

Original Operating Instructions

Open-Air Swimming Pool Heat Pump Silent 10 / 15 / 20 / 30



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Table of Contents

		Page
1	General	4
1.1	Delivery and scope of delivery	
1.2	Advice	
2	Safety	6
2.1	General safety advice	
2.2	Intended use	
2.3	Action in an emergency	
2.4	Duties of the user	
2.5	Residual hazards	
3	Technical data	10
3.1	Choice of equipment	
3.2	Open-air swimming pool heat pump	
3.3	Accessories	
3.3.1	External On/Off	
3.3.2	Remote control	
3.3.3	Pool water heat pump	
3.4	Regulation	
3.5	Hot gas defrosting	
3.6	Range of application / operating limits	
4	Transport / installation	13
4.1	Equipment transport	
4.1.1	Equipment installation	
4.2	Electrical installation	
4.2.1	Rotating field monitoring	
4.3	Water side connections	
4.3.1	Condensate discharge	
4.3.2	Pool water connection	
5	Commissioning	16
5.1	Commissioning advice	
5.2	Regulator displays	
5.3	Commissioning	
5.4	Condensate discharge test	

Table of Contents

		Page
6	Operation	18
6.1	Setting of the water temperature to be adjusted (target value)	
6.2	Changing from heating mode to cooling mode	
6.3	Changing from cooling mode to heating mode	
6.4	Standby mode	
6.5	Sensor calibration	
6.6	Hysteresis	
6.7	Error messages	
7	Maintenance	21
7.1	Advice on maintenance and care	
7.2	Complete cleaning	
7.3	Condensate discharge	
7.4	Fan	
7.5	Corrosion protection	
7.6	Refrigeration cycle	
8	Repairs	23
9	Shutdown	24
9.1	Shutdown advice	
9.2	Shutdown	
10	Disassembly/disposal	25
11	Appendices	26
	Connection diagram - water	
	Troubleshooting	
	CE declaration	
	Leak test protocol (sample)	
	Safety data sheet - refrigerant R-410A	
	Circuit diagrams 230 V 1 N	
	Circuit diagrams 400 V 3 N	

Dear Customer,

Thank you for deciding on an open-air swimming pool heat pump from SET Energietechnik Ltd.

You have purchased a powerful open-air swimming pool heat pump which has been developed according to state-of-the-art technical standards. So that the device will provide faithful service over a long period of time, we ask you to closely study the operating instructions, particularly the safety advice.

If you still have any questions about the device after reading the operating instructions, please do not hesitate to contact us:

E-mail address: info@set-energietechnik.de

If you specify your telephone number, we will call you back free of charge.

We are pleased to receive any feedback from customers and would welcome you getting in touch with us.

With kind regards,

SET Energietechnik Ltd.

Dr. Andreas Seibold

Managing Director

1. General

1.1 Delivery and scope of delivery

Please check your SET open-air swimming pool heat pump for transport damage immediately upon receipt! Report any cases of damage to the carrier immediately upon delivery and indicate this on the dispatch document.

If, after unpacking the device, you should discover any transport damage, please contact your seller or specialist dealer immediately.

Each shipment is accompanied by a delivery note, from which you can see the scope of the shipment. Please check the completeness of the shipment and report any shortages immediately to your seller or specialist dealer.

1.2 Advice

These operating instructions should help the user to operate the open-air swimming pool heat pump properly.

Please read them carefully before using for the first time, so that perfect functioning of this device can be guaranteed.

Special advice on potential hazards is highlighted in grey.

2. Safety

2.1 General safety advice

Caution:

Read the instructions carefully before using for the first time. Failures to observe the safety advice and instructions could result in electrical shock, fire and/or serious injury. Keep all safety advice and instructions for future reference.

Repairs should only be undertaken by an authorised specialist company. The following safety advice is designed to ensure trouble-free operation and a long service life for your open-air swimming pool heat pump.

Assembly, electrical installation, initial operation, repair and maintenance of SET outdoor swimming pool heat pumps may only be carried out by qualified or trained personnel who have been instructed about the tasks entrusted to them and about the potential dangers of improper conduct. The following rules, regulations and standards must be observed:

Accident prevention regulations

- “General regulations (VBG 1)”
- “Dealing with refrigeration plants (VBG 20)”
- “Dealing with pressure vessels (VBG 17)”
- “Electrical systems and equipment (VBG 4)”
- “Load lifting equipment in hoisting operation (VBG 9a)”

DIN/VDE standards/regulations

- DIN/VDE 0100: Regulation for the erection of power installations with rated voltages of up to 1000V
- DIN/VDE 0105: Regulations for the operation of power installations

In the connection diagrams, no protective measures are specified. These must be provided in addition for the assembly of the plant, or when connecting the devices according to VDE 0100 and the provisions of the relevant energy supply companies.

Please note that the operating voltage is 230V or 400V at 50Hz. The control voltage is max. 24V.

Before starting any maintenance or repair work on open-air swimming pool heat pumps, the power supply must be switched off and secured against being switched on again. Danger of death from electric shock!

Before opening the control cabinet and/or the device, the power supply must be switched off and secured against being switched on again! Danger of death from electric shock!

The fan parts must not be opened or operated during operation. You must wait for the run-down time of the fans of up to 2 minutes.

Within the warranty period, repairs to open-air swimming pool heat pumps must only be undertaken by SET Energietechnik or their representatives.

2. Safety

2.2 Intended use

SET open-air swimming pool heat pumps are designed and constructed for the heating and/or cooling of private and public swimming pools. They are to be used exclusively for this purpose. Unauthorised conversions and modifications to the device must not be undertaken for safety reasons. This would lead to the warranty becoming void and to the termination of conformity.

Important: The operating and installation conditions specified in these operating instructions must be adhered to.

No foreign parts may be used on the device, as compliance with the required safety and operability may not be guaranteed.

The user must adhere to the specified operating parameters of these instructions. The open-air swimming pool heat pump may only be used as stipulated. Any further use beyond this is not regarded as the intended use. The user/operator, and not the manufacturer, shall be liable for any resulting damage or injury.

2.3 Action in an emergency

No safety equipment may be dismantled or taken out of operation. In order to avoid damage, the open-air swimming pool heat pump must always be operated in perfect technical condition.

Repair and maintenance work must only be carried out with the power supply switched off and only by qualified personnel.

2.4 Duties of the user

In accordance with the provisions of Regulation (EU) No. 517/2014 of the European Parliament and of the Council of 16th April 2014 on fluorinated greenhouse gases, repealing Regulation (EC) No. 842/2006, and fully in force since 4th January 2015, refrigeration plants must be checked on a regular basis by authorised specialist companies, and an operations manual (air conditioning and heat pumps) must be kept, with a 5-year retention requirement. The requirements are dependent on the CO₂ equivalent of the filling capacity of each refrigeration plant:

5 to 50t of CO₂ equivalent: annual check (every 24 months with leakage monitoring);
50 to 500t of CO₂ equivalent: biannual inspection (annually with leakage monitoring);
over 500t of CO₂ equivalent: quarterly inspection (biannually with leakage monitoring).

The refrigerant capacity of the device can be found on the rating plate of the device. 5t of CO₂ equivalent correspond to a refrigerant capacity of 2.8kg (R 407C) or 2.4kg (R410A).

The operator is responsible for complying with this requirement!

2. Safety

2.5 Residual hazards

SET open-air swimming pool heat pumps are state-of-the-art and are safe to operate given correct connection and operation.

Residual hazards can result from the devices if they are not used or operated properly. Residual hazards are referred to in this user manual.

If you have any queries, our hotline is available by calling +49 (0)7150 9454-0, Mondays to Fridays from 8:00 to 12:00 a.m. and from 1:00 to 5:00 p.m. (CET). Outside these times, please leave a voicemail message, and we will call back as soon as possible.

3. Technical data

3.1 Choice of equipment

Choosing the right open-air swimming pool heat pump depends on the required heat pump performance. This is dependent on the pool type and size. A pool with an overflow gutter has a larger water surface and thus may have higher losses than a pool with a skimmer. The greatest loss factor with an open-air swimming pool is the evaporation losses. These losses increase dramatically in the case of an unprotected water surface. A constant light breeze over the water surface guarantees significant evaporation losses, and thus also heat losses. A further loss factor is convection losses, i.e. the heat transfer to air and ground. These two types of losses represent in total approx. 75% of the heat losses from an open-air swimming pool. Insulation of the pool in the ground and the use of a cover reduce these losses significantly. Heating an open-air swimming pool without a cover involves approximately 3-fold higher investment and operating costs.

The “Silent” open-air swimming pool heat pumps have hot gas defrosting, which even ensures continuous operation in the range below +8°C.

3.2 Open-air swimming pool heat pump

The SET open-air swimming pool heat pump is a device for outdoor installation. A canopy or an enclosure is, in principle, not necessary. The installation of the heat pump should be carried out on a level and firm base. The clearance from buildings, walls or partitions should be at least 1 m on the air outlet side. On the air intake side, we recommend a clearance of at least 0.5m to such obstacles.

In heating mode, the heat pump blows out cold air on the fan, and hot air in cooling mode. This area is not suitable for planting of any kind.

3.3 Accessories

Below, we have given an overview of the accessories available for the devices. For the features of your device, please refer to the delivery note.

3.3.1 External On/Off







The heat pump can also be switched on or off externally. This requires the use of a potential-free switch to contact X1 3/4, connected in series. If this switch is open, the regulator is off and the heat pump will not work. If this switch is closed, the regulator is switched on. After a short time (about 1 minute) the fan and the compressor will then switch on.

3. Technical data

3.3.2 Remote control

The optional remote control is designed for both surface- and flush-mounted installation. The connection to the open-air swimming pool heat pump is via a two-wire bus line with a maximum cross-section of 0.75mm².



	M Enter function menu. Also contains the real-time parameters.
	SET Display or change the target value. During programming, confirm a default or display next parameter.
	AUF Arrow button Selection of the display in the top display: Water inlet/outlet temperature or ambient temperature. During the programming phase, increase values or display next parameter.
	AB Arrow button Selection of the display: Outside air or defrost temperature. During the programming phase, decrease values or display next parameter.
	Press and hold for 5 seconds to start the chiller or heat pump operation.
	Press and hold for 5 seconds to start the heat pump operation or chiller.

3.3.3 Pool water pump

A pool water pump can be connected to terminals X1 1, N and PE on the terminal strip. Please note the maximum switching capacity of 5 A.

3.4 Regulation

In the event of a deviation in the water temperature from the set target value, the fan and the compressor will switch on. When the target value is reached, the heat pump will switch off. All the necessary sensors and the low-water cut-off system are already built into the device.

3. Technical data

3.5 Hot gas defrosting

If the heat pump is operated at outside temperatures below 8°C, the evaporator will rime by the air cooling to below freezing point. The rime on the evaporator increases and hinders the air flow. As a result, efficiency would be reduced permanently.

To eliminate icing, hot gas is injected into the evaporator for a short period of time. This heats the evaporator on the surface, and the ice melts. The air can flow through the evaporator again without major hindrance. In order to shorten the defrosting process, the fan will then switch off. The hot gas defrosting is controlled by temperature and time and will, if required, be carried out at intervals of 35 minutes.

The settings of the defrosting control can only be changed after consultation with SET.

3.6 Range of application / operating limits

The use of a Silent open-air swimming pool heat pump is limited to outside temperatures in the range between approx. -8°C and +35°C. When operating a heat pump with hot gas defrosting below the frost line, it must be ensured that water is prevented with certainty from freezing in the pipeline system.

Frost damage is excluded from any warranty.

Operation outside these limits can lead to malfunctions, and the device will not reach its performance data. Please observe these operating limits. We would be happy to advise you about any special equipment which may be required.

The corrosion protection of the built-in device components is guaranteed if the chemical threshold values of the pool water are not exceeded, in accordance with DIN 19643 "Treatment of swimming and bathing pool water".

This only applies to fresh water with a salinity of max. 0.8%. In the event of higher salinity, special corrosion protection is required.

4. Transport / installation

4.1 Equipment transport

Please use only suitable aids for transport. Please observe health and safety regulations and use your own personal protective equipment (gloves, safety shoes etc.)

- Only use loading equipment with sufficient load capacity;
- Do not use damaged loading equipment;
- Do not lay loading equipment on joints or sharp edges;
- Use lifting trucks or cranes with sufficient load capacity;
- Do not lift the load over persons;
- For maintenance and repair work, use scaffolding or lifting platforms instead of ladders.

4.1.1 Equipment installation

The SET open-air swimming pool heat pump is a device for outdoor installation. A canopy or an enclosure is, in principle, not necessary. The installation of the heat pump should be carried out on a level and firm base. The clearance from buildings, walls or partitions should be at least 1m on the air outlet side. On the air intake side, we recommend a clearance of at least 0.5m to such obstacles.

In heating mode water comes out of the condensate pan of the heat pump. With the enclosed hose connection, the water can be drained to seepage.

In heating mode, the heat pump blows out cold air on the fan, and hot air in cooling mode. This area is not suitable for planting of any kind.

Important: If the recommended clearances are not adhered to, worse efficiency of the device is to be expected.

4.2 Electrical installation

For the connection values, please refer to the technical data or the type plate. Connection, laying and protective measures of the on-site electrical installation must be implemented in accordance with VDE regulation 0100. Please also observe the technical connection conditions of the network operator of the local power networks. On the installation side, an all-pole mains separator must be included with a contact opening width of at least 3mm per pole (FI circuit breaker type B and back-up fuse (C) provided by the customer!) The device is wired ready for connection. Regulation takes place with a protective low voltage of 12V.

Important: Damage caused by incorrect or improper installation is not covered by warranty.

4. Transport / installation

4.2.1 Rotating field monitoring

The heat pumps with three-phase connection (AC 400 V 3 N) are equipped with a phase sequence relay for protection against incorrect electrical connection. In the event of an incorrect rotating field, the relay blocks the power supply to the heat pump. The incorrect rotating field is indicated by the relay. After the replacement of the phase sequence, the heat pump will work again.

A CM-PFE phase sequence relay by the manufacturer ABB is used.

The correct rotation field is indicated with a yellow LED to the left of the letters “ABB”. In the case of incorrect phase sequence, this LED is off and the compressor will not start.



4. Transport / installation

4.3 Water side connections

4.3.1 Condensate discharge

The drainage outlet for the condensate is approximately in the middle of the base pan of the heat pump. For the defined draining of the condensate, the enclosed condensate hose is pushed into the rubber seal in the base pan.

4.3.2 Pool water connection

The connection should be made in accordance with the enclosed pipe system diagram (Appendix). If necessary, additional air vents should be provided. In any case, as shown in the pipe system diagram, provision should be made for drainage so that, after the end of the bathing season, the system can be drained on the water side to prevent frost damage.

Directly in front of and behind the heat pump, shut-off devices must be provided. It is important to ensure that the cross-section of the pipes is also matched to the length of the pipe. The required minimum amount of water (see table), the pressure drop in the device, as well as in the pipe system, must be taken into account. We recommend plastic pipes from NW 50 to NW 80, depending on the amount of water, length of the pipe and device type.

SET heat pumps should be connected with at least NW 50 (d63).

The following table shows a recommendation and does not replace any necessary calculation of the nominal pipe sizes.

Device	Amount of water (m ³ /h)	Temperature difference between water inlet and outlet max. (K)	QF	Pipe outside diameter (d)
Silent 10, Silent 15	6 - 12	2.0	50	63
Silent 20, Silent 30	10 - 24	2.0	60	75

5. Commissioning

5.1 Commissioning advice

In order to ensure trouble-free functioning from the beginning, please observe the following advice. For queries and assistance, we would be pleased to help; just call us on +49 (0)7150 9454-0.

Correct and complete commissioning and adjustment of the fully installed heat pump is a prerequisite for trouble-free operation. It includes the function test of all regulating and monitoring circuits, the setting of operating parameters, the creation of a commissioning protocol and a briefing of the operator.

An important prerequisite for a successful commissioning is a completed swimming pool. All supply lines are installed and connected, regulating devices, sensors etc. are installed and connected, and the swimming pool is filled with water.

For the briefing on the operation of the system, the operator must be present.

Before commissioning, the following requirements should therefore also be met:

- electrical cables are laid and connected,
- the water side connection is completed and vented,
- the swimming pool is filled with water.

5.2 Regulator displays

The regulator display is divided into 3 zones. In the top right-hand corner, the water inlet temperature is displayed in red as an actual value. In normal operation, the water outlet temperature is displayed underneath in yellow as an actual value. In the event of a fault, an error code is displayed here in conjunction with an icon on the left-hand side.

Icons in the green box on the left indicate the operating mode: a sun for heating mode, a snowflake for the cooling mode, a snowflake with drops for the defrosting mode.



The operation of the compressor is indicated by a green compressor icon with the number 1, the active switching of the filter pump by the green pump icon and the operation of the axial fan by the green fan icon.

In the event of a fault, the alarm message lights up in the form of a red triangle. The yellow icons LP or HP then indicate a low pressure or high pressure fault.

5. Commissioning

5.3 Commissioning (initial and re-commissioning)

The commissioning or re-commissioning of the operational system is carried out as follows:

The gate valves on the device are fully opened, and the pipe system is completely vented. The heat pump is switched on via the main switch. The regulator on the fan side of the heat pump starts up and, after a self-test, displays the current water inlet and water outlet temperature.

In the event of very cold water and low outside temperatures, the amount of water must, under certain circumstances, be slightly reduced by the outlet valve. With the compressor running, the uninsulated copper wire on the compressor should be at a temperature of about 60°C.

When operating a heat pump with hot gas defrosting below the frost line, it must be ensured that water is prevented with certainty from freezing.

Frost damage is excluded from any warranty.



5.4 Condensate discharge test

If installed outdoors, the condensate can drain away freely. If installed in the plant room, a drainage hose with a removable connection must be provided which is fed into the wastewater system. The function of the condensate discharge should be checked using a watering can filled with water.

6. Operation

6.1 Setting of the water temperature to be adjusted (target value)


The regulator is either in heating mode - green sun icon displayed - or in cooling mode - green snowflake icon displayed.


For the display and adjustment of the water temperature as a target value, the SET button should be pressed for 3 seconds. The programmed target value flashes and can be adjusted if required by using the arrow keys  or . By pressing the SET button again, the changed value is stored. The regulator then switches back to the basic function.

During the target value adjustment, the yellow indicator panel displays “SetH” if in heating mode and “SetC” if in cooling mode.


The maximum temperature in heating mode is 35°C; the minimum temperature in cooling mode is 9°C.


6.2 Changing from heating mode to cooling mode

In heating mode, a green sun is displayed on the regulator. By pressing the button  for 5 seconds, the heating mode is stopped and the green sun icon goes out.

The heat pump can now be switched off and then on again via the main switch. As soon as the self-test of the regulator has been completed, press the button  for 5 seconds to start the cooling mode; the green snowflake icon appears.



6.3 Changing from cooling mode to heating mode

In cooling mode, a green snowflake is displayed on the regulator. By pressing the button  for 5 seconds, the cooling mode is stopped and the green snowflake icon goes out.

The heat pump can now be switched off and then on again via the main switch. As soon as the self-test of the regulator has been completed, press the button  for 5 seconds to start the heating mode; the green sun icon appears.

6.4 Standby mode

To adjust certain parameters, the standby mode is activated. This is indicated in the display in the top right-hand corner by the red lettering “Stby”. The heat pump does not work in this mode!

By pressing the button  for 5 seconds, the regulator goes into stand-by mode and the red lettering “Stby” lights up in the top right-hand corner of the regulator. By pressing the button  for 5 seconds again, the regulator goes into operating mode, the lettering “Stby” disappears and the heat pump is ready for operation.

6. Operation

6.5 Sensor calibration

The temperature sensors integrated into the heat pump are factory calibrated by comparison with reference temperature measuring points. Therefore, no sensor calibration need be carried out.

6.6 Hysteresis

The hysteresis is the difference between the actual value of the water outlet temperature and set target value. It thereby indicates the control band of the heat pump. A hysteresis of +/- 1K is factory set.

The hysteresis is always +/- 1K.

6. Operation

6.7 Error messages

The error messages of the regulator are shown below. Possible causes are assigned to the error messages. Other causes are listed in the Appendix (troubleshooting table).



Operating status: Error: "High pressure"
Icons: "**Warning triangle**", "**HP**" and "**A01**"
Water deficiency, air deficiency



Operating status: Error: "Low pressure"
Icons "**Warning triangle**", "**LP**" and "**A02**"
Cold water, dirty evaporator, refrigerant deficiency



Operating status: Error: "Motor protection switch" (MS)
Icons: "**Warning triangle**" and "**A09**" (only 400V)
Missing phase, check MS setting



Operating status: Error: "Sensor break Pb1"
Icons: "**Warning triangle**" and "**P1**"
Check pool water input temperature sensor



Operating status: Error: "Sensor break Pb2"
Icons: "**Warning triangle**" and "**P2**"
Check pool water output temperature sensor



Operating status: Error: "Sensor break Pb3"
Icons: "**Warning triangle**" and "**P3**"
Check evaporator temperature sensor



Operating status: Error: "Flow monitor"
Icons: "**Compressor**", "**Fan**" and "**Filter pump**"
on, but compressor and fan are still off;
Solution: Eliminate water deficiency, heat pump will start again after 30 seconds via time switching relay.

7. Maintenance

7.1 Advice on maintenance and care

An open-air swimming pool heat pump is an electrical device which requires maintenance. Professional maintenance and care is a prerequisite for trouble-free operation and a long service life of the device. Maintenance should be carried out at regular intervals (at least once a year) and documented.

For documentation, use the data collection sheet and maintenance log. If both are missing from these maintenance instructions, please request the logs by telephoning us on +49 (0)7150 9454-0.

In the event of a warranty claim, the complete commissioning and maintenance logs must be produced.

The following safety advice is designed to ensure trouble-free operation and a long service life for your heat pump.

Work on the refrigerant circuit must only be carried out by a specialist.

Within the warranty period, repairs to the heat pump must only be undertaken by SET Energietechnik Ltd. or their representatives.

Work on electrical equipment may only be carried out by an authorised specialist.

Before starting any maintenance or repair work on the heat pump, the power supply must be switched off and secured against being switched on again. Danger of death from electric shock!

Before opening the control cabinet and/or the device, the power supply must be switched off and secured against being switched on again! Danger of death from electric shock!

The fan parts must not be opened or operated during operation. The run-down time of the fans of up to 2 minutes must be waited for.

To clean the device, no cleaning agents containing solvents may be used. To clean the plastic parts, the use of a neutral household cleaner is recommended.

The heat exchangers in the heat pump are cleaned with special cleaners (coil cleaners, such as Saf-N-Kleen). Please observe the instructions for use of the cleaner.

7. Maintenance

Professional maintenance and care are a prerequisite for trouble-free operation and a long service life for the device. They should therefore be carried out at regular intervals (once a year) and include at least the following work.

7.2 Complete cleaning

A complete cleaning of the entire device, which should also include the fan impeller, evaporator, defrost water pan and condensate discharge.

7.3 Condensate discharge

The condensate discharge must be cleaned of residues on a regular basis.

Depending on requirements, we recommend a ¼ - ½-annual flushing of the condensate discharge, e.g. by filling the condensate pan with a watering can. This also prevents the accumulation of particles in the subsequent pipes. If the pan then empties quickly, this is an indication that the pipe is free.

7.4 Fan

The bearing of the fan shaft has been equipped with permanent lubrication. The fan impeller and, if necessary, the air diffuser plate should be cleaned of adhesions.

7.5 Corrosion protection

If necessary, the inside of the heat pump should be treated with a corrosion protection spray. Damage to painted surfaces should be repaired during maintenance.

7.6 Refrigeration cycle

The adjustment of the refrigeration cycle is carried out in the factory. For maintenance and any repairs which must only be carried out by authorised professionals, the following reference values apply for determining the correct filling capacity:

- Supercooling (before injection) approx. 2 - 3 K condensation 38-40°C
- Superheating (after evaporator) approx. 7-10 K evaporation 7-10°C

(controlled by manometer and thermometer)

Caution: The rubber feet on the bottom of the compressor must be checked during each maintenance and changed if necessary.

8. Repair

General advice

Repairs should only be undertaken by an authorised specialist company. The following advice is designed to ensure trouble-free operation and a long service life for your heat pump.

Repair and maintenance of a SET heat pump should only be carried out by qualified or trained personnel who have been instructed about the tasks entrusted to them and about the potential dangers of improper conduct.

In the connection diagrams, no protective measures are specified. These must be provided in addition for the assembly of the plant, or when connecting the devices according to VDE 0100 and the provisions of the relevant energy supply companies.

35mA type B residual current circuit breakers and type C back-up fuses should be used.

Please note that the operating voltage is 230V or 400V at 50Hz. The control voltage is max. 24V.

Before starting any maintenance or repair work on the heat pump, the power supply must be switched off. Danger of death from electric shock!

Before opening the control cabinet and/or the device, the power supply must be switched off! Danger of death from electric shock!

The fans must not be opened or operated during operation.

Within the warranty period, repairs to the heat pump must only be undertaken by SET Energietechnik Ltd. or their representatives.

Unauthorised conversions and modifications to the device must not be undertaken for safety reasons. This would lead to the warranty becoming void and to the termination of conformity.

No foreign parts may be used on the device, as compliance with the required safety and operability may not be guaranteed. The user/operator, and not the manufacturer, shall be liable for any resulting damage or injuries.

9. Shutdown

9.1 Shutdown advice

If the device should be taken out of service for an extended period of time, the system must be disconnected from the mains at the customer's main switch or via the appropriate fuses.

If there is a danger of frost, water-bearing parts must be emptied or safeguarded against freezing.

9.2 Shutdown

When shutting down, the system is switched off at the main switch and the water side connection fittings on the Titan heat exchanger are opened. The heat exchanger is emptied on the water side, then the caps of the screw fittings are loosely tightened.

Now the system can be disconnected from the network via the fuse.

Before a longer shutdown, we recommend that maintenance is carried out, during which the system must be thoroughly cleaned and the corrosion protection renewed.

If necessary, water-carrying parts of the system must be safeguarded against freezing or drained.

Frost damage is excluded from any warranty.

10. Disassembly/disposal

General advice

Disassembly and electrical installation of SET heat pumps may only be carried out by qualified or trained personnel who have been instructed about the tasks entrusted to them and about the potential dangers of improper conduct.

Please arrange for safe and environmentally friendly disposal of operational and auxiliary materials. The disposal of the refrigerant and the oil filling of the cooling circuit must be undertaken by a refrigeration specialist.

If the removed device is delivered to our plant in DE-71282 Hemmingen, Germany, we shall dispose of it professionally for you. Please contact us to discuss this.

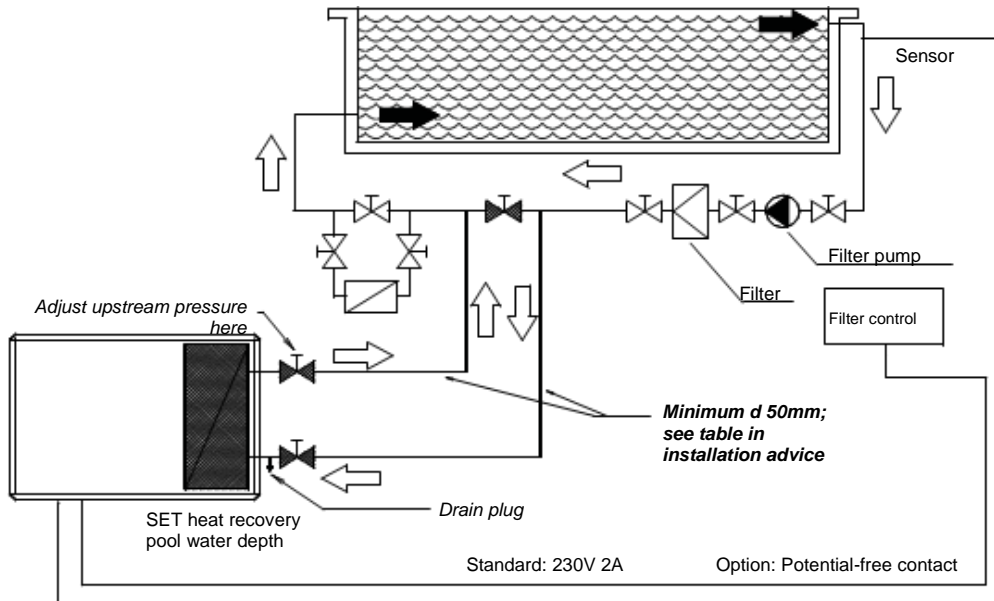
If you have any queries, our hotline is available by calling +49 (0)7150 94 54 10, Mondays to Fridays from 8:00 to 12:00 a.m. and from 1:00 to 5:00 p.m. (CET). Outside these times, please leave a voicemail message, and we will call back as soon as possible.

11. Appendix

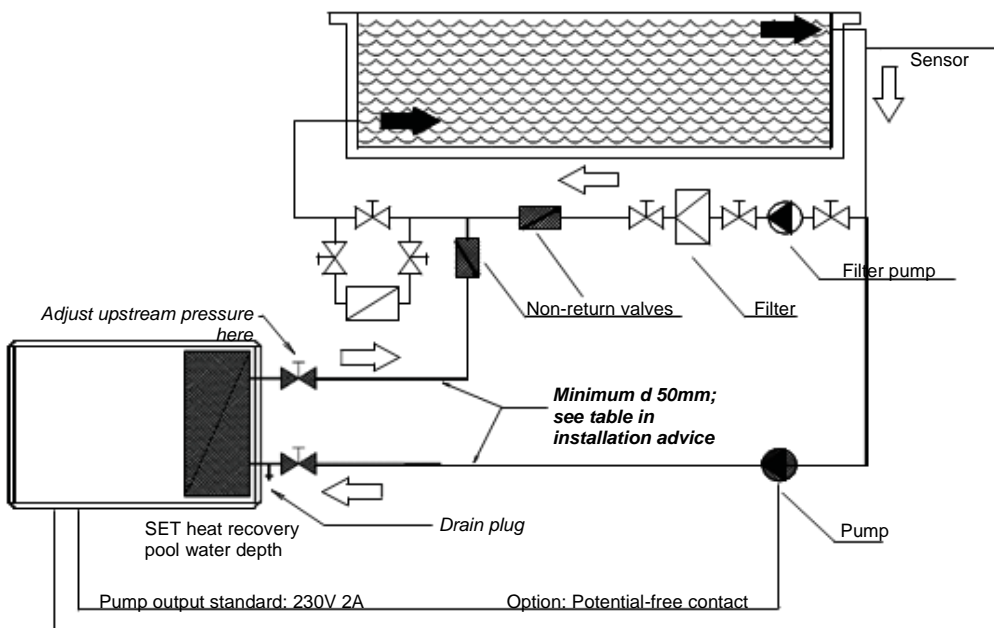
TITAN installation advice

for the hydraulic integration of the TITAN heat pump and accessories

Connection diagram heat recovery to pool water with filter pump



Connection diagram heat recovery to pool water with separate pump



Heat pump troubleshooting table

It is <u>essential</u> to disconnect the device from the mains before undertaking electrical work! Work on the refrigeration part may only be carried out by experts.		
Complaint	Possible fault	Possible cause and solution
<i>As a general rule in the event of faults:</i>	Check <u>all</u> cable contacts to the regulator and on the protection plate for tightness and possible arcing spots. Error codes in the regulator indicate the cause of the fault	
Device is not working	Infeed interrupted	Check back-up fuse, FI circuit-breaker and motor protection switch
	No requirement	Increase pool water temperature target value
	Flow monitor has tripped	Increase the amount of water, increase heat pump upstream pressure
	FI switch switches off	Check FI switch (type B), check and, if necessary, replace crankcase heater, short-circuit, check external consumers
Fan and compressor at standstill	Motor protection switch has tripped (error code A09)	Fault in the power supply (phase L1-L2-L3 failed), measure power consumption of compressor and adjust motor protection switch
	Time delay in progress (LED lit in the upper left-hand corner of the regulator)	Wait for time delay (6min.)
Fan and compressor “pulsing” (starting up briefly) or switching off prematurely	Fault in the refrigeration circuit	Device dirty, air openings dirty
	Low pressure fault (error code A02)	Evaporator dirty, faulty fan, lack of refrigerant. Very cold water and low outside temperature, throttle water quantity at the output valve
	High pressure fault (error code A01)	Check water deficiency and circulation pump, increase water quantity
	Motor protection switch works automatically	Check motor protection switch setting

Heat pump troubleshooting table

It is <u>essential</u> to disconnect the device from the mains before undertaking electrical work! Work on the refrigeration part may only be carried out by experts.		
Complaint	Possible fault	Possible cause and solution
<i>As a general rule in the event of faults:</i>	Check <u>all</u> cable contacts to the regulator and on the protection plate for tightness and possible arcing spots. Error codes in the regulator indicate the cause of the fault	
Rattling, humming or clanking	Rattling	“Fluttering” contactor
	Rattling or humming	Crankcase heating has become loose and must be reattached, compressor mounting replaced, compressor vibration damper replaced
	Rattling or humming or clanking	Device is not horizontal, cables or pipeline touching each other or the device housing
Compressor in heat pump does not switch on, or only briefly	Lack of water	Check filter pump; check ball valve position on the water pipework; there may be too little upstream pressure in the pump
	Low pressure fault (error code A02)	Lack of refrigerant/evaporator dirty, starting capacitor defective; faulty fan, very cold water
Fan in heat pump does not switch on	High pressure fault (error code A01)	Lack of water Faulty fan, starting capacitor is faulty
Condensate pan overflowing		Heavy contamination of the condensate pan, drainage blocked, faulty installation of the condensate line (slope, more than one siphon etc.)
Motor protection error message in 400V system	Overcurrent trip is set incorrectly, defective compressor, e.g. interwinding fault, contactor coil or RC element is defective, 1 or 2 phases are missing	Set overcurrent trip to nominal current, press unlock button on the overcurrent trip, replace parts, check power supply, the overcurrent trip should be set to “H”

Heat pump troubleshooting table

<p>It is essential to disconnect the device from the mains before undertaking electrical work! Work on the refrigeration part may only be carried out by experts.</p>		
Complaint	Possible fault	Possible cause and solution
<p><i>As a general rule in the event of faults:</i></p>	<p>Check all cable contacts to the regulator and on the protection plate for tightness and possible arcing spots. Error codes in the regulator indicate the cause of the fault</p>	
<p>Error message A 08 Flow monitor compressor not running, fan not running</p>	<p>no water flow</p>	<p>Filter pump off, Air in the system, using ball valve Increase upstream pressure at the water outlet of the heat pump; refer to the installation instructions in the operating instructions</p>
<p>Fan off, compressor off, regulator dark</p>	<p>open customer-installed switch</p>	<p>Check external On/Off, check bridge to terminal X1 3/4</p>

EC declaration of conformity

for the purposes of the EC Machinery Directive 2006/42/EC Appendix II, 1 A, as well as:

EC 2004/108/EC
97/23/EC
842/2006/EC

EC EMC Directive
EC Pressure Equipment Directive
EC Regulation on certain fluorinated greenhouse gases
(F-Gas Regulation)

Manufacturer:

SET Energietechnik Ltd.
D-71282 Hemmingen
August-Blessing-Str. 5

Authorised representative for the assembling of the technical documentation:

Jens Rozema
SET Energietechnik Ltd.
D-71282 Hemmingen

The manufacturer/authorised representative declares that the following product:

Product name: Heat pump
Type designation: FWP/Silent/WP
Year built: from 2019

complies with the provisions of the above-mentioned directives.

The following harmonised standards and specifications have been applied:

EN 349	1993 +A1:2008	Safety of machinery - minimum clearances to avoid the crushing of body parts
EN 378-2	2008 +A2:2012	Refrigeration systems and heat pumps - safety-related and environmentally relevant requirements - Part 2: Design, manufacture, testing, labelling and documentation
EN 55014-1	2012	Electromagnetic compatibility - Requirements for household appliances, electrical tools and similar electrical appliances - Part 1: Emitted interference
EN 55014-2	2009	Electromagnetic compatibility - Requirements for household appliances, electrical tools and similar electrical appliances - Part 2: Interference immunity - Product family standard
EN 60204-1	2006 +A1:2009	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
DIN EN 61000-6-3	2007	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emitted interference for residential, business and commercial areas and small businesses
DIN EN 61000-6-2	2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Interference immunity for industrial areas
EN ISO 12100	2010	Safety of machinery - General principles for design - risk assessment and risk reduction
EN ISO 13857	2008	Safety of machinery - Safety clearances to prevent the reaching of hazard areas with the upper and lower limbs

And in addition, the relevant German standards and guidelines. This declaration of conformity loses its validity if changes are made to the system which have not been previously agreed with us and approved by us in writing.

**Hemmingen,
15/01/2019**

**Dr. Andreas Seibold,
Managing Director**



(Place, date)

(Signatory (name) and particulars of the signatory (e.g. Managing Director))

(Signature)

Certificate for leak testing of stationary refrigeration and air conditioning systems in accordance with Regulation (EU) No. 517/2014

1. General information about the leak test:

Operators of the tested system: _____

Location of the plant: Place: _____ Street: _____

Tel. No. of the plant operator in the event of queries: _____

Plant type: _____ Plant No.: _____

Refrigerant: _____ Refrigerant filling capacity: _____ kg

The plant was tested for leaks by the expert Mr./Mrs./Company: _____

at the installation site.

The test was carried out on: _____

2. Performance programme and completed measures:

- a. Visual inspection of all refrigeration components
- b. Visual inspection of the pipework and connection points
- c. Inspection of the brackets and fixtures
- d. Test for vibrations present under operating conditions
- e. Examination for proper functioning of the leak detection device

Test device: _____ Sensitivity of detection (min. 5g per annum): _____ g/a

- f. Fine leak testing of all freely accessible refrigeration components, pipework, joints, brackets, fixtures and of the refrigeration unit air curtain with a state-of-the-art leak detection device
- g. Additional fine leak testing of non-freely accessible components as a result of a suspected leak
- h. Examination of the logbook belonging to the plant for proper entries (refrigerant movements, leak tests)
- i. Written certificate of the leak test and recording of all data
- j. Attachment of a test seal for the leak test carried out

3. Results:

No defects were found

The following defects were eliminated (cf. mechanic certificate / proof of work)

.....

Place, date

.....

Expert's signature

REFRIGERANT R410A

FACTS AND FIGURES

...	Chemical symbol/composition:	50% difluoromethane (R32), 50% pentafluoroethane (R125)
...	Purity:	99.9 vol.%
...	ODP: = Ozone Depletion Potential	0
...	GWP: = Global Warming Potential = The climate impact of a greenhouse gas extrapolated to a certain period of time	1980
...	Safety group:	A1
...	Boiling point:	-51°C
...	Temperature glide:	< 0.2K
...	Critical temperature:	72°C
...	Properties:	Non-toxic, non-flammable, ozone-friendly (if not, refer to the material safety data sheet)
...	Main safety feature:	suffocating in high concentrations, may cause frostbite
...	Main applications:	Sales chest freezers and display cabinets in supermarkets, freezers in processing plants, warehouses, heat pumps in industrial refrigeration systems, transport refrigeration.
...	Operating temperature range:	8°C to 45°C, two-stage -40°C to -80°C

Specific values at 25°C

Vapour pressure (bar)	Specific volume of liquid (l/kg)	Specific volume of steam (l/kg)	Liquid density (kg/l)	Vapour density (kg/m ³)
16.5	0.941	15.0	1.07	66.7

DELIVERY FORMS

Individual bottles, gaseous

Type	Volume (l)	External Ø approx. (mm)	Length with cap approx. (mm)	Total approx. weight (kg)	Fill pressure (bar, at 15°C)	Filling* (kg)
10	12.5	229	515	19.0	47.0	10.0
50	61.0	267	1420	81.0	47.0	50.0

Palettes: Approx. dimensions, LxWxH, 1090x800x1100mm, tare weight approx. 110kg.
Filling takes place gravimetrically. The filling pressure depends on the ambient temperature.
Determination of the content quantity is only possible by weighing.

COLOUR CODING IN ACCORDANCE WITH DIN EN 1089, PART 3

Bottle colour	Shoulder	Valve/bundle connection
bright green RAL 6018	bright green RAL 6018	W 21.80 x 1/14", right (OIN 477, No. 6)



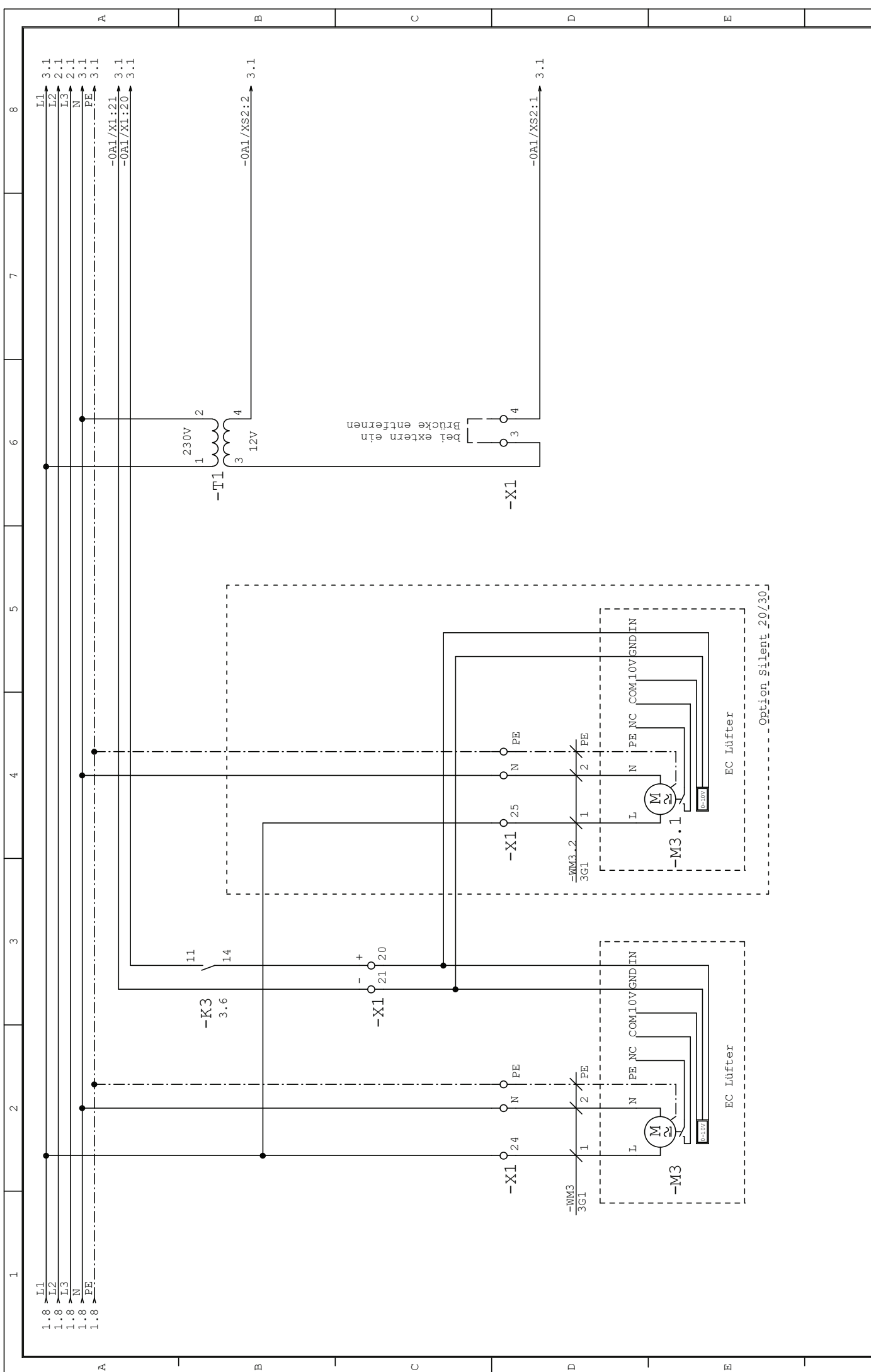
For properties, safety advice and transport regulations, please refer to the material safety data sheets of the individual products.

Central administration:

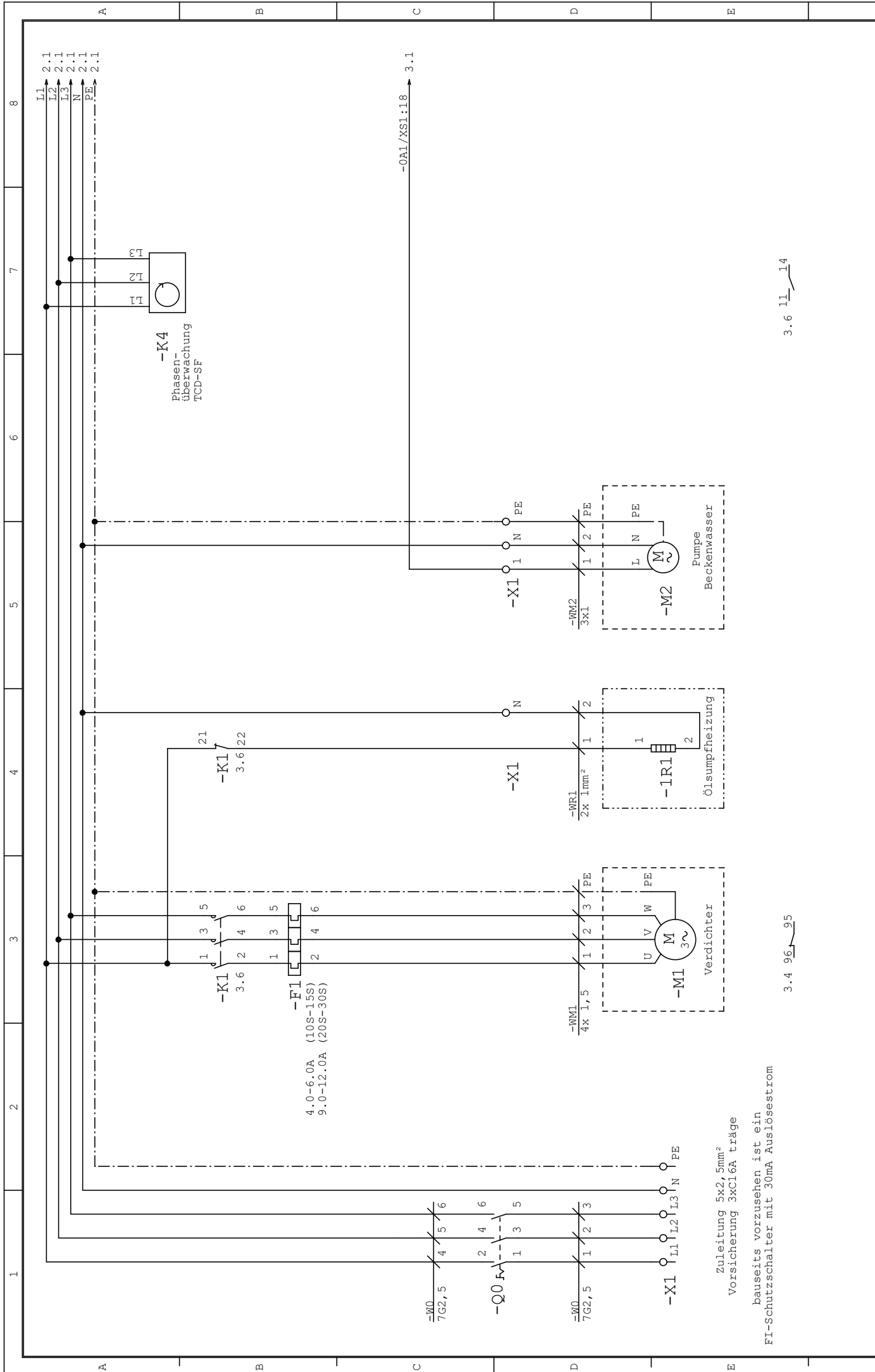
D-68159 Mannheim-Landzungenstr. 17, Germany
Telephone 0621 / 18009 - 0 --Fax 0621 / 18009 --150

Management system certified in accordance with DIN EN ISO 9001
info@tig.de

www.tig.de



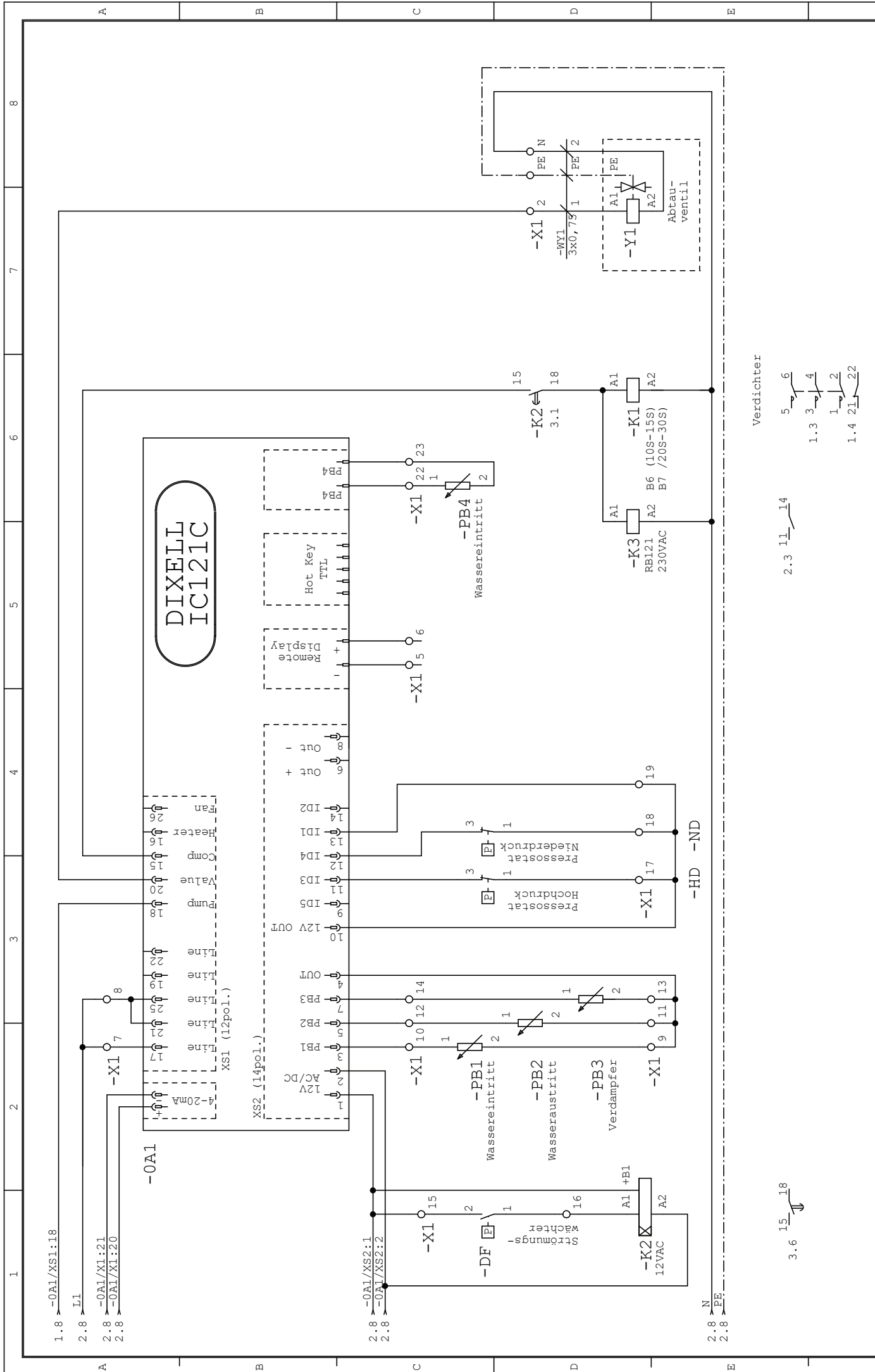
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Bearb. S.Zube				400V				Tel: 07150-94540		Gesamt:		Aktuell:		von 3Bl.	
Gepr.				Urspr.		Ers. f.		Ers. d.							
Datum		Name		Norm		Urspr.		Ers. f.		Ers. d.					



3.4 96 95

3.6 11 14

Datum		16.01.2019	
Bearb. S.Zube			
Gepr.			
Norm			
Zust. Änderung	Datum	Name	
		Silent + 15/20/30S	
		400V	
Urspr.		Ers. f.	
		Ers. d.	
Projektseiten		SET	
Gesamt:		Energietechnik	
Aktuell:		71282 Hemmingen	
Blatt 1		Tel: 07150-94540	
von 3Bl.		Fax: 07150-2337	



Datum		16.01.2019		Silent + 10/20S		SET		Energietechnik		71282 Hemmingen		Projektseiten		Blatt 3	
Bearb. S.Zube				230V				Tel: 07150-94540		Gesamt:		Aktuell:		von 3Bl.	
Gepr.				Ers. f.		Ers. d.		Urspr.		Ers. f.		Ers. d.			
Norm				3		4		5		6		7		8	
Änderung				1		2		3		4		5		6	
Zust.				1		2		3		4		5		6	

Verdichter

2.3 11 14

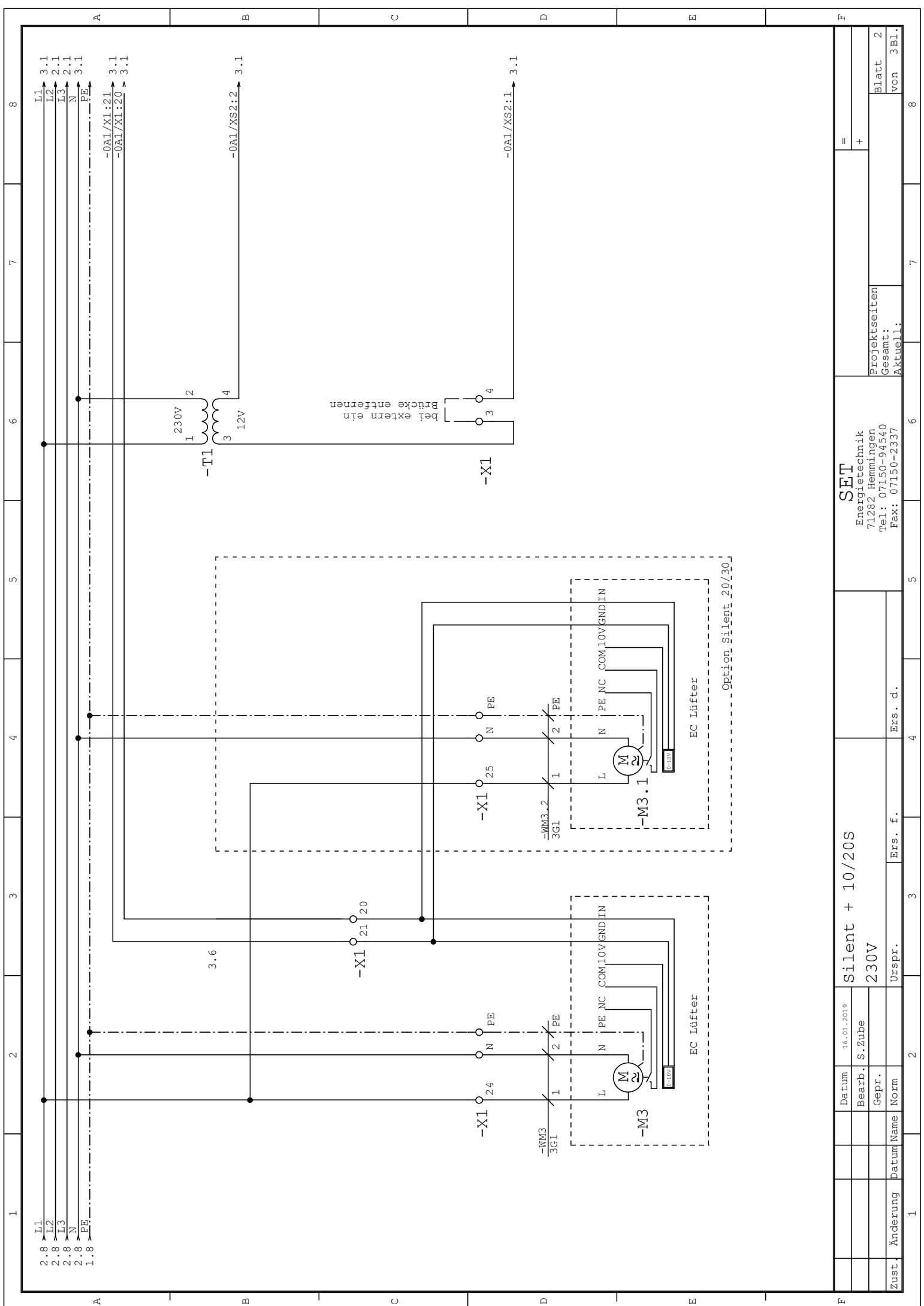
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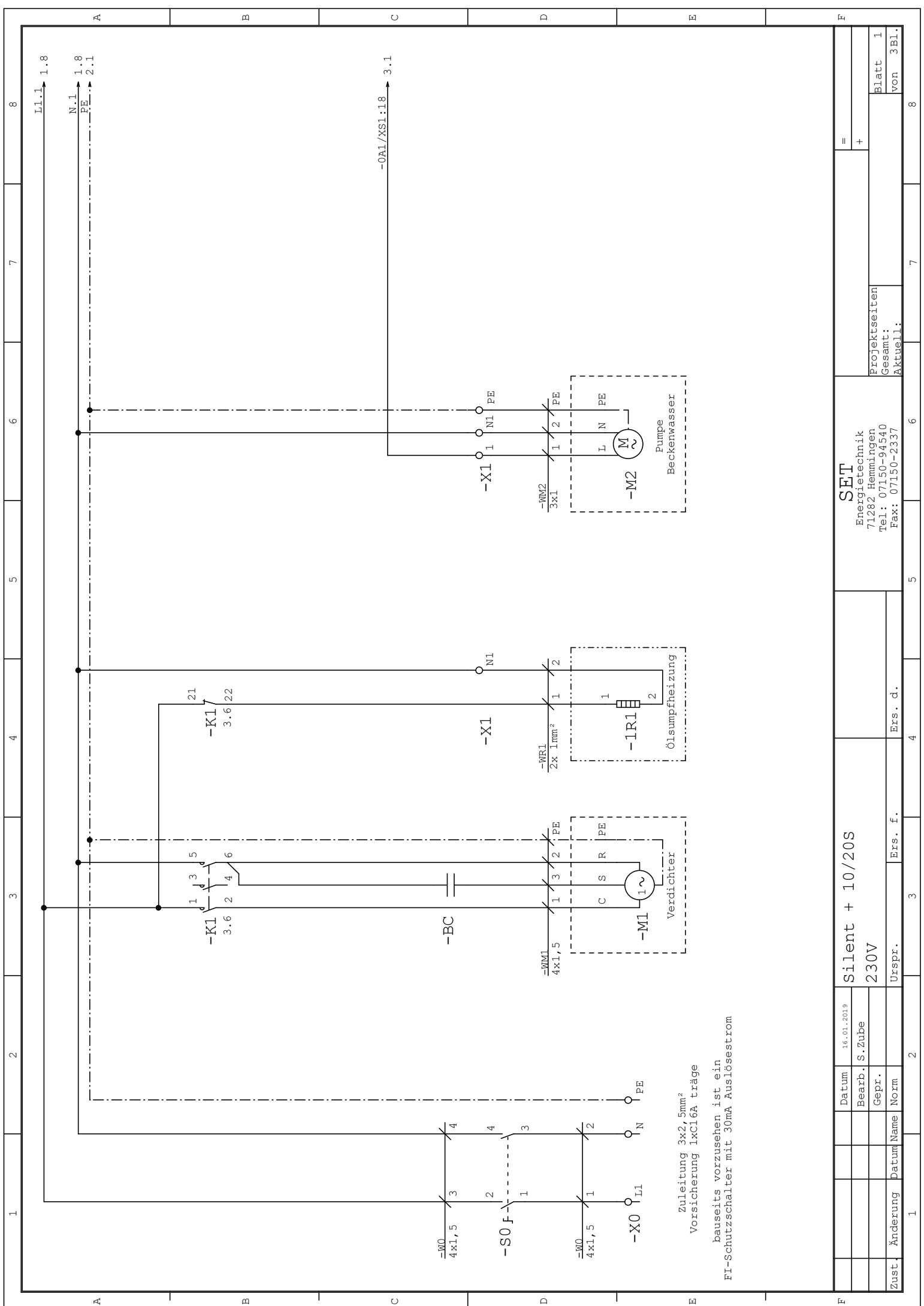
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Datum		16.01.2019	
Bearb. S.Zube			
Gepr.			
Norm			
Datum		Name	
Urspr.		Ers. f.	
Ers. d.		Ers. d.	
Silent + 10/20S 230V			
Option Silent 20/30			
SET Energietechnik 71282 Hemmingen Tel: 07150-94540 Fax: 07150-2337			
Projektseiten		Blatt 2	
Gesamt:		von 3Bl.	
Aktuell:			



Zuleitung 3x2,5mm²
 Vorsicherung 1xC16A träge
 bauseits vorzusehen ist ein
 FI-Schutzschalter mit 30mA Auslösestrom

Datum		16.01.2019	Silent + 10/20S		SET		=		
Bearb. S.Zube			230V		Energietechnik		+		
Gepr.			Ers. f.		71282 Hemmingen		Projektseiten		
Norm			Ers. d.		Tel: 07150-94540		Gesamt: 1		
Datum			Urspr.		Fax: 07150-2337		Aktuell:		
Name							Blatt		
Änderung							von		
1		2	3	4	5	6	7	8	
								3Bl.	