h	12.6 / 4	18.9 / 6	25.2 / 8	31.5 / 10	37.8 / 12	44.1 / 14	50.4 / 16

Specifications		MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 520	MACH 600
Max Heating Operating Pressure	bar	6	6	6	6	6	6	6
Min Heating Operating Pressure	bar	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Max Heating Temperature	°C	95	95	95	95	95	95	95
Heating water content	litres	24	35	46	57	68	79	90
Protection rating	IP	X4D	X4D	X4D	X4D	X4D	X4D	X4D
Supply voltage	V/Hz	230/50	230/50	230/50	230/50	230/50	230/50	230/50
Electric power absorbed	W	380	570	760	950	1140	1330	1520
Type of appliance		B23						

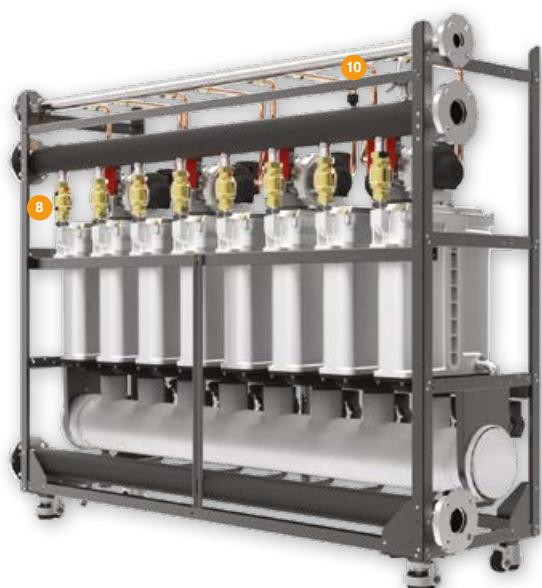
Dimensions and connections		MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 520	MACH 600
Height	mm	1650	1650	1650	1650	1650	1650	1650
Width	mm	1190	1190	1190	1630	1630	2070	2070
Depth	mm	710	710	710	710	710	710	710
Empty weight	kg	215	255	290	355	395	465	500
System delivery Ø	In.	DN 65 (PN16)						
System return Ø	In.	DN 65 (PN16)						
Gas inlet Ø	In.	DN 40 (PN16)						
Flue gas outlet Ø	mm	200	200	200	200	200	200	200

01. ACCESSORIES ON REQUEST FOR CONFIGURATION AS PER PROJECT SPECIFICATIONS

DESCRIPTION		CODE
	cable 2 m	1KWMA11W
	cable 5 m	043005X0
	Empty technical cabinet for outdoor use	046062X0
	external probe	013018X0
	Hydraulic separator DN 65 (from 151 kW up to 300 kW)	042078X0
	Hydraulic separator connection kit (from 151 kW up to 300 kW)	042089X0
	Hydraulic separator DN 100 (from 301 kW up to 600 kW)	042080X0
	Hydraulic separator connection kit (from 301 kW up to 600 kW)	042088X0

DESCRIPTION		CODE
	INAIL manifold (included with equipment) DN65 PN16	042075X0
	kit for the management of a DHW boiler with a thermostat (not supplied)	013017X0
	PPS smoke pipe M/F length 500 mm - 200 mm	041076X0
	PPS smoke pipe M/F length 1000 mm - 200 mm	041062X0
	90° elbow M/F, PPS - 200 mm	041060X0
	Plate exchanger. The installer is responsible for the hydraulic connection between the generator and the exchanger. See dedicated pages for correct sizing	
	Temperature control - Water treatment - Plates see dedicated pages	
	neutralisers (see the chapter on condensation neutralisers for condensing boilers)	

01. MAIN COMPONENTS

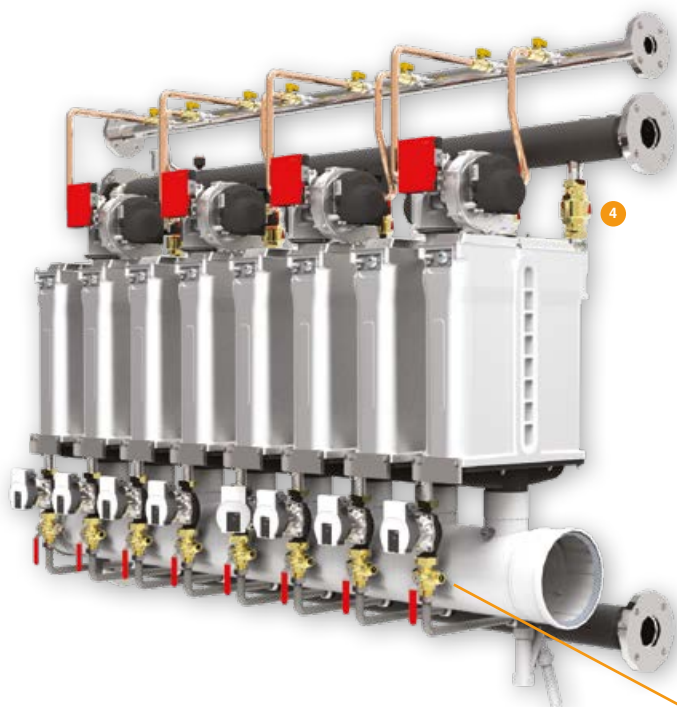


- 1 The outer shell is completely rainproof and resistant to atmospheric agents
- 2 The top panel was designed in a single piece to improve waterproofing and access to the main components from above
- 3 The control panel is protected by a sturdy panel
- 4 The generator is delivered with 4 sturdy floating wheels as standard. Each wheel is equipped with locking and fixing feet
- 5 Exchanger consisting of die-cast elements in aluminium and silicon alloy
- 6 Premix combustion unit
- 7 System return unit
- 8 System flow unit
- 9 Air bleed valve
- 10 Hydraulic circuit safety pressure switch



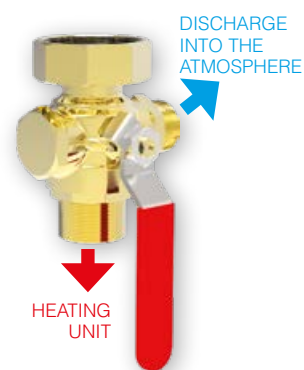
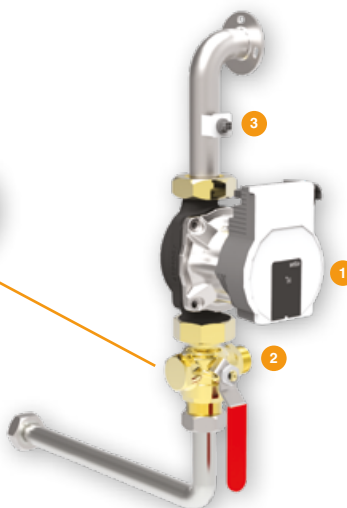
COMBUSTION AND EXCHANGE UNIT

- 1 High-performance **heat exchanger** in aluminium-silicon alloy. Each single element can exchange a power of 75 kW
- 2 Total pre-mix **burner**, with modulating fan and micro-flame front burner, with low emissions (NOx class 6)
- 3 **Flue gas non-return valve supplied as standard on each single combustion group.** The device allows the combustion gases to be discharged under pressure and consequently to size the flue more easily, using pipes with a smaller diameter than traditional vacuum systems
- 4 Condensation collection collector
- 5 Ignition electrodes and flame sensor
- 6 System flow temperature sensor



CIRCULATION UNIT

- 1 High-efficiency modulating circulator. Max. head 8 metres
- 2 3-way valve for the hydraulic disconnection of the single heating unit in safety
- 3 System return temperature sensor
- 4 Non-return valve



MACH 150

ErP-compliant condensing heat generator, certified Range rated for output adaptation to system demand and designed for either installation in central heating plants or outdoors. Pre-mix appliance, type B23, with construction for floor installation, consisting of two heating units in parallel with a total input of 142 kW and continuous modulation of thermal output (at temperatures 50/30°C) from 15.1 kW to 148.4 kW. Thermal output modulation ratio 1:10
Maximum operating pressure 6 bar.
Delivery temperature adjustment range Tmax 80°C - Tmin 20°C
Protection rating IP X4D
Efficiency at Pmax (80/60°C) > 93 + 2log (Pn)
Heating unit consisting of two aluminium alloy (Al/Si) die-cast exchangers connected in parallel on the delivery and return hydraulic manifolds with flanged hydraulic connections DN 65 (gas DN 40)
Combustion unit, operating on Natural Gas or LPG, full air-gas pre-mix with variable speed fan supplied with silencer and flue gas non-return valve on each heating unit. Low NOx, front micro-flame steel burner guaranteeing class 6 emissions in accordance with EN 15502-1 (Weighted NOx emission 42 mg/kWh).
The electronics supplied as standard with the generator (without the use of additional modules) are able to:

- Manage the switch-on and switch-off sequence of heating units using Master-Slave logic
- Manage the system flow temperature based on fluctuations in the outside temperature using specific climate curves
- Manage a two-user, high-temperature system
- Manage a DHW cylinder probe
- Manage a delivery probe for the secondary heating circuit
- Manage generator operation remotely with 0/10 V, Opentherm and Modbus protocols.

Generator delivered as standard equipped with four floating wheels for on-site handling and positioning.

MACH 225

ErP-compliant condensing heat generator, certified Range rated for output adaptation to system demand and designed for either installation in central heating plants or outdoors. Pre-mix appliance, type B23, with construction for floor installation, consisting of two heating units in parallel with a total input of 213 kW and continuous modulation of thermal output (at temperatures 50/30°C) from 15.1 kW to 222.6 kW. Thermal output modulation ratio 1:15
Maximum operating pressure 6 bar.
Delivery temperature adjustment range Tmax 80°C - Tmin 20°C
Protection rating IP X4D
Efficiency at Pmax (80/60°C) > 93 + 2log (Pn)
Thermal unit consisting of three die-cast exchangers in aluminium alloy (Al/Si) connected in parallel on the delivery and return hydraulic manifolds with flanged hydraulic connections DN 65 (gas DN 40)
Combustion unit, operating on Natural Gas or LPG, full air-gas pre-mix with variable speed fan supplied with silencer and flue gas non-return valve on each heating unit. Low NOx, front micro-flame steel burner guaranteeing class 6 emissions in accordance with EN 15502-1 (Weighted NOx emission 42 mg/kWh).
The electronics supplied as standard with the generator (without the use of additional modules) are able to:

- Manage the switch-on and switch-off sequence of heating units using Master-Slave logic
- Manage the system flow temperature based on fluctuations in the outside temperature using specific climate curves
- Manage a two-user, high-temperature system
- Manage a DHW cylinder probe
- Manage a delivery probe for the secondary heating circuit
- Manage generator operation remotely with 0/10 V, Opentherm and Modbus protocols.

Generator delivered as standard equipped with four floating wheels for on-site handling and positioning.

MACH 300

ErP-compliant condensing heat generator, certified Range rated for output adaptation to system demand and designed for either installation in central heating plants or outdoors. Pre-mix appliance, type B23, with construction for floor installation, consisting of two heating units in parallel with a total input of 284 kW and continuous modulation of thermal output (at temperatures 50/30°C) from 15.1 kW to 296.8 kW. Thermal output modulation ratio 1:20
Maximum operating pressure 6 bar.
Delivery temperature adjustment range Tmax 80°C - Tmin 20°C
Protection rating IP X4D
Efficiency at Pmax (80/60°C) > 93 + 2log (Pn)
Heating unit consisting of four aluminium alloy (Al/Si) die-cast exchangers connected in parallel on the delivery and return hydraulic manifolds with flanged hydraulic connections DN 65 (gas DN 40)
Combustion unit, operating on Natural Gas or LPG, full air-gas pre-mix with variable speed fan supplied with silencer and flue gas non-return valve on each heating unit.
Low NOx, front micro-flame steel burner guaranteeing class 6 emissions in accordance with
EN 15502-1 (Weighted NOx emission 42 mg/kWh).
The electronics supplied as standard with the generator (without the use of additional modules) are able to:

- Manage the switch-on and switch-off sequence of heating units using Master-Slave logic
- Manage the system flow temperature based on fluctuations in the outside temperature using specific climate curves
- Manage a two-user, high-temperature system
- Manage a DHW cylinder probe
- Manage a delivery probe for the secondary heating circuit
- Manage generator operation remotely with 0/10 V, Opentherm and Modbus protocols.

Generator delivered as standard equipped with four floating wheels for on-site handling and positioning.

MACH 370

ErP-compliant condensing heat generator, certified Range rated for output adaptation to system demand and designed for either installation in central heating plants or outdoors. Pre-mix appliance, type B23, with construction for floor installation, consisting of two heating units in parallel with a total input of 355 kW and continuous modulation of thermal output (at temperatures 50/30°C) from 15.1 kW to 371 kW. Thermal output modulation ratio 1:25
Maximum operating pressure 6 bar.
Delivery temperature adjustment range Tmax 80°C - Tmin 20°C
Protection rating IP X4D
Efficiency at Pmax (80/60°C) > 93 + 2log (Pn)
Heating unit consisting of five aluminium alloy (Al/Si) die-cast exchangers connected in parallel on the delivery and return hydraulic manifolds with flanged hydraulic connections DN 65 (gas DN 40)
Combustion unit, operating on Natural Gas or LPG, full air-gas pre-mix with variable speed fan supplied with silencer and flue gas non-return valve on each heating unit.
Low NOx, front micro-flame steel burner guaranteeing class 6 emissions in accordance with
EN 15502-1 (Weighted NOx emission 42 mg/kWh).
The electronics supplied as standard with the generator (without the use of additional modules) are able to:

- Manage the switch-on and switch-off sequence of heating units using Master-Slave logic
- Manage the system flow temperature based on fluctuations in the outside temperature using specific climate curves
- Manage a two-user, high-temperature system
- Manage a DHW cylinder probe
- Manage a delivery probe for the secondary heating circuit
- Manage generator operation remotely with 0/10 V, Opentherm and Modbus protocols.

Generator delivered as standard equipped with four floating wheels for on-site handling and positioning.

MACH 450

ErP-compliant condensing heat generator, certified Range rated for output adaptation to system demand and designed for either installation in central heating plants or outdoors. Pre-mix appliance, type B23, with construction for floor installation, consisting of two heating units in parallel with a total input of 426 kW and continuous modulation of thermal output (at temperatures 50/30°C) from 15.1 kW to 445.2 kW. Thermal output modulation ratio 1:30
Maximum operating pressure 6 bar.
Delivery temperature adjustment range Tmax 80°C - Tmin 20°C
Protection rating IP X4D
Efficiency at Pmax (80/60° C) $> 93 + 2\log (P_n)$ (based on $P_n = 400$ kW)
Heating unit consisting of six die-cast exchangers in aluminium alloy (Al/Si) connected in parallel on the delivery and return hydraulic manifolds with flanged hydraulic connections
DN 65 (gas DN 40)
Combustion unit, operating on Natural Gas or LPG, full air-gas pre-mix with variable speed fan supplied with silencer and flue gas non-return valve on each heating unit.
Low NOx, front micro-flame steel burner guaranteeing class 6 emissions in accordance with EN 15502-1 (Weighted NOx emission 42 mg/kWh).
The electronics supplied as standard with the generator (without the use of additional modules) are able to:

- Manage the switch-on and switch-off sequence of heating units using Master-Slave logic
- Manage the system flow temperature based on fluctuations in the outside temperature using specific climate curves
- Manage a two-user, high-temperature system
- Manage a DHW cylinder probe
- Manage a delivery probe for the secondary heating circuit
- Manage generator operation remotely with 0/10 V, Opentherm and Modbus protocols.

Generator delivered as standard equipped with four floating wheels for on-site handling and positioning.

MACH 520

ErP-compliant condensing heat generator, certified Range rated for output adaptation to system demand and designed for either installation in central heating plants or outdoors. Pre-mix appliance, type B23, with construction for floor installation, consisting of two heating units in parallel with a total input of 497 kW and continuous modulation of thermal output (at temperatures 50/30°C) from 15.1 kW to 519.4 kW. Thermal output modulation ratio 1:35
Maximum operating pressure 6 bar.
Delivery temperature adjustment range Tmax 80°C - Tmin 20°C
Protection rating IP X4D
Efficiency at Pmax (80/60° C) $> 93 + 2\log (P_n)$ (based on $P_n = 400$ kW)
Heating unit consisting of seven die-cast exchangers in aluminium alloy (Al/Si) connected in parallel on the delivery and return hydraulic manifolds with flanged hydraulic connections
DN 65 (gas DN 40)
Combustion unit, operating on Natural Gas or LPG, full air-gas pre-mix with variable speed fan supplied with silencer and flue gas non-return valve on each heating unit.
Low NOx, front micro-flame steel burner guaranteeing class 6 emissions in accordance with EN 15502-1 (Weighted NOx emission 42 mg/kWh).
The electronics supplied as standard with the generator (without the use of additional modules) are able to:

- Manage the switch-on and switch-off sequence of heating units using Master-Slave logic
- Manage the system flow temperature based on fluctuations in the outside temperature using specific climate curves
- Manage a two-user, high-temperature system
- Manage a DHW cylinder probe
- Manage a delivery probe for the secondary heating circuit
- Manage generator operation remotely with 0/10 V, Opentherm and Modbus protocols.

Generator delivered as standard equipped with four floating wheels for on-site handling and positioning.

MACH 600

ErP-compliant condensing heat generator, certified Range rated for output adaptation to system demand and designed for either installation in central heating plants or outdoors.

Pre-mix appliance, type B23, with construction for floor installation, consisting of two heating units in parallel with a total input of 568 kW and continuous modulation of thermal output (at temperatures 50/30°C) from 15.1 kW to 593.6 kW.

Thermal output modulation ratio 1:40

Maximum operating pressure 6 bar.

Delivery temperature adjustment range Tmax 80°C - Tmin 20°C

Protection rating IP X4D

Efficiency at Pmax (80/60° C) $> 93 + 2 \log (P_n)$ (based on $P_n = 400$ kW)

Heating unit consisting of eight aluminium alloy (Al/Si) die-cast exchangers connected in parallel on the delivery and return hydraulic manifolds with flanged hydraulic connections

DN 65 (gas DN 40)

Combustion unit, operating on Natural Gas or LPG, full air-gas pre-mix with variable speed fan supplied with silencer and flue gas non-return valve on each heating unit.

Low NOx, front micro-flame steel burner guaranteeing class 6 emissions in accordance with

EN 15502-1 (Weighted NOx emission 42 mg/kWh).

The electronics supplied as standard with the generator (without the use of additional modules) are able to:

- Manage the switch-on and switch-off sequence of heating units using Master-Slave logic
- Manage the system flow temperature based on fluctuations in the outside temperature using specific climate curves
- Manage a two-user, high-temperature system
- Manage a DHW cylinder probe
- Manage a delivery probe for the secondary heating circuit
- Manage generator operation remotely with 0/10 V, Opentherm and Modbus protocols.

Generator delivered as standard equipped with four floating wheels for on-site handling and positioning.

01. ERP PRODUCT DATA SHEETS

Model: MACH 150

Brand: FERROLI

Condensing boiler: YES

Low temperature boiler (**): YES

Type B1 boiler: NO

Mixed heating appliance: NO

Cogeneration appliance for space heating: NO

Element	Symbol	Unit	Value
Nominal heat output	P _n	kW	139
Seasonal space heating energy efficiency	η_s	%	93
Useful heat output			
At the nominal heat output and high temperature regime (*)	P ₄	kW	139.4
At 30% of the nominal heat output and low temperature regime (**)	P ₁	kW	23.0
Useful efficiency			
At the nominal heat output and high temperature regime (*)	η_4	%	88.4
At 30% of the nominal heat output and low temperature regime (**)	η_1	%	98.0
Auxiliary electricity consumption			
At full load	el _{max}	kW	0.230
At partial load	el _{min}	kW	0.025
In Standby mode	PSB	kW	0.005
Other elements			
Heat loss in Standby mode	P _{stby}	kW	0.240
Ignition burner energy consumption	P _{ign}	kW	0.000
Annual energy consumption	QHE	GJ	236
Indoor sound power level	LWA	dB	69
Nitrogen oxide emissions	NO _x	mg/kWh	42

(*) High temperature regime: return temperature at appliance inlet 60°C and usage temperature at appliance outlet 80°C.

(**) Low temperature: return temperature (at boiler inlet) for condensing boilers 30°C, for low temperature appliances 37°C and for other appliances 50°C.

Model: MACH 225

Brand: FERROLI

Condensing boiler: YES

Low temperature boiler (**): YES

Type B1 boiler: NO

Mixed heating appliance: NO

Cogeneration appliance for space heating: NO

Element	Symbol	Unit	Value
Nominal heat output	P _n	kW	209
Seasonal space heating energy efficiency	η_s	%	93
Useful heat output			
At the nominal heat output and high temperature regime (*)	P ₄	kW	209.2
At 30% of the nominal heat output and low temperature regime (**)	P ₁	kW	23.0
Useful efficiency			
At the nominal heat output and high temperature regime (*)	η_4	%	88.4
At 30% of the nominal heat output and low temperature regime (**)	η_1	%	98.0
Auxiliary electricity consumption			
At full load	el _{max}	kW	0.345
At partial load	el _{min}	kW	0.025
In Standby mode	PSB	kW	0.006
Other elements			
Heat loss in Standby mode	P _{stby}	kW	0.360
Ignition burner energy consumption	P _{ign}	kW	0.000
Annual energy consumption	QHE	GJ	344
Indoor sound power level	LWA	dB	71
Nitrogen oxide emissions	NO _x	mg/kWh	42

(*) High temperature regime: return temperature at appliance inlet 60°C and usage temperature at appliance outlet 80°C.

(**) Low temperature: return temperature (at boiler inlet) for condensing boilers 30°C, for low temperature appliances 37°C and for other appliances 50°C.

01. ERP PRODUCT DATA SHEETS

Model: MACH 300

Brand: FERROLI

Condensing boiler: YES

Low temperature boiler (**): YES

Type B1 boiler: NO

Mixed heating appliance: NO

Cogeneration appliance for space heating: NO

Element	Symbol	Unit	Value
Nominal heat output	P _n	kW	279
Seasonal space heating energy efficiency	η_s	%	93
Useful heat output			
At the nominal heat output and high temperature regime (*)	P ₄	kW	278.9
At 30% of the nominal heat output and low temperature regime (**)	P ₁	kW	23.0
Useful efficiency			
At the nominal heat output and high temperature regime (*)	η_4	%	88.4
At 30% of the nominal heat output and low temperature regime (**)	η_1	%	98.0
Auxiliary electricity consumption			
At full load	el _{max}	kW	0.460
At partial load	el _{min}	kW	0.025
In Standby mode	PSB	kW	0.007
Other elements			
Heat loss in Standby mode	P _{stby}	kW	0.480
Ignition burner energy consumption	P _{ign}	kW	0.000
Annual energy consumption	QHE	GJ	452
Indoor sound power level	LWA	dB	72
Nitrogen oxide emissions	NO _x	mg/kWh	42

(*) High temperature regime: return temperature at appliance inlet 60°C and usage temperature at appliance outlet 80°C.

(**) Low temperature: return temperature (at boiler inlet) for condensing boilers 30°C, for low temperature appliances 37°C and for other appliances 50°C.

Model: MACH 370

Brand: FERROLI

Condensing boiler: YES

Low temperature boiler (**): YES

Type B1 boiler: NO

Mixed heating appliance: NO

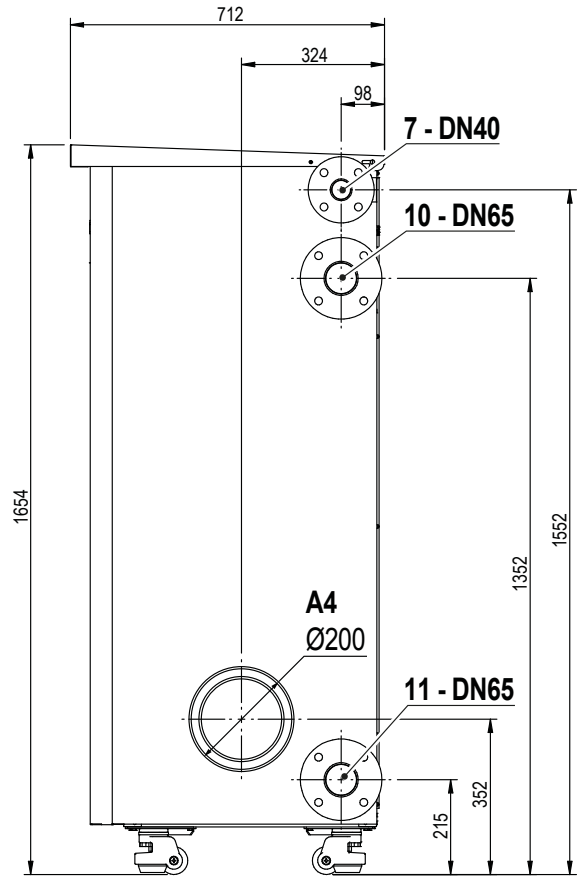
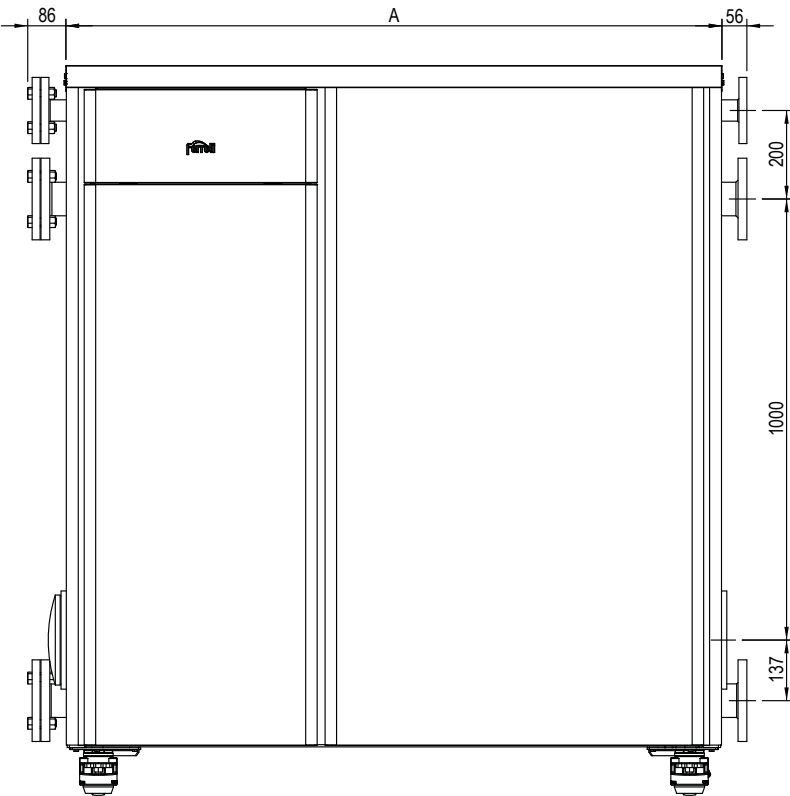
Cogeneration appliance for space heating: NO

Element	Symbol	Unit	Value
Nominal heat output	P _n	kW	349
Seasonal space heating energy efficiency	η_s	%	93
Useful heat output			
At the nominal heat output and high temperature regime (*)	P ₄	kW	348.7
At 30% of the nominal heat output and low temperature regime (**)	P ₁	kW	23.0
Useful efficiency			
At the nominal heat output and high temperature regime (*)	η_4	%	88.4
At 30% of the nominal heat output and low temperature regime (**)	η_1	%	98.0
Auxiliary electricity consumption			
At full load	el _{max}	kW	0.575
At partial load	el _{min}	kW	0.025
In Standby mode	PSB	kW	0.008
Other elements			
Heat loss in Standby mode	P _{stby}	kW	0.600
Ignition burner energy consumption	P _{ign}	kW	0.000
Annual energy consumption	QHE	GJ	560
Indoor sound power level	LWA	dB	74
Nitrogen oxide emissions	NO _x	mg/kWh	42

(*) High temperature regime: return temperature at appliance inlet 60°C and usage temperature at appliance outlet 80°C.

(**) Low temperature: return temperature (at boiler inlet) for condensing boilers 30°C, for low temperature appliances 37°C and for other appliances 50°C.

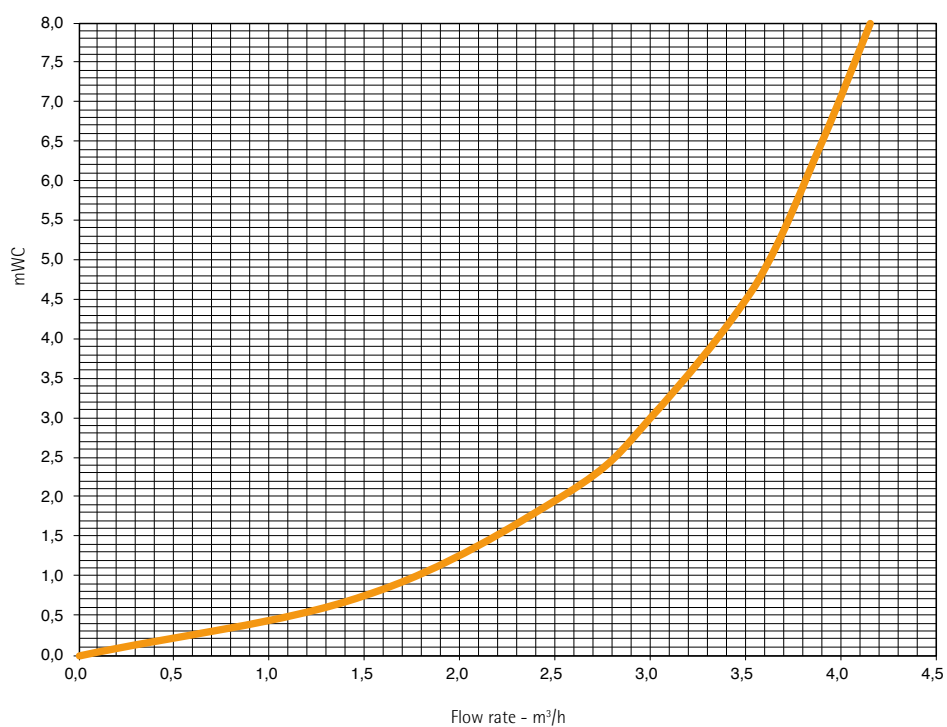
01. PHYSICAL AND DIMENSIONAL DATA



MODEL	A mm
MACH 150	1047
MACH 225	
MACH 300	
MACH 370	1487
MACH 450	
MACH 520	1927
MACH 600	

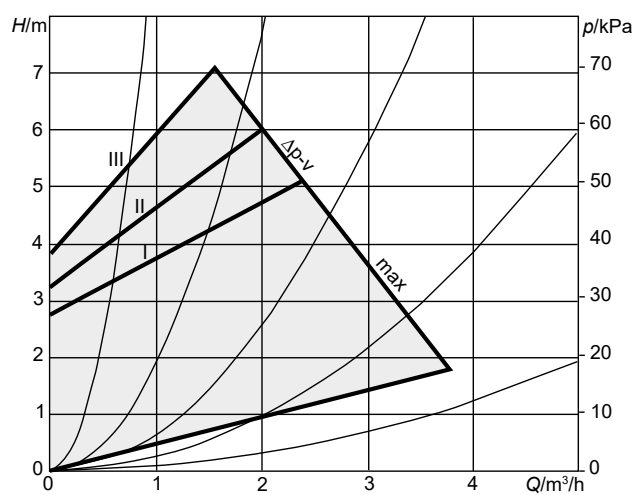
- 7 Gas inlet - DN40
- 10 System delivery - DN65
- 11 System return - DN65
- A1 Flue gas outlet - Ø 200 mm

Graph of exchanger pressure drop with non-return valve and cock

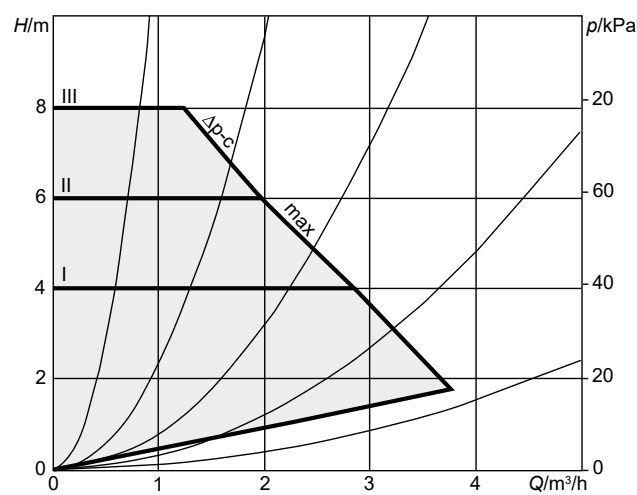


Circulator diagrams

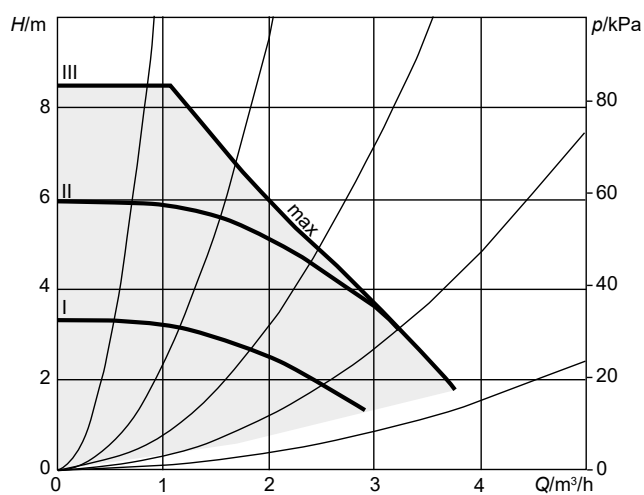
$\Delta p-v$ (variable)



$\Delta p-c$ (constant)



Constant speed I, II, III

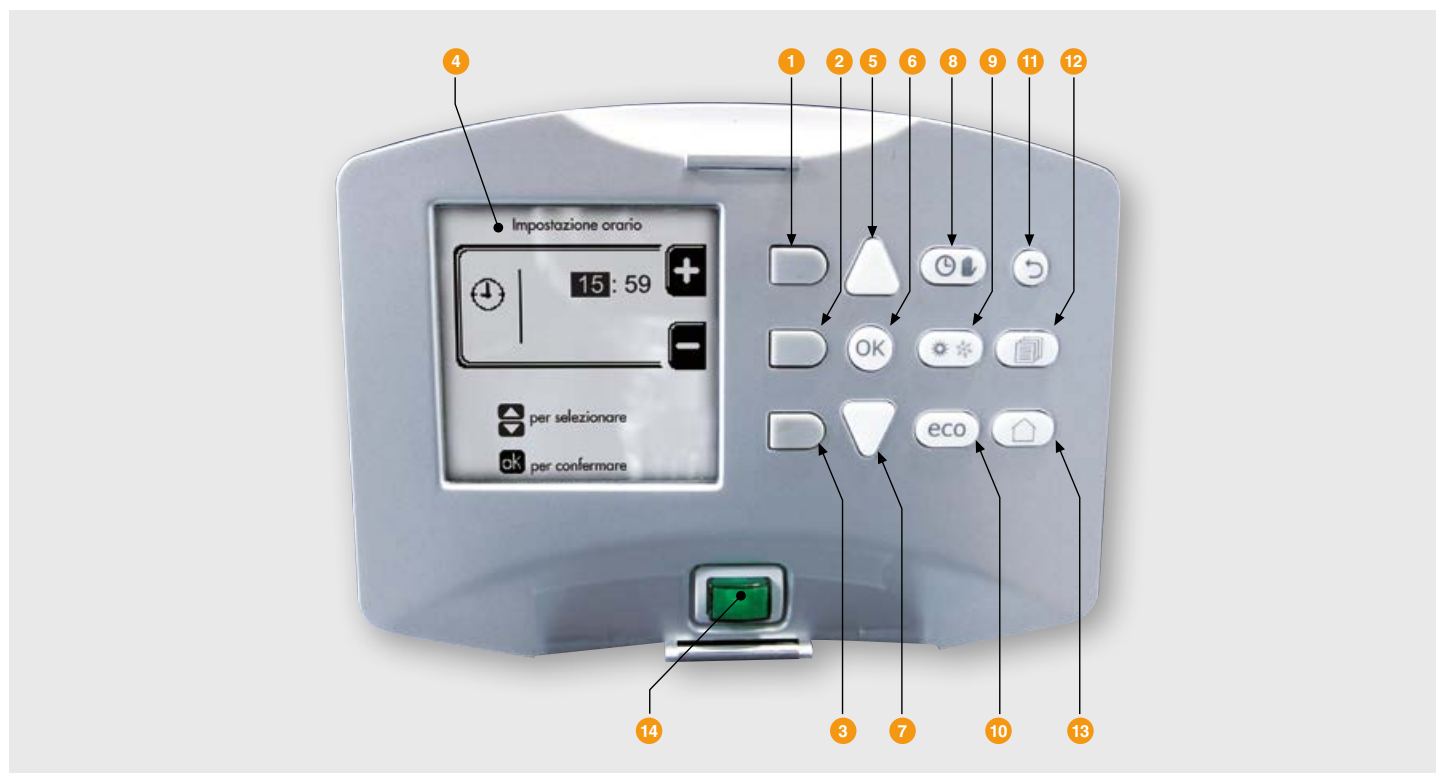




02

Electronic control

• CONTROL PANEL



Control panel legend

- | | |
|----|---|
| 1 | Soft key 1 |
| 2 | Soft key 2 |
| 3 | Soft key 3 |
| 4 | Dot-matrix display (example of main screen) |
| 5 | Menu navigation key |
| 6 | Menu entry/confirm key |
| 7 | Menu navigation key |
| 8 | Automatic/Manual heating/DHW operation key |
| 9 | Summer/Winter mode selection key |
| 10 | Economy/Comfort mode selection key |
| 11 | Menu exit key |
| 12 | Main menu key |
| 13 | Home key (return to main screen) |
| 14 | Main switch |

CONTEXTUAL KEYS (part. 1, 2, 3) can be distinguished by their grey colour, the lack of screen printing and can take on a different meaning depending on the selected menu. It is essential to follow the indication provided by the display (icons and texts). for example, using contextual key 2 (part. 2) it is possible to access device information such as: sensor temperatures, operating powers, etc.

DIRECT KEYS (part. 8, 9, 10) always have the same function

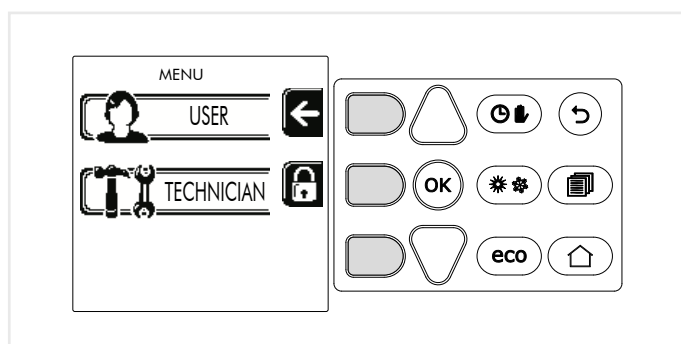
NAVIGATION/MENU KEYS

The navigation/menu keys (part. 5, 6, 7, 11, 12, 13) are used to navigate between the various menus implemented in the control panel

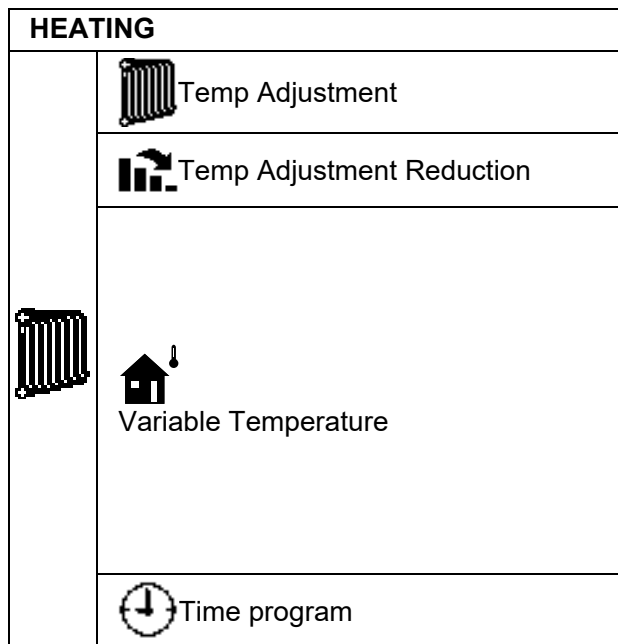
Access to the generator and system parameters via the control panel has two distinct operating levels.

The first one, called **USER MENU**, allows the owner and/or administrator to view the main parameters and make the basic adjustments related to running the central heating plant and the system.

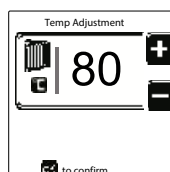
The second one, called **TECHNICAL MENU**, is reserved for qualified professionals and allows them to view and edit the default parameters of the electronic board.



• USER MENU

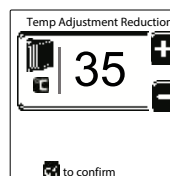


Heating temperature adjustment



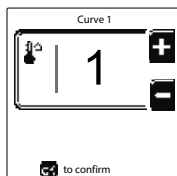
Access the “USER” MENU > “HEATING” > “Adjustment Temp” to change the temperature from a minimum of 20°C to a maximum of 80°C. Confirm by pressing OK.

Reduction adjustment temperature

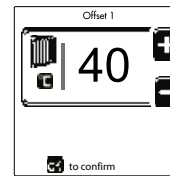


Access the “USER” MENU > “HEATING” > “Reduction Adjustment Temp” to change the delivery temperature adjustment range from 20/60°C (default) to 0/50°C.

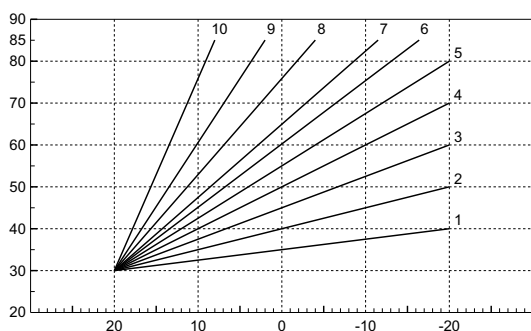
Compensation curve and curve shift



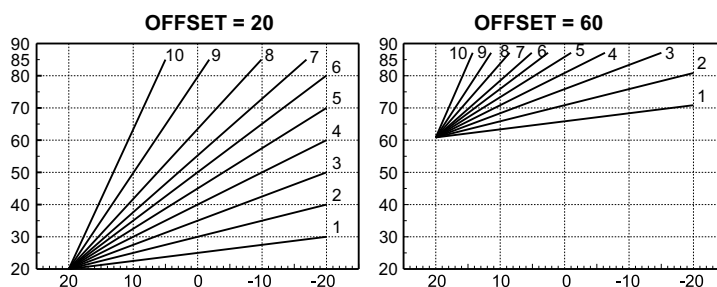
Access the “USER” MENU > “HEATING” > “Variable Temperature”. Set the desired curve from 1 to 10 according to the characteristic via the “Curve1” parameter and confirm by pressing OK. By setting the curve to 0, variable temperature adjustment is disabled.



Set the parallel shift of the curves from 20 to 60°C (fig. 29), via the “Offset 1” parameter and confirm by pressing OK.



Compensation curves

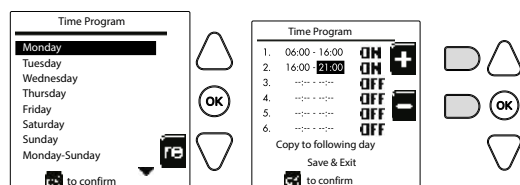


Parallel shift of the compensation curves

Time programming

Time programming is carried out in the same way for both heating and DHW; the two programs are independent.

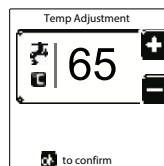
To program Heating, access the “Time Program” menu by following the path “USER” MENU > “HEATING” > “Time Program”.



The program is of the weekly type: this means that **6 independent time slots can be set for each day** of the week; 4 options can be chosen for each time slot.

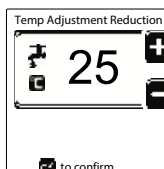
• USER MENU

DOMESTIC HOT WATER	
	Temp Adjustment
	Temp Adjustment Reduction
	Legionella
	Time program
HOLIDAY FUNCTION	
	



DHW temperature reduction adjustment (with optional cylinder installed)

Access the “USER” MENU > “DOMESTIC HOT WATER” > “Adjustment Temp” to change the temperature from a minimum of 10°C to a maximum of 65°C. Confirm by pressing OK.



DHW temperature reduction (with optional cylinder installed)

to change the DHW temperature adjustment range from 10/65°C (default) to 0/50°C.

Legionella Programming (with optional cylinder installed)

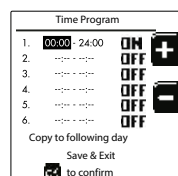
This function must be activated by enabling an installer parameter.

Access the “Legionella” menu through the path “USER” MENU > “DOMESTIC HOT WATER” > “Legionella”

to set:

- Anti-legionella day. Defines the day of the week during which the function will be activated.
- Anti-legionella time of day. Defines the start time of the function.
- Anti-legionella duration. Defines the duration (in minutes) of the function.
- Anti-legionella control Temp. Defines the DHW adjustment temperature during the function.

DHW time programming



To program the DHW, access the menu “Time Program” > “USER” MENU “DOMESTIC HOT WATER” > “Time Program”.

It is a weekly program: this means that **6 independent time slots can be set for each day of the week**. 4 options can be chosen for each time slot.

- **ON** - In the case a Heating/DHW demand, the boiler operates at the set Heating/DHW Adjustment Temperature.
-  In the case of a Heating/DHW demand, the boiler operates at the Reduced Adjustment Temperature. The Reduced temperature is obtained by subtracting the value of the Reduced Adjustment Temperature from the set Heating/DHW Adjustment Temperature.
- **OFF** - In the case of a Heating/DHW demand, the boiler will not activate Heating/DHW mode.
- **-- : -- OFF** - Time slot disabled.

Holiday function

Access the “HOLIDAY FUNCTION” menu through the path “USER” MENU > “HOLIDAY FUNCTION” to set:

- Holiday start date.
- Holiday end date.

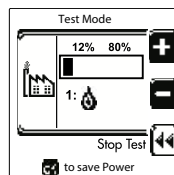
The display can activate two types of icons:

- The Holiday function is programmed but not yet active.
- The Holiday function is in progress. The boiler will behave as if Summer mode and Economy mode are active (with optional cylinder installed).

The Antifreeze function and the Legionella function (if activated) will remain active.

• USER MENU

MAINTENANCE	
	Test Mode
	Service Information
	Service Intervention Date
SETTINGS	
	Language
	Unit of Measurement
	Date Setting
	Time Setting



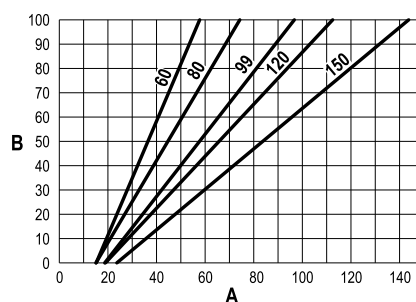
TEST mode activation

Reach the screen by scrolling through the menu following the path "USER" MENU > MAINTENANCE > Test Mode "Test Mode". The boiler switches on and reaches the maximum heating power (Range Rated).

Thermal Output Adjustment (RANGE RATED)

This boiler is of the "RANGE RATED" type (according to EN 483) and can be adapted to the heating requirements of the system by setting the maximum thermal output for operation in heating mode, as indicated below:

- Put the boiler in TEST mode
- Press the **soft keys 1 and 2** to increase or decrease the thermal output (minimum = 00 - Maximum = 100). See the "Thermal Output Adjustment" diagram.



Thermal output adjustment diagram

A = kW - B = Electronic Board Parameter

Information

From the main page (Home), press soft key 2.

Then use the "Menu navigation" keys to display the following values:

Heating demand	OT – Open Therm control demand
	TA – Room thermostat demand
	0-10VDC – 0-10VDC signal demand
Heating Circulator	TA2 – Second room thermostat demand
3-way heating valve	ON/OFF
3-way DHW valve	ON/OFF
Waiting time	ON/OFF
Delta T protection	ON/OFF
Flame supervisor	ON/OFF
Heating 1 sensor	°C
Safety Sensor	°C
Return Sensor	°C
DHW Sensor	°C
External Probe	°C
Flue gas sensor	°C
Cascade heating sensor	°C
Fan frequency	Hz
Burner Load	%
System water pressure	1.4bar = ON, 0.0 bar = OFF
Modulating Circulator	%
Cascade Modulating Circulator	%
Ionising Current	uA
Input 0-10VDC	VDC
Heating adjustment temperature	Setpoint (°C)
Output level adjustment 0-10VDC	Setpoint (%)

02. ELECTRONIC CONTROL

•TECH MENU

ACCESS TO THE SERVICE MENU AND CHANGING PARAMETERS CAN ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL. The Technical Menu can be accessed only after entering the code 4 1 8. And it is valid for 15 minutes.

Parameter Menu - Configuration

There are 16 parameters indicated by the letter “b” which cannot be edited using the Remote Control.

Parameter	Description	Range	MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 500	MACH 600
b01	Gas type selection	Natural Gas/LPG	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
b02	Boiler type selection	1=Heating only 2=Combi with storage tank and double pump 3=Combi with storage tank and diverter valve 4-9=Not in use	1	1	1	1	1	1	1
b03	Water system pressure protection selection	0=Pressure switch 1=Flow switch 1 sec 2=Flow switch 3 sec 3=Flow switch 5 sec 4=Flow switch 10 sec 5=Pressure transducer	0	0	0	0	0	0	0
b04	Maximum fan frequency in DHW mode	0-255 Hz	210 Hz	210 Hz	210 Hz	210 Hz	210 Hz	210 Hz	210 Hz
b05	Maximum fan frequency in heating mode	0-255 Hz	210 Hz	210 Hz	210 Hz	210 Hz	210 Hz	210 Hz	210 Hz
b06	Maximum fan frequency in DHW/heating mode	0-255 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz
b07	Minimum fan frequency offset	0-255 Hz	40 Hz	40 Hz	40 Hz	40 Hz	40 Hz	40 Hz	40 Hz
b08	Operation selection Variable output relay	0=Burner on 1=Legionella pump 2=Boiler room ventilation 3=Motorised shut-off valve	0	0	0	0	0	0	0
b09	Post-Ventilation	0-120 seconds	30	30	30	30	30	30	30
b10	Pre-Ventilation boiler room	1-15 minutes	1	1	1	1	1	1	1
b11	Post-Ventilation boiler room	1-15 minutes	1	1	1	1	1	1	1
b12	Flue gas sensor	OFF=Deactivated ON=Enabled	OFF	OFF	OFF	OFF	OFF	OFF	OFF
b13	Not implemented	0-90°C	45	45	45	45	45	45	45
b14	Maximum flue gas temperature	0-125°C	110	110	110	110	110	110	110
b15	Fan type selection	-	-	-	-	-	-	-	-
b16	Pump seizing protection operation time	0-20 seconds	5	5	5	5	5	5	5
b17	High voltage input	0=Remote reset 1=Disable all modules 2=Not in use 3=Enable heating demand	0	0	0	0	0	0	0
b18	Password	0-999	418	418	418	418	418	418	418
b19	Module activation	ON-OFF	ON	ON	ON	ON	ON	ON	ON

Notes on parameter b02

b02=7 = heating only boiler

b02=8 = heating boiler and DHW storage tank with double circulator

b02=9 = heating boiler and DHW storage tank with three-way valve

• TECH MENU

Parameter Menu - Transparent

There are 31 parameters indicated by the letter "P" which can also be edited using the Remote Control.

Parameter	Description	Range	MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 500	MACH 600
P01	Ignition Power	0-100%	30	30	30	30	30	30	30
P02	Heating ramp	1-10°C/minute	1	1	1	1	1	1	1
P03	Minimum virtual setpoint temperature	20-80°C	20	20	20	20	20	20	20
P04	Heating wait time	0-10 minutes	4	4	4	4	4	4	4
P05	Heat post circulation	0-255 minutes	3	3	3	3	3	3	3
P06	Pump operation	0-3 Operation strategy	0	0	0	0	0	0	0
P07	Minimum speed modulating pump	0-100%	30	30	30	30	30	30	30
P08	Modulating pump start speed	0-100%	75	75	75	75	75	75	75
P09	Maximum modulating pump speed	30-100%	100	100	100	100	100	100	100
P10	Pump switch-off temperature during Post Circulation	0-100°C	35	35	35	35	35	35	35
P11	Pump switch-on hysteresis temperature during Post Circulation	0-20°C	5	5	5	5	5	5	5
P12	Minimum heating user setpoint	10-90°C	20	20	20	20	20	20	20
P13	Maximum heating user setpoint	20-90°C	80	80	80	80	80	80	80
P14	Maximum heating power	0-100%	80	80	80	80	80	80	80
P15	DHW ramp	1-10°C/min	5	5	5	5	5	5	5
P16	DHW wait time	0-255 seconds	120	120	120	120	120	120	120
P17	Dhw pump post circulation	0-255 seconds	30	30	30	30	30	30	30
	With B02=7 Not implemented	-	-	-	-	-	-	-	-
P18	With B02=8 Minimum DHW user setpoint	10-40°C	10°	10°	10°	10°	10°	10°	10°
	With B02=9 Minimum DHW user setpoint	10-40°C	10°	10°	10°	10°	10°	10°	10°
	With B02=7 Not implemented	-	-	-	-	-	-	-	-
P19	With B02=8 Minimum DHW user setpoint	40-70°C	65°	65°	65°	65°	65°	65°	65°
	With B02=9 Minimum DHW user setpoint	40-70°C	65°	65°	65°	65°	65°	65°	65°
P20	DHW maximum power	0-100%	80%	80%	80%	80%	80%	80%	80%
	With B02=7 Not implemented	-	-	-	-	-	-	-	-

• TECH MENU

Parameter Menu - Transparent

There are 31 parameters indicated by the letter "P" which can also be edited using the Remote Control.

Parameter	Description	Range	MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 500	MACH 600
P21	With B02=8 Boiler hysteresis	0-60°C	2°	2°	2°	2°	2°	2°	2°
	With B02=9 Boiler hysteresis	0-60°C	2°	2°	2°	2°	2°	2°	2°
	With B02=7 Not implemented	-	-	-	-	-	-	-	-
P22	With B02=8 Primary set point	70-85°C	80°	80°	80°	80°	80°	80°	80°
	With B02=9 Primary set point	70-85°C	80°	80°	80°	80°	80°	80°	80°
	With B02=7 Not implemented	-	-	-	-	-	-	-	-
P23	With B02=8 Legionella protection	ON-OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	With B02=9 Legionella protection	ON-OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
P24	Fan frequency in standby	0-255 Hz	0	0	0	0	0	0	0
P25	Modulating pump temperature adjustment	0-60°C	20	20	20	20	20	20	20
P26	Primary heat exchanger protection temperature	0-80°C	35	35	35	35	35	35	35
P27	Minimum system pressure value	-	-	-	-	-	-	-	-
P28	Nominal system pressure value	-	-	-	-	-	-	-	-
P29	Exchanger protection triggered	0 = No F43, 1-15 = 1-15°C/second	0	0	0	0	0	0	0
P30	Heating hysteresis after switch-on	6-30°C	10	10	10	10	10	10	10
P31	Heating hysteresis timer after switch-on	0-180 seconds	60	60	60	60	60	60	60

02. ELECTRONIC CONTROL

•TECH MENU

Parameter Menu - System type

There are 27 parameters indicated by the letter "P" which cannot be edited using the Remote Control.

Parameter	Description	Range	MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 500	MACH 600
P.01	Heating demand selection	0=Normal heating demand 1=Remote control demand with external on-off enable 2=0-10V signal demand with temperature control with external on-off enable 3=0-10V signal demand with external on-off enable 4=Control of 2 zones with remote control room thermostat and second room thermostat 5=Control of 2 climate curves with remote control room thermostat and second room thermostat	0	0	0	0	0	0	0
P.02	Cascade sensor selection	0=Disabled 1=Enabled 2=Enabled	0	0	0	0	0	0	0
P.03	No function	0-1	0	0	0	0	0	0	0
P.04	3-way valve time	0-255 seconds	0	0	0	0	0	0	0
P.05	Activation timer*	0-255 minutes	1	1	1	1	1	1	1
P.06	Deactivation timer*	0-255 minutes	1	1	1	1	1	1	1
P.07	Activation power*	0-100%	70	70	70	70	70	70	70
P.08	Deactivation power*	0-100%	25	25	25	25	25	25	25
P.09	Hydraulic separator function	OFF =Disabled ON =Enabled	OFF	OFF	OFF	OFF	OFF	OFF	OFF
P.10	System loading function	OFF =Disabled ON =Enabled	OFF	OFF	OFF	OFF	OFF	OFF	OFF
P.11	3-way valve selection	2/3 =2 or 3 wires 2 =2 wires	2/3	2/3	2/3	2/3	2/3	2/3	2/3
P.12	0-10Vdc Heating voltage OFF (Temperature Control)**	0.1-10 Vdc	2.5	2.5	2.5	2.5	2.5	2.5	2.5
P.13	0-10Vdc Heating voltage ON (Temperature Control)**	0.1-10 Vdc	3	3	3	3	3	3	3
P.14	0-10Vdc Maximum Voltage (Temperature Control)**	0.1-10 Vdc	10	10	10	10	10	10	10
P.15	0-10Vdc Minimum Temperature (Temperature Control)**	0-100°C	20	20	20	20	20	20	20
P.16	0-10Vdc Maximum Temperature (Temperature Control)**	0-100°C	90	90	90	90	90	90	90
P.17	0-10Vdc Heating voltage OFF (Power Control)**	0.1-10 Vdc	2.5	2.5	2.5	2.5	2.5	2.5	2.5

•TECH MENU

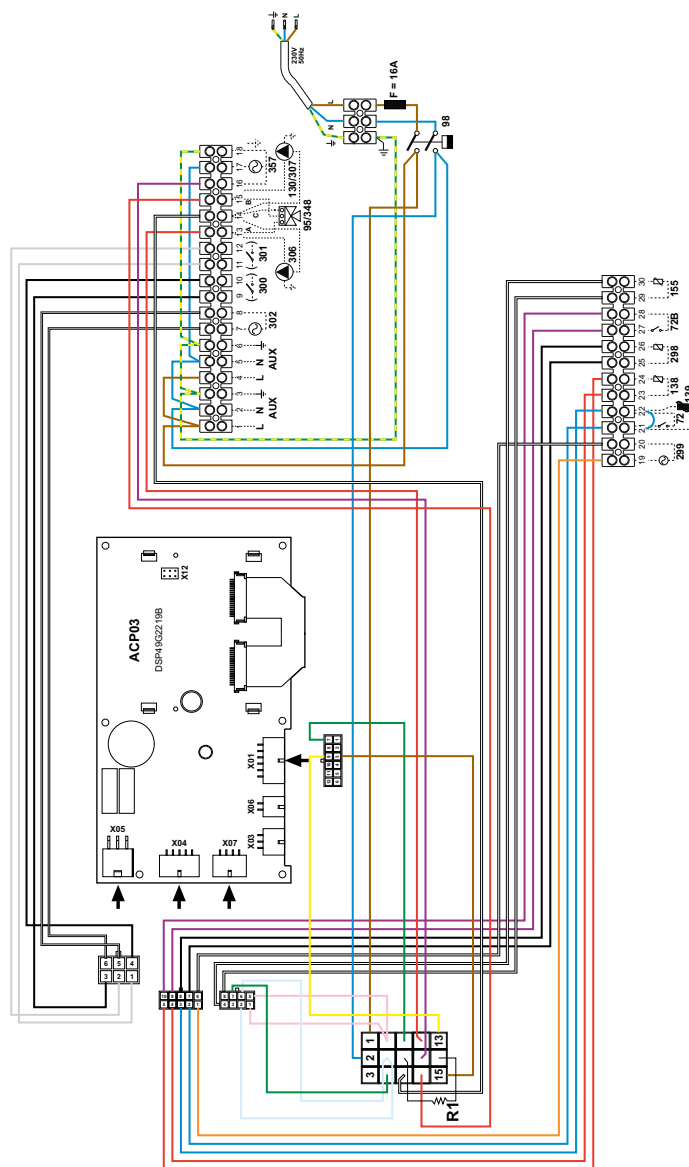
Parameter Menu - System type

There are 27 parameters indicated by the letter "P" which cannot be edited using the Remote Control.

Parameter	Description	Range	MACH 150	MACH 225	MACH 300	MACH 370	MACH 450	MACH 500	MACH 600
P.18	0-10Vdc Heating voltage ON (Power Control)**	0.1-10 Vdc	3	3	3	3	3	3	3
P.19	0-10Vdc Maximum Power (Power Control)**	0.1-10 Vdc	10	10	10	10	10	10	10
P.20	0-10Vdc Minimum Power (Power Control)**	0-100%	0	0	0	0	0	0	0
P.21	0-10Vdc Maximum Power (Power Control)**	0-100%	100	100	100	100	100	100	100
P.22	NOT IN USE	-	OFF	OFF	OFF	OFF	OFF	OFF	OFF
P.23	Continuous comfort Slave boiler	OFF =Disabled ON =Enabled	OFF	OFF	OFF	OFF	OFF	OFF	OFF
P.24	Activation timer***	0-255 minutes	1	1	1	1	1	1	1
P.25	Deactivation timer***	0-255 minutes	5	5	5	5	5	5	5
P.26	Activation power***	0-100%	70	70	70	70	70	70	70
P.27	Deactivation power***	0-100%	25	25	25	25	25	25	25

02. WIRING DIAGRAM

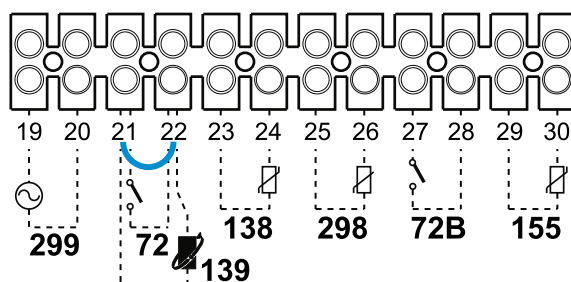
WIRING DIAGRAM DISPLAY AND CONNECTION TERMINAL BLOCKS



LEGEND

R1	620 Ohm 1/4W	138	External probe (not supplied)
R	(Module 2) 1k3 Ohm 1/4W	139	Remote control (not supplied)
R	(Module 3) 2k2 Ohm 1/4W	155	Cylinder temperature probe (not supplied)
R	(Module 4) 3k3 Ohm 1/4W	186	Return sensor
R	(Module 5) 4k3 Ohm 1/4W	188	Ignition/Ionisation electrode
R	(Module 6) 5k6 Ohm 1/4W	191	Flue gas temperature sensor
R	(Module 7) 7k5 Ohm 1/4W	256	Modulating heating circulator signal
R	(Module 8) 9k1 Ohm 1/4W	278	Dual sensor (Safety + Heating)
RT	120 Ohm 1/4W	298	Cascade temperature sensor (not supplied)
F	Fuse	299	0-10 Vdc input
16	Fan	300	Burner on contact (clean contact)
32	Heating circulator	301	Fault contact (clean contact)
44	Gas valve	302	Remote reset input (230 Volt)
72	Room thermostat (not supplied)	306	Heating system circulator (not supplied)
72b	Second room thermostat (not supplied)	307	Second heating system circulator (not supplied)
81	Ignition electrode	348	3-wire 3-way valve (not supplied)
95	2-wire 3-way valve (not supplied)	A =	Heating phase
A =	Heating phase	B =	Neutral
B =	Neutral	C =	DHW phase
98	Switch	357	Fault contact (230 Volt)
114	Water pressure switch		
130	DHW circulator (not supplied)		

• LOW VOLTAGE TERMINAL BLOCK DETAIL



298 - Cascade installation delivery sensor input

By connecting the NTC sensor and parametrising the electronics on board the machine, the generator modulates power according to the temperature detected by the sensor on the delivery manifold, ignoring the individual temperature sensors located on the delivery lines of each generator (ref. 278 of the wiring diagram).

155 - DHW production sensor input

By connecting the DHW NTC sensor, the DHW production functions are automatically enabled.

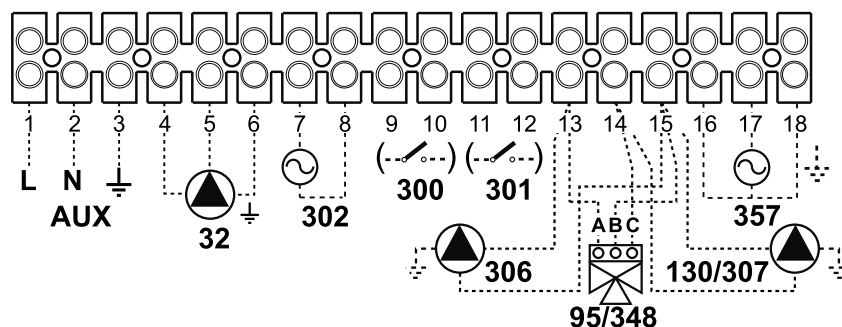
Characteristic data of DHW NTC probe and cascade system delivery.

NTC thermistor 10,000 Ohm $\pm$ 3% at 25°C B 3977 $\pm$ 0.75% (25-85)

T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)
-20	96125	0	32505	20	12483	40	5332	60	2492	80	1257	100	677
-19	90743	1	30898	21	11935	41	5123	61	2404	81	1216	101	657
-18	85694	2	29381	22	11414	42	4923	62	2319	82	1178	102	638
-17	80957	3	27946	23	10919	43	4732	63	2238	83	1141	103	620
-16	76510	4	26590	24	10447	44	4549	64	2160	84	1105	104	602
-15	72335	5	25308	25	9999	45	4374	65	2086	85	1070	105	585
-14	68412	6	24094	26	9572	46	4207	66	2014	86	1037	106	568
-13	64725	7	22946	27	9166	47	4047	67	1945	87	1005	107	552
-12	61259	8	21859	28	8779	48	3894	68	1879	88	974	108	537
-11	57999	9	20829	29	8411	49	3748	69	1815	89	944	109	522
-10	54932	10	19854	30	8060	50	3608	70	1754	90	915	110	507
-9	52045	11	18930	31	7726	51	3473	71	1695	91	887	111	493
-8	49327	12	18054	32	7407	52	3345	72	1638	92	860	112	480
-7	46767	13	17223	33	7103	53	3222	73	1584	93	835	113	467
-6	44354	14	16436	34	6813	54	3104	74	1532	94	810	114	454
-5	42080	15	15689	35	6537	55	2991	75	1481	95	785	115	442
-4	39936	16	14980	36	6273	56	2882	76	1433	96	762	116	430
-3	37914	17	14306	37	6021	57	2778	77	1386	97	740	117	418
-2	36006	18	13667	38	5761	58	2679	78	1341	98	718	118	407
-1	34205	19	13060	39	5551	59	2583	79	1298	99	607	119	396

02. WIRING DIAGRAM

• HIGH VOLTAGE TERMINAL BLOCK DETAIL



L/N AUX Power supply 230 V/50 Hz

Support terminals for the power supply of any auxiliaries.

32 - Primary loop circulator power supply

This circulator is dedicated exclusively to circulation between the generator and any heat exchanger or hydraulic separator. It follows the logic of the NTC sensor on the generator delivery line (Ref. 278 wiring diagram) or, in the case of modular cascade installation, that of the NTC sensor on the delivery manifold (Ref. 155 wiring diagram).

N.B. It cannot be used to serve a heating system in addition to the two served by the dedicated circulators (Ref. 306-307 wiring diagram).

302 - REMOTE RESET input

Powering terminals 7 and 8 at 230 V/50 Hz resets any lockouts due to a fault.

300 - Burner on indication (clean contact output):

Installer Parameter = 0 (default): burner on indication

Installer Parameter = 1: output powered at 230 V on activation of anti-legionella cycle. If connected to the DHW recirculation pump, the anti-legionella cycle can be run on the entire system.

Installer Parameter = 2: an external fan in the boiler room is powered each time there is a burner ignition demand.

Installer Parameter = 3: the contact is closed each time there is a heat demand (heating, DHW, test, antifreeze). It can be used in the case of cascade installations with motorised shut-off valves for each generator.

301 - Fault indication (clean contact output)

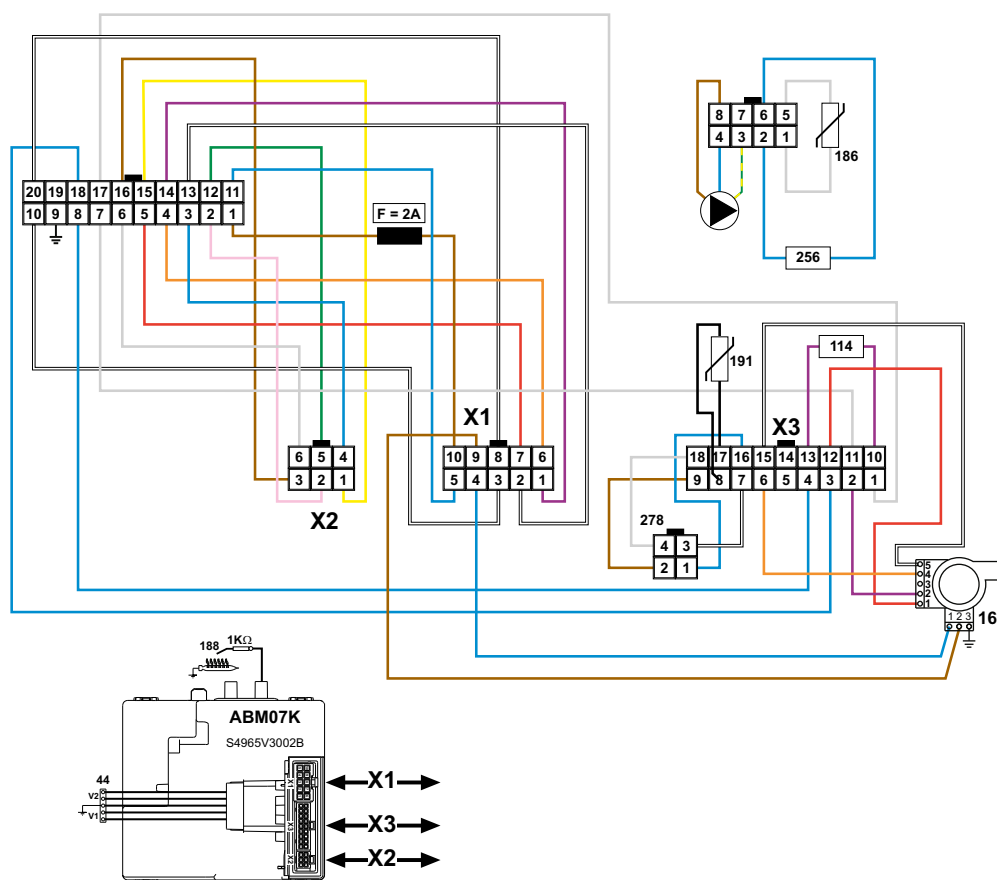
The output contact (Phase and Neutral at 230 Vac) is closed each time a fault is generated.

357 - 230V/50Hz fault indication

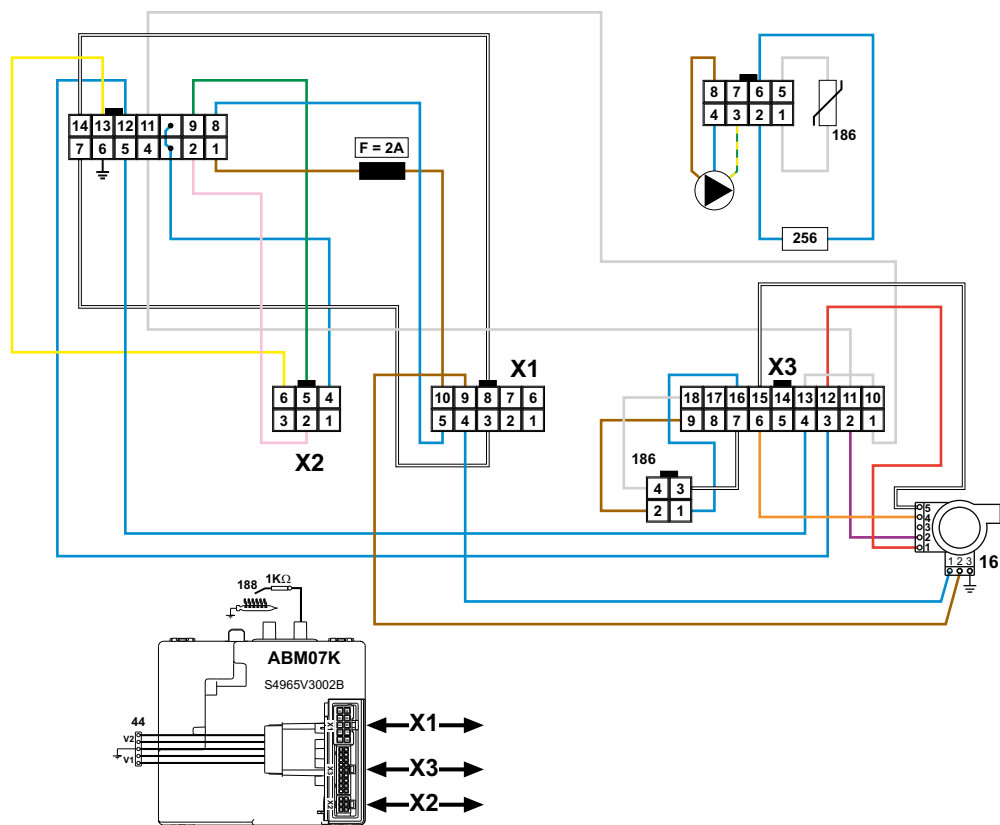
In the event of a lockout due to a fault, the terminals are powered.

02. WIRING DIAGRAM

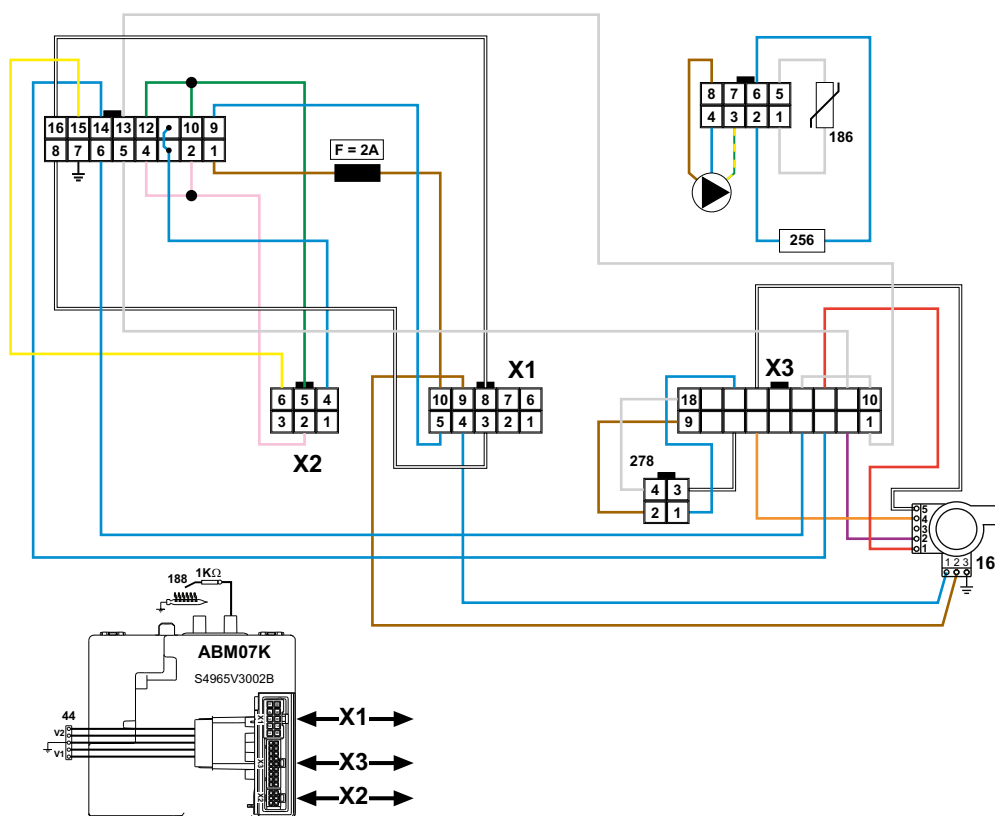
• FIRST MODULE WIRING DIAGRAM DETAIL



• CENTRAL MODULE WIRING DIAGRAM DETAIL



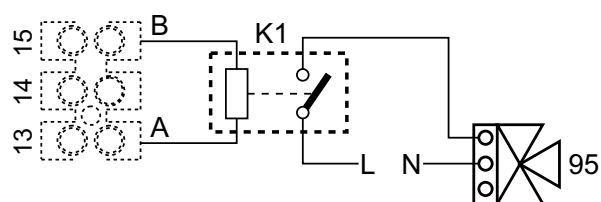
• FINAL MODULE WIRING DIAGRAM DETAIL



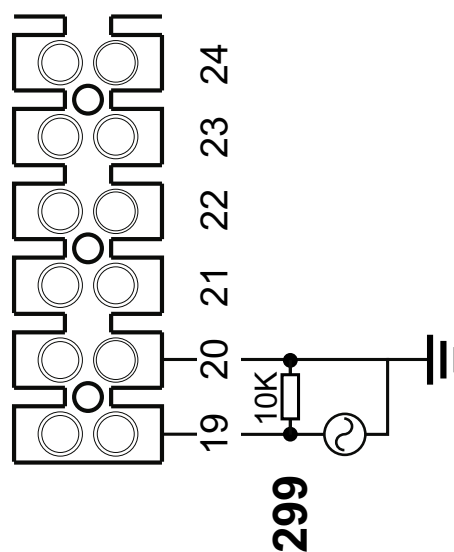
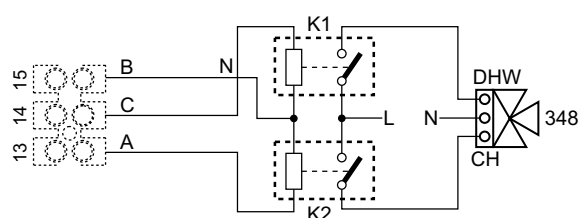
CAUTION: to connect the 3-way valve (terminals 13-14-15), refer to the diagrams below.

CAUTION: In the event of an unstable 0-10V signal reading by the electronic control unit, connect the signal reference to ground, and insert a 10K resistor in parallel.

Connection of 3-way valve with 2 wires



Connection of 3-way valve with 3 wires





03

System solutions

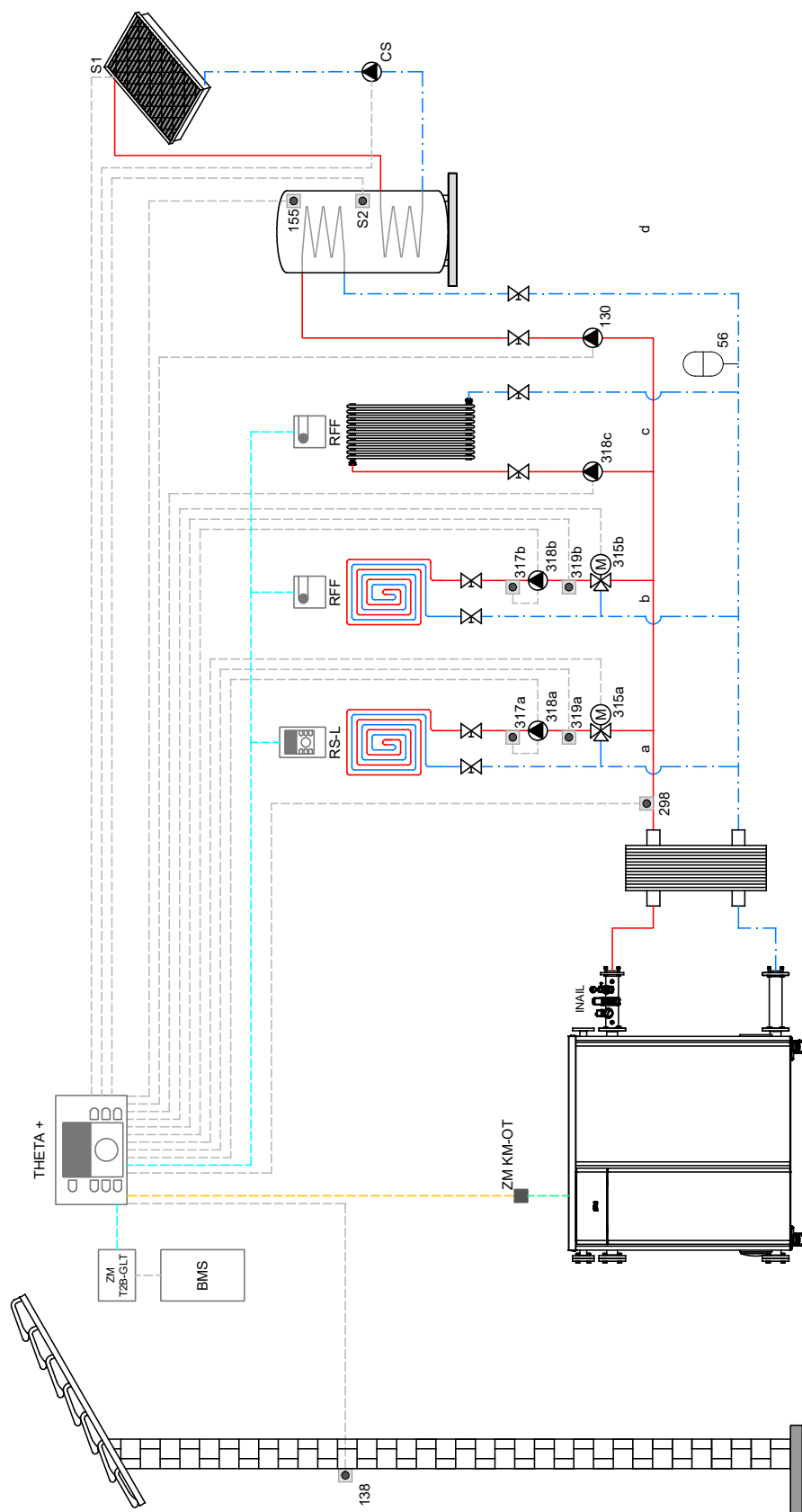
Some system solutions that can be made with the products from our catalogue are suggested in this section.

Ferrolì has a dedicated portal for system diagrams, which can be accessed from the website www.ferrolì.com

DIAGRAM 1: SINGLE MACH, MULTI-ZONE SYSTEM WITH DIFFERING TEMPERATURES

The primary circuit includes a MACH model condensing thermal module, operating in sliding temperature mode, connected to an inspectable plate heat exchanger. Distribution on the secondary circuit is obtained by means of two mixed temperature zones, a direct zone, and a double coil DHW cylinder integrated with a solar thermal system.

All system components (primary and secondary) are managed remotely via the THETA+ temperature controller connected to the home network with the HEATapp system.



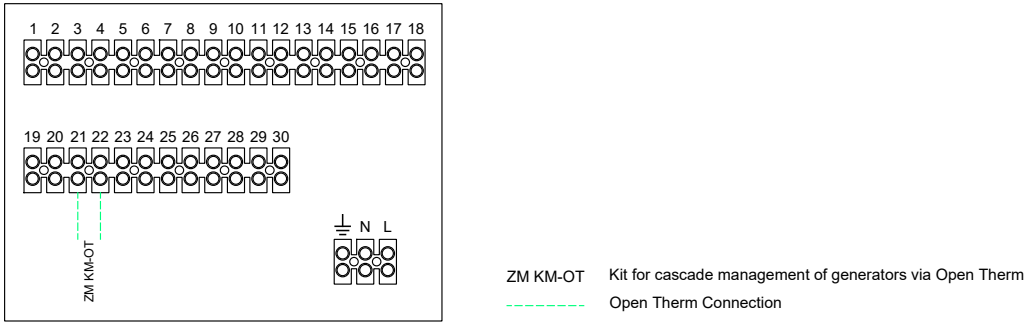
THETA+ Central temperature control unit and cascade manager **ZM KM-OT** Module for cascade management and communication between generator and THETA+ unit via Open Therm **RS-L** Room unit **RFF** Room sensor **ZM T2B-GLT** Interface with **BMS** Building Management System **a** Low-temperature mixed zone **b** Low-temperature mixed zone **c** High-temperature direct zone **d** DHW production with dual coil storage **315 a/b** Motorised mixing valve **318 a/b/c** Heating system circulator **317 a/b** Safety thermostat **319 a/b** Mixed zone flow probe (supplied as standard with THETA+) **298** System flow collector probe (standard with THETA+) **INAIL** Safety stub **138** Expansion tank **130** External probe (standard with THETA+) **155** Cylinder probe (standard with THETA+) **130** Domestic hot water storage filling circulator **S1** Solar field flow probe (PT 1000) **S2** Cylinder temperature probe (standard with THETA+) **CS** Solar circulator

03. SYSTEM DIAGRAMS

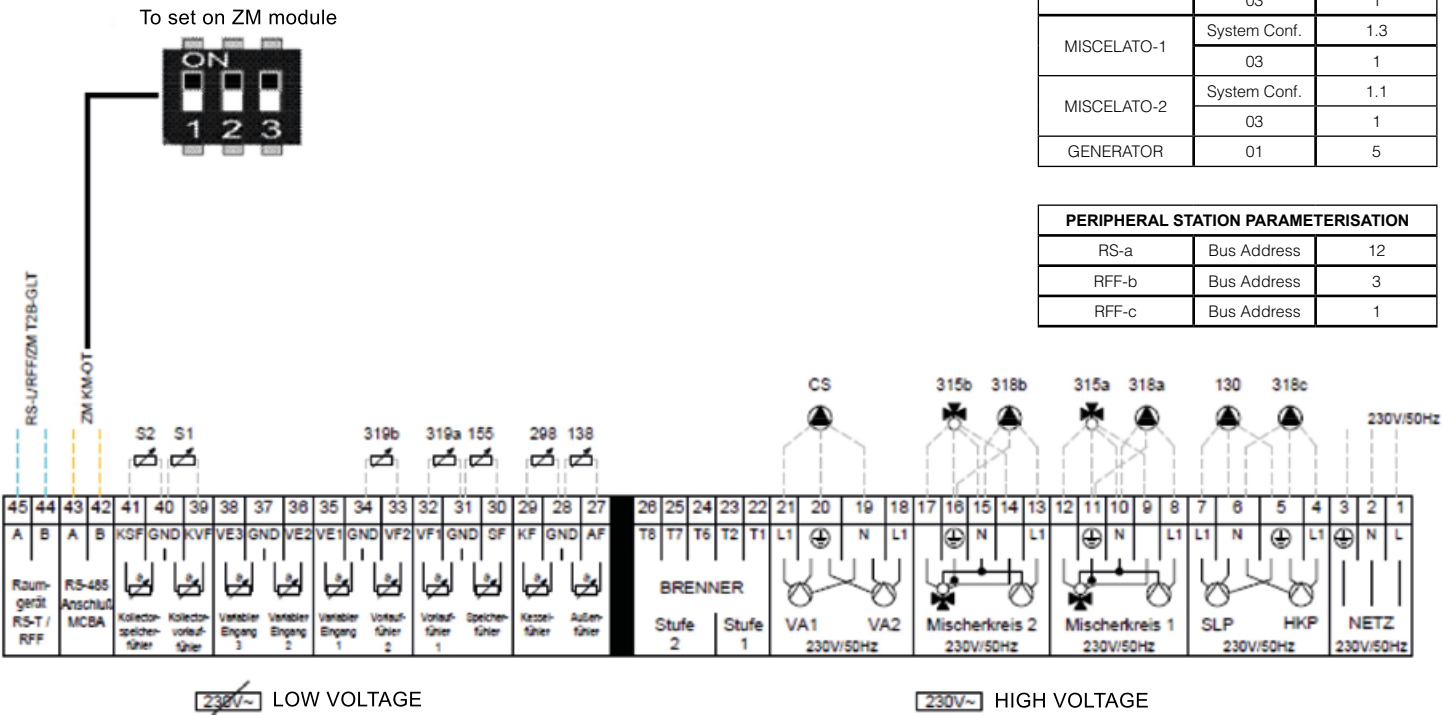
DIAGRAM 1: SINGLE MACH, MULTI-ZONE SYSTEM WITH DIFFERING TEMPERATURES

The primary circuit includes a MACH model condensing thermal module, operating in sliding temperature mode, connected to an inspectable plate heat exchanger. Distribution on the secondary circuit is obtained by means of two mixed temperature zones, a direct zone, and a double coil DHW cylinder integrated with a solar thermal system. All system components (primary and secondary) are managed remotely via the THETA+ temperature controller connected to the home network with the HEATapp system.

GENERATOR TERMINAL BLOCK



WALL-MOUNTED TERMINAL BLOCK WG500



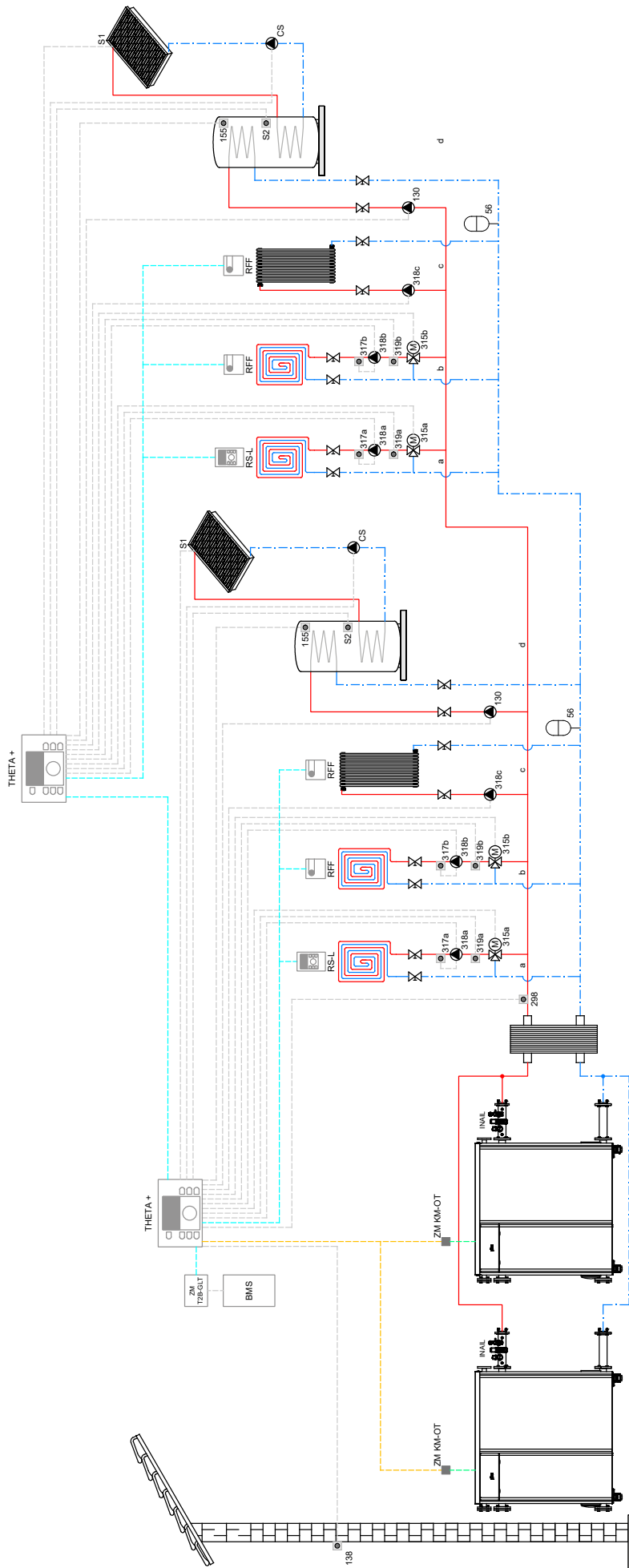


DIAGRAM 2: MACH IN CASCADE, MULTI-ZONE SYSTEM WITH DIFFERING TEMPERATURES

The primary circuit consists of two MACH generators as a bank (each with its own INAIL safety manifold) operating in variable temperature mode, connected to an inspectable plate heat exchanger.

Distribution on the secondary is obtained by means of four mixed temperature zones, two direct zones, and two double coil DHW cylinders integrated with a solar thermal system.

The system components (primary cascade and distribution system) are managed remotely via two THETA+ temperature controllers connected to the home network with the HEATapp system.

If the system includes more zones, simply add more THETA+ units and network them via ModBus.

THETA+ Central temperature control unit and cascade manager **ZM KM-OT** Module for cascade management and communication between generator and THETA+ unit via Open Therm **RS-L** Room unit **RFF** Room sensor **ZM T2B-GLT** Interface with **BMS** Building Management System **a** Low-temperature mixed zone **b** Low-temperature mixed zone **c** High-temperature direct zone **d** DHW production with dual coil storage **315 a/b** Motorised mixing valve **318 a/b/c** Heating system circulator **317 a/b** Safety thermostat with THETA+ **INAIL** Safety stub **56** Expansion standard with THETA+ **298** System flow collector probe (standard with THETA+) **155** Cylinder probe (standard with THETA+) **130** Domestic hot tank **138** External probe (standard with THETA+) **S1** Solar field flow probe (PT 1000) **S2** Cylinder temperature probe (standard with THETA+) **CS** Solar circulator **THETA+** **ZM KM-OT** **RS-L/RFF/ZM T2B-GLT** **OpenTherm**

03. SYSTEM DIAGRAMS

DIAGRAM 2: MACH IN CASCADE, MULTI-ZONE SYSTEM WITH DIFFERING TEMPERATURES

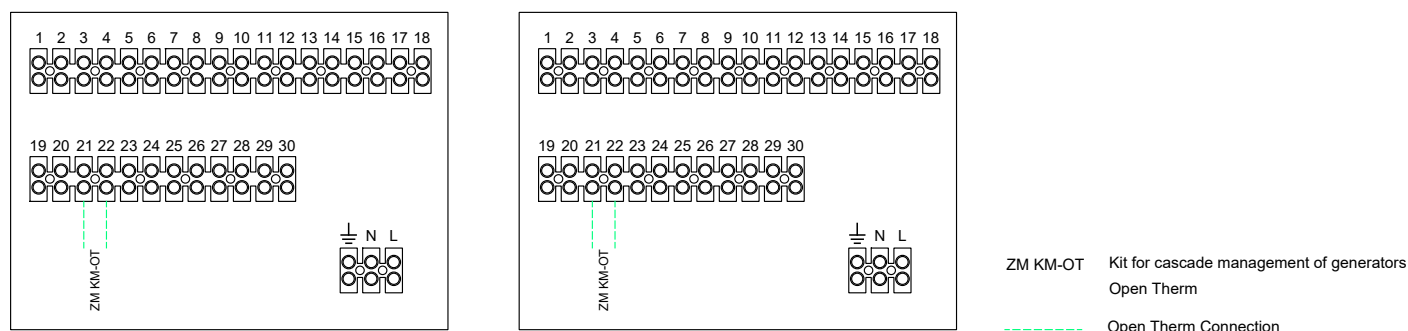
The primary circuit consists of two MACH generators as a bank (each with its own INAIL safety manifold) operating in variable temperature mode, connected to an inspectable plate heat exchanger.

Distribution on the secondary is obtained by means of four mixed temperature zones, two direct zones, and two double coil DHW cylinders integrated with a solar thermal system.

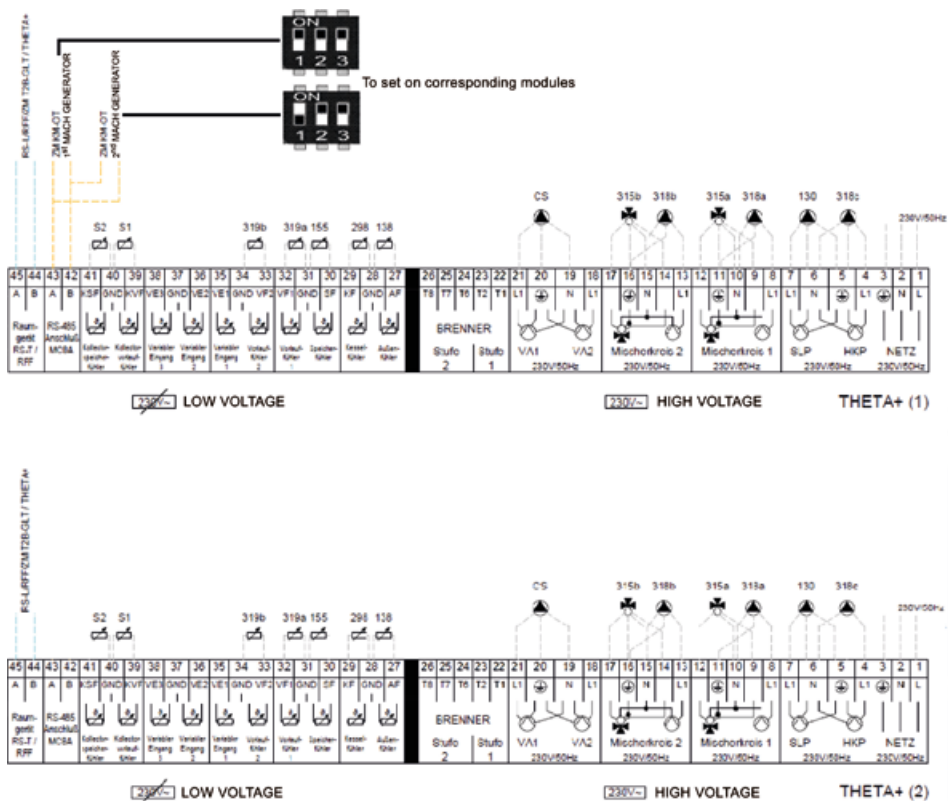
The system components (primary cascade and distribution system) are managed remotely via two THETA+ temperature controllers connected to the home network with the HEATapp system.

If the system includes more zones, simply add more THETA+ units and network them via ModBus.

GENERATOR TERMINAL BLOCK



WALL-MOUNTED TERMINAL BLOCK WG500



THETA NORM 1

CAUTION: all parameterisations are to be performed after a reset with installer login.

HYDRAULIC	PARAMETER	VALUE
	15	1
DIRECT CIRC.	System Conf.	1.3
	03	1
MISCELATO-1	System Conf.	1.3
	03	1
MISCELATO-2	System Conf.	1.1
	03	1
GENERATOR	01	5

PERIPHERAL STATION PARAMETERISATION

RS-a	Bus Address	12
RFF-b	Bus Address	3
RFF-c	Bus Address	1

THETA NORM 2

CAUTION: all parameterisations are to be performed after a reset with installer login.

HYDRAULIC	PARAMETER	VALUE
	15	1
DIRECT CIRC.	System Conf.	1.3
	03	1
MISCELATO-1	System Conf.	1.3
	03	1
MISCELATO-2	System Conf.	1.1
	03	1
GENERATOR	01	OFF
DATA BUS	Bus Address	20

PERIPHERAL STATION PARAMETERISATION

RS-a	Bus Address	22
RFF-b	Bus Address	6
RFF-c	Bus Address	4



04

System accessories

04. SIZING AND CHOICE OF PLATE HEAT EXCHANGER

A number of sizing examples of plate heat exchangers to be combined with MACH generators are provided below. The choice and verification of the exchanger to be used in relation to the system, remains the responsibility of the customer. Installation is the installer's responsibility.

The characteristics and technical data of PHE plate heat exchangers are in the section "System accessories".

HIGH-TEMPERATURE SYSTEMS

MODEL	MODEL	CODE	Primary: 80/60°C		Secondary: 50/70°C	
			Flow rates	Pressure drops	Flow rates	Pressure drops
			m³/h	m.H ₂ O	m³/h	m.H ₂ O
MACH 150	PHE 50420 35P	052686X0	6.11	0.58019	6.08	0.5803
MACH 225	PHE 50420 43P	052687X0	9.17	0.88937	9.13	0.88914
MACH 300	PHE 50420 53P	052688X0	12.24	1.11413	12.18	1.09737
MACH 370	PHE 65456 43P	052689X0	15.29	1.21929	15.23	1.21495
MACH 450	PHE 65456 49P	052690X0	18.36	1.41434	18.28	1.40984
MACH 520	PHE 65456 61P	052692X0	21.41	1.39622	21.32	1.39155
MACH 600	PHE 65456 63P	052693X0	24.47	1.61771	24.37	1.72613



LOW-TEMPERATURE SYSTEMS

MODEL	MODEL	CODE	Primary: 60/40°C		Secondary: 30/50°C	
			Flow rates	Pressure drops	Flow rates	Pressure drops
			m³/h	m.H ₂ O	m³/h	m.H ₂ O
MACH 150	PHE 50420 35P	052686X0	6.47	0.67835	6.44	0.68005
MACH 225	PHE 50420 53P	052688X0	9.70	0.7504	9.66	0.75176
MACH 300	PHE 65456 43P	052689X0	12.94	0.92106	12.89	0.91889
MACH 370	PHE 65456 53P	052691X0	16.17	1.0257	16.11	1.02329
MACH 450	PHE 65456 63P	052693X0	19.40	1.14601	19.33	1.14242
MACH 520	PHE 65456 71P	052694X0	22.64	1.322637	22.55	1.32257
MACH 600	PHE 65456 83P	052696X0	25.87	1.43574	25.77	1.43574



04. CHOICE OF HYDRAULIC SEPARATOR

The hydraulic separator guarantees independence between the primary circuit (generator) and the secondary one (system) without them disturbing or interfering with each other.

The separator is provided complete with deaerator, dirt separator and is completely insulated.

FEATURES:

Max operating pressure: 6 bar - Temperature range: 0 - 100°C - Connections: DN 65 / DN 100

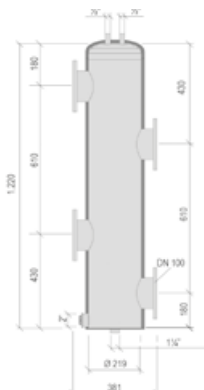
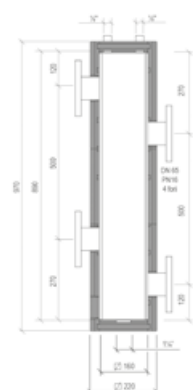
HYDRAULIC SEPARATOR FOR INSTALLATIONS FROM 151 TO 300 kW

DESCRIPTION	CODE
 Hydraulic separator DN 65 (from 151 kW up to 300 kW)	042078X0
 Hydraulic separator connection kit (from 151 kW up to 300 kW)	042089X0

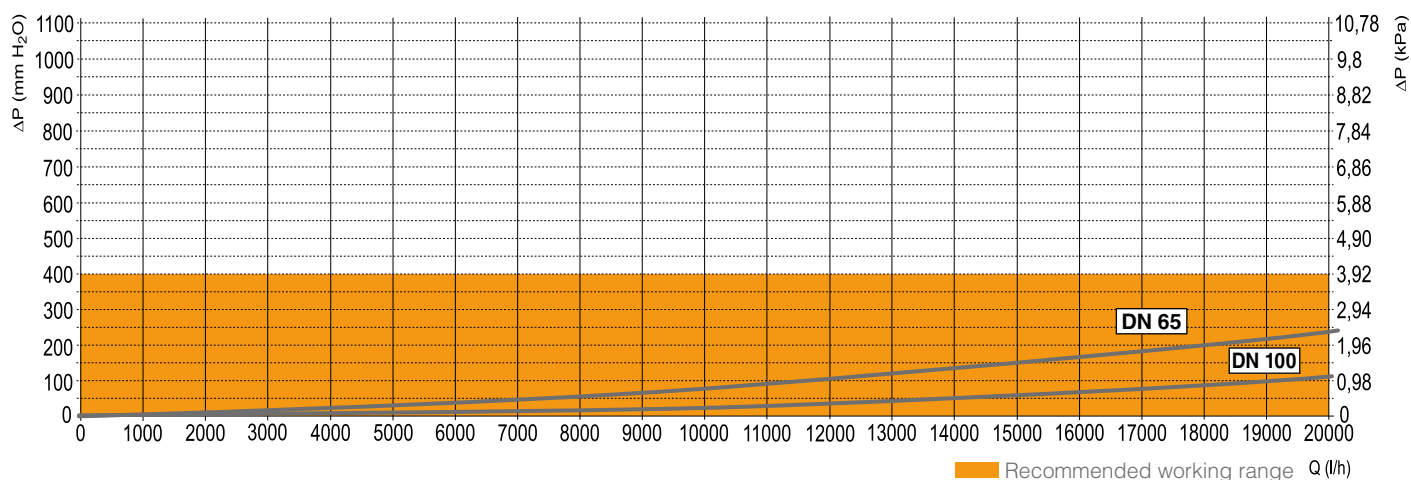
HYDRAULIC SEPARATOR FOR INSTALLATIONS FROM 301 TO 600 kW

DESCRIPTION	CODE
 Hydraulic separator DN 100 (from 301 kW up to 600 kW)	042080X0
 Hydraulic separator connection kit (from 301 kW up to 600 kW)	042088X0

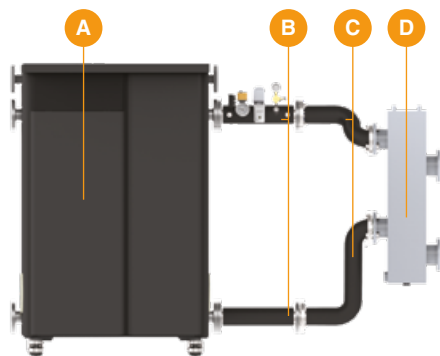
DIMENSIONS AND TECHNICAL DATA



MODEL		DN 65	DN 100
Flow rate	m ³ /h	18	30
Capacity	lt	21	46
Max temperature	°C	100	100
Max pressure	bar	6	6
Raw material	-	ST37.1 steel	ST37.1 steel
Isolation	-	EPP Black - 40 g/l	EPP Black - 40 g/l

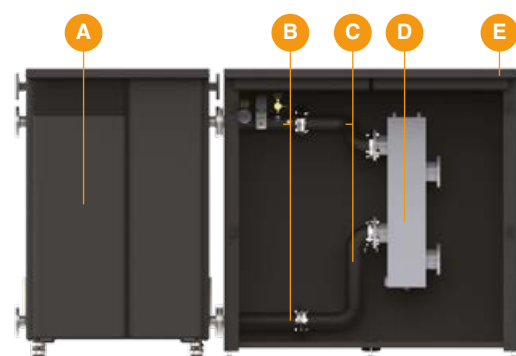


04. PRIMARY LOOP CONFIGURATION WITH HYDRAULIC SEPARATOR



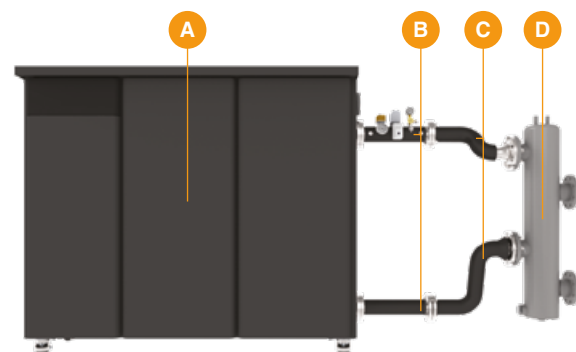
	DESCRIPTION	CODE
A	MACH 150	0MCMFAWA
	MACH 225	0MCMJAWA
	MACH 300	0MCMLAWA
B	INAIL manifold (included with equipment) DN65 PN16	042075X0
D	Hydraulic separator DN 65 (from 151 kW up to 300 kW)	042078X0
C	Hydraulic separator connection kit (151 kW up to 300 kW)	042089X0

Installation with **MACH mod. 150 - 225 - 300** in heating plant or outdoors in a partially protected location, with unprotected hydraulic separator and INAIL safety manifold.



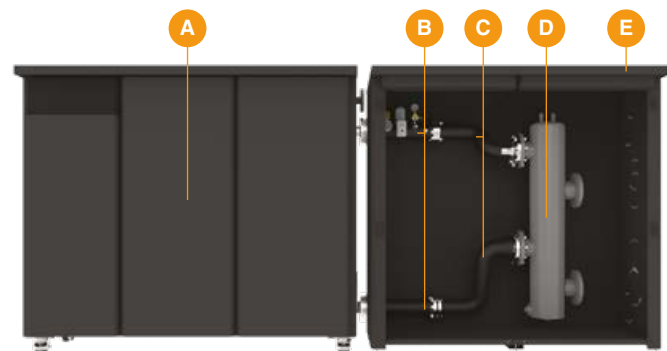
	DESCRIPTION	CODE
A	MACH 150	0MCMFAWA
	MACH 225	0MCMJAWA
	MACH 300	0MCMLAWA
E	Empty technical cabinet for outdoor use	046062X0
B	INAIL manifold (included with equipment) DN65 PN16	042075X0
D	Hydraulic separator DN 65 (from 151 kW up to 300 kW)	042078X0
C	Hydraulic separator connection kit (151 kW up to 300 kW)	042089X0

Installation with **MACH mod. 150 - 225 - 300** outdoors in an unprotected location, with hydraulic separator and INAIL safety collector mounted inside technical cabinet.



	DESCRIPTION	CODE
A	MACH 370	0MCMMAWA
	MACH 450	0MCMNAWA
	MACH 520	0MCMPAWA
	MACH 600	0MCMQAWA
B	INAIL manifold (included with equipment) DN65 PN16	042075X0
D	Hydraulic separator DN 100 (from 301 kW up to 600 kW)	042080X0
C	Hydraulic separator connection kit (301 kW up to 600 kW)	042088X0

Installation with **MACH mod. 370 - 450 - 520 - 600** in heating plant or outdoors in a partially protected location, with unprotected hydraulic separator and INAIL safety manifold.



	DESCRIPTION	CODE
A	MACH 370	0MCMMAWA
	MACH 450	0MCMNAWA
	MACH 520	0MCMPAWA
	MACH 600	0MCMQAWA
E	Empty technical cabinet for outdoor use	046062X0
B	INAIL manifold (included with equipment) DN65 PN16	042075X0
D	Hydraulic separator DN 100 (from 301 kW up to 600 kW)	042080X0
C	Hydraulic separator connection kit (301 kW up to 600 kW)	042088X0

Installation with **MACH mod. 370 - 450 - 520 - 600** outdoors in an unprotected location, with hydraulic separator and INAIL safety collector mounted inside technical cabinet.

04. CONDENSATE NEUTRALISERS FOR CONDENSING BOILERS



NTR3

Maximum flow rate litres/h 70 - Maximum flow rate of generators kW 320

Consisting of:

- 1 Container 410 x 310 h 220 mm made of food-grade polypropylene
- 2 x 1" panel mount with filter and hose connector with ring nut
- 2 Rubber hoses with diameter 25 x 32 mm, 2 m long each
- 1 x 25 Kg bag of granules

051000X0 **CONDENSATE NEUTRALISER WITHOUT BOOSTER PUMP UP TO 320 kW**



NTR3 P

Maximum flow rate litres/h 150 - Maximum flow rate of generators kW 320 - Maximum delivery height 3.7 m - Max condensate temperature 80°C - Max condensate acidity Ph 2

Consisting of:

- 1 Container 400 x 300 h 220 mm made of food-grade polypropylene
- 1 x 1" panel mount with filter and hose connector
- 1 Rubber hose with diameter 25 x 32 mm, 2 m long
- 1 Transparent rubber hose with diameter 10 x 14 mm, 5 m long
- 1 Treated condensate booster unit - flow rate 2.5 l/min at 3 metres head - protection rating IP X4
- 1 x 25 Kg bag of granules

051001X0 **CONDENSATE NEUTRALISER WITH BOOSTER PUMP UP TO 320 kW**



NTR6

Maximum flow rate litres/h 300 - Maximum flow rate of generators kW 1500

Consisting of:

- 1 Container 670 x 470 mm h 180, with 4 internal dividers, made of shock-proof ABS
- 2 x 1" panel mounts with filter and hose connector
- 1 x 1" panel mount with elbow and hose connector
- 2 Rubber hoses with diameter 25 x 32 mm, 2 m long each
- 1 x 25 Kg bag of granules

051002X0 **CONDENSATE NEUTRALISER WITHOUT BOOSTER PUMP UP TO 1500 kW**



NTR6 P1

Maximum flow rate litres/h 550 - Maximum flow rate of generators kW 1500

Consisting of:

- 1 Container 670 x 470 mm h 280 mm made of food-grade polypropylene
- 1 x 1" panel mount with filter and hose connector with ring nut
- 1 x 1" panel mount with elbow and hose connector with ring nut
- 1 Rubber hose with diameter 25 x 32 mm, 2 m long
- 1 Transparent rubber hose with diameter 10 x 14 mm, 5 m long
- 1 Treated condensate booster unit - flow rate 9.2 l/min at 3 metres head - protection rating IP X4
- 1 x 25 Kg bag of granules

051003X0 **CONDENSATE NEUTRALISER WITH BOOSTER PUMP UP TO 1500 kW**



N135

Pack of granules for condensate neutralisers, in 25 Kg bags

057000X0 **25 KG BAG OF GRANULES**



05

Certifications



EU DECLARATION OF CONFORMITY

Company Name and Address:

Ferroli S.p.A.
Via Ritonda 78/A
IT - 37047 San Bonifacio (VR) Italy
Tel.: +39 045 6139411
Email: info@ferroli.com

The declaration of conformity is issued under the sole responsibility of Ferroli S.p.A.

Appliance type: CONDENSING BOILER

Trademark: FERROLI

Identification of products:

MACH 150 - MACH 225 - MACH 300 - MACH 370 - MACH 450 - MACH 520 - MACH 600

The appliance types satisfy the essential requirements of the relevant Directives and Standards:

92/42/EEC BED Directive	DIN EN 15502-1 (01.10.2015)
2014/35/EU LVD Directive	DIN EN 15502-2-1 (01.09.2017)
2009/125/EC Ecodesign Directive	EN 60335-2-102:2016
2014/30/EU EMC Directive	EN 55014-1:2017
2016/426 EU Regulation	EN 55014-2:2015
	EN 61000-3-2:2019
	EN 61000-3-3:2013

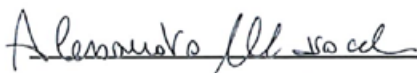
PIN N°:	CE-0085DN0121
Notified Body:	0085
Certificate issued by:	DVGW CERT GmbH
Address:	Josef-Wirmer Straße 1-3 D-53123 Bonn
Type examination report:	K 2975 2022 B5 and K 2975 2022 B6
Issued by:	TÜV Rheinland Energy GmbH
Address:	Am Grauen Stein, D-51105 Köln

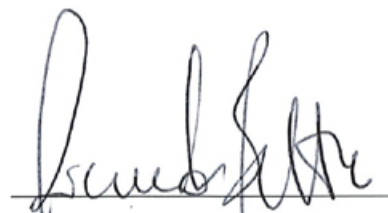
Any change to the appliance and/or any use not according the instructions will lead the invalidation of this Declaration of Conformity.

Signed for and on behalf of:

San Bonifacio, 24/06/2022
(Place, date)




Corporate R&D Officer
Alessandro Marocco


Country Manager
Riccardo Bottura

EU type examination certificate

EU-Baumusterprüfbescheinigung

CE-0085DN0121

Product Identification No.
Produkt-Identnummer

Field of Application <i>Anwendungsbereich</i>	EU Gas Appliances Regulation (EU/2016/426) <i>EU-Gasgeräteverordnung (EU/2016/426)</i>
Owner of Certificate <i>Zertifikatinhaber</i>	Ferrolì S.p.A. Via Ritonda 78A, I-37047 San Bonifacio (VR)
Distributor <i>Vertreiber</i>	Ferrolì S.p.A. Via Ritonda 78A, I-37047 San Bonifacio (VR)
Product Category <i>Produktart</i>	Boilers: Condensing water heater (3102)
Product Description <i>Produktbezeichnung</i>	floor standing gas fired central heating condensing boiler
Model <i>Modell</i>	MACH...
Countries of Destination <i>Bestimmungsländer</i>	AL, AT, BE, BG, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR
Test Reports <i>Prüfberichte</i>	supplement test: K 2975 2022 E4 from 06.07.2022 (TRG) supplement test: K 2975 2022 B6 from 06.07.2022 (TRG)
Test Basis <i>Prüfgrundlagen</i>	EU/2016/426 A III B (09.03.2016) DIN EN 15502-1 (01.10.2015) DIN EN 15502-2-1 (01.09.2017)

Date of Expiry / File No. 22.03.2032 / 22-0360-GEA
Ablaufdatum / AZ

11.11.2022 Pz A-1/2

Date, Issued by, Sheet, Head of Certification Body
Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle



Deutsche
Akkreditierungsstelle
D-ZE-16028-01-01

DVGW CERT GmbH
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Appliance Categories <i>Gerätekategorien</i>	Supply Pressures <i>Versorgungsdrücke</i>	Countries of Destination <i>Bestimmungsländer</i>	Remarks <i>Bemerkungen</i>
I2E	20 mbar	LU, RO	
I2H	20 mbar	CZ, ES, FR, GR, NL	
I2N	20 mbar	BE, SI	
I3B	30 mbar	ES, IE	
I3B/P	30 mbar	BE, PT	
I3B/P	50 mbar	DE, GR	
II2E+3+	20/25, 28-30/37 mbar	BE, FR	
II2E+3B/P	20/25, 37 mbar	FR	
II2E+3P	20/25, 37 mbar	BE	
II2E3B/P	20, 50 mbar	DE	
II2E3B/P	20, 30 mbar	PL	
II2EK3B/P	20/25, 30 mbar	NL	
II2ELL3B/P	20, 50 mbar	DE	
II2ELw3B/P	20, 30 mbar	PL	
II2H3+	20, 28-30/37 mbar	CH, CY, CZ, ES, GB, GR, IE, IT, LT, PT, SI, SK	
II2H3+	20, 30/37 mbar	TR	
II2H3B/P	20, 30 mbar	CY, CZ, DK, EE, FI, HR, HU, IS, IT, LT, NO, RO, SE, SI, SK	
II2H3B/P	20, 37 mbar	HR, LV, TR	
II2H3B/P	20, 50 mbar	AT, CH, GR, LU, SK	
II2H3P	20, 37 mbar	ES, GB, IE, PT	
II2HM3+	20, 28-30/37 mbar	IT	
II2HM3B/P	20, 30 mbar	IT	
II2HM3P	20, 37 mbar	IT	
II2HS3B/P	25, 30 mbar	HU	
II2L3B/P	25, 30 mbar	NL	

Type <i>Typ</i>	Technical Data <i>Technische Daten</i>	Remarks <i>Bemerkungen</i>
FORCE W 60	nominal heat output: 14,7...57,0 kW nominal heat input (Hi): 15,0...58,0 kW	
FORCE W 80; FORCE B 80	nominal heat output: 14,7...72,9 kW nominal heat input (Hi): 15,0...74,4 kW	
FORCE W 99	nominal heat output: 18,7...94,7 kW nominal heat input (Hi): 19,0...96,6 kW	
FORCE W 120; FORCE B 120	nominal heat output: 18,7...110,5 kW nominal heat input (Hi): 19,0...113,0 kW	
FORCE W 150; FORCE B 150	nominal heat output: 23,6...140,0 kW nominal heat input (Hi): 24,0...143,0 kW	
FORCE B 240	nominal heat output: 18,7...221,0 kW nominal heat input (Hi): 19,0...226,0 kW	
FORCE B 300	nominal heat output: 23,6...280,0 kW nominal heat input (Hi): 24,0...286,0 kW	

Hints of Utilization /Remarks

Verwendungshinweise / Bemerkungen

flue types: B23, C13 and C33

Additionally tested appliance categories, supply pressures and countries of destination:

ES, FR, GR, PT: I2N (20 mbar)

AL: II2E3B/P (20, 50 mbar)

BG, MT: II2H3B/P (20, 30 mbar)

MK: II2E3B/P (20, 50 mbar)

In the non-EU countries the conformity approval will be accepted if the Gas Appliance Regulation EU/2016/426 is transferred into national law by this countries.



EC type examination certificate

EG-Baumusterprüfbescheinigung

CE-0085CU0181

Product Identification No.
Produkt-Identnummer

Field of Application <i>Anwendungsbereich</i>	EC Efficiency Directive (92/42/EEC) EG-Wirkungsgradrichtlinie (92/42/EWG)
Owner of Certificate <i>Zertifikatinhaber</i>	Ferrol S.p.A. Via Ritonda 78A, I-37047 San Bonifacio (VR)
Distributor <i>Vertreiber</i>	Ferrol S.p.A. Via Ritonda 78A, I-37047 San Bonifacio (VR)
Product Category <i>Produktart</i>	Boilers: Condensing water heater (3102)
Product Description <i>Produktbezeichnung</i>	Wall-hung gas fired central heating condensing boiler with integrated gas burner in modulating operation method and with enclosed combustion chamber
Model <i>Modell</i>	FORCE W...; FORCE B...
Type of Boiler <i>Heizkesseltyp</i>	condensing boiler
Test Reports <i>Prüfberichte</i>	supplement test: K 2607 2019 B 6 from 04.02.2020 (TRG)
Test Basis <i>Prüfgrundlagen</i>	EU/92/42 (21.05.1992)
File Number <i>Aktenzeichen</i>	20-0099-GWR

70026-014-02

12.05.2020 Rie A-1/2

Date, Issued by, Sheet, Head of Certification Body
Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle

DVGW CERT GmbH is an accredited body by DAkkS according to DIN EN ISO/IEC 17065:2013 and notified by the government of the Federal Republic of Germany for certification of heating boilers under EC Directive 92/42/EC.

DVGW CERT GmbH ist von der DAkkS nach DIN EN ISO/IEC 17065:2013 akkreditierte und von der Deutschen Bundesregierung benannte Stelle für die Zertifizierung von Heizkesseln nach der Richtlinie 92/42/EWG.



Deutsche
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Elektrical Data
Elektrische Daten

230 V AC, 50 Hz

Appliance Categories <i>Gerätekategorien</i>	Supply Pressures <i>Versorgungsdrücke</i>	Countries of Destination <i>Bestimmungsländer</i>	Remarks <i>Bemerkungen</i>
I2H	20 mbar	DK, EE, FI, NO, SE, TR	
I2HS	25 mbar	HU	
II2E(S)3P	20, 37 mbar	BE	
II2E3P	13, 37 mbar	PL	
II2E3P	20, 37 mbar	PL	
II2EK3P	20/25, 30 mbar	NL	
II2EK3P	20/25, 37 mbar	NL	
II2EK3P	20/25, 50 mbar	NL	
II2ELL3P	20, 50 mbar	DE	
II2Esi3P	20/25, 37 mbar	FR	
II2H3P	20, 30 mbar	CZ, IS, LU, LV, RO	
II2H3P	20, 37 mbar	CH, CZ, ES, FR, GR, HR, IE, IS, IT, LT, LU, LV, PT, SI, SK	
II2H3P	20, 50 mbar	AT, CH, IS, LU, LV, SK	
II2HM3P	20, 37 mbar	IT	

Installation Codes <i>Installationsarten</i>	Countries of Destination <i>Bestimmungsländer</i>	Remarks <i>Bemerkungen</i>
B23	AL, AT, BE, BG, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR	

Type <i>Typ</i>	Technical Data <i>Technische Daten</i>	Remarks <i>Bemerkungen</i>
MACH 150	nominal heat output: 13,7...139,2 kW heat input (Hi): 14,0...142,0 kW	
MACH 225	nominal heat output: 13,7...208,8 kW heat input (Hi): 14,0...213,0 kW	
MACH 300	nominal heat output: 13,7...278,4 kW heat input (Hi): 14,0...284,0 kW	
MACH 370	nominal heat output: 13,7...348,1 kW heat input (Hi): 14,0...355,0 kW	
MACH 450	nominal heat output: 13,7...417,7 kW heat input (Hi): 14,0...426,0 kW	
MACH 520	nominal heat output: 13,7...487,3 kW heat input (Hi): 14,0...497,0 kW	
MACH 600	nominal heat output: 13,7...556,9 kW heat input (Hi): 14,0...568,0 kW	

Hints of Utilization /Remarks**Verwendungshinweise / Bemerkungen**

Additionally tested appliance categories, supply pressures and countries of destination:

GB; II2H3P (20, 30 mbar)

AL, BG, MK, MT; II2H3P (20, 30 mbar)

AL, BG, MK, MT; II2H3P (20, 37 mbar)

AL, BG, MK, MT; II2H3P (20, 50 mbar)

In the non-EU countries the conformity approval will be accepted if the Gas Appliance Regulation EU/2016/426 is transferred into national law by this countries.

The recognition of the CE mark in the United Kingdom is currently limited to January 1st, 2023.

EC type examination certificate

EG-Baumusterprüfbescheinigung

CE-0085DN0121Product Identification No.
Produkt-Identnummer

Field of Application <i>Anwendungsbereich</i>	EC Efficiency Directive (92/42/EEC) <i>EG-Wirkungsgradrichtlinie (92/42/EWG)</i>
Owner of Certificate <i>Zertifikatinhaber</i>	Ferrolì S.p.A. Via Ritonda 78A, I-37047 San Bonifacio (VR)
Distributor <i>Vertreiber</i>	Ferrolì S.p.A. Via Ritonda 78A, I-37047 San Bonifacio (VR)
Product Category <i>Produktart</i>	Boilers: Condensing water heater (3102)
Product Description <i>Produktbezeichnung</i>	floor standing gas fired central heating condensing boiler
Model <i>Modell</i>	MACH...
Type of Boiler <i>Heizkesseltyp</i>	condensing boiler
Test Reports <i>Prüfberichte</i>	supplement test: K 2975 2022 B5 from 06.07.2022 (TRG)
Test Basis <i>Prüfgrundlagen</i>	EU/92/42 (21.05.1992)
File Number <i>Aktenzeichen</i>	22-0360-GWA

70009-01-4-06

11.11.2022 Pz A-1/2

Date, Issued by, Sheet, Head of Certification Body
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info@dvgw-cert.com

Type <i>Typ</i>	Technical Data <i>Technische Daten</i>	Energy Labelling <i>Energieeffizienzkennzeichnung</i>
MACH 150	nominal heat output: 13,7...139,2 kW heat input (Hi): 14,0...142,0 kW	
MACH 225	nominal heat output: 13,7...208,8 kW heat input (Hi): 14,0...213,0 kW	
MACH 300	nominal heat output: 13,7...278,4 kW heat input (Hi): 14,0...284,0 kW	
MACH 370	nominal heat output: 13,7...348,1 kW heat input (Hi): 14,0...355,0 kW	

NOTES



NOTICE FOR SALES AGENTS:

With a view to constantly improve its production range and customer satisfaction levels, the Company hereby specifies that aesthetic and/or dimensional features, specifications and accessories may be subject to changes.

Please place the utmost care to ensure all technical and/or sales documents (lists, catalogues, brochures, etc.) provided to the final Customer are updated according to the latest edition.

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