



TI45 Ultra Lean Heat Interface Unit

www.rhico.co.uk

Ultra Low primary temperatures
Ultra High DHW production!



Illustrated with all insulation removed



Ultra Lean Indirect Heat Interface Unit

DESCRIPTION

The **TI45 Ultra Lean** is an electronic Heat Interface Unit for heating and hot water applications. Two plate heat exchangers within the module allow for complete separation from the primary circuit or central plant system making the **TI45 Ultra Lean** ideally suited to apartments, terraced houses, semi detached houses etc. where centralised plant or district heating systems are employed.

The production of instantaneous domestic hot water is electronically controlled via a electronic central control unit and a brazed stainless steel plate heat exchanger. By utilizing a modulating valve with 5-second stepper motor actuator (installed in the primary return circuit), it prioritises the water flow in the primary circuit eliminating wasted DHW and unnecessary waiting times. The primary water flow rate is also proportionally managed according to domestic hot water demand. The modulating valve increases or decreases the opening of the primary return circuit and any energy not used in the DHW production is used in the heating circuit (provided the heating mode is already selected).

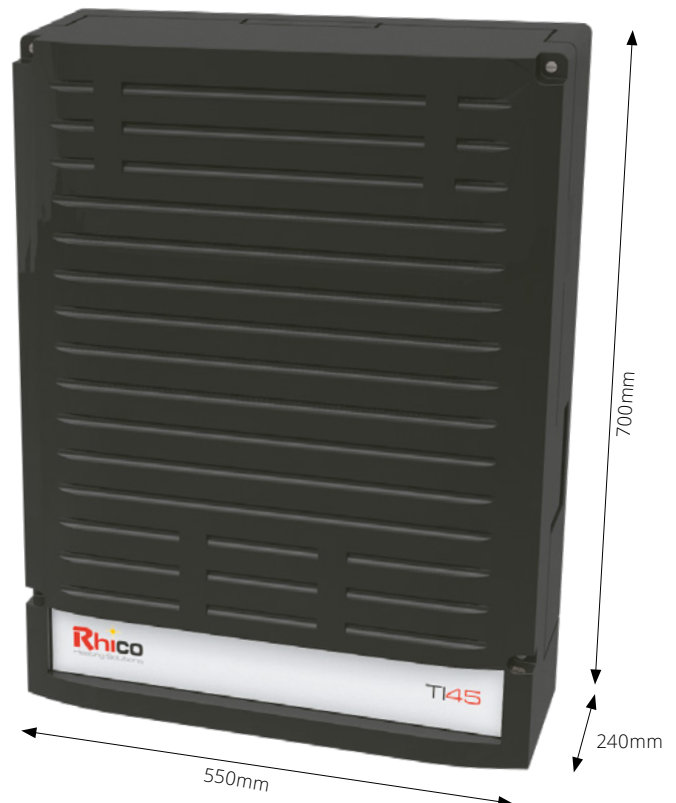
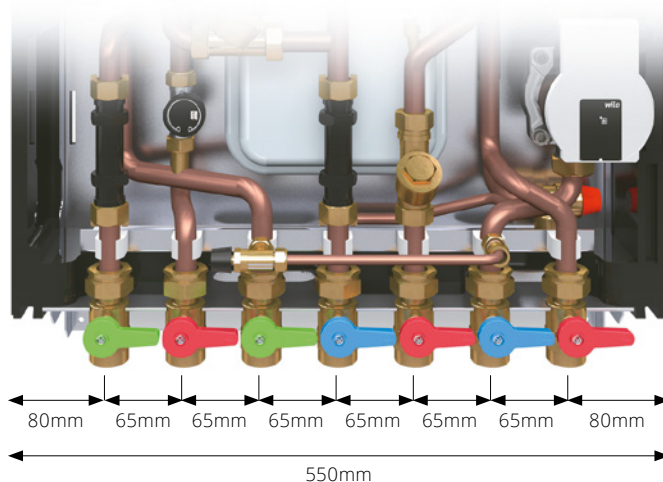
The **TI45 Ultra Lean** also includes a built-in by-pass function, directly controlled by the modulating valve and the pre-set temperature on the DHW sensor. During the stand-by phase, the DHW comfort function is activated keeping the temperature of the water in the heat exchanger at the set point selected. This could be lower than the desired temperature at the tap. If the temperature falls below the set temperature (hysteresis temperature - $T_{set-T hys}$), the two-way valve on the module is activated taking heat from the primary circuit.

The electronic control also offers two temperature levels in the heating circuit, underfloor heating and radiator/fan coil systems. However, these cannot be selected simultaneously. Once selected the pump will change speed according to the ΔT value between flow and return. (There is also a pressure transducer to protect from pump damage caused by over pressures).

FEATURES

- Ultra low primary temperatures (55°C)
- Ultra high hot water production
- Fully insulated module with EPP60 g/l
- Fully settable DHW flow / standby temperature
- Fully settable secondary heating return temperature
- Offsite monitoring via RS485
- Management of errors and alarms
- Universal first fix bracket allows for easy future upgrades

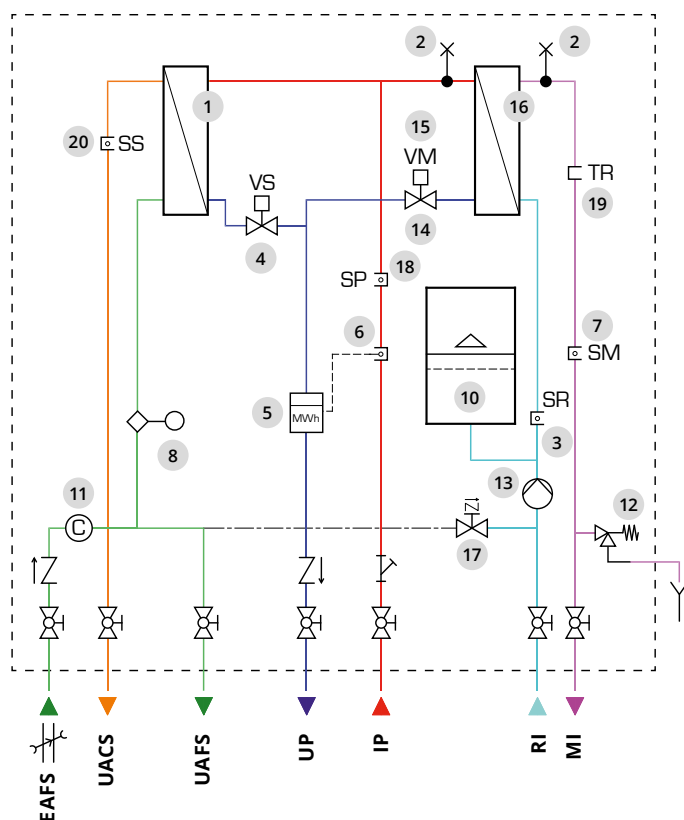
DIMENSIONS



TECHNICAL DATA

Maximum temperature:	85°C
Primary circuit max. flow rate:	1500 l/h
Necessary primary circuit head:	12 m H ₂ O / Max. 16 m
H ₂ O pressure transducer:	0.5 ÷ 2.5 bar
Primary circuit maximum pressure:	16 bar
Domestic water circuit maximum pressure:	10 bar
Heating circuit maximum pressure:	3 bar
Hydraulic connections (with interception jig):	M-F 1" - 3/4"
Insulation material:	EPP 0.037 W/m*K
Dimensions built-in version (WxHxD):	570x800x160 mm
Dimensions wall-hung version (WxHxD):	560x750x220 mm
Weight (including interception jig):	25 Kg
Type of fluid:	H ₂ O
Main component material:	UNI EN 12165 CW617N

HYDRAULIC CIRCUIT



ELECTRICAL DATA

Module supply:	230V
Power consumption:	70W
Stepper motor	
Power supply:	12V
Running time:	5 sec.
Rotary electric actuator	
Power supply:	230V
Running time:	24 sec.
Force:	120N

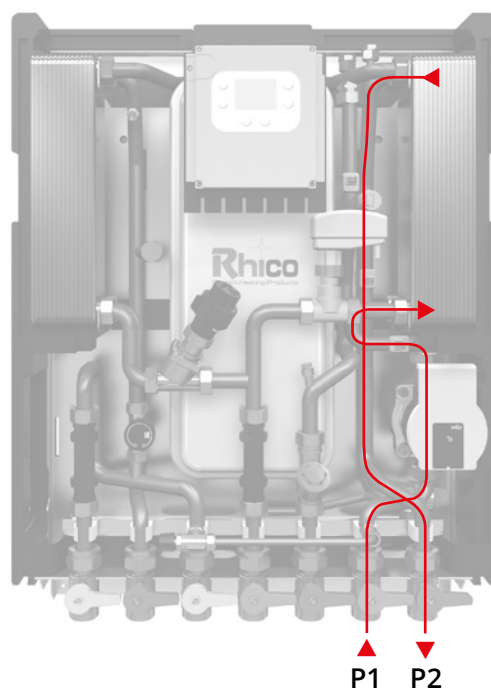
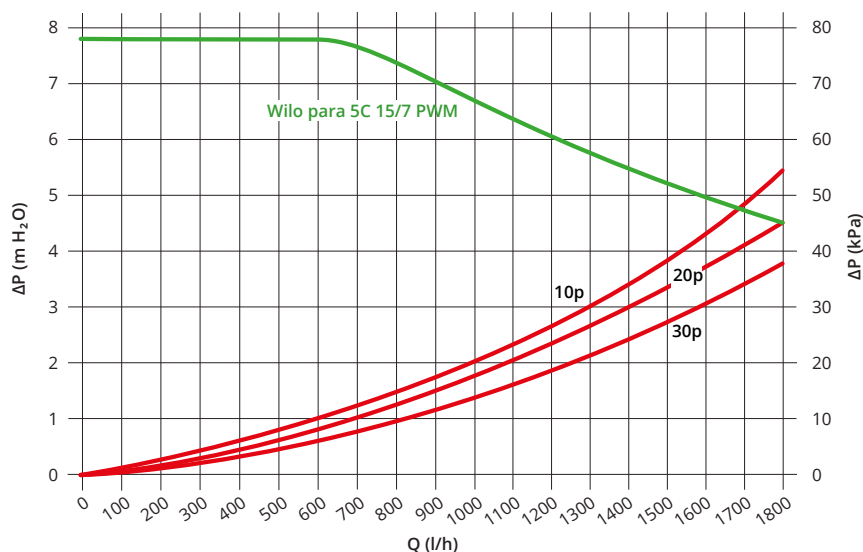
COMPONENTS

1. Brazed plate stainless steel plate heat exchanger (DHW circuit)
2. Manual air vent valve
3. Sensor pocket for heating return sensor
4. Modulating 2-way valve with 12V, 5s stepper motor (normally closed)
5. Spool piece for heat meter 3/4"M-110 mm (heat meter available in the following versions: single-jet with M-Bus, radio and ultrasonic)
6. Sensor pocket for heat meter
7. Sensor pocket for heating supply sensor
8. Flow switch (1.5 ÷ 35 l/min)
9. Filter
10. Expansion tank (7 litres)
11. Spool piece for cold water meter 3/4"M-110 mm
12. Safety valve heating circuit (3 bar)
13. High efficiency pump type Wilo PARA SC 15/1-7 iPWM
14. Sensor pocket for thermostatic valve primary side (heating side)
15. 230V, 3-point electric servomotor, 120 N, 8 s/mm
16. Brazed stainless steel plate heat exchanger (heating circuit)
17. Filling loop connections
18. Sensor pocket for primary circuit supply sensor
19. Pressure transducer
20. Sensor pocket for DHW sensor
21. Digital controller

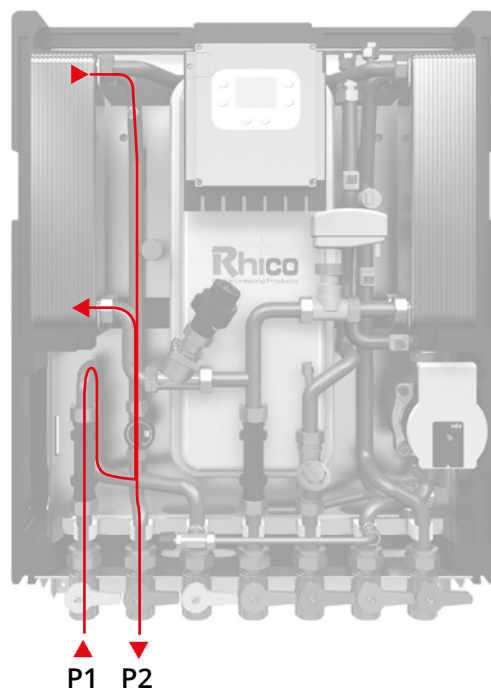
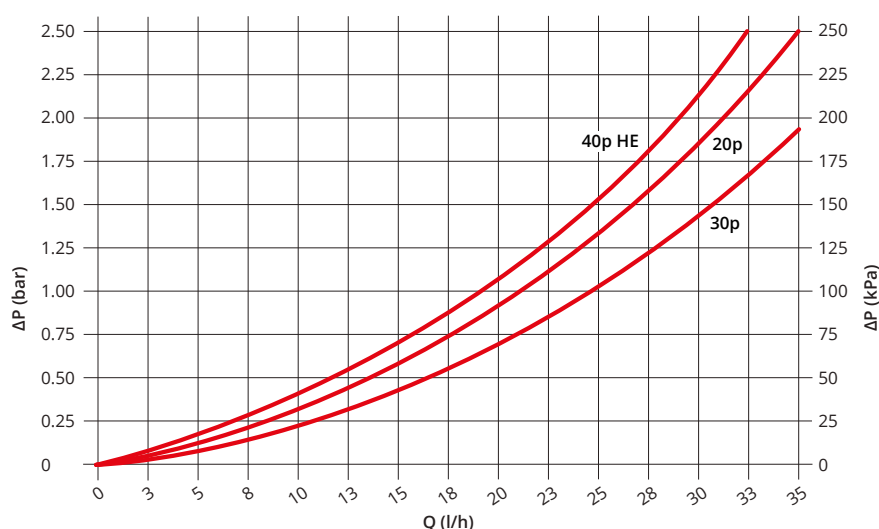
CONNECTIONS

IP	Primary circuit supply (M-F 1" - 3/4")
MI	Heating supply (M - F 1" - 3/4")
RI	Heating return (M - F 1" - 3/4")
UP	Primary circuit return (M - F 1" - 3/4")
UACS	Domestic hot water (M - F 1" - 3/4")
EAFS	Domestic cold water supply (M - F 1" - 3/4")
UAFS	Domestic cold water return (M - F 1" - 3/4")

PRESSURE LOSS HEATING CIRCUIT



PRESSURE LOSS DOMESTIC WATER CIRCUIT



Max working pressure DHW circuit: 10 bar
 Min pressure domestic water: 0.2 bar
 Heat exchanger material (15/20/30/40 plates): Inox AISI 316

If the hardness of the water exceeds 25 French degrees, it should be treated at the inlet to the system, so as to prevent fouling caused by hard water or corrosion due to aggressive water. Remember that even small deposits measuring just a few millimetres in thickness will cause problems, due to their low thermal conductivity, a reduction in performance on the DHW side.

HEATING TEMPERATURE IN/OUT LOW TEMPERATURE SYSTEM

Prim. temp	Prim. flow rate	Heating flow rate [l/h] - Power supply [kW] - Return temperature primary side [°C]																	
		30/35°C									33/38°C								
		10 p			20 p			30 p			10 p			20 p			30 p		
	m³/h	l/min	kw	°C	l/min	kw	°C	l/min	kw	°C	l/min	kw	°C	l/min	kw	°C	l/min	kw	°C
50 °C	0.2	724	4.2	31.9	751	4.4	31.2	-	4.4	31.1	609	3.5	34.8	636	3.7	34.1	-	3.7	34.0
	0.3	1055	6.1	32.4	1116	6.5	31.4	1129	6.6	31.2	883	5.1	35.3	943	5.5	34.3	956	5.5	34.1
	0.4	1369	7.9	32.9	1473	8.5	31.6	1497	8.7	31.3	1143	6.6	35.7	1242	7.2	34.5	1266	7.3	34.2
	0.5	-	-	-	-	-	-	-	-	-	1388	8.1	36.1	1533	8.9	34.7	1571	9.1	34.3
55 °C	0.2	918	5.3	32.1	934	5.5	31.4	948	5.5	31.3	804	4.7	34.9	829	4.8	34.3	834	4.8	34.2
	0.3	1345	7.8	32.6	1405	8.2	31.6	1417	8.2	31.4	1175	6.8	35.4	1234	7.2	34.4	1245	7.2	34.2
	0.4	-	-	-	-	-	-	-	-	-	-	-	-	1631	9.5	34.6	1653	9.6	34.3
60 °C	0.2	1111	6.4	32.2	1135	6.6	31.6	1138	6.6	31.5	977	5.8	35.1	1021	5.9	34.5	1024	5.9	34.3
	0.3	-	-	-	-	-	-	1704	9.9	31.6	1465	8.5	35.6	1522	8.8	34.6	1533	8.9	34.5
65 °C	0.2	1303	7.6	32.5	1326	7.7	31.9	1329	7.7	31.8	1189	6.9	35.3	1212	7.0	34.7	1215	7.1	34.6

HEATING TEMPERATURE IN/OUT HIGH TEMPERATURE SYSTEM

Prim. temp	Prim. flow rate	Heating flow rate [l/h] - Power supply [kW] - Return temperature primary side [°C]																	
		45/60°C									50/70°C								
		10 p			20 p			30 p			10 p			20 p			30 p		
	m³/h	l/min	kw	°C	l/min	kw	°C	l/min	kw	°C	l/min	kw	°C	l/min	kw	°C	l/min	kw	°C
70 °C	0.2	263	4.6	50.3	294	5.1	48.0	303	5.3	47.3	-	-	-	-	-	-	-	-	-
	0.4	467	8.1	53.5	550	9.6	49.4	579	10.1	48.3	-	-	-	-	-	-	-	-	-
	0.5	557	9.7	53.3	669	11.7	49.9	709	12.4	48.7	-	-	-	-	-	-	-	-	-
	0.6	640	11.2	54.0	784	13.7	50.4	836	14.6	49.1	-	-	-	-	-	-	-	-	-
	0.7	718	12.5	54.6	893	15.6	50.9	958	16.7	49.9	-	-	-	-	-	-	-	-	-
	0.8	791	13.8	55.2	999	17.4	51.3	1078	18.8	49.8	-	-	-	-	-	-	-	-	-
	1.0	927	16.1	56.1	1200	20.9	53.0	1307	22.8	50.4	-	-	-	-	-	-	-	-	-
	1.5	1213	21.1	57.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75 °C	0.2	336	5.9	49.8	364	6.3	47.7	372	6.5	47.2	161	3.8	58.9	195	4.5	55.5	207	4.8	54.3
	0.4	612	10.7	52.1	696	12.1	48.9	721	12.6	48.0	270	6.3	61.5	348	8.1	57.6	380	8.8	56.0
	0.5	735	12.8	53.0	852	14.8	49.5	889	15.5	48.4	316	7.4	62.4	416	9.7	58.4	459	10.7	56.7
	0.6	851	14.8	53.7	1003	17.5	50.0	1053	18.3	48.7	358	8.3	63.1	481	11.2	59.0	533	12.4	57.2
	0.7	961	16.7	54.4	1149	20.0	50.4	1213	21.1	49.0	396	9.2	63.7	542	12.6	59.5	604	14.1	57.8
	0.8	1065	18.6	55.1	1290	22.5	50.8	1369	23.9	49.4	431	10.0	64.2	599	13.9	60.0	673	15.7	58.2
	1.0	1258	21.9	56.2	1561	27.2	51.6	1672	29.1	50.0	494	11.5	65.1	707	16.4	60.9	803	18.7	59.0
	1.5	-	-	-	-	-	-	-	-	-	623	14.5	66.7	942	21.9	62.5	1094	25.4	60.4
80 °C	0.2	406	7.1	49.6	432	7.5	47.7	438	7.6	47.2	227	5.3	57.3	258	6.0	54.2	268	6.2	53.2
	0.4	751	13.1	51.9	834	14.5	48.8	857	14.9	47.9	399	9.3	60.1	479	11.1	56.1	508	11.8	54.6
	0.5	907	15.8	52.8	1026	17.9	49.3	1061	18.5	48.2	473	11.0	61.1	581	13.5	56.8	620	14.4	55.2
	0.6	1055	18.4	53.7	1212	21.1	49.8	1260	22.0	48.5	542	12.6	62.0	678	15.8	57.4	729	16.9	55.7
	0.7	1195	20.8	54.4	1392	24.3	50.2	1455	25.4	48.9	606	14.1	62.7	770	17.9	58.0	834	19.4	56.2
	0.8	1329	23.2	55.1	1568	27.3	50.6	1647	28.7	49.2	667	15.5	63.4	859	20.0	58.5	935	21.7	56.6
	1.0	-	-	-	-	-	-	-	-	-	777	18.1	64.5	1028	23.9	59.5	1131	26.3	57.4
	1.5	-	-	-	-	-	-	-	-	-	1008	23.4	66.6	1405	32.7	61.3	1577	36.7	59.0
85 °C	0.2	474	-8.3	49.5	498	8.7	47.7	503	8.8	47.3	285	6.6	56.5	314	7.3	53.7	322	7.5	52.9
	0.4	886	15.4	51.8	969	16.9	48.7	991	17.3	47.9	513	11.9	59.4	594	13.8	55.4	620	14.4	54.1
	0.5	1075	18.7	52.8	1195	20.8	49.2	1228	21.4	48.2	614	14.3	60.5	725	16.9	56.1	762	17.7	54.6
	0.6	1255	21.9	53.7	1416	24.7	49.7	1462	25.5	48.5	709	16.5	61.4	851	19.8	56.7	900	20.9	55.0
	0.7	1426	24.8	54.5	1630	28.4	50.1	1691	29.5	48.8	798	18.5	62.3	972	22.6	57.3	1034	24.1	55.5
	0.8	-	-	-	-	-	-	-	-	-	881	20.5	63.0	1089	25.3	57.8	1166	27.1	55.9
	1.0	-	-	-	-	-	-	-	-	-	1036	24.1	64.3	1314	30.5	58.8	1419	33.0	56.7
	1.5	-	-	-	-	-	-	-	-	-	1368	31.8	66.8	-	-	-	-	-	-

DHW TEMPERATURE 45/50/55/60°C, INLET 10°C

Prim. temp	Prim. flow rate	DHW production [l/min] - Primary circuit return temperature [°C]																							
		10/45°C						10/50°C						10/55°C						10/60°C					
		20 p		30 p		40 p HE		20 p		30 p		40 p HE		20 p		30 p		40 p HE		20 p		30 p		40 p HE	
	m³/h	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C
50 °C	0.7	6.3	31.2	7.3	28.0	9.8	20.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.8	6.8	32.0	8.1	28.8	10.9	21.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.9	7.4	32.8	8.8	29.5	12.0	21.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.0	7.9	33.4	9.4	30.2	13.1	22.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.2	8.8	34.6	10.7	31.3	15.3	23.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.3	9.3	35.1	11.2	31.8	16.3	23.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.4	9.7	35.5	11.8	32.3	17.3	24.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55 °C	1.5	10.1	35.9	12.3	32.7	18.3	24.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.7	8.7	28.8	9.9	25.3	12.3	18.2	6.0	34.4	7.0	30.8	9.5	22.6	-	-	-	-	-	-	-	-	-	-	-	-
	0.8	9.6	29.7	11.0	26.1	13.8	18.7	6.6	35.3	7.8	31.7	10.6	23.3	-	-	-	-	-	-	-	-	-	-	-	-
	0.9	10.5	30.5	12.0	26.9	15.4	19.2	7.1	36.2	8.4	32.6	11.6	23.9	-	-	-	-	-	-	-	-	-	-	-	-
	1.0	11.3	31.3	13.0	27.7	16.9	19.6	7.5	36.9	9.0	33.3	12.7	24.5	-	-	-	-	-	-	-	-	-	-	-	-
	1.2	12.8	32.6	14.9	28.9	19.8	20.4	8.4	38.2	10.2	34.6	14.8	25.5	-	-	-	-	-	-	-	-	-	-	-	-
	1.3	13.5	33.2	15.8	29.5	21.2	20.8	8.8	38.7	10.8	35.1	15.7	25.9	-	-	-	-	-	-	-	-	-	-	-	-
60 °C	1.4	14.2	33.7	16.7	30.0	22.6	21.1	9.2	39.2	11.3	35.6	16.7	26.4	-	-	-	-	-	-	-	-	-	-	-	-
	1.5	14.9	34.2	17.5	30.5	23.9	21.5	9.6	39.7	11.8	36.1	17.7	26.8	-	-	-	-	-	-	-	-	-	-	-	-
	0.7	10.9	27.3	12.1	23.7	14.4	16.8	8.3	31.6	9.4	27.7	11.8	19.6	5.8	37.6	6.8	33.7	9.2	24.4	-	-	-	-	-	-
	0.8	12.1	28.3	13.5	24.6	16.3	17.3	9.1	32.7	10.4	28.7	13.3	20.2	6.3	38.7	7.5	34.7	10.3	25.3	-	-	-	-	-	-
	0.9	13.2	29.2	14.8	25.4	18.1	17.7	9.9	33.6	11.4	29.6	14.7	20.8	6.8	39.6	8.1	35.6	11.3	26.0	-	-	-	-	-	-
	1.0	14.3	30.0	16.1	26.2	19.9	18.1	10.7	34.4	12.3	30.4	16.1	21.3	7.3	40.4	8.7	36.4	12.4	26.6	-	-	-	-	-	-
	1.2	16.4	31.4	18.6	27.5	23.5	18.9	12.1	35.9	14.1	31.8	18.9	22.2	8.1	41.8	9.9	37.8	14.4	27.7	-	-	-	-	-	-
65 °C	1.3	17.3	32.0	19.8	28.1	25.2	19.2	12.7	36.5	14.9	32.4	20.2	22.6	8.5	42.4	10.4	38.4	15.3	28.2	-	-	-	-	-	-
	1.4	18.3	32.6	20.9	28.6	27.0	19.6	13.4	37.1	15.7	33.0	21.6	23.0	8.9	42.9	10.9	39.0	16.3	28.7	-	-	-	-	-	-
	1.5	19.2	33.1	22.1	29.1	28.6	19.9	14.0	37.6	16.5	33.6	22.9	23.4	9.2	43.4	11.4	39.5	17.2	29.1	-	-	-	-	-	-
	0.7	12.9	26.3	14.1	22.7	16.3	16.1	10.2	29.9	11.4	25.9	13.7	18.0	7.9	34.5	9.0	30.2	11.4	21.1	5.6	40.9	6.7	36.5	9.0	26.3
	0.8	14.4	27.3	15.8	23.6	18.5	16.5	11.3	31.0	12.7	26.9	15.5	18.6	8.7	35.6	10.0	31.3	12.8	21.8	6.1	42.0	7.3	37.6	10.1	27.3
	0.9	15.8	28.2	17.4	24.4	20.6	16.8	12.4	32.0	13.9	27.8	17.2	19.1	9.5	36.7	10.9	32.2	14.2	22.4	6.6	43.0	7.9	38.6	11.1	28.0
	1.0	17.1	29.1	19.0	25.1	22.8	17.2	13.4	32.9	15.2	28.6	18.9	19.5	10.2	37.6	11.8	33.1	15.6	23.0	7.1	43.8	8.5	39.5	12.1	28.7
70 °C	1.2	19.7	30.6	22.0	26.5	26.9	17.9	15.3	34.4	17.4	30.1	22.3	20.4	11.5	39.2	13.5	34.7	18.2	24.0	7.9	45.3	9.6	41.0	14.0	29.9
	1.3	20.9	31.2	23.5	27.1	28.9	18.2	16.2	35.1	18.6	30.8	23.9	20.8	12.1	39.8	14.3	35.4	19.5	24.5	8.2	46.0	10.1	41.7	15.0	30.5
	1.4	22.1	31.9	24.9	27.6	31.0	18.6	17.1	35.8	19.6	31.4	25.6	21.2	12.7	40.5	15.0	36.0	20.8	24.9	8.6	46.6	10.6	42.3	15.9	31.0
	1.5	23.2	32.5	26.3	28.2	32.9	18.9	17.9	36.4	20.7	31.9	27.2	21.6	13.3	41.0	15.8	36.6	22.0	25.4	8.9	47.2	11.1	42.9	16.8	31.5
	0.7	14.8	25.6	16.0	22.0	18.1	15.6	12.0	28.7	13.2	24.7	15.4	17.1	9.7	32.6	10.9	28.1	13.2	19.3	7.6	37.3	8.7	32.7	11.1	22.6
	0.8	16.5	26.6	18.0	22.8	20.6	16.0	13.4	29.8	14.8	25.7	17.5	17.6	10.7	33.8	12.1	29.2	14.9	19.9	8.4	38.6	9.7	33.8	12.4	23.4
	0.9	18.2	27.5	19.9	23.6	23.0	16.3	14.7	30.9	16.3	26.6	19.5	18.0	11.7	34.8	13.3	30.2	16.5	20.5	9.1	39.7	10.5	34.9	13.8	24.0
75 °C	1.0	19.8	28.4	21.7	24.4	25.4	16.6	15.9	31.8	17.7	27.4	21.5	18.4	12.7	35.8	14.4	31.1	18.2	21.0	9.8	40.7	11.4	35.9	15.1	24.7
	1.2	22.9	30.0	25.3	25.7	30.1	17.3	18.3	33.4	20.6	28.9	25.4	19.2	14.5	37.5	16.6	32.8	21.4	21.9	11.0	42.4	13.0	37.6	17.7	25.8
	1.3	24.3	30.7	27.0	26.3	32.4	17.6	19.4	34.2	21.9	29.6	27.3	19.6	15.3	38.2	17.6	33.5	22.9	22.4	11.6	43.2	13.7	38.3	18.9	26.4
	1.4	25.8	31.4	28.7	26.9	34.7	17.9	20.5	34.9	23.2	30.2	29.2	20.0	16.1	38.9	18.6	34.1	24.5	22.8	12.2	43.8	14.5	39.0	20.1	26.9
	1.5	27.1	32.0	30.4	27.5	37.0	18.2	21.6	35.5	24.5	30.8	31.0	20.3	16.9	39.6	19.6	34.7	26.0	23.3	12.8	44.5	15.2	39.7	21.3	27.4
	0.3	7.9	19.5	8.3	17.1	8.7	13.9	6.7	21.5	7.0	18.7	7.6	14.4	5.7	24.2	6.0	20.9	6.6	15.3	4.7	27.6	5.1	23.8	5.8	16.7
	0.4	10.3	21.1	10.8	18.3	11.6	14.3	8.6	23.5	9.1	20.2	10.0	15.0	7.2	26.3	7.8	22.6	8.7	16.2	6.0	30.0	6.6	25.8	7.6	17.9
80 °C	0.5	12.5	22.6	13.2	19.5	14.4	14.7	10.4	25.1	11.1	21.5	12.4	15.6	8.7	28.2	9.4	24.1	10.7	17.0	7.2	32.0	7.9	27.5	9.3	19.0
	0.6	14.6	23.8	15.6	20.5	17.1	15.0	12.1	26.6	13.1	22.7	14.7	16.1	10.1	29.8	11.0	25.5	12.8	17.6	8.3	33.7	9.2	29.0	11.0	19.8
	0.7	16.7	25.0	17.9	21.4	19.9	15.3	13.8	27.8	14.9	23.8	17.1	16.5	11.4	31.2	12.5	26.7	14.7	18.2	9.3	35.2	10.4	30.3	12.7	20.6
	0.8	18.7	26.0	20.1	22.3	22.6	15.7	15.4	29.0	16.7	24.8	19.4	16.9	12.6	32.4	14.0	27.8	16.7	18.7	10.3	36.5	11.6	31.5	14.3	21.2
	1.0	22.4	27.9	24.4	23.8	28.0	16.3	18.4	31.0	20.2	26.5	23.9	17.7	15.0	34.5	16.8	29.7	20.5	19.7	12.1	38.7	13.8	33.7	17.5	22.4
	1.2	26.0	29.6	28.5	25.2	33.2	16.9	21.2	32.7	23.5	28.0	28.3	18.5	17.2	36.3	19.4	31.3	24.2	20.6	13.8	40.5	15.9	35.4	20.6	23.5
	0.3	8.7	19.1	9.0	16.9	9.4	14.0	7.4	20.9	7.7	18.2	8.2	14.4	6.3	23.2	6.7	20.0	7.2	15.0	5.4	26.0	5.8	22.3	6.4	16.0
85 °C	0.4	11.3	20.7	11.8	18.0	12.5	14.3	9.5	22.8	10.1	19.6	10.9	14.9	8.1	25.3	8.6	21.7	9.5	15.7	6.9	28.3	7.4	24.3	8.4	17.0
	0.5	13.8	22.1	14.5	19.1	15.6	14.6	11.6	24.4	12.3	20.9	13.5	15.3	9.8	26.1	10.5	23.1	11.8	16.4	8.3	30.4	9.0	25.9	10.4	17.9
	0.6	16.2	23.4	17.1	20.1	18.6	14																		

DHW TEMPERATURE 45/50/55/60°C, INLET 12°C

Prim. temp	Prim. flow rate	DHW production [l/min] - Primary circuit return temperature [°C]																							
		12/45°C						12/50°C						12/55°C						12/60°C					
		20 p		30 p		40 p HE		20 p		30 p		40 p HE		20 p		30 p		40 p HE		20 p		30 p		40 p HE	
	m³/h	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C
50 °C	0.7	6.5	31.7	7.5	28.7	10.0	21.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.8	7.1	32.5	8.3	29.5	11.1	22.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.9	7.6	33.2	9.0	30.2	12.3	23.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.0	8.1	33.9	9.7	30.8	13.4	23.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.2	9.1	35.0	11.0	31.9	15.6	24.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.3	9.6	35.4	11.6	32.3	16.7	24.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.4	10.0	35.9	12.2	32.8	17.7	24.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55 °C	0.7	9.0	29.4	10.2	26.1	12.6	19.5	6.2	34.9	7.2	31.5	9.6	23.7	-	-	-	-	-	-	-	-	-	-	-	-
	0.8	10.0	30.3	11.3	26.9	14.2	19.9	6.7	35.8	7.9	32.4	10.7	24.4	-	-	-	-	-	-	-	-	-	-	-	-
	0.9	10.8	31.1	12.4	27.7	15.7	20.4	7.3	36.6	8.6	33.2	11.9	24.9	-	-	-	-	-	-	-	-	-	-	-	-
	1.0	11.7	31.9	13.4	28.4	17.3	20.8	7.8	37.3	9.3	33.9	13.0	25.5	-	-	-	-	-	-	-	-	-	-	-	-
	1.2	13.3	33.1	15.4	29.6	20.3	21.5	8.7	38.5	10.5	35.1	15.1	26.4	-	-	-	-	-	-	-	-	-	-	-	-
	1.3	14.0	33.6	16.3	30.1	21.7	21.9	9.1	39.1	11.1	35.6	16.1	26.8	-	-	-	-	-	-	-	-	-	-	-	-
	1.4	14.8	34.1	17.2	30.6	23.2	22.2	9.5	39.6	11.6	36.1	17.1	27.2	-	-	-	-	-	-	-	-	-	-	-	-
60 °C	0.7	11.3	29.1	12.5	24.7	14.8	18.2	8.5	32.3	9.7	28.6	12.0	20.9	5.9	38.1	7.0	34.3	9.3	25.5	-	-	-	-	-	-
	0.8	12.5	29.0	13.9	25.5	16.7	18.7	9.4	33.3	10.7	29.5	13.5	21.4	6.5	39.1	7.7	35.3	10.4	26.3	-	-	-	-	-	-
	0.9	13.7	29.8	15.3	26.3	18.6	19.0	10.2	34.2	11.7	30.3	15.0	21.9	7.0	40.0	8.3	36.2	11.5	27.0	-	-	-	-	-	-
	1.0	14.9	30.6	16.7	27.0	20.5	19.4	11.0	35.0	12.7	31.1	16.5	22.4	7.5	40.8	8.9	37.0	12.6	27.5	-	-	-	-	-	-
	1.2	17.0	31.9	19.3	28.2	24.2	20.1	12.5	36.3	14.5	32.4	19.3	23.3	8.3	42.1	10.1	38.3	14.6	28.6	-	-	-	-	-	-
	1.3	18.0	32.5	20.5	28.8	26.0	20.4	13.2	36.9	15.4	33.0	20.7	23.7	8.7	42.7	10.6	38.9	15.6	29.1	-	-	-	-	-	-
	1.4	19.0	33.1	21.7	29.3	27.7	20.8	13.8	37.5	16.2	33.6	22.1	24.1	9.1	43.2	11.2	39.4	16.5	29.5	-	-	-	-	-	-
65 °C	0.7	13.4	27.1	14.6	23.7	16.8	17.6	10.5	30.7	11.7	26.8	14.0	19.4	8.1	35.1	9.2	31.0	11.6	22.4	5.8	41.4	6.8	37.2	9.1	27.4
	0.8	14.9	28.1	16.3	24.6	19.0	17.9	11.7	31.7	13.1	27.8	15.8	19.9	8.9	36.2	10.2	32.0	13.0	23.0	6.3	42.4	7.4	38.2	10.2	28.3
	0.9	16.4	28.9	18.0	25.3	21.2	18.3	12.8	32.6	14.4	28.6	17.6	20.4	9.7	37.2	11.2	32.9	14.5	23.6	6.8	43.4	8.1	39.2	11.3	29.0
	1.0	17.8	29.7	19.7	26.0	23.4	18.6	13.8	33.5	15.6	29.4	19.4	20.8	10.4	38.1	12.1	33.8	15.9	24.1	7.2	44.3	8.7	40.0	12.3	29.6
	1.2	20.5	31.2	22.9	27.3	27.7	19.2	15.8	34.9	18.0	30.8	22.8	21.6	11.8	39.6	13.8	35.3	18.6	25.1	8.0	45.7	9.8	41.5	14.3	30.8
	1.3	21.8	31.8	24.4	27.8	29.8	19.5	16.8	35.6	19.1	31.4	24.5	22.0	12.5	40.2	14.6	36.0	19.9	25.5	8.4	46.4	10.3	42.2	15.2	31.3
	1.4	23.0	32.4	25.9	28.4	31.9	19.8	17.7	36.2	20.3	32.0	26.2	22.3	13.1	40.9	15.4	36.6	21.2	26.0	8.8	46.9	10.8	42.8	16.1	31.8
70 °C	0.7	15.4	26.4	16.6	23.1	18.7	17.2	12.4	29.5	13.6	25.7	15.8	18.6	10.0	33.3	11.1	29.0	13.4	20.6	7.8	38.0	8.9	33.4	11.2	23.8
	0.8	17.2	27.4	18.6	23.9	21.2	17.5	13.8	30.6	15.2	26.6	17.9	19.0	11.0	34.4	12.4	30.1	15.1	21.2	8.6	39.2	9.8	34.6	12.6	24.5
	0.9	19.0	28.3	20.6	24.6	23.7	17.8	15.2	31.5	16.8	27.5	20.0	19.4	12.1	35.4	13.6	31.0	16.8	21.7	9.3	40.3	10.8	35.6	14.0	25.2
	1.0	20.6	29.1	22.6	25.3	26.2	18.1	16.5	32.4	18.3	28.3	22.0	19.8	13.1	36.4	14.8	31.9	18.5	22.2	10.0	41.2	11.6	36.5	15.4	25.8
	1.2	23.9	30.6	26.3	26.6	31.1	18.7	19.0	34.0	21.2	29.7	26.0	20.5	14.9	38.0	17.0	33.4	21.8	23.1	11.3	42.8	13.3	38.2	18.0	26.9
	1.3	25.4	31.3	28.1	27.2	33.5	19.0	20.1	34.7	22.6	30.3	28.0	20.9	15.8	38.7	18.1	34.1	23.4	23.6	11.9	43.6	14.0	38.9	19.2	27.4
	1.4	26.9	32.0	29.9	27.7	35.9	19.2	21.3	35.4	24.0	30.9	29.9	21.2	16.6	39.4	19.1	34.7	25.0	24.0	12.5	44.2	14.8	39.6	20.5	27.9
75 °C	0.3	8.2	20.7	8.5	18.6	9.0	15.7	6.9	22.7	7.2	20.1	7.7	16.2	5.8	25.3	6.1	22.2	6.7	17.0	4.8	28.6	5.2	25.0	5.9	18.3
	0.4	10.7	22.3	11.2	19.7	11.9	16.0	8.9	24.5	9.4	21.5	10.2	16.7	7.4	27.3	7.9	23.8	8.9	17.8	6.1	30.8	6.7	26.9	7.7	19.5
	0.5	13.0	23.6	13.7	20.7	14.8	16.4	10.7	26.1	11.5	22.7	12.7	17.2	8.9	29.1	9.6	25.2	11.0	18.5	7.8	32.8	8.1	28.5	9.5	20.5
	0.6	15.2	24.8	16.2	21.7	17.7	16.7	12.5	27.5	13.5	23.8	15.1	17.6	10.3	30.6	11.3	26.5	13.0	19.1	8.5	34.4	9.4	29.9	11.2	21.2
	0.7	17.4	25.9	18.5	22.6	20.5	17.0	14.2	28.7	15.4	24.9	17.5	18.0	11.7	31.9	12.8	27.7	15.0	19.6	9.5	35.9	10.6	31.2	12.9	21.9
	0.8	19.4	26.9	20.9	23.3	23.3	17.2	15.9	29.8	17.3	25.8	19.9	18.4	13.0	33.1	14.4	28.7	17.0	20.1	10.5	37.2	11.8	32.4	14.6	22.5
	1.0	23.4	28.7	25.4	24.8	28.9	17.8	19.0	31.7	20.9	27.4	24.5	19.1	15.5	35.1	17.2	30.6	20.9	21.0	12.4	39.2	14.1	34.4	17.9	23.7
80 °C	0.3	9.0	20.4	9.3	18.4	9.7	15.8	7.6	22.2	7.9	19.7	8.4	16.1	6.5	24.3	6.8	21.3	7.4	16.7	5.5	27.0	5.9	23.6	6.5	17.7
	0.4	11.7	21.9	12.2	19.4	12.9	16.1	9.8	23.9	10.4	21.0	11.1	16.6	8.3	26.3	8.9	22.9	9.7	17.4	7.0	29.3	7.6	25.4	8.5	18.6
	0.5	14.3	23.2	15.1	20.4	16.1	16.4	12.0	25.5	12.7	22.2	13.8	17.0	10.1	28.1	10.8	24.3	12.0	18.0	8.5	31.3	9.2	27.0	10.5	19.4
	0.6	16.9	24.4	17.8	21.4	19.2	16.6	14.0	26.8	14.9	23.2	16.5	17.4	11.7	29.6	12.7	25.6	14.3	18.5	9.8	33.0	10.8	28.4	12.5	20.1
	0.7	19.3	25.5	20.5	22.2	22.3	16.9	16.0	28.0	17.1	24.2	19.1	17.7	13.3	30.9	14.5	26.7	16.6	18.9	11.1	34.4	12.2	29.7	14.4	20.7
	0.8	21.6	26.5	23.1	23.0	25.4	17.1	17.9	29.1	19.3	25.1	21.7	18.1	14.9	32.1	16.2	27.7	18.8	19.4	12.3	35.6	13.7	30.9	16.3	21.2
	1.0	26.1	28.4	28.1	24.4	31.5	17.6	21.5	31.1	23.4	26.8	26.9	18.7	17.8	34.2	19.6	29.5	23.2	20.2	14.7	37.9	16.4	32.9	20.1	22.3
85 °C	0.3	9.8	20.2	10.1	18.3	10.5	16.0	8.3	21.7	8.6	19.4	9.1	16.2	7.1	23.6	7.5	20.8	8.0	16.6	6.2	25.9	6.5	22.6	7.1	17.8
	0.4	12.8	21.7	13.3	19.3	13.9	16.2	10.8	23.5	11.3	20.6	12													

DHW TEMPERATURE 45/50/55/60°C, INLET 15°C

Prim. temp	Prim. flow rate	DHW production [l/min] - Primary circuit return temperature [°C]																							
		15/45°C						15/50°C						15/55°C						15/60°C					
		20 p		30 p		40 p HE		20 p		30 p		40 p HE		20 p		30 p		40 p HE		20 p		30 p		40 p HE	
	m³/h	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C	l/min	°C
50 °C	0.7	6.8	32.6	7.9	29.8	10.3	23.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.8	7.4	33.3	8.7	30.5	11.5	24.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.9	8.0	34.0	9.4	31.1	12.7	24.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.0	8.6	34.6	10.2	31.7	13.9	24.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.2	9.6	35.6	11.5	32.7	16.2	25.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.3	10.1	36.0	12.2	33.1	17.3	26.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.4	10.6	36.4	12.8	33.6	18.4	26.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55 °C	0.7	9.5	30.5	10.7	27.4	13.1	21.4	6.4	35.8	7.5	32.6	9.9	25.4	-	-	-	-	-	-	-	-	-	-	-	-
	0.8	10.5	31.3	11.9	28.2	14.7	21.9	7.0	36.6	8.2	33.4	11.1	26.0	-	-	-	-	-	-	-	-	-	-	-	-
	0.9	11.5	32.0	13.1	28.9	16.4	22.2	7.6	37.3	9.0	34.1	12.2	26.5	-	-	-	-	-	-	-	-	-	-	-	-
	1.0	12.4	32.7	14.2	29.5	18.0	22.6	8.1	38.0	9.6	34.7	13.4	27.0	-	-	-	-	-	-	-	-	-	-	-	-
	1.2	14.1	33.8	16.3	30.6	21.2	23.3	9.1	39.1	10.9	35.9	15.5	27.8	-	-	-	-	-	-	-	-	-	-	-	-
	1.3	14.9	34.3	17.3	31.1	22.7	23.6	9.5	39.6	11.5	36.4	16.6	28.2	-	-	-	-	-	-	-	-	-	-	-	-
	1.4	15.7	34.8	18.2	31.5	24.2	23.9	9.9	40.1	12.1	36.9	17.6	28.6	-	-	-	-	-	-	-	-	-	-	-	-
60 °C	0.7	12.0	29.2	13.2	26.2	15.4	20.4	8.9	33.3	10.1	29.8	12.4	22.8	6.1	38.9	7.2	35.4	9.6	27.2	-	-	-	-	-	-
	0.8	13.3	30.1	14.7	26.9	17.4	20.8	9.8	34.2	11.2	30.7	14.0	23.3	6.7	39.9	7.9	36.3	10.7	27.9	-	-	-	-	-	-
	0.9	14.6	30.8	16.2	27.6	19.5	21.1	10.7	35.0	12.2	31.5	15.5	23.8	7.2	40.7	8.6	37.1	11.8	28.5	-	-	-	-	-	-
	1.0	15.8	31.2	17.6	28.2	21.4	21.4	11.5	35.8	13.3	32.2	17.1	24.2	7.7	41.4	9.2	37.8	12.9	29.0	-	-	-	-	-	-
	1.2	18.2	32.8	20.4	29.4	25.3	22.0	13.1	37.0	15.2	33.4	20.0	25.0	8.7	42.7	10.5	39.1	15.0	30.0	-	-	-	-	-	-
	1.3	19.3	33.3	21.8	29.9	27.2	22.3	13.9	37.6	16.1	34.0	21.5	25.4	9.1	43.3	11.0	39.6	16.0	30.4	-	-	-	-	-	-
	1.4	20.3	33.9	23.1	30.3	29.1	22.6	14.6	38.1	17.0	34.5	22.9	25.7	9.5	43.8	11.7	40.2	17.0	30.8	-	-	-	-	-	-
65 °C	0.7	14.2	28.4	15.4	25.3	17.6	19.8	11.1	31.8	12.2	28.3	14.5	21.5	8.4	36.1	9.6	32.2	11.0	24.2	5.9	42.1	7.0	38.2	9.3	29.1
	0.8	15.9	29.3	17.3	26.1	19.9	20.2	12.3	32.7	13.7	29.1	16.4	22.0	9.3	37.1	10.6	33.2	13.4	24.8	6.5	43.2	7.7	39.2	10.4	29.8
	0.9	17.5	30.1	19.1	26.8	22.3	20.5	13.5	33.6	15.0	29.9	18.3	22.4	10.1	38.1	11.6	34.1	14.9	25.3	7.0	44.1	8.3	40.1	11.5	30.5
	1.0	19.0	30.8	20.9	27.4	24.6	20.7	14.6	34.4	16.4	30.7	20.1	22.7	10.9	38.9	12.6	34.9	16.3	25.8	7.5	44.9	8.9	40.9	12.6	31.1
	1.2	21.9	32.1	24.3	28.5	29.1	21.3	16.7	35.8	18.9	31.9	23.7	23.5	12.4	40.3	14.4	36.3	19.1	26.7	8.3	46.3	10.1	42.3	14.6	32.2
	1.3	23.3	32.7	26.0	29.0	31.4	21.6	17.7	36.4	20.1	32.5	25.5	23.8	13.1	40.9	15.2	36.9	20.5	27.2	8.7	46.9	10.6	42.9	15.6	32.7
	1.4	24.7	33.3	27.6	29.5	33.6	21.8	18.7	37.0	21.3	33.0	27.2	24.1	13.7	41.5	16.1	37.4	21.8	27.6	9.1	47.5	11.2	43.5	16.5	33.1
70 °C	0.7	16.4	27.8	17.6	24.7	19.6	19.6	13.1	30.7	14.3	27.2	16.4	20.8	10.4	34.4	11.6	30.4	13.8	22.7	8.1	38.9	9.2	34.7	11.5	25/7
	0.8	18.4	28.7	19.8	25.5	22.3	19.8	14.6	31.7	16.0	28.1	18.6	21.2	11.5	35.4	12.9	31.4	15.6	23.2	8.9	40.1	10.2	35.7	12.9	26.3
	0.9	20.3	29.5	21.9	26.1	25.0	20.1	16.0	32.6	17.6	28.9	20.8	21.5	12.6	36.4	14.1	32.3	17.4	23.7	9.6	41.1	11.1	36.7	14.4	26.9
	1.0	22.1	30.3	24.0	26.8	27.6	20.3	17.4	33.4	19.3	29.6	22.9	21.9	13.7	37.2	15.4	33.1	19.1	24.1	10.4	42.0	12.0	37.6	15.8	27.5
	1.2	25.6	31.7	28.1	27.9	32.8	20.9	20.1	34.9	22.4	30.9	27.1	22.5	15.6	38.8	17.8	34.5	22.5	25.0	11.8	43.5	13.7	39.1	18.5	28.5
	1.3	27.2	32.3	30.0	28.5	35.3	21.1	21.3	35.6	23.9	31.5	29.2	22.9	16.6	39.5	18.9	35.1	24.2	25.3	12.4	44.2	14.6	39.8	19.8	29.0
	1.4	28.9	32.9	31.9	29.0	37.9	21.3	22.5	36.2	25.3	32.0	31.2	23.2	17.5	40.1	20.0	35.7	25.8	25.7	13.1	44.8	15.4	40.4	21.0	29.4
75 °C	0.3	8.7	22.7	9.0	20.8	9.5	18.4	7.2	24.6	7.5	22.2	8.0	18.8	6.0	27.0	6.4	24.1	6.9	19.5	5.0	30.1	5.4	26.8	6.0	20.7
	0.4	11.3	24.1	11.8	21.8	12.5	18.7	9.3	26.2	9.8	23.5	10.6	19.3	7.7	28.9	8.2	25.6	9.1	20.2	6.3	32.2	6.9	28.5	7.9	21.7
	0.5	13.8	25.3	14.5	22.7	15.6	18.9	11.3	27.6	12.0	24.6	13.2	19.7	9.3	30.5	10.0	26.9	11.3	20.8	7.6	34.0	8.3	30.1	9.7	22.6
	0.6	16.2	26.4	17.2	23.6	18.6	19.2	13.2	28.9	14.1	25.6	15.7	20.0	10.8	31.9	11.7	28.1	13.4	21.3	8.8	35.6	9.7	31.4	11.5	23.3
	0.7	18.5	27.4	19.7	24.3	21.6	19.4	15.0	30.0	16.2	26.5	18.2	20.4	12.2	33.1	13.4	29.2	15.5	21.8	9.9	37.0	11.0	32.6	13.3	23.9
	0.8	20.8	28.3	22.2	25.0	14.6	19.7	16.8	31.0	18.2	27.3	20.7	20.7	13.6	34.2	15.0	30.2	17.6	22.2	10.9	38.1	12.3	33.7	15.0	24.5
	1.0	25.1	29.9	27.0	26.3	30.5	20.1	20.1	32.8	22.0	28.8	25.6	21.3	16.2	36.1	18.0	31.8	21.6	23.1	12.9	40.1	14.6	35.6	18.3	25.5
80 °C	0.3	9.6	22.5	9.9	20.7	10.2	18.6	8.0	24.1	8.3	21.9	8.7	18.8	6.7	26.1	7.2	23.4	7.6	19.3	5.7	28.7	6.1	25.5	6.7	20.2
	0.4	12.5	23.8	13.0	21.6	13.6	18.8	10.4	25.7	10.9	23.0	11.6	19.2	8.7	28.0	9.2	24.8	10.0	19.9	7.3	30.8	7.8	27.2	8.7	21.0
	0.5	15.3	25.0	16.0	22.5	17.0	19.0	12.6	27.1	13.3	24.1	14.4	19.5	10.5	29.6	11.2	26.1	12.4	20.4	8.8	32.6	9.5	28.7	10.8	21.7
	0.6	18.0	26.0	18.9	23.3	20.3	19.2	14.8	28.3	15.7	25.1	17.2	19.8	12.3	31.0	13.2	27.3	14.8	20.8	10.2	34.2	11.1	30.0	12.8	22.3
	0.7	20.6	27.0	21.8	24.0	23.6	19.4	16.9	29.4	18.0	25.9	20.0	20.1	14.0	32.2	15.1	28.3	17.2	21.2	11.5	35.5	12.7	31.2	14.8	22.8
	0.8	23.1	28.0	24.6	24.7	26.9	19.6	18.9	30.5	20.3	26.8	22.7	20.4	15.6	33.3	16.9	29.2	19.5	21.6	12.8	36.7	14.2	32.3	16.8	23.3
	1.0	28.0	29.7	30.0	26.0	33.3	20.0	22.7	32.3	24.7	28.3	28.1	21.0	18.6	35.3	20.5	30.9	24.0	22.4	15.3	38.8	17.0	34.1	20.6	24.3
85 °C	1.2	32.6	31.2	35.2	27.2	39.7	20.4	26.4	33.9	28.8	29.6	33.4	21.6	21.5	37.0	23.8	32.4	28.5	23.1	17.5	40.6	19.7	35.7	24.4	25.2
	0.3	10.5	22.3	10.7	20.6	11.1	18.7	8.8	23.7	9.1	21.6	9.4	18.9												



A. TI45 Ultra Lean	
Description	Part no.
Module base unit	49049301

B. Heat Exchanger Kit		
Description		Part no.
DHW CIRCUIT	HEATING CIRCUIT	
20 plates	10 plates	38002519
20 plates	20 plates	38002520
20 plates	30 plates	38002521
30 plates	10 plates	38002522
30 plates	20 plates	38002523
30 plates	30 plates	38002524
40 plates*	10 plates	38002525
40 plates*	20 plates	38002526
40 plates*	30 plates	38002527
*High efficiency heat exchanger DHW side		

C. Connection Jig	
Description	Part no.
3x M-F 1"-3/4" for cold water interface 3x M-F 1"-3/4" for hot water interface 1x M-F 1"-3/4" for cold water interface	49048721

D. TI45 Built-in Cover Box	
Description	Part no.
Built-in box 570mm x 800mm x 160mm Painted door - RAL 9010	49048718

E. TI45 Cover Box	
Description	Part no.
TI45 insulated front cover 750mm x 560mm x 220 mm	38002190

F. Wall Bracket	
Description	Part no.
Bracket for standard wall mount	20508164

G. Stand-off Brackets	
Description	Part no.
Wall mounting bracket with 50mm stand-off for installation of top connection pipework	20501822

H. Upward Connection Piping Kit	
Description	Part no.
Top connection piping kit. Stand-off brackets required for installation.	38002160

I. Energy Metering	
Description	Part no.
MEC CFMS   Qn 1.5 m³/h - 110x3/4" - CL3	20318910
MEC CFRS   Qn 1.5 m³/h - 110x3/4" - CL3	20318920
ULTRA CFMUS    Qn 1.5 m³/h - 110x3/4" - CL2	20319084
ULTRA CFRUS    Qn 1.5 m³/h - 110x3/4" - CL2	20319095

J. Water Meter	
Description	Part no.
C-VOL AFS 3/4"M - Single-jet water meter with dry dial for cold domestic water with pulse output. Max temp: 30 °C Qn 1.5 m³/h 10 l/mp - reed L 110 x 3/4"	20318464

K. Anti-water Hammer Kit	
Description	Part no.
Max. pressure: 15 bar Operating temperature: -10°C ÷ 100°C Precharge: 3.5 bar Material: INOX AISI 304 Rubber membrane: EPDM	20370010

L. External Sensor	
Description	Part no.
External sensor	20318486

M. Remote Control TI45 Ultra Lean	
Description	Part no.
With chronothermostat function and domestic temperature management	20318715



GENERAL INFORMATION

DHW

The production of instantaneous DHW is via a stainless steel plate heat exchanger. The regulation of DHW temperature is electronic via a pressure independent control valve that also allows balancing of the HIUs within the system.

HEATING

The heating is supplied via stainless steel plate heat exchanger. The regulation is made by a two-way valve (primary circuit) and the modulation of the secondary pump. The operation of the two-way valve maintains the secondary flow temperature at the set value. The speed of the secondary heating pump controls the desired thermal operation (between inlet and outlet of the space heating circuit).

EQUIPPED

The module is equipped with all the necessary safety components to ensure a correct functionality:

- 7 litre expansion tank for the secondary circuit
- Secondary circuit safety valve
- Primary / secondary air-vent valves
- Check valves
- Input for safety thermostat (low temperature systems)
- Filling system from DCW
- Strainer (primary side)

The module can be equipped with anti-water hammer kit if required.

SENSORS

The variables monitored are as follows:

- Primary circuit flow temperature (°C)
- DHW production temperature (°C)
- SPACE HEATING flow temperature
- SPACE HEATING return temperature
- Portata RISC
- Domestic water flow switch
- Heating circuit pressure transducer
- Primary circuit flow rate (energy meter)
- PWM modulating status feedback (heating circuit pump)
- Stepper motor position feedback

HEATING CONTROL LOGICS

- OFF: off position. The system does not activate the pump and the valve for heating control. The valve on the primary side is completely closed. The heating is only active when the winter season is selected.
- HEATING ACTIVATION: The control unit, thanks to its versatility, allows the connection of up to 2 zones through generic thermostats (dry contact). Moreover, the system can be connected to an OpenTherm remote controller. For low temperature systems, the control unit allows the connection with a safety thermostat (dry contact) to interrupt the circulation in case of over temperature.
- CONTROL OF THE FLOW TEMPERATURE: The controller through the control of the 2-way valve on the primary circuit (VM), guarantees the desired heating flow temperature. The flow temperature is controlled by means of the 2-way valve on the primary side reducing any kind of energy waste. The flow temperature, if an outside sensor is installed,

could be managed by means of a weather compensation curve, otherwise, the valve works as a fix point (settable).

- THERMAL GRADIENT CONTROL: Thanks to the PWM circulator, a precise modulation is possible in order to guarantee the desired thermal gradient between heating flow and return. This allows each type of system to work in the best possible way (desired design conditions). For example: 5°C for radiant; 10/15°C for high temperature systems; 20°C for fan coils or other settable values.
- ANTI-FREEZE: In case there is no heating demand but the flow sensor detects a temperature lower than 6°C the anti-freeze pump will be activated in order to prevent freezing.
- FLOW RATE BALANCING: with the stepper motor parameter (100÷700), you can set the value from 150 l/min to 1500 l/h.

DHW CONTROL LOGICS

- OFF: NO production of DHW. NO hot water from the primary.
- DHW WITHDRAWAL: If the flowmeter detects an DHW request higher than 0.9l/min, the system activates the controller with an Advanced PID logic* it quickly modulates the 2-way valve (primary side).
- PRIORITY: DHW demand has priority over heating. However, for small requests (< 6l/min), both heating and DHW can function together. With a DHW request over then 6 l/min for a time longer than 30', DHW has the 100% of priority - the two-way valve (primary side) and the heating is closed. This logic is designed to avoid continuous opening and closing of the valve when not necessary. The DHW request is closed if the flowmeter detects a flow rate of less than 0.6l/min.
- COMFORT FUNCTION: Is a timer function set to keep the plate heat exchanger "warm" and reactive enough to guarantee DHW in a very short time. The primary inlet sensor is controlled to remain over a threshold value (settable by the user). When the temperature of the primary inlet is lower than this threshold, the DHW two-way valve opens. When the threshold temperature is exceeded by a hysteresis value (user adjustable), the valve closes.
- The minimum opening of the DHW valve on the primary side allows the passage of the necessary energy to heat the plate heat exchanger and the primary inlet pipe affecting the primary outlet temperature by the minimum (Energy Efficient Function).
- RECIRCULATION PUMP: It is possible to install an external DHW secondary return (recirculation) pump. The control of this circulator can be time band controlled by the output (230V). If there is no control over the recirculation temperature, pumps with an integrated sensor should be considered. The use of the timer is an alternative to the use of the comfort function. The use of recirculation excludes the comfort function.

* The development of the PID logic relies on a numerical model to achieve the 'set point' in a shorter time than the traditional algorithm (FF Feed forward).

ERRORS

- Indication of the pressure of the heating system above or below threshold values (settable)
- Indication of temperature probe faults
- Indication of the failure of the secondary circulator
- Indication of intervention of the safety thermostat
- Anti-scald indication with threshold temperature at 60°C
- Electronic board fault indication

TI45

REMOTE CONTROL

A weekly programmable digital chronothermostat with remote boiler control (OpenTherm® compatible) and remote management via gsm.

The digital chronothermostat Kronos series integrates the functions of room temperature control and remote control of home heating system in a single interface. Specifically designed for the TI45 Ultra Lean, the functionality is both intuitive and user friendly.

It is possible to choose between different modes of thermoregulation, even when using an external probe for climatic compensation.

Weekly programming is particularly versatile because it provides four settable temperature levels with no restriction on the number of time slots per day. Segmented by quarter of an hour intervals, configuration can viewed on a daily programme graph in the control panel.

The communication between the thermostat and the control board of the boiler takes place by means of a two-wire cable; the data are exchanged with the communication protocol compatible OpenTherm™ v3.0.



Operating temperature	0°C + 50°C
Power supply	3V
Protection degree	IP30
Dimensions	140mm x 90mm x 32 mm
Weight	170 g
Directive	EMC 2004/1108/CE LVD 2006/95/CE

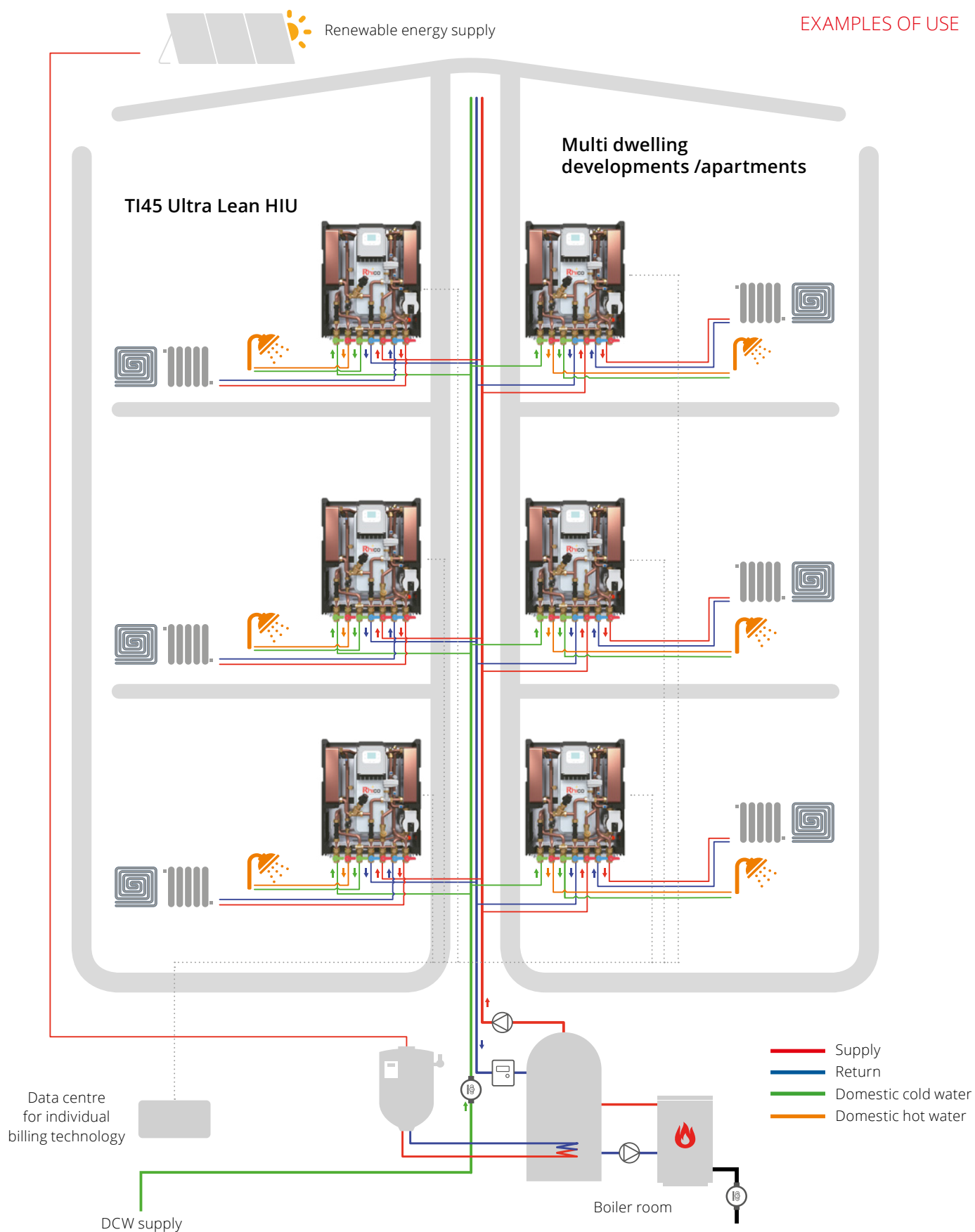
DIGITAL CONTROLLER



Error code	Meaning
E1.1	System pressure lower than parameter value P 9
E1.2	System pressure higher than parameter value P 10
E2.1	Primary circuit sensor failure: short circuit
E2.2	Primary circuit sensor failure: open circuit
E3.1	Heating circuit flow sensor: short circuit
E3.2	Heating circuit flow sensor failure: open circuit
E4.1	Domestic water circuit sensor failure: short circuit
E4.2	Domestic water sensor failure: open circuit
E5.1	Heating circuit return sensor failure: short circuit
E5.2	Heating circuit return sensor failure: open circuit
E 7 <-> nn	Circulating pump error: the feedback signal notify a malfunction
E.8	Limit thermostat intervention (visualizzato solo con P2 = 1)
E.9	DHW temperature over 60°C
E.10	Eeprom memory failure: replace the circuit board

AUX 1 IN/OUT	AUX 2 IN/OUT	SE IN	TS IN
Room thermostat zone 1 connection (option remote control OPEN THERM)	Room thermostat zone 2 connection (depending on module configuration)	External sensor connection	50°C safety thermostat connection (low temperature heating circuit)
EV2 OUT	VC OUT	RS 232 TX RX 5V GND IN/OUT	RS 485 BUS A B GND IN/OUT
2-way valve (heating zone 2) or DHW return pump with scheduling (Excludes by-pass function)	Primary circuit 2-way valve connection	Firmware update serial connection	RS485 connection interface (remote control), external sensor reading, primary circuit main valve settings

Code	Description
t.1	Primary circuit sensor temperature [°C]
t.2	Heating flow circuit sensor temperature [°C]
t.3	Heating return circuit sensor temperature [°C]
t.4	DHW sensor temperature [°C]
H2o	Heating circuit pressure [bar]
FLM	DHW withdrawal [l/min]
Pmp	PWM signal value [%] (refer to the graph.1 operating manual)
Fb.p	Circulating pump feedback: flowrate [l/min]
Stp	Stepper motor position [1 half step = 0,0064mm] in relation to total closure
Act	Heating circuit modulating valve working position [msec]
t.5	External sensor temperature [°C]
Es.t	Heating circuit setpoint (calculated in function of the outside temperature) [°C]



Notes



RHICO DESIGN

Rhico was founded after years of research and development in the field of district heating after recognising the need for high quality equipment at competitive prices. It is our aim to become a market leader by supplying ground breaking ultra low temperature products reducing gas consumption and building overhear temperatures by the reduction of primary flow temperatures to 60°C. The reduction in temperature has a positive throughout the system by allowing the introduction of renewable energy products such as heat pump technology and reducing our reliance on fossil fuels.

Rhico Limited. Aviation Business Park, Enterprise Close, Christchurch, Dorset, BH23 6NX

T: 0800 975 0795 E: info@rhico.co.uk www.rhico.co.uk



Aviation Business Park, Enterprise Close,
Christchurch, Dorset, BH23 6NX

T: 0800 975 0795 E: info@rhico.co.uk

www.rhico.co.uk