Appendix to the Original operating instructions

WP Max-AirMono F11/F17

As of 10/12/2023

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INFORMATION

This appendix to the operating instructions is part of the technical documentation for the device in accordance with:

- Directive 2014/35/EU of the European Parliament and of the Council of February 26, 2014, on the harmonization of the laws of Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
- Directive 2014/68/EU of the European Parliament and of the Council of May 15, 2014, on the harmonization of the laws of Member States relating to the making available on the market of pressure equipment

This appendix to the operating instructions is intended for the operator, who must hand it over to the personnel who come into contact with the device. The operator must ensure that the information contained in the appendix to the operating instructions and in the accompanying documents has been read and understood.

NOTE: If in doubt, consult the appendix to the operating instructions, which must be kept in a known and easily accessible location.

The manufacturer accepts no liability for damage to persons, animals, or property, or to the device itself, resulting from improper use, failure to observe or insufficient observance of the safety criteria contained in the appendix to these operating instructions, or from modification of the device or the use of unsuitable spare parts. The copyright for the appendix to these operating instructions is held exclusively by the company:

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Smart Energy Systems

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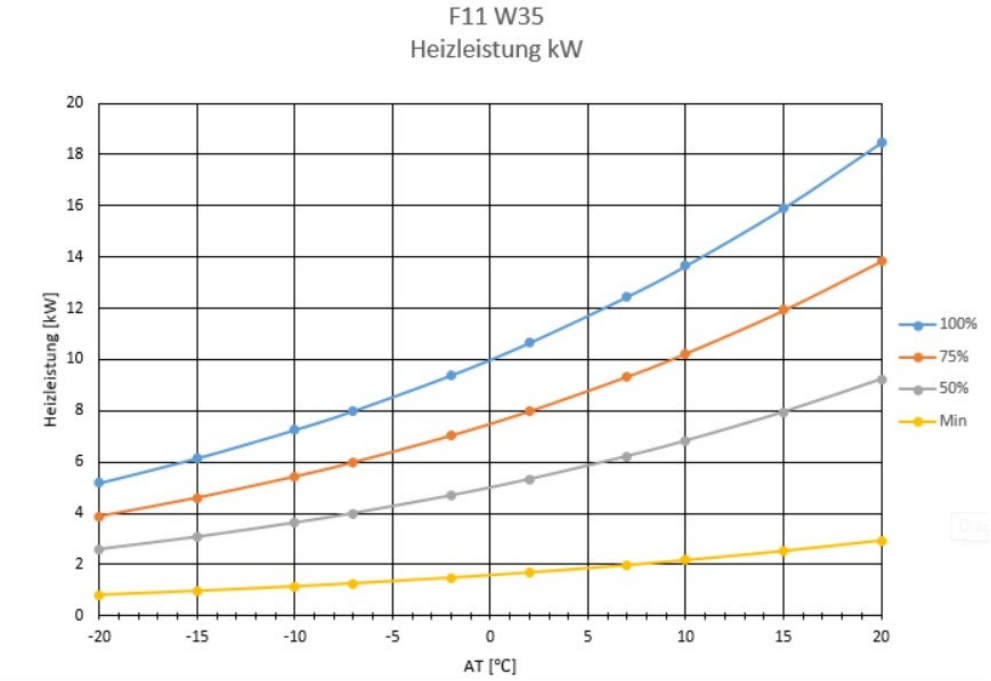
Wellheimer Straße 34
91795 Dollnstein Germany

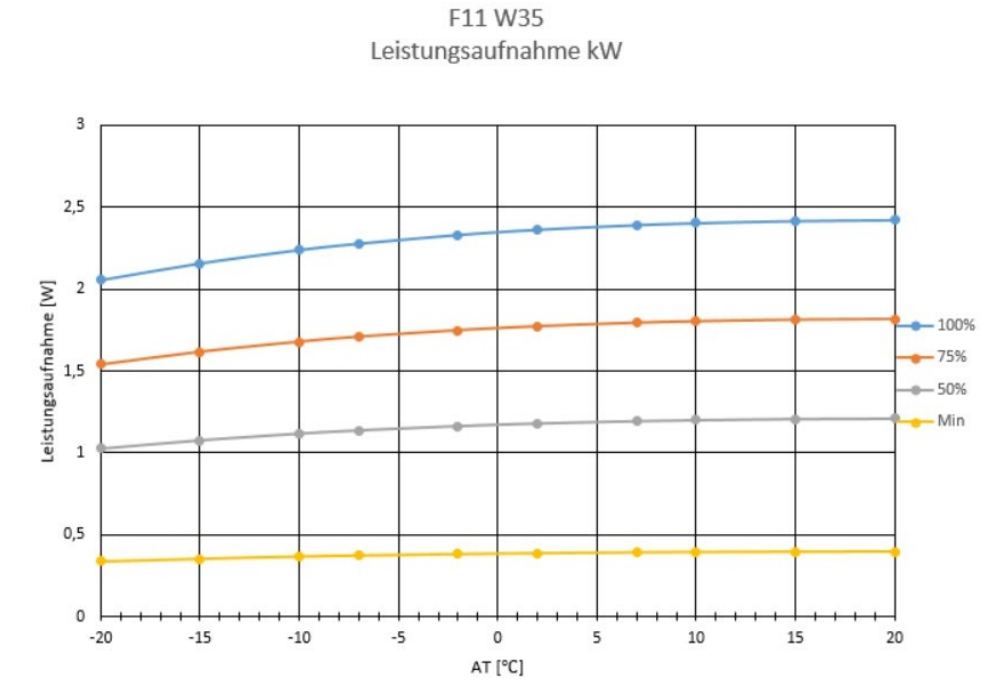
Status: 07/11/2022

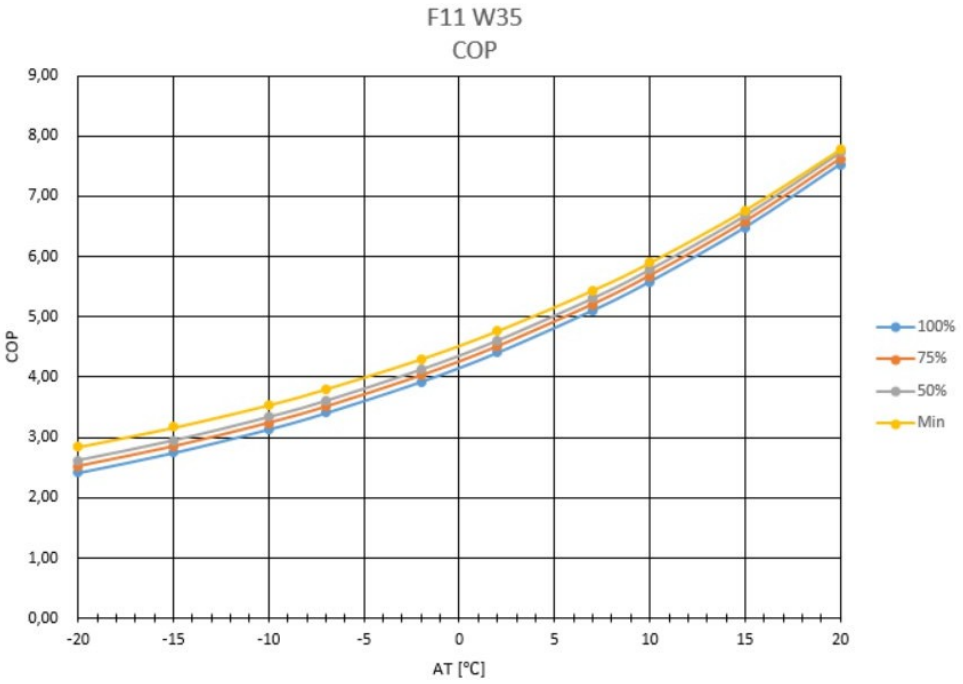
TABLE OF CONTENTS

1. PERFORMANCE TABLES

1.1 PERFORMANCE TABLE F11 W35



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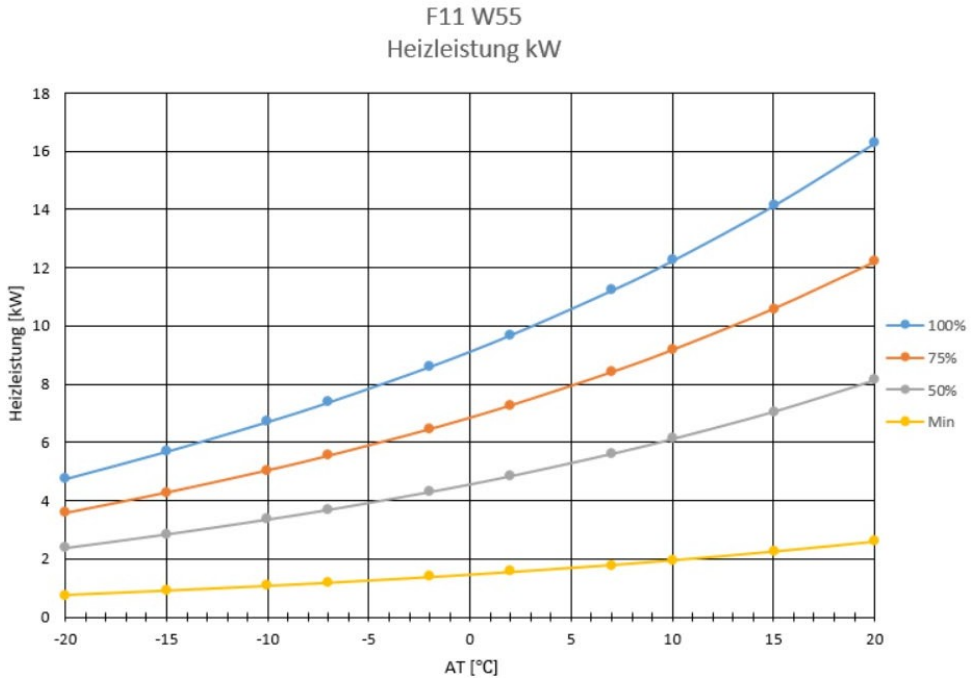
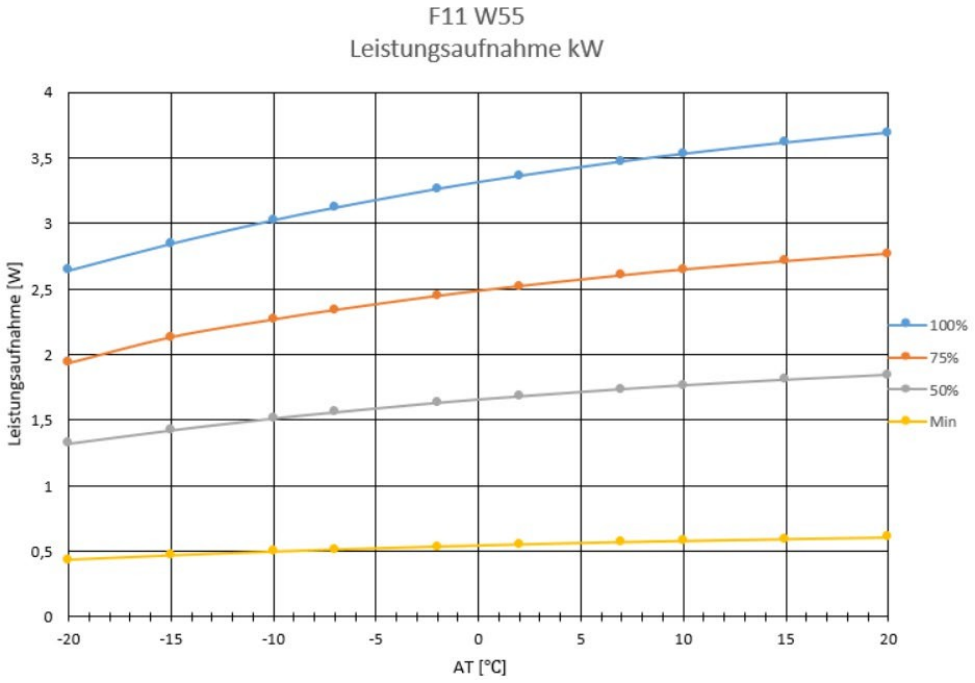
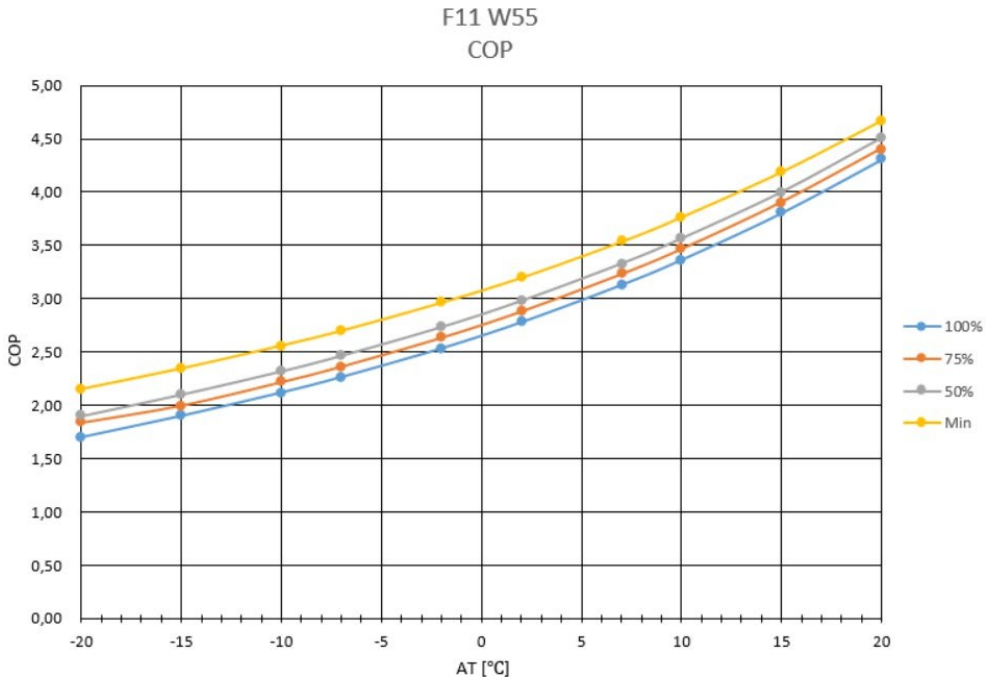
1.2 PERFORMANCE TABLE F11 W55



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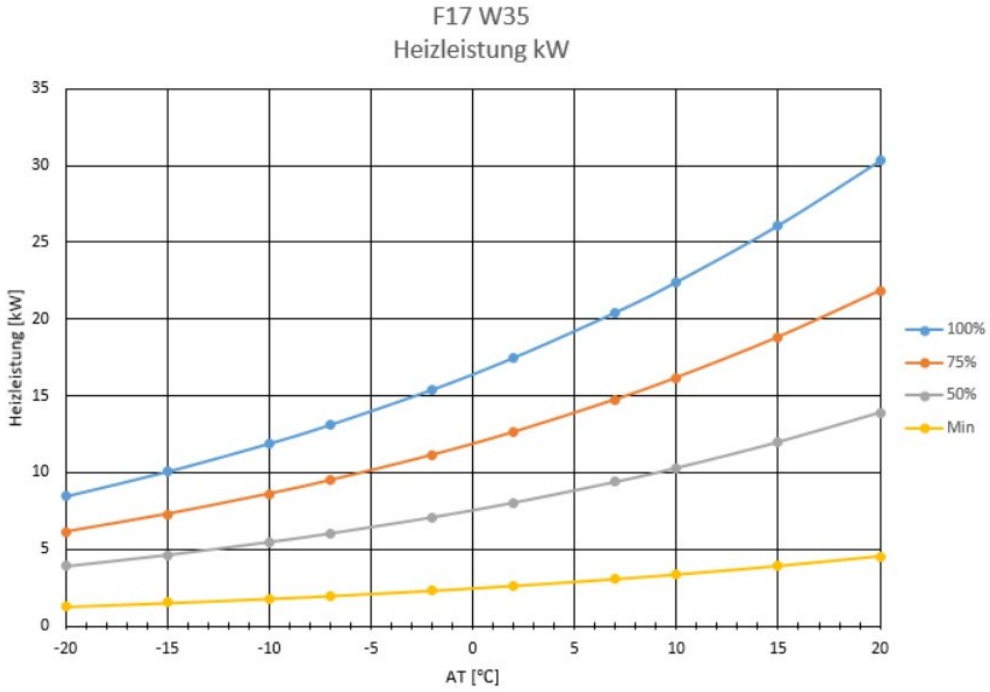

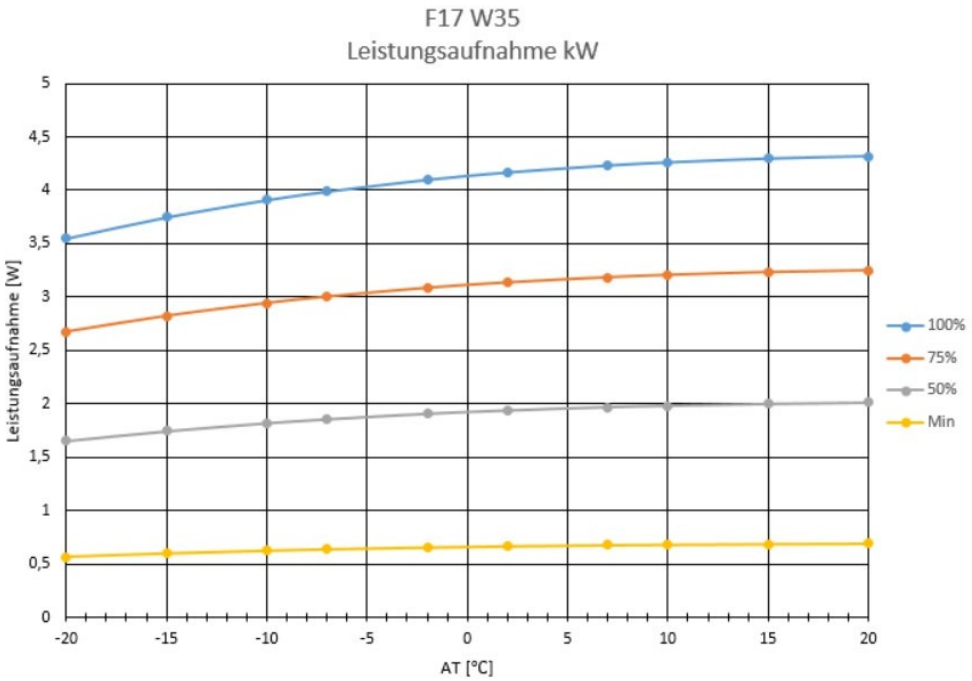

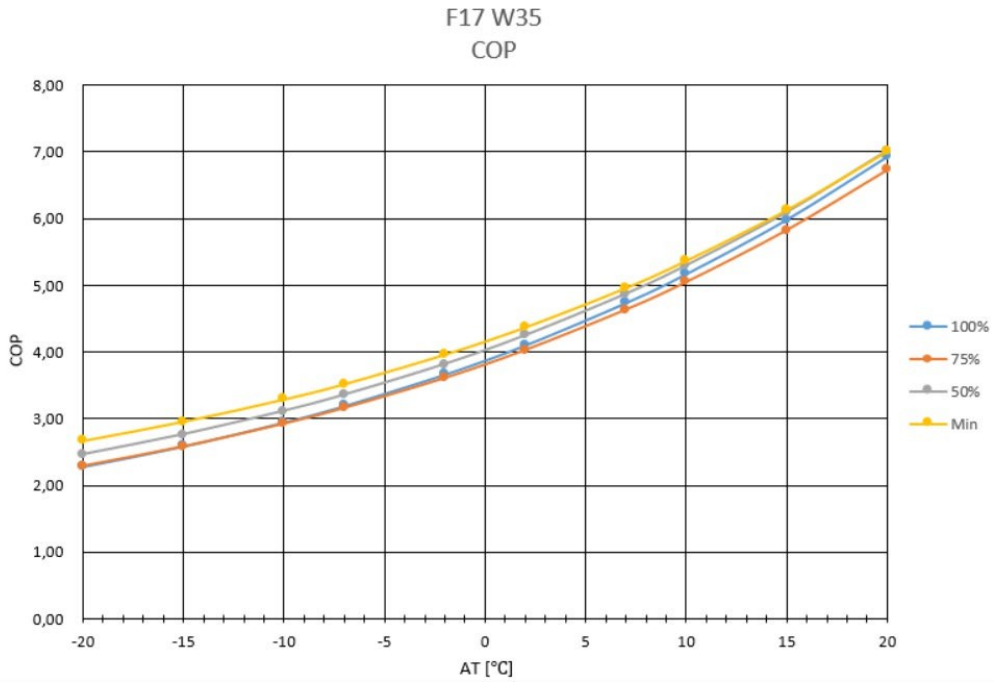
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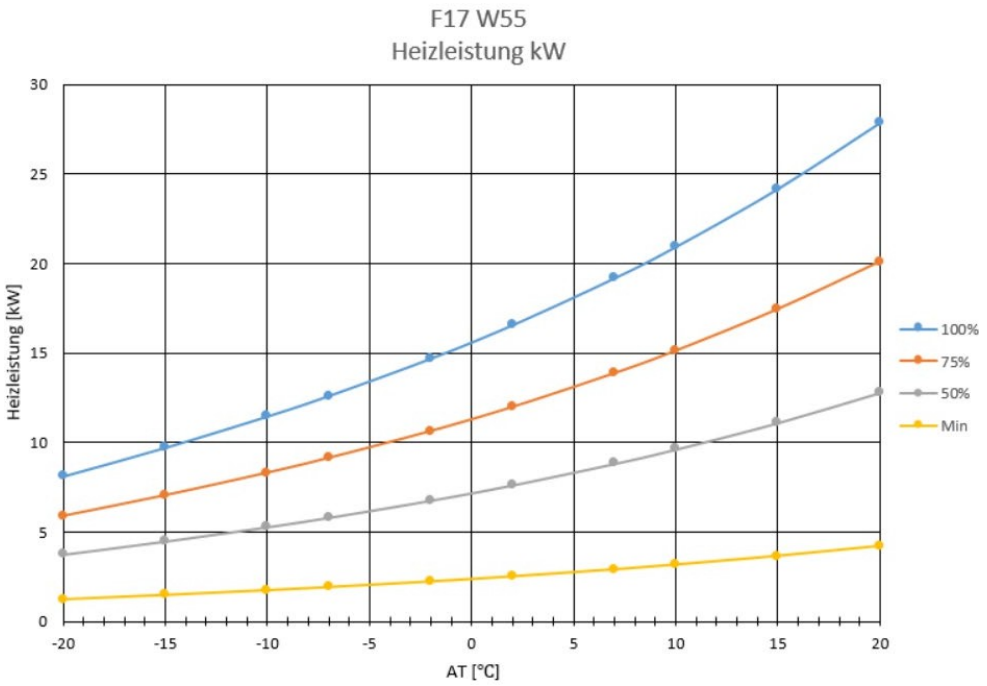
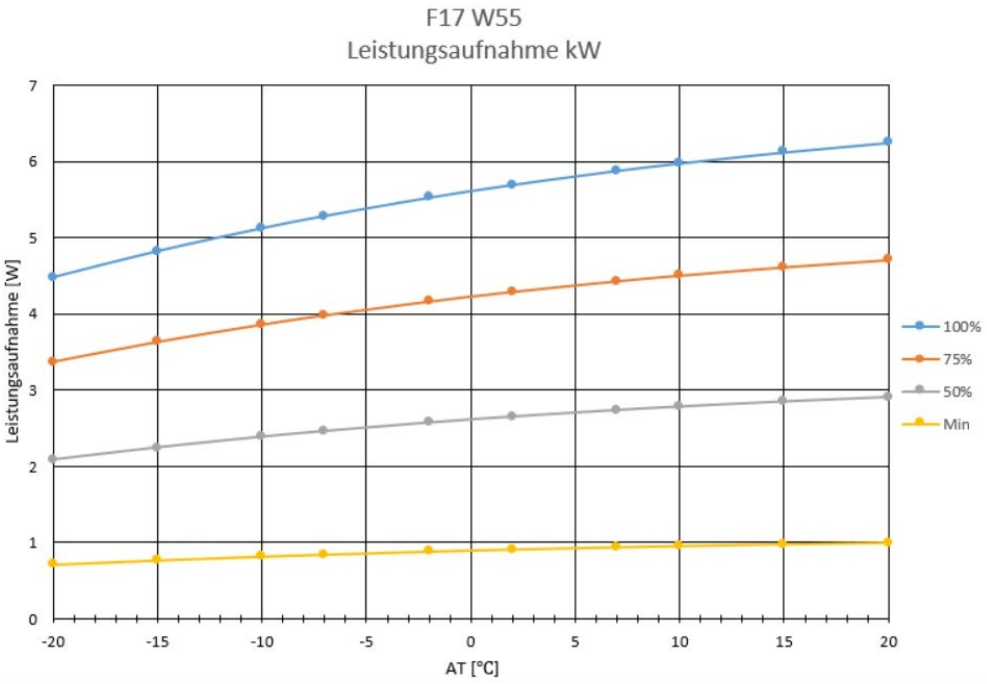
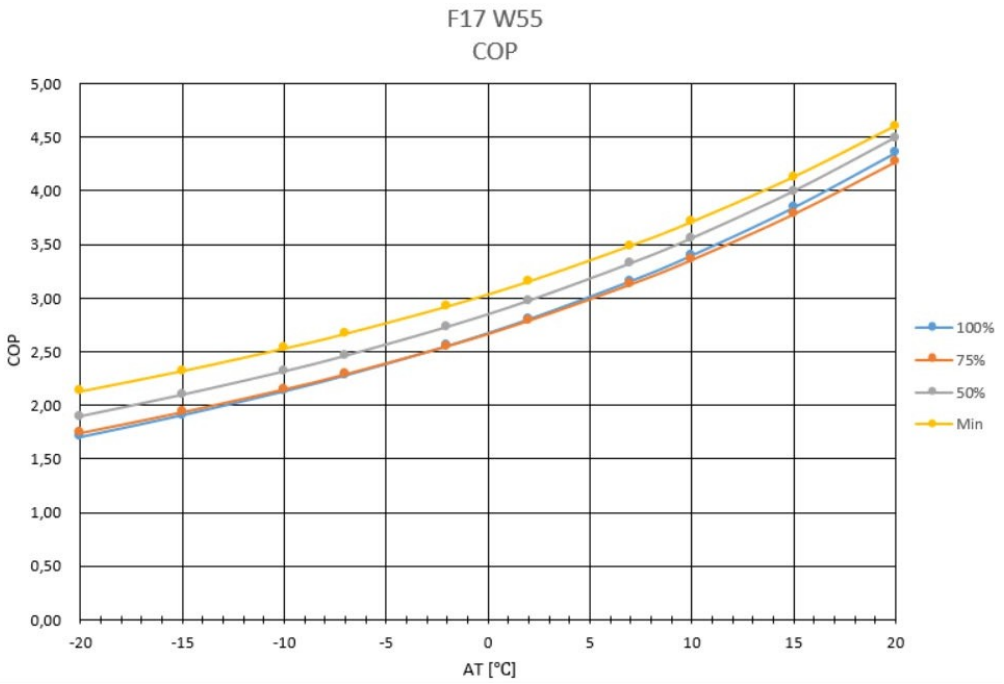
1.4 PERFORMANCE TABLE F17 W55



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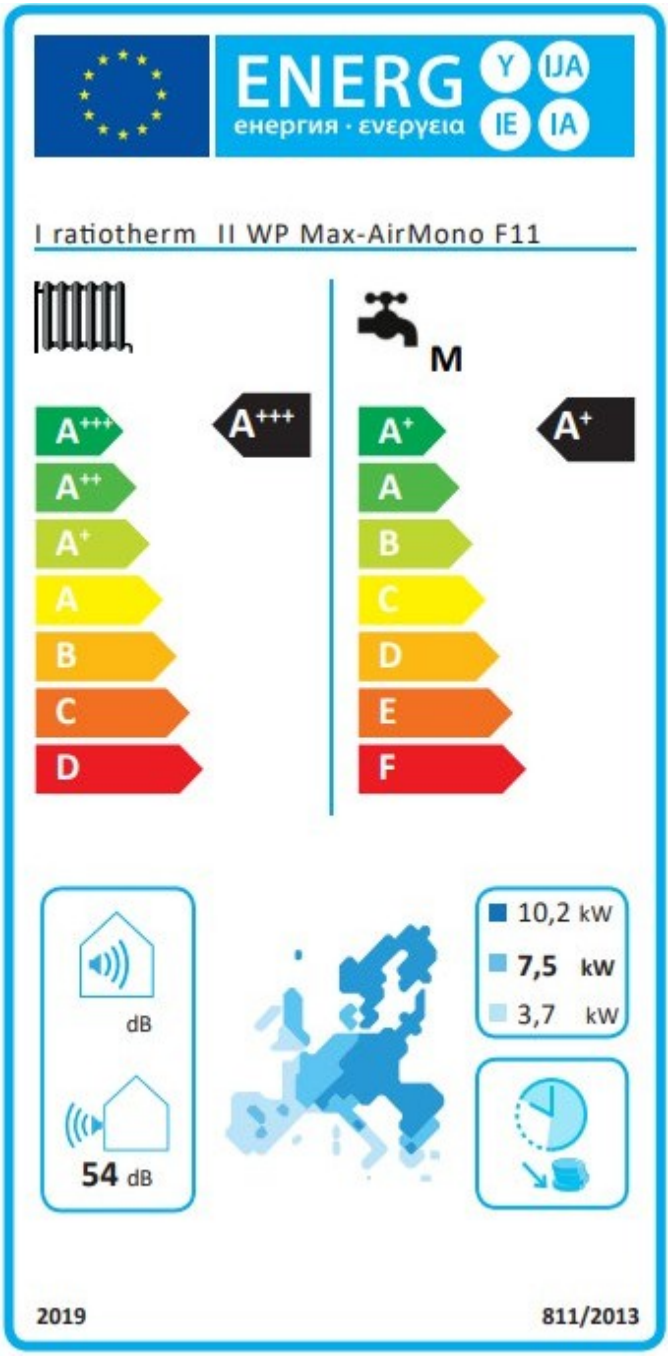
2. PRODUCT DATA SHEET IN ACCORDANCE WITH EU REGULATION NO. 811/2013

Product data sheet according to EU Regulation No. 811/2013				
Model		WP Max-AirMono F11		
Air/water heat pump			Yes	
Water/water heat pump			No	
Brine/water heat pump			No	
Equipped with additional heating unit			No	
Combination heater with heat pump			Yes	
Heating mode	**Climate zone**	**Flow temperature**		
		35 °C	**55 °C**	
Class for space heating energy efficiency	Cold	A	A	
	medium	A	A	
	Warm	A	A	
Space heating energy efficiency	Cold	171.47	125.9	
	Medium	193.6	141.7	
	warm	259.7	187.85	
Seasonal performance factor	Cold	4.36	3.22	
	Average	4.92	3.62	
	warm	6.57	4.77	
Nominal heating output	cold	10.26	9.48	kW
	Medium	7.5	7.0	
	warm	3.78	3.51	
Performance points				
-7 °C	P1	6.21 kW	5.74 kW	
	COP1	3.36	2.5	
2 °C	P2	3.78 kW	3.51 kW	
	COP2	4.69	3.49	
7 °C	P3	2.62 kW	2.24 kW	
	COP3	6.66	4.64	
12 °C	P4	2.54 kW	2.32 kW	
	COP4	8.92	6.31	
Bivalence temperature = -10 °C	P5	7.27 kW	6.97 kW	
	COP5	3.05	2.33	
Power consumption Operating mode				
P Temperature controller off			9	W
P Standby mode			8	
P Crankcase heater			11	
P off			9	
Energy label – hot water preparation				
Load profile			m	
Hot water energy efficiency			188.24	
Class for hot water energy efficiency			A	
Daily electricity consumption			1.26	kWh
Annual electricity consumption			272	kWh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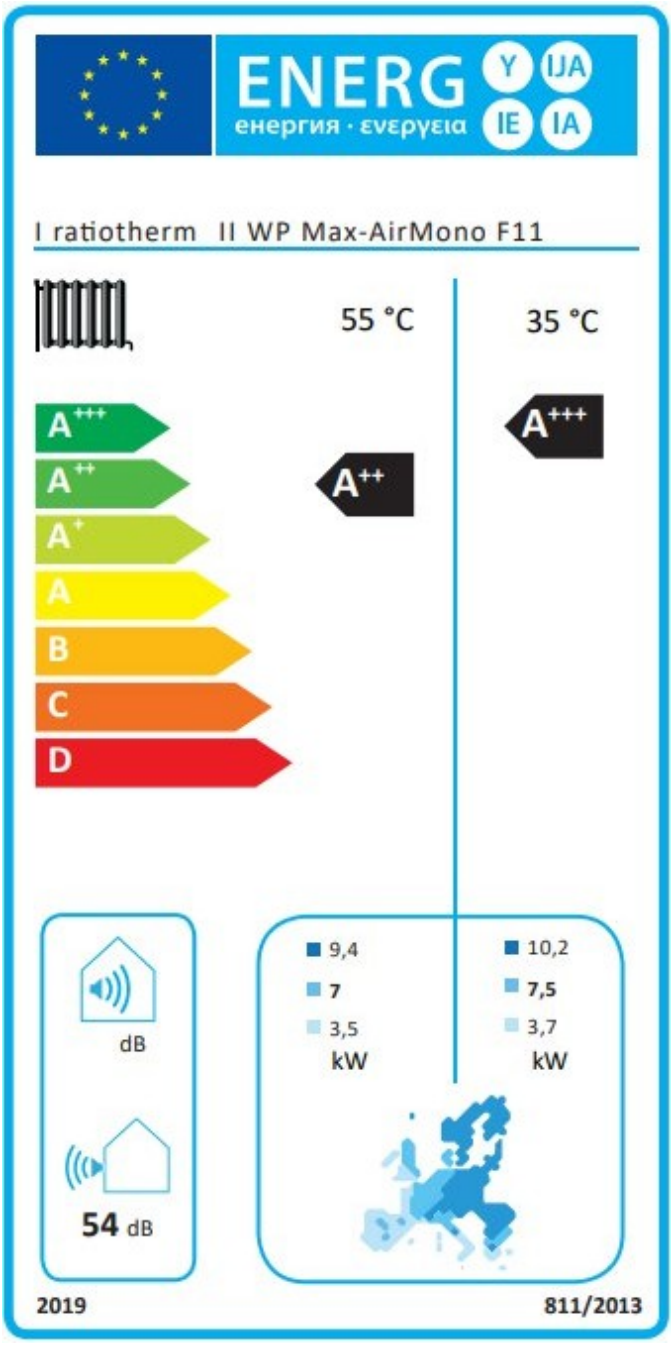
54 dB
10,2 kW
7,5 kW
3,7 kW
2019
811/2013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9,4
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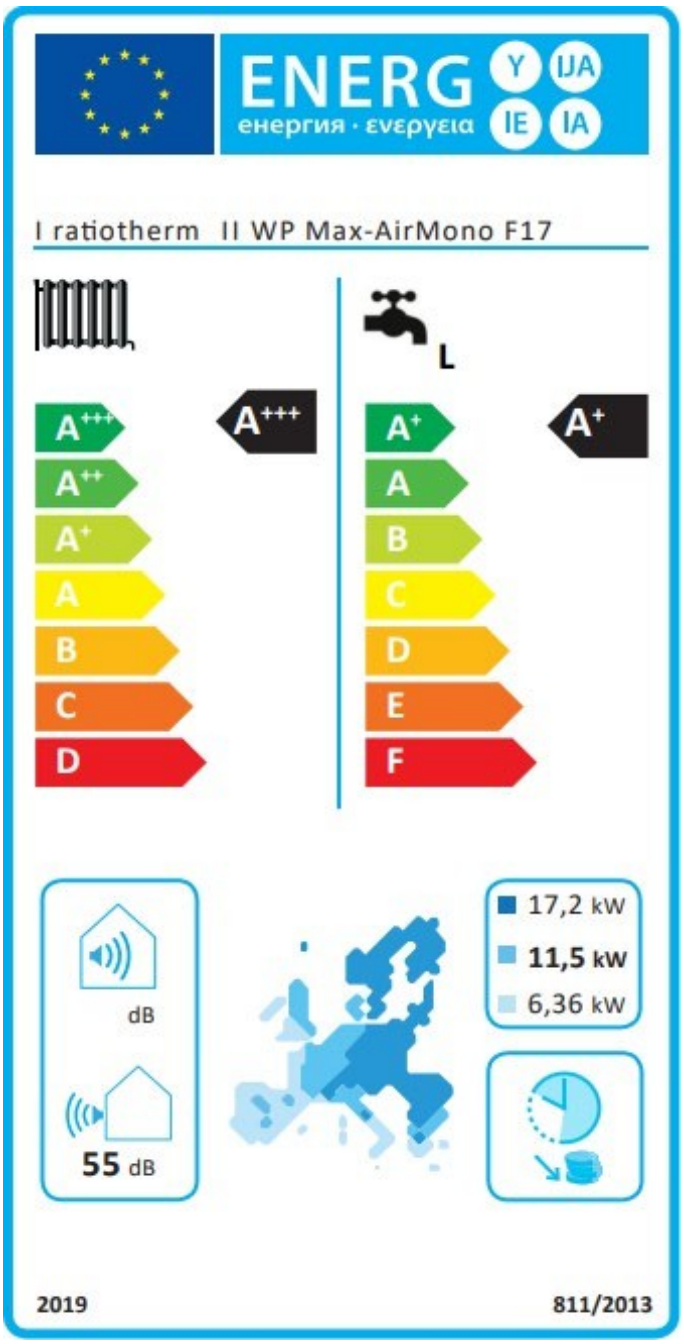
811/2013

Product data sheet in accordance with EU Regulation No. 811/2013

Model	WP Max-AirMono F17	
Air/water heat pump	Yes	
Water/water heat pump	No	
Brine/water heat pump	No	
Equipped with additional heating unit	no	
Combination heater with heat pump	Yes	

Heating mode	Climate zone	Flow temperature		
		35 °C	55 °C	
Class for space heating energy efficiency	Cold	A	A	
	medium	A	A	
	Warm	A	A	
Space heating energy efficiency	Cold	155.9	126.3	%
	Medium	180.6	143.6	
	warm	247.5	194.7	
Seasonal performance factor	Cold	3.97	3.23	
	Average	4.59	3.67	
	warm	6.26	4.94	
Nominal heating output	cold	17.26	16.37	kW
	Medium	11.5	12.3	
	warm	6.36	6.03	
Power points				
-7 °C	P1	10.60 kW	9.90 kW	
	COP1	2.87	2.51	
2 °C	P2	6.98 kW	5.99 kW	
	COP2	4.57	3.51	
7 °C	P3	5.03 kW	4.11 kW	
	COP3	6.07	4.74	
12 °C	P4	3.95 kW	3.87 kW	
	COP4	7.80	6.08	
Bivalence temperature = -10 °C	P5	10.11 kW	11.68 kW	
	COP5	2.49	2.25	
Power consumption Operating mode				
P Temperature controller off			9	W
P Standby mode			8	
P Crankcase heater			11	
P off			9	
Energy label – hot water preparation				
Load profile			l	
Hot water energy efficiency			190.97	
Class for hot water heating energy efficiency			A	
Daily electricity consumption			2.50	kWh
Annual electricity consumption			536	kWh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dB
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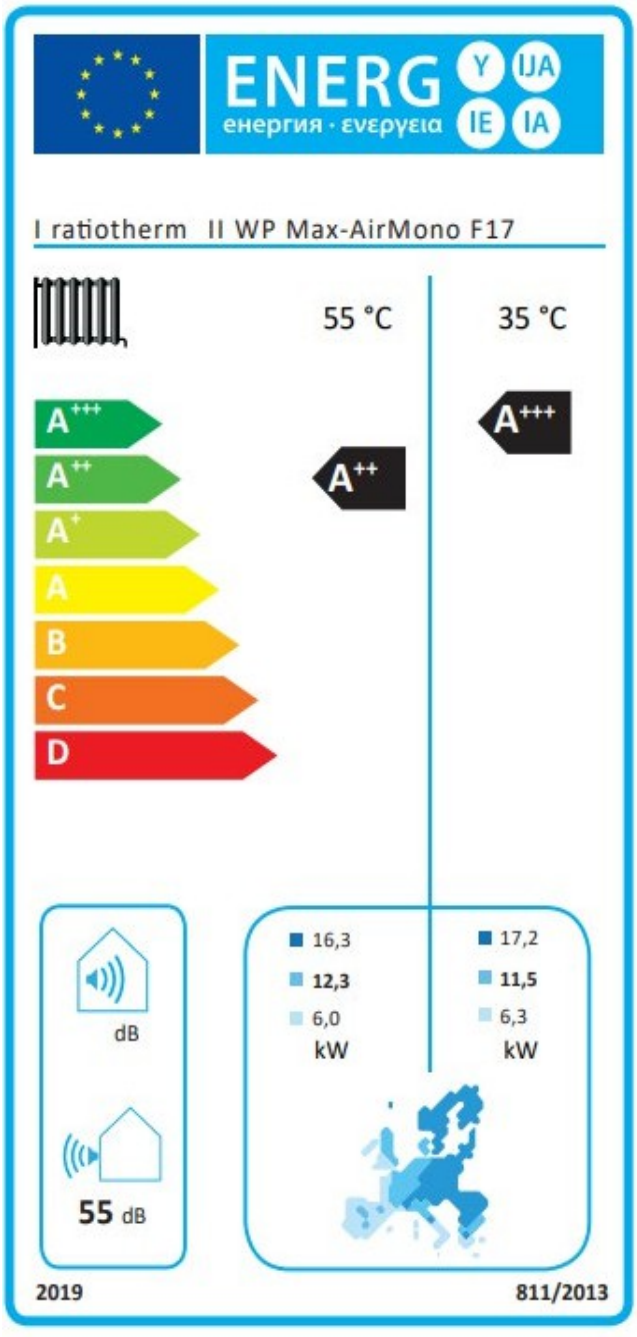
17,2 kW
11,5 kW
6,36 kW
2019
811/2013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55 dB
16,3
12,3
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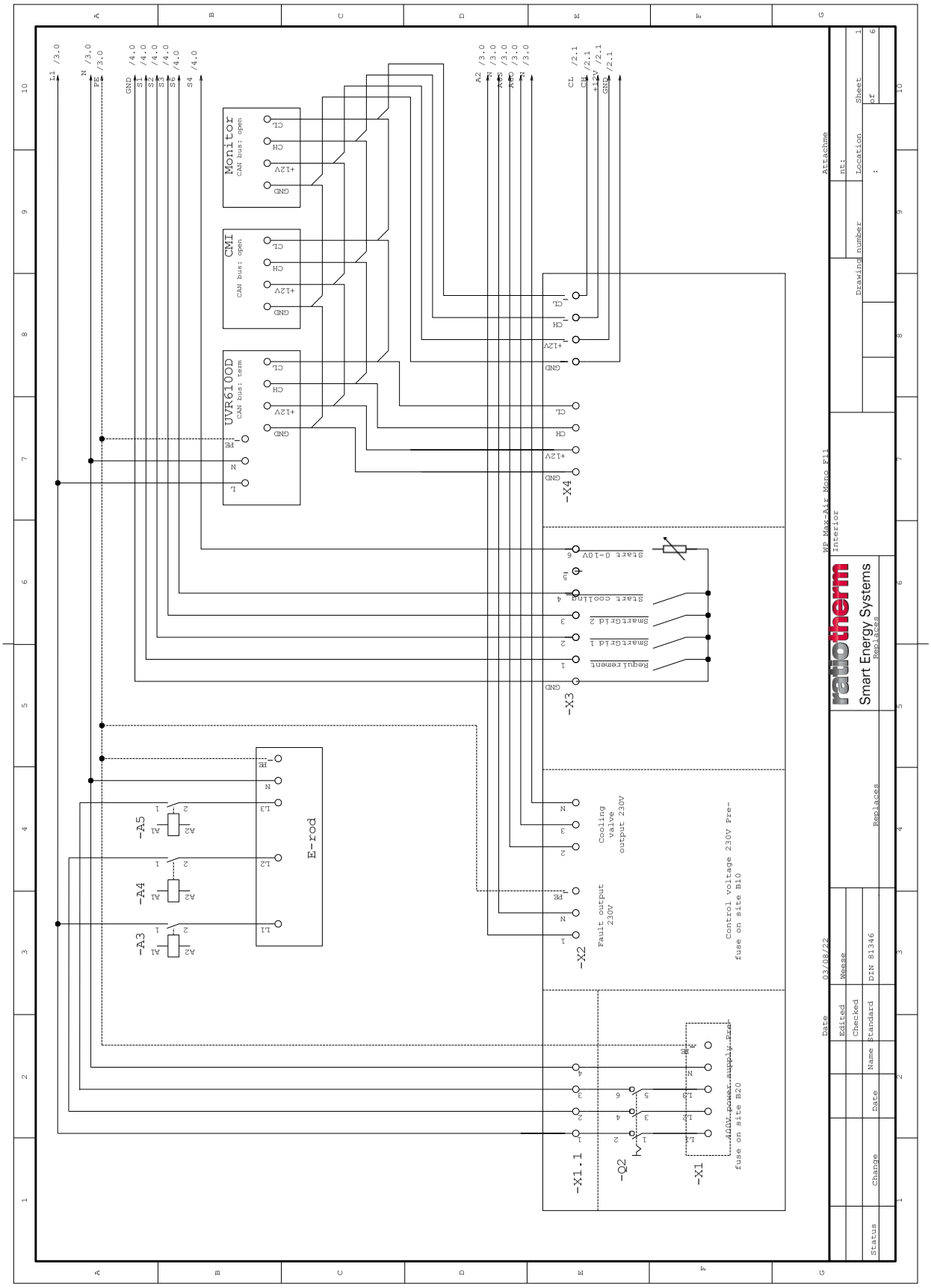
kW
17,2
11,5
6,3
kW
2019
811/2013

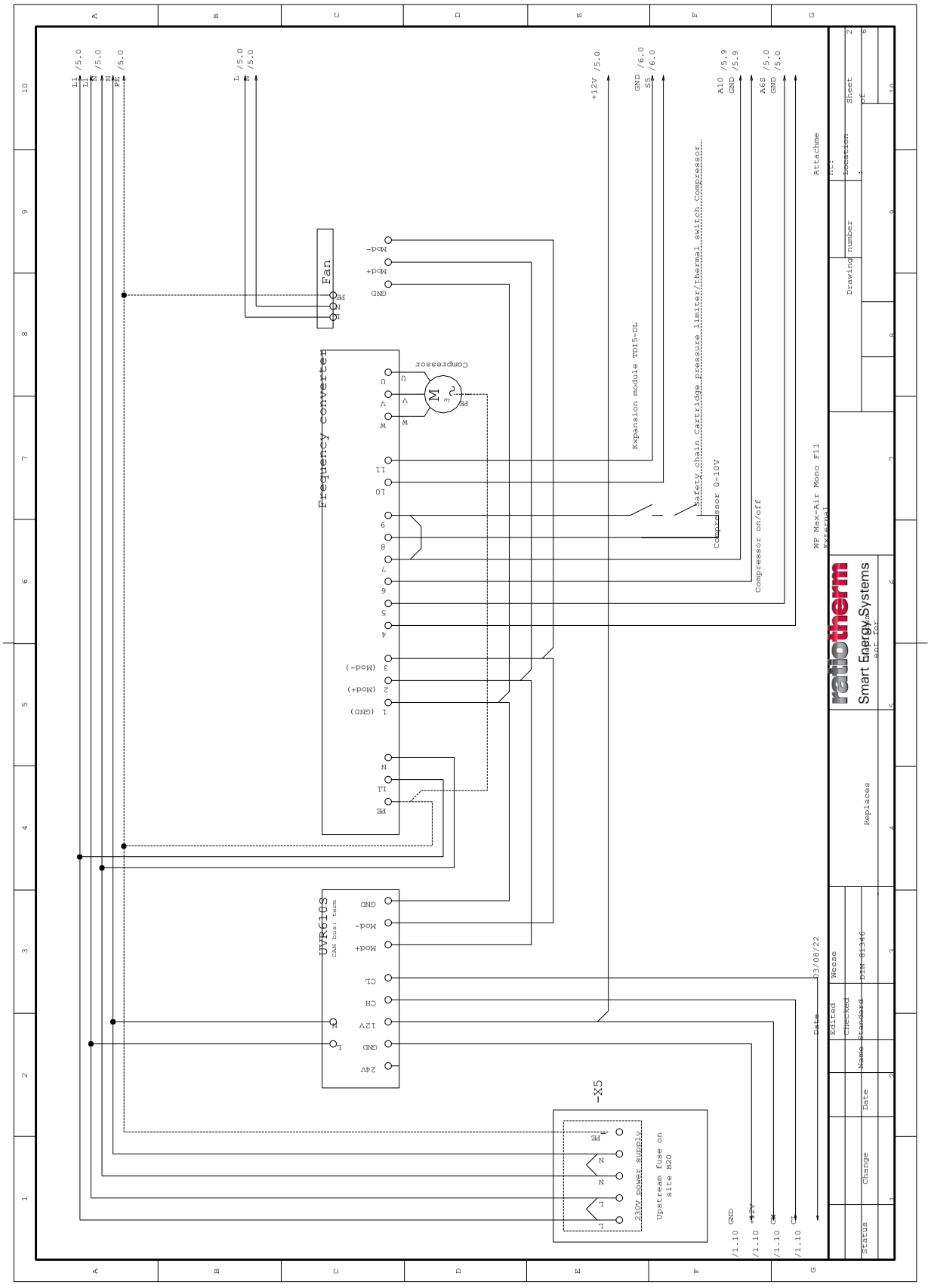
3. ELEKTROPLAN

3.1 ELEKTROPLAN WP MAX-AIRMONO F11

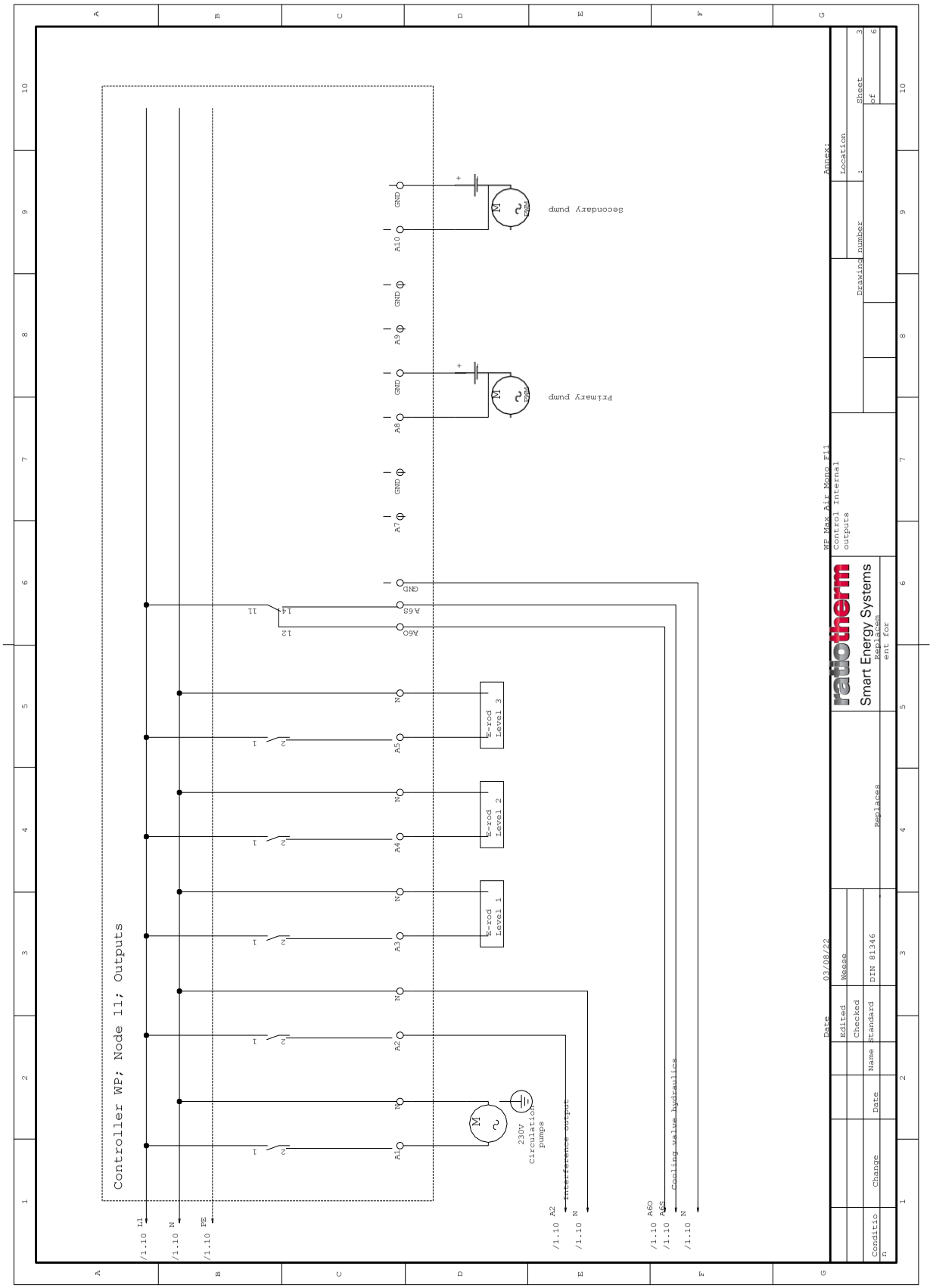
3.1.1 INDOOR CONTROL



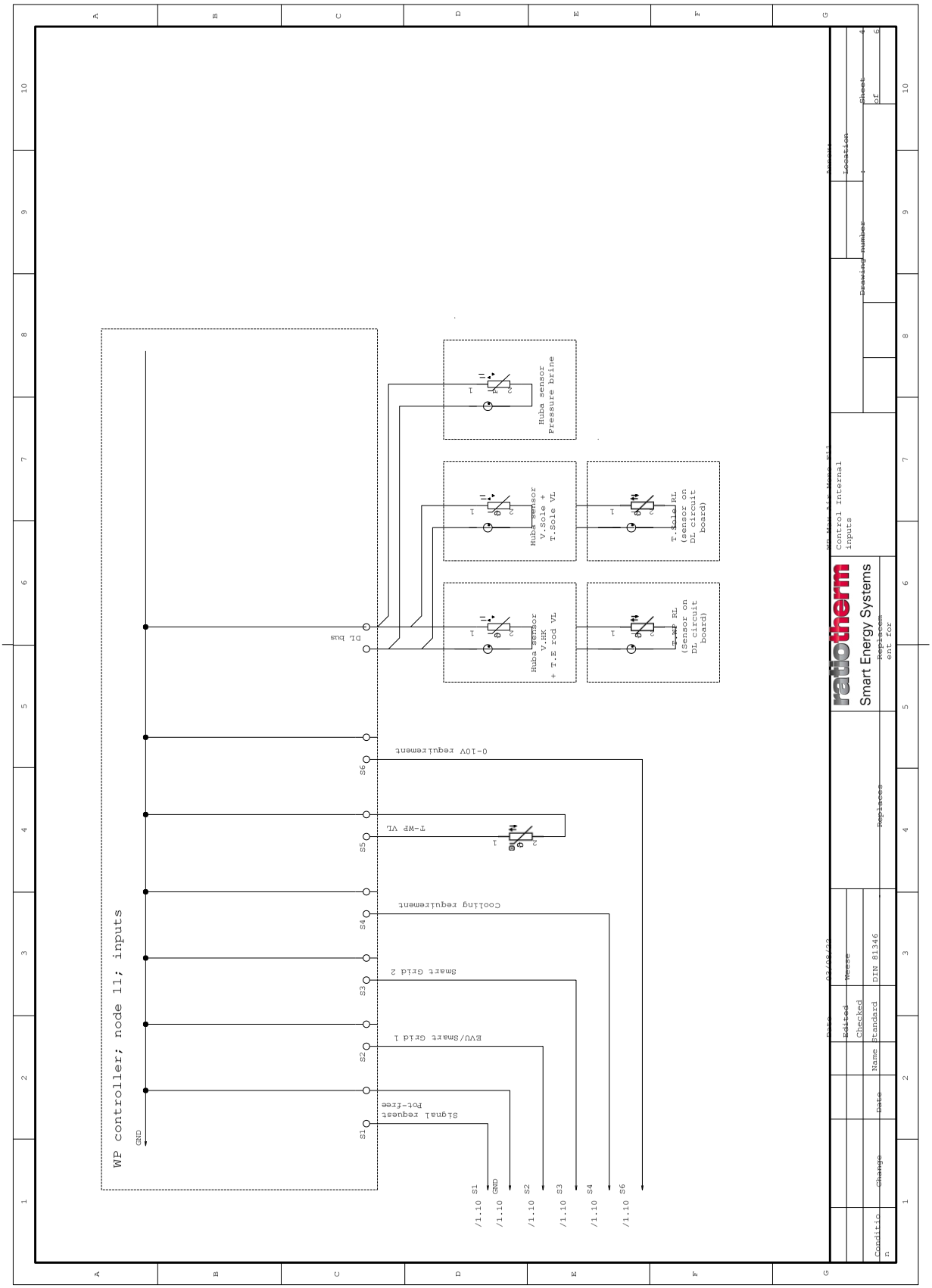
3.1.2 OUTDOOR CONTROLS



3.1.3 CONTROLS INTERNAL OUTPUTS



3.1.4 REGULATIONS FOR INTERIOR ENTRANCES



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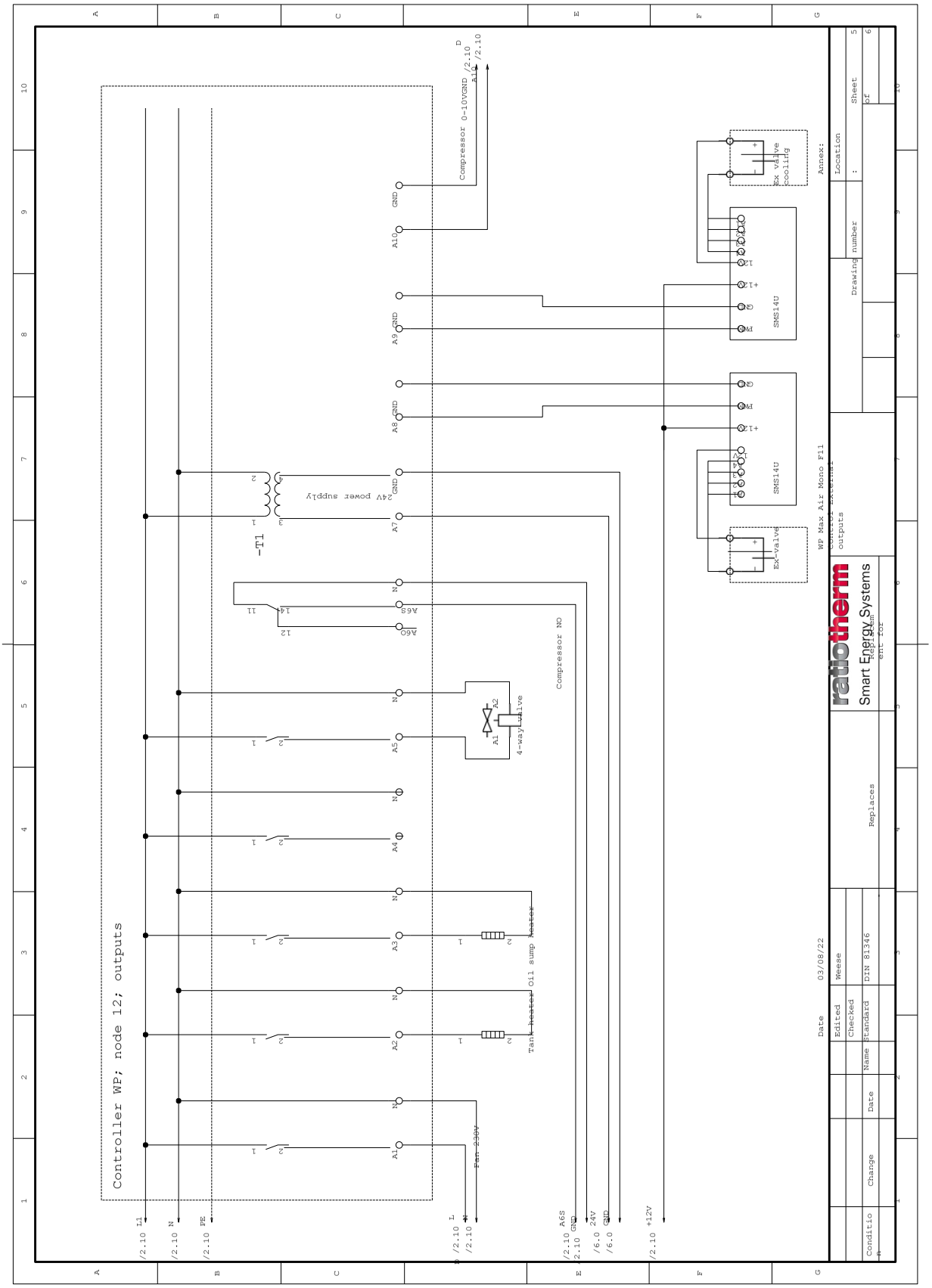
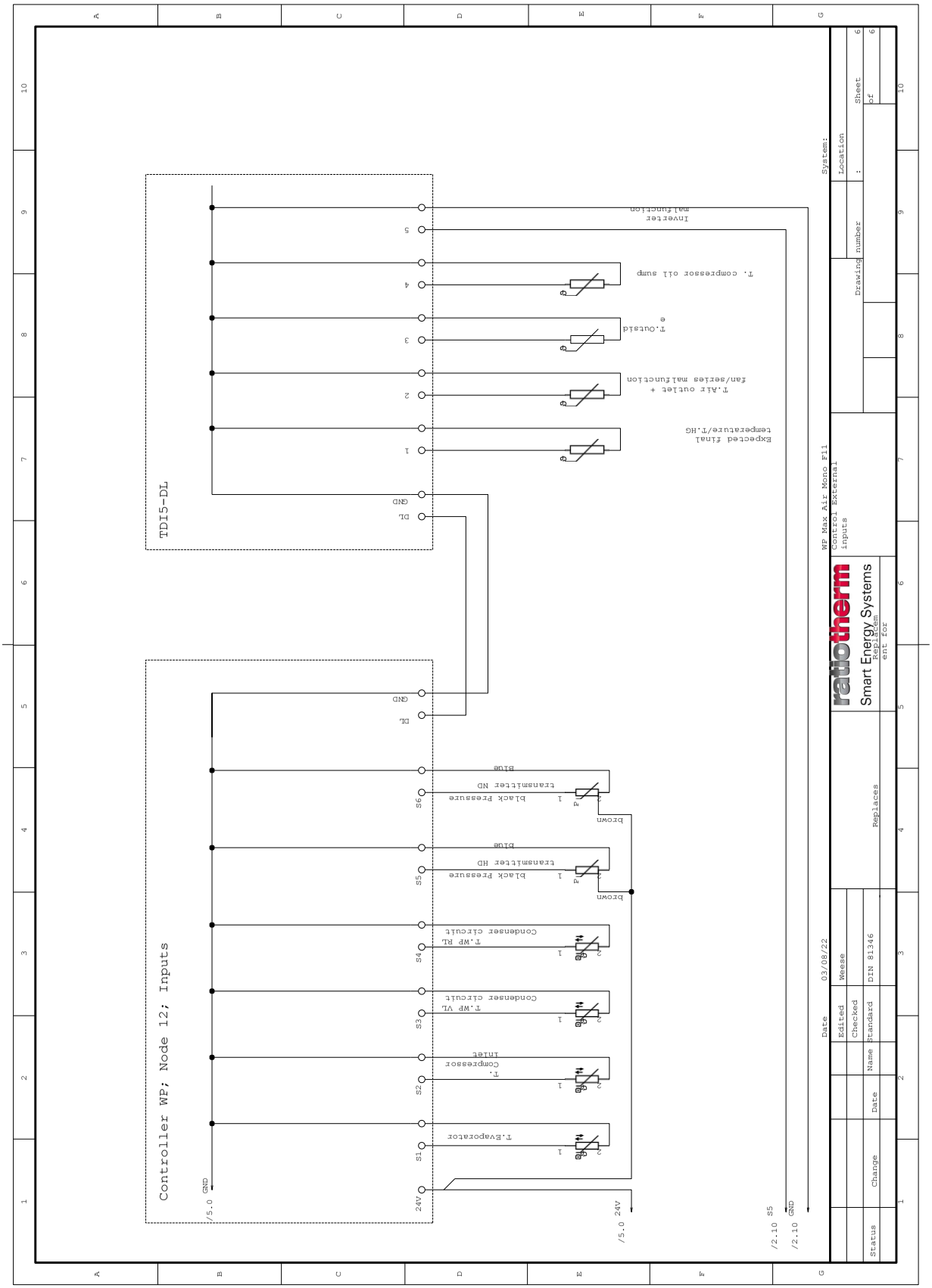
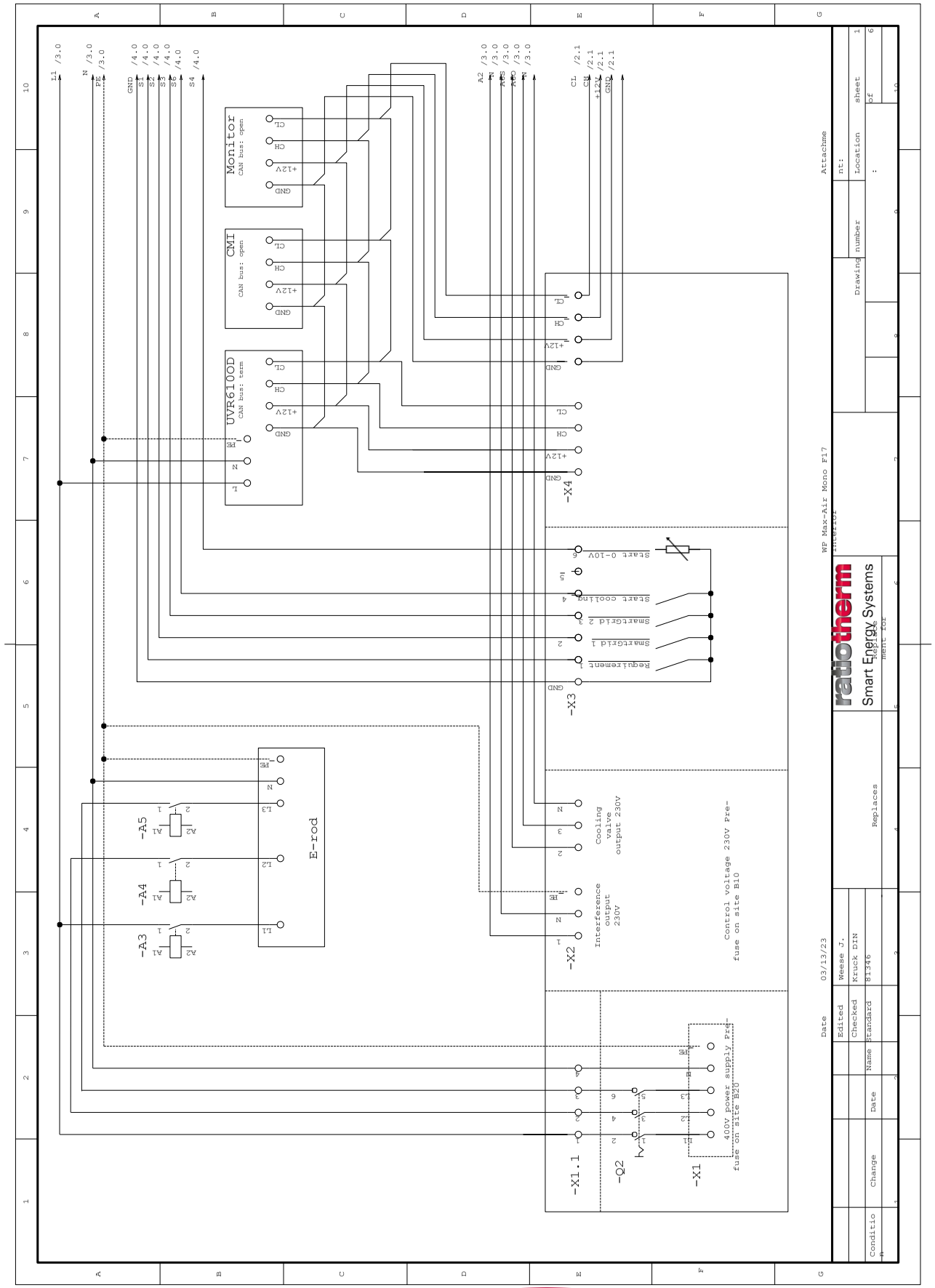


3.1.6 CONTROLS EXTERNAL INPUTS

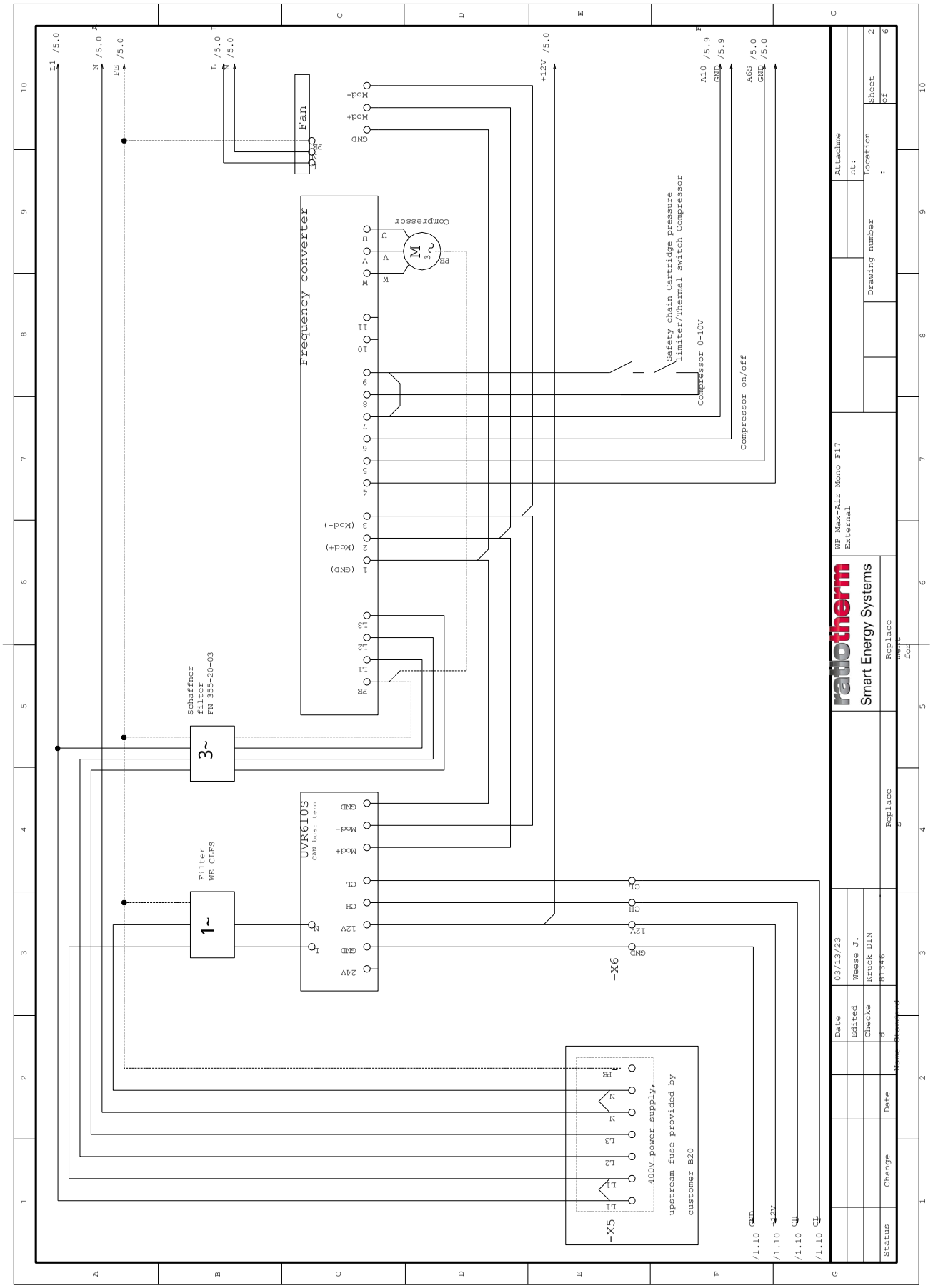


3.2 ELEKTROPLAN WP MAX-AIRMONO F17

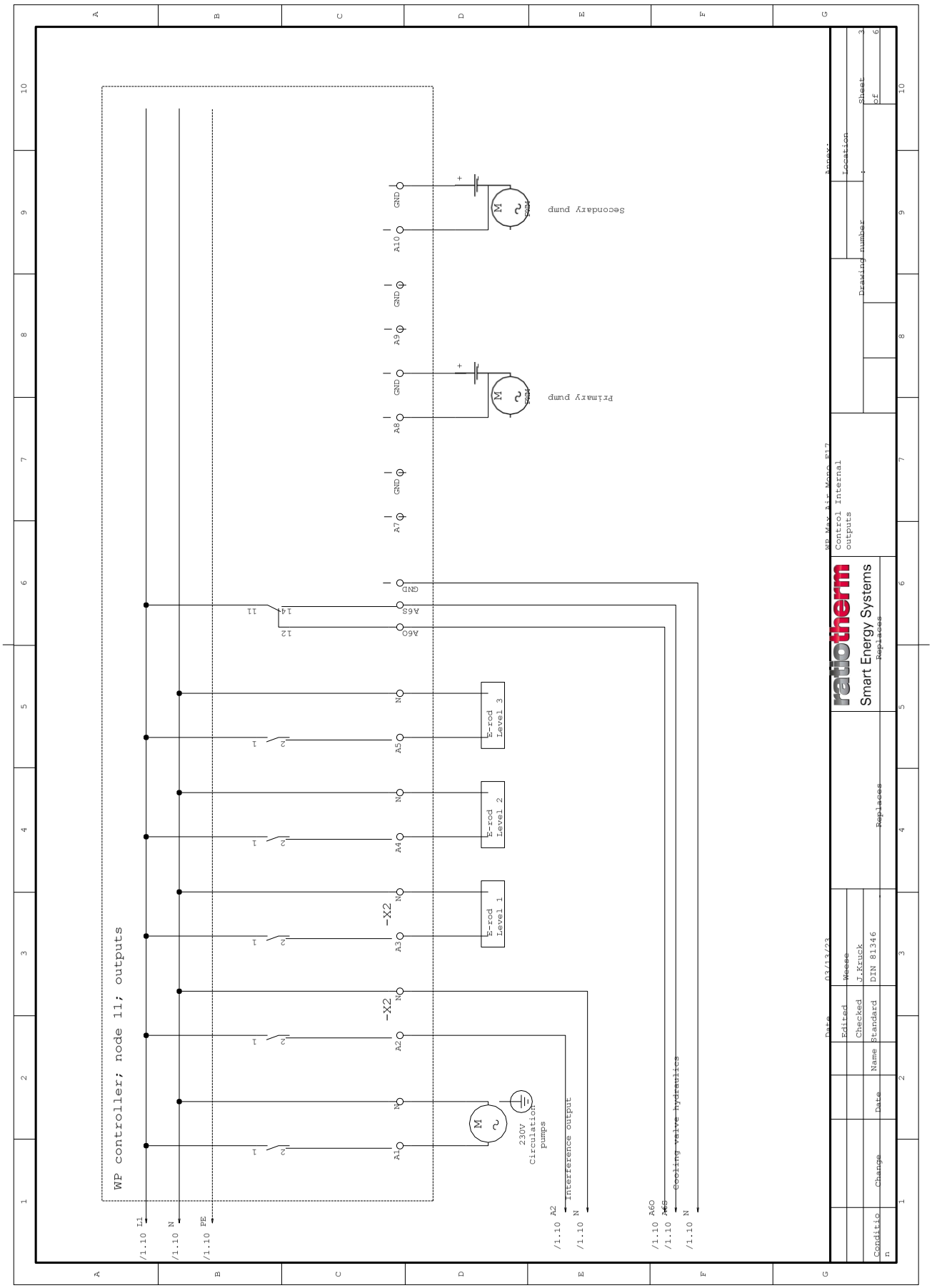
3.2 INDOOR CONTROL



3.2.2 OUTDOOR CONTROLS



3.2.3 INTERNAL OUTPUT CONTROLS



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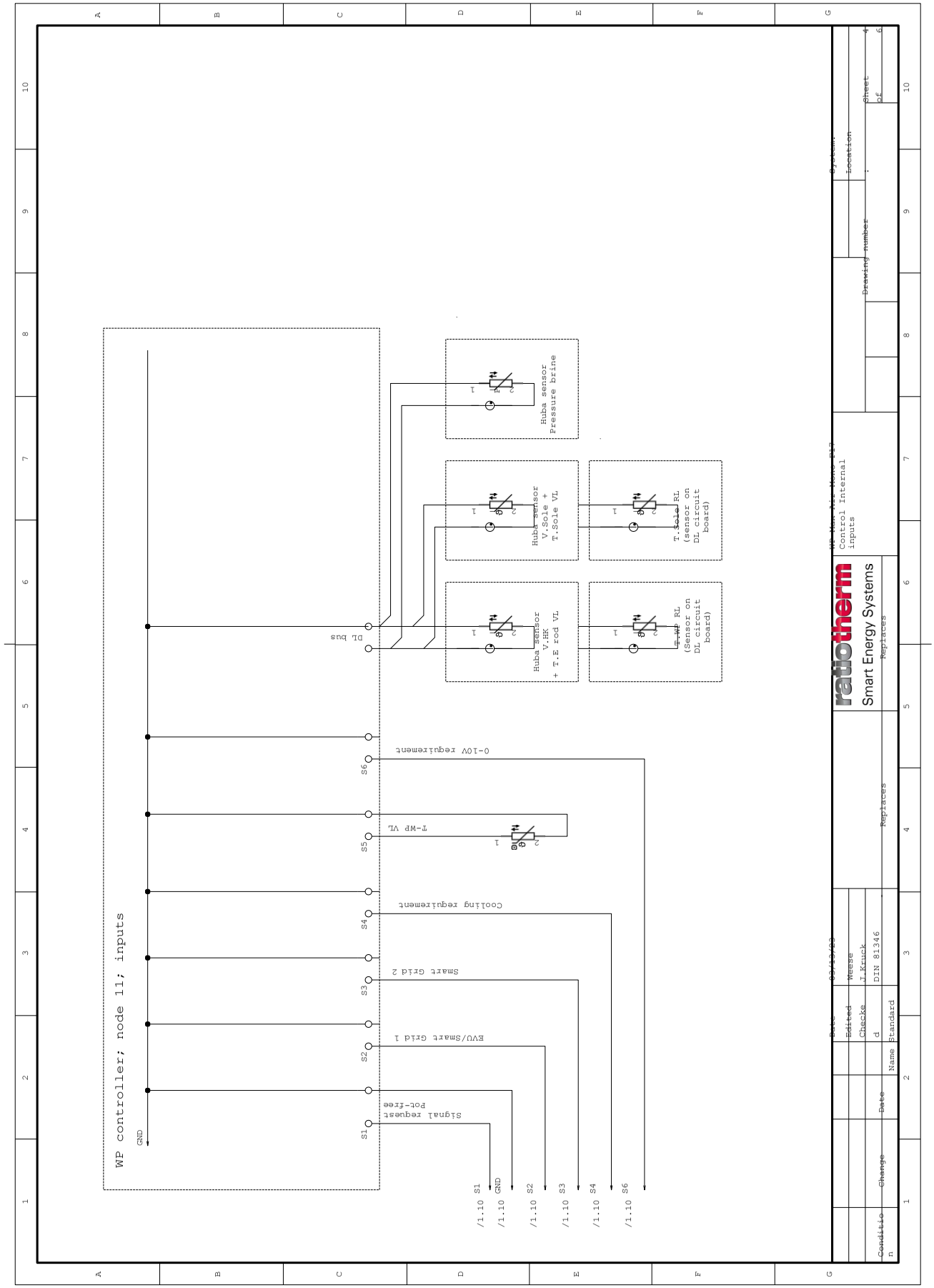
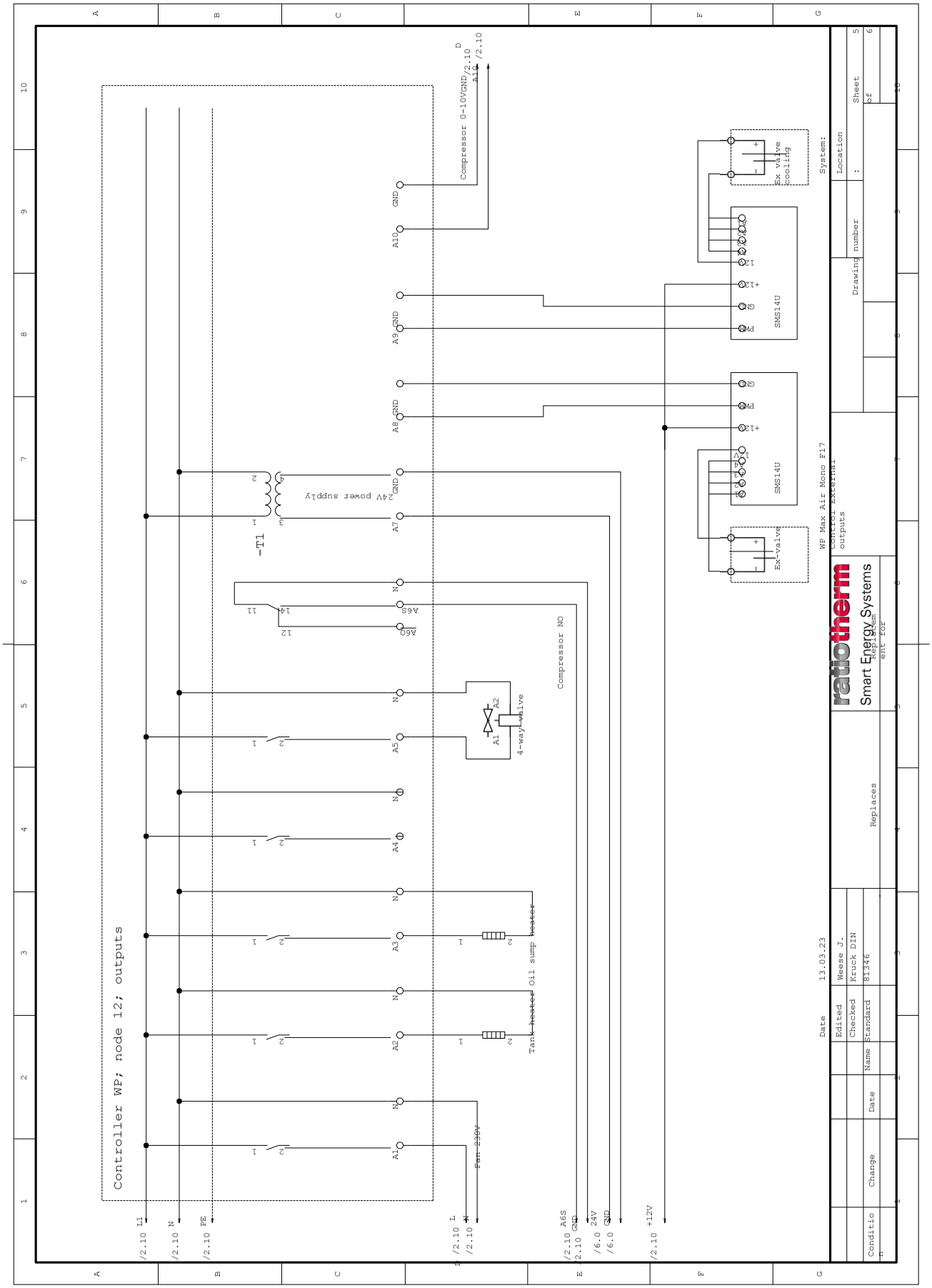
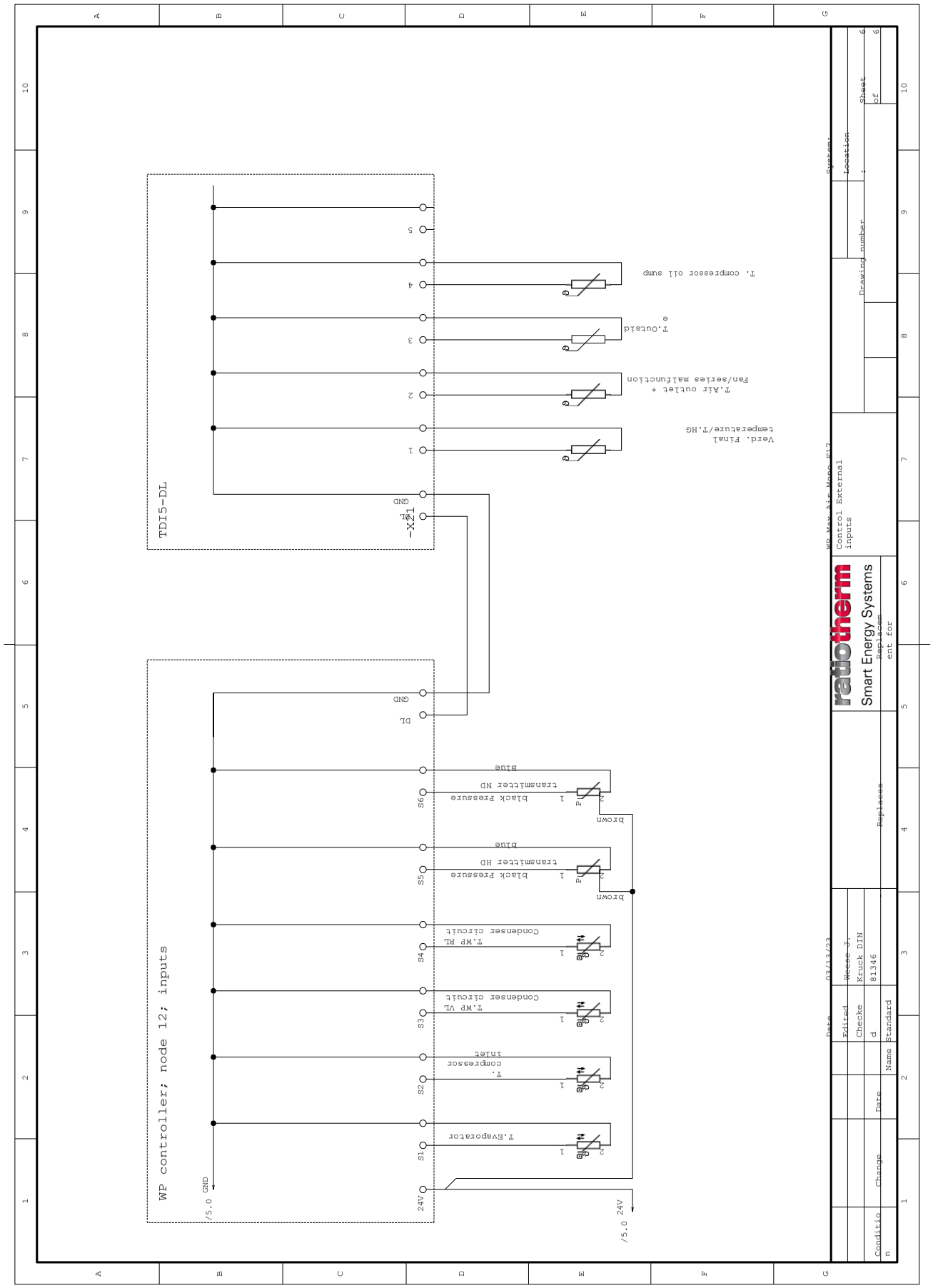
3.2.4 CONTROLS INTERNAL INPUTS



3.2.5 CONTROLS EXTERNAL OUTPUTS



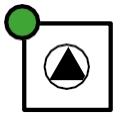
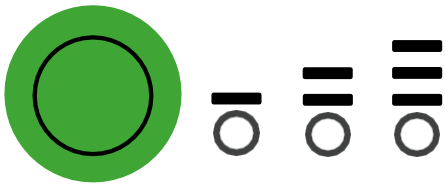
3.2.6 CONTROLS EXTERNAL INPUTS



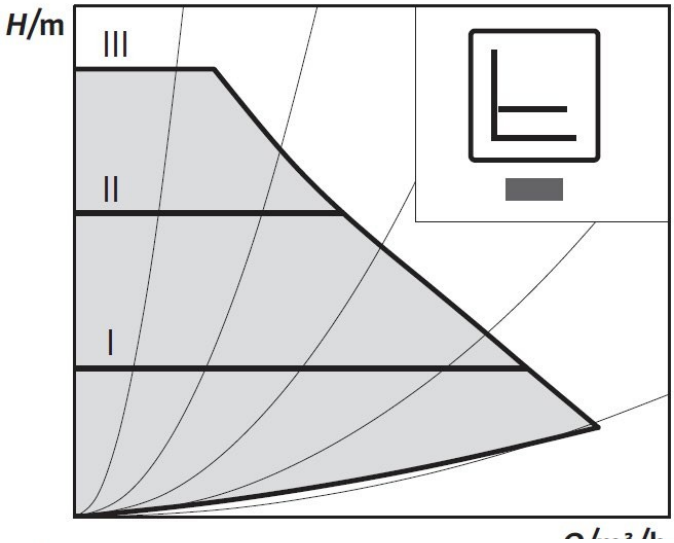
4. CAPACITOR AND STORAGE PUMP WILO-PARA STG

Technical data	
Connection voltage	1 ~ 230 V +10 %/-15 %, 50/60 Hz
Protection	IP X4D
Energy Efficiency Index EEI	See type plate (6)
Medium temperatures at max. ambient temperature	-20 °C to +95 °C (heating/GT) -10 °C to +110 °C (ST)
Ambient temperature	0 °C to +70 °C
Max. operating pressure	10 bar (1000 kPa)
Minimum inlet pressure at +95 °C/+110 °C	0.5 bar/1.0 bar (50 kPa/100 kPa)

4.1 INDICATOR LIGHTS (LEDS) AND CONTROL BUTTONS

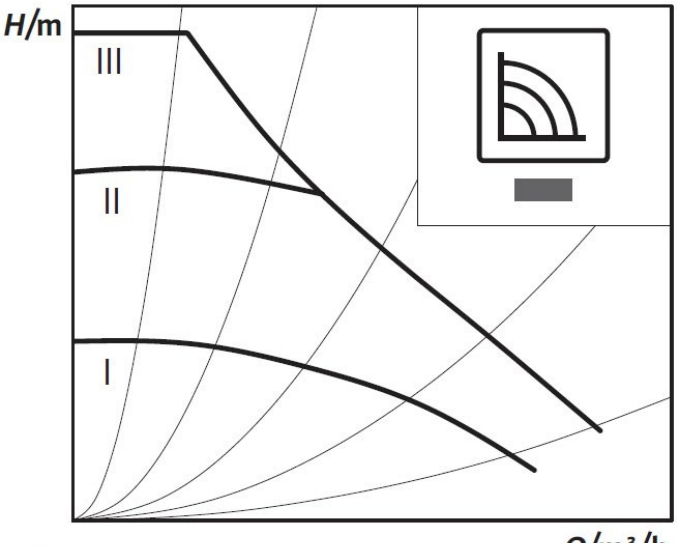
Indicator lights (LEDs)	
■ LED lights up green during normal operation ■ LED lights up/flashes in case of malfunction	
Display of the selected control mode PWM, Δp-c, and constant speed	
Display of the selected characteristic curve (I, II, III) within the control mode	
Control buttons	
Press ■ Select control mode ■ Select characteristic curve (I, II, III) within the control mode	
Press and hold ■ Activate venting function (press for 3 seconds) ■ Activate manual restart (press for 5 seconds) ■ Lock/unlock button (press for 8 seconds)	

4.2 CONTROL MODES AND FUNCTIONS



Constant differential pressure Δp-c (I, II, III)

Recommended for underfloor heating systems, large-diameter pipes, all applications without variable pipe network characteristics (e.g., storage tank charging pumps), and single-pipe heating systems with radiators. The control system maintains the set delivery head constant regardless of the volume flow rate. Three predefined characteristic curves (I, II, III) to choose from.

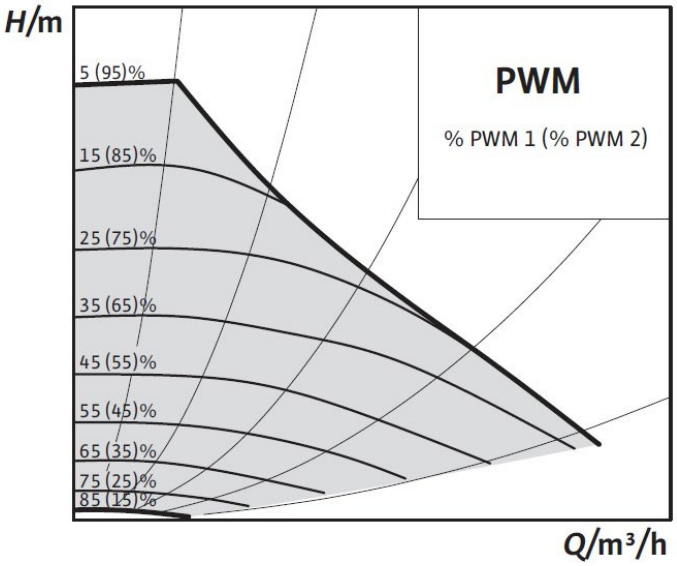


Constant speed (I, II, III)

Recommended for systems with unchanging system resistance that require a constant volume flow. The pump runs at three preset fixed speed levels (I, II, III).

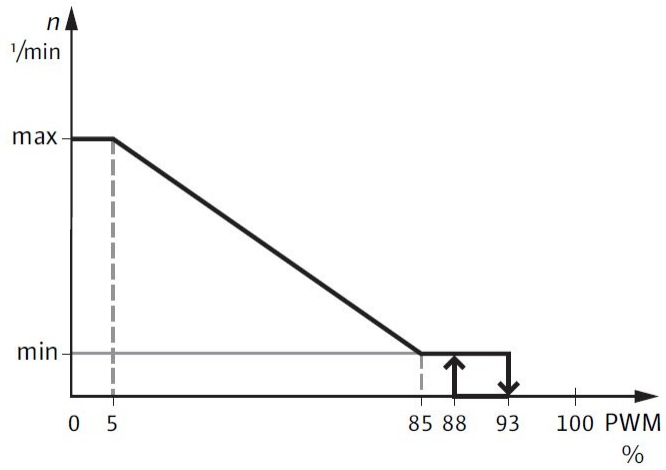
NOTE:

Factory setting: Constant speed, characteristic curve III



External control via iPWM signal

The required setpoint/actual value comparison is performed by an external controller for control purposes. A PWM signal (pulse width modulation) is supplied to the pump as a control variable via a separate cable with plug. The PWM signal generator sends a periodic sequence of pulses (the duty cycle) to the pump in accordance with DIN IEC 60469-1.

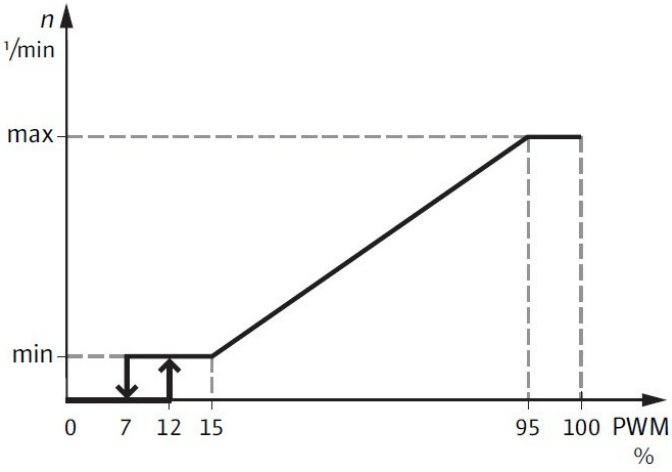


iPWM 1 mode (heating application):

In iPWM 1 mode, the pump speed is controlled depending on the PWM input signal. Behavior in case of cable break: If the signal cable is disconnected from the pump, e.g., due to a cable break, the pump accelerates to maximum speed.

PWM signal input [%]

> 5:	Pump runs at maximum speed 5 - 85: The speed of the pump decreases linearly from n_{max} to n_{min}
85 - 93:	Pump runs at minimum speed (operation)
85 - 88:	Pump runs at minimum speed (start-up)
93 - 100:	Pump stops (standby)



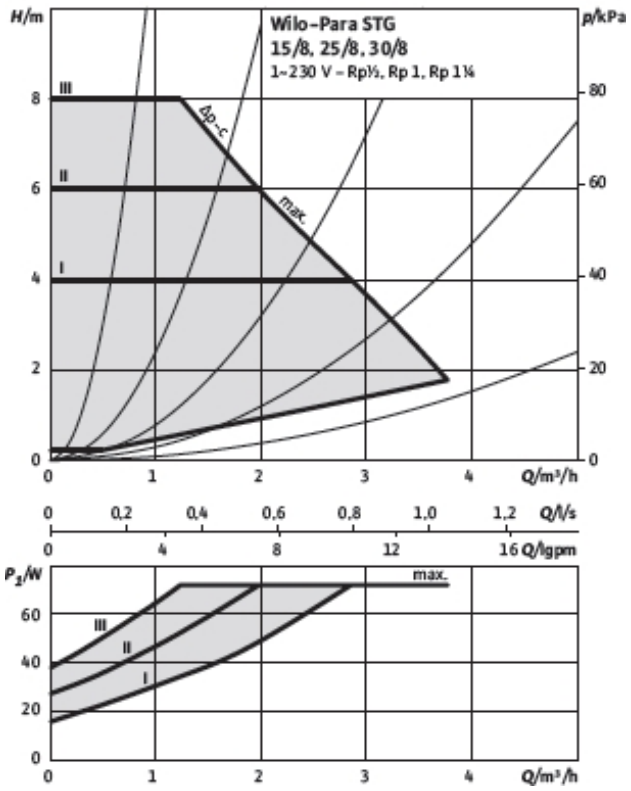
iPWM 2 mode:

In iPWM 2 mode, the pump speed is controlled depending on the PWM input signal. Behavior in case of cable break: If the signal cable is disconnected from the pump, e.g., due to a cable break, the pump stops.

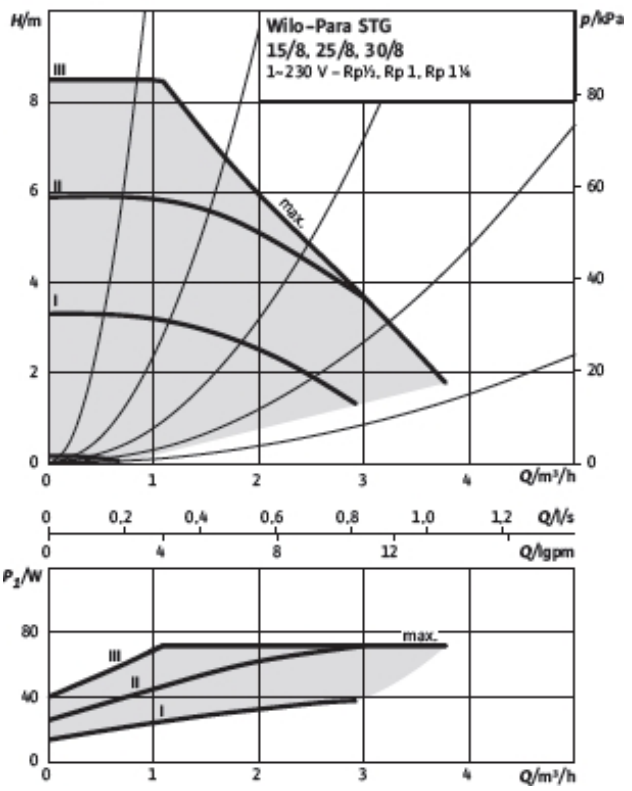
PWM signal input [%]

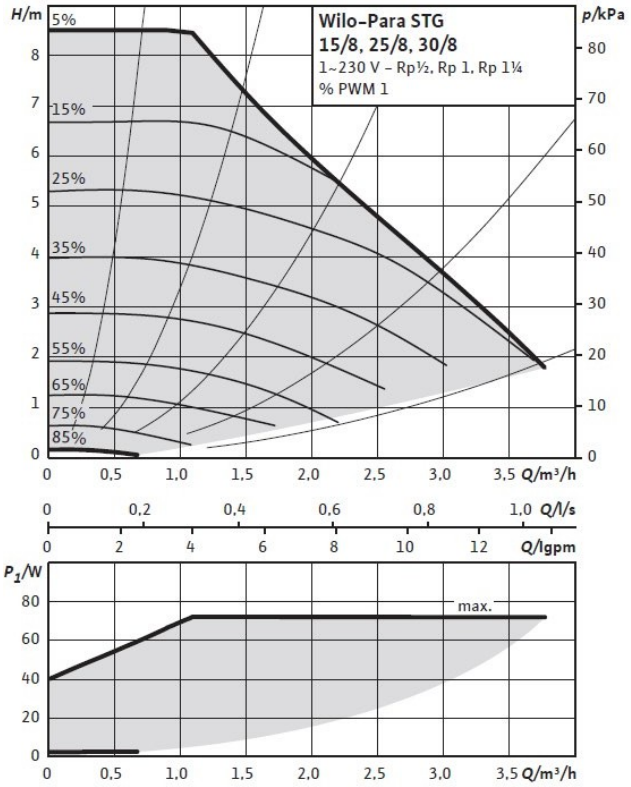
0 - 7:	Pump stops (standby)
7 - 15:	Pump runs at minimum speed (operation)
12 - 15:	Pump runs at minimum speed (start-up)
15 - 95:	The speed of the pump increases linearly from n_{min} to n_{max}
> 95:	Pump runs at maximum speed

Δp-c (constant)



Constant speed I, II, III





Vent

The venting function is activated by pressing and holding (3 seconds) the control button and automatically vents the pump. The heating system is not vented during this process.

Manual restart

A manual restart is activated by pressing and holding (5 seconds) the control button and unblocks the pump if necessary (e.g., after a prolonged period of inactivity during the summer).

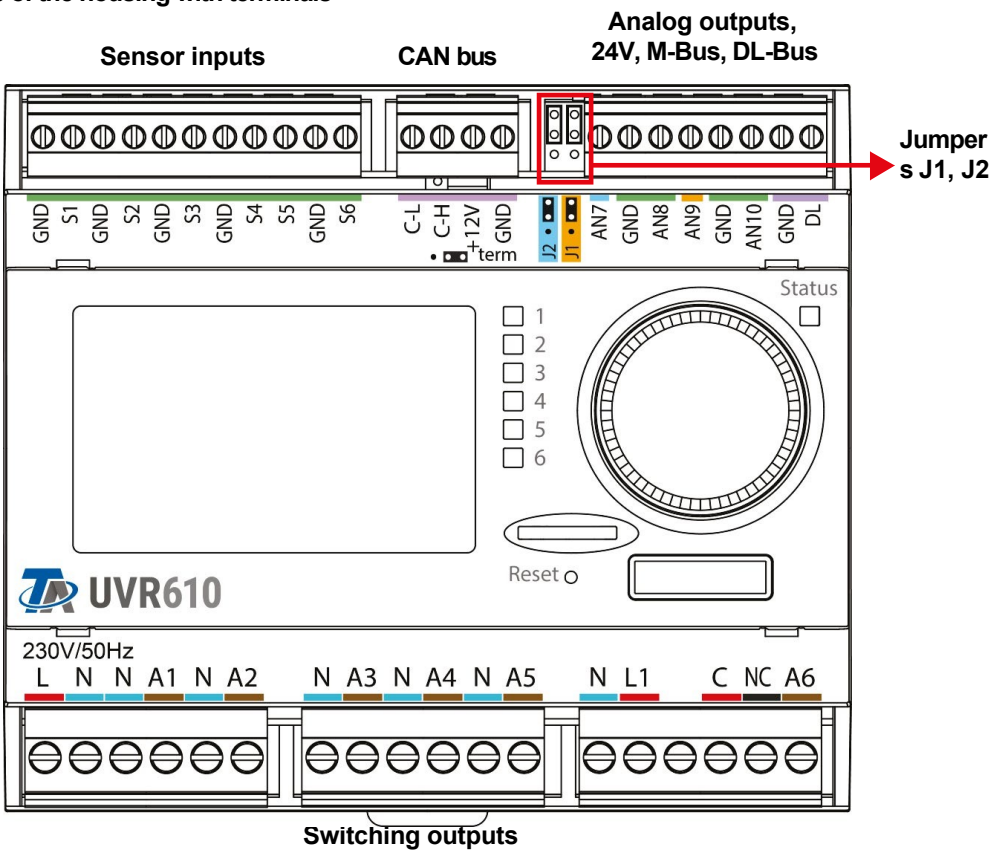
Key lock

The key lock is activated by pressing and holding (8 seconds) the control button and locks the settings on the pump. It protects against unwanted or unauthorized adjustment of the pump.

5. TECHNICAL DATA UVR 610S

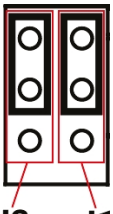
Terminal diagram

View of the top of the housing with terminals



Main	
s: L...	Outer conductor
N...	(phase) Neutral conductor
Outputs:	
C...	Root
A1 - A6...	**Normally** open
NO NC...	Normally closed **A6**
N...	Neutral conductor
L1...	Output External conductor/phase

Jumper position J1 and J2



Jumper **J2** changes the function of analog output **A7** to a 24V output for supplying external devices. In the position shown (top), the analog output is active.

Jumper **J1** changes the function of analog output **A9** to an M-Bus interface. In the position shown (top), the analog output is active.

J2 ... J1 connection

The controller has a built-in power supply unit and is powered by this. The power connection must therefore be **230V 50Hz**; this voltage is also switched through by the output relays. The built-in power supply unit also supports the power supply of the CAN bus.

Technical data Daten UVR610S

All inputs	Temperature sensors of types PT1000, KTY (2 kΩ/25˚C), KTY (1 kΩ/25˚C), PT100, PT500, Ni1000, Ni1000TK5000, and room sensors RAS or RASPT, radiation sensor GBS01, thermocouple THEL, humidity sensor RFS, rain sensor RES01, pulses max. 10 Hz (RAS or RASPT room sensors, GBS01 radiation sensor, THEL thermocouple, RFS humidity sensor, RES01 rain sensor, pulses **max. 10 Hz** (e.g. for VSG volume flow sensor), voltage **up to 3.3V DC**, resistance (1-100 kΩ), and as digital inputs
inputs 5, 6	additional voltage 0-10 V DC
Outputs 1 - 5	Relay outputs, normally open contacts
Output 6	Relay changeover contact NC/NO - **potential-free**
Outputs 7 - 10	Analog outputs 0-10V (max. 20mA) or PWM (10V/1kHz) in 1000 steps each (= 0.01V or 0.1% per step) or expansion option as switching outputs with additional relay modules
Max. switching capacity	Relay outputs: 230V / 3A each
M-Bus	M-Bus input for up to 4 M-Bus meters (= 4 unit loads)
24	Power supply for external 24V devices, in total with the 12V devices max. 6W
Max. bus load (DL bus)	100
CAN bus	Standard data rate 50 kbit/s, adjustable from 5 to 500 kbit/s
Differential temperatures	with separate switch-on and switch-off difference
Threshold values	with separate switch-on and switch-off differential or with fixed hysteresis
Temperature measuring range	PT100, PT500, PT1000: -200.0°C to +850°C with a resolution of 0.1K All other temperature sensors: -49.9˚C to +249.9˚C with a resolution of 0.1K
Temperature accuracy	Typ. 0.4K, max. ±1K in the range from 0 to 100˚C **for PT1000 sensors**
Resistance measurement accuracy	max. 1.6% at 100kΩ (measured variable: resistance, process variable: resistance)
Voltage accuracy	Typ. 1%, max. 3% of the maximum measuring range of the input
Accuracy of 0-10V output	max. -2% to +6%
Dimensions W x H x D	107 x 95 x 64 mm
Connection	100 - 230V, 50 - 60 Hz, (outputs A1 - A5 and device jointly fused with 6.3A fast-acting fuse) (output A6 only fused when energized; see "**Output 6 energized**" on page 16)
Max. cable cross-section Power supply	2.5 mm^2
Power consumption	1.0 - 1.9 W depending on the number of active switching outputs
Protection class	IP10
Protection class	II - Protective insulation ⧈
Permissible ambient temperature	+5 to +45˚C

Subject to technical changes and typographical errors. These instructions are only valid for devices with the corresponding firmware version. Our products are subject to continuous technical progress and further development, so we reserve the right to make changes without prior notice. © 2021

6. ERROR CODES FREQUENCY CONVERTER INVERTEK OPTIDRIVE

MCE error, ErrorCode, and ErrorCode2

Error code no.	TFT message	Description	Actions
00	No error	No error	Displayed in P0-13 if no errors have been recorded in the log.
03	Error shutdown Overcurrent.	Momentary overcurrent at the inverter output.	Error occurs when the inverter is enabled. Check the motor and wiring for short circuits in phase/phase and phase/ground connections. Check the load for mechanical problems such as jams, blockages, or standstill. Check that the parameters on the motor nameplate match P1-07, P1-08, P1-09. Reduce the voltage boost value in P1 11. Increase the ramp acceleration time in P1-03. If the connected motor is equipped with a holding brake, it must be correctly connected, controlled, and enabled. An error occurs during execution Reduce the speed loop gain in P4-03 and P4-04.
04	Overload shutdown error.	For the inverter, >100 % of the value in P1-08 was triggered for a certain period of time. Check whether the decimal points are flashing (inverter overloaded) and either increase the acceleration rate or reduce the load.	Check whether the decimal places are flashing (inverter overloaded) and either increase the acceleration rate or reduce the load. Ensure that the motor cable length of the respective inverter meets the specifications in section 11.5. Output power and current values. Check that the parameters on the motor nameplate, P1-07, P1-08, P1-09, have been entered correctly. Check the load for mechanical problems such as jams, blockages, or similar mechanical faults. In the case of a radial fan or pump, a small reduction in output frequency could significantly reduce the load.
05	Hardware overcurrent	Momentary overcurrent at the inverter output	Check the motor wiring and the motor itself for Phase-to-phase and phase-to-ground connections. Disconnect the motor from the wiring and perform another test. If the fault shutdown occurs even without the motor, the entire system must first be checked again and the inverter replaced.
06	Overvoltage	DC link overvoltage	The value of the DC link voltage can be displayed via P0-20. A history log is stored at 256 ms intervals and "frozen" in parameter P0-36 in the event of a fault shutdown. This fault is usually caused by too much regenerative energy being transported from the load back to the inverter. This occurs when there is high inertia or a trailer load is connected. If the fault occurs during stopping or deceleration, increase the ramp time P1-04. If you are working in PID mode, ensure that the ramp times are activated by reducing the value in P3-11 .

Error code no.	TFT message	Description	Actions
07	Undervoltage	Intermediate circuit undervoltage	This error occurs regularly when the power is turned off. If this happens during operation, check the input voltage and all cables to the inverter, fuses, contactors, etc.
08	Error shutdown due to overheating.	Overheating of the heat sink.	The heat sink temperature can be displayed via P0-21. A history log is stored at 30 ms intervals and "frozen" in parameter P0-38 in the event of an error shutdown. Check the ambient temperature of the inverter. Ensure that the internal cooling fan of the inverter is working properly. Check that the distances around the inverter described in section 3.6. Instructions for enclosure mounting (IP20 units) are correct. 3.10. Guidelines for mounting (IP66 devices) described distances around the inverter have been maintained and the airflow path to and from the inverter is not blocked. Reduce the effective switching frequency in parameter P2-24. Reduce the load on the motor/converter.
09	Fault shutdown due to low temperature temperature	Under-temperature of the converter.	This error occurs when the ambient temperature is below -10°C. To start the inverter, this value must be increased to above -10°C.
10	Loading the default parameters	The factory default parameters have been loaded.	Press the stop button. The inverter can now be configured for the desired application. Four standard buttons – see section 5.5. Factory settings / reset user settings.
11	External fault shutdown.	External error shutdown of the digital input.	External fault shutdown requested for control input terminals. Some settings in P1-13 require an NC contact for external fault shutdown of the drive in the event of a problem with an external device. If a motor thermistor is connected, check for possible overheating of the unit.
12	Error with the se-Optibus communication	Communication error	Communication with the PC or keyboard has been interrupted. Check all cables and connections to external devices.
13	Excessive DC voltage ripple.	Excessive voltage ripple of the internal intermediate circuit.	The DC ripple voltage of the DC link can be displayed via P0-16. A history log is stored at 20 ms intervals and "frozen" in parameter P0-37 in the event of a fault shutdown. Check that all three supply phases are present and meet the 3% deviation tolerance. Reduce the load on the motor. If the malfunction persists, contact your Invertek Drives distributor.
14	Loss of input phase.	Fault shutdown due to loss of input phase phase.	The inverter is designed for three-phase operation. The connection to one of the phases has been interrupted/lost.

Error code no.	TFT message	Description	Actions
15	Momentary overcurrent	Momentary overcurrent at inverter output .	See error 3 above.
16	Thermistor error	Defective thermistor on the heat sink.	Contact your Invertek sales representative.
18	4-20 mA signal outside the value range	4-20 mA signal lost.	The strength of the reference signal from analog input 1 or 2 (terminal 6 or 10) has fallen below the minimum value of 3 mA (for signal format 4-20 mA). Check the signal source and the wiring of the Optidrive terminals.
19	Data error in the M/C processor	Internal memory error	Parameters not saved, factory settings are loaded. If the malfunction persists, contact your authorized IDL sales partner.
20	Standard user parameters	Standard user parameters	The standard user parameter has been loaded. Press the stop button. Standards Four buttons – see section 5.5. Reset factory settings/user settings.
21	Overheating of the motor PTC	Overheatin g of the motor PTC	The connected motor PTC has triggered a fault shutdown of the inverter (analog input 2 configured for PTC device).
22	Cooling fan error	Cooling fan error	Check and, if necessary, replace the internal cooling fan of the inverter.
23	Ambient temperature too high	Ambient temperature too high	The measured temperature around the inverter is above the operating value. Ensure that the internal cooling fan of the inverter is working properly. Check that the distances around the inverter described in section 3.6. Instructions for enclosure mounting (IP20 units) and in 3.10. Installation guidelines (IP66 units) and that the airflow path to and from the inverter is not blocked. Increase the cooling air flow to the inverter. Reduce the effective switching frequency in parameter P2-24. Reduce the load on the motor/inverter.
24	Maximum torque exceeded	Overcurrent fault	The monitoring function has detected current values above the normal operating value for the application. Check whether the mechanical load has been changed or whether there is a blockage/standstill. standstill. For pump applications, check for possible blockages. For fan applications, check for obstructions in the air flow from/to the fan.

Error code no.	TFT message	Description	Actions
25	Output torque too low	Undercurrent error	The monitoring function has detected current values below the normal operating value for the application. Check for mechanical causes of load loss (e.g., broken belt). Check for correct wiring between the motor and the inverter.
26	Inverter output error	Inverter output error	Drive output error. Check for loose motor cables on the drive and motor or for a possible short circuit. Otherwise, contact your authorized dealer.
29	Internal STO circuit error	Please contact your Invertek sales representative.	
40	Auto-tuning error 1	Auto-tuning error	The measured stator resistance of the motor fluctuates between phases. Check that the motor has been wired correctly and is operating without faults. Check the windings for correct resistance.
40	Auto-tuning error 1	40	Autotuning error 1
41	Auto tuning error 2	Auto-tuning error	The measured stator resistance of the motor is too high. Check that the motor has been wired correctly and is operating without faults. Check that the rated power matches that of the connected inverter .
42	Autotuning error 3		The measured motor inductance is too low. Check whether the motor has been wired correctly and is operating without faults.
43	Autotuning error 4		The measured motor inductance is too high. Check whether the motor has been wired correctly and is operating without faults. Check whether the rated power matches that of the connected inverter .
44	Autotuning error 5		The measured motor parameters are not convergent. Check that the motor has been wired correctly and is operating without faults. Check that the rated power matches that of the connected inverter .
45	Incorrect phase sequence	1-L2-L3 Phase sequence is incorrect.	Applies only to size 8 drives; if the incoming power supply shows incorrect phase sequence, any two phases may have been swapped.
48	Low back pressure	Low pressure during line filling filling function.	Check the pump system for leaks or broken pipes. Check whether the line fill function has been configured correctly (P3-16 & P3-17).

Error code no.	TFT message	Description	Actions
49	Loss of output phase.	Loss of motor output phase.	The connection to one of the motor output phases has been interrupted.
50	Error in Modbus communication.	Error detected in Modbus communication.	When using Modbus RTU: A valid Modbus telegram was not received within the watchdog time limit, setting in P5-05. Check whether the network master/PLC is still in operation. Check the connection cables. Increase the value of P5-05 to a suitable level. When using an optional fieldbus interface: Internal communication to the plugged-in communication option module has been lost. Check that the module is inserted correctly.
52	Option module error	Error with installed communication module	Internal communication with the installed communication module has been interrupted. Check that the module is installed correctly.
53	Error in I/O card communication	Error shutdown due to I/O card communication The internal communication to the installed I/O option module is interrupted.	Internal communication with the installed I/O option module has been interrupted. Check that the module is installed correctly.
54	Error in BACnet communication	Fault shutdown due to loss of BACnet communication	No valid BACnet telegram was received during the watchdog period in P5-05. Check the network master or PLC for correct functioning. Check the cabling. Increase the value for P5-05 accordingly.

7. ERROR CODES FAN

Address 19:
This parameter represents the operating status of the fan. If the fan is in normal operation, the parameter value is 0, and if there is an error, the parameter value is the non-zero value of the corresponding error.

Error codes:

None Error	Low VPS	Overcurrent	Over temperature	Module error	Motor error	Busbar error	Restart error
0	1	2	3	4	5	6	7

8. SAFETY DATA SHEETS

Version: 1.0
Revision Date: 03/08/2015

SAFETY DATA SHEET

1. Identification

Identification
Product name: **RL 32-3MAF** (4314-64, 4314-66, 4314-65, 4314-67)

Additional identification
Chemical name: Mixture

Recommended use and restriction on use
Recommended use: Not determined.
Restrictions on use: Not determined.

Details of the supplier of the safety data sheet Supplier
Company Name: THE LUBRIZOL CORPORATION
Address: 29400 LAKELAND BOULEVARD
WICKLIFFE, OH 44092-2298 US
Telephone (440)943-1200

Emergency telephone number:
FOR TRANSPORT EMERGENCY CALL CHEMTREC (+1)703 527 3887, OR WITHIN USA 800 424 9300 (LUBRIZOL)

2. Hazard identification

Hazard Classification
Not classified

Label Elements:

Hazard symbol: No symbol

Signal word: No signal word.

Hazard Statement: Not applicable

Precautionary Statement: Not applicable

Other hazards which do not result in GHS classification: None identified.

3. Composition/information on ingredients

General information: The components are not hazardous or are below required disclosure limits.

4. First-aid measures

Ingestion: Treat symptomatically. Get medical attention.

Inhalation: Remove exposed person to fresh air if adverse effects are observed.

Skin Contact: Wash with soap and water. If skin irritation occurs, seek medical attention.
Wash contaminated clothing before reuse.

Eye contact: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses.

Most important symptoms/effects, acute and delayed

Symptoms: See section 11.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically.

5. Firefighting measures

General fire hazards: No unusual fire or explosion hazards noted.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: CO2, dry chemical, or foam. Water can be used to cool and protect exposed material.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical: See section 10 for additional information. Keep away from heat, sparks, and open flames. Water may cause splattering. Container may rupture when heated.

Special protective equipment and precautions for firefighters

Special firefighting procedures: No data available.

Special protective equipment for firefighters: Wear full protective fire gear including self-contained breathing apparatus operated in positive pressure mode with full facepiece, coat, pants, gloves, and boots.

6. Accidental release measures

Personal precautions, protective equipment, and emergency procedures: Personal protective equipment must be worn; see the Personal Protection section for PPE recommendations. Ventilate the area if spilled in confined spaces or other poorly ventilated areas.

Methods and material for containment and cleaning up: Dike far ahead of larger spill for later recovery and disposal. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.

Environmental precautions: Avoid release to the environment. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling: Observe good industrial hygiene practices. Provide adequate ventilation.
Wear appropriate personal protective equipment.
Keep away from ignition sources such as heat, sparks, and open flames. No smoking. Keep containers closed when not in use. Wash thoroughly after handling. Launder contaminated clothing before reuse. Empty container contains product residue which may exhibit hazards of product.

Maximum Handling Temperature:	Not determined.
Conditions for safe storage, including any incompatibilities:	Store away from incompatible materials. See section 10 for incompatible materials.
Maximum Storage Temperature:	Not determined.

8. Exposure controls/personal protection

Control Parameters:

Occupational Exposure Limits

None of the components have assigned exposure limits.

Appropriate engineering controls:	Use material in well ventilated area only. Adequate ventilation should be provided so that exposure limits are not exceeded. Mechanical ventilation or local exhaust ventilation may be required.

Individual protection measures, such as personal protective equipment General information: Use personal protective equipment as required.

Eye/face protection: If contact is likely, safety glasses with side shields are recommended.

Skin protection

Hand protection: Neoprene. Suitable gloves can be recommended by the glove supplier.

Other: A long-sleeved shirt is recommended. Wear an apron or protective clothing in case of contact.

Respiratory Protection: Use a respirator with an organic vapor cartridge if the exposure limit is exceeded. Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respiratory protection program compliant with all applicable regulations must be followed whenever workplace conditions require the use of a respirator. Use self-contained breathing apparatus for entry into confined spaces, other poorly ventilated areas, and large spill cleanup sites.

Hygiene measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state:	liquid
Form:	liquid
Color:	Colorless to yellow
Odor:	Mild
Odor threshold:	No data available.
pH	No data available.
Freezing point:	No data available.
Boiling point:	No data available.
Flash point:	464 °F (240 °C) (Cleveland Open Cup)

Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits Flammability	
limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Upper explosive limit (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Relative density:	0.981 68 °F (20 °C)
Solubility(ies)	
Solubility in water:	Slightly soluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	31.2 mm²/s (104 °F (40 °C)) 5.6 mm²/s (100 °C (212 °F))

Other information

Pour point temperature:	-69 °F (-56 °C)

10. Stability and reactivity

Reactivity:	No data available.
Chemical stability:	Material is stable under normal conditions.
Possibility of Hazardous Reactions:	Will not occur.
Conditions to Avoid:	Do not expose to excessive heat, ignition sources, or oxidizing materials.
Incompatible Materials:	Strong acids. Strong bases. Strong oxidizing agents.
Hazardous Decomposition Products:	Thermal decomposition or combustion may generate smoke, carbon monoxide, carbon dioxide, and other products of incomplete combustion.

11. Toxicological information

Information on likely routes of exposure Inhalation:
No data available.

Ingestion: No data available.

Skin Contact: No data available.

Eye contact: No data available.

Information on toxicological effects

Acute toxicity

Oral
Product Not classified for acute toxicity based on available data.

Dermal
Product Not classified for acute toxicity based on available data.

Inhalation
Product: Not classified for acute toxicity based on available data.

Skin Corrosion/Irritation:
Product: Prolonged or repeated contact may cause irritation.
Remarks: Not classified as a primary skin irritant.

Serious Eye Damage/Eye Irritation:
Product: Remarks: Not classified as a primary eye irritant.

Respiratory sensitization:
No data available

Skin sensitization:
No data available

Specific Target Organ Toxicity - Single Exposure:
No data available

Aspiration hazard:
No data available

Chronic Effects

Carcinogenicity:
No data available

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ cell mutagenicity:
No data available

Reproductive toxicity:
No data available

Specific Target Organ Toxicity - Repeated Exposure:
No data available

12. Ecological information

Ecotoxicity

Fish
No data available

Aquatic invertebrates
No data available

Toxicity to aquatic plants
No data available

Toxicity to soil dwelling organisms
No data available

Sediment toxicity
No data available

Toxicity to terrestrial plants
No data available

Toxicity to above-ground organisms
No data available

Toxicity to microorganisms
No data available

Persistence and degradability
Biodegradation
No data available

Bioaccumulative potential
Bioconcentration factor (BCF)
No data available

Partition coefficient n-octanol/water (log Kow)
No data available

Mobility:
No data available

Other adverse effects: No data available.

13. Disposal considerations

Disposal instructions: Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulations.
Since emptied containers retain product residue, follow label warnings even after container is emptied.

Contaminated packaging: Container packaging may exhibit hazards.

14. Transport information

DOT
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
None known.

Shipping descriptions may vary based on mode of transport, quantities, temperature of the material, package size, and/or origin and destination. It is the responsibility of the transporting organization to follow all applicable laws, regulations, and rules relating to the transportation of the material. Review classification requirements before shipping materials at elevated temperatures.

15. Regulatory information

Lubrizol

Version: 1.0
Revision date: 03/08/2015

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
None present or none present in regulated quantities.

Superfund Amendments and Reauthorization Act of 1986 (SARA) Hazard categories
None known.

SARA 302 Extremely Hazardous Substance
SARA 304 Emergency Release Notification
SARA 311/312 Hazardous Chemical
SARA 313 (TRI Reporting)
This product may contain chemical(s) regulated under the Superfund Amendments and Reauthorization Act (SARA). For additional information please contact Lubrizol Customer Assistance: America(s): AmerLZAMCustomerAssistance@Lubrizol.com ; Europe: EMEAICustomerAssistance@Lubrizol.com ; Asia: APCustomerAssistance@Lubrizol.com

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

Inventory Status

Australia (AICS)
All components are in compliance with chemical notification requirements in Australia.

Canada (DSL/NDSL)
All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.

China (IECSC)
All components of this product are listed on the Inventory of Existing Chemical Substances in China.

European Union (REACh)
To obtain information on the REACH compliance status of this product, please visit Lubrizol.com/REACH, or e-mail us at REACH_MSDS_INQUIRIES@Lubrizol.com

Japan (ENCS)
All components are in compliance with the Chemical Substances Control Law of Japan.

Korea (ECL)
All components are compliant in Korea.

New Zealand (NZIoC)
All components are in compliance with chemical notification requirements in New Zealand.

Philippines (PICCS)
All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).

Switzerland (SWISS)
All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.

Taiwan (TCSCA)
All components of this product are listed on the Taiwan inventory.

United States (TSCA)
All components of this material are on the US TSCA Inventory.

The information that was used to confirm the compliance status of this product may deviate from the chemical information shown in Section 3.

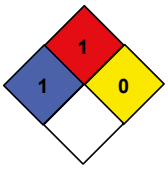
Version: 1.0
Revision date: 03/08/2015

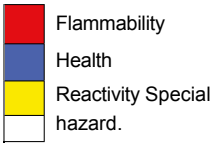
16.Other information, including date of preparation or last revision

HMIS Hazard ID

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

NFPA Hazard ID





Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	03/08/2015
Version	1.0
Source of information:	Internal company data and other publicly available resources.
Further information:	Contact supplier (see Section 1)
Disclaimer:	As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.

Safety data sheet in accordance with 1907/2006/EC

Trade name: R290 - Propane 2.5; Tegan®290, Propane 2.5
Product No.: R290
Current version: 1.1.0, created on: May 13, 2020 **Replaced version:** 1.0.0, created on: 02/20/2019 **Region:** DE

SECTION 1: Identification of the substance or mixture and of the company

1.1 Product identifier

Trade name

R290 - Propane 2.5; Tegan®290, Propane 2.5

Name of the substance	Propane
REACH registration no.	01-2119486944-21

Identification numbers

CAS	74-98-6
EC No.	200-827-9
Index No.	601-003-00-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses
Industrial use Professional use
Formulation of mixtures Fuel
Pure chemical
Aerosol
Propellant
Consumer use
Refrigerant

Uses advised against
Other uses are not recommended.

1.3 Details of the supplier providing the safety data sheet

Address
TEGA - Technische Gase und Gasetechnik GmbH
Werner-von-Siemens-Straße 18
97076 Würzburg

Phone	+49 931 2093-220
Fax	+49 931 2093-180
Email	kaeltemittel@tega.de

Information about the safety data sheet
sdb_info@umco.de

1.4 Emergency

For medical information (in German and English):
+49 (0)551 192 40 (Poison Control Center North)

SECTION 2: Potential hazards

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 (CLP)
Flam. Gas 1; H220 Press.
Gas liq.; H280

Note	Specific concentration limits	M-factor (acute)	M factor (chronic)
U	-	-	-

Full text of the notes: See section 16, "Notes on the identification, classification, and labeling of substances (EC) No. 1272/2008, Annex VI."

Notes on classification

The classification of the product was determined on the basis of the following procedures in accordance with Article 9 and the criteria of Regulation (EC) No. 1272/2008:
Physical hazards: Evaluation of test data in accordance with Annex I, Part 2
Health and environmental hazards: Evaluation of toxicological and ecotoxicological data in accordance with Annex I, Parts 3 and 4.

2.2 Labeling elements

Labeling in accordance with Regulation (EC) No. 1272/2008 (CLP)

Product identifier
74-98-6 (propane)

Hazard pictograms


GHS02


GHS04

Signal word
Danger

Hazard statements

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.

Safety instructions

P210	Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.
P377	Fire involving escaping gas: Do not extinguish until leak can be safely stopped.
P381	In case of leak, remove all sources of ignition.
P403	Store in a well-ventilated place.

2.3 Other hazards

Contact with the liquid may cause cold burns or frostbite.

PBT assessment
The product is not considered to be a PBT.

vPvB assessment
The product is not considered to be vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical characterization

Name of substance	Propane
Molecular formula	C3H8
Molecular weight	44.09

Identification numbers

CAS	74-98-6
EC No.	200-827-9
Index No.	601-003-00-5

3.2 Mixtures

Not applicable. The product is not a mixture.

SECTION 4: First aid measures

4.1 Description of first aid measures

General

High concentrations can cause suffocation. Symptoms may include loss of mobility and consciousness. The victim does not notice the suffocation. Remove affected persons from the danger zone and lay them down. Consult a doctor immediately.

After inhalation
Remove affected person from the danger zone, taking appropriate respiratory protection measures. Provide fresh air. In case of irregular breathing/respiratory arrest: artificial respiration. Consult a doctor immediately.

After skin contact
In case of contact with skin, wash immediately with soap and water. In case of frostbite, rinse with plenty of water. Do not remove clothing.

After eye contact
Remove contact lenses. Rinse eye under running water for 10-15 minutes with eyelids wide open, protecting the uninjured eye.

After swallowing
Rinse mouth thoroughly with water. Do not induce vomiting. Do not give anything by mouth to unconscious persons.

4.2 Most important acute and delayed symptoms and effects

Symptoms
Shortness of breath; frostbite; respiratory arrest. Unconsciousness

4.3 Indications for immediate medical attention or special treatment

Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing

Suitable extinguishing media
Extinguishing powder; water spray; water mist; foam

Unsuitable extinguishing media
Water jet; carbon dioxide

5.2 Special hazards arising from the substance or mixture

In case of fire, the following may be released: carbon monoxide and carbon dioxide; explosion hazard when heated. Liquefied gas: escaping liquid may cause frostbite. The gas is heavier than air and may accumulate in lower rooms.

5.3 Firefighting instructions

Use self-contained breathing apparatus. Wear full protective suit. If possible, remove endangered containers from the danger zone. Cool closed containers near the source of the fire with water. Pressure increase, bursting and explosion hazard when heated. Fire residues and contaminated extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment, and emergency procedures

Personnel not trained for emergencies
Observe protective regulations (see sections 7 and 8). Ensure adequate ventilation. Keep ignition sources away. Do not inhale gas. Cordon off and mark the contaminated area. Bring people to safety.
Explosion hazard.

Emergency responders
No information available. Personal protective equipment – see Section 8.

6.2 Environmental precautions

Prevent release into the environment. Suppress gases/vapors/mists with water spray.

6.3 Methods and material for containment and cleaning

Ensure adequate ventilation. Dispose of collected material in accordance with regulations.

6.4 Reference to other sections
For information on safe handling, see Section 7. For information on personal protective equipment, see Section 8. For information on disposal, see Section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Precautions for safe handling
Handling only by qualified and trained personnel. Ensure good room ventilation, extraction at the workplace if necessary. Use only in accordance with the instructions for use. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose containers to heat or ignition sources. In case of liquid product leakage, there is a risk of low temperatures. Only use the material in areas where open flames, fire, and other ignition sources are kept away. Avoid the formation of flammable and explosive vapor concentrations in the air and exceeding the occupational exposure limits. Container is pressurized. Protect from sunlight and temperatures above 50 °C. Do not open by force or incinerate, even after use. Follow legal protection and safety regulations.

General protective and hygiene measures
Wash hands before breaks and at the end of work. Do not inhale gases. Do not smoke, eat, or drink while working. Keep away from food and beverages. Keep emergency shower ready.

Fire and explosion protection
Vapors may form an explosive mixture with air. Keep away from heat sources, sparks, and open flames. Take measures against electrostatic charges (grounding during transfer). Use explosion-proof equipment/fittings and non-sparking tools. Electrical equipment must be protected in accordance with recognized standards.

7.2 Conditions for safe storage, taking into account incompatibilities

Technical measures and storage conditions
Keep container tightly closed, store in a cool, well-ventilated place, open and handle with care. Protect from heat and direct sunlight.

Recommended storage temperature
Value < 50 °C

Requirements for storage rooms and containers
Carefully close open containers and store them upright to prevent any leakage. Always store in containers that correspond to the original packaging.

Storage compatibility
Do not store together with: flammable substances; oxidizing agents; oxidizing substances; self-igniting substances; explosive substances

Storage class according to TRGS 510
2A Gases (excluding aerosol containers and lighters)

7.3 Specific end uses
No information available.

SECTION 8: Exposure controls/personal protective equipment

8.1 Parameters to be monitored

Occupational exposure limits

No	Name of substance	CAS		EC No.	
1	**Propane**	**74-98-6**		**200-827-9**	
	TRGS 900				
	Propane				
	Value	1800	mg/m³	1000	ml/m³
	Peak limitation	4(II)			

8.2 Exposure limits and monitoring

Suitable technical control equipment
Ensure good room ventilation, extraction at the workplace if necessary. If this is not sufficient to keep the aerosol and solvent vapor concentration below the occupational exposure limits, suitable respiratory protection must be worn.

Personal protective equipment

Respiratory
Self-contained breathing apparatus. Respiratory protection in case of insufficient extraction or prolonged exposure.
Respiratory filter gas AX

Eye/face protection
Tight-fitting safety goggles (DIN EN 166).

Hand protection
Cold protection gloves (EN 511). If skin contact with the product is possible, the use of gloves tested in accordance with, for example, EN 374 provides adequate protection. The protective gloves should always be checked for their suitability for the specific workplace (e.g., mechanical resistance, product compatibility, antistatic properties). Follow the glove manufacturer's instructions and information on the use, storage, care, and replacement of gloves. Protective gloves should be replaced immediately if they are damaged or show signs of wear. Organize work processes so that gloves do not have to be worn continuously.
Suitable material Leather

Other protective measures
Chemical-resistant work clothing. Flame-retardant and antistatic protective clothing. Safety shoes.

Limitation and monitoring of environmental exposure
No information available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form/color
Liquefied gas
Colorless

Odor
Odorless

Odor threshold
No data available

pH
No data available

Boiling point / boiling range	
Value	-42.1 °C
Reference pressure	101.32 kPa

Melting point / melting range	
Value	-187.6 °C

Decomposition point / decomposition range	
Value	650 °C

Flash point
No data available

Auto-ignition temperature	
Value	472 °C

Oxidizing properties
No data available

Explosive properties

May form explosive gas-air mixtures.

Flammability (solid, gaseous)
Highly flammable

Lower flammability or explosion limit		
Value	1.7	Vol

Upper flammability or explosive limit		
Value	12.5	Vol

Vapor pressure		
Value	953.25	kPa
Reference temperature	25	°C

Vapor density		
Value	1.56	
Reference temperature	0	°C
Comment	Air = 1	

Evaporation rate
No data available

Relative density		
Value	0.5853	
Reference temperature	-45	°C

Density
No data available

Water solubility		
Value	75	mg/l

Solubility(ies)
No data available

Distribution coefficient: n-octanol/water			
No	**Name of substance**	**CAS**	**EC No.**
1	**Propane**	**74-98-6**	**200-827-9**
log Pow	approx.	1.8	
Method	QSAR		
Source	ECHA		

Viscosity		
Value	0.08	mPa*s
Reference temperature	17.9	°C
Type	Dynamic	

9.2 Other information

Other
Critical temperature: 96.7 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No hazardous reactions are expected when used as intended.

10.2 Chemical stability
Stable when used in accordance with the recommended storage and handling instructions (see Section 7).

10.3 Possibility of hazardous reactions
May ignite when exposed to strong oxidizing agents. Formation of explosive gas mixtures with air.

10.4 Conditions to avoid
T > 48 °C; heat, open flames, and other ignition sources.

10.5 Incompatible materials
Oxidizing agents; air humidity

10.6 Hazardous decomposition products
None when used as intended.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity

No data available

Acute dermal toxicity

No data available

Acute inhalation toxicity

No	Name of substance	CAS	EC No.
1	Propane	74-98-6	200-827-9

LC50	>	800000	ppmV
Exposure duration		0.25	hours
Physical state	Gas		
Species	Rat		
Source	ECHA		
Assessment/Classification	Based on the available data, the classification criteria are not met.		

Skin corrosion/irritation

No data available

Severe eye damage/irritation

No data available

Respiratory/skin sensitization

No data available

Germ cell mutagenicity

No	Name of substance	CAS	EC No.
1	Propane	74-98-6	200-827-9

Route of administration	Inhalation
Species	Salmonella typhimurium
Method	OECD 471
Source	ECHA
Assessment/Classification	Based on the available data, the classification criteria are not met.

Reproductive toxicity

No.	Name of substance	CAS No.	EC No.
1	Propane	74-98-6	200-827-9

Route of administration	Inhalation
Species	Rat
Method	OECD 422
Source	ECHA
Assessment/Classification	Based on the available data, the classification criteria are not met.

Carcinogenicity

No data available

Specific target organ toxicity after single exposure

No data available

Specific target organ toxicity after repeated exposure			
No	**Name of substance**	**CAS**	**EC No**
1	**Propane**	**74-98-6**	**200-827-9**

Route of administration	Inhalation
Species	Rat
Method	OECD 422
Source	ECHA
Assessment/Classification	Based on the available data, the classification criteria are not met.

Aspiration hazard
No data available

SECTION 12: Environmental information

12.1 Toxicity

Fish toxicity (acute)
No data available

Fish toxicity (chronic)
No data available

Daphnia toxicity (acute)
No data available

Daphnia toxicity (chronic)
No data available

Algal toxicity (acute)
No data available

Algal toxicity (chronic)
No data available

Bacterial toxicity
No data available

12.2 Persistence and degradability

Biodegradability			
No.	**Name of substance**	**CAS No.**	**EC No.**
1	**Propane**	**74-98-6**	**200-827-9**

Type	Aerobic biodegradability		
Value		50	%
Duration		3	d
Method	QSAR		
Source Rating	ECHA Readily biodegradable		

12.3 Bioaccumulation potential

Distribution coefficient: n-octanol/water			
No	**Name of substance**	**CAS**	**EC No.**
1	**Propane**	**74-98-6**	**200-827-9**

log Pow	approx.	1.8
Method	QSAR	
Source	ECHA	

12.4 Mobility in soil
No data available.

12.5 Results of the PBT and vPvB assessment

Results of the PBT and vPvB assessment	
PBT assessment	The product is not considered to be a PBT.
vPvB assessment	The product is not considered to be vPvB.

12.6 Other adverse effects

Other adverse effects
Global warming potential: 3

12.7 Other information

Other information
Do not allow product to enter the environment uncontrolled.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Dispose of in accordance with official regulations.
The assignment of a waste code number in accordance with the European Waste Catalogue (EWC) must be carried out in consultation with the regional waste disposal company.

Packaging
Pressurized gas container is under pressure, must not be opened by force and must not be heated above 50°C. Only dispose of completely empty pressurized gas containers. Do not burn empty pressurized gas containers. Do not puncture, cut or weld uncleaned containers.

SECTION 14: Transport information

14.1 Transport ADR/RID/ADN

Class	2
Classification code	2F
Hazard No. (Kemler number)	23
UN number	UN1978
Description of goods	PROPANE
Tunnel restriction code	B/D
Danger label	2.1 RID: (+13)

14.2 Transport IMDG

Class	2.1
UN number	UN1978
Proper shipping name	PROPANE
EmS	F-D, S-U
Label	2.1

14.3 Transport ICAO-TI / IATA

Class	2.1
UN number	UN1978
Proper shipping name	Propane
Label	2.1

14.4 Other information

No information available.

14.5 Environmental hazards

For information on environmental hazards, see 14.1 - 14.3, if relevant.

14.6 Special precautions for the user

Always transport in closed, upright, and secure containers. Ensure that persons transporting the product know what to do in the event of an accident or spill.

14.7 Bulk transport in accordance with Annex II of the MARPOL Convention and the IBC Code

Not relevant

Safety data sheet in accordance with 1907/2006/EC

Trade name: R290 - Propane 2.5; Tegan®290, Propane 2.5
Product No.: R290
Current version: 1.1.0, created on: May 13, 2020 **Replaced version:** 1.0.0, created on: February 20, 2019 **Region:** US

SECTION 15: Regulatory information

15.1 Regulations on safety, health, and environmental protection / specific legal provisions for the substance or mixture

EU regulations

Regulation (EC) No. 1907/2006 (REACH) Annex XIV (List of substances subject to authorization)
The product does not contain any substance(s) that is/are subject to authorization in accordance with REACH Regulation (EC) 1907/2006 Annex XIV. subject to authorization.

REACH Candidate List of Substances of Very High Concern (SVHC) for the Authorization Process
The substance is not considered to be a candidate for inclusion in Annex XIV pursuant to Article 57 in conjunction with Article 59 of the REACH Regulation (EC) 1907/2006 a substance eligible for inclusion in Annex XIV (list of substances subject to authorization).

Regulation (EC) No. 1907/2006 (REACH) Annex XVII: Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures, and articles	
The product is subject to REACH Regulation (EC) 1907/2006 Annex XVII.	No. 40

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances	
The product is subject to Annex I, Part 1, Hazard category:	P2

Other regulations
National health and safety regulations must be observed when using this product .

National regulations

Water hazard class

Class	nwg
Identification no.	560
Source	Classification according to AwSV (Ordinance on Facilities for Handling Substances Hazardous to Water).

Other regulations
To be observed: "Technical Rule for Pressure Vessels" TRB 610; BGI 546 "Handling Hazardous Substances"; To be observed: TRGS 510 "Storage of Hazardous Substances in Mobile Containers"

15.2 Substance safety assessment
A substance safety assessment has been carried out for this substance.

SECTION 16: Other information

Data sources used to compile the data sheet:
Regulation (EC) No. 1907/2006 (REACH), 1272/2008 (CLP) in the currently valid version. EC Directives 2000/39/EC, 2006/15/EC, 2009/161/EU
National occupational exposure limit lists of the respective countries, as amended. Transport regulations in accordance with ADR, RID, IMDG, IATA, as amended.
Data sources used to determine physical, toxicological, and ecotoxicological data are specified directly in the respective sections.

Notes on the identification, classification, and labeling of substances and mixtures ((EC) No. 1272/2008, Annex VI)

U	When placed on the market, gases must be classified as "gases under pressure" in the group of compressed gases, liquefied gases, cryogenic gases, or dissolved gases. The assignment to a group depends on the physical state in which the gas is packaged and must therefore be decided on a case-by-case basis.

Data sheet issued by
UMCO GmbH

The information is based on our current knowledge and experience. The safety data sheet describes products with regard to safety requirements.

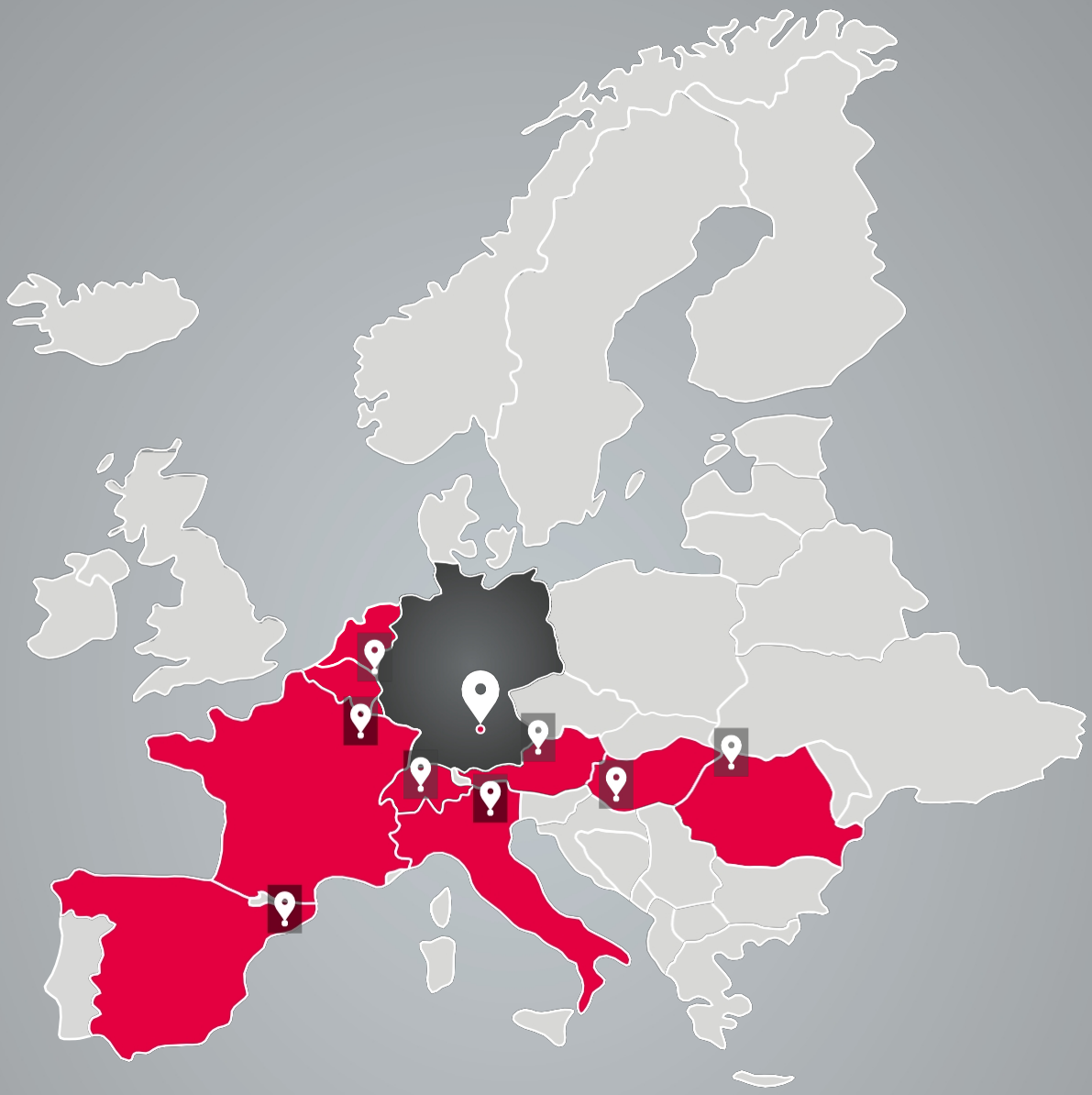
Safety data sheet in accordance with 1907/2006/EC

The information provided does not constitute a guarantee of properties and does not establish a contractual legal relationship.

Changes/additions to the text:
Changes to the text are marked in the margin.

Prod-ID 753969

Where to find us



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