GEBWELL

Installation, Operation and Maintenance manual

T3 Inverter and Gemini Inverter heat pump

WWW.GEBWELL.COM

Contents

KEEP THE OPERATION INSTRUCTIONS IN THE IMMEDIATE VICINITY OF THE DEVICE!

Read the instructions carefully before installing, adjusting or servicing the device. **Always follow the instructions. The installation technician must complete the installation record. The manufacturer's warranty is only valid with an installation log.**

Fill in the details below. If there are problems with the device, these details must be available.

Ground source heat pump model:	Serial number:
Plumbing contractor:	Name:
Installation date:	Phone:
Electrician:	Name:
Installation date:	Phone:

CE

MARKING:

The CE mark is the manufacturer's declaration that the product conforms to EU legal requirements. Gebwell Ltd affirms that the product meets all of the requirements of relevant EU directives. The purpose of the CE mark is to facilitate the free movement of goods on the internal market in Europe.

1 WARRANTY

Gebwell Ltd

Patruunapolku 5, 79100 LEPPÄVIRTA, Finland, tel. +358 20 1230 800, info@gebwell.fi

issues this product,

T3 Inverter Heat Pump | Gemini Inverter Heat Pump

with the following warranty regarding manufacturing and material faults.

Warranty period and entry into force

Heat pumps come with a warranty of two (2) years starting from the purchase date. In addition, the warranty can be extended with three (3) years. The extended warranty of three years are granted to ground source heat pumps installed by an installation company authorised by Gebwell Ltd. and registered within six months after the installation. The extended warranty does not apply to any additional equipment, accessories or other system parts of ground source heat systems. The start date of the warranty have to be verified with a purchase receipt. If no receipt is presented, the delivery date from the factory is considered as the warranty start date.

The technician/retailer of the ground source heat pump completes the installation record of the manual and goes it through with the customer. Both parties verify that they have read and understood the installation log, and they accept the installation by filling in the respective data onto the registration form found on the Gebwell Ltd.'s website. Registration will extend the warranty period with three years. The customer will be provided with an e-mail confirmation on the successful registration. If no confirmation is delivered, the customer can ask for it directly from Gebwell Ltd.. If the installation record has not been properly completed, the extended warranty will not be valid.

Warranty content

This warranty covers manufacturing or material defects detected in this product within the warranty period, as well as direct costs resulting from repairing the device.

The buyer is liable for all defects caused due to the storage conditions during the period between the delivery date and the commissioning date (see the installation, operation and maintenance manual; storage).

Warranty limitations

The warranty does not cover costs resulting from a defective device (travel, energy, etc. costs), damage caused by a defective device, the buyer's production losses, profits not realised, or other indirect costs.

This warranty has been provided on the ground that the product functions correctly in normal use conditions and that the user manual is carefully followed. The liability of the warrantor is limited in accordance with these terms, and shall not therefore cover any damages caused by the product to another object or person.

The warranty does not apply to direct personal injuries or damages to property caused by a defective product delivered.

The warranty is granted on the condition that all effective regulations, generally accepted installing methods and product mounting instructions provided by the manufacturer have been complied with.

The warranty does not cover and is invalid if the product is used in any other way than required by the dimensions.

The customer is liable for inspecting visually the product before installation. A product that is clearly defective must not be installed.

A requirement for the extended warranty is that the product is registered within six months of installation.

The warranty does not include damage caused

- during transportation
- by negligence of the user of the product or overload of the product, failure to observe the operating instructions or to carry out care or maintenance
- by circumstances not dependent on the guarantor, such as fluctuations in power supply voltage (voltage fluctuations can be no more than ± 10%), thunderstorms, fires or accidents; by service, repairs or structural alterations performed by parties other than authorised repair services
- by installation or placement of the product in contravention of the installation, operation and maintenance manual, or otherwise incorrectly

Moreover, the warranty does not cover the repair of faults that are insignificant in terms of the operation of the equipment, such as superficial scratches. The warranty does not include normal adjustments described in the operation manual, user guidance visits, service and cleaning, or tasks due to negligence of the precautions and installation instruction or investigations of the same.

The warranty terms in accordance with the joint recommendation by the Association of Finnish Metal and Engineering Industries and Kuluttajaneuvosto (Consumer Council) apply to matters not covered by the foregoing.

Some features of the heat pump require a mobile data connection (such as 3G or 4G). If the heat pump is installed in a location with poor or non-existent mobile data connection, Gebwell cannot guarantee the proper operation of all the features (such as remote access).

Gebwell is not be responsible for the operation of mobile data, and if you want to improve its functionality by using amplifiers, for example, Gebwell is not responsible for the resulting costs.

The warranty becomes void, if

- the product is modified or repaired without Gebwell Ltd's consent
- the product is installed or the product is used or serviced contrary to the manufacturer's instructions (see the manual)
- the product is used for a purpose for which it is not intended

- the product is stored in humid or otherwise inappropriate conditions (see the manual)
- the control automation of the product is replaced or its properties are modified from the original (for example, by installing an accessory that affects the control)

Actions in the event of a fault

If a fault is detected during the warranty period, the customer must immediately (normally within 14 days) report it to the authorised Gebwell retailer that sold the product. The information to be provided includes the equipment model and serial number of the product as well as a detailed description of how the fault was found and the conditions under which it developed and/or can be detected. The warranty form properly completed in relation to the purchase must be presented upon request. After the warranty has expired, it shall not be considered valid to invoke a defect reported during the warranty period unless the defect was reported in writing during the warranty period.

Defects must be reported as soon as they are detected. If a defect is not reported as soon as the customer detects the fault, or when the customer should have detected the fault, the buyer will lose his/her right to a claim based on this warranty.

Servicing in Finland

Servicing for this product during and after the warranty period in Finland is performed by the servicing organisation authorised by the manufacturer throughout the economic service life of the heat pump.

How to make a service request

Repairs under warranty, servicing requests and orders for spare parts must be directed to the authorised Gebwell retailer that sold/delivered the product. Before making a service request, please ensure the following:

- read the installation, operation and maintenance manual carefully and consider whether you have followed the manual when using the device
- ensure that the warranty period is still valid, you have carefully read the warranty terms and you know the product's model and serial numbers before making a warranty repair request
- all parts belonging to the device to be returned must be packed with the device
- the device to be returned must be packed in such a way that handling it does not have adverse effects on health or the environment

The device replaced under warranty is the manufacturer's property. Gebwell Ltd reserves the right to decide how, where and who will perform the repair or replacement under the responsibility of the manufacturer.

Gebwell Ltd. is not liable for breakdown of an incorrectly installed device.

The device may only be repaired by a professional designated by Gedwell Oy. Faulty repairs and installations may cause danger to the user, damage to the device and weaken the efficiency of the device. Please bear in mind that a visit by a retailer or service technician is not free, even during the warranty period, if repairs are required due to faulty installation, repair or adjustment.

2 INSTALLATION RECORD:

The heating system must be inspected in accordance with applicable regulations before commissioning. The inspection must be performed by a qualified person. The installation record should be completed before the equipment is handed over to the end-user. **A completed installation record is a precondition for the validity of the warranty.**

Inspected	Description	Comment
	COLLECTOR CIRCUIT:	
	Circulation direction checked	
	System pressure-tested	
	System rinsed	
	System bled	
	Fluid quantity in the collector	
	Operating pressure of the collector _____bar	
	Strainer checked/cleaned	
	Expansion tank	
	Initial pressure of the expansion tank (0.5 bar)	
	Strainer/flow direction	
	Safety valve checked	
	Shut-off valves checked	
	Length of the collector _____ m	
	- If there are several loops, record the lengths: _____ m	

Checked by _____ (date)

	HEATING SYSTEM:	
	System filled	
	Operating pressure of the heating system _____bar	
	Accumulator coil filled / bled (coil accumulator)	
	System pressure-tested	
	System rinsed	
	System bled	
	Safety valve	
	Diaphragm expansion tank	
	Initial pressure of the expansion tank	
	Strainer checked/cleaned	
	Pressure measuring device	
	Shut-off valves	
	Filling valve	
	Buffer tank	
	Heating circuit control set	
	Circulator pumps	
	Rotation direction of pumps	
	Actuators	

Checked by _____ (date)

	DOMESTIC HOT WATER:	
	System filled	
	System pressure-tested	
	System rinsed	
	Safety valve	
	Pressure measuring device	
	Buffer tank	
	Hot water circulation	

Checked by _____ (date)

Inspected	Description	Comment
	ELECTRICITY:	
	Building fuses	
	Heat pump fuses	
	Phase sequence	
	Power supply	
	Adjustment group(s)	
	Supply temperature sensor(s)	
	Room sensor	
	Outdoor temperature sensor	

Checked by _____ (date)

	CONTROLLER:	
	Room set point for the heating circuit	
	Heating curve gradient set	
	Minimum set point for supply water to the heating circuit	
	Maximum set point for supply water to the heating circuit	

Checked by _____ (date)

	GENERAL:	
	Wiring in accordance with the installation instructions	
	Connection seals	
	Device started up in accordance with the instructions	
	Operation of the machine monitored on site for 30 minutes	

Checked by _____ (date)

	GUIDANCE FOR THE END USER:	
	Adding fluid to the brine circuit	
	Increasing the pressure of the heating system	
	Setting the heating adjustment curve	
	App user interface guidance	

Checked by _____ (date)

NOTE! By registering the heat pump within six months from its installation, you will get a five-year warranty for the it. Register the installed heat pump on our website at www.gebwell.fi/rekisteroi-maalampopumppu/. You can also access the registration page on a smartphone by using the QR code below. If you are unable to register the heat pump, call Gebwell Ltd on +358 20 1230 800.

www.gebwell.fi/rekisteroi-maalampopumppu/

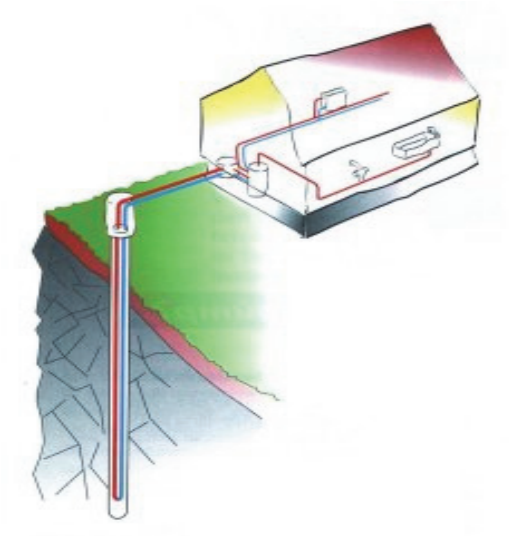
3 GROUND SOURCE HEAT AND GROUND SOURCE COOLING

A well-designed ground source heat system with the correct power values offers low operating costs and good energy efficiency. The heat pump enables you to efficiently heat your indoor air and domestic water. In the summer, the system can also cool indoor air in an environmentally friendly way.

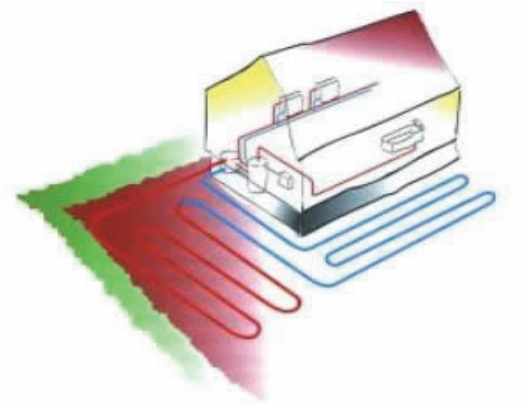
3.1 Heat from the ground

The ground source heat pump collects heat from the ground and brings it into the building. Heat can be collected using either a network of pipes embedded in a bored well, a heat collector pipes installed close to the soil surface, or a network of pipes anchored to the bottom of a body of water.

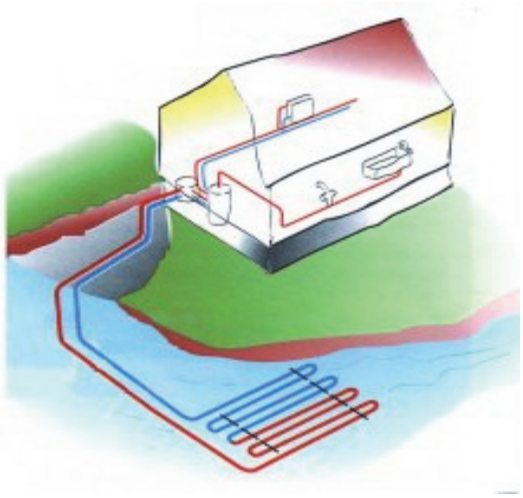
Bored well as a heat source



Soil as a heat source



Bodies of water as heat sources



Further information about heat collection systems and their dimensions can be found on the websites of Gebwell Ltd. and the Finnish Heat Pump Association (SULPU).

www.gebwell.fi

www.sulpu.fi

3.2 Ground source cooling

The low temperature of the brine can also be used to cool your home. In the summer, free cooling energy can be transferred from the ground using only a circulator pump. The ground source heat system can be connected to the ventilation fan convector or an underfloor heating/cooling system designed for cooling.

3.3 Operating principle of a heat pump

The heat pump consists of four main components

- Evaporator
- Compressor
- Condenser
- Expansion valve

The solar energy stored in the soil is collected by the brine circulating in the heat collector pipe (9/10)networks.

In the evaporator (4), the energy contained in the brine is transferred to the refrigerant, which absorbs the heat energy as it evaporates. The brine returns to the ground approximately 3°C cooler than when it came. The brine entering the heat pump can be no colder than -5°C.

The pressure and temperature of the refrigerant increase in the compressor (3). The refrigerant also absorbs the heat energy created by the compressor's work.

The warm refrigerant is transferred into the condenser (2). The condenser transfers the heat energy from the refrigerant into the water circulating in the house's heating system, which distributes it to heat the building and the domestic water with the help of a change-over valve (8).

The refrigerant condenses into a liquid state in the condenser as it loses heat energy.

The pressure of the refrigerant remains high as the liquid refrigerant is transferred to the expansion valve (6). The pressure of the refrigerant decreases in the expansion valve, and the temperature drops to approximately -10°C.

The expansion valve injects the correct amount of refrigerant into the evaporator, where the heat energy transferred from the brine causes the refrigerant to evaporate.

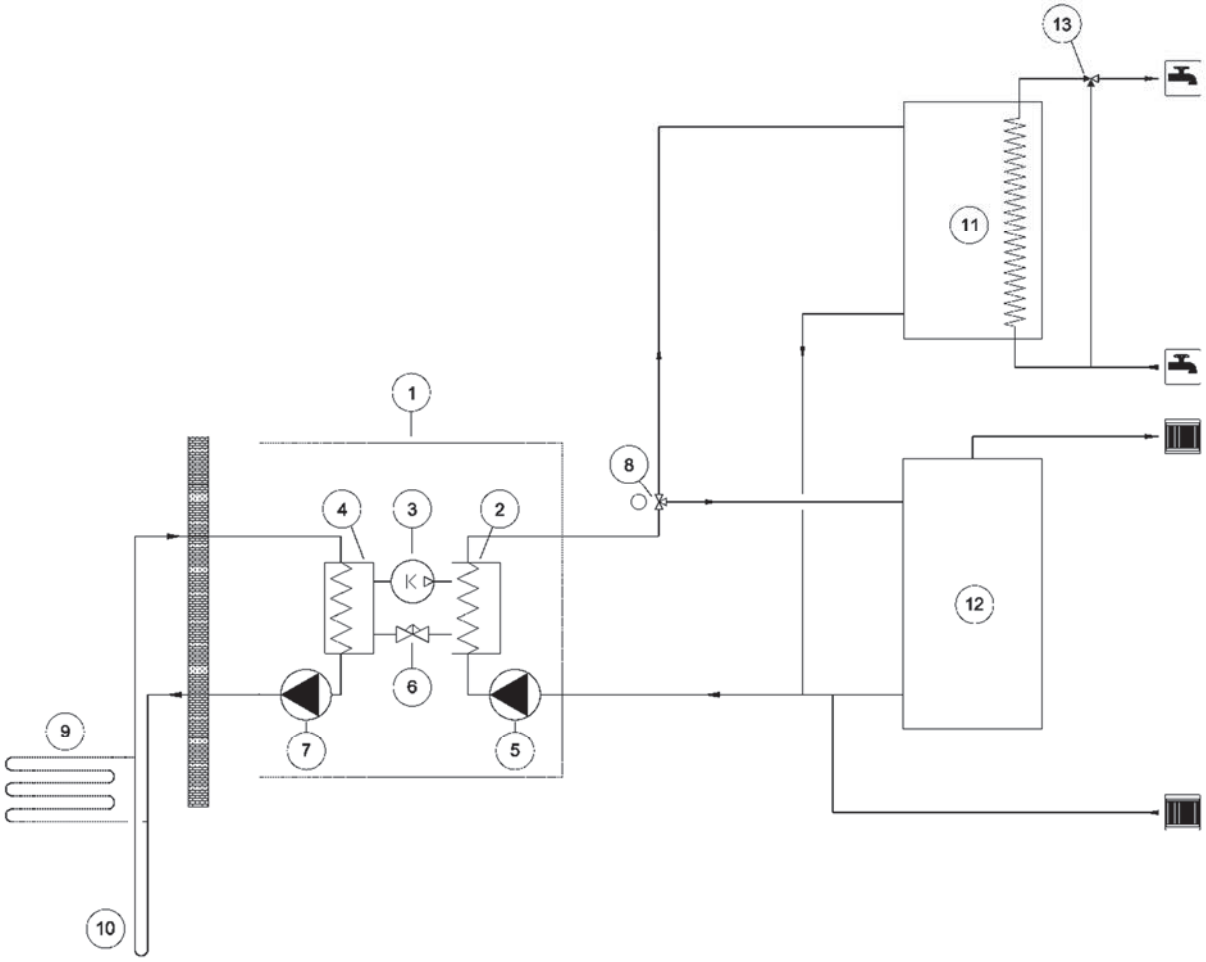


Figure: Functional description T3 Inverter

1 Heat pump
2 Condenser
3 Compressor
4 Evaporator
5 Charge pump
6 Expansion valve
7 Source pump
8 Change-over valve
9 Heat collector, ground loop
10 Heat collector, bored well
11 Hot water accumulator
12 Heating accumulator tank
13 Domestic hot water control valve

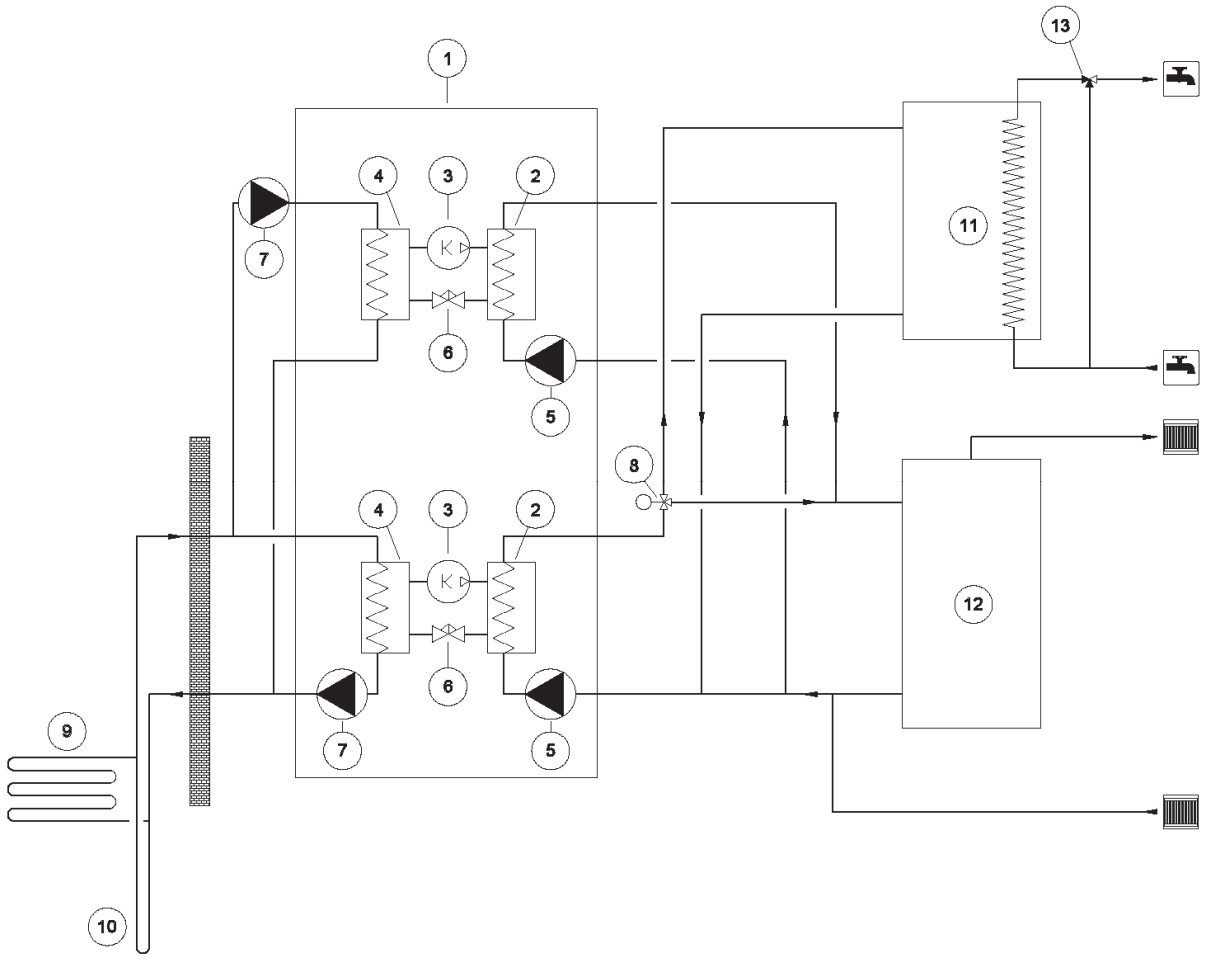


Figure: Functional description Gemini Inverter

1 Heat pump
2 Condenser
3 Compressor
4 Evaporator
5 Charge pump
6 Expansion valve
7 Source pump
8 Change-over valve
9 Heat collector, ground loop
10 Heat collector, bored well
11 Hot water accumulator
12 Heating accumulator tank
13 Domestic hot water control valve

3.4 Heating functions

Domestic hot water

The heat pump outputs domestic water based on the tank's operational measurement sensor (B3). The temperature of domestic hot water can be selected from the options, *Eco*, *Normal* or *Comfort*. This selection affects the amount of domestic hot water. When *Comfort* is selected, the heat pump also uses an electric heater to heat domestic hot water.

Heating

The heat pump outputs heating water directly into the building's heating network. Automatic adjustment determines the set point for the supply water from the heating circuit based on the set heating curve and the outdoor temperature measurement. The controller uses the set point for the supply water to determine the set point for the heat pump, and the frequency-controlled compressor uses this value to set itself to the correct rotation speed in order to keep the temperature of the supply water at the set point. The room sensor also affects the set point.

In order for the heat pump to operate at maximum efficiency, the heating system and the collector circuit

must be under ideal conditions. The difference between the heating system's output and return temperatures must be 5–8°C, and the difference between the collector's output and return temperatures must be 3–4°C. If the temperature differences deviate from these values, the efficiency will decrease, along with the savings. The heat pump's controller ensures the correct temperature difference for the heat supply and the source pump.

Factory settings:

Heating temperature difference: 5°C

Domestic hot water preparation temperature difference: 8°C

Collector temperature difference: 3°C

3.5 Tips for making savings

The heat pump is intended to generate the desired heat and domestic water. The system attempts to meet these desires by all available means within the limits of the set points.

Important factors affecting energy consumption are the indoor temperature, the domestic hot water consumption, the temperature of the domestic hot water, the quality of the house's insulation, and the desired level of comfort.

Keep the aforementioned factors in mind when changing the device's settings.

IMPORTANT!

Underfloor heating and radiator thermostats can have a negative impact on energy consumption. They reduce the flow rate in the heating system, and the heat pump compensates for this by raising the temperature of the network. This affects the device's operation by causing more electrical energy to be consumed. Thermostats are only intended for adjustments due to "free heat" (from the sun, people, fireplaces, etc.).

4 IMPORTANT

These installation instructions describe installation and maintenance measures that should only be carried out by a professional.

The installation instructions should be given to the customer in the manual folder.

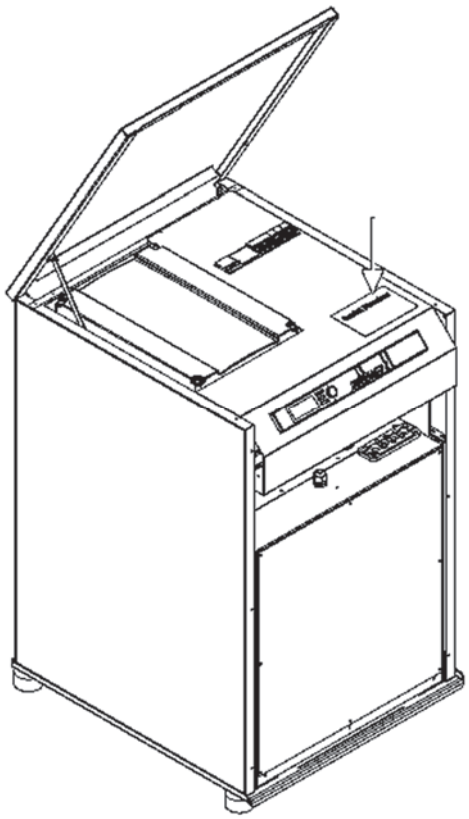
After commissioning, the heat pump sends telemetry data to the Gebwell Smart cloud automatically. Data storage in the cloud enables the display of the device's history data in the Gebwell Smart control room and system optimization. The data can also be used for maintenance and product development purposes.

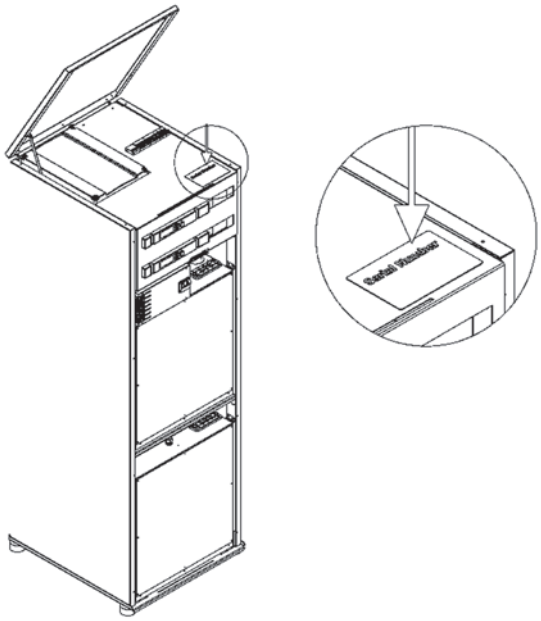
4.1 Serial number

Keep in mind that you will need to know the device's serial number whenever you contact the manufacturer, maintenance or support services.

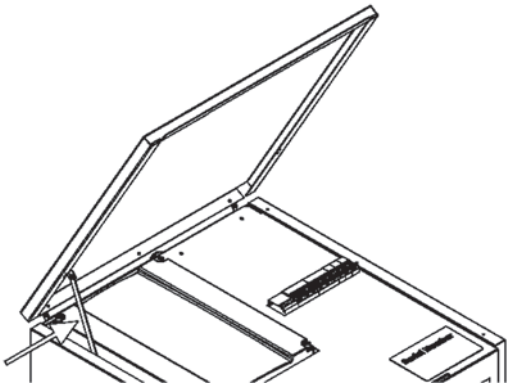
The serial number of the heat pump is on the ID plate attached on top of the heat pump on the cover of the control unit, under the cover plate. The cover can be lifted from the front edge so that it remains on the hinges in the rear edge.

T3 Inverter





The cover can be locked in the upper position with the latch on the left rear edge.



4.2 Safety instructions

The following safety instructions must be kept in mind when handling, installing and operating the device.

- Only lift the device at the locations shown in the instructions.
- The metallic edges of the heat pump could injure your hands when you are hauling the unit. Use slash-resistant gloves to move the heat pump.
- Always turn off the main power of the device before performing any maintenance.
- Never jeopardise safety by bypassing safety devices.
- The refrigeration compressor unit in the device must only be serviced and repaired by a qualified person.
- Do not rinse the heat pump with water.
- During installation, keep all of the device's housing panels intact to prevent water from splashing onto the device's electrical components.

4.3 Hazardous substances

Electricity

The electrical components inside the heat pump carry a potentially fatal voltage. Unplug the device before you open the protective plate on the control unit or the compressor module.

Refrigerant

The heat pump contains a refrigerant that is harmful and hazardous to the environment. The refrigerant is in a hermetically sealed refrigerant circuit in the compressor module. If the refrigerant leaks into indoor premises, the room must be thoroughly ventilated.

Heat collection liquid

The mixture of antifreeze agents, including ethanol, used as the heat collection liquid are highly flammable. Avoid splashing the liquid on your skin.

5 DELIVERY AND HANDLING

5.1 Content of the delivery

- Gebwell T3 Inverter / Gebwell Gemini Inverter Heat Pump 1
- Installation, commissioning and maintenance manual 1
- Outdoor temperature sensor 1
- Room sensor 1
- External source pump (Gemini Inverter) 1

5.2 Optional accessories

- Collector valve group
- Heating control group
- Domestic hot water buffer tank
- Heating buffer tank
- Domestic hot water circulator pump series
- Diaphragm expansion tank for the collector
- Diaphragm expansion tank for heating
- Energy measurement

5.3 Storage

Before installation, the heat pump should be stored in its shipping package in a warm, dry place. If the device is stored in a cold or humid environment, the electrical components may get wet, causing problems in the operation of the device at a later stage.

5.4 Transportation

The panels on the exterior of the heat pump should be removed if the device is being brought into a confined space, and replaced once the device has been hauled inside. The heat pump can be tilted temporarily but it must not be left in a slanted position for long periods, even during transportation. The maximum tilt angle for the heat pump is 45°. The heat pump should not be turned onto its side. However, if it is necessary to turn the heat pump onto its side for reasons such as transportation, the compressor unit can be removed during transportation. However, the heat pump must not be transported upside down. If it is necessary to tilt the heat pump, the heat pump must be left in the vertical position for at least two hours before starting up to ensure that the lubricating oil in the compressor flows into the right place. The heat pump should only be lifted by the pallet. The device must be transported to the place of installation on the pallet.

5.5 Removing the packaging

The product is packaged in protective plastic in such a way that it can be installed without removing the plastic. The protective plastic can be retained to protect the heat pump until it is started up.

- Ensure that you have received the correct product with the correct accessories.
- Place the heat pump near the intended installation location.
- Lift the heat pump off the shipping pallet.
- Use the leveling feet to get the heat pump into a horizontal and stable position.
- Make sure the frame is not in contact with the building's structures, with the exception of the leveling feet.

5.6 Instructions for recycling a decommissioned heat pump

The refrigerants of the heat pump must be removed by an authorised refrigerant installer.

We recommend that the refrigerants be regenerated. Otherwise, the refrigerants must be disposed of as hazardous waste in accordance with local instructions.

The liquids inside the solution and charge circuit must be recycled in an appropriate manner.

The oils in the heat pump are recovered and disposed of as hazardous waste in accordance with local instructions.

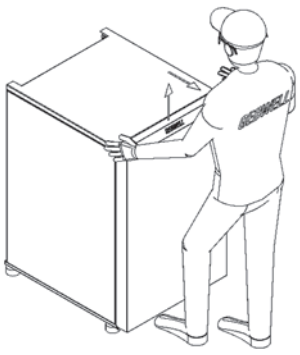
5.7 Handling the housing panels

Handling the front door

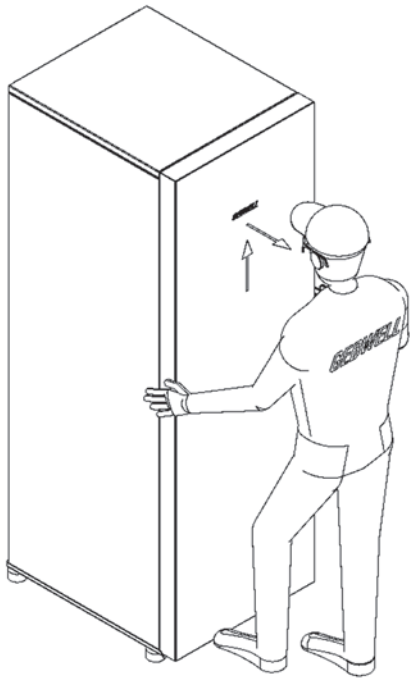
To open the heat pump door, lift the door up and pull towards yourself. You can make lifting easier by lifting the bottom edge with your foot. Hold the door firmly to keep it from falling on you.

The front door of the heat pump must be removed for any measures carried out inside the device. The door is put back in place by lifting the bottom edge of the door in position so that the lip at the bottom edge of the door goes in the opening made for it in the bottom plate of the heat pump, and the lip at the top edge of the door sets in place at the top edge of the heat pump.

T3 Inverter



Gemini Inverter



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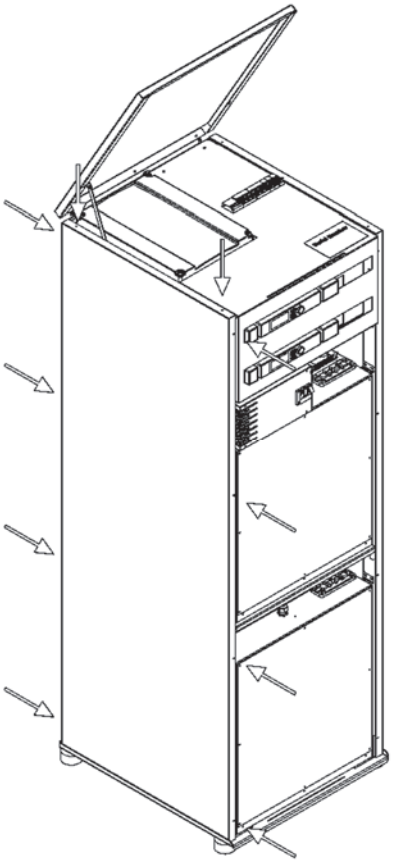
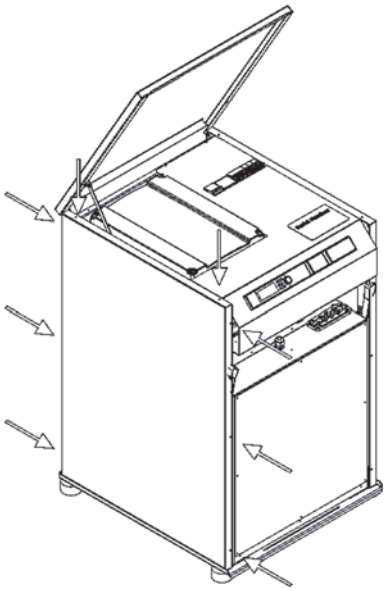


Handling the side panels

The side panels of the heat pump can be removed to facilitate maintenance work.

Remove the front door before removing the side panels. Remove the side panels by opening the screws on the front and rear edges of the device, after which the side panel is pulled to the side.

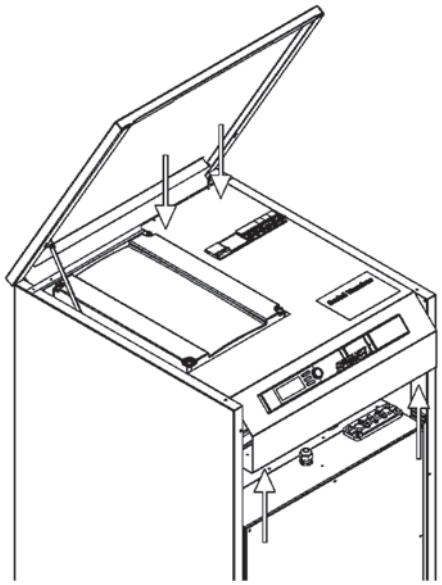
T3 Inverter



Detaching the cover of the control unit

The cover of the control unit is attached with a hex screw. You will need a 6-mm ring spanner or socket wrench to open the cover.

T3 Inverter



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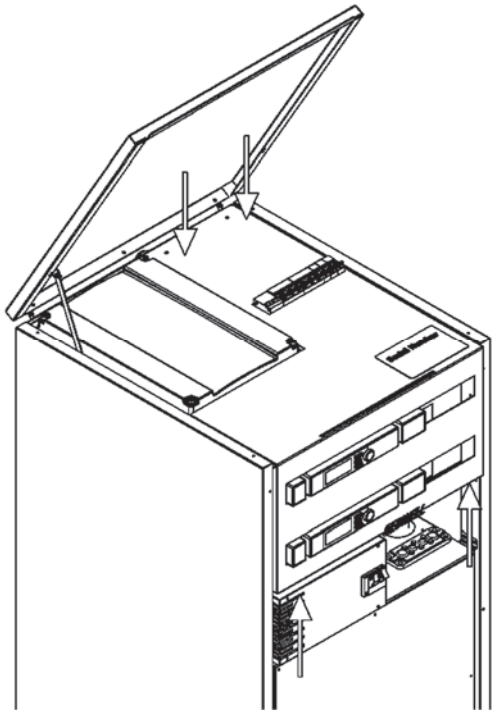
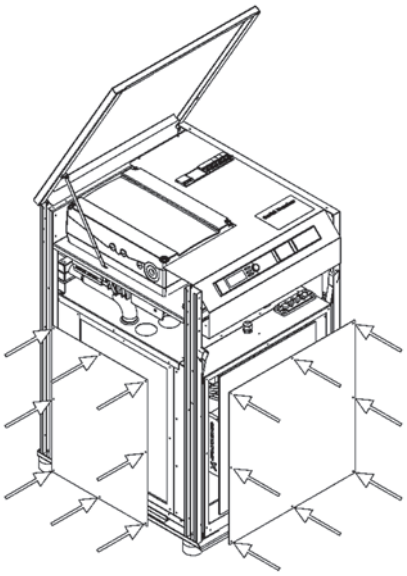


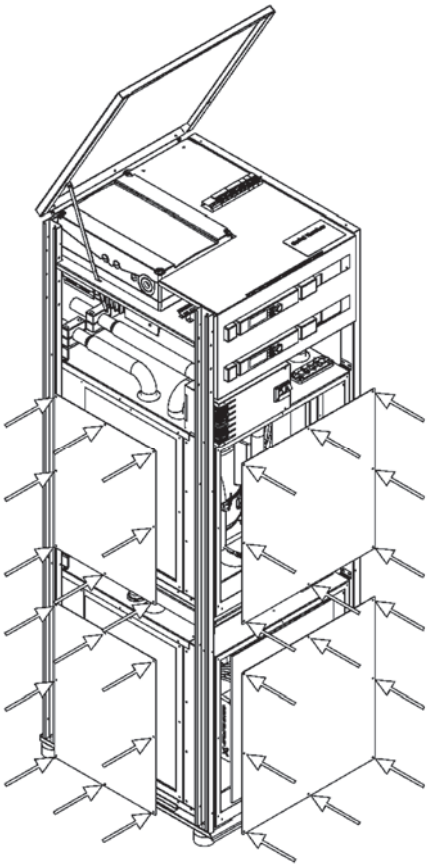
Opening the cooling module

The cooling module of the heat pump can be opened from the front, sides and back to facilitate the maintenance of the heat pump.

T3 Inverter



Gemini Inverter



5.8 Heat pump placement

The placement of the heat pump must take account of a few factors related to safety, convenience and serviceability.

The temperature of the placement location must be between +5°C and +30°C. The installation space must be adequately ventilated. Water condenses on the cold sections of pipe in the collector if the space is very humid.

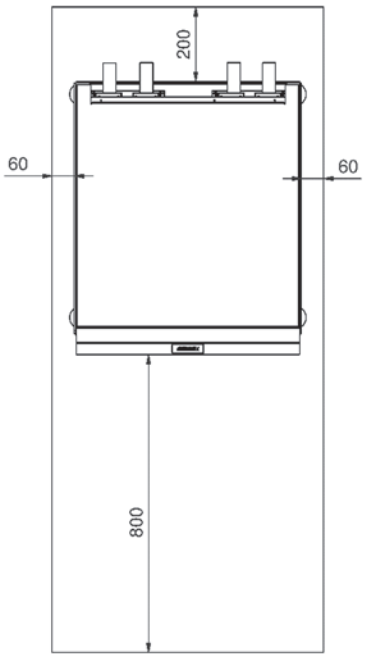
There must be a floor drain in the space in which the heat pump is installed.

The heat pump's compressor generates a noise that can be carried by the structures of the house into other areas far away. It is advisable to use flexible components for pipe connections. The heat pump should be placed in a location where noise cannot be conducted in a way that adversely affects residential premises. If necessary, supplementary noise insulation can be installed in the wall structures between the heat pump's installation location and residential premises, and additional rubber cushioning can be fitted beneath the heat pump's feet.

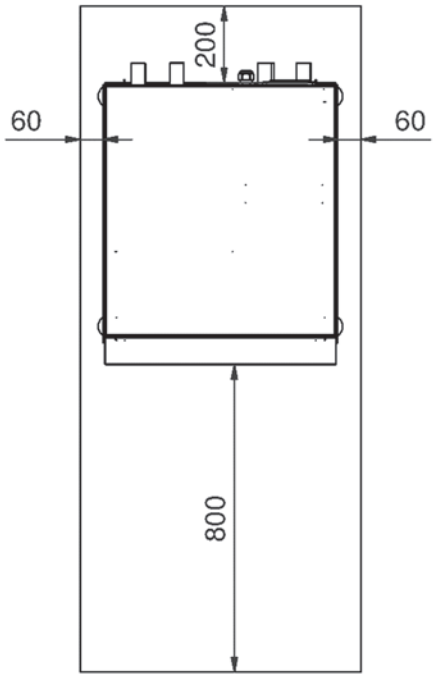
We recommend placing the heat pump in a separate utility services room. Noise can be prevented from travelling through structures by using solutions such as special floor structures in the area reserved for the heat pump. A cast floor that is separated from the building's other areas can prevent noise from travelling through the floor and into residential premises.

At least 800 mm of clearance should be reserved in front of the heat pump to allow the compressor unit to be pulled out for servicing. For the same reason, the device must not be installed below the floor surface. Adequate clearance should be left behind the heat pump to prevent vibrations from being transmitted onward.

T3 Inverter Heat Pump



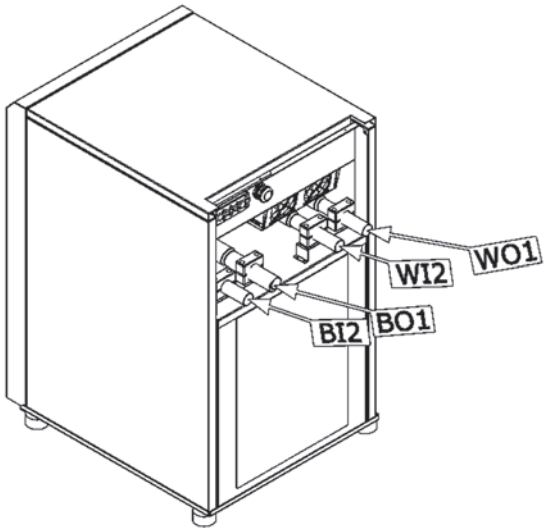
Gemini Inverter Heat Pump



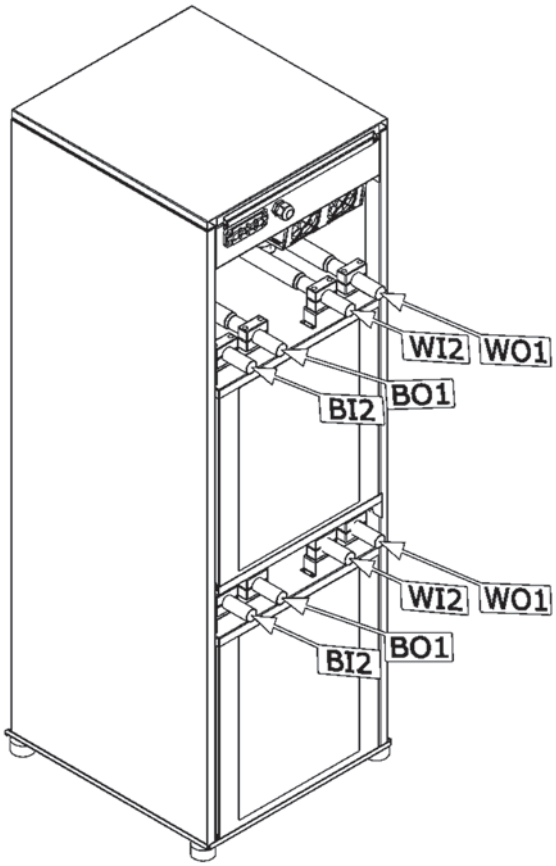
6 DIMENSIONS AND PIPE CONNECTIONS

6.1 Pipe connections

T3 Inverter



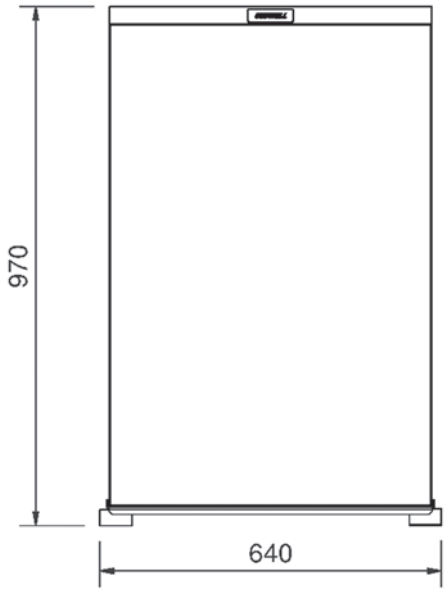
Gemini Inverter



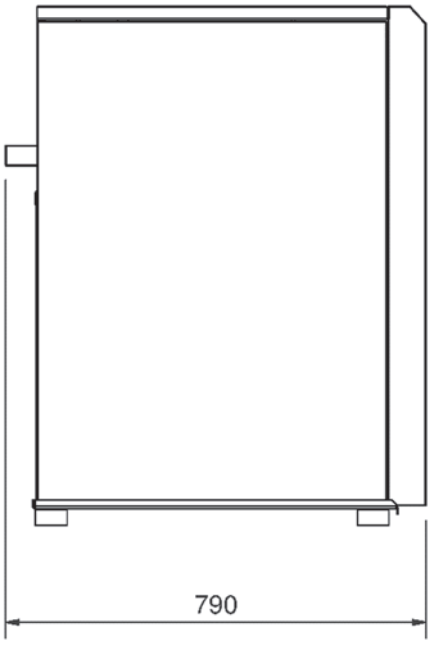
		T3 Inverter	Gemini Inverter
BO1	Brine to the ground	35 mm	35 mm
BI2	Brine from the ground	35 mm	35 mm
WO1	Heat supply	35 mm	35 mm
WI2	Heat return	35 mm	35 mm

6.2 Heat pump dimensions

T3 Inverter – viewed from the front

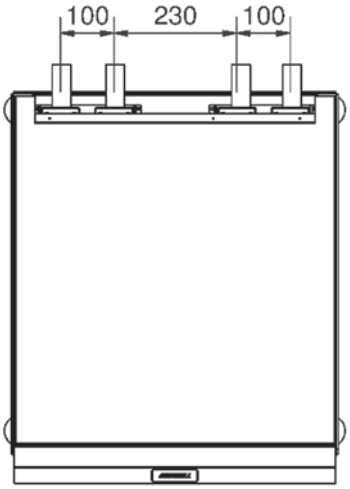


T3 Inverter – viewed from the side

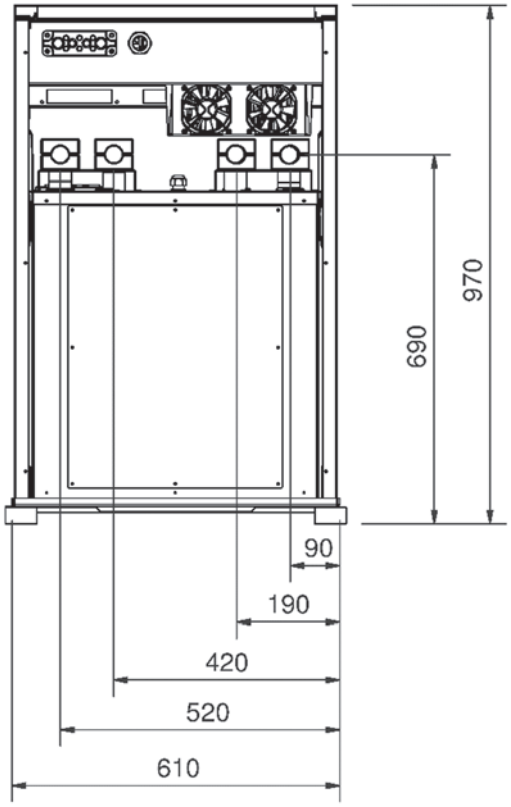


Installation dimensions of the T3 Inverter pipe connections

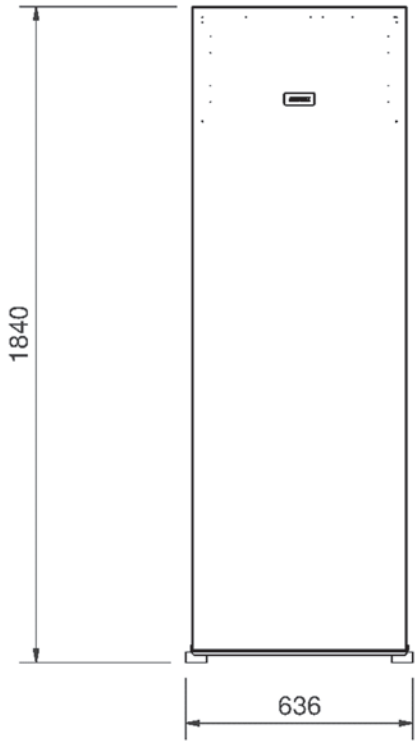
Viewed from the top



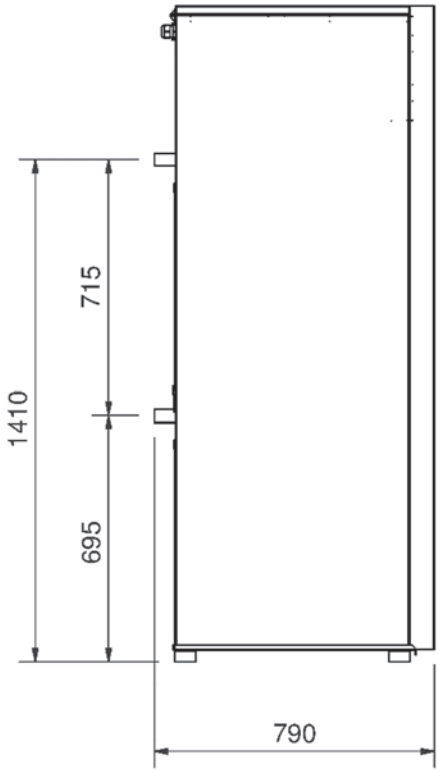
Viewed from behind



Gemini Inverter – viewed from the front

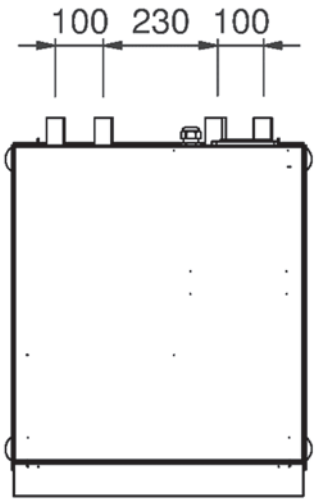


Gemini Inverter – viewed from the side

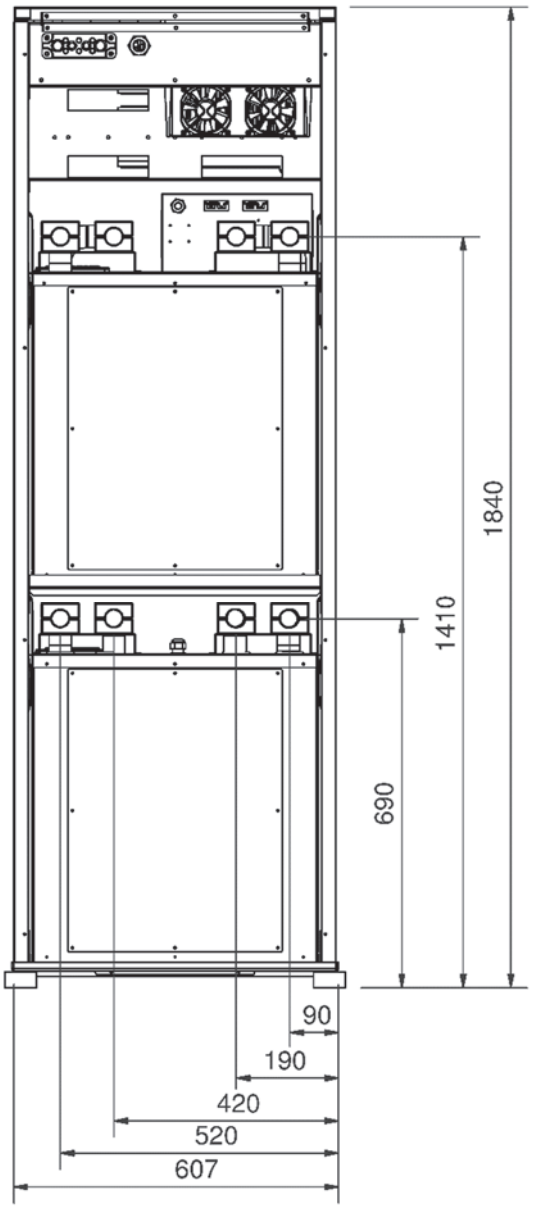


Installation dimensions of the Gemini Inverter pipe connections

Viewed from the top



Viewed from behind



6.3 Structure of the heat pump

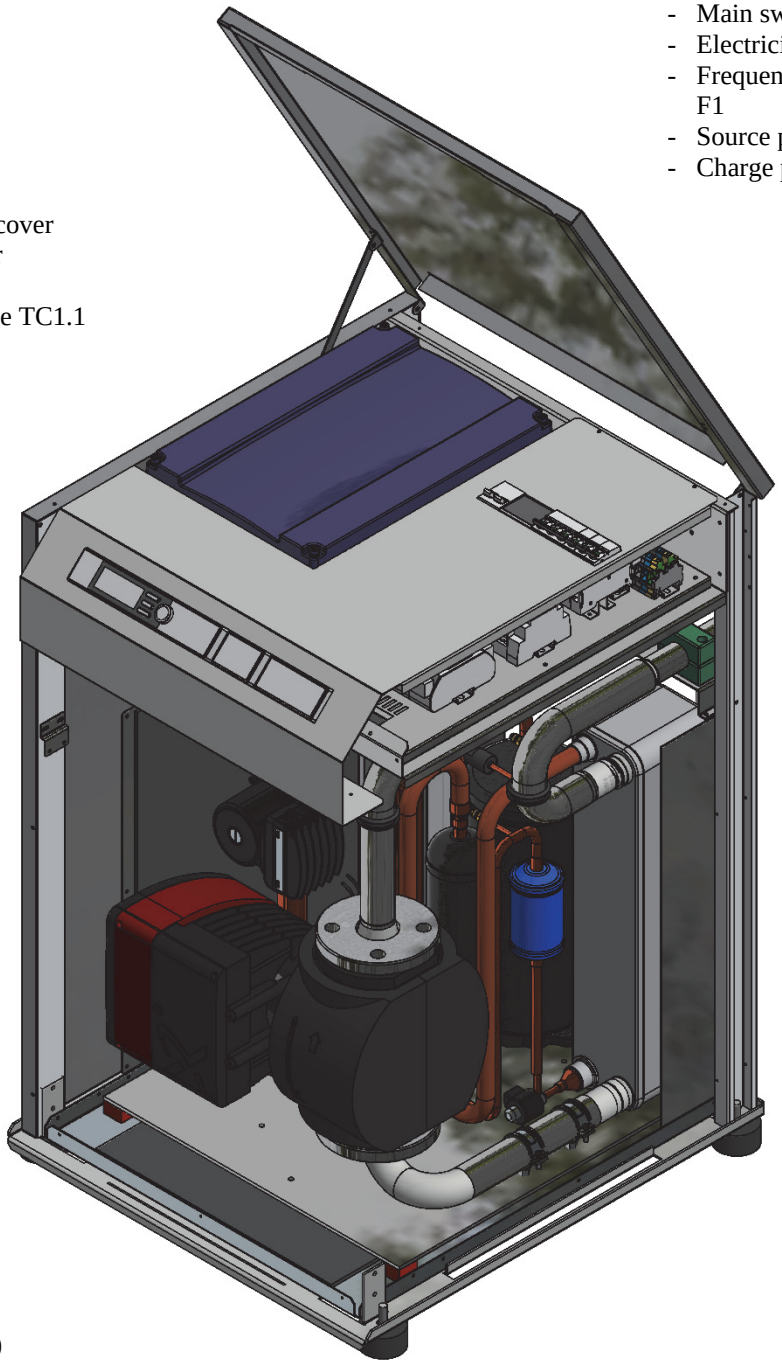
T3 Inverter

Control unit:

- Main switch Q1
- Electricity meter EM1
- Frequency converter switch F1
- Source pump switch F2
- Charge pump switch F3

Automation:

- Locking bolt of the cover
- Frequency converter
- Controller TC1
- IO expansion module TC1.1



Cooling module:
(Inverter compressor)

- Charge pump Q9
- Source pump Q8
- Compressor K1
- Condenser LS2.1
- Evaporator LS1.1
- Electronic expansion valve
- Filter dryer

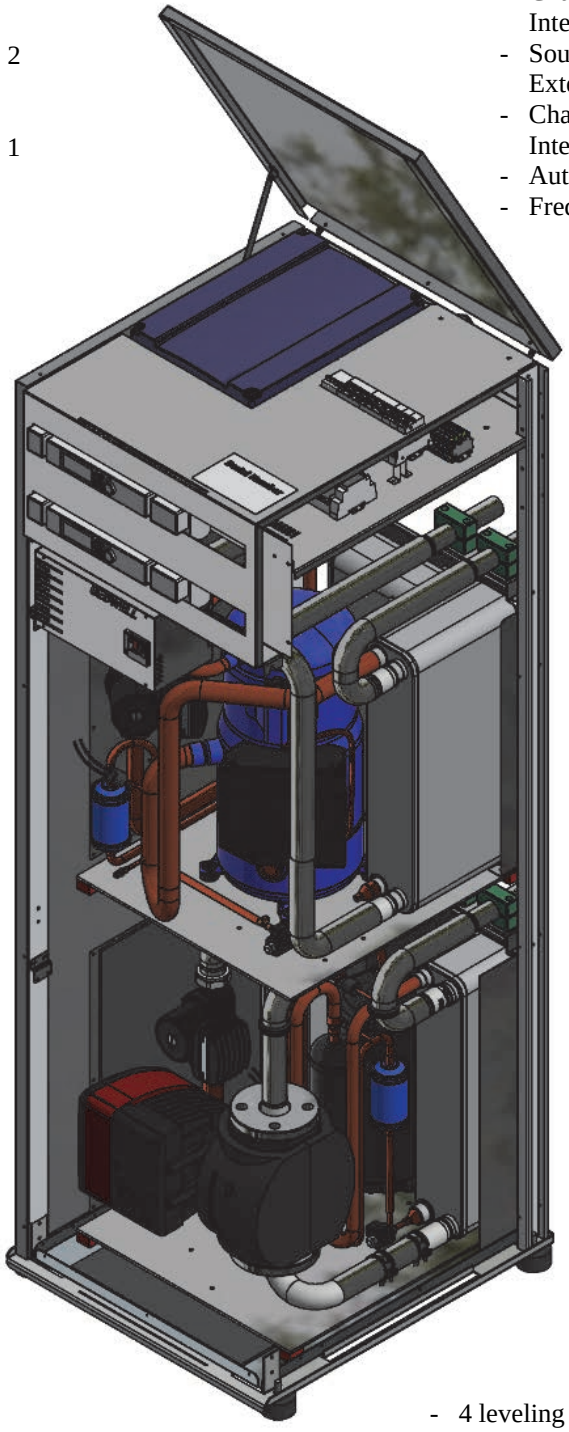
Gemini Inverter

Control unit:

- Main switch Q1
- Electricity meter EM1
- Frequency converter switch F1
- Source pump switch F2
  Internal, lower cooling module
- Charge pump switch F3
  Internal, lower cooling module
- Source pump switch F5
  External, upper cooling module
- Charge pump switch F6
  Internal, upper cooling module
- Automation switch F10
- Frequency converter U1

Automation:

- Controller 2 (TC2)
- Modbus RTU expansion module 2 *(accessory)*
- Controller 1 (TC1)
- Modbus RTU expansion module 1 *(accessory)*
- IO expansion module (TC1.1)



Cooling module 2:
(ON-OFF compressor)

- Soft starter U2
- Motor protection F4
- Charge pump Q9.2
- Compressor K2
- Condenser LS2.2
- Expansion coil LS1.2
- Electronic expansion valve
- Filter dryer

Cooling module 1:
(Inverter compressor)

- Charge pump Q9.1
- Source pump Q8.1
- Compressor K1
- Condenser LS2.1
- Evaporator LS1.1
- Electronic expansion valve
- Filter dryer

- 4 leveling feet

6.4 Heat pump sensors

Functional and measuring thermal sensors are installed in the heat pump. The sensors are attached to components and insulated from external heat. Some of the sensors are located in the compressor unit module.

B21 Charge supply water (space heating)

B71 Charge heating water return (heating return)

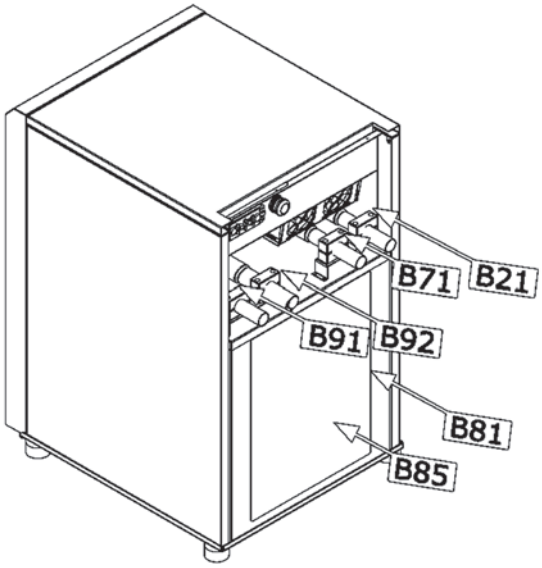
B91 Brine from the ground

B92 Brine to the ground

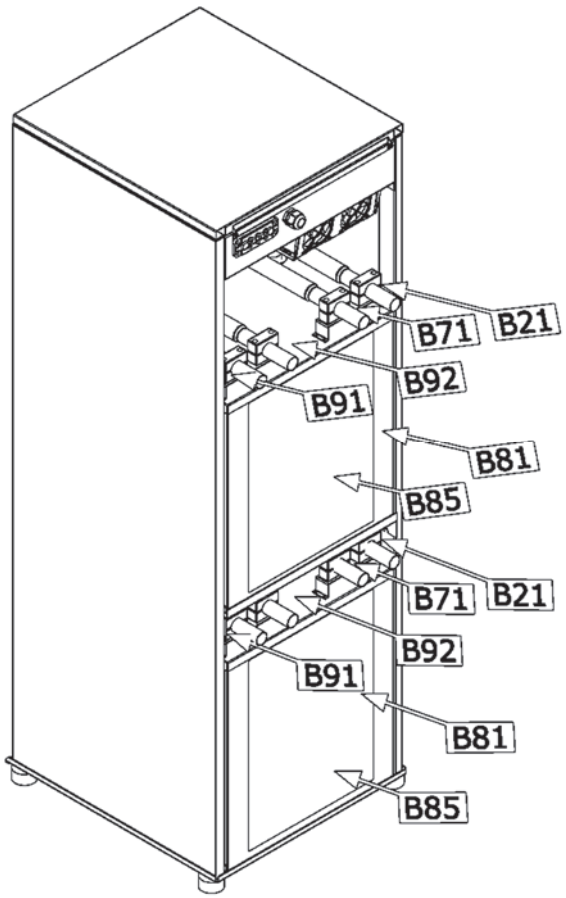
B81 Hot gas

B85 Suction gas

T3 Inverter



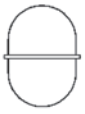
Gemini Inverter



7 PIPE INSTALLATION

7.1 General

The symbols used in PI-diagrams.

SYMBOL	DEFINITION
	Shut-off valve
	Air vent
	Check valve
	Strainer
	Safety valve
	Circulation pump
	Compressor
	Expansion valve
	Change-over valve
	Control valve
	Balancing valve
	Temperature sensor
	Pressure gauge
	Expansion vessel
	Heat exchanger

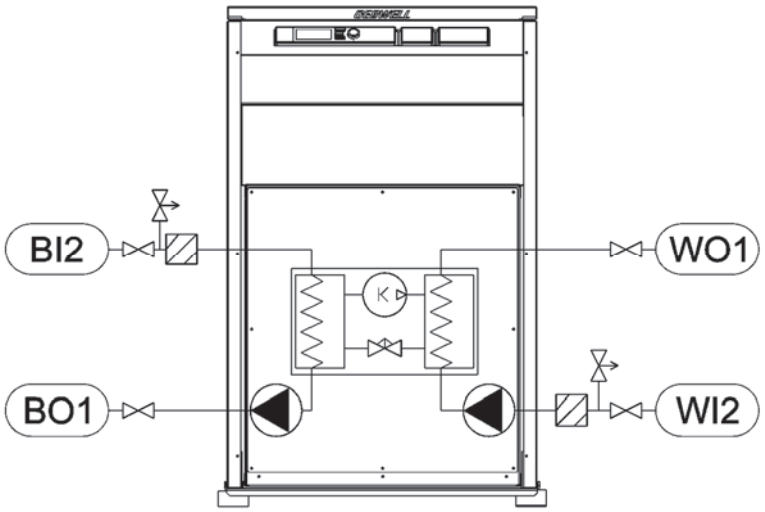
Pipe installations must be carried out in accordance with the regulations in force. The piping must not be connected to the device by soldering/welding to ensure that the internal sensors of the device are not damaged. The connection must be made with approved compression connectors.

T3 Inverter and Gemini Inverter heat pumps are not equipped with shut-off valves, and these must be installed immediately outside the device to facilitate maintenance.

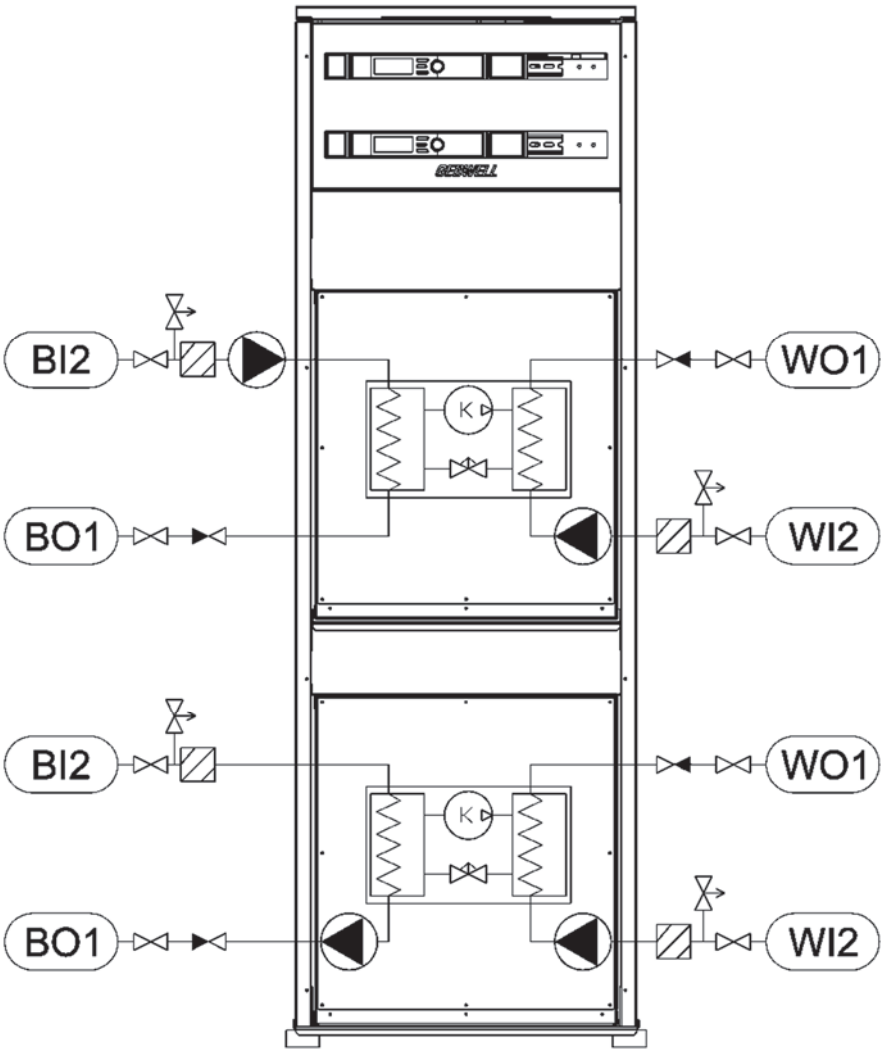
Install a strainer (dirt separator) in the return water pipes of the charging and brine circuits to prevent any impurities in the network from entering the heat exchanger and causing a blockage in the exchanger. To facilitate the cleaning of the strainer, install a shut-off valve near the strainer.

When the system comprises more than one heat pump, or a Gemini heat pump, install non-return valves in the charging and brine circuits for each compressor unit. Non-return valves prevent incorrect fluids circulation in the system. For information on how to install non-return valves, please see the connection instructions.

T3 Inverter



Gemini Inverter



7.2 Collector circuit

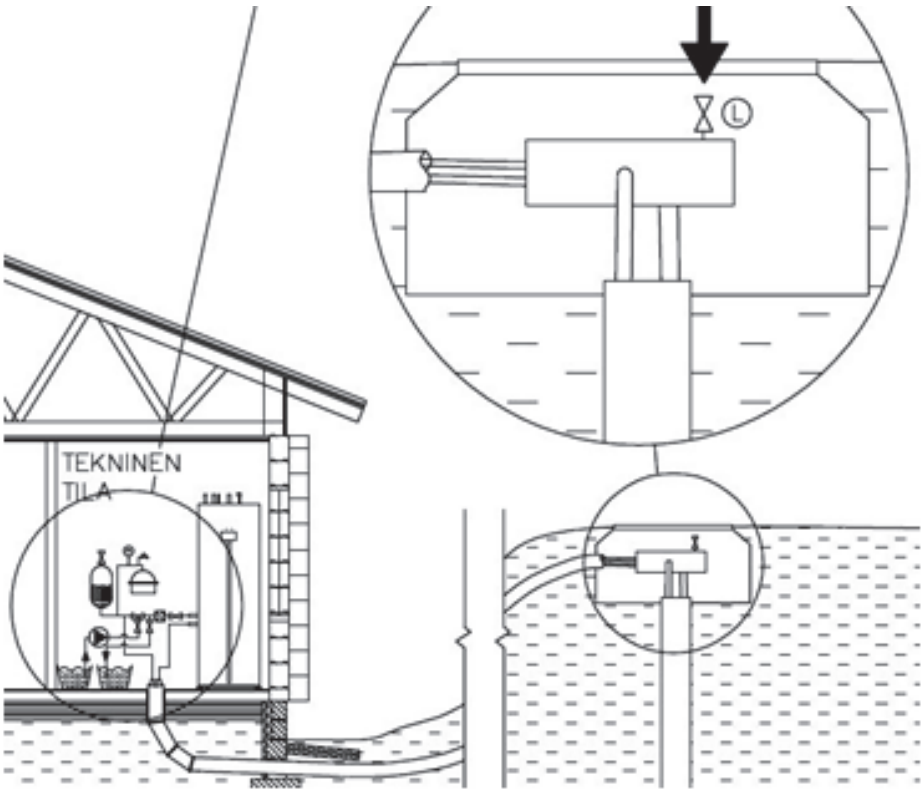
When using PEM pipes 40 x 2.4 PN6.3

Device	Recommended length of the collector pipe installed below the soil surface (m)	Recommended active boring depth (m)
T3 Inverter	800–2,500	360–1,000
Gemini Inverter	1,600–5,000	720–2,000

These figures are approximate set point values. Before commencing installation, the building's heat requirement should be precisely calculated.

The maximum recommended length of one loop of the collector is 500 m. If a longer heat collector pipe network must be installed, the network should be divided into several loops and connected in parallel. The connection should be made in such a way that it is possible to balance the flows in the loops.

The collector pipe network should steadily rise towards the heat pump to prevent air pockets. If this is not possible, venting valves should be installed at the high points.



Before installing the heat pump, rinse the collector pipe network to remove any impurities that may remain after installation.

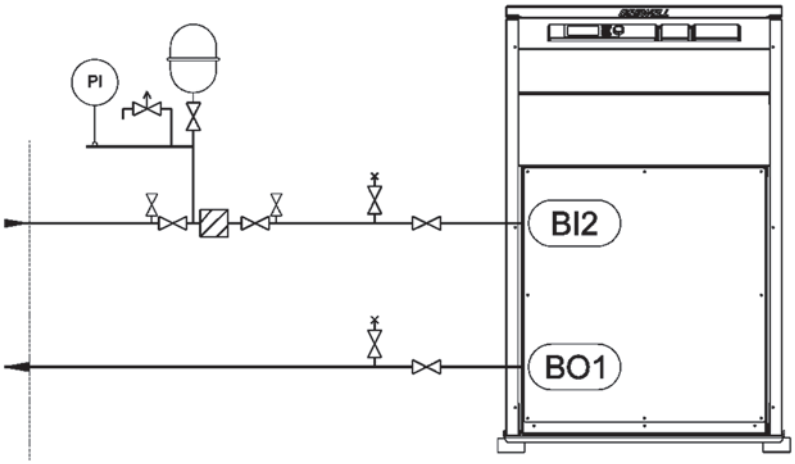
The collector connection must be selected before the device is put into position.

- Insulate all of the collection pipes in the building using closed-cell insulation to prevent condensation.
- Use rubber-insulated brackets for pipes.
- Enter the type of collection fluid and the freezing point in the installation record.
- Install shut-off valves in pipe connections as close to the heat pump as possible.
- Make sure that the top of the heat pump and the electrical equipment are entirely free of water during operation.
- Only use a diaphragm expansion tank in the collector. The use of a flat expansion tank is not recommended.
- Check the pre-pressure of the diaphragm expansion tank in accordance with the plan before pressurising the system. The pre-pressure must be checked when the circuit is open.
- Connect the collector's valve group with the related expansion tanks as shown in the diagram. The arrow on the poppet seat indicates the flow direction.
- The collector must be pressure-tested with 3 bars of pressure and the test pressure must be sustained for at least 30 minutes.
- Only connecting components designed for cold conditions should be used in the collector.

Connection instructions

The T3 Inverter heat pump has an internal source pump.

T3 Inverter

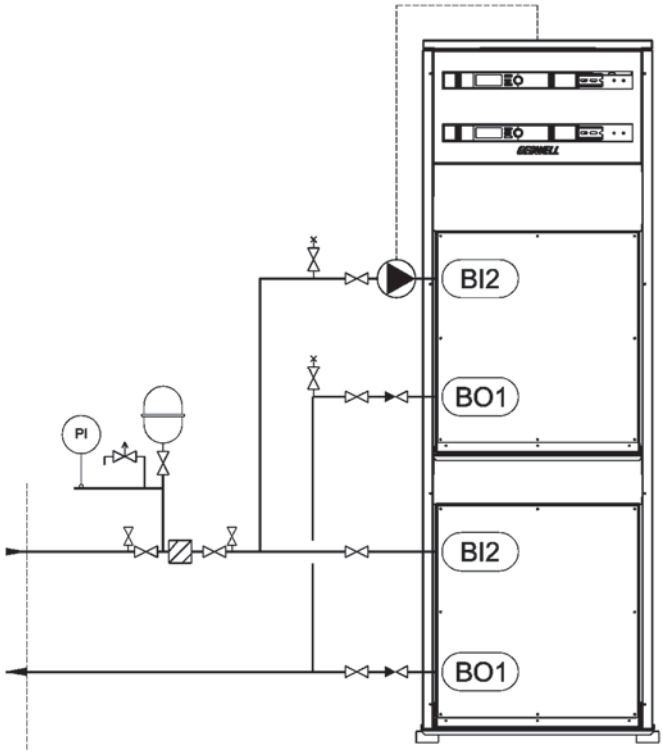


Gemini Inverter

The Gemini Inverter heat pump has two cooling modules. The lower module has an inverter controlled compressor with an internal source pump. The upper module has an on-off compressor that does not have an internal source pump. Instead, the pump is installed outside the device. Install the source pump in the return pipe of the collector circuit near the heat pump, between the shut-off valve and the heat pump according to the installation instructions of the pump. See Electrical connection under *Electrical connections -> Connecting an external source pump.*

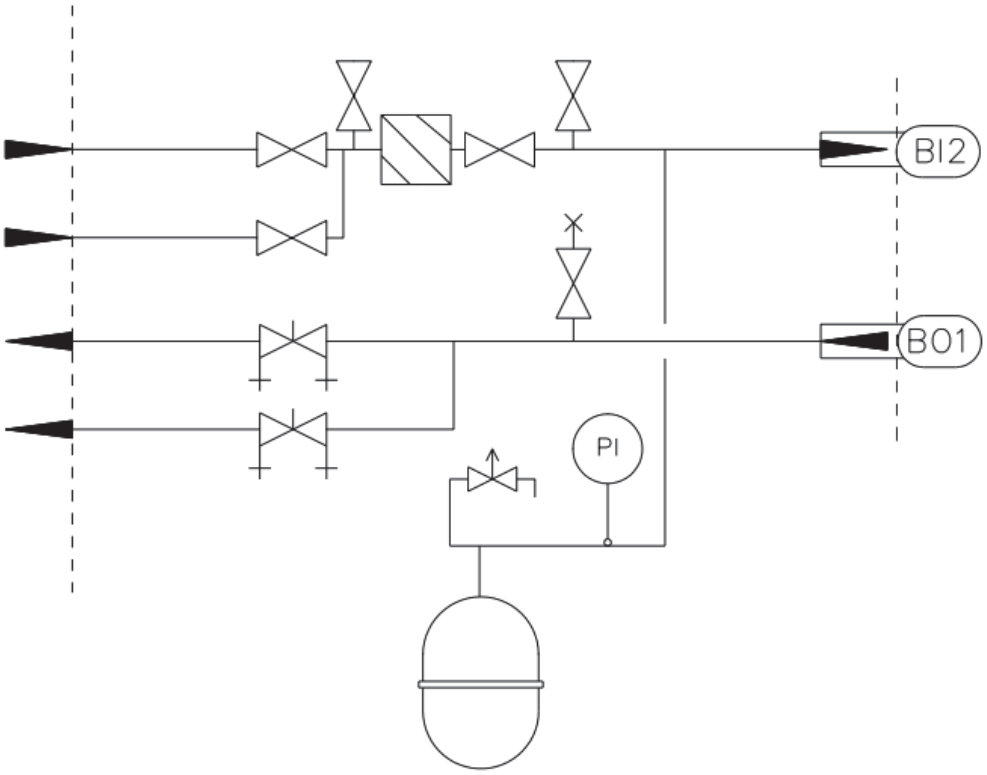
The external (standard) source pump is included in the standard delivery of the heat pump.

Install the heat source pump (GP16) according to the installation instructions of the circulator pump near the return pipe (EP14-XL6) and (EP15-XL6) of the collector circuit, between the heat pump and the shut-off valve (see the figure). The heat source pump is not included in the delivery in certain countries (see the delivery note).



Installing the collector onto several loops

If you are using several collector loops, every circuit must have shut-off and control valves. Follow the valve manufacturer's instructions when you install control valves. The valve must be installed in such a way that it is easy to adjust and inspect, and it does not freeze. Ventof air from the circuits one at a time and regulate the flow rate in relation to the lengths of the circuits. Try to use collection loops of equal length.

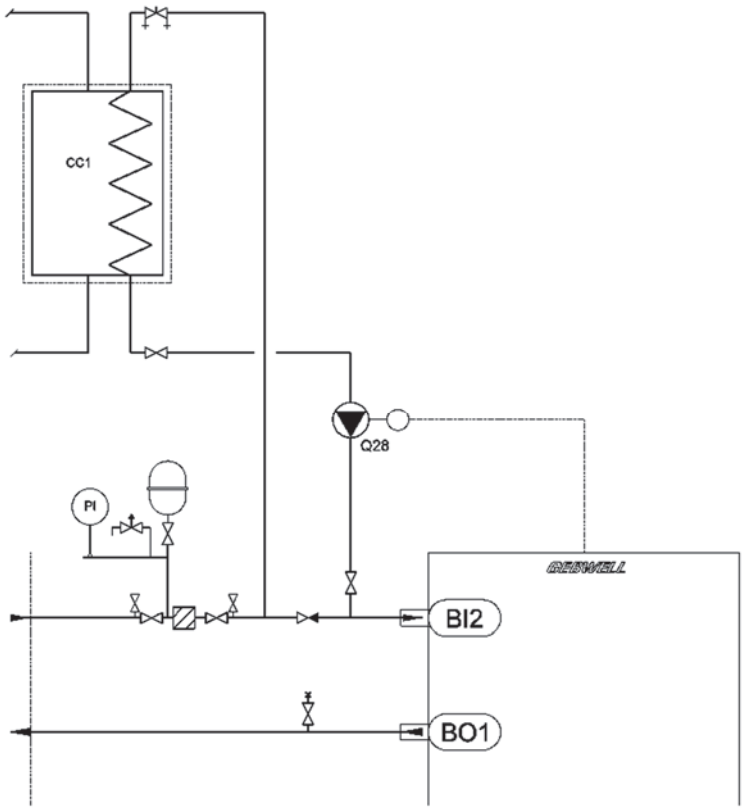


Ground source cooling

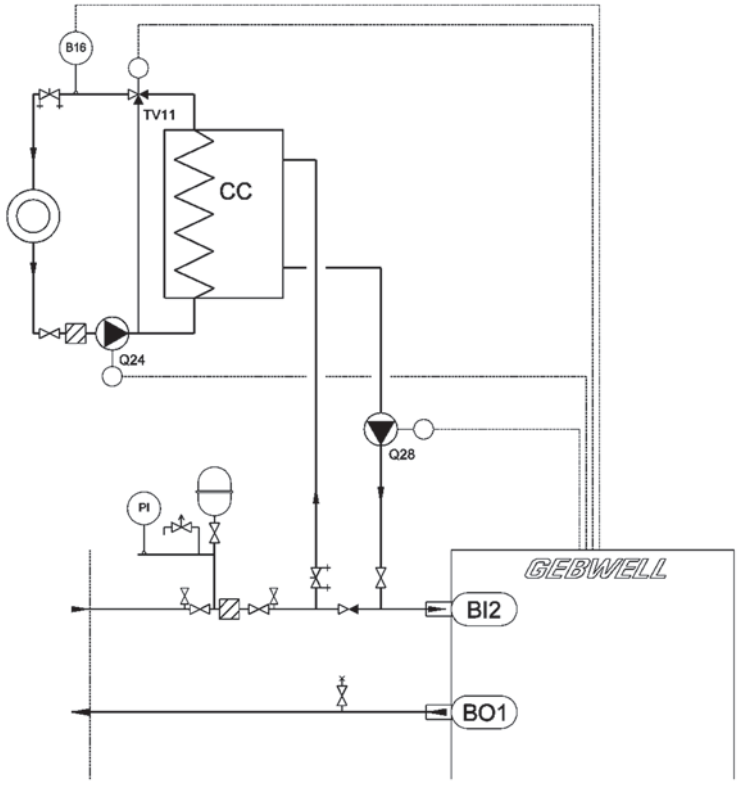
Ground source cooling functions best when heat collection is arranged using a bored well. During the summer, loops installed in the soil or in lakes may be at such a high temperature that the required cooling power cannot be obtained. Air within the collector should be allowed to freely rise to the expansion tank. Venting should always take place at the highest point in the collector. If it is necessary to connect the cooling radiator to the highest point in the circuit, venting should take place via the radiator.

Cooling can be controlled/regulated using the GWPOL945C cooling accessory available for the heat pump. Building automation or ventilation machines can also control the heat pump's internal source pump. See the electrical diagrams for instructions.

Cooling outputs



Control circuit



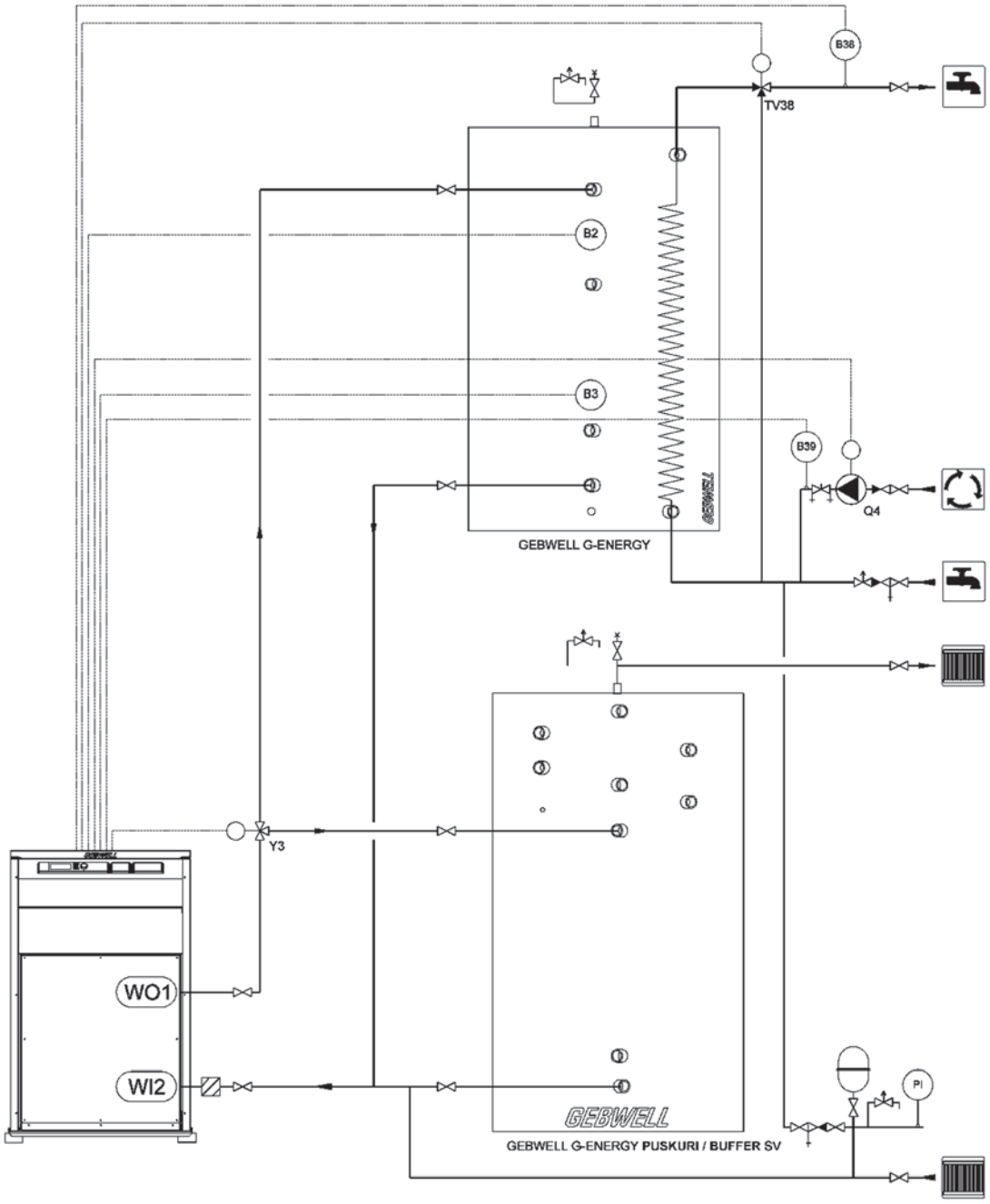
7.3 Heat supply circuit

The heating system controls the indoor temperature with the help of the control regulator and radiators, underfloor heating, ventilation or convector fans.

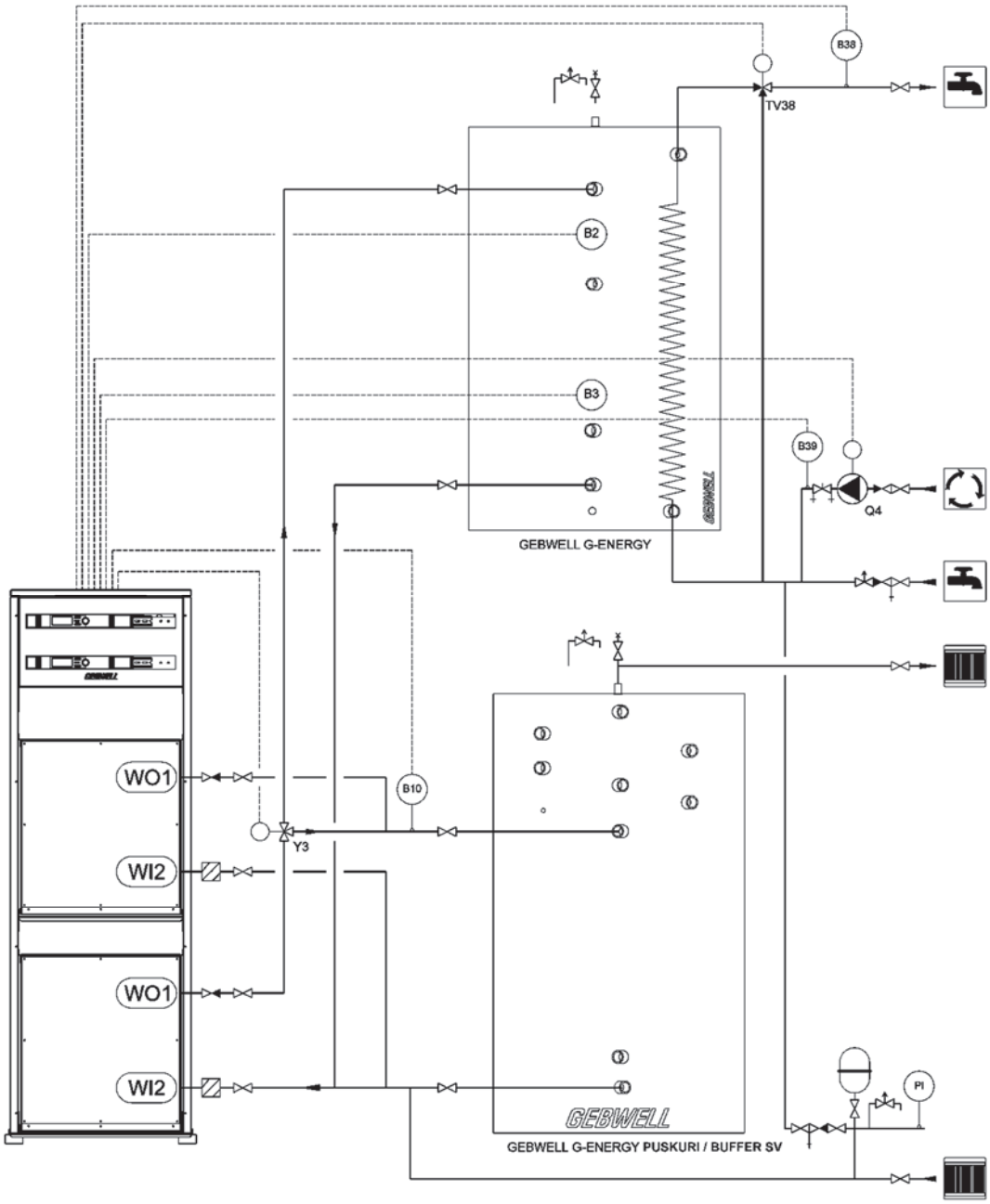
- Before installing the heat pump, rinse the pipe network in the building's heating system to remove any impurities that may remain after installation.
- Install the required protective devices, strainer, shut-off and non-return valves. The shut-off valves must be installed as close to the heat pump as possible.
- It is advisable to install the heat pump in a closed heating system with a diaphragm expansion tank.
- Make sure that the top of the heat pump and the electrical equipment are entirely free of water during operation.
- The product must be protected from overpressure using a safety valve. The opening pressure of the safety valve can be a maximum of 0.6 MPa (6.0 bar), and it should be installed in the return pipe of the heating system. It is advisable to lead the safety valve overflow pipe to the nearest floor drain. The overflow pipe should be installed in such a way that water is able to flow out of the overflow pipe unobstructed.
- If the device is connected to a system equipped with thermostats, bypass valves should be installed in every radiator or a few thermostats should be removed to ensure an adequate flow rate. See the *Technical details* table for the device's minimum flow rate.

Connecting the heating system

T3 Inverter



SYMBOL	DEFINITION				
	Shut-off valve		Compressor	PI	Pressure gauge
	Air vent		Expansion valve		Expansion vessel
	Check valve		Change-over valve		
	Strainer		Control valve		Heat exchanger
	Safety valve		Balancing valve		



SYMBOL	DEFINITION
	Shut-off valve
	Air vent
	Check valve
	Strainer
	Safety valve

	Circulation pump
K	Compressor
	Expansion valve
	Change-over valve
	Control valve
	Balancing valve

B	Temperature sensor
PI	Pressure gauge
	Expansion vessel
	Heat exchanger

Buffer tank for the heating system

If the fluid volume of the heating system is too low in relation to the power of the heat pump, a heating buffer tank should be used. The internal heating circulator pump acts as the heating system's pump.

NOTE! Ensure the minimum flow rate of the device using bypass valves or by leaving a sufficient number of open circuits in the heating network. The minimum flow rates for each device are shown in the ***Technical details*** *table.*

Heating system with an external heating circulator pump and buffer tank

If the heating system requires an external circulator pump, the pump must be dimensioned to correspond to the needs of the heating system. If the fluid volume of the heating system is too low in relation to the power of the heat pump, a heating buffer tank should be used in the heating system.

Water-circulating post-heating of ventilation should be connected with a buffer tank as well as an external heating circulator pump to ensure that heat is supplied to the ventilation device.

Several heating systems

If there are heating systems in the building using different temperatures, such as radiator heating and underfloor heating, an additional heating circuit should be used. The higher-temperature circuit should always be connected as circuit 1 and the lower-temperature circuit should be circuit 2.

7.4 Domestic water system

Any domestic water systems must be connected as planned.

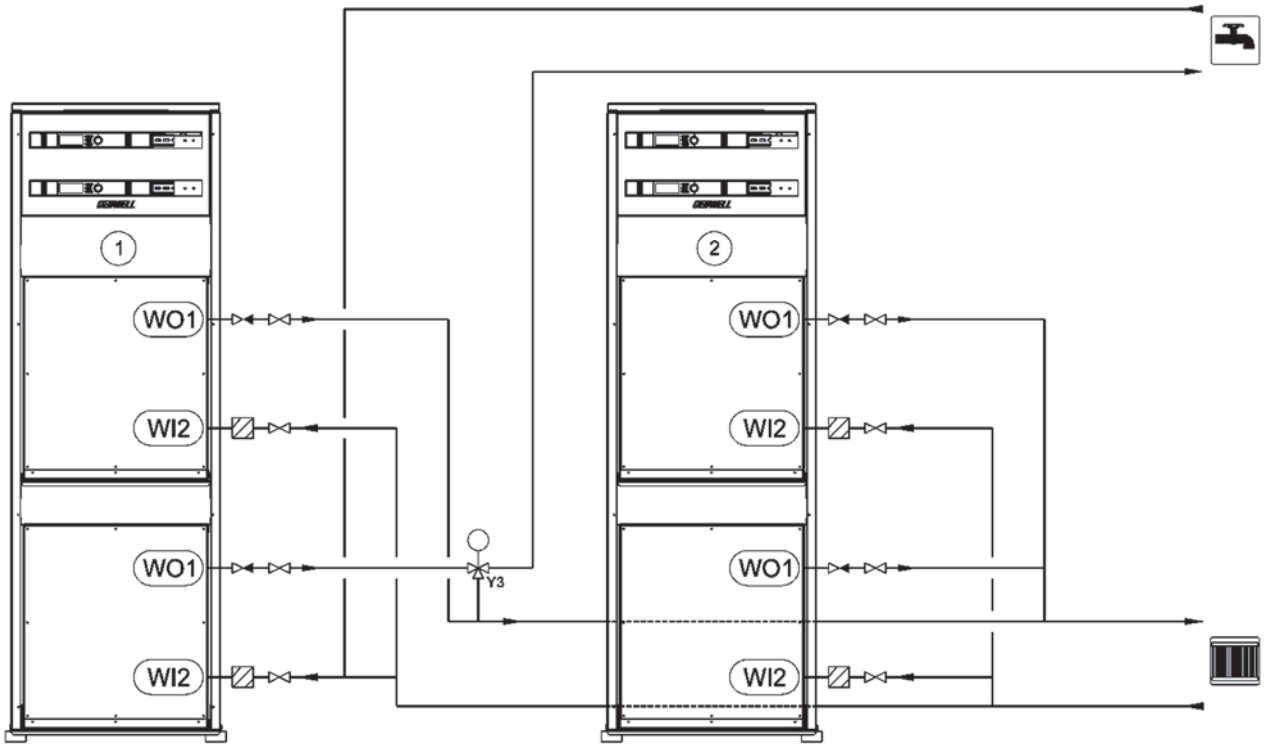
The domestic water system should be equipped with a safety valve (max. 10 bar), and it should be installed in the inbound cold water pipe as shown in the diagram. It is advisable to lead the safety valve overflow pipe to the nearest floor drain. The overflow pipe should be installed in such a way that water is able to flow out of the overflow pipe unobstructed.

The safety valve for domestic hot water may leak almost constantly when domestic hot water is no longer consumed in large volumes. The overflow is due to the heat expansion of cold water and pressure shocks. The safety valve can be prevented from leaking by installing an expansion tank in the domestic water network to level out pressure fluctuations and prevent pressure shocks.

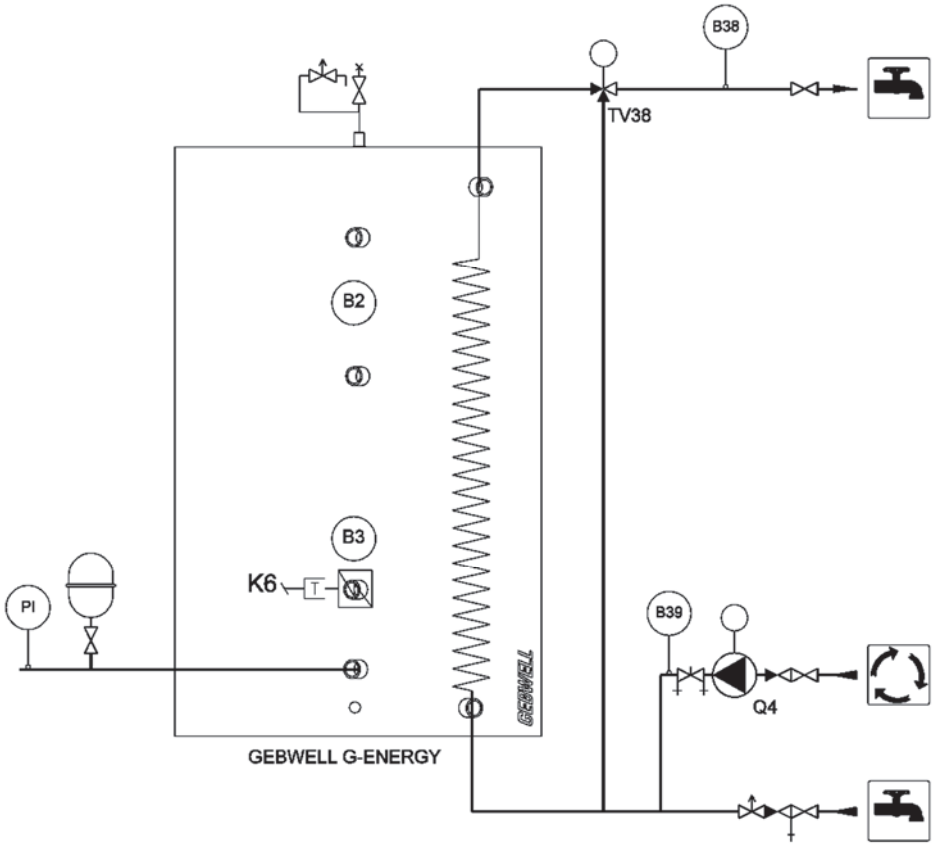
The heat pump's domestic hot water tank is equipped with a domestic hot water circulation connection. The circulation flow should be precisely regulated to ensure that the tank functions. If the flow is too high, it will reduce the temperature layering in the heat pump's internal tank and weaken the operation of the system.

7.5 Connection options

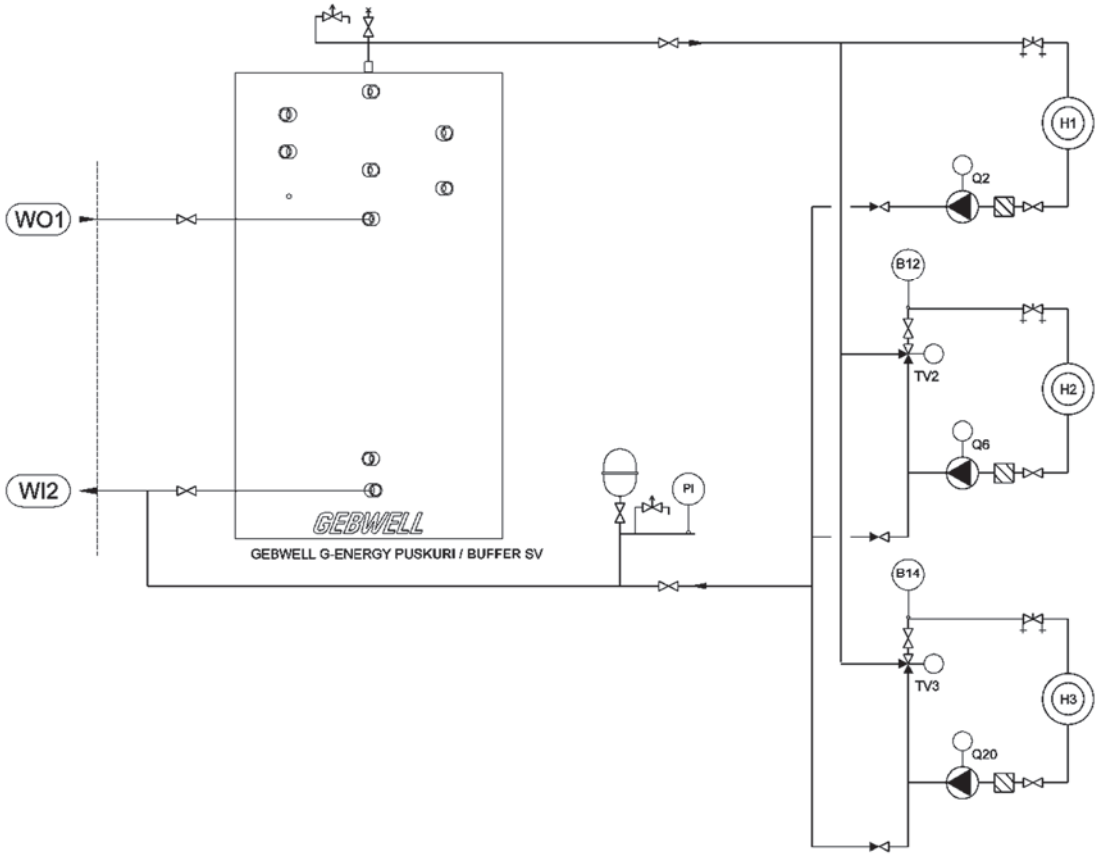
Cascade



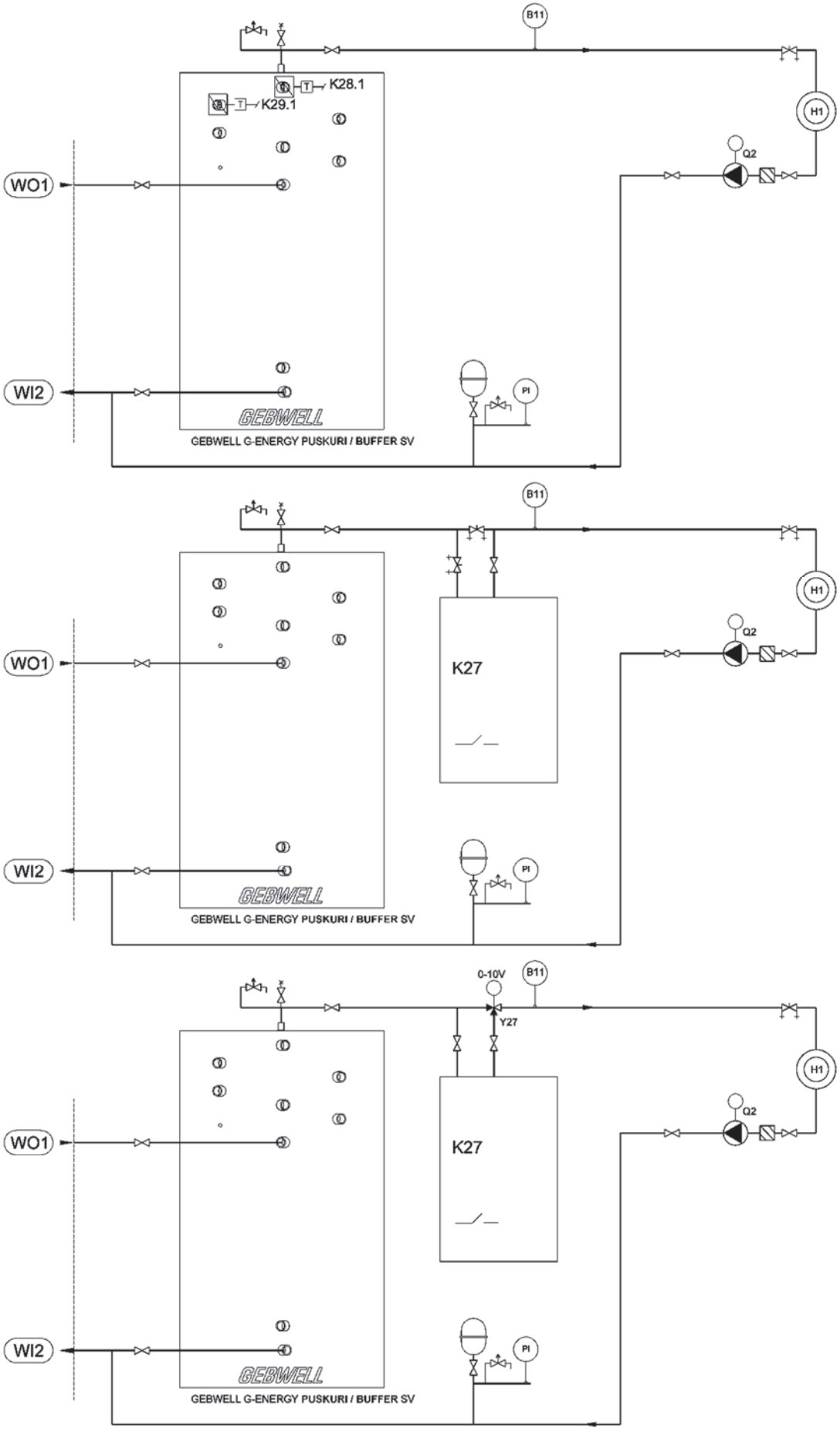
Domestic water connections



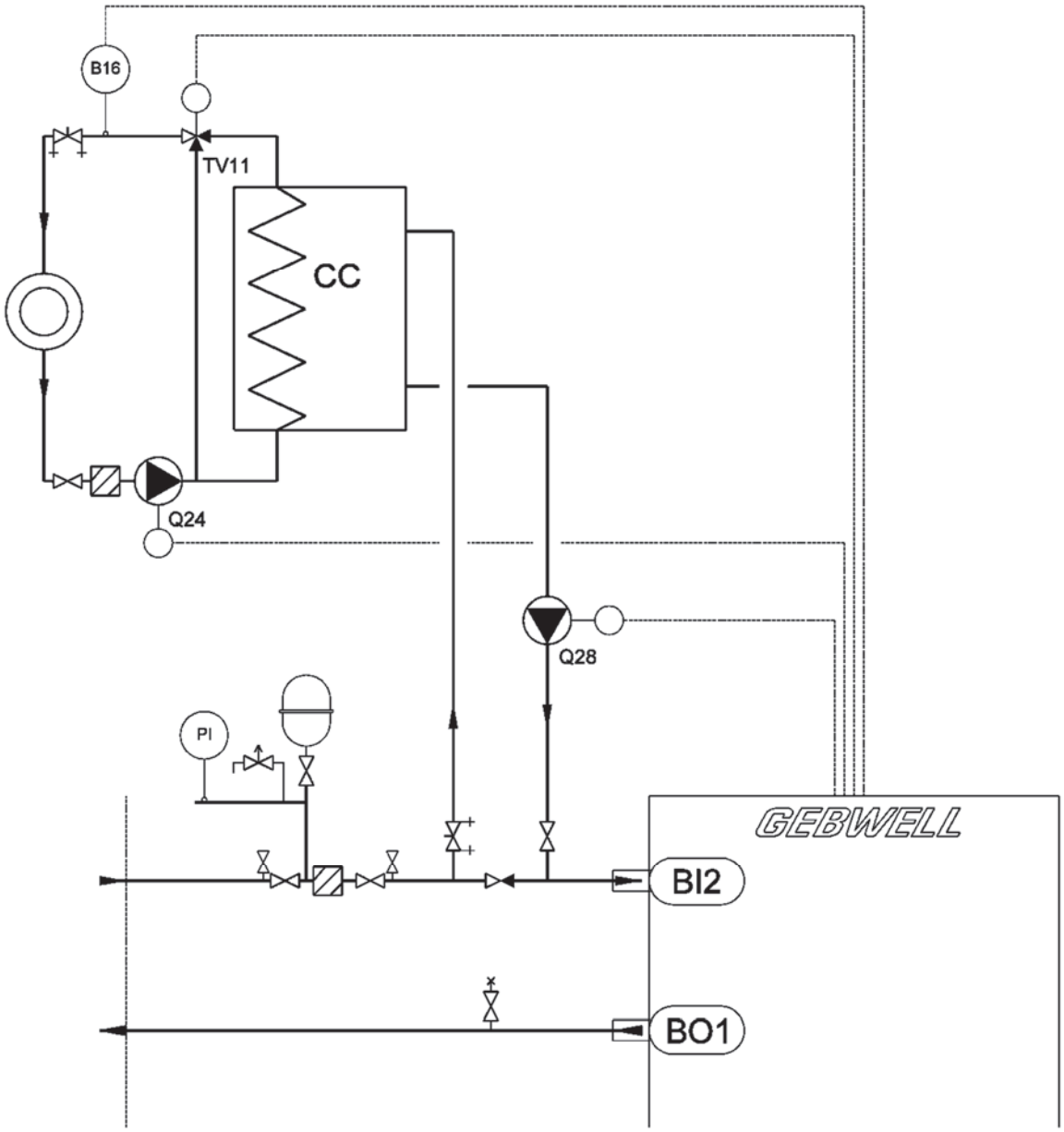
Heating circuits 1



Connections to an additional heat source



Cooling circuits 1



8 ELECTRICAL CONNECTIONS

8.1 General

The heat pump is connected to a 400 V (50 Hz) electricity network. Do not turn on the heat pump until the heating network of the heat pump is filled with water. This could cause damage to the pumps, protective devices or compressor.

Only authorised electricians may connect additional electrical accessories to the heat pump.

- The heat pump must be disconnected before the building's insulation is tested.
- The heat pump's circuit diagram is shown in the end of this manual.
- The heat pump's fuse should be type C (slow).
- Cabling for electrical accessories used with the heat pump should use the control unit lead-throughs at the back of the device.
- Sensor and data transmission cables must not be installed near power lines.

Included standard electronic equipment.

The heat pump comes with the following standard equipment, which must be installed and connected according to the instructions when installing the device.

T3 Inverter:

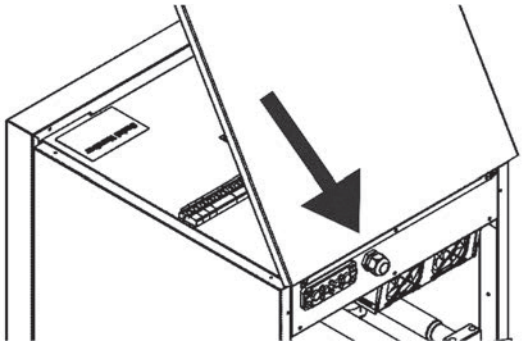
- Outdoor temperature sensor
- Room sensor
- Domestic water accumulator sensors

GEMINI Inverter:

- Outdoor temperature sensor
- Room sensor
- Domestic water accumulator sensors
- External source pump (upper cooling module)

8.2 Power supply

A separate lead-through at the rear edge of the control unit is reserved for power supply. Tighten the bushing seal to ensure that the cable is not strained.



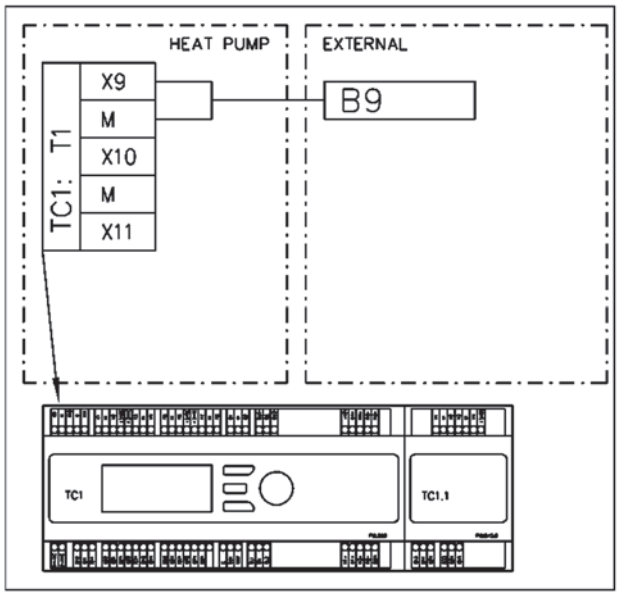
8.3 Connecting the sensors

Connect the sensors according to the instructions below before the heat pump start-up. The sensors are delivered in the manual folder. The sensors have position markings. Connect the sensors to the heat pump's controller. The controller is in the control unit behind the cover plate.

Outdoor temperature sensor (B9)

Place the sensor in a shaded location on a wall facing north or north-east. The sensor must not be installed near windows or doors.

Connect the outdoor temperature sensor (B9) to the T1 connectors X9 and M on the controller.



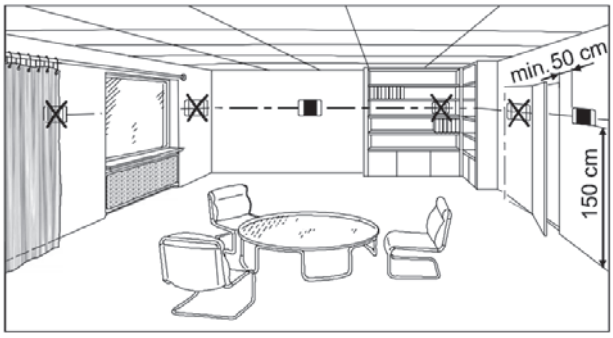
Room sensor (B5)

Place the room sensor in a central location in the residential space. The room sensor must be connected to the controller before the heat pump is started up.

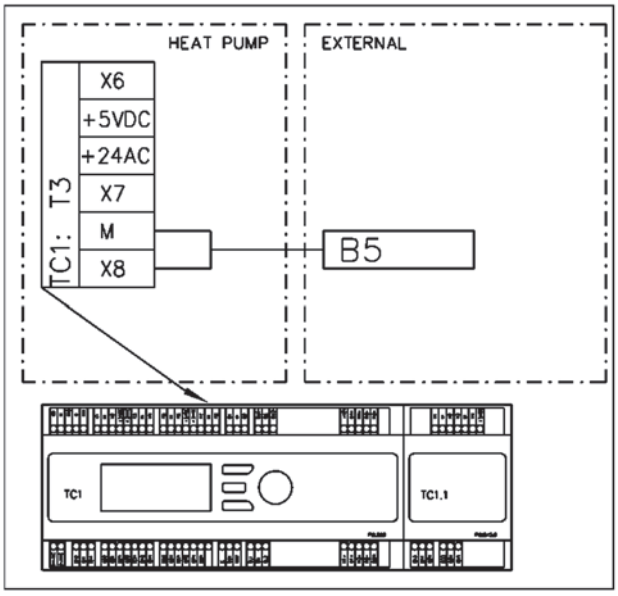
The room sensor measures the room temperature, which is displayed on the heat pump's user interface, and it also regulates the room temperature. The impact of the room sensor on the indoor temperature can be adjusted on the user interface.

The effect of the room sensor is turned off when the device is delivered from the factory. The room sensor must be removed from the settings if the room sensor is not connected.

Room sensor placement:

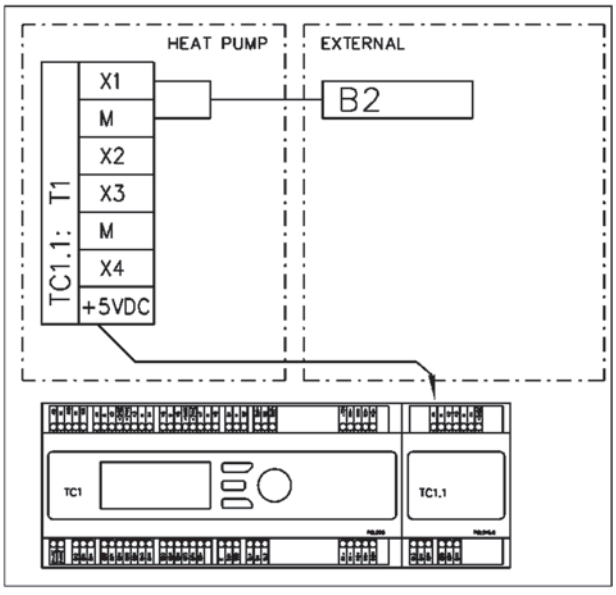


Connect the room sensor (B5) to the T3 connectors X8 and M on the controller.



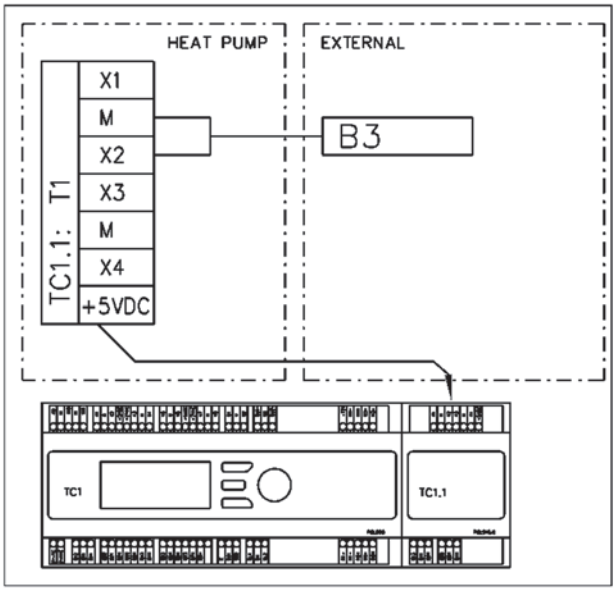
Upper sensor of the domestic water accumulator (B2)

The domestic water accumulator sensor is installed on upper side of the accumulator, in the sensor pocket.



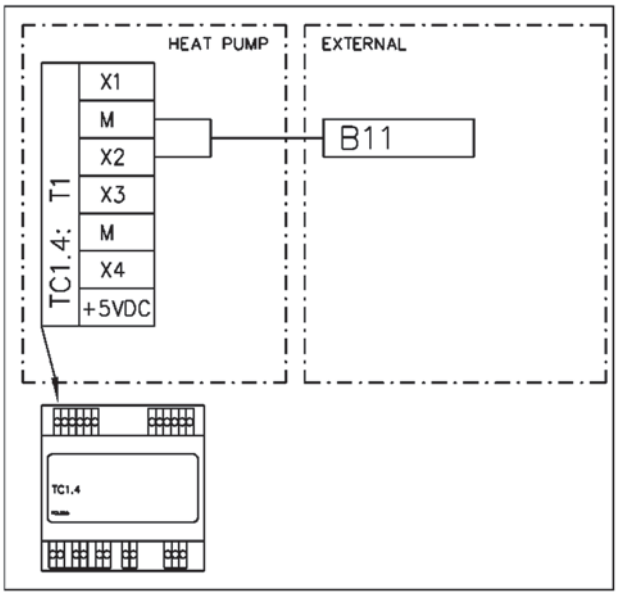
Lower sensor of the domestic water accumulator, operation (B3)

The lower sensor of the domestic water accumulator is installed in the middle/bottom (1/3 of the bottom) of the accumulator, in the sensor pocket.



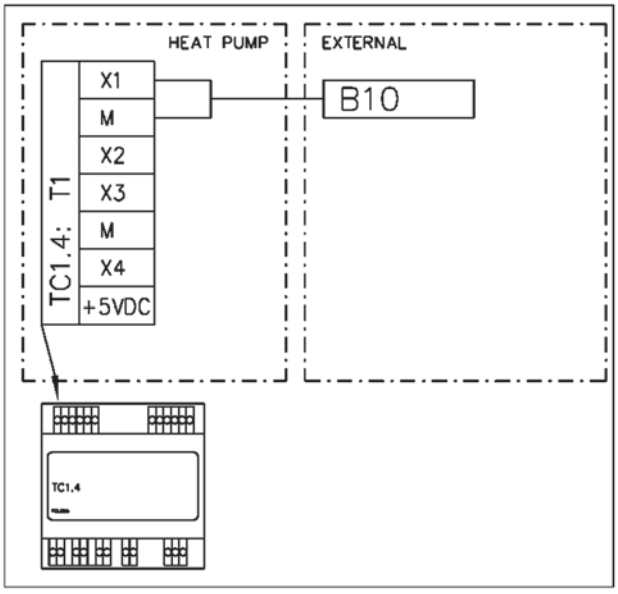
Common flow sensor (B11)

The common flow sensor is installed in systems that involve accumulator resistors or an external additional heat source (oil, gas, district heating, electric burner, etc.). The sensor is installed in a common heating system on the supply pipe after the additional heat source. The sensor acts as a sensor for controlling additional heat.

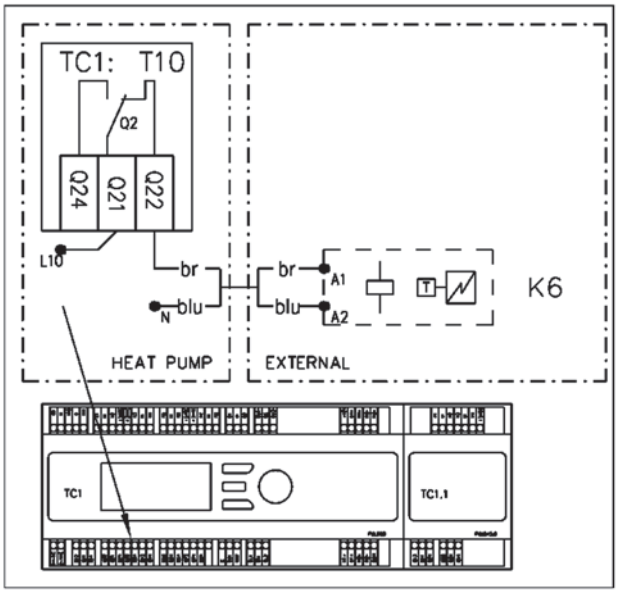


Cascade supply temperature sensor (B10)

The cascade supply temperature sensor is installed in systems with several heat pumps producing heat. Gemini's devices always have a cascade supply temperature sensor. The sensor is installed in the cascade's common supply pipe for heating before any additional heat sources. The sensor acts as a measurement that controls the cascade.



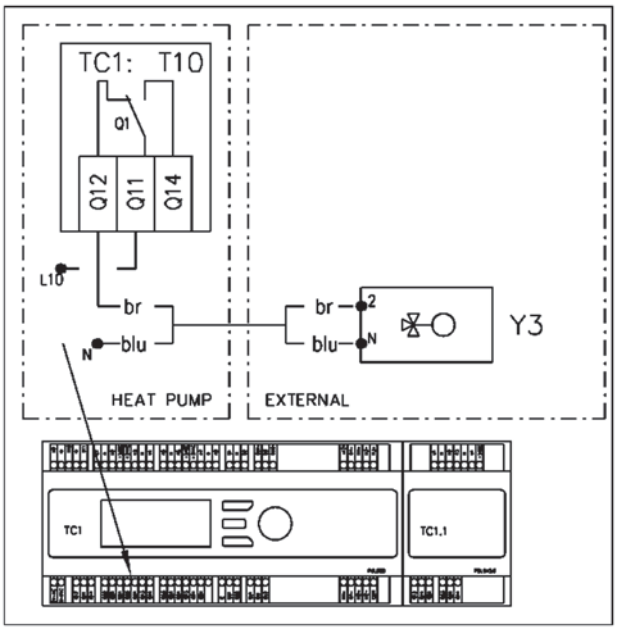
8.4 Connection of the domestic water resistor (K6)



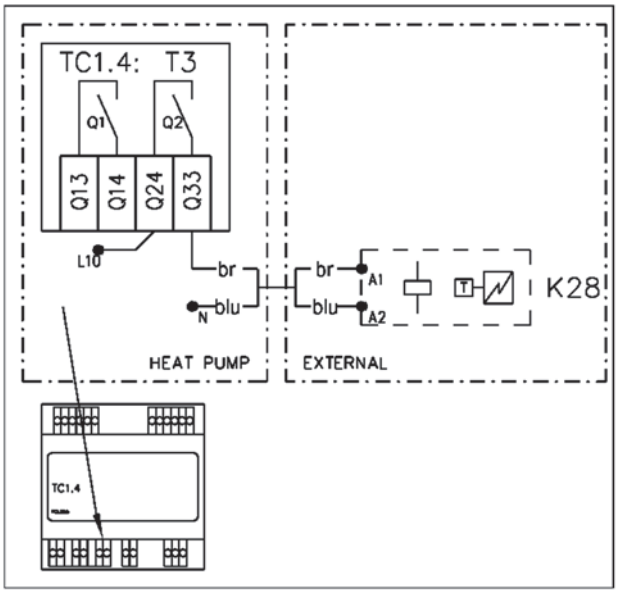
8.5 Change-over valve connection (Y3)

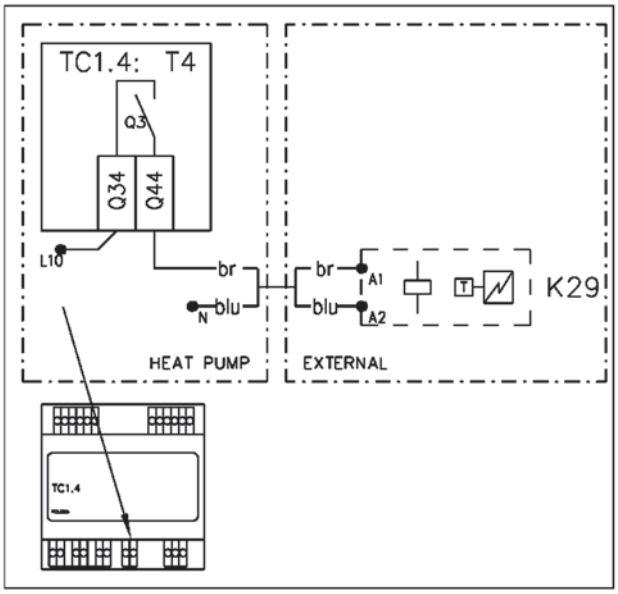
The heat pump can be equipped with an external change-over valve for the control of domestic hot water and heating. Connect the external change-over valve to the heat pump control unit as shown.

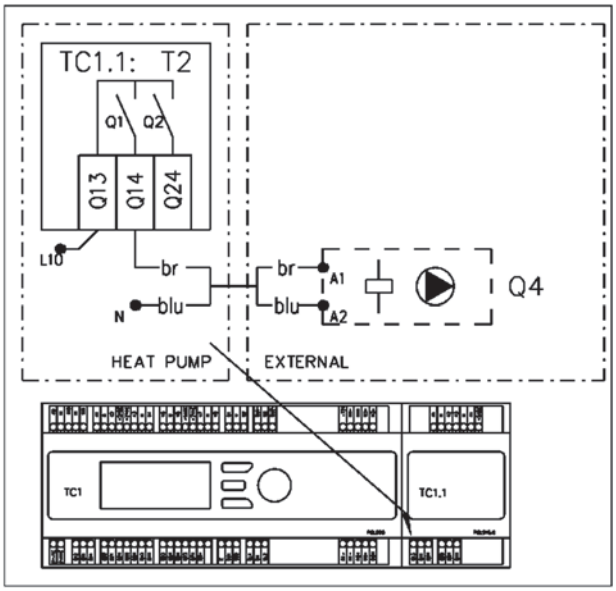
In cascade systems, there may be two change-over valves.



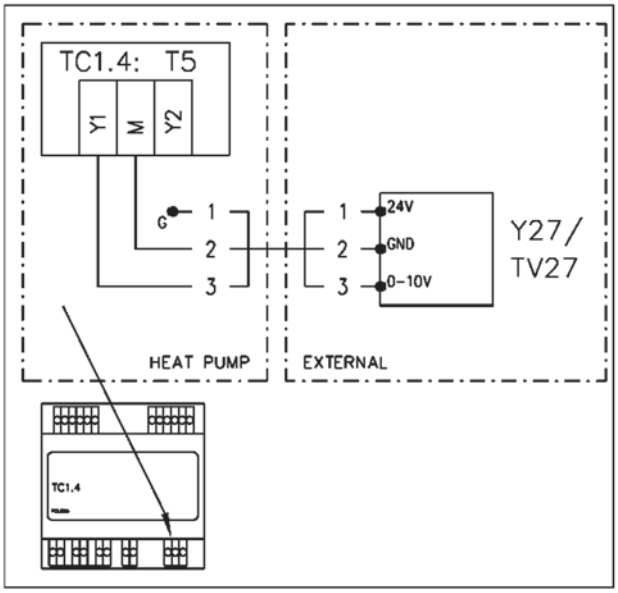
8.6 Sequence-controlled additional heat, heating accumulator's resistors (K28/K29)







8.7 Additional regulated heat, additional heat source (Y27)



8.8 Connecting the domestic water circulator pump

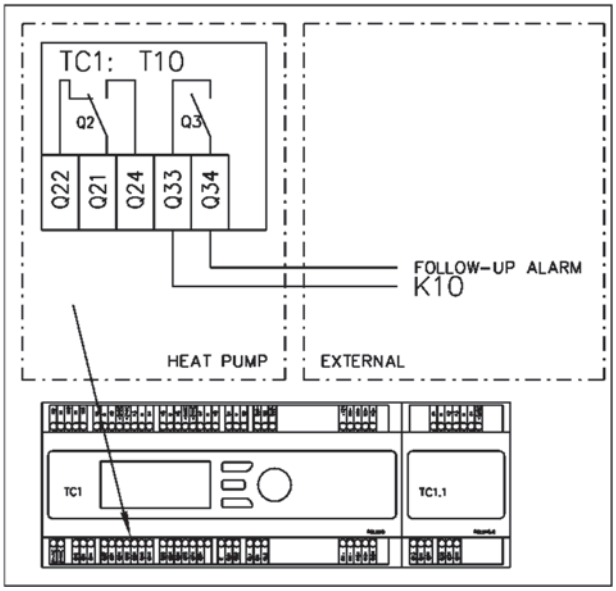
The domestic hot water circulator pump (Q4) can be connected to the controller's electrical control. According to the factory settings, the circulator pump operates whenever the domestic hot water operating method is in the ON state. The circulator pump's control method can be adjusted so that it operates according to a schedule. The adjustment can be made using the heat pump's user interface.

NOTE: The maximum load current on the relay output is 1.5 A (230 V AC)

The control of the circulator pump is connected to terminal Q14 of the expansion module TC1.1.

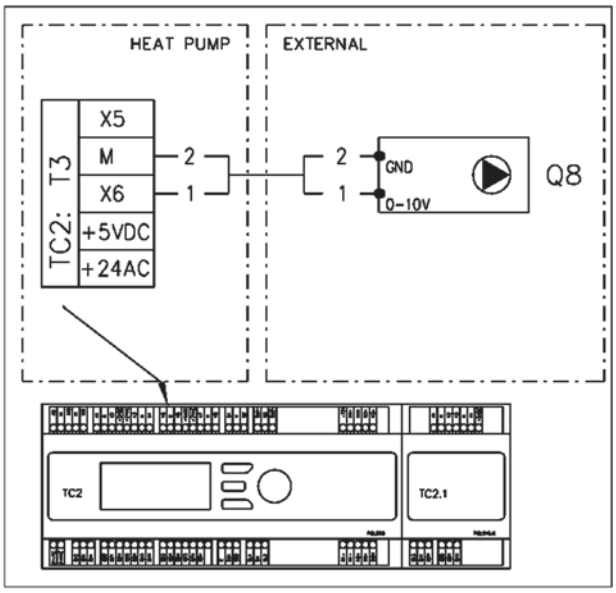
8.9 Continuous alert

The heat pump can provide a continuous alert in the event of failure. The continuous alert is connected to the controller's potential-free relay, K10. Use a 2-pole cable with a cross-sectional area of at least 0.5 mm^2.



8.10 Connection of the external source pump (GEMINI)

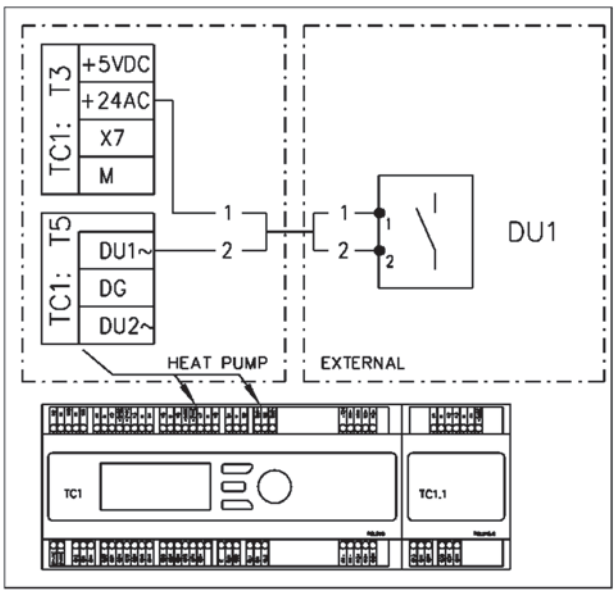
A regulation message is connected to the external source pump using the heat pump controller TC2.



8.11 External control to the source pump

The source pump can be started up using external potential-free contact terminal information. The contact terminal information is connected to the controller connections T3, +24V and T5, DU1. This function can be used for passive cooling.

Closing the contact terminal starts up the source pump inside the heat pump.



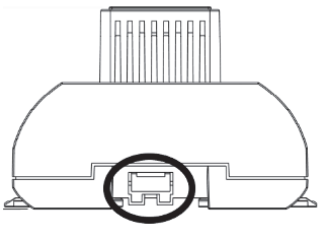
8.12 Connecting accessories

The connection instructions for accessories are included in the installation instructions supplied with each product.

8.13 Connecting an expansion card

Accessories that require an expansion module should be connected to the controller using a connector or cable attached to the end of the module. First attach the connector to the expansion module before attaching the expansion module to the DIN rail. When the module is attached to the DIN rail, push the connector into the controller. The protective plastic in front of the connector must be removed from the controller before installation.

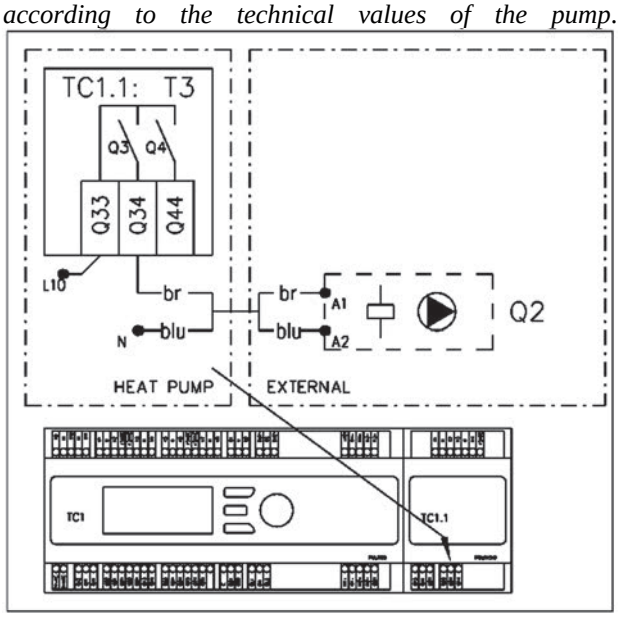
Connection at the end of the controller



8.14 Connecting an external circulator pump

An external circulator pump can be installed into the first heating circuit. The external circulator pump can be connected to the heat pump control system.* The circulator pump always functions according to factory presets when the functional state of domestic water is ON. The summer shut-off switches off the pump programmatically if the operation is active.

** The power supply for the heat pump's external circulation pumps must be taken from the control panel. The group control panel must be equipped with a contactor controlled by a heat pump controller. The external control voltage must be marked on the control panel. Dimension the contactor and power supply according to the technical values of the pump.*



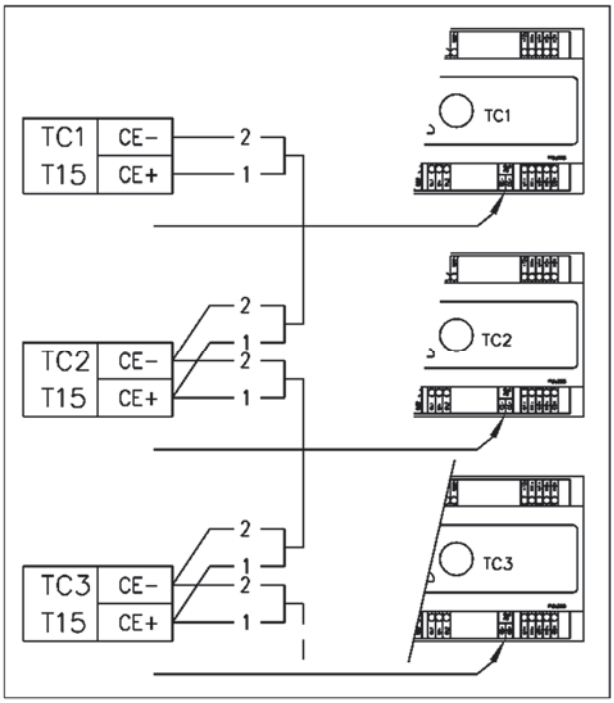
8.15 Heating control group (accessory)

The heating control group is an accessory available for the T3 Inverter and the Gemini Inverter heat pumps, enabling a second heating circuit to be controlled. The heating control group is delivered separately, in a separate product package. The heating control group includes a controller expansion card and a factory-assembled mixing group.

Install the heating control group according to the instructions supplied with the product.

8.16 Cascade connection

Several heat pumps can be connected to a single cascade system. In the system, one device acts as a master and other devices as slaves. The master device always acts as the system controller and all external sensors are always connected to the master device. Device-specific change-over valves, external controls of compressors, alerts, and the Modbus are connected device-specifically. Other devices must be defined as slave devices and each device must have its own device address.



8.17 Installation of a Modbus card

The Modbus module is connected to the left of the controller using a connector attached to the end of the module. First attach the connector to the expansion module before attaching the expansion module to the DIN rail. When the module is attached to the DIN rail, push the connector into the controller. The protective plastic in front of the connector must be removed from the controller before installation.

9 FILLING and VENTING

9.1 Filling the heating system

A leak test must be performed on the system before filling the system with liquid.

Fill the charging/heating circuit using the filling valve of the system. Open the venting valves to allow air to get out of the system during filling. Close the outlet valve when no more air comes out of the outlet valve. The pressure starts to pick up after a few minutes. Close the filling valve when the pressure is at the correct level.

Carefully vent the system using the vent valves. Repeat the filling and venting process until all air is out and the pressure is at the correct level.

9.2 Filling the collector

Fill the collector with a mixture of water and geothermal fluid that can withstand a temperature of -15°C. Environmentally friendly bioethanol is recommended for use as a geothermal fluid.

Filling is carried out using valves C and D in the filling group. Valve A must be closed during filling and venting.

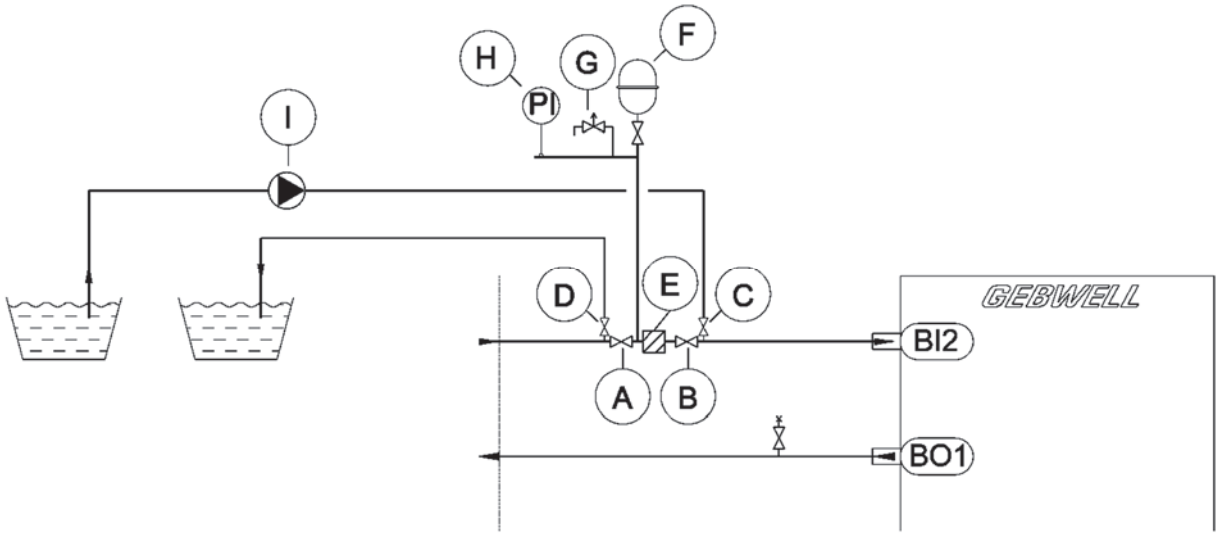
Fill the system with pure geothermal fluid. Make sure that no debris from the base of the container passes into the suction hose. When recycling liquid with an external filling/venting pump, make sure that the liquid is not pumped as foam into the system. If necessary, use two large containers to prevent microbubbles from entering the collector. It might be difficult to get foamy microbubble liquid out of the system. Microbubbles could cause the device to malfunction.

Pressurise the collector using an external booster pump (I). Connect the pump to valves C as shown in the figure. Use a strong hose or pipe with a diameter of at least 30 mm. Close valve A while you increase the pressure in the collector. Make sure that no debris from the base of the container passes into the suction hose. Monitor the collector pressure gauge H. The pressure must not exceed 2 bar.

Clean the strainer before the heat pump start-up. Close valves A and B, open strainer E. Clean the strainer sieve under running water. Close the strainer and open valves A and B.

9.3 Pressure-testing the collector

A pressure test should be performed on the filled collector as follows: increase the pressure up to the design pressure and check the pressure after 30 minutes. If the pressure drops during these 30 minutes, there is a leak in the system. Repair any leaks and repeat the pressure test. Mark the pressure test as complete in the *Insallation record* when the pressure test is successful.


H
G
F
PI
I
D
E
C
GEBWELL
BI2
A
B
BO1

10 CHECKS BEFORE THE HEAT PUMP START-UP

When the heat pump is delivered, all of the operational switches will be in the “OFF” position.

Before starting the heat pump, ensure that:

- the collector is filled with frost-resistant liquid
- the charge circuit of the heat pump is filled with water
- the charge circuit and the collector have been thoroughly vented
- external temperature sensors are connected and attached to the system according to the diagram
- the electrical connections are correct.

10.1 Venting of air from the charge circuit with the built-in charge pump of the heat pump

Once the system is vented using external equipment, the last of the air can be recycled using an internal charge pump.

1. Go to *MAIN MENU* -> press the roller
2. Go to *SERVICE MENU* -> press the roller for 3 seconds
3. Enter the code 2000 in the field *LIST* to enter the menu
4. Go to *TEST FUNCTIONS* -> press the roller

In the Service Menu, you can drive the charge pumps electronically at different speeds to remove the air from the system.

The charge pump start-up

FEED PUMP: **AUTO** / 0–100%

AUTO = factory setting > the controller regulates the pump in accordance with the domestic hot water and heating settings

0–100% = you can electronically increase the pump speed to facilitate venting

NOTE! REMEMBER TO SET ALL TESTS TO ‘AUTO’ AT THE END OF THE TEST.

IF A FUNCTION IS SET TO ELECTRONIC MANUAL MODE, THE DEVICE WON’T WORK PROPERLY.

Testing/turning the change-over valve for venting

You can remove the air from the charging coil by toggling the change-over valve ON/OFF a few times.

CHANGE-OVER VALVE: **AUTO**/ON/OFF

AUTO = factory setting > automatically turns the valve according to the heating needs

ON = valve position A > flow to the domestic water accumulator’s charging coil

OFF = valve position B > flow to the heating system

10.2 Venting the collector with the source pump of the heat pump

The collector must be vented with extreme care. If there is even a small amount of air in the collector, the device will not operate optimally and may malfunction.

Venting of the collector

The source pump start-up:
SOURCE PUMP: AUTO / 0–100%

AUTO = factory setting > the controller regulates the pump automatically in accordance with collector settings
0–100% = you can electronically increase the pump speed to facilitate purging

NOTE! REMEMBER TO SET ALL TESTS TO THE AUTO MODE AT THE END OF TESTING.
IF A FUNCTION IS SET TO ELECTRONIC MANUAL MODE, THE DEVICE WON’T WORK PROPERLY.

11 THE HEAT PUMP START-UP

Set the heat pump's main switch (Q1) in the ON position

Set all switches to the ON position

- frequency converter (F1)
- source pump (F2)
- charge pump (F3)
- control (F10)
- the controller is starting for a short time

Set the operating mode of the control to the HMI > AUTO position. Factory setting OFF

- if you are not at the service level, press the roller for 3 seconds to log in and set code the 2000

The heat pump starts calculating the heating need and starts charging as needed. If the system has domestic water, the charge is started there first.

If there is no need for heat in the property, perform a test run by increasing the heat demand in the heating settings.

Finally, set the heating and domestic water settings to match the needs of the property.

11.1 Operation without the collector and operating during construction

The heat pump can be used for heating before the collector is connected. All of the heat will be generated by the device's electric heater. However, all of the control functions for heating and domestic water are available. Note that the heating and domestic water circuits should be connected and vented, and that the electrical connections should be completely ready for use.

If the heat pump is to be used for heating during construction, the device should be set to "Emergency operation" mode to ensure that the compressor (K1) and the source pump (Q8) do not start. This ensures that the heat pump uses the electric heaters in the accumulators for domestic water and heating, as controlled by the heat pump. The electric heater controls must be connected to the heat pump control.

12 HEAT PUMP SETTINGS

All heat pump settings should be entered primarily using the app. However, the user terminal of the heat pump can be used to make basic settings for the device.

Some of the settings can only be configured at the expert level. If you are unable to access a setting, press the roller for 3 seconds and set the code 2000.

12.1 HEAT PUMP

Time and date

The controller has an annual schedule with the time of day, day of the week and date. To ensure that the heating programme functions correctly, the time and date must be set correctly. The heat pump will not start until the time and date have been set.

The time can be set on the controller menu by selecting MAIN MENU > HEAT PUMP > SYSTEM CLOCK.

Month / Day / Hour / Minute / Second

Language selection

By default, the heat pump's language is Finnish. Several language options are available for the user terminal. You can change the language by selecting MAIN MENU > HEAT PUMP > LANGUAGE SELECTION.

Language options:

English, Swedish, Finnish

Operating mode HMI

The heat pump is started/switched off using the ***OPERATING MODE HMI*** setting. In factory delivery, the setting is in ***OFF*** mode. When the operating mode is set to ***AUTO***, the device starts. The device starts automatically and starts heating the domestic hot water and heating according to the heat request.

MAIN MENU > HEAT PUMP > OPERATING MODE HMI

Options: AUTO/OFF***

**** NOTE! To change this setting, you must be in the service mode. To enter service mode, press the roller for 3 seconds and set the code 2000.*

12.2 DOMESTIC WATER

Domestic water is prepared with a heat pump and its change-over valve control. When the domestic water request is activated, the change-over valve turns to domestic water accumulator

and charging starts. The heat pump charges the domestic water to the set point and returns to the heating position. If heating is active, the charging continues to heating the

property.

The domestic water accumulator has two temperature sensors, of which B2 is measuring and B3 is the control sensor. B2 is located at the top of the domestic water accumulator and B3 is located in the middle

or below. The heat pump prepares domestic water based on the accumulator's measurement B3.

B3 is the sensor controlling domestic water, and it starts and turns off charging. Charging hysteresis and the set point of domestic water

influence the starting process. The charging of domestic water is started when the B3 measurement is below the value:

Set point – (minus) Charging hysteresis

Charging ends when the set point is reached.

Mode

Indicates the charging status of domestic hot water.

Operating mode HMI

The operating mode is used to choose the functional status of domestic hot water. In the ***AUTO*** mode, the heat pump prepares domestic water normally within the set point and the connection difference. The heat pump does not heat domestic water in ***OFF*** mode.

AUTO/OFF

Set value Temperature

The set point of domestic hot water has an effect on the lower sensor of the functional accumulator. Due to accumulator layering, the actual temperature of domestic hot water raises 5–10°C higher than the set point.

Factory setting 50°C

You can change the set point of domestic hot water in the HOT DOM WATER > SET VALUE TEMP menu.

Comfort: The normal set point for domestic hot water. This value changes, if you toggle the status of domestic hot water COMFORT/NORMAL/ECO in the application

ECO: The domestic hot water temperature drop used in time control

Legionella

The anti-bacterial function of domestic hot water. The Legionella function raises the domestic water accumulator temperature to the Legionella set point once a week. The heat pump uses an electric heater for Legionella charging.

Set value temperature:

The set point to which the heat pump will charge the accumulator temperature.

Factory setting 55°C

Legionella function:

The weekday when the charging takes place.

Mon/Tue/Wed/Thu/Fri/Sat/Sun

Start-up time:

The time of day when the Legionella function starts.

Legionella overcharge

The time by which the Legionella charging exceeds the set point.

Circulator pump:

The domestic hot water circulator pump can be controlled using the heat pump's controller. If domestic hot water is on, the circulator pump will also be on.

12.3 HEATING CIRCUIT 1/2

The heating system is configured circuit-specifically. The heat pump controller is capable of controlling two heating circuits. Heating circuit 1 is always the heat pump's internal pump heating circuit for which a mixing function cannot be configured. Heating circuit 2 is an optional mixing heating circuit that can be used to adjust a lower temperature, for instance, to heat a garage. If you use two heating circuits, circuit 1 should always have the higher temperature.

Operating mode HMI

In the Operating Mode menu, you can turn a heating circuit ON or OFF. The correct operating mode for heating a property is the ***AUTO*** mode.

MAIN MENU > HEATING CIRCUIT 1 (2) > OPERATING MODE HMI

Set value room temperature

The room temperature can be controlled according to the room set point. The room sensor must be placed in a central part of the building in order for adjustment to function optimally.

The controller uses ***COMFORT*** for normal heat control and ***ECO*** for the time control drop period.

If the heating circuit does not include a room sensor, you should disable the room sensor in the Service Menu. In this case, the controller will use a 20-degree reference value for heat control.

Adjustment curve

The adjustment curve is used to calculate the set point for the supply water temperature, and this set point is used to adjust the supply water temperature according to the prevailing weather conditions. The adjustment curve can be changed at five different outdoor temperature

points so that the heating output and room temperature can be adjusted as required.

A steeper adjustment curve gradient means that the temperature of the supply water changes more when the outdoor temperature decreases. In other words, if the room temperature is wrong when the outdoor temperature is low but not when the outdoor temperature is high, the gradient of the curve needs to be changed.

Increasing the setting:	Increases the temperature of the supply water, particularly at low outdoor temperatures.
Decreasing the setting:	Decreases the temperature of the supply water, particularly at high outdoor temperatures.

The end user can make minor changes to the adjustment curve during the first heating period. See the operating manual for instructions on this.

Outdoor temperature values:

Y1 = -30°C

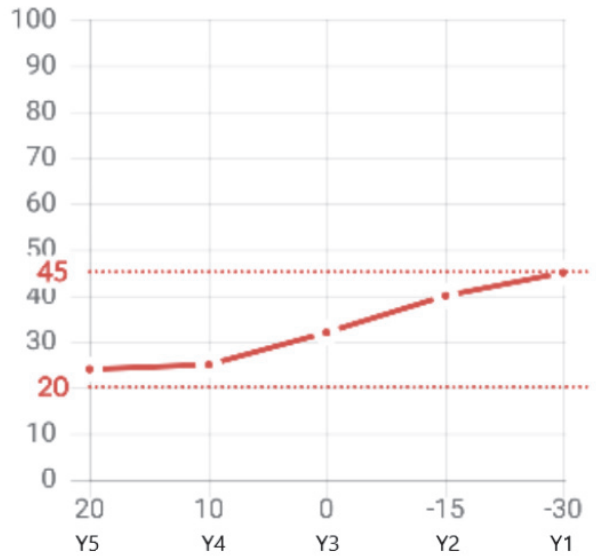
Y2 = -15°C

Y3 = 0°C

Y4 = 10°C

Y5 = 20°C

Supply water temperature (°C)



Outdoor temperature (°C)

Set value supply water

You should set permitted supply water limits for the heating circuits. The supply water set values are cut at the minimum and maximum set values, even if the heating graph were to exceed the set point.

If you use underfloor heating to heat wet rooms, please note the minimum temperature increase when setting the lower limit.

Upper limit:

Maximum supply water temperature

Set point values:

Underfloor heating 40–45°C

Radiator heating 50–65°C

Lower limit:

Minimum supply water temperature

Set point values:

Underfloor heating 18–25°C

Radiator heating 15–18°C

Summer/winter heating limit

The summer/winter heating threshold switches the heating on or off according to outdoor temperature conditions. When heating is set to AUTO, this cross-connection functions automatically, and the user does not need to switch the heating on or off. The annual periods can be shortened or extended by adjusting the set values.

NOTE: If the system has heating areas that should not be stopped in the summer (humid areas), the setting for the circuit in question should be changed to a continuous WINTER state.

MAIN MENU > HEATING CIRCUIT 1 (2) > SUMMER/WINTER HEATING LIMIT

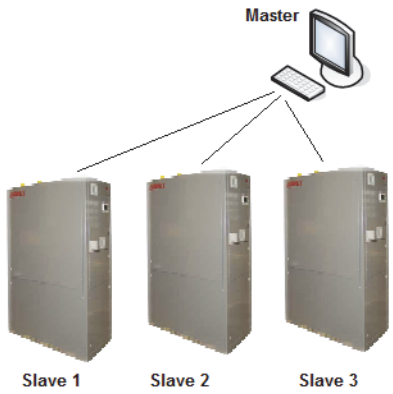
Factory setting 16°C

12.4 Modbus communication

The Modbus communication connection (MODBUS350) enables the device’s temperatures, status information, setpoint s and malfunctions to be read by a higher-level automation system. With a Modbus350 connection, a setpoint can be specified for the temperature at which the heat pump will output heat to the accumulator or heating network. The Modbus connection requires an optional cellular data card. The cellular data card is specific to the controller.

Modbus Description

The master-slave protocol means that one master device and one slave device are connected to the same bus at the same time. The master always begins data transfer. Slave devices do not communicate with each other, nor do they send requests or other messages to the master device unless the master specifically requests this. In a precise transmission, the master first sends a request to one particular slave device and waits for a response. The slave device has a unique address between 1 and 247.



Network typology

The recommended network structure is to connect the devices directly or in short branches to a single trunk cable. “Branch” refers to the distance between a device and the trunk cable. Branches should be as short as possible to avoid signal reflection. According to Modbus guidelines, branches should never be longer than 20 metres. The network topology cannot be a star or ring. It also cannot be a trunk bus with connected stars or clusters. All such structures must be removed from the network.

Modbus framework (RTU)

There are two Modbus data transfer methods: RTU and ASCII. The data framework for a byte is determined on the basis of the data transfer method. RTU is mandatory, and all Gebwell devices use it by default.

Data transfer settings:

For serial traffic, the required parameters are the baud rate, the parity and the stop bits. The data transfer settings of all devices on the same bus must be the same, and they must be set for each device individually. If the parameters are set incorrectly, the slave device will not be able to respond to requests sent by the master device.

Address:

Specify the slave device. Every device must have a unique address. The address can be between 1 and 247.

Function code:

Specify the request that the master device sends to the slave device. The most commonly supported function codes are listed in the following table.

Function code	Description
01	Coils - number
02	Discrete Inputs - number
03	Holding Registers – number
04	Input Registers – number
05	Single Coil – writing
06	Single Register – writing
15	Multiple Coil – writing
16	Multiple Registers - writing

Data transfer cables

Twisted pair cables should be used for Modbus/RTU data transfer, and the cables must meet the requirements specified in the EIA-485 standard for double-wire systems.

The cable’s maximum standardised length depends on the data transfer rate and the cable’s properties, such as its characteristic impedance and thickness. The Modbus guidelines specify a maximum length of 1,000 metres if the cable’s cross-sectional area allows for this. At baud rates of 19,200 or more, the recommended characteristic impedance is 100 ohms.

13 HEAT PUMP MAINTENANCE AND SERVICING

To ensure the long life and trouble-free operation of your heat pump, the following sections should be checked every year, and more frequently during the first year. Also remember to maintain and inspect accessories in accordance with these instructions.

13.1 Inspections

Turn off the main power.

NOTE: The refrigerant circuit must only be serviced by an authorised refrigeration technician.

General appearance and leaks

Check whether there are any visible fluid leaks, oil or anything else that appears abnormal inside and outside the heat pump. It is normal for a small amount of water to drip from the safety valves due to pressure fluctuations.

Heating system

Check the heating system pressure to ensure liquid circulation. The pressure should be 0.8–2.0 bar, depending on the property. Check the correct operating pressure from the *INSTALLATION* RECORD. If the pressure is too low, add liquid using the network filling valve. If you have to add liquid on a regular basis, please contact the installation or service company.

Collector circuit

Check the amount of fluid in the collector by looking at the collector's pressure gauge and add fluid if necessary. The operating pressure should be 0.5–1.5 bar. If the pressure is lower, fill the system. After commissioning, it may be necessary to add fluid for a few days – a few litres is within the normal range. When the pressure is too low, increase the pressure by using the filling pump. If it is repeatedly necessary to add fluid, contact an installation or servicing company. When the source pump starts up, the pressure should decrease slightly. The pressure will then increase correspondingly when the pump shuts off. Any other behaviour is indicative of air in the system or a blocked strainer.

Check and clean the strainer in the collector. The strainer must be checked after commissioning. However, avoid opening the collector unnecessarily. If the filter is dirty, the collector's temperature difference will increase when the compressor is running, which may cause the device to malfunction.Drainage of the hot water accumulator (LVV1)

The hot water accumulator (LVV1) is drained by siphoning. Install a drain valve on the cold water pipe or insert a hose into the cold water connection.

13.2 Draining heat pump fluids

If the compressor unit needs maintenance, close the shut-off valves on the charge circuit and the collector outside the heat pump and drain the fluids from the lower drains of the heat exchangers. If fluid flows inside the compressor unit, dry the unit thoroughly.

15 FAILURE

In most cases, the controller detects an operating problem and indicates it by showing a failure notification on the display. If a failure notification appears on the display, make a note of the alert in the service log to facilitate any service actions.

15.1 Alerts

When an alert is active, the alert symbol will appear on the heat pump's display. Open the INFO menu for more information about the alert. Always try to resolve the error yourself using the troubleshooting table first. If you cannot resolve the error, contact an authorised technician.

15.2 Troubleshooting

Follow these instructions if no failure is displayed.

Basic actions:

1. Check all of the connections
2. Check the fuses in the house and the heat pump
3. Check the residual current device

Low room temperature:

- The heat pump is in the wrong operating mode.
  - Set the heat pump's heating functions to the correct operating mode.
- Thermostats closed on the radiators/underfloor heating
  - Open the thermostats in as many rooms as possible
  - Adjust the room temperature in the *Heating area* menu instead of closing the thermostats
- The automation set point is too low
  - Increase the comfort set point on the *Heating area* menu
  - Increase the set point for the gradient of the heating curve on the *Heating area* menu
  - Set the maximum set point for supply water to a sufficiently high value on the *Heating area* menu.
- The heating circuit's time programme is on
  - Go to the *Time programme heating circuit* menu and adjust the time programme
- Air in the heating system
  - Release the air from the heating system
- Closed valves between the accumulator and the heat supply network
  - Open the valves
- Activated an external contact for decreasing the room temperature
  - Check any external contacts

High room temperature:

- The set points for the heating circuits are too high.
  - If the room temperature is only too high during cold weather, decrease the gradient of the heating curve.
  - If the room temperature is too high during mild weather, decrease the comfort set point.

Domestic water is cold:

- The domestic hot water function is not active.
  - Put the *Operating mode* for domestic hot water in the On state
- Domestic hot water consumption too high
  - Wait until the water warms up. When a temporary period of high consumption begins, you may select forced charging of domestic hot water by pressing the domestic hot water button on the user terminal for 3 seconds.
- Set point too low
  - Go to the *Domestic hot water* menu and increase the set point for domestic hot water.
- Supply mixing valve setting too small
  - Open the valve

Compressor does not start up:

- No need for heat
  - Check the device's status information on the *Info* menu
- The minimum compressor stop time is active
  - Wait 20 minutes and check whether the compressor starts up
- The device has a failure
  - Check the reason for the failure on the *Info* menu and take the necessary measures with the help of the troubleshooting table.

Alarms Registers

	ID	Read/ Write	Register type [1]	Register address	Unit	Resolution (divider) [2]	Device 1 (master)	Devices 2, 3 etc. (slave)
Alarm ack		R/W	0x	101	1=ACK		x	x
DHW storage tank temp (upper sensor)	B2	R	1x	701	0=Nor-mal/1=Alarm		x	
DHW storage tank temp (lower sensor)	B3	R	1x	702	0=Nor-mal/1=Alarm		x	
Common flow temp	B10	R	1x	901	0=Nor-mal/1=Alarm		x	
LC 1, flow temp	B11	R			0=Nor-mal/1=Alarm		x	
Outside temp	B9	R	1x	101	0=Nor-mal/1=Alarm		x	
LC2, flow temp	B12	R	1x	604	0=Nor-mal/1=Alarm		x	
DHW flow temp	B38	R			0=Nor-mal/1=Alarm		x	
Common brine pump	Q8C	R	1x	903	0=Nor-mal/1=Alarm		x	
Change-over valve	Q3	R	1x	704	0=Nor-mal/1=Alarm		x	
DHW resistor	K6	R	1x	703	0=Nor-mal/1=Alarm		x	
Electric resistor	K25 /K26	R	1x	801	0=Nor-mal/1=Alarm		x	
Compressor alarm	K1	R	1x	310	0=Nor-mal/1=Alarm		x	x
Compressor feed-back alarm	K1	R	1x	311	0=Nor-mal/1=Alarm		x	x
Expansion valve		R	1x	314	0=Nor-mal/1=Alarm		x	x
Flow temp HP	B21	R	1x	201	0=Nor-mal/1=Alarm		x	x
Heat pump return wa-ter	B71	R	1x	202	0=Nor-mal/1=Alarm		x	x
Brine circuit in	B91	R	1x	301	0=Nor-mal/1=Alarm		x	x
Brine circuit out	B92	R	1x	302	0=Nor-mal/1=Alarm		x	x
Hot gas	B81	R	1x	303	0=Nor-mal/1=Alarm		x	x
Evaporator pressure	H82	R	1x	304	0=Nor-mal/1=Alarm		x	x
Condenser pressure	H83	R	1x	305	0=Nor-mal/1=Alarm		x	x
Brine restriction valve	Y8/Q8	R	1x	306	0=Nor-mal/1=Alarm		x	x
Suction gas temp	B85	R	1x	307	0=Nor-mal/1=Alarm		x	x
Charge pump	Q9	R	1x	204	0=Nor-mal/1=Alarm		x	x
Commun. Elect-ric.mtr		R	1x	102	0=Nor-mal/1=Alarm		x	x
Num.IO out of s.		R	1x	193	0=Nor-mal/1=Alarm		x	x
Num.IO manual		R	1x	194	0=Nor-mal/1=Alarm		x	x
Fault Ext.IO-m.		R	1x	197	0=Nor-mal/1=Alarm		x	x
Comm.mod.changed		R	1x	198	0=Nor-mal/1=Alarm		x	x
Archive full		R	1x	196	0=Nor-mal/1=Alarm		x	x
High alarm		R	1x	191	0=Nor-mal/1=Alarm		x	x
Low alarm		R	1x	192	0=Nor-mal/1=Alarm		x	x

	ID	Read/ Write	Register type [1]	Register address	Unit	Resolution (divider) [2]	Device 1 (master)	Devices 2, 3 etc. (slave)
Max.high press.		R	1x	321	0=Nor-mal/1=Alarm		x	x
Min.high press.		R	1x	322	0=Nor-mal/1=Alarm		x	x
MOP		R	1x	323	0=Nor-mal/1=Alarm		x	x
LOP		R	1x	324	0=Nor-mal/1=Alarm		x	x
Press.ratio max.		R	1x	325	0=Nor-mal/1=Alarm		x	x
Press.ratio.min.		R	1x	326	0=Nor-mal/1=Alarm		x	x
High pr.detect.		R	1x	327	0=Nor-mal/1=Alarm		x	x
Low pr.detect.		R	1x	328	0=Nor-mal/1=Alarm		x	x
Expansion open		R	1x	329	0=Nor-mal/1=Alarm		x	x
Evaporator temp.		R	1x	330	0=Nor-mal/1=Alarm		x	x
Discharge temp.		R	1x	331	0=Nor-mal/1=Alarm		x	x
Superheat		R	1x	332	0=Nor-mal/1=Alarm		x	x
Commun. Compr.1 (LS Cont-rol)		R	1x	333	0=Nor-mal/1=Alarm		x	x
Commun. Compr.1 (KOSTAL)		R	1x	334	0=Nor-mal/1=Alarm		x	x
No press.change1		R	1x	335	0=Nor-mal/1=Alarm		x	x
No compr.avail.		R	1x	336	0=Nor-mal/1=Alarm		x	x
All compr.in al.		R	1x	337	0=Nor-mal/1=Alarm		x	x

[1] 0x = Coil
1x = Input status
3x = Input registers
4x = Holding registers

[2] The value read from the register must be divided by the number indicated by the resolution so that the values will be displayed correctly in the monitoring system.

[3] 0 = 1 and 2 off
1 = 1 on and 2 off
2 = 1 off and 2 on
3 = 1 and 2 on

[4] 0 = Auto
1 = Protection
2 = Reduced
3 = Comfort

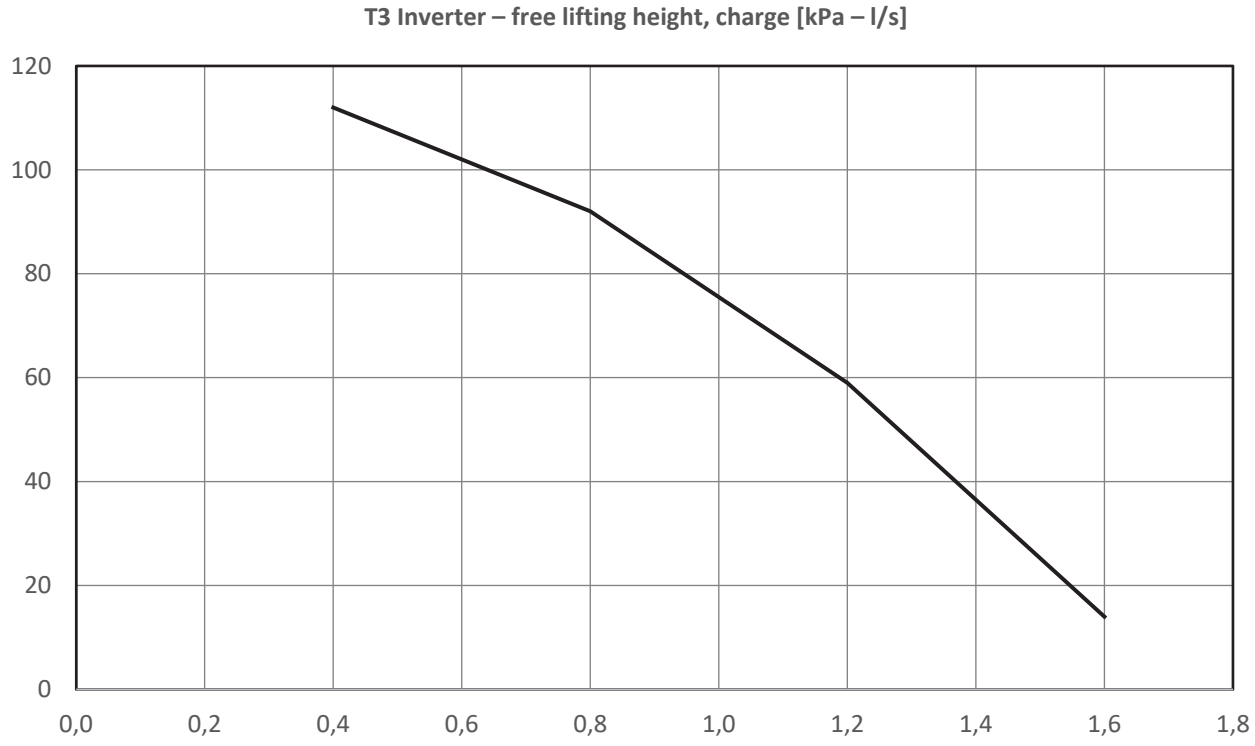
16 TECHNICAL DETAILS

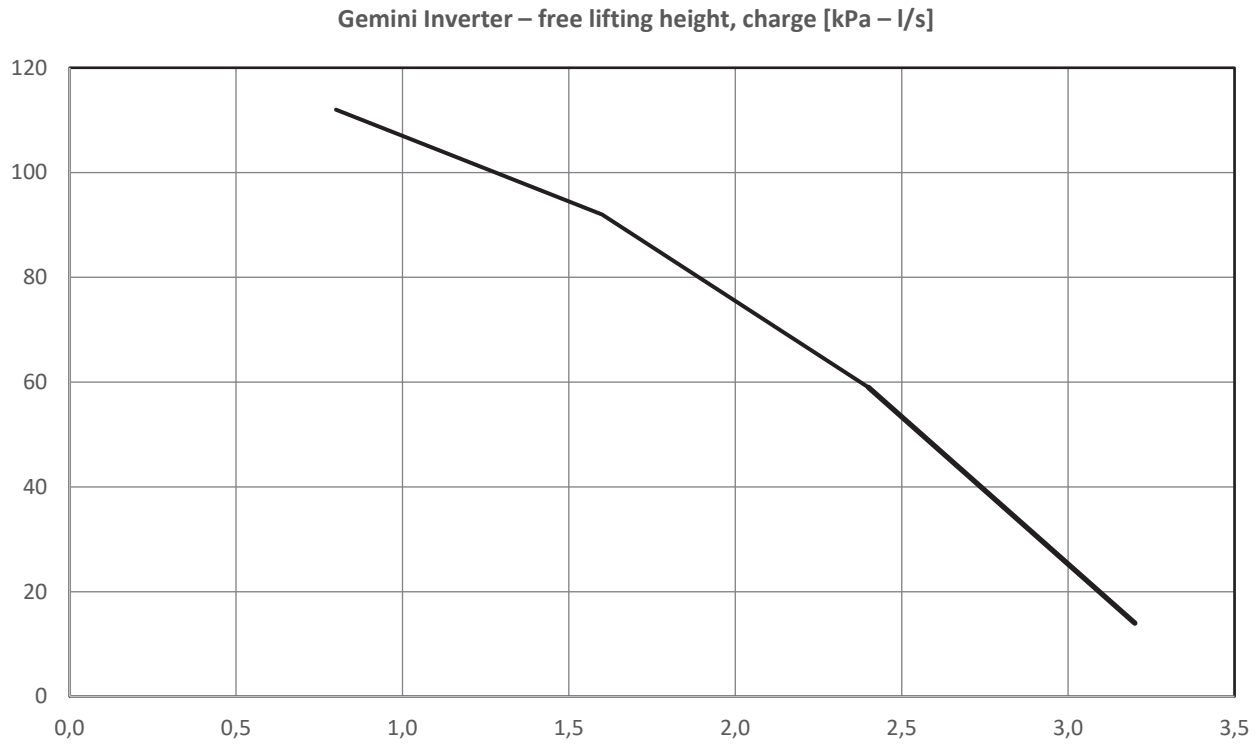
		T3 Inverter	Gemini Inverter
Power data (in accordance with EN14511)			
0/35			
Heating output		9.5–26.5	9.5–57.1
Cooling capacity		7.6–21.0	7.6–45.0
Input power		2.1–6.0	2.1–12.9
COP*		4.8	4.5
SCOP (in accordance with EN14825)		4.87	5,08
0/55			
Heating output		9.1–25.0	9.1–52.1
Cooling capacity		6.3–17.0	6.3–34.6
Input power		3.0–8.1	3.0–14.3
COP*		3.1	2.9
SCOP (in accordance with EN14825)		4.17	4.16
Energy labelling			
The system's energy efficiency class, average climactic conditions, underfloor heating		A+++	A+++
Number of compressors		1 (Twin rotary, frequency-controlled)	2 (1 Twin rotary inverter and 1 Scroll constant speed)
Electrical information			
Rated voltage / electrical connection		400 VAC 3N 50 Hz	400 VAC 3N 50 Hz
Maximum supply current (including the control systems and pumps)	A_{rms}	25	52
Recommended fuse size	A	3 x 32	3 x 63
Power of the charge pump(s)	W	60–160	60–320
Power of source pump(s)	W	220–480	220–960
Refrigerant circuit			
Includes fluorinated greenhouse gases		yes	yes
Hermetically sealed		yes	yes
Refrigerant		R410A	R410A
Global Warming Potential (GWP) of the refrigerant		2,088	2,088
Quantity of refrigerant	kg	2.1	2.1 and 3.4
CO_2 equivalence	ton CO_2e	4.385	4.385 and 7.099
Disconnection, overpressure	MPa	4.4 (44 bar)	4.4 (44 bar)
Difference, overpressure	MPa	0.7 (7 bar)	0.7 (7 bar)
Disconnection, underpressure	MPa	0.17 (1.7 bar)	0.17 (1.7 bar)
Difference, underpressure	MPa	0.10 (1.0 bar)	0.10 (1.0 bar)
Collector			
Maximum pressure	MPa	0.6 (6 bar)	0.6 (6 bar)
Rated flow (0/35)	l/s	1.25	2.68
Maximum external pressure loss at rated flow	kPa	110	110
Minimum input temperature of brine	°C	-5	-5
Maximum input temperature of brine	°C	+20	+20
Heating circuit			
Maximum pressure	Mpa	0.6 (6 bar)	0.6 (6 bar)
Rated flow	l/s	0.91	1.95
Maximum external pressure loss at rated flow	kPa	82	78
Dimensions and weights			
Depth		790	790
Width		640	640
Height		970	1,840
Weight	kg	206.5	402.5
Pipe connections			
Brine / collector	mm	35	35
Heating / charge circuit	mm	35	35
Sound power level (L_{WA})	dB	37–56	37–56
Sound pressure level (L_{WP})	dBA	22–36	22–36
Controller		Gebwell CLI	Gebwell CLI

** T3 Inverter: 60 Hz, Gemini Inverter: on/off compressor unit on, Inverter compressor unit 60 Hz*

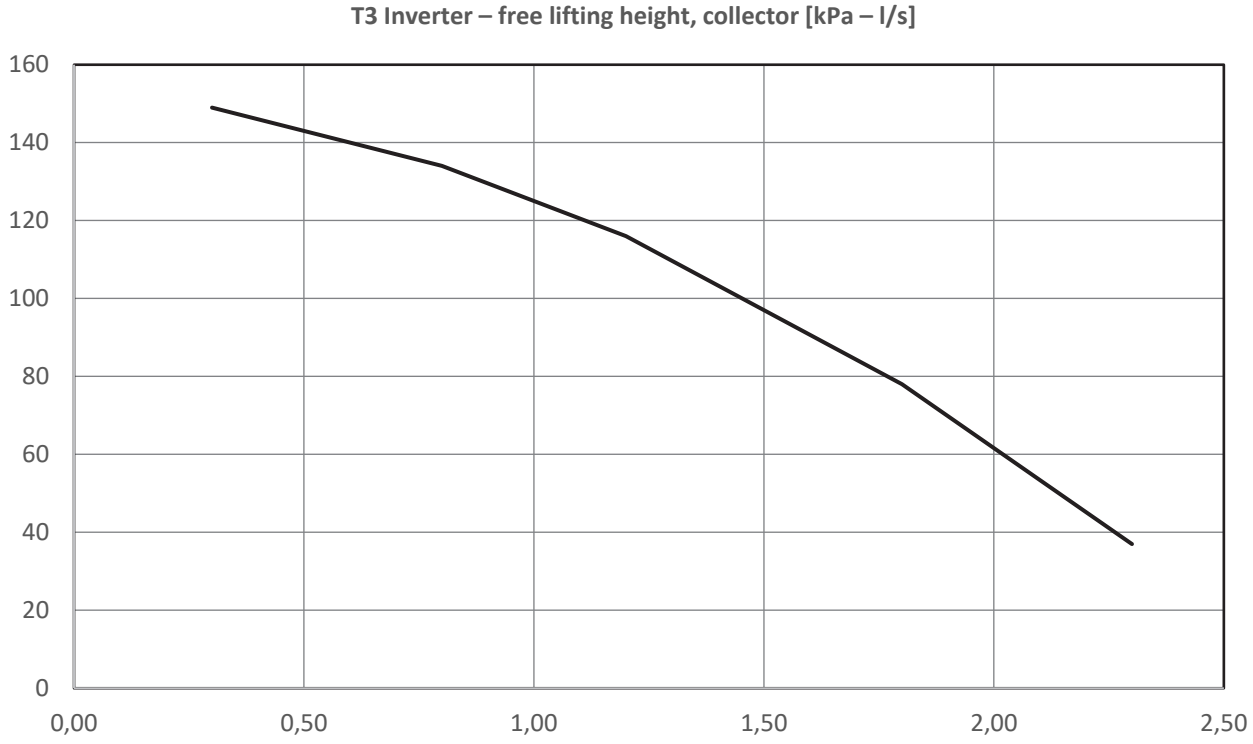
17 Performance value graphs

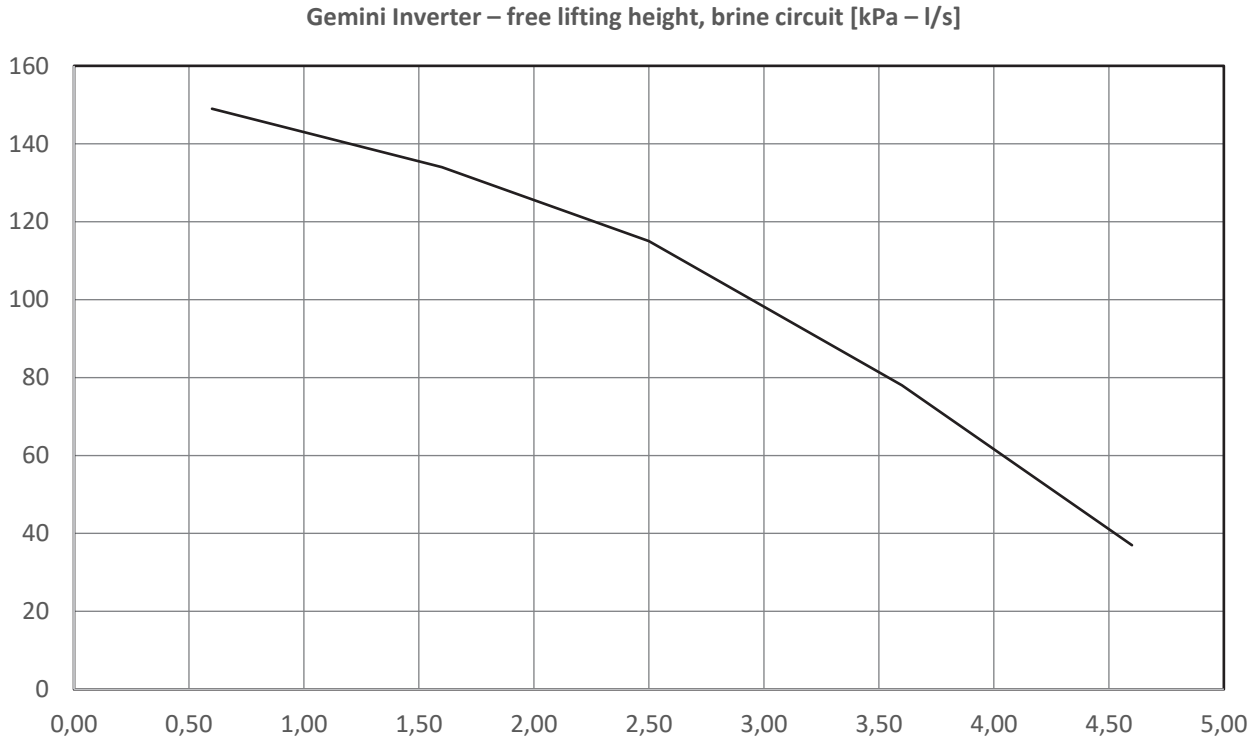
Heating circuit





Collector circuit



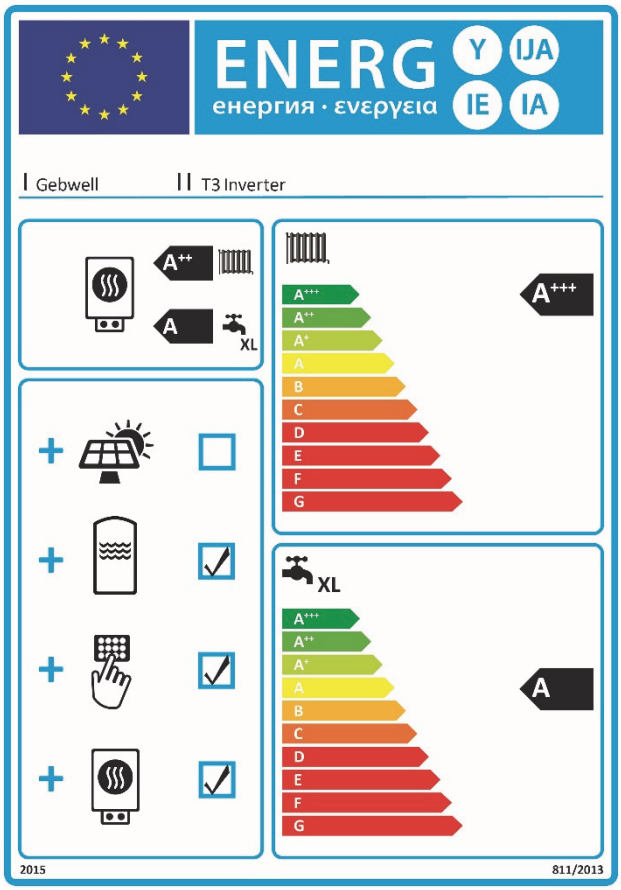


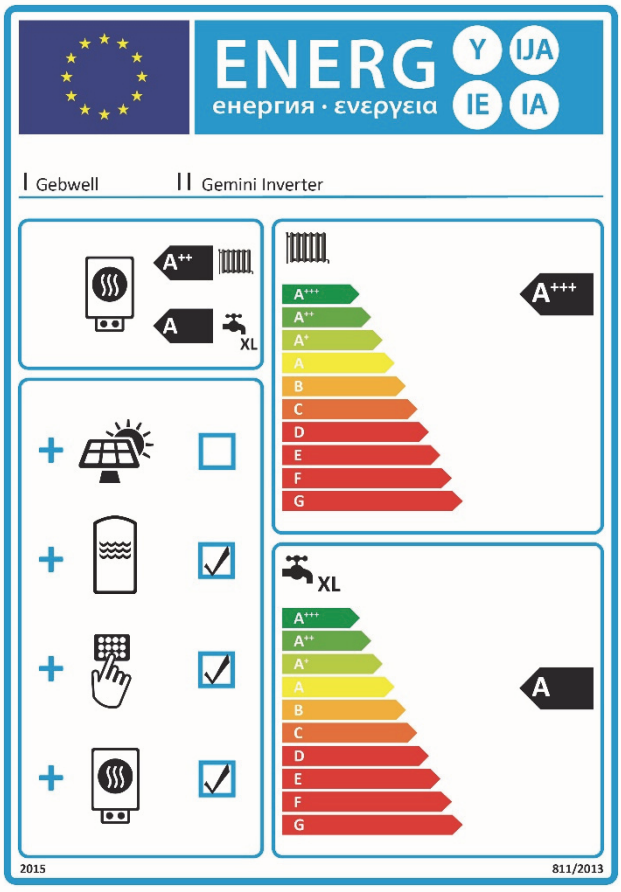
18 SET POINT VALUES FOR HEAT PUMP SETTINGS IN DIFFERENT HEATING NETWORKS

Heating circuit set points

Row number		Control row	Factory setting	Underfloor heating	Radiator heating	Air heating
LP1	LP2					
710	1,010	Comfort operation set point	20			
712	1,012	Reduced set point	15			
720	1,020	Heating curve gradient		0.5 (0.3–0.5)	0.8 (0.5–1.0)	0.8 (0.5–1.0)
740	1,040	Supply water min. set point	15	18	15	15
741	1,041	Supply water max. set point	45	45 (35–45)	55 (45–60)	55 (45–60)
730	1,030	Summer/winter heating threshold	16			

19 ENERGY LABELLING





Vaatimustenmukaisuusvakuutus
Declaration of Conformity
Försäkran om överensstämmelse

Gebwell Oy vakuuttaa omalla vastuullaan, että tuotteet
We, Gebwell Ltd, hereby declare under our sole responsibility that the product
Gebwell Ab försäkrar under eget ansvar att de produkter

Aries heat pump
Qi heat pump
T2 heat pump
T3 heat pump
Gemini heat pump
Taurus heat pump

joita tämä vakuutus koskee, on seuraavien direktiivien ja asetusten mukainen
to which this declaration relates is in conformity with the
som omfattas av denna försäkran är i överensstämmelse med följande direktiv

ELECTROMAGNETIC COMPATIBILITY (EMC) DIRECTIVE 2014/30/EU
LOW VOLTAGE DIRECTIVE (LVD) 2014/35/EU
ECO-DESIGN REQUIREMENTS FOR ENERGY-RELATED PRODUCTS DIRECTIVE 2009/125/EC
RESTRICTION OF THE USE OF HAZARDOUS SUBSTANCES DIRECTIVE (RoHS II): 2011/65/EU
REGULATION (EU) 2017/1369 ON ENERGY LABELLING
(Pressure Equipment Directive (PED) 2014/68/EU shall not apply to this pressurized equipment according to item 2.f.iii in Article 1.)

ja seuraavia yhdenmukaistettuja standardeja ja teknisiä eritelmiä on sovellettu:
and the following harmonised standards and technical specifications have been applied:
och följande harmoniserade standarder och tekniska specifikationer har tillämpats:

LVD:	EN 61439-1:2011 EN 61439-2:2011 EN 61439-3:2012
EMCD:	EN 61439-1 Annex J, Point J.9.4.2
HD:	60364 Low-voltage electrical installations 384 Electrical installations of buildings
	EN 14511

Commission Regulation (EU) No 813/2013 on eco design of space heaters and combination heaters
Commission Delegated Regulation (EU) No 811/2013 on energy labelling of space heaters and combination heaters.

Tuotteilla on CE-vaatimuksenmukaisuusmerkintä.
Products are provided with a CE marking of conformity.
Produkterna är försedda med CE-märkning av överensstämmelse.

Leppävirta 21.4.2021

Janne Rahunen
Managing Director

19.1.2022

CLIMATIX MODBUSREGISTERS

	ID	Read/ Write	Register type 1)	Register address	Unit	Resolution (divider) 2)	Device 1 (master)	Devices 2, 3 etc. (slave)
Operating temperatures:								
DHW storage tank temp (upper sensor)	B2	R	3x	701	°C	10	x	
DHW storage tank temp (lower sensor)	B3	R	3x	702	°C	10	x	
DHW storage tank temp (lower sensor) from BAS. See 7)	B3	R/W	4x	708	°C	10	x	
DHW flow temp	B38	R	3x	708	°C	10	x	
DHW circulation temp	B39	R	3x	709	°C	10	x	
Cascade flow temp	B10	R	3x	901	°C	10	x	
Cascade flow temp from BAS. See 7)	B10	R/W	4x	901	°C	10	x	
System flow temp	B11	R	3x	805	°C	10	x	
Outside temp	B9	R	3x	101	°C	10	x	
HC2 flow temp	B12	R	3x	604	°C	10	x	
HC3 flow temp	B14	R	3x	1004	°C	10	x	
Readable setpoints:								
Cascade temp. setpoint	B10	R	3x	902	°C	10	x	
System temp. setpoint	B11	R	3x	815	°C	10	x	
Heat pump information								
Heat pump flow temp	B21	R	3x	201	°C	10	x	x
Heat pump return temp	B71	R	3x	202	°C	10	x	x
Source circuit in	B91	R	3x	301	°C	10	x	x
Source circuit out	B92	R	3x	302	°C	10	x	x
Hot gas	B81	R	3x	303	°C	10	x	x
Hot gas 1 (EVI)		R	3x	321	°C	10	x	x
Hot gas 2 (EVI)		R	3x	322	°C	10	x	x
Evaporator pressure	H82	R	3x	304	bar	10	x	x
Condenser pressure	H83	R	3x	305	bar	10	x	x
Source pump status	Q8	R	3x	309	0=Off / 1=On		x	x
Source restriction valve / Source pump speed	Y8 / Q8	R	3x	306	%	1	x	x
Suction gas temp	B85	R	3x	307	°C	10	x	x
Condenser temperature difference		R	3x	203	°C	10	x	x
Temp diff evaporator		R	3x	308	°C	10	x	x
Supply pump speed	Q9	R	3x	204	%	1	x	x

19.1.2022

CLIMATIX MODBUSREGISTERS

	ID	Read/ Write	Register type 1)	Register address	Unit	Resolution (divider) 2)	Device 1 (master)	Devices 2, 3 etc. (slave)
Supply pump status	Q9	R	3x	205	0=Off / 1=On		x	x
Heating request		R	3x	213	%	1	x	x
Current capacity		R	3x	214	%	1	x	x
Heating circuit pressure	H11	R	3x	215	bar	10	x	x
Suorce circuit pressure	H21	R	3x	320	bar	10	x	x
Auxilary pressure	H31	R	3x	113	bar	10	x	x
Additional heat source information:								
Additional heat source status	K27	R	3x	806	0=Off / 1=On		x	
Additional heat source current capacity	Y27	R	3x	807	%	1	x	
Status data:								
Compressor status info	K1	R	3x	310	0=Off / 1=On		x	x
Compressor speed (inverter)	K1	R	3x	311	%	1	x	x
Compressor status info	K2	R	3x	315	0=Off / 1=On		x	x
Compressor speed (inverter)	K2	R	3x	316	%	1	x	x
DHW resistor status	K6	R	3x	703	0=Off / 1=On		x	
Electric resistor status	K25 / K26	R	3x	801	See 3)		x	
Electric resistor status	K28 / K29	R	3x	808	See 3)		x	
Change-over valve status	Q3	R	3x	704	0=heating/1=DHW		x	
Common Source pump speed	Q8C	R	3x	903	%	1	x	
Common Source pump status	Q8C	R	3x	904	0=Off / 1=On		x	
Energy monitoring:								
Cumulative heat production, heating		R	3x	206	kWh (32Bit data)	1	x	x
Cumulative heat production, DHW		R	3x	208	kWh (32Bit data)	1	x	x
Cumulative system heat production		R	3x	210	kWh (32Bit data)	1	x	x
Cumulative energy consumption, heating		R	3x	102	kWh (32Bit data)	1	x	x
Cumulative energy consumption, DHW		R	3x	104	kWh (32Bit data)	1	x	x
Cumulative system energy consumption		R	3x	106	kWh (32Bit data)	1	x	x
Cumulative COP, heating		R	3x	108		10	x	
Cumulative COP, DHW		R	3x	109		10	x	

19.1.2022

CLIMATIX MODBUSREGISTERS

	ID	Read/ Write	Register type 1)	Register address	Unit	Resolution (divider) 2)	Device 1 (master)	Devices 2, 3 etc. (slave)
Cumulative system COP		R	3x	110		10	x	
Momentary heat production		R	3x	212	kW	10	x	x
Momentary energy consumption		R	3x	111	kW	10	x	x
Momentary COP		R	3x	112		10	x	x
Run monitoring:								
Compressor running time	K1	R	3x	312	h (32Bit data)	1	x	x
Compressor start-up counter	K1	R	3x	314	pcs	1	x	x
Compressor running time	K2	R	3x	317	h (32Bit data)	1	x	x
Compressor start-up counter	K2	R	3x	319	pcs	1	x	x
Electric resistor running time DHW	K6	R	3x	705	h (32Bit data)	1	x	
Electric resistor start-up counter DHW	K6	R	3x	707	pcs	1	x	
Electric resistor running time	K25/ K26	R	3x	802	h (32Bit data)	1	x	x
Electric resistor start-up counter	K25/ K26	R	3x	804	pcs	1	x	x
Electric resistor running time	K28/ K29	R	3x	809	h (32Bit data)	1	x	
Electric resistor start-up counter	K28/ K29	R	3x	811	pcs	1	x	
DHW set points								
DHW temp setpoint Protection	B3	R/W	4x	702	°C	10	x	
DHW temp setpoint Reduced	B3	R/W	4x	703	°C	10	x	
DHW temp setpoint Comfort	B3	R/W	4x	704	°C	10	x	
Domestic hot water Operating mode		R/W	4x	701	See 4)		x	
DHW flow temp. set point		R/W	4x	705	°C	10	x	
DHW charge hysterisis		R/W	4x	706	K	10	x	
DHW charge set point correction		R/W	4x	707	K	10	x	
Writable setpoints: Heat pump(s)								
Heat pump operation mode		R/W	4x	105	See 5)	1	x	x
Emergency stop		R/W	4x	101	0 = Emergency stop 1 = Normal operation		x	x
Setpoint heat pump °C		R/W	4x	104	°C	10	x	
Setpoint heat pump %		R/W	4x	103	%	1	x	
Supply circuit activation		R/W	4x	102	0=Off / 1=On		x	
Passive cooling		R/W	4x	106	0=Off / 1=On		x	x
Heat pump switching differential		R/W	4x	111	°C	10	x	
Source pump minimum speed		R/W	4x	331	%	1	x	x

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CLIMATIX MODBUSREGISTERS

	ID	Read/ Write	Register type 1)	Register address	Unit	Resolution (divider) 2)	Device 1 (master)	Devices 2, 3 etc. (slave)
Source pump maximum speed		R/W	4x	333	%	1	x	x
Source circuit temp. difference (dT) set point		R/W	4x	335	K	10	x	x
Supply pump minimum speed		R/W	4x	204	%	1	x	x
Supply pump maximum speed		R/W	4x	206	%	1	x	x
Supply circuit temp. difference (dT) set point		R/W	4x	208	K	10	x	x
Source circuit temp. set point	B91/ B92	R/W	4x	210	°C		x	x
Heating circuit 1								
Set point value		R/W	4x	501	°C	10	x	
Reduced setpoint		R/W	4x	502	°C	10	x	
Protection setpoint		R/W	4x	503	°C	10	x	
Heating curve – X1		R/W	4x	511	°C	10	x	
Heating curve – Y1		R/W	4x	512	°C	10	x	
Heating curve – X2		R/W	4x	513	°C	10	x	
Heating curve – Y2		R/W	4x	514	°C	10	x	
Heating curve – X3		R/W	4x	515	°C	10	x	
Heating curve – Y3		R/W	4x	516	°C	10	x	
Heating curve – X4		R/W	4x	517	°C	10	x	
Heating curve – Y4		R/W	4x	518	°C	10	x	
Heating curve – X5		R/W	4x	519	°C	10	x	
Heating curve – Y5		R/W	4x	520	°C	10	x	
Supply water min. value		R/W	4x	504	°C	10	x	
Supply water max. value		R/W	4x	505	°C	10	x	
Set point correction		R/W	4x	521	K	10	x	
Heating circuit 2								
Set point value		R/W	4x	601	°C	10	x	
Reduced setpoint		R/W	4x	602	°C	10	x	
Protection setpoint		R/W	4x	603	°C	10	x	
Heating curve – X1		R/W	4x	611	°C	10	x	
Heating curve – Y1		R/W	4x	612	°C	10	x	
Heating curve – X2		R/W	4x	613	°C	10	x	
Heating curve – Y2		R/W	4x	614	°C	10	x	
Heating curve – X3		R/W	4x	615	°C	10	x	
Heating curve – Y3		R/W	4x	616	°C	10	x	
Heating curve – X4		R/W	4x	617	°C	10	x	
Heating curve – Y4		R/W	4x	618	°C	10	x	
Heating curve – X5		R/W	4x	619	°C	10	x	
Heating curve – Y5		R/W	4x	620	°C	10	x	
Supply water min. value		R/W	4x	604	°C	10	x	
Supply water max. value		R/W	4x	605	°C	10	x	
Set point correction		R/W	4x	621	K	10	x	
Heating circuit 3								
Set point value		R/W	4x	1001	°C	10	x	
Reduced setpoint		R/W	4x	1002	°C	10	x	

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CLIMATIX MODBUSREGISTERS

	ID	Read/ Write	Register type 1)	Register address	Unit	Resolution (divider) 2)	Device 1 (master)	Devices 2, 3 etc. (slave)
Protection setpoint		R/W	4x	1003	°C	10	x	
Heating curve – X1		R/W	4x	1011	°C	10	x	
Heating curve – Y1		R/W	4x	1012	°C	10	x	
Heating curve – X2		R/W	4x	1013	°C	10	x	
Heating curve – Y2		R/W	4x	1014	°C	10	x	
Heating curve – X3		R/W	4x	1015	°C	10	x	
Heating curve – Y3		R/W	4x	1016	°C	10	x	
Heating curve – X4		R/W	4x	1017	°C	10	x	
Heating curve – Y4		R/W	4x	1018	°C	10	x	
Heating curve – X5		R/W	4x	1019	°C	10	x	
Heating curve – Y5		R/W	4x	1020	°C	10	x	
Supply water min. value		R/W	4x	1004	°C	10	x	
Supply water max. value		R/W	4x	1005	°C	10	x	
Set point correction		R/W	4x	1021	K	10	x	
Superheat circuit								
Superheat pump		R	3x	1101	0=Off / 1=On		x	x
Superheat circuit flow temp.	B36	R	3x	1102	°C	10	x	x
Superheat circuit return temp.	B37	R	3x	1103	°C	10	x	x
Superheat circuit dT		R	3x	1104	K	10	x	x
Superheat tank temp.	B95	R	3x	1105	°C	10	x	x
Superheat circuit set point	B3 / B95	R/W	4x	1106	°C	10	x	x
Superheat circuit demand correction		R/W	4x	1107	K	10	x	x
Startup hysteresis		R/W	4x	1108	K	10	x	x
Superheat circuit pump speed	Q35	R	3x	1109	%		x	x
Superheat circuit pump speed	Q35	R	3x	1110	h (32Bit data)		x	x
Superheat circuit pump dT	Q35	R/W	4x	1112	K	10	x	x
Superheat circuit pump min. speed	Q35	R/W	4x	1113	%		x	x
Superheat circuit pump max. speed	Q35	R/W	4x	1114	%		x	x
Superheat tank ele. heater set point	K90	R/W	4x	1115	°C	10	x	x
Superheat tank ele. heater status	K90	R	3x	1116	0=Off / 1=On		x	x
Superheat tank ele. heater start up counter	K90	R	3x	1118	pcs		x	x
Superheat tank ele. heater op. Hours	K90	R	3x	1119	h (32Bit data)		x	x
Superheat circuit flow	FM30	R	3x	1121	l/min	10	x	x
Superheat circuit heat. power		R	3x	1122	kW		x	x
Superheat circuit heating energy (sum.)		R	3x	1123	kWh (32Bit data)		x	x
Superheat circuit tank temp. from upper level automation		R/W	4x	1124	°C	10	x	x
Alarm registers								
Alarm status		R	3x	199	See 6)			
Alarm ack		R/W	0x	101	1=ACK		x	x
DHW storage tank temp (upper sensor)	B2	R	1x	701	0=Normal/ 1=Alarm		x	
DHW storage tank temp (lower sensor)	B3	R	1x	702	0=Normal/ 1=Alarm		x	
DHW flow temperature	B38	R	1x	708	0=Normal/ 1=Alarm		x	
DHW circulation temperature	B39	R	1x	709	0=Normal/ 1=Alarm		x	
Cascade flow temperature	B10	R	1x	901	0=Normal/ 1=Alarm		x	
System flow temp	B11	R	1x	805	0=Normal/ 1=Alarm		x	
Outside temp	B9	R	1x	101	0=Normal/ 1=Alarm		x	

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CLIMATIX MODBUSREGISTERS

	ID	Read/ Write	Register type 1)	Register address	Unit	Resolution (divider) 2)	Device 1 (master)	Devices 2, 3 etc. (slave)
Heat circuit 2 flow temp.	B12	R	1x	604	0=Normal/ 1=Alarm		x	
Heat circuit 3 flow temp.	B14	R	1x	1004	0=Normal/ 1=Alarm		x	
Common Source pump	Q8C	R	1x	903	0=Normal/ 1=Alarm		x	
Change-over valve	Q3	R	1x	704	0=Normal/ 1=Alarm		x	x
DHW resistor	K6	R	1x	703	0=Normal/ 1=Alarm		x	
Electric resistor	K25 / K26	R	1x	801	0=Normal/ 1=Alarm		x	
Compressor 1 alarm	K1	R	1x	310	0=Normal/ 1=Alarm		x	x
Compressor 1 feedback alarm	K1	R	1x	311	0=Normal/ 1=Alarm		x	x
Compressor 1 alarm	K2	R	1x	315	0=Normal/ 1=Alarm		x	x
Compressor 1 feedback alarm	K2	R	1x	316	0=Normal/ 1=Alarm		x	x
Expansion valve		R	1x	314	0=Normal/ 1=Alarm		x	x
Flow temp heat pump	B21	R	1x	201	0=Normal/ 1=Alarm		x	x
Return temp heat pump	B71	R	1x	202	0=Normal/ 1=Alarm		x	x
Source circuit in	B91	R	1x	301	0=Normal/ 1=Alarm		x	x
Source circuit out	B92	R	1x	302	0=Normal/ 1=Alarm		x	x
Hot gas temperature	B81	R	1x	303	0=Normal/ 1=Alarm		x	x
Evaporator pressure	H82	R	1x	304	0=Normal/ 1=Alarm		x	x
Condenser pressure	H83	R	1x	305	0=Normal/ 1=Alarm		x	x
Source control valve / source pump	Y8/ Q8	R	1x	306	0=Normal/ 1=Alarm		x	x
Suction gas temp	B85	R	1x	307	0=Normal/ 1=Alarm		x	x
Charge pump	Q9	R	1x	204	0=Normal/ 1=Alarm		x	x
Commun. Electric.mtr		R	1x	102	0=Normal/ 1=Alarm		x	x
Num.IO out of s.		R	1x	193	0=Normal/ 1=Alarm		x	x
Num.IO manual		R	1x	194	0=Normal/ 1=Alarm		x	x
Fault Ext.IO-m.		R	1x	197	0=Normal/ 1=Alarm		x	x
Comm.mod.changed		R	1x	198	0=Normal/ 1=Alarm		x	x
Archive full		R	1x	196	0=Normal/ 1=Alarm		x	x
High alarm		R	1x	191	0=Normal/ 1=Alarm		x	x
Low alarm		R	1x	192	0=Normal/ 1=Alarm		x	x
Max.high press.		R	1x	321	0=Normal/ 1=Alarm		x	x
Min.high press.		R	1x	322	0=Normal/ 1=Alarm		x	x
MOP		R	1x	323	0=Normal/ 1=Alarm		x	x
LOP		R	1x	324	0=Normal/ 1=Alarm		x	x
Press.ratio max.		R	1x	325	0=Normal/ 1=Alarm		x	x
Press.ratio.min.		R	1x	326	0=Normal/ 1=Alarm		x	x
Expansion open		R	1x	329	0=Normal/ 1=Alarm		x	x
High pr.detect.		R	1x	327	0=Normal/ 1=Alarm		x	x
Low pr.detect.		R	1x	328	0=Normal/ 1=Alarm		x	x
Evaporator temp.		R	1x	330	0=Normal/ 1=Alarm		x	x
Condensing temp.		R	1x	331	0=Normal/ 1=Alarm		x	x
Superheat		R	1x	332	0=Normal/ 1=Alarm		x	x
Inverter communication (LS Control)		R	1x	333	0=Normal/ 1=Alarm		x	x
Inverter communication (KOSTAL)		R	1x	334	0=Normal/ 1=Alarm		x	x
No press.change1		R	1x	335	0=Normal/ 1=Alarm		x	x
No compr.avail.		R	1x	336	0=Normal/ 1=Alarm		x	x

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	ID	Read/ Write	Register type 1)	Register address	Unit	Resolution (divider) 2)	Device 1 (master)	Devices 2, 3 etc. (slave)
All compr.in al.		R	1x	337	0=Normal/ 1=Alarm		x	x
Cascade master communication		R	1x	902	0=Normal/ 1=Alarm			x
Cascade slave 1 communication		R	1x	904	0=Normal/ 1=Alarm		x	
Cascade slave 2 communication		R	1x	905	0=Normal/ 1=Alarm		x	

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CLIMATIX MODBUSREGISTERS

ID	Read/ Write	Register type 1)	Register address	Unit	Resolution (divider) 2)	Device 1 (master)	Devices 2, 3 etc. (slave)

[1)] 0x = Coil
1x = Input status
3x = Input registers
4x = Holding registers

[2)] The value read from the register must be divided by the number indicated by the resolution so that the

[3)] 0 = 1 and 2 off
1 = 1 on and 2 off
2 = 1 off and 2 on
3 = 1 and 2 on

[4)] 0 = Auto
1 = Protection
2 = Reduced
3 = Comfort

[5)] 0 = Auto
1 = Off
2 = ----------
3 = Reserve heat

[6)] 0 = No alarms
1 = Active alarm(s)
2 = Active acknowledged alarm(s)

[7)] Certain temperature sensor's value can be written to the controller from BAS. This way we can avoid double sensors.

Gebwell CLI control menu structure

► Main menu	► Heat pump
	► Domestic hot wateri
	► Heat circuit 1-3
	► Cool circuit 1
	► Information
	► Service menu

Heat pump

► Heat pump	**► System clock**	Year	
		Month	
		Day	
		Houri	
		Minute	
		Second	
	Language selection		*suomi, English, svenska*
	HP operating mode		*Auto, Off, Backup heat*
	Alarm acknowledge		*Execute*

Domestic hot water

► Domestic hot water	**Status**		Value is read-only
	DHW operating mode		*Auto, Off/Prt, Recuced, Comfort*
	Top temp. tank		Value is read-only
	Bottom temp. tank		Value is read-only
	Change over valve		Value is read-only
	► DHW SP temperatures	Actual	*˚C*, Value is read-only
		Comfort	*˚C*
		Reduced	*˚C*
	► Legionella	Setp.temperature	*˚C*
		Legionella mode	*Mo,Tu,We,Th,Fr,Sa,Su*
		Start time leg.function	*h*
	Circulation pump		Value is read-only

Heat circuit 1-3

► Heat circuit 1-3	**HC operating mode**		*Auto, Off/Prt, Recuced, Comfort*
	► Sp.room temp.	Actual	*˚C*
		Comfort	*˚C*
		Reduced	*˚C*
		Protect	*˚C*
		Sp.correction	*K*
		Room temp. control	Value is read-only
		Room temp. comp.	
		Ti room	*min*
		Room influence	*K*, Value is read-only
	► Heating curve	Out.temp.filtered. X	*˚C*
		X1	*-30˚C*, Value is read-only
		Y1	*˚C*
		X2	*-15˚C*, Value is read-only
		Y2	*˚C*
		X3	*0˚C*, Value is read-only
		Y3	*˚C*
		X4	+10*˚C*, Value is read-only
		Y4	*˚C*
		X5	*+20˚C*, Value is read-only
		Y5	*˚C*
		Heating curve Y	*˚C*, Value is read-only
	► Setpoint flow temp.	Present value	*˚C*, Value is read-only
		High limit	*˚C*
		Low limit	*˚C*
	Summer-winter switch temperature		*˚C*
	► Week calender HC1	Present value	Value is read-only
		Monday	*Time-1* *Value-1: Off/Pro., Comfort, Eco* . . . . . *Time-6* *Time-6: Off/Pro., Comfort, Eco*
		Tuesday	
		Wednesday	
		Thursday	
		Friday	
		Saturday	
		Sunday	

► Heat circuit 1-3	**► Week calender HC1**	Exception	
		Start time	*Day of week, Day, Month, Year*
		End time	*Day of week, Day, Month, Year*
		Selection-1	*Day, Area, Day of week, Calendar*
		(Start)day	*Day of week, Day, Month, Year*
		End day	*Day of week, Day, Month, Year*
		Weekday	*Day of week, Day, Month, Year*
	Copy schedule		*Ma to, Tu-Fr, Tu-Su, Tu, We, Th, Fr, Sa, Su, Ecpt*

Cool circuit

► Cool circuit	**Op.mode HMI**		*Auto, Off/Prt, Recuced, Comfort*
	► Sp.room temp.	Actual	*˚C*
		Comfort	*˚C*
		Reduced	*˚C*
		Sp. correction	*K*
		Room temp. control	Value is read-only
		Room temp. comp.	
		Ti room	*min*
		Room influence	*K,* Value is read-only
	►Cooling curve	Out.temp.filtered X	*˚C*
		X1	*15˚C,* Value is read-only
		Y1	*˚C*
		X2	*20˚C,* Value is read-only
		Y2	*˚C*
		X3	*25˚C,* Value is read-only
		Y3	*˚C*
		X4	30*˚C,* Value is read-only
		Y4	*˚C*
		X5	35*˚C,* Value is read-only
		Y5	*˚C*
		Cooling curve Y	Value is read-only
	► Setpoint flow temp.	Present value	*˚C,* Value is read-only
		High limit	*˚C*
		Low limit	*˚C*

	Su/Wi Temperature		*˚C*
	► Viikkokalenteri JP1	Present value	Value is read-only
		Monday	*Time-1* *Value-1: Off/Pro., Comfort, Eco* . . . . . *Time-6* *Time-6: Off/Pro., Comfort, Eco*
		Tuesday	
		Wednesday	
		Thursday	
		Friday	
		Saturday	
		Sunday	
		Exception	
		Start time	*Day of week, Day, Month, Year*
		End time	*Day of week, Day, Month, Year*
		Selection-1	*Day, Area, Day of week, Calendar*
		(Start)day	*Day of week, Day, Month, Year*
		End day	*Day of week, Day, Month, Year*
		Weekday	*Day of week, Day, Month, Year*
	Copy schedule		*Ma to, Tu-Fr, Tu-Su, Tu, We, Th, Fr, Sa, Su, Ecpt*

Information

► Information	► Status data and measurements	Outside temp.	˚C, Value is read-only
		Supply pump	%, Value is read-only
		Flow temp.	˚C, Value is read-only
		Return temp.	˚C, Value is read-only
		dT supply	*K*, Value is read-only
		Source pump	%, Value is read-only
		Source temp.	˚C, Value is read-only
		Return temp.source	˚C, Value is read-only
		dT source	*K*, Value is read-only
		Operating mode	Value is read-only
		Request	*%*, Value is read-only
		Present capacity	*%*, Value is read-only
		Compressor 1	*On*, Value is read-only
		VSD Compr. 1	*%*, Value is read-only
		Heat circuit 1	
		HC operating mode	*Auto, Off/Prt, Recuced, Comfort*
		Oprating mode	Value is read-only
		+Room temp.	˚C, Value is read-only
		+Flow temp.	˚C, Value is read-only
		Set point	˚C, Value is read-only
		Heat circuit 2	
		…..	
		Domestic hot water	
		DHW operating mode	*Auto, Off/Prt, Recuced, Comfort*
		Operating mode	Value is read-only
		Change over valve	Value is read-only
		Top temp. tank	˚C, Value is read-only
		Bottom temp. tank	˚C, Value is read-only
		Legionella mode DHW	Value is read-only
		Additional heat	
		K27 command	Value is read-only
		Control mode Add. heat	*HPErr, Parallell*
		Heat. ele. heater	Value is read-only
		Add. heat control signal	*%*, Value is read-only

► **Information**	► **Status data and measurements**	Setpoint	*˚C,* Value is read-only
		Present value	*˚C,* Value is read-only
		Control output	*%,* Value is read-only
	► **Operating hours,** Values read-only	Automation stat.	*h*
		Compressor 1	*h*
		Compressor start-ups	
		Hot water charges	
		Supply pump	*h*
		Source pump	*h*
		El.heater Add. heat	*h*
		El.heater start-ups Add.heat	
		K27 command Add. heat	*h*
		K27 start-ups Add. heat	
	► **Energy,** Values read-only	Energy total	*kWh*
		Generated heat total	*kWh*
		Energy heating	*kWh*
		Energy DHW	*kWh*
		Generated heat Heat.circuit	*kWh*
		Generated heat dhw	*kWh*

Service menu

► **Service menu**	► **Funtion testing**	Change over valve			*Heating, DHW*
		Source pump			*%*
		Source pump			*%*
		Charge pump			*%*
		Circulation pump DHW			*Off, On*
		DHW Ele. heat			*Off, On*
		Flow through heater			*Auto, Off, St 1-3*
		Valve HC2			*%*
		Valve HC3			*%*
		El.heater Add. heat			*Auto, Off, St 1-3*
		Add. heat			*Off, On*
		Add. heat control signal			%

► **Service menu**	► **Measurements** (Values read-only)	+Circuit 1			
		Cond.press.			*bar*
		Evap.press.			*bar*
		Cond. temp.			*˚C*
		Evaporatr temp.			*˚C*
		Suct.gas temp.			*˚C*
		Superheat			*K*
		Capacity request			*%*
		Present capacity			*%*
		Compressor 1			
		VSD Compressor 1			*%*
		Compressor 2			
		VSD Compressor 2			*%*
		Discharge templ.			*˚C*
		Feedb.esxp.val.			*%*
		+EXD-TEVI			
		Valve			*%*
		SuctionT1			*˚C*
		Superheat			*K*
		HotGasT1			*˚C*
		HotGasT2			*˚C*
		Pressure			*bar*
		Supply pump			*%*
		Flow temp.			*˚C*
		Return temp.			*˚C*
		dT supply			*K*
		Source pump			*%*
		Source temp			*˚C*
		Return temp. source			*˚C*
		dT source			*K*
		Flow temp. System			*˚C*
		Ext. control			
		Ext. heat demand			*%*
		Ext. setpoint			*˚C*

► Service menu	**► Commissioning**	Restart			*Execute*
		► Heat circuit 1-3	Heat circuit 1-3		*Enable, Disable*
			Room sensor		*Disabled, Wired, Wireless 1, Wireless 2, Wireless 1&2*
		► Cool circuit 1	Cool circuit 1		*Enable, Disable*
			Room sensor		*Disabled, HC1, HC2*
			Transfer pump (Q28)		*Enable, Disable*
		► Flow through heater	Flow through heater		*Enable, Disable*
			Number of stage		*One, Two, Three*
		► Additional heat	+K27/TV27		
			Add.heat		*Enable, Disable*
			+K28/K29		
			Heat. ele. heater		*Enable, Disable*
		► Cascade settings	Heat pump type		*Independent, Master, Slave1*
			Number of slaves		*0, 1*
			Common source pump type		*None, 1-stage, 0-10V*
		► Wiresell sensors	Nr. of wireless sensors		
			Addr. wireless base station		
			► Modbus	+Inbuilt RS485:2	
				Baud rate	*9600, 19200, 38400, 57600, 115200*
				Parity	*Even, Odd, None*
				Stop bits	*One, Two*
		► Ext.heat demand	Supl. cont.		*Heat pump, Ext. %, Ext. ˚C*
			ExtDmdTyp		*AI, Modbus*
	► Device settings	**► Charging circuit**	Sp.dT		*K*
			Supply pump min.		*%*
			Supply pump max.		*%*
		► Source circuit	Source pump min.		*%*
			Source pump max.		*%*
			Free cool pos src		*%*
		► El.heater	Operating mode		Value is read-only
			Src.temp limit		*˚C*

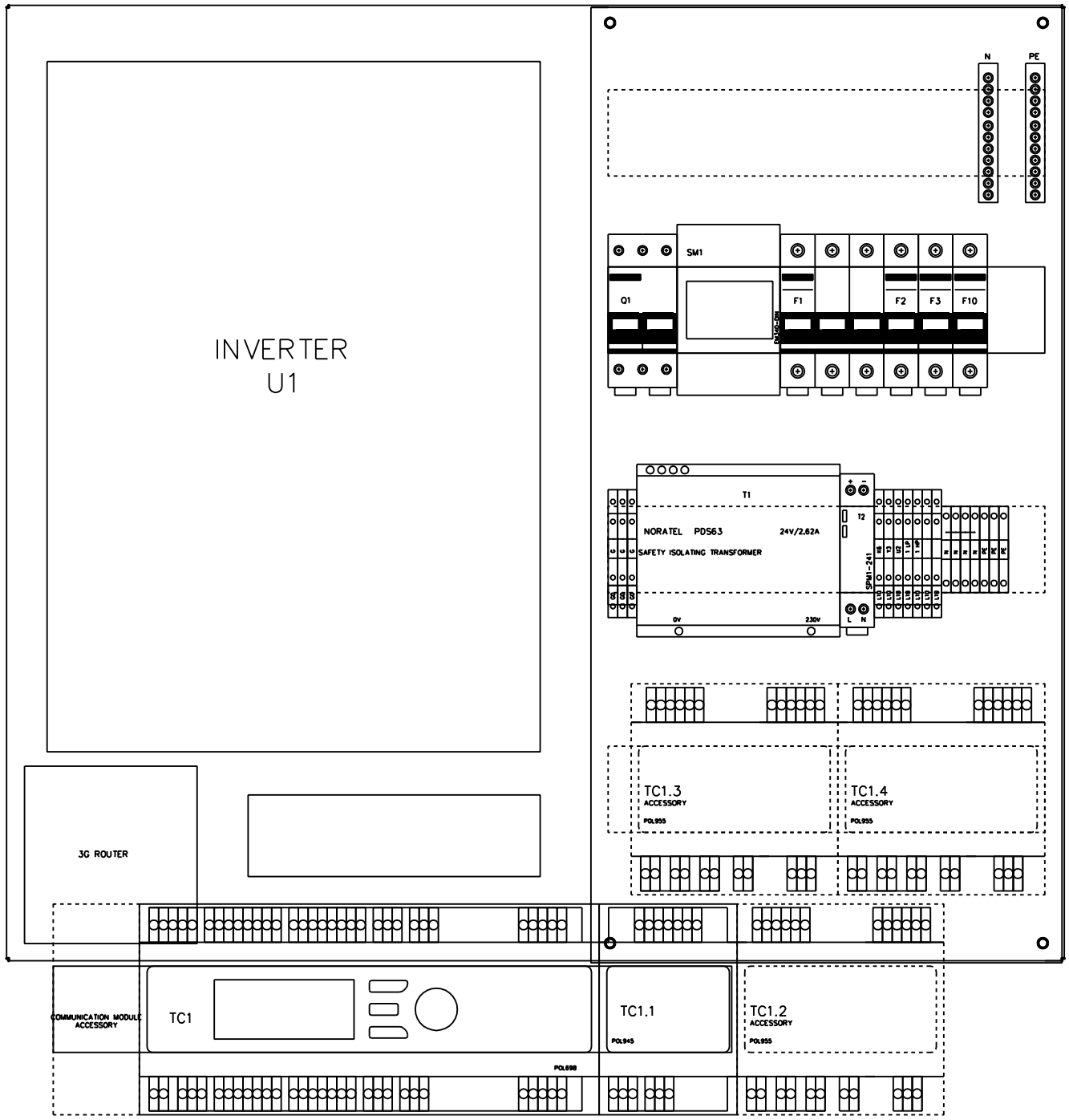
► Service menu	**► Device settings**	**► El.heater**	Switch on		*%*
			Switch hys.		*%*
			Switch on 2		*%*
			Switch hys 2		*%*
			Switch on 3		*%*
			Switch hys. 3		*%*
			Gain (Kp)		
			Ti Integr.act.t.		*s*
		► Domestic hot water	Circulation pump		*Off, On*
		► Heat circuit 1-3	► Alarm limits	Flow temp. – HihgLimit	*˚C*
				Flow temp. - LowLimit	*˚C*
				Room temp. – HighLimit	*˚C*
				Room temp. – LowLimit	*˚C*
			► Summer / Winter setting	Su/Wi mode	*Auto/Temp, Date, Summer, Winter*
				Su/Wi Time const.	*h*
				Start date	*Day of week, Date*
				End date	*Day of week, Date*
				Reset outside temp.	*Execute*
			Room temp. comp.		*Value is read-only*
			Room influence		*K*

Service menu → Device settings → Additional heat

Service	**Device**	**► Additional heat**	Operating mode			*Value is read-only*
			Flow temp.			*Value is read-only*
			El.heater			*Value is read-only*
			K27 command			*Value is read-only*
			Add. heat control signal			*Value is read-only*
			► +Settings	**► Flow temp.**	High limit	*˚C*
					Low limit	*˚C*
			Control mode Heat. ele. heater			*HPErr, Parallell*
			Sequence selector			*K28-K27, K27-K28*

Service menu → Communication

► Service menu	**► Communication**	**► Modbus module 1**	State	Value is read-only
			Comm.failure	Value is read-only
			+Kanava 1:	Value is read-only
			Slave	Value is read-only
			Slave address	
			Baud rate	
			Stop bits	*1,2*
			Parity	*Parill., Pariton, Ei mitään*
		► IP-Config.	DHCP	*Active, Passive*
			IP address	
			Subnet mask	
			Default gateway	
			Preferred DNS server	
			Alternate DNS server	
► Service menu	**► Device information**	Activation key		
		Operating hours		*h*
		Internal temp.		*˚C*
		Serial number		Value is read-only



TECHNICAL DETAILS		
VOLTAGE	Un	400 V
CURRENT	In	3X32 A
CONTROL VOLTAGE	U	5–24V AC DC
CONTROL VOLTAGE	U	230V AC
IP–CATEGORY	IP	4X
MAX TEMPERATURE		35°C

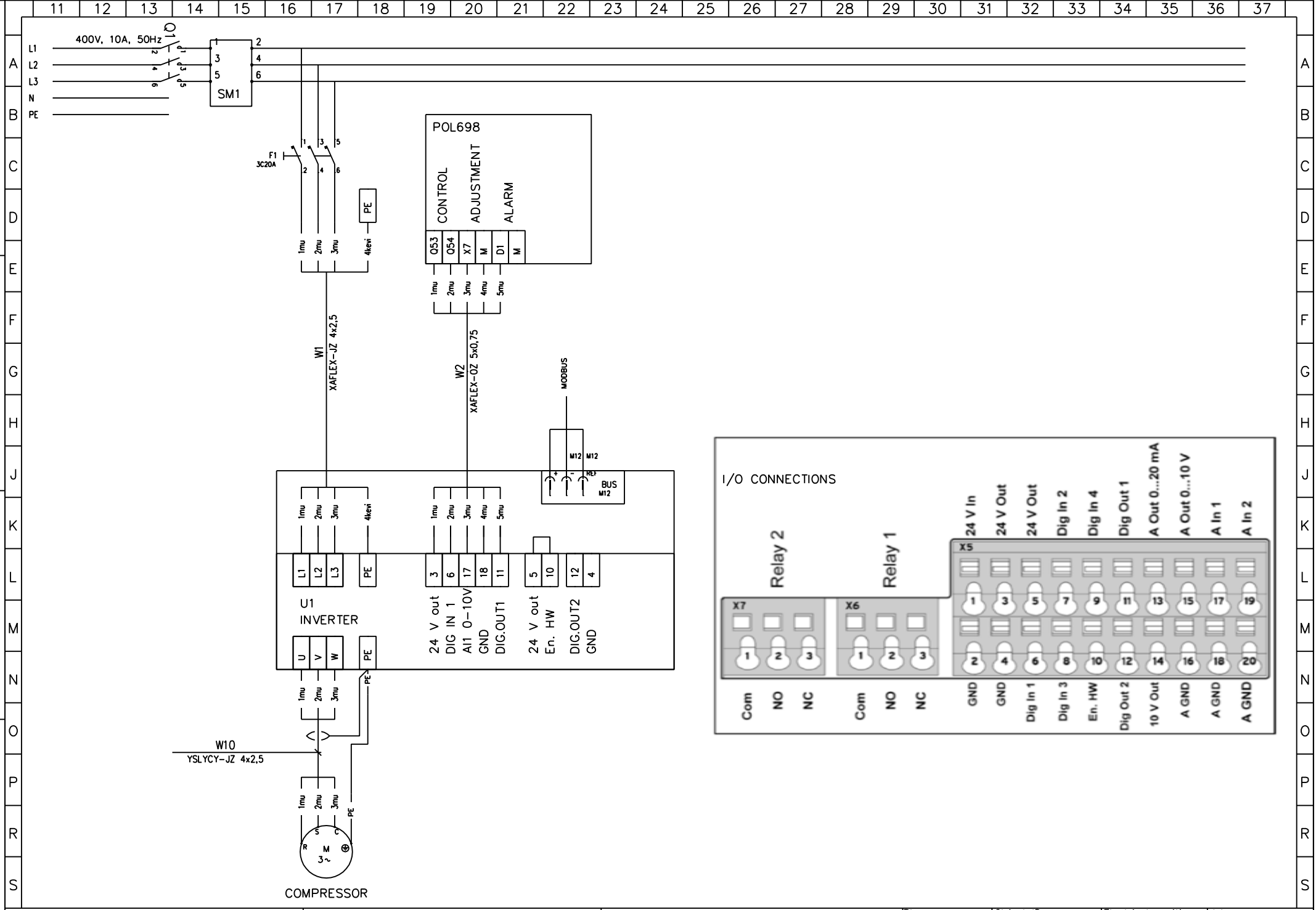
D rev | E rev | F rev

A rev | B Rev. | C Rev.

GEBWELL

T3 30 kW
LAY–OUT

Plan. MHe /12.1.2022	Object ID =T3	Electrical position	Job no.
Draw.	Sheet 1/12	Drawing no. EL EL114	
Check			

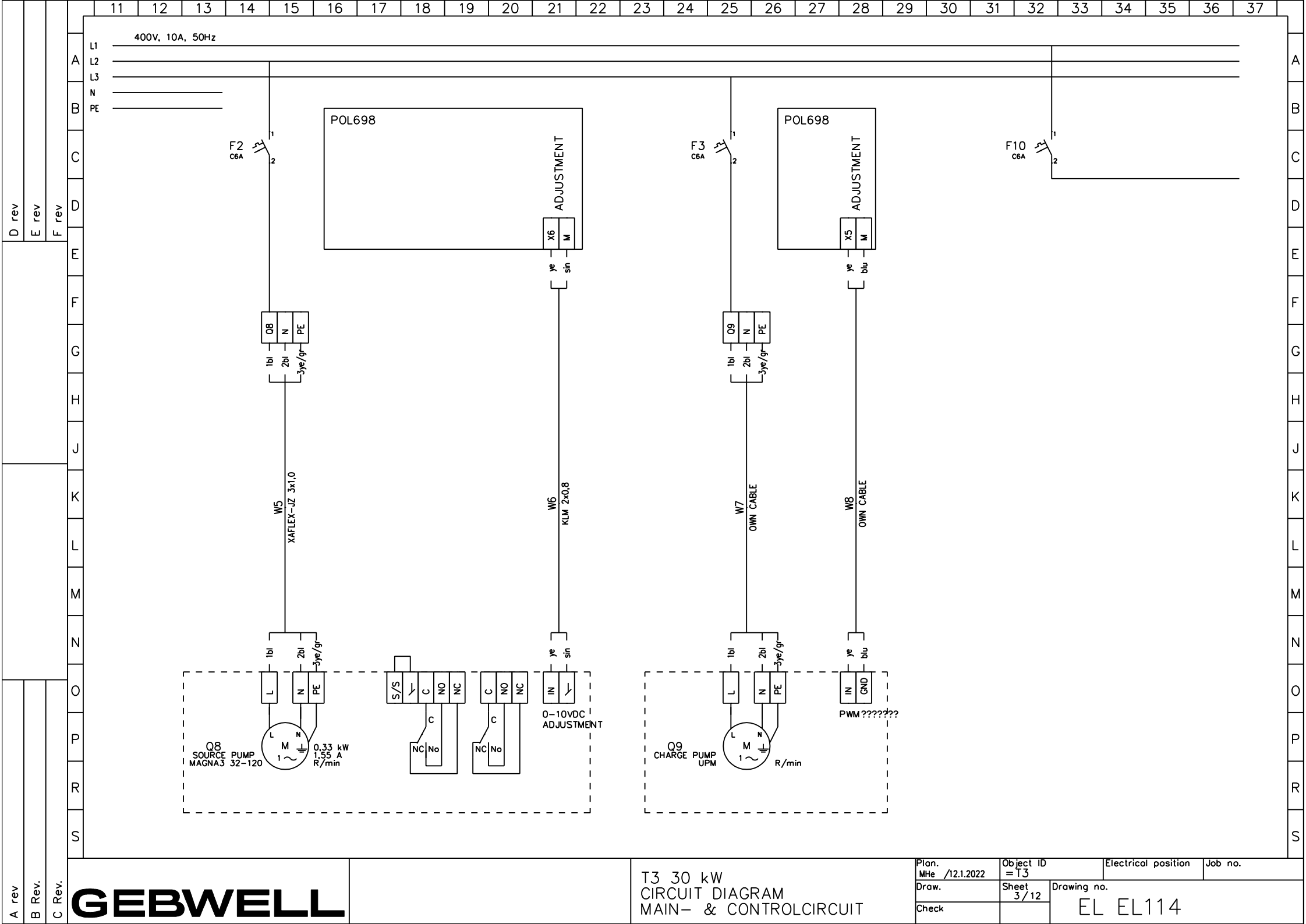


GEBWELL

T3 30 kW
CIRCUIT DIAGRAM
MAIN- & CONTROLCIRCUIT

Plan. MHe /12.1.2022	Object ID =T3	Electrical position	Job no.
Draw.	Sheet 2/12	Drawing no. EL EL114	
Check			

D rev
E rev
F rev
A rev
B Rev.
C Rev.

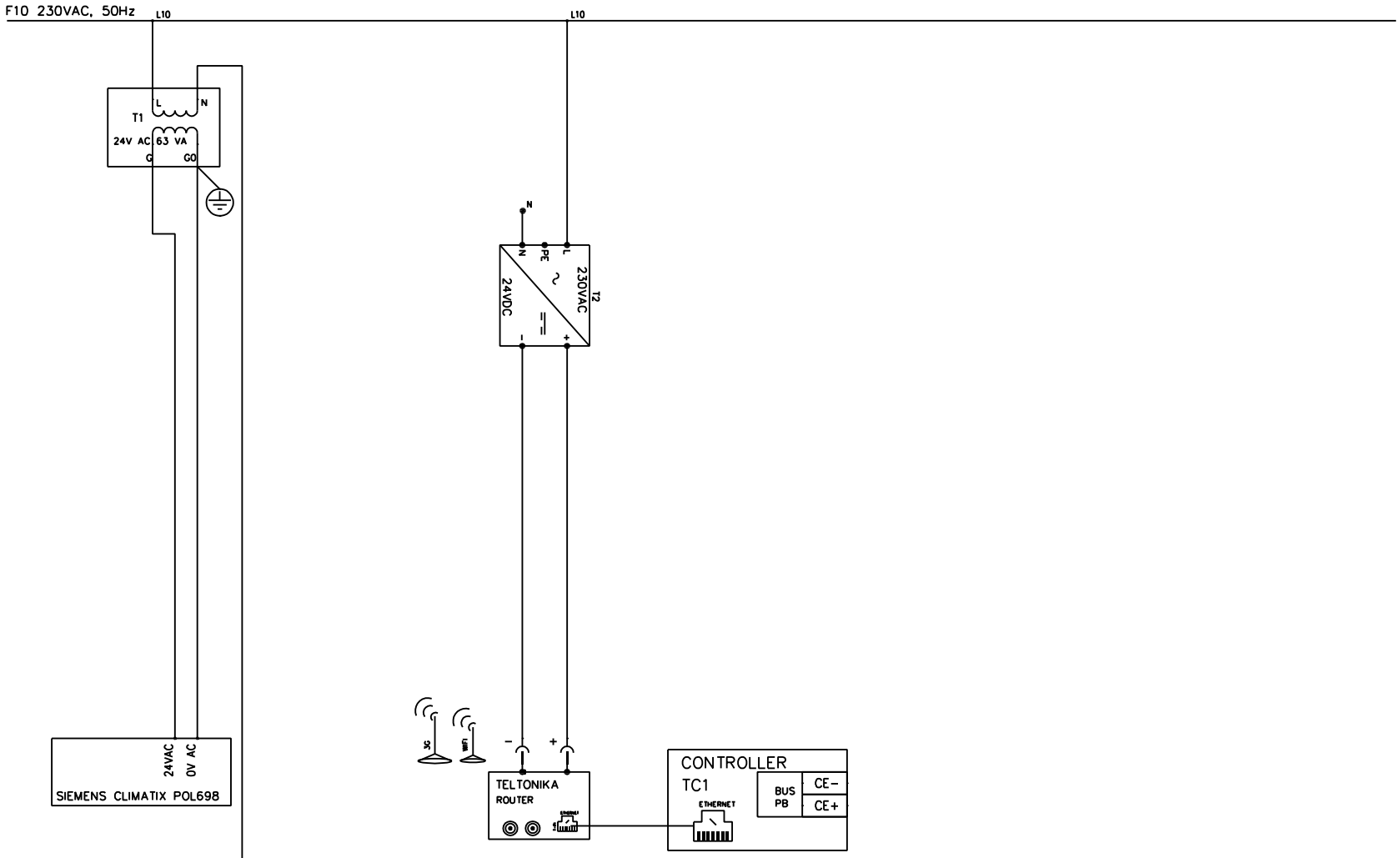


GEBWELL

T3 30 kW
CIRCUIT DIAGRAM
MAIN- & CONTROLCIRCUIT

Plan. MHe /12.1.2022	Object ID =T3	Electrical position	Job no.
Draw.	Sheet 3/12	Drawing no. EL EL114	
Check			

A rev
B Rev.
C Rev.
D rev
E rev
F rev

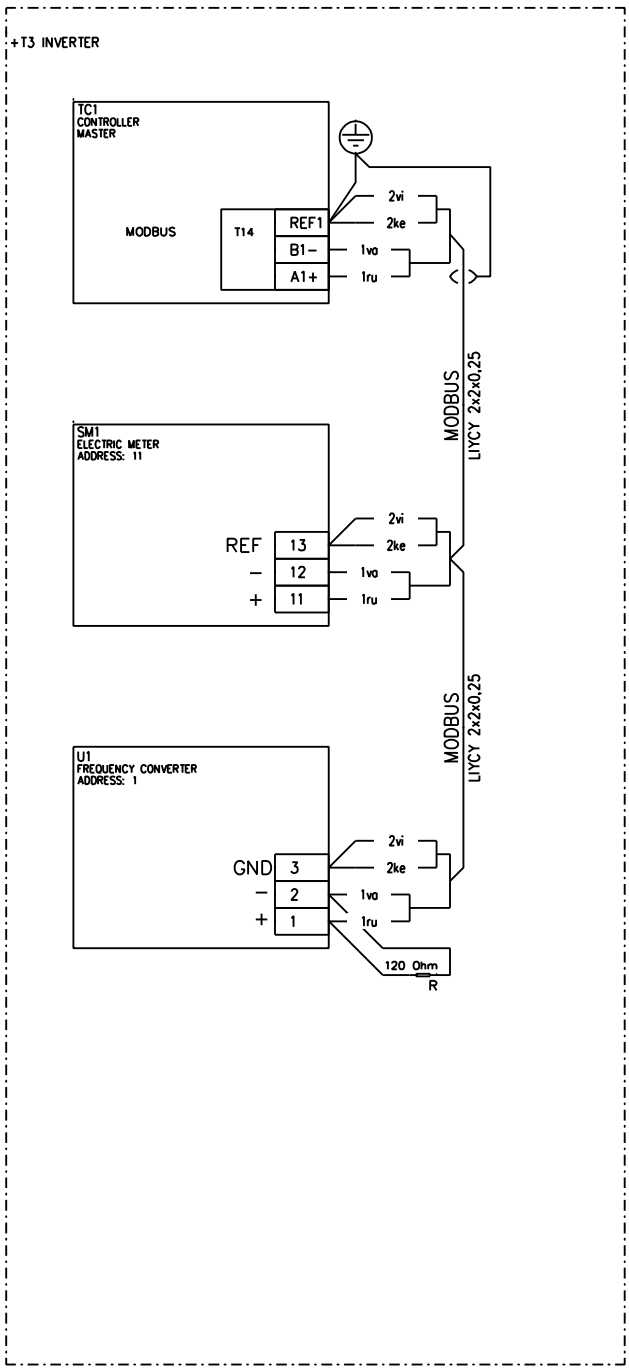


D rev
E rev
F rev
A rev
B Rev.
C Rev.

GEBWELL

T3 30 kW
CIRCUIT DIAGRAM
MAIN- & CONTROLCIRCUIT

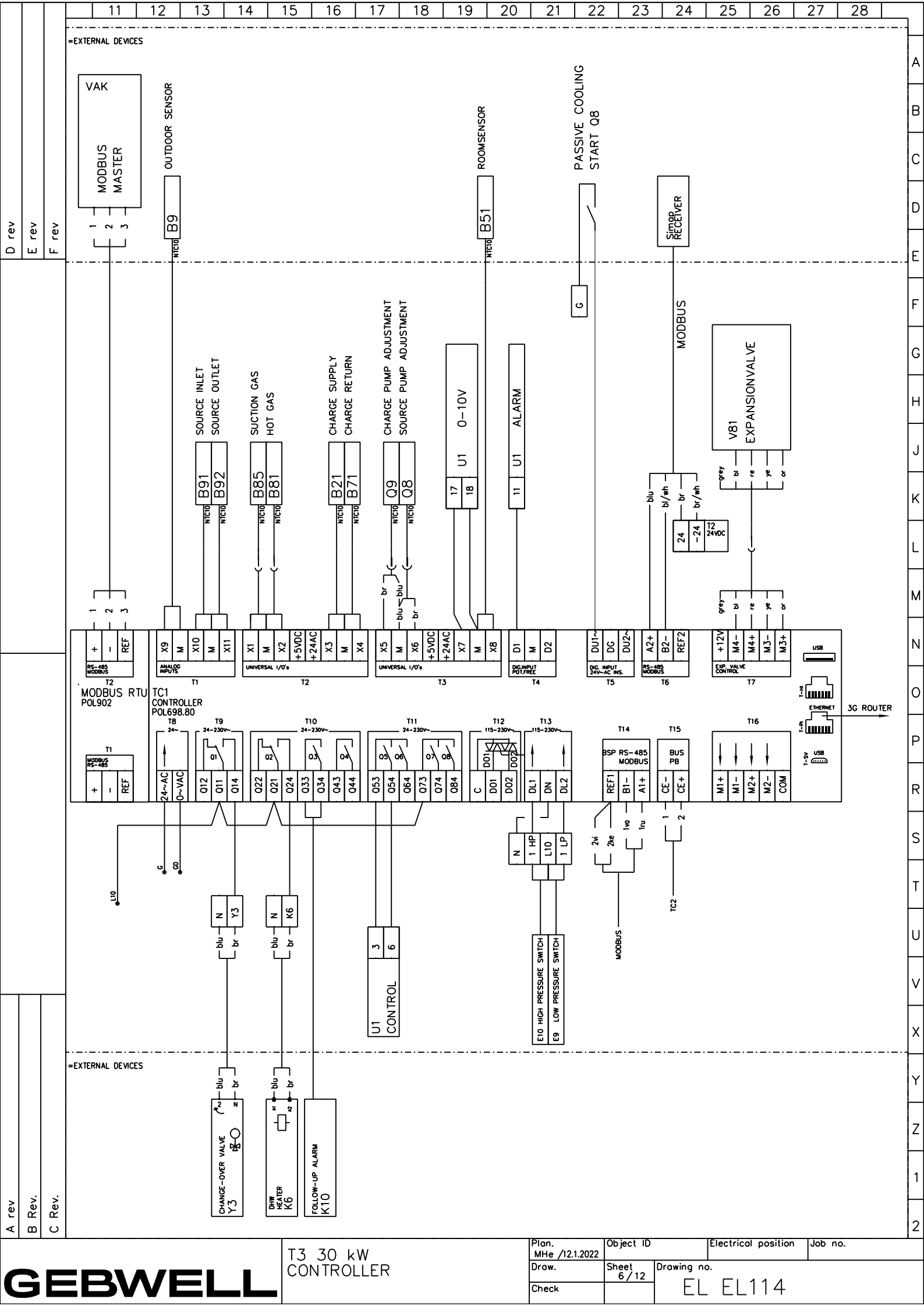
Plan.	Object ID	Electrical position	Job no.
MHe /12.1.2022	=T3		
Draw.	Sheet 4/12	Drawing no. EL EL114	
Check			



T14 INTERNAL BUS:
BAUD RATE = 19200
PARITY = EVEN
STOP BIT = 1

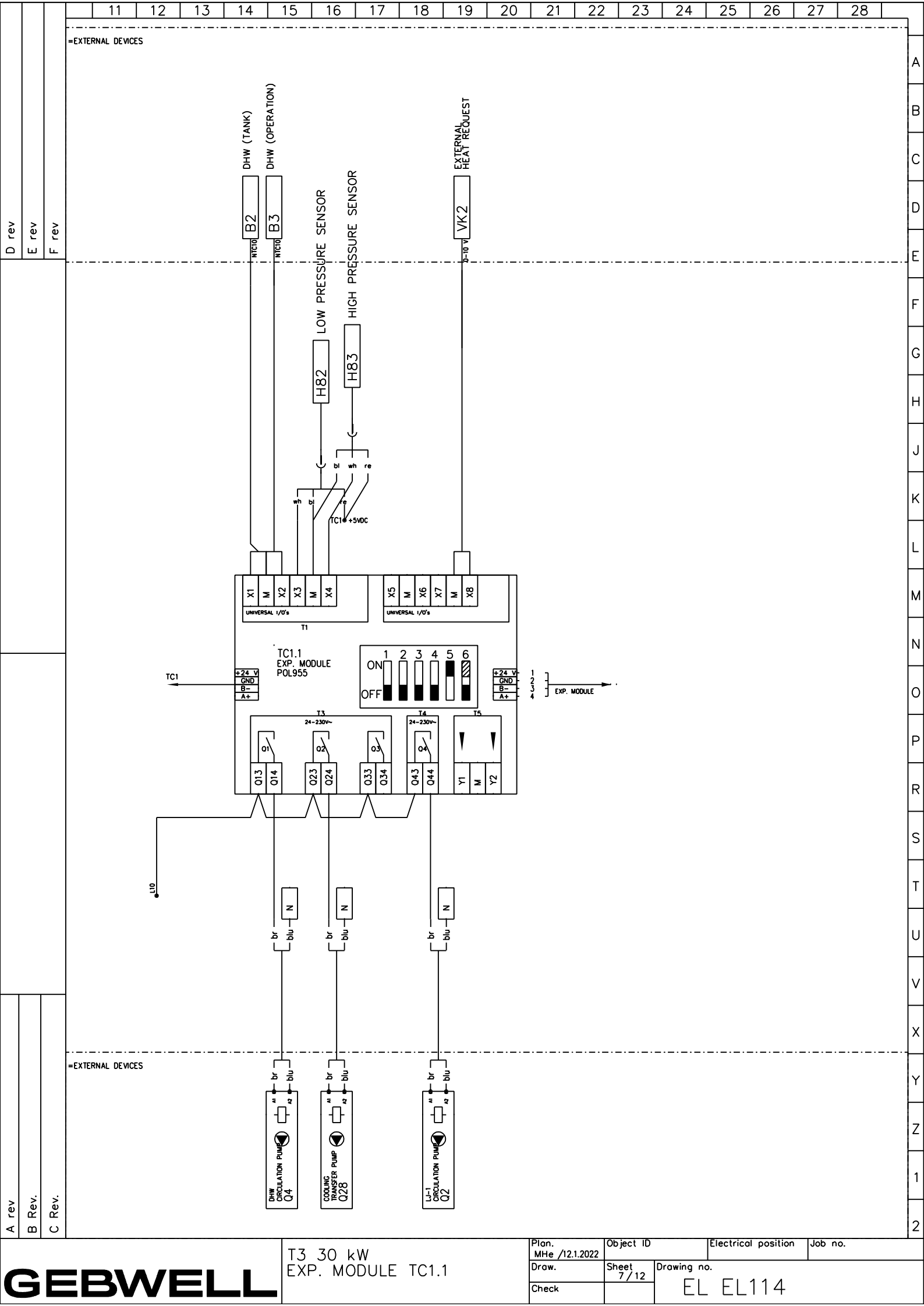
D rev
E rev
F rev
A rev
B Rev.
C Rev.

GEBWELL	T30 30kW MODBUS INTERNAL BUS	Plan. MHe /12.1.2022	Object ID	Electrical position / Job no.
		Draw.	Sheet 5/12	Drawing no. EL EL114
		Check		



GEBWELL	T3 30 kW CONTROLLER	Plan. MHe /12.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 6/12	Drawing no. EL EL114	
		Check			

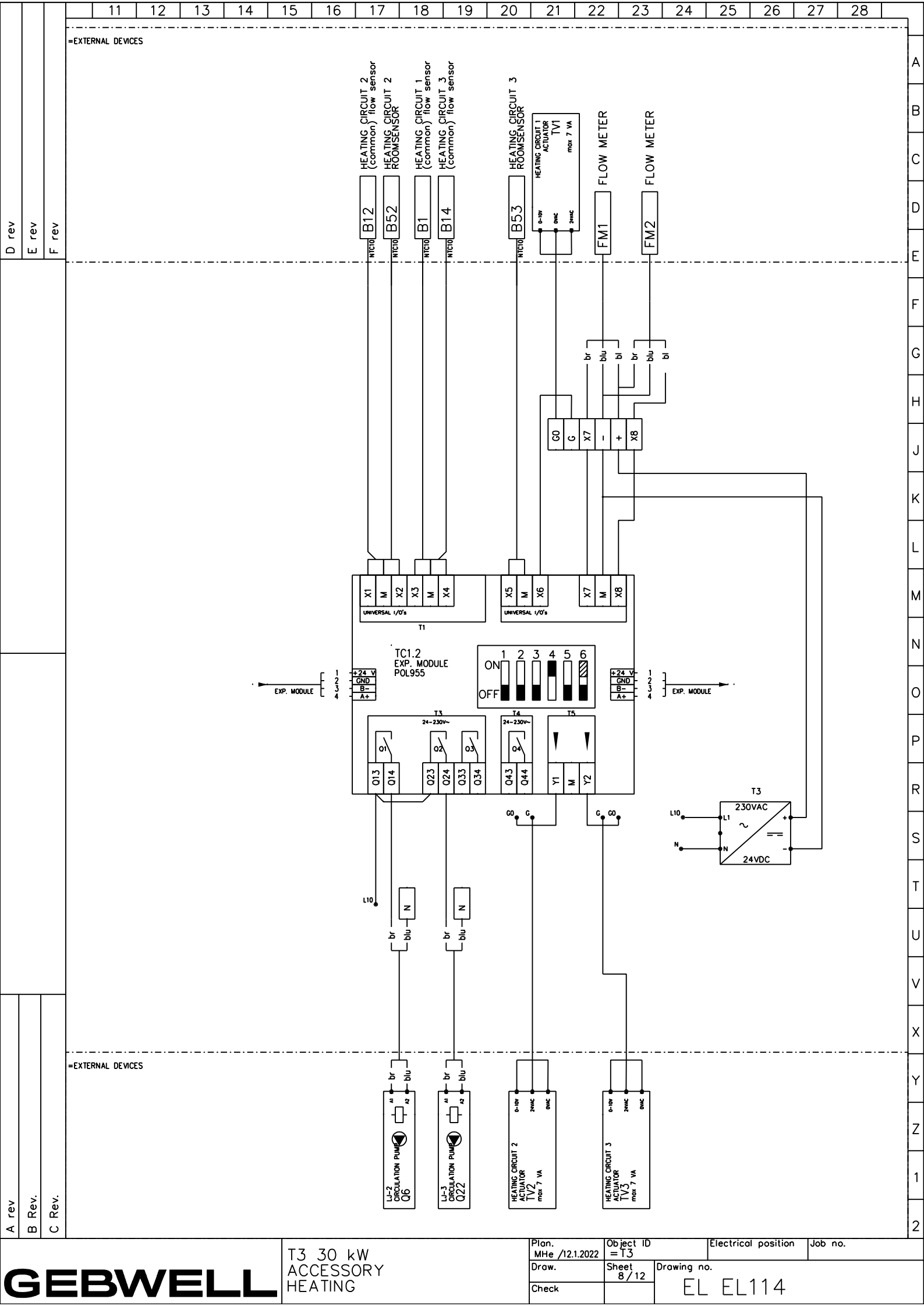
D rev
E rev
F rev
A rev
B Rev.
C Rev.



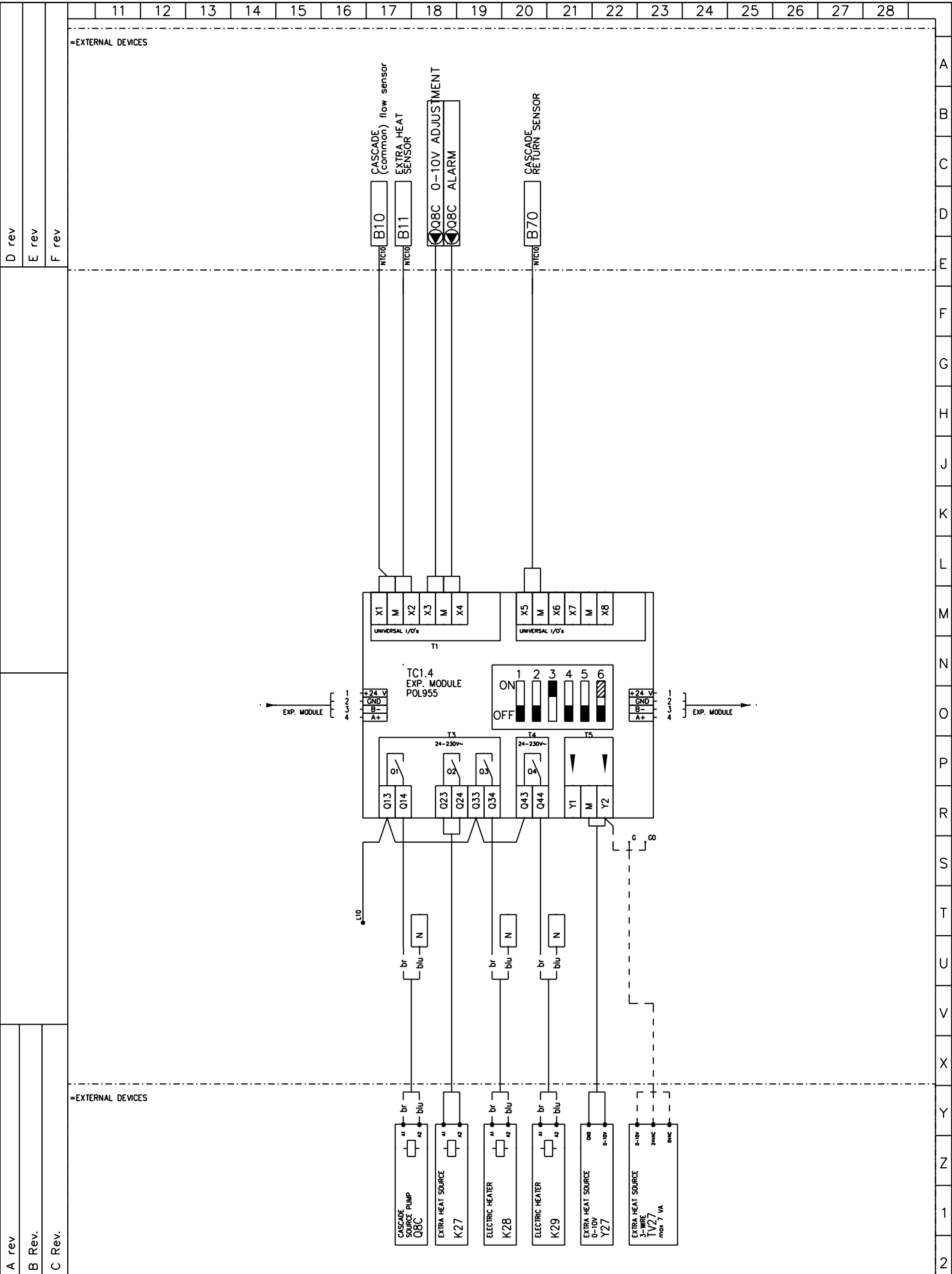
D rev E rev F rev

A rev B Rev. C Rev.

GEBWELL	T3 30 kW EXP. MODULE TC1.1	Plan. MHe /12.1.2022	Object ID	Electrical position / Job no.
		Draw.	Sheet 7/12	Drawing no. EL EL114
		Check		



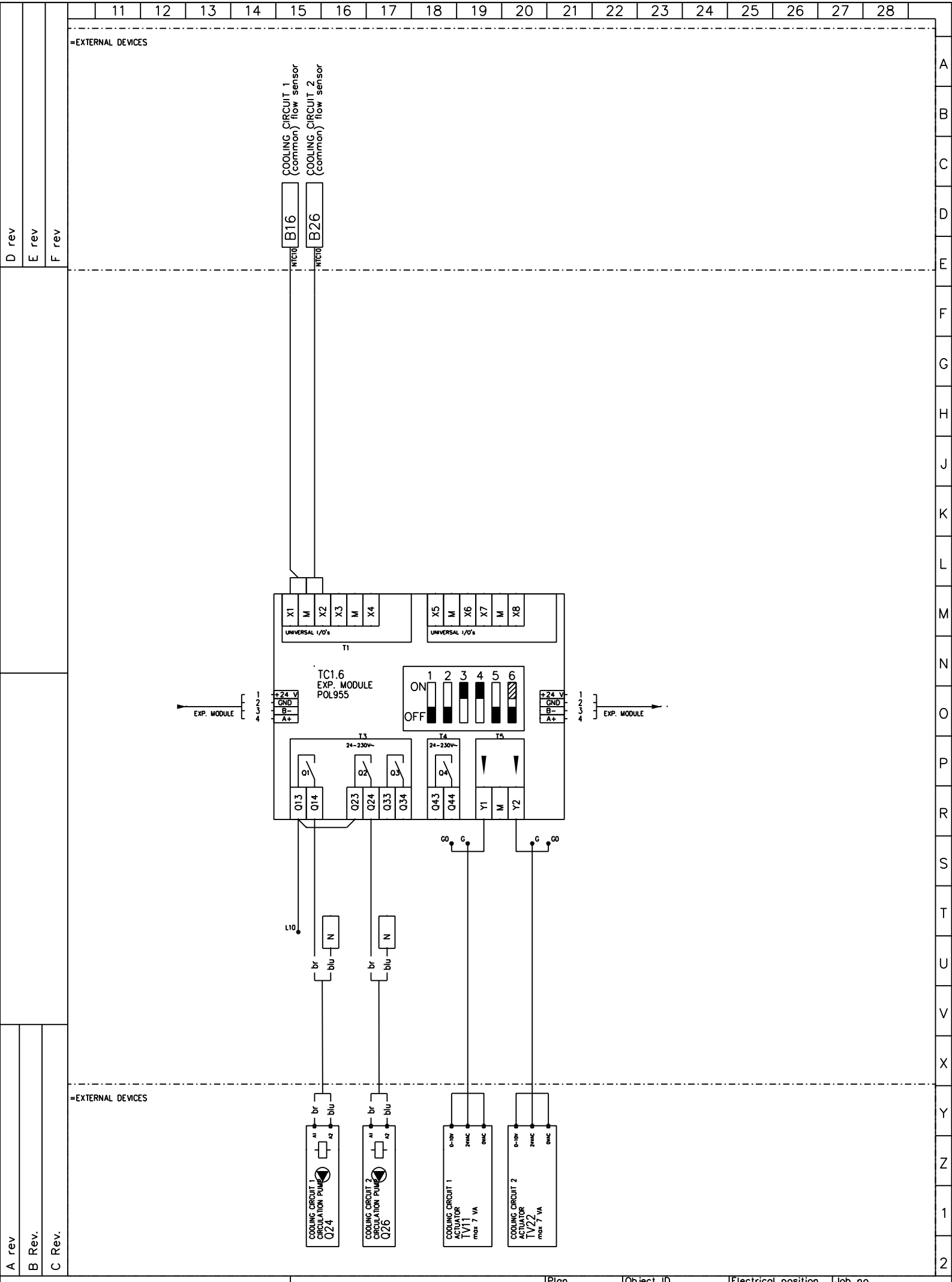
GEBWELL	T3 30 kW ACCESSORY HEATING	Plan. MHe /12.1.2022	Object ID =T3	Electrical position	Job no.
		Draw.	Sheet 8/12	Drawing no. EL EL114	
		Check			



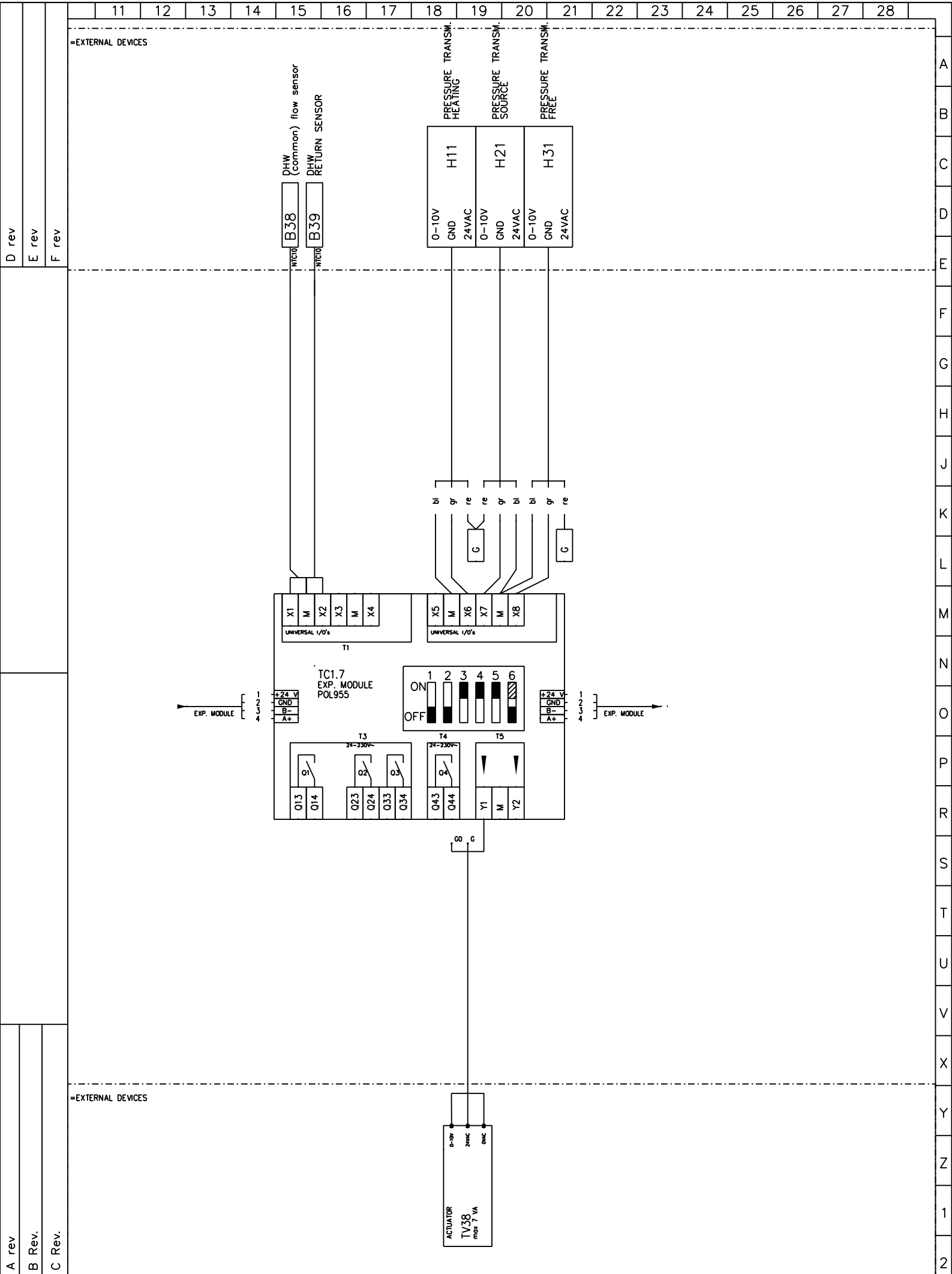
GEBWELL	T3 30 kW ACCESSORY CASCADE	Plan. MHe /12.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 9/12	Drawing no. EL EL114	
		Check			

D rev E rev F rev

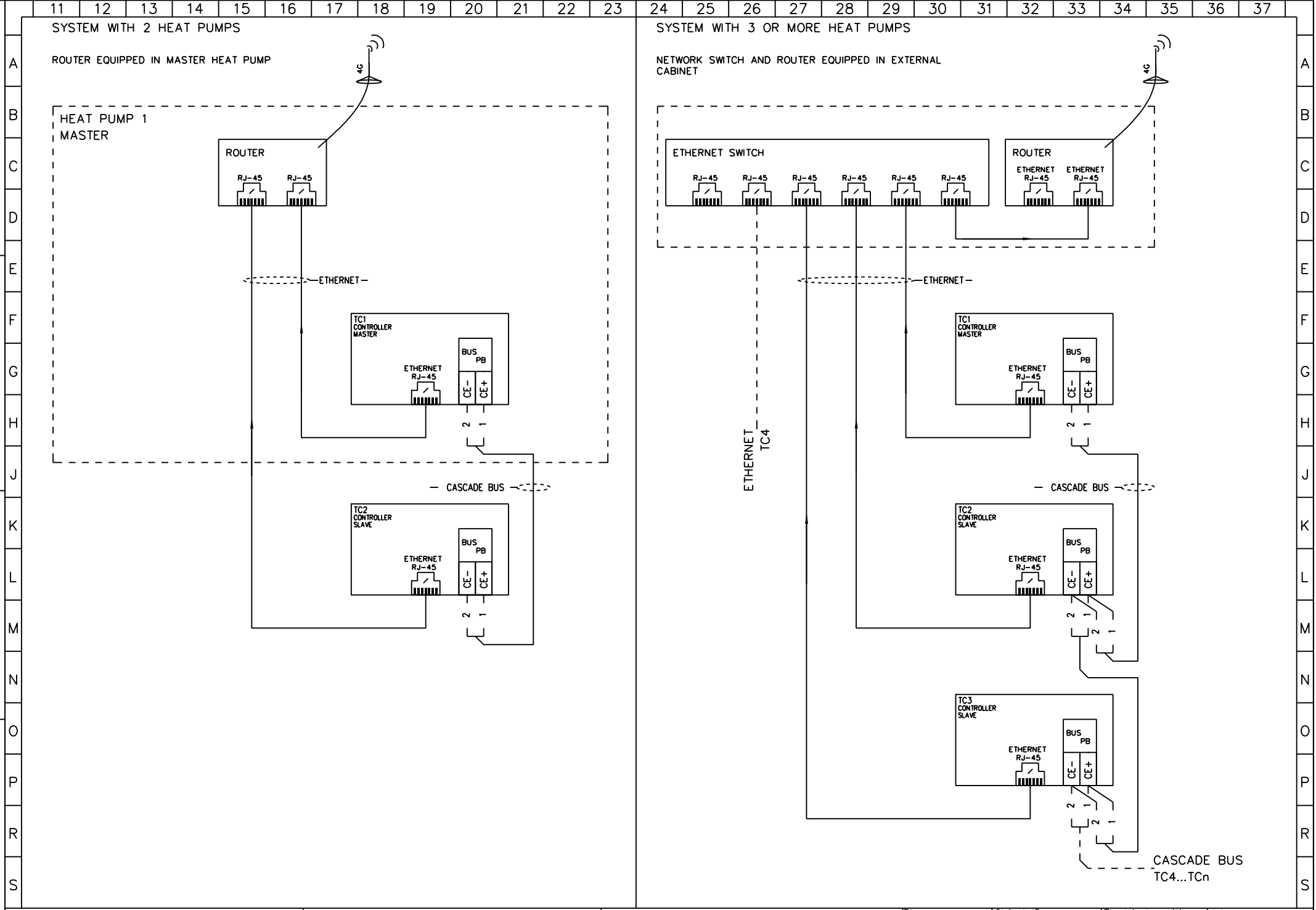
A rev B Rev. C Rev.



GEBWELL	T30 30kW ACCESSORY COOLING CONTROL	Plan. MHe /12.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 10/12	Drawing no. EL EL114	
		Check			



GEBWELL	T30 30kW ACCESSORY DHW CONTROL	Plan. MHe /12.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 11/12	Drawing no. EL EL114	
		Check			



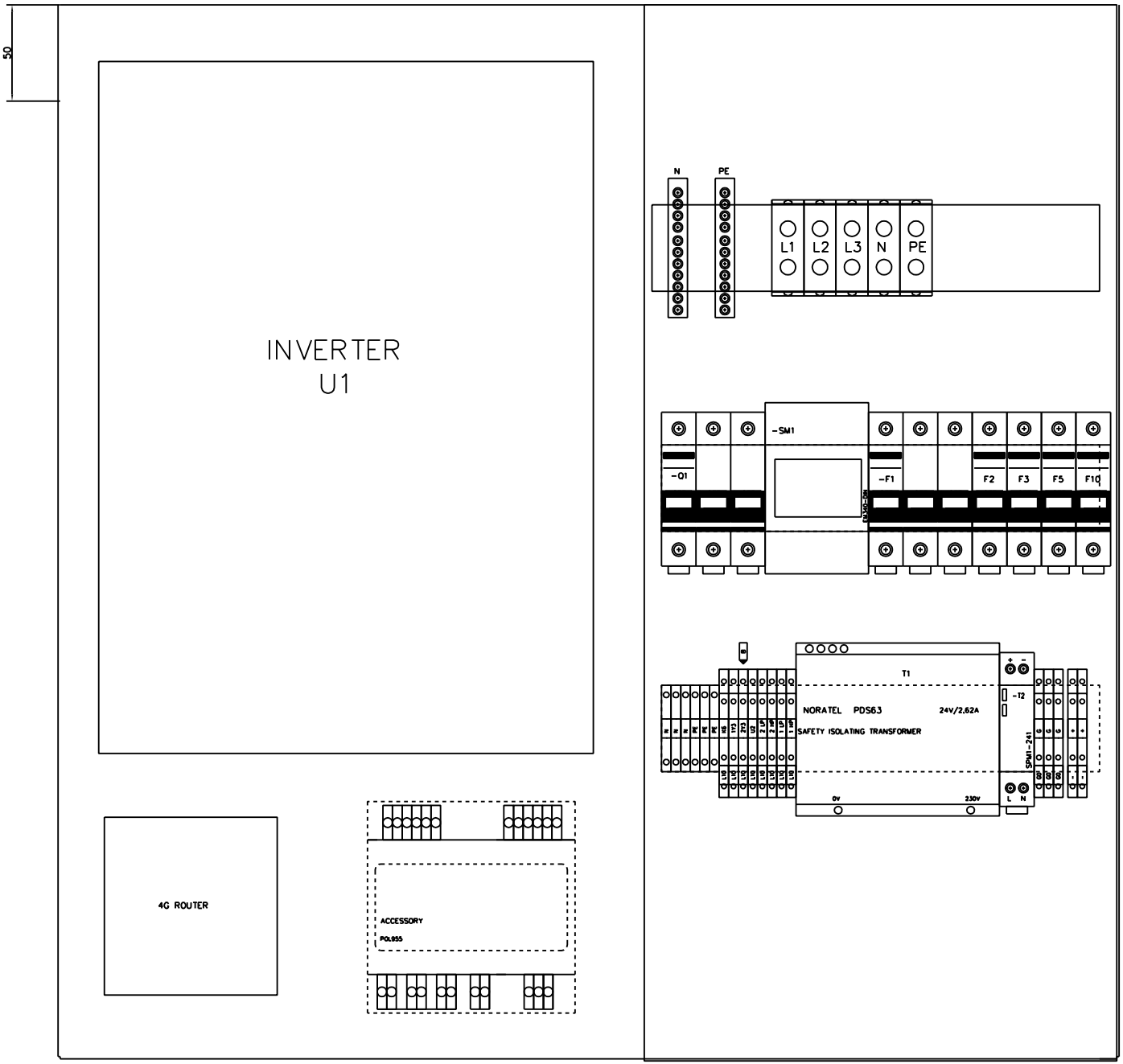
D rev | E rev | F rev

A rev | B Rev. | C Rev.

GEBWELL

T30 30kW
EXTERNAL BUS CONNECTIONS

Plan. MHe /12.1.2022	Object ID	Electrical position	Job no.
Draw.	Sheet 12/12	Drawing no. EL EL114	
Check			



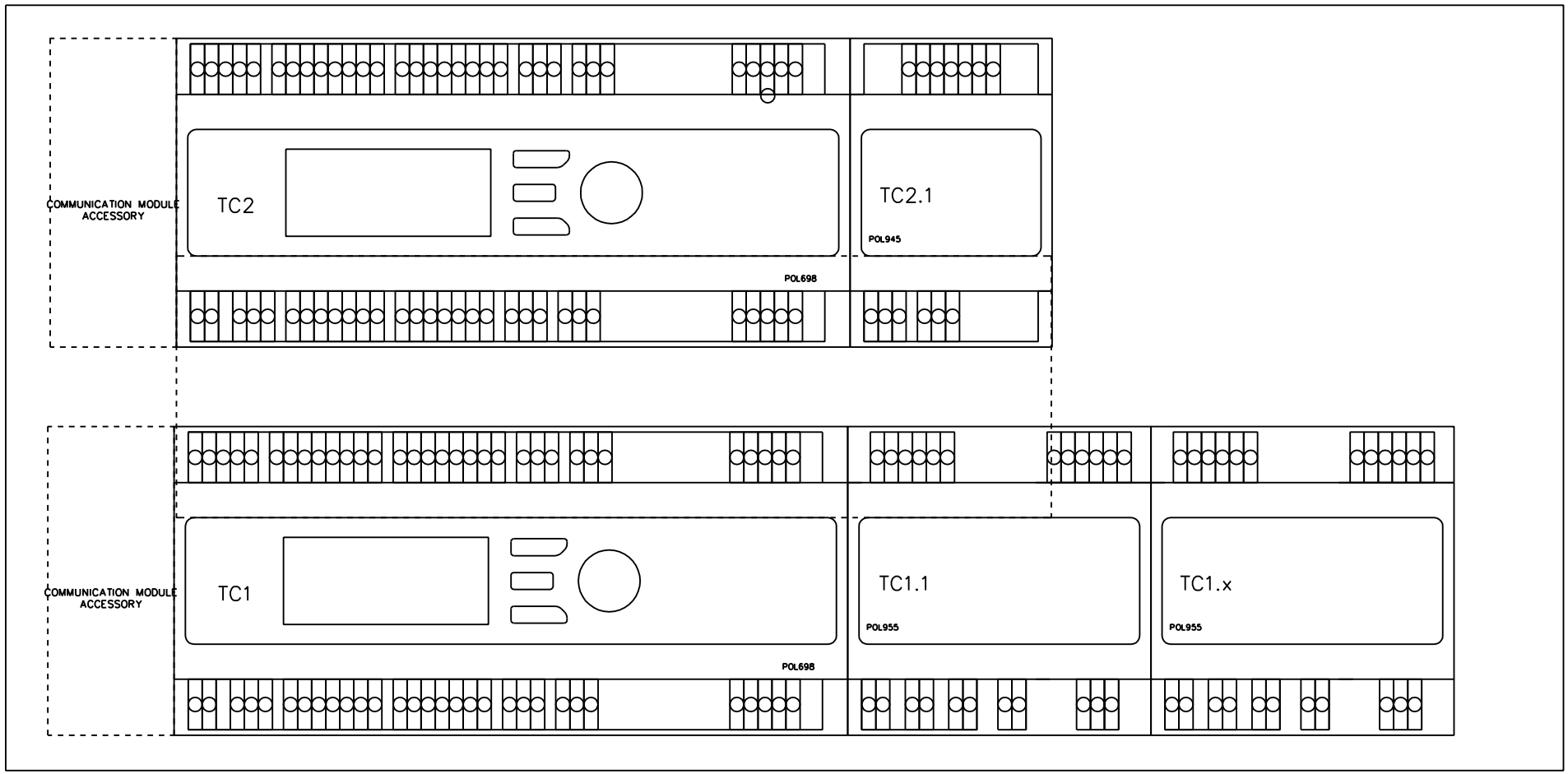
TECHNICAL DETAILS		
VOLTAGE	Un	400 V
CURRENT	In	3X63 A
CONTROL VOLTAGE	U	5-24V AC DC
CONTROL VOLTAGE	U	230V AC
IP-CATEGORY	IP	4X
MAX TEMPERATURE		35°C

GEBWELL

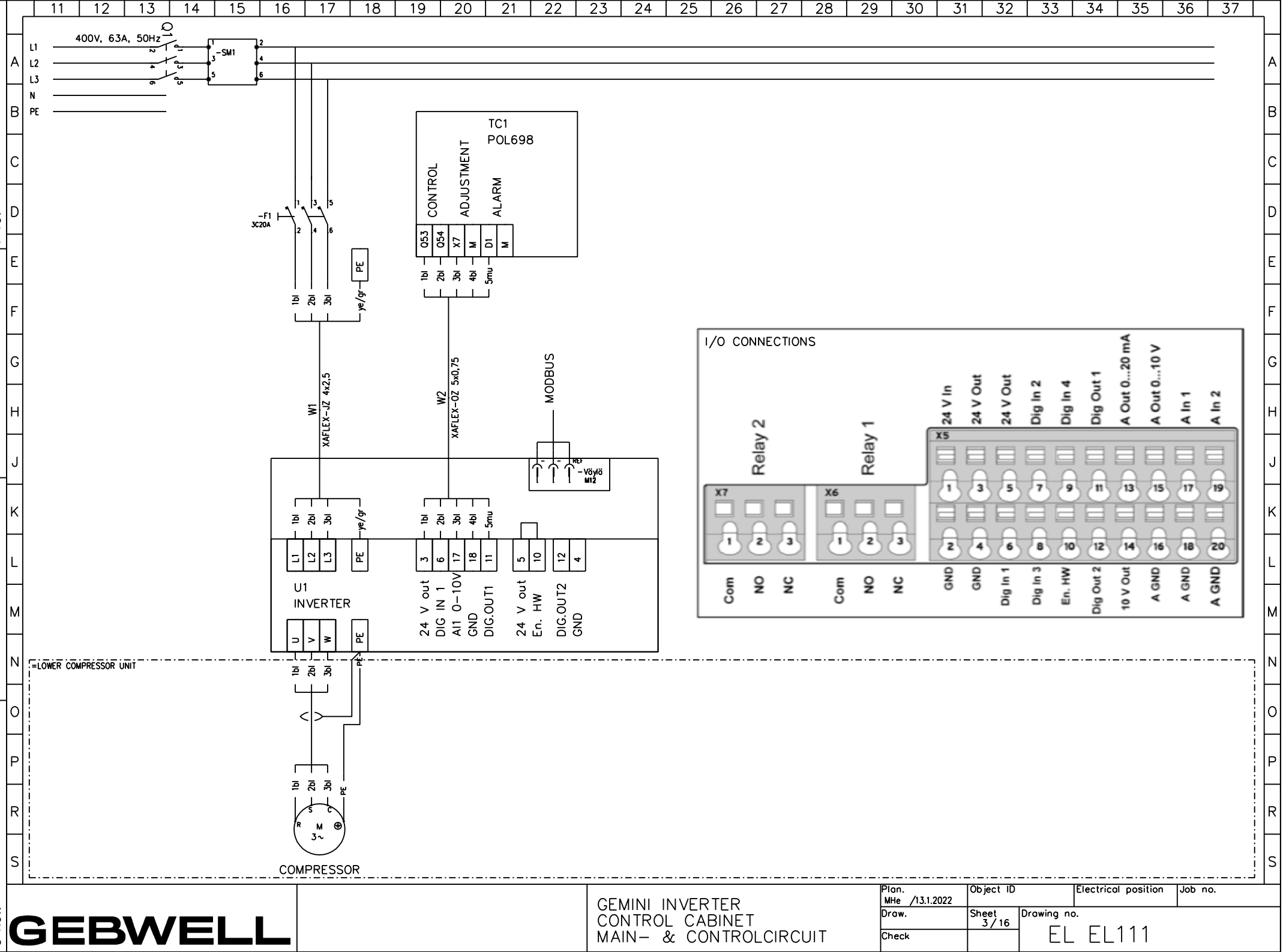
GEMINI INVERTER
CONTROL CABINET
LAY-OUT

Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
Draw.	Sheet 1/16	Drawing no. EL EL111	
Check			

D rev E rev F rev A rev B Rev. C Rev.



GEBWELL	GEMINI INVERTER CONTROL CABINET LAYOUT FRONT PANEL	Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 2/16	Drawing no. EL EL111	
		Check			

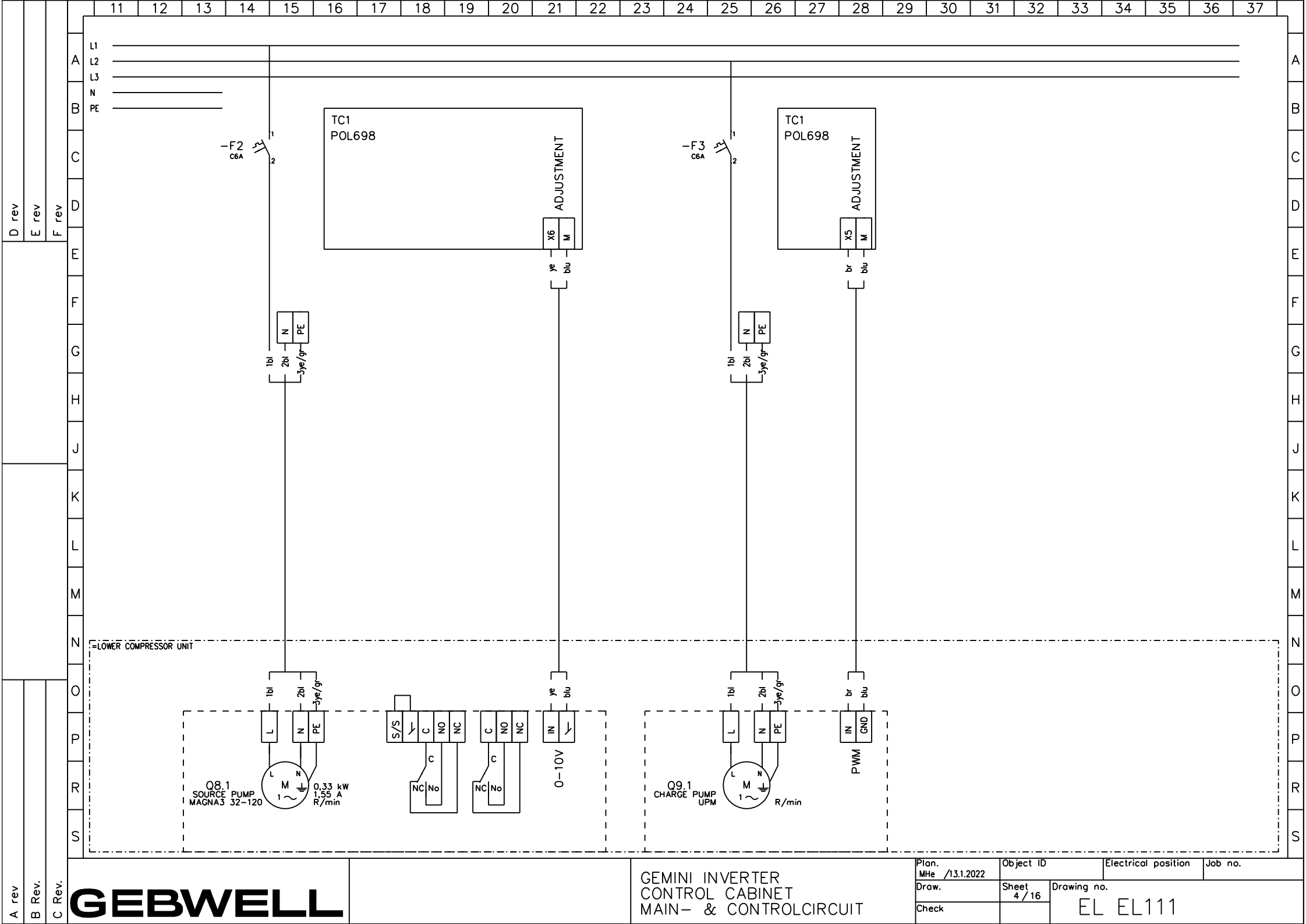


GEBWELL

GEMINI INVERTER
CONTROL CABINET
MAIN- & CONTROLCIRCUIT

Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
Draw.	Sheet 3/16	Drawing no. EL EL111	
Check			

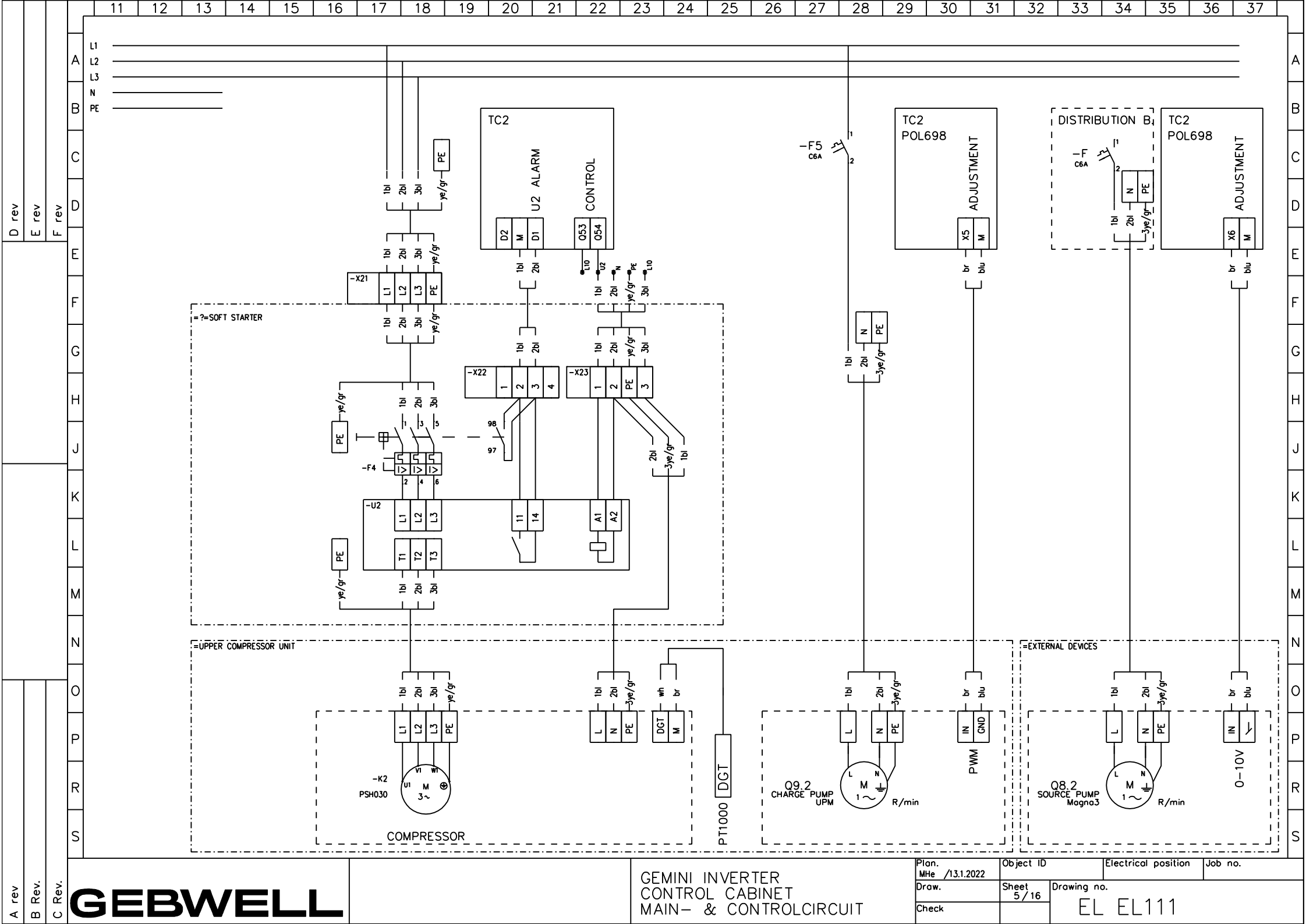
A rev B Rev. C Rev. D rev E rev F rev



GEBWELL

GEMINI INVERTER
CONTROL CABINET
MAIN- & CONTROLCIRCUIT

Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
Draw.	Sheet 4/16	Drawing no. EL EL111	
Check			

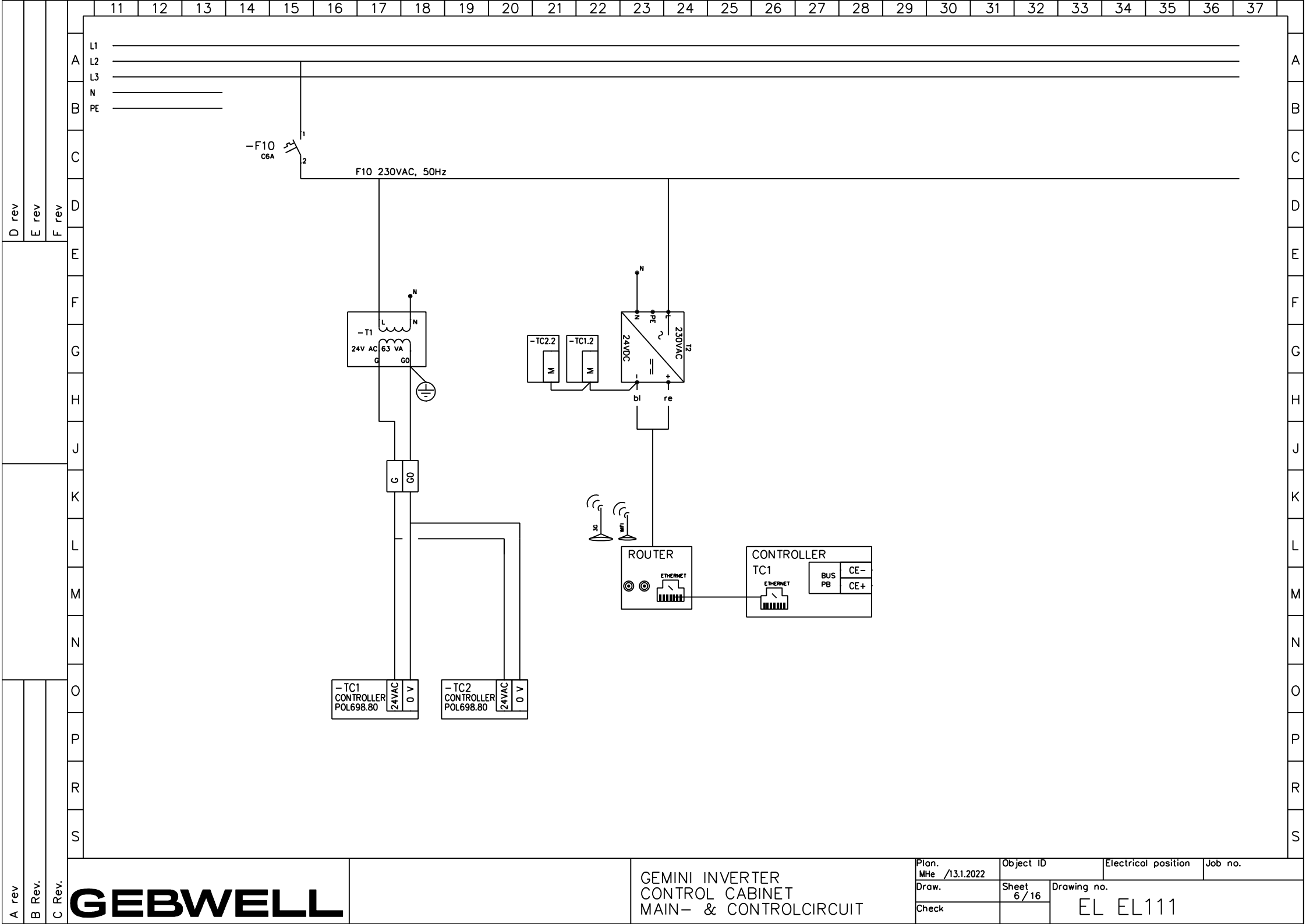


GEBWELL

GEMINI INVERTER
CONTROL CABINET
MAIN- & CONTROLCIRCUIT

Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
Draw.	Sheet 5/16	Drawing no. EL EL111	
Check			

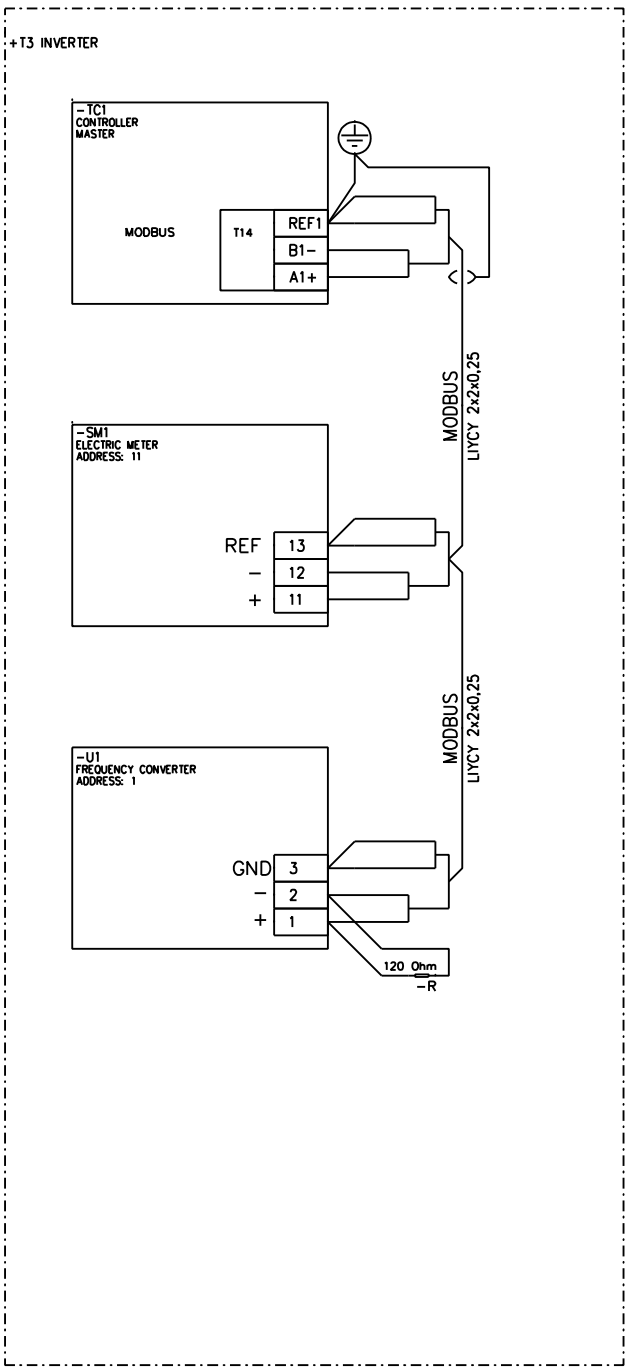
D rev
E rev
F rev
A rev
B Rev.
C Rev.



GEBWELL

GEMINI INVERTER
CONTROL CABINET
MAIN- & CONTROLCIRCUIT

Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
Draw.	Sheet 6/16	Drawing no. EL EL111	
Check			



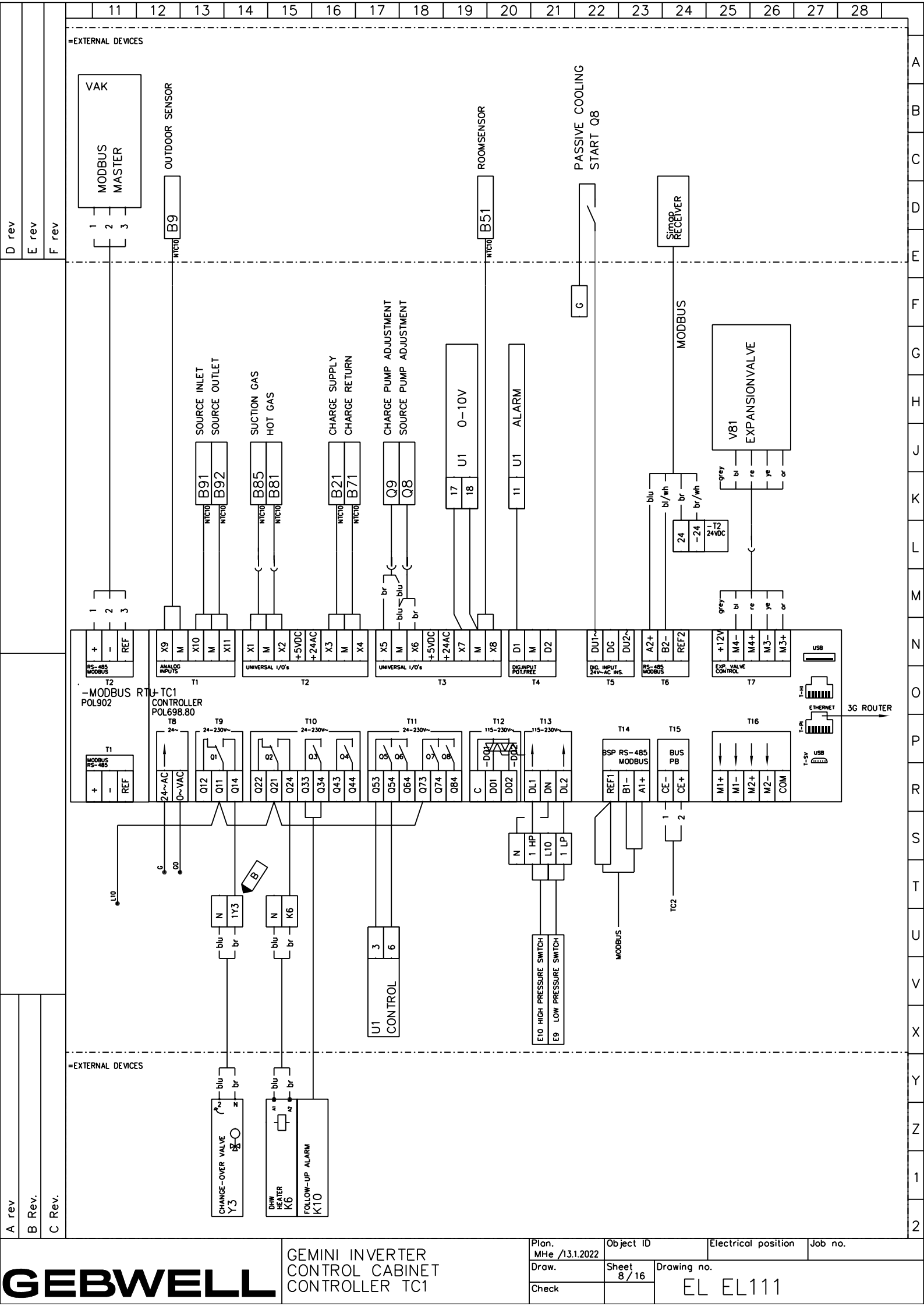
T14 INTERNAL BUS:
BAUD RATE = 19200
PARITY = EVEN
STOP BIT = 1

D rev
E rev
F rev
A rev
B Rev.
C Rev.

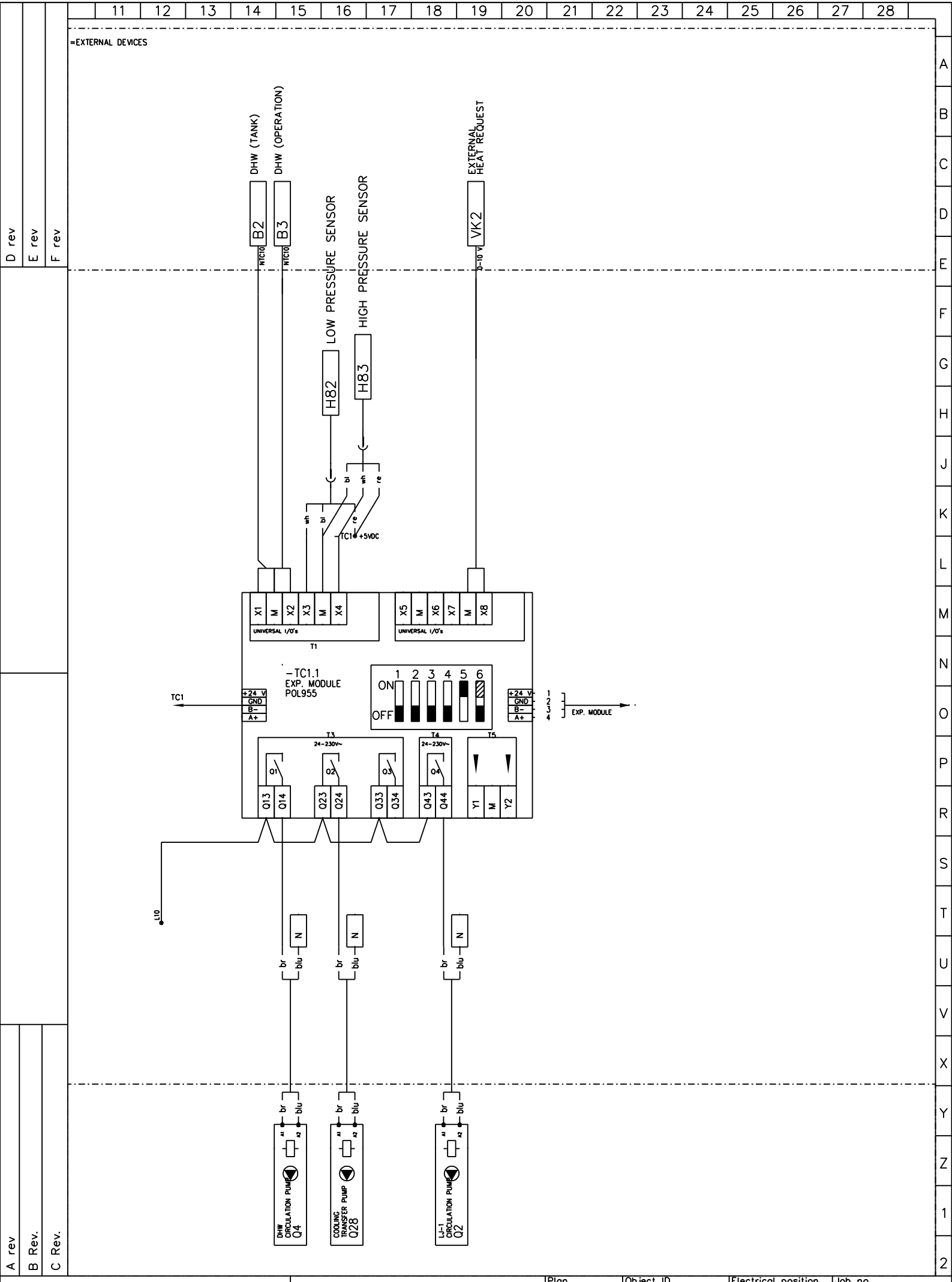
GEBWELL

GEMINI INVERTER
CONTROL CABINET
INTERNAL BUS

Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
Draw.	Sheet 7/16	Drawing no. EL EL111	
Check			



GEBWELL	GEMINI INVERTER CONTROL CABINET CONTROLLER TC1	Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 8/16	Drawing no. EL EL111	
		Check			

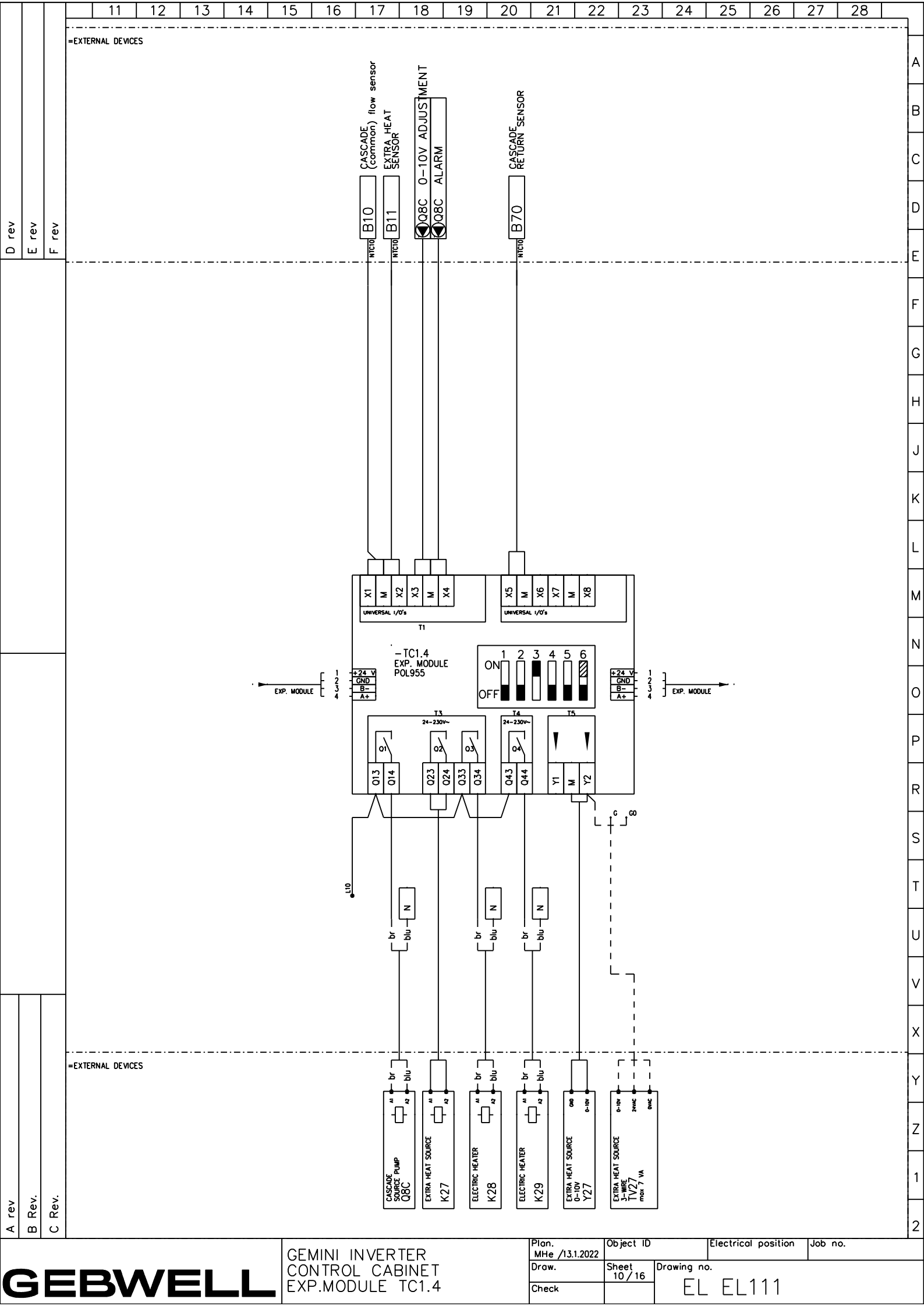


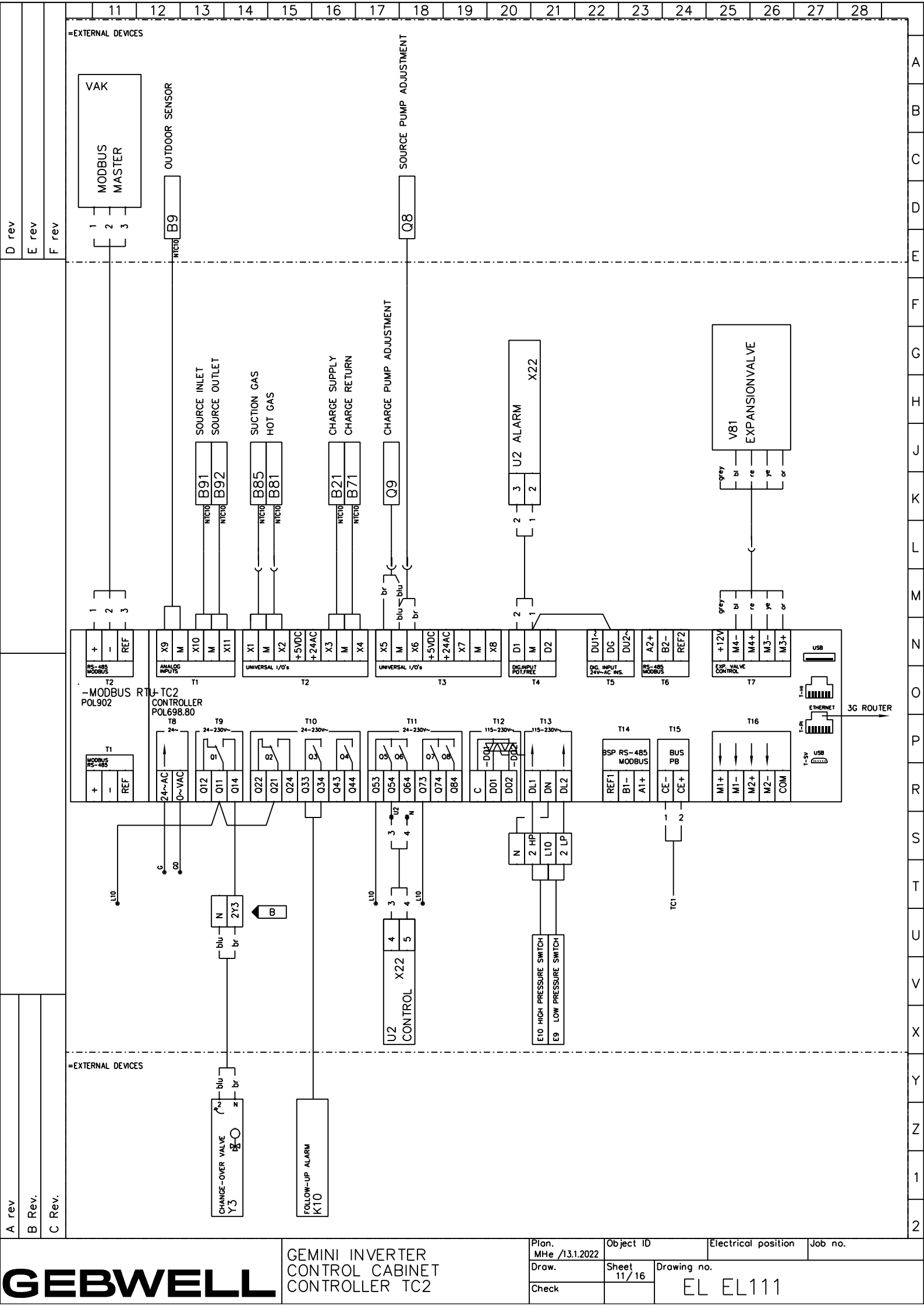
D rev
E rev
F rev
A rev
B Rev.
C Rev.

GEBWELL

GEMINI INVERTER
CONTROL CABINET
EXP. MODULE TC1.1

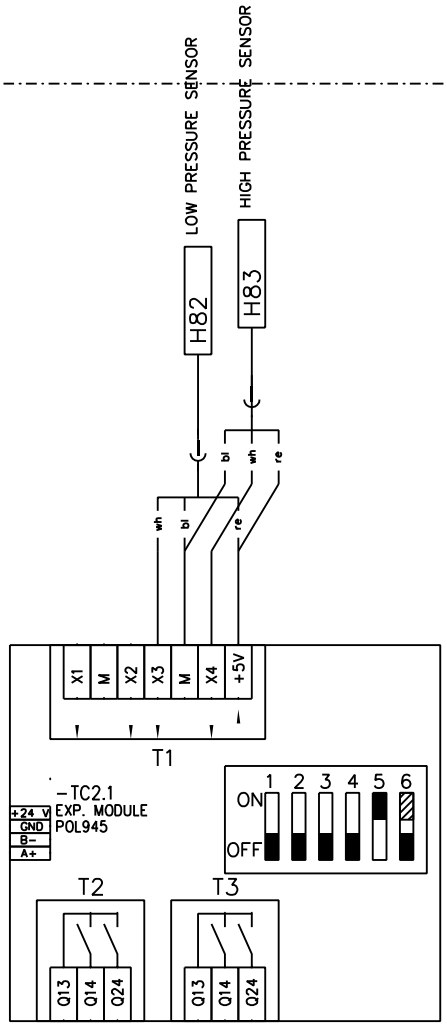
Plan.	Object ID	Electrical position	Job no.
MHe /13.1.2022			
Draw.	Sheet 9/16	Drawing no. EL EL111	
Check			


11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
A B C D E F G H J K L M N O P R S T U V X Y Z 1 2
D rev
E rev
F rev
A rev
B Rev.
C Rev.
=EXTERNAL DEVICES
CASCADE (common) flow sensor
EXTRA HEAT SENSOR
Q8C 0-10V ADJUSTMENT
Q8C ALARM
CASCADE RETURN SENSOR
B10
B11
B70
NTC10
X1 M X2 X3 M X4
X5 M X6 X7 M X8
UNIVERSAL I/O's
T1
-TC1.4
EXP. MODULE
POL955
ON
OFF
+24 V
GND
B-
A+
EXP. MODULE
T3 24-230V~
T4 24-230V~
T5
Q1 Q2 Q3 Q4
Q13 Q14 Q23 Q24 Q33 Q34 Q43 Q44
Y1 M Y2
G G0
L10
N
br
blu
=EXTERNAL DEVICES
CASCADE SOURCE PUMP Q8C
EXTRA HEAT SOURCE K27
ELECTRIC HEATER K28
ELECTRIC HEATER K29
EXTRA HEAT SOURCE 0-10V Y27
EXTRA HEAT SOURCE 3-WIRE TV27 max 7 VA
GEBWELL
GEMINI INVERTER
CONTROL CABINET
EXP.MODULE TC1.4
Plan. MHe /13.1.2022
Draw.
Check
Object ID
Sheet 10/16
Electrical position
Job no.
Drawing no.
EL EL111

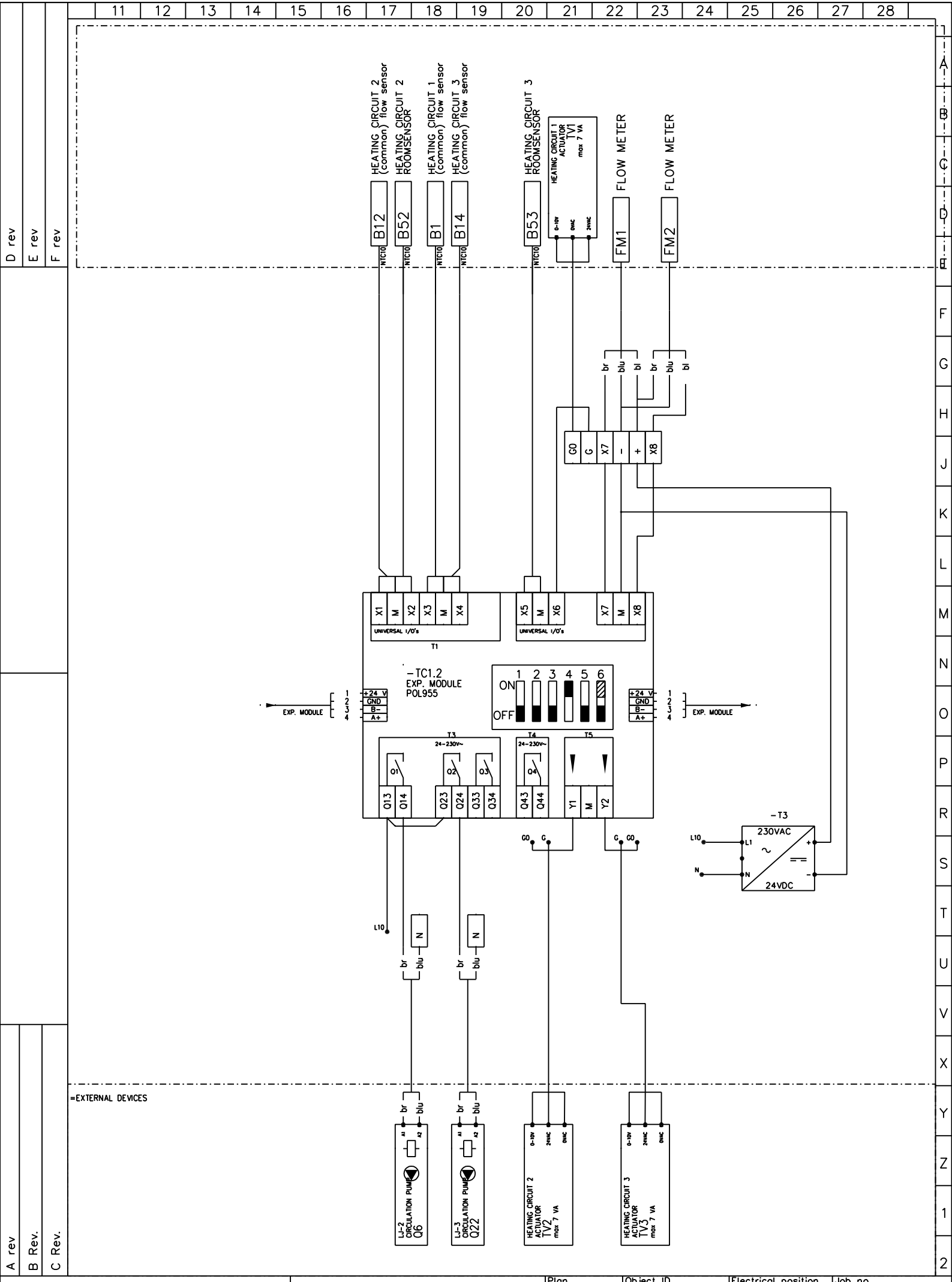


GEBWELL	GEMINI INVERTER CONTROL CABINET CONTROLLER TC2	Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 11/16	Drawing no. EL EL111	
		Check			

=EXTERNAL DEVICES



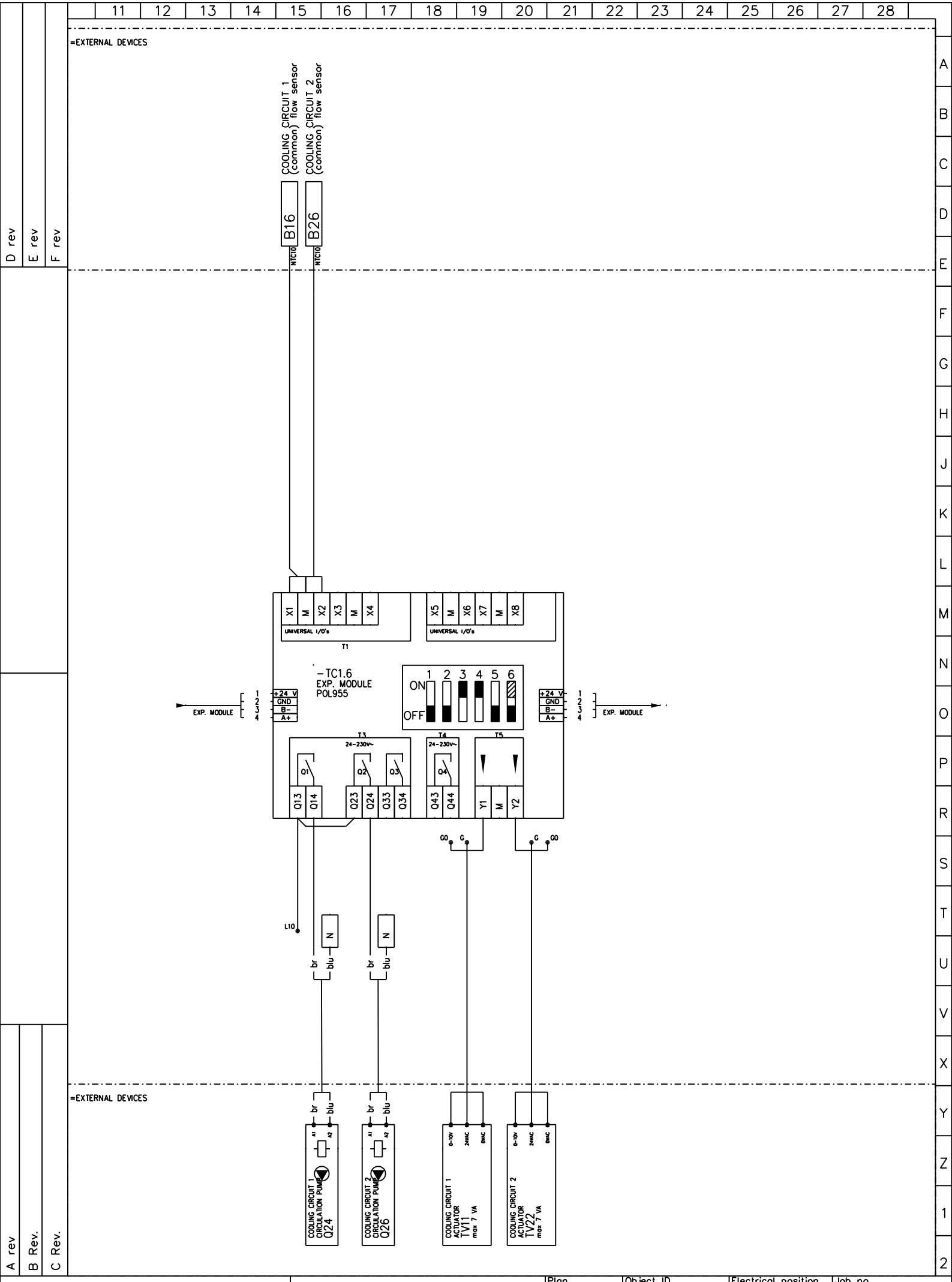
GEBWELL	GEMINI INVERTER CONTROL CABINET EXP. MODULE TC2.1	Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 12/16	Drawing no. EL EL111	
		Check			



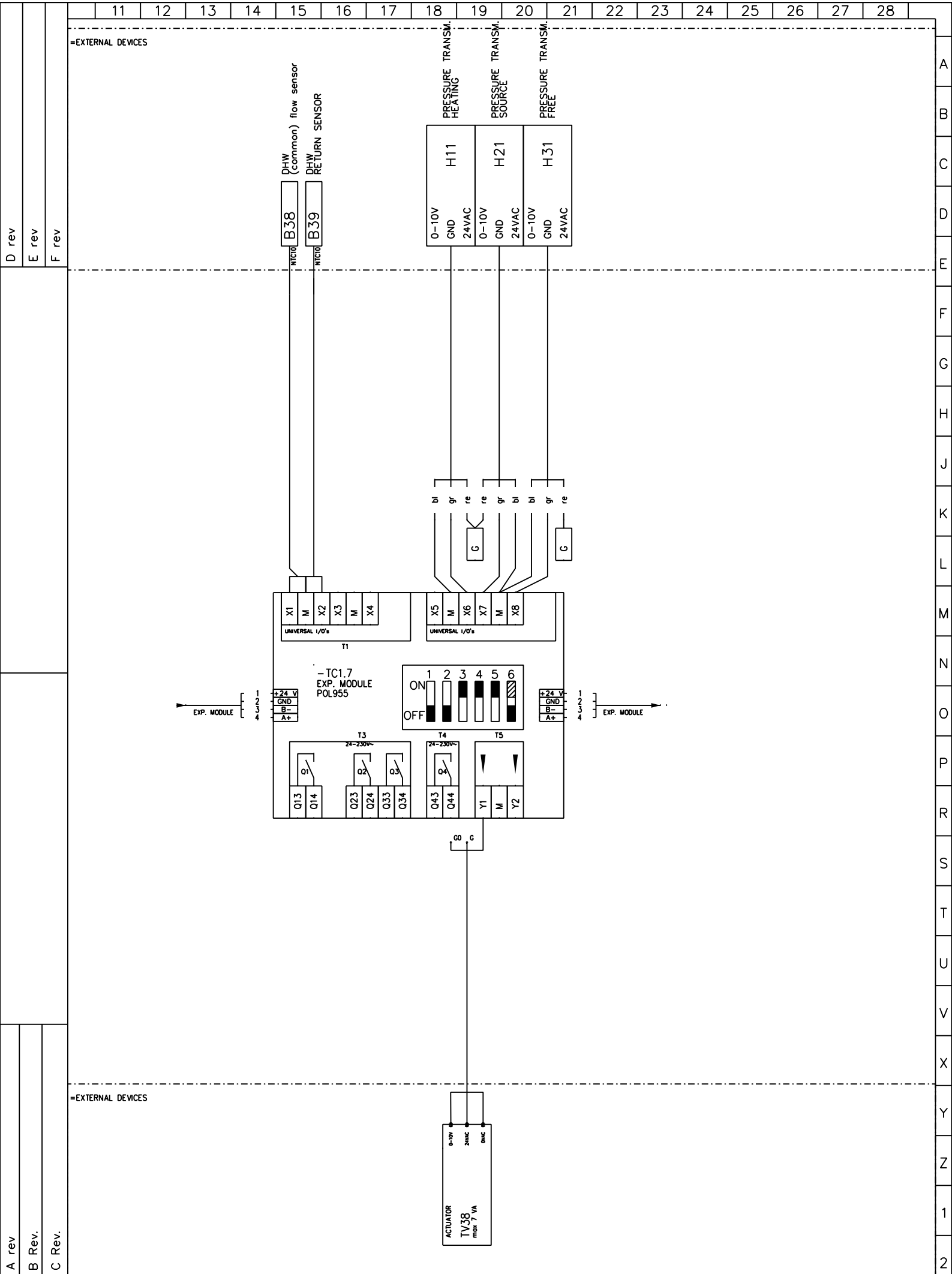
GEBWELL	GEMINI INVERTER ACCESSORY HC CONTROL	Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 13/16	Drawing no. EL EL111	
		Check			

D rev E rev F rev

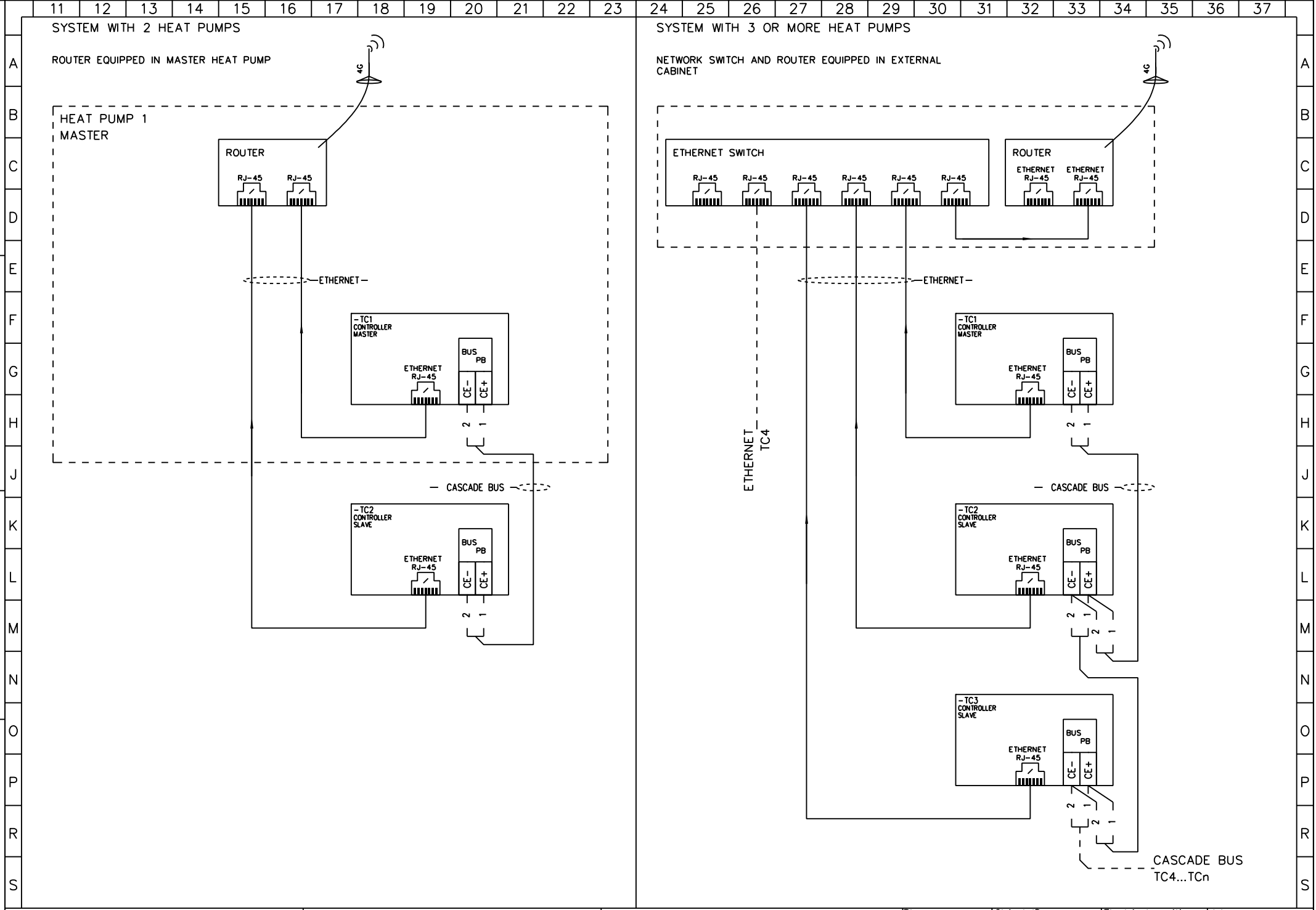
A rev B Rev. C Rev.



GEBWELL	GEMINI INVERTER ACCESSORY COOLING CONTROL	Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 14 / 16	Drawing no. EL EL111	
		Check			



GEBWELL	GEMINI INVERTER ACCESSORY DHW CONTROL	Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
		Draw.	Sheet 15/16	Drawing no. EL EL111	
		Check			



D rev
E rev
F rev
A rev
B Rev.
C Rev.

GEBWELL

GEMINI INVERTER
EXTERNAL BUS CONNECTIONS

Plan. MHe /13.1.2022	Object ID	Electrical position	Job no.
Draw.	Sheet 16/16	Drawing no. EL EL111	
Check			

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MADE IN FINLAND