

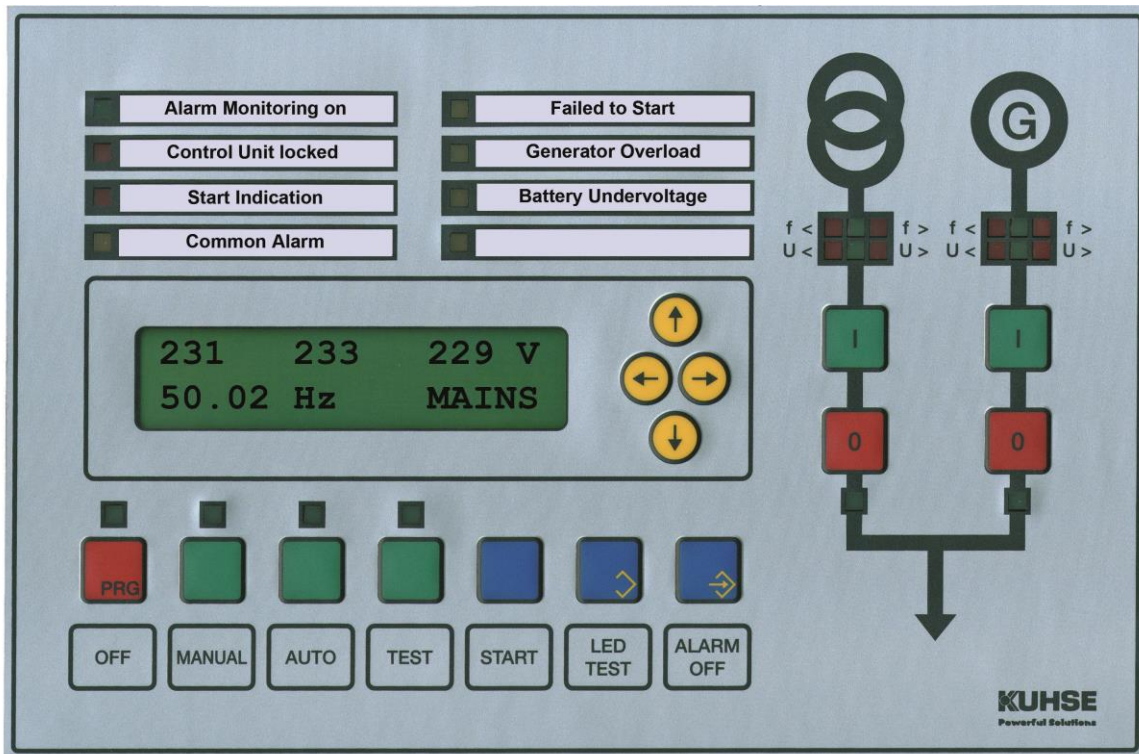
Service Manual

for product: KEA 201 ERSY:

Control Unit for Emergency Power Gensets
with Overlapping Synchronisation



File: SA_KEA 201 ERSY_EN_Ver 2016-07-01



1. Design

The control unit is incorporated into the front door of the switchboard. The front meets the **protection class IP 44** when installed. The two rows of LEDs are marked with interchangeable labels. The **relay units** are mounted on the mounting plate and linked to the control unit in the door with the supplied cable.

The control unit has an optic fibre or a USB interface - switches automatically - for the connection of a PC. By means of the parameterisation program PARAWIN, the following settings (password-protected) and analogue readouts are possible. Parameterisation can also be performed at the display.

1.1. Parameterisation

- | | |
|---|-----------------------------------|
| 1. Additional Interface CAN | 13. Internal Synchronizer |
| 2. Additional Parameters | 14. J1939 engine management |
| 3. Alarm Remote cancelling | 15. J1939 hide analogue values |
| 4. Alarms | 16. Mains Voltage Monitor |
| 5. Analogue Inputs | 17. Modem |
| 6. Analogue Outputs | 18. ProMerk. Programmable Flags |
| 7. Battery Monitor | 19. Relay and Indicator Functions |
| 8. CAN 0 | 20. Speed Monitoring and Control |
| 9. Frequency Controller at isolated Operation | 21. Sprinkler Operation |
| 10. Generator Current Monitor | 22. Starting and Stopping |
| 11. Generator Voltage Monitor | 23. Transfer Mains – Generator |
| 12. Hardware | 24. Voltage Controller |

1.2. Analogue Readouts

- Actual values:
 - Voltages
 - Currents
 - Active and apparent load
 - Power factor
 - Speed
 - Battery voltage,
 - Actual values of the four analogue channels
 - Actual status of the digital inputs of the relay unit RZ 071-D
 - Actual status of the output relays
- Timers' status.

2. Amendments

Created	Amendments	Version
2016-07-01	- Technical Data: Corrected: Optical fibre or USB interface – with automatic switching – for parameterisation 2. Removed: Option in preparation: GSM modem - Last page: Added: Drilling Template, Scale 1:1 (was down-scaled before)	2015-02-05
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4. Safety Instructions

4.1. Regulations and Instructions

1. The relevant regulations, especially the VDE regulations, must be observed.
2. The SERVICE MANUAL should be read carefully before commissioning.
3. The device must be parameterised in such a way that any risk to persons or property is prevented.

4.2. Installation and Commissioning

Only adequately qualified personnel should undertake the installation and commissioning.

4.3. Connections

1. Care must be taken when connecting the device, as it may be destroyed if incorrectly connected. All details of the connection specifications must be fulfilled.
2. The PE(N) must be connected for security reasons to terminal 5 on the X403.
3. The shielding of the analogue wiring must only be connected the earth screws beside the terminal strip X401 on the KEA cover and may have no galvanic connection to any other metal parts.
4. The transformer connections, k, are to be connected to the protective conductor.

4.4. Battery and Supply voltage

1. The charging device must be switched off before the battery is disconnected.
2. The negative pole of the battery must be grounded at the input terminal of the switchboard. The minimum conductor cross-section is 10 mm²
3. The supply voltage can be set to 12 or 24 V DC with a switch on the RZ 071-D.
4. When the supply voltage of the control unit has been switched off, you must wait at least 20 seconds before applying it again.
5. The leakage current of the noise filters is 22 mA in case of a 2-phase voltage lost.

4.5. Inductors

All coils must be fitted with reverse diodes to prevent high voltage peaks. All other coils or inductive loads must also be fitted with suppressor elements. The same applies for all relays and inductors that are used in the switchboard or controlled externally.

5. Connections

1. Trained experts may only make the connections of the KEA.
2. The PE(N) must be connected for security reasons to terminal 5 on the X403.
3. The charging device must be switched off before the battery is disconnected.
4. When the supply voltage of the control unit has been switched off, you must wait at least 20 seconds before applying it again.
5. The negative pole of the battery must be grounded at the input terminal of the switchboard. The minimum conductor cross-section is 10 mm².
6. The supply voltage can be set to 12 or 24 V DC with a switch on the RZ 071-D.
7. The screens of the analogue input wiring must be connected to the earth screws beside the terminal strip X401 on the KEA cover, and must have no connection to any other metal parts.
8. All coils must be fitted with reverse diodes to prevent high voltage peaks. All other coils or inductive loads must also be fitted with suppressor elements. The same applies for all relays and inductors that are used in the switchboard or controlled externally.

The following signals (if needed) are directly applied to the control unit:

- Voltage of mains and generator
- Current of generator
- Four analogue sensors
- Pick-up
- Two analogue output signals
- Optical fibre or USB for parameterisation
- Two CAN bus systems.

Although the control system is protected against reverse polarity, the correct polarity when connecting the battery voltage must be strictly observed, as reverse diodes or other electronic parts of the switchboard may possibly be damaged.

The fuse on the RZ 071-D will be blown, if the control system is connected with the wrong polarity!

Due to the fact that most of the control relays may be configured for various functions, only the status print out of the supplied control unit is to be considered as a binding document. It must be observed, that in case of a possible replacement of a unit, any modifications made after commissioning cannot be taken into account by the manufacturer.

6. Operating the Display

Values or **parameters** are selected, as you would read a book. The further down listed groups are arranged as 'pages'. You can scroll forwards and backwards through these groups by pressing the [→] and [←] keys. The **entries** of each group can be read from top to bottom like lines of a text.

Select a **line** by pressing the keys [↓] (down) and [↑] (up). The selection starts again with the other end of the 'page', when the top or bottom of the 'page' is reached.

Hold down the LED TEST button, and press [←] to select directly the **ACTUAL VALUES group**.

Hold down LED TEST and press [→] to display the **group CURRENT ALARMS**.

To **modify a parameter**, first enter the relevant **IDENT-NUMBER**.

Note: Parameters of **group 0, -GENERAL PARAMETERS-**, can be modified without entering this number.

Parameters are modified as follows:

1. Select the required **parameter group** with the [←] and [→] buttons.
2. Select the required parameter **line** with the [↓] and [↑] buttons.
3. Press OFF and LED TEST (function: PARA ON or PARA OFF) together. This opens **parameterisation mode** as can be seen by the specific cursor [█]. The selection of the group cannot be changed now.
4. Press [↓] / [↑] to select the desired **parameter**.
5. Press OFF and ALARM OFF (ENTER function) together to select the **parameter line**. The shape of the cursor confirms the selection, as it underscores (e.g. 196) now the part of the parameter that is to be modified. The chosen parameter cannot be deselected now.
6. Select the **figure or letter of the parameter** that you want to modify with the [←] and [→] cursor keys. Numerical parameters can be increased or decreased by increments of 1 with the [↑] and [↓] buttons. Press the same buttons to negate parameters that are displayed with a letter (+/- signs, alarm coding etc.).
7. Press OFF and ALARM OFF together to **store** the displayed parameter.
Press OFF and LED TEST instead of OFF and ALARM OFF to **abort** parameterisation.

7. Setting the Display Contrast

- Hold down LED TEST and press key [↑] to **increase** the display contrast (makes the display darker)
- Hold down LED TEST and key [↓] to **lower** it (makes the display lighter).

8. PIN Number, Ident-Number

To modify a parameter, you first have to enter the relevant IDENT-NUMBER. This number is compared with the PIN NUMBER, and if they are identically, the user is authorised to parameterise the device. The user can chose any PIN NUMBER between 00000 and 50000. The PIN NUMBER and IDENT-NUMBER are factory-set to 00000.

A special IDENT-NUMBER can be obtained on enquiry from the factory if you forget your PIN NUMBER, so that a new PIN NUMBER can be entered. Modify the PIN NUMBER as follows:

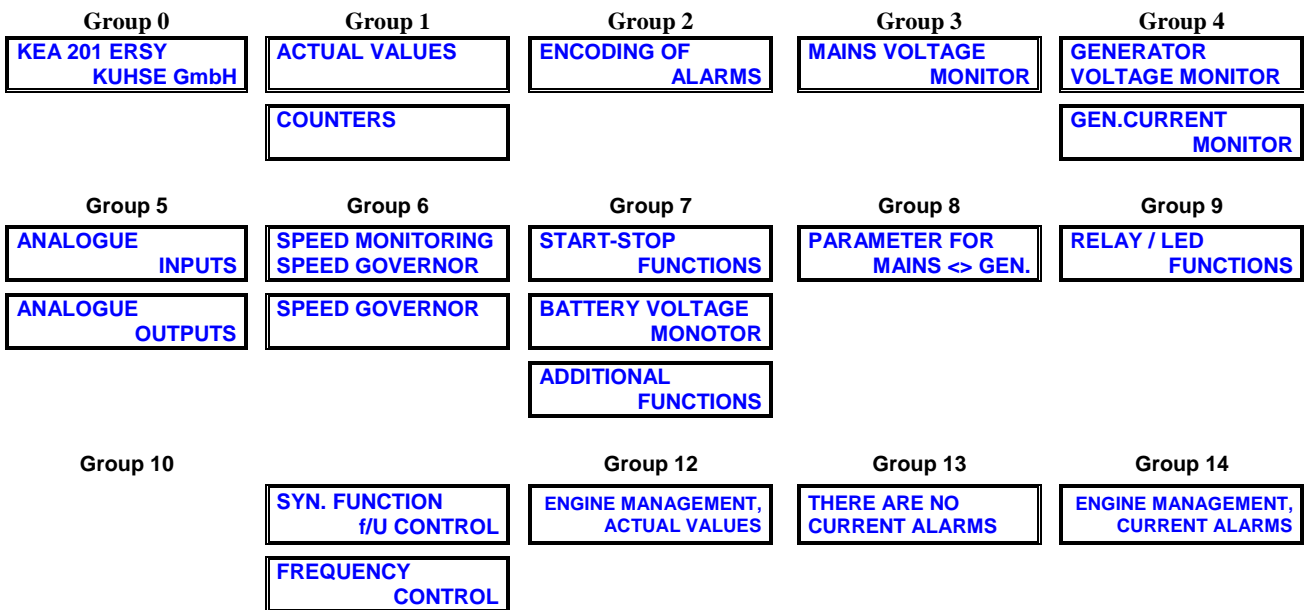
1. Enter the currently valid Ident-Number. The pin number is now also shown.
2. Enter a new PIN Number.

The Ident-number previously entered is now no longer valid.

The IDENT-NUMBER is deleted 15 minutes after the last input, if the user has not previously set it to an invalid value.

The automatic deletion of the IDENT-NUMBER is, however, not carried out while 00000 is set as the PIN.

9. Parameterisation Menu structure



10. Connections on Relay Unit RZ 071-D

The contacts for the terminals 1 to 28 must be connected to [L-] potential. Terminal 29 is provided to be connected to terminal D+ of the charging dynamo. The "running" signal is active when the voltage exceeds about 8 volts DC. AC-dynamos are pre-excited via this terminal.

The functions of several relays may be different, according to their programming. Therefore, the individual printed status report is valid for a specific control unit.

The stated contact rating of the relays must not be exceeded. Basically is valid, that all operated coils and inductivities must be provided with reverse diodes (on DC) or with suppressor components matching the inductivity of the coil.

Terminals 1–14: Input for alarms signals.

Terminal 15: Feedback signal: MAINS IS OFF.

An auxiliary contact (NC) of the mains CB (or contactor) is connected to this terminal. It shows the position of the breaker. The control unit is fitted with an interlocking circuit which prevents the generator from switching on (without synchronising) as long as the mains is supply on.

Terminal 16: Feedback signal: GENERATOR IS OFF.

An auxiliary contact (NC) of the generator CB (or contactor) is connected to this terminal. It shows the position of the breaker. The control unit is fitted with an interlocking circuit that prevents the mains from switching on (without synchronising) as long as the generator is supply on.

Terminal 17: Operation mode selection is locked.

The selection of the operation modes by the push-buttons will be locked if a signal is applied at this terminal. A key-operated switch, to prevent the selected mode from being changed by unauthorised persons or by mistake, could perform this.

Terminal 18: Remote start with load transfer.

There are two programmable modes for this input: input always active or input only active along with a mains voltage failure.

If an active command is stated, the start of genset will be initiated and the load will be transferred from mains to generator supply in the operation mode AUTO.

If the genset is already running in TEST or AUTO mode or was started by the signal REMOTE START WITHOUT LOAD TRANSFER, the generator will also takes over the load.

The load will be switched back to mains supply after the re-connection delay and the genset will be shutdown (in AUTO) after cooling down period when the signal to this terminal is disconnected (the signal for REMOTE START WITHOUT LOAD TRANSFER may not be present).

Terminal 19: IMMEDIATE STOP.

The signal can be parameterised as normally-closed or normally-open. The genset will be immediately shut down if a signal is applied to this terminal. The control unit will be locked for any further starting attempts. To reset the control unit, the operation mode has to be set to OFF. Resetting is only possible if the signal is no longer connected, otherwise the indicator AUTOMATIC LOCKED would remain on.

Terminal 20: Overlapping synchronisation active.

When an L[-] signal is connected here, the load transfer between mains and generator supply (in operation mode TEST) and the re-connection to mains supply (in operation mode AUTO) will take place without interruption, by synchronized change-over.

When an L[-] potential is not applied, the change-over between mains and generator supply will take place with configured breaks.

Terminal 21

This terminal has no fixed function and can be used as an alarm input.

Terminal 22

This terminal has no fixed function and can be used as an alarm input.

Terminal 23: Sprinkler mode.

When a [L-] signal is connected to this terminal the genset starts without changing over to generator supply and all alarms serve only as a warning ones. If mains fails, the consumers are also switched to generator supply.

Terminal 24: Start enable input.

Any starting attempt emitted manually or automatically, will be interlocked as long as there is no [L-] potential connected to terminal no. 24. It is therefore possible to incorporate relevant pre-start conditions before a signal is given to the starter motor for cranking. **If this function is not used, a wire jumper from [L-] to terminal no. 24 has to be connected.**

This function does not meet the requirements of the German Standards DIN VDE 0107, because a running genset will not be shut down; this function only protects the engine before start-up.

Terminal 25: Remote start without load transfer.

The genset starts in the automatic mode without the generator being switched on when a command is issued to this terminal. The generator breaker will only be switched on if a command is also issued to terminal 18 or mains fails. To switch off the generator breaker again, both signals (terminals 18 and 25) must be cut!

Terminal 26: External command :GENERATOR OFF

If a command is applied here, the generator CB is immediately switched off and remains off as long as the signal is applied.

Terminal 27

This terminal has no fixed function and can be used as an alarm input.

Terminal 28

This terminal has no fixed function and can be used as an alarm input.

Terminal 29: Charging Dynamo, terminal D+.

Terminal D+ of the charging dynamo, if present, has to be connected here. An AC-dynamo receives the pre-excitation via this connection, and the [+] signal of the dynamo will cause the starter motor to be switched off.

11. Technical Data

11.1. KEA Controller

- Device for frontal installation, dimensions: (\Rightarrow , \uparrow , depth) 260 x 170 x 100 mm
- Weight approx. 2.2 kg, can be installed wherever required
- Protection class (installed) IP 44
- Ambient temperature: Storage -20°C ... +70°C, Operation 0°C ... +55°C
- Supply voltage convertible 9-12-15V or 14-24-35V DC
- 3 customer-defined relays, 35 V DC, 1 A. (e.g. for acoustic signallers)
- Standards/regulations VDE 100, Part 710

11.2. Analogue Inputs and Outputs

- 3-phase mains and generator voltage monitor, set in increments of 1 Volt; if the rotary field is incorrect, the display shows <U.
- UNom 230/400 volts. They can be set from 50 to 300 volts. Accuracy class 1
- Mains and generator frequency monitor 50 or 60 Hz; they can be set to any value between 40 and 70 Hz; accuracy class 1
- 3-phase generator current monitor; accuracy class 1
- INom 5 Amp: measuring range 0.1 – 15 A; it can be set in increments of 20 mA
- Battery voltage monitor
- Input for pick-up
- Option: four analogue inputs, which can be fitted with interface cards for
 - PT 100 / PT1000
 - Current loops
 - 0 - 10 V DC
 - Thermocouple NiCr-Ni
 - Temperature and pressure: VDO sensor
- Option: two analogue outputs 0 – 20 mA or 0 – 10 V

11.3. Relay Unit RZ 071-D

- Device for attachment on a mounting rail, dimensions: (\Rightarrow , \uparrow , depth) 300 x 100 x 90 mm
- Weight approx. 0.7 kg, can be installed wherever required
- Protection class IP 00
- Fitted with:
 - Input for charging dynamo D+ with pre-excitation for AC alternators
 - 14 ports for alarm contacts
 - 14 general control inputs
 - 12 relays, of which 8 can be configured; contact load: 2 relays max. 35 V, 20 A DC; 10 relays 250 V AC, 6 A.

11.4. Relay unit RZ 071-E (optional)

- Device for attachment on a mounting rail, dimensions: (\Rightarrow , \uparrow , depth) 210 x 100 x 50 mm,
- Weight approx. 0.5 kg, can be installed wherever required, protection class IP 00,
- Fitted with 15 relays, of which 14 can be configured, contact load max. 250 V AC, 6 A

11.5. Serial interfaces

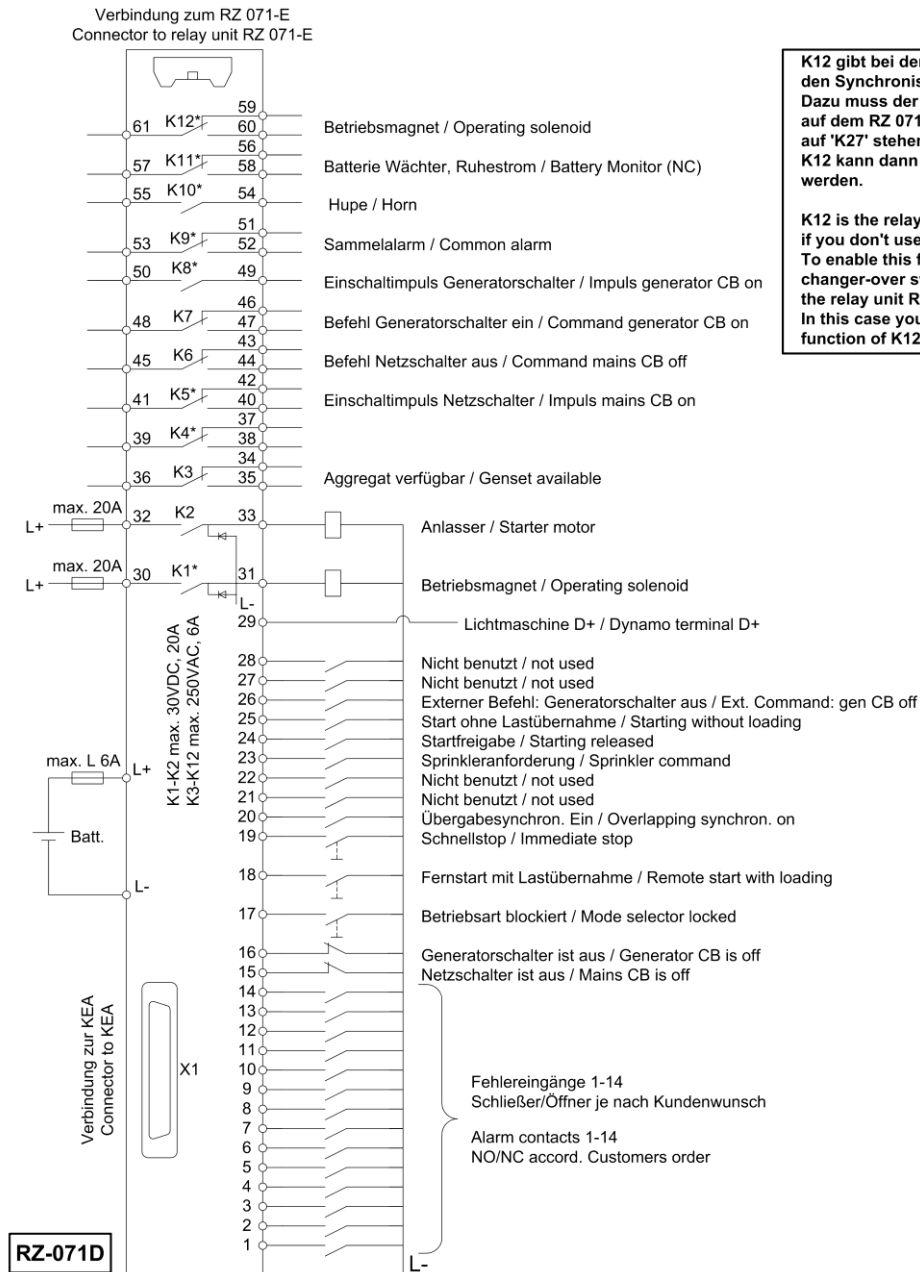
- Optical fibre or USB interface – with automatic switching – for parameterisation.
- CAN bus interface to a Common Control System,
- CAN bus interface to engine management (the protocol must be known and implemented)

11.6. Connection to other Systems (optional)

Device for attachment on a mounting rail: KNG (Kuhse Network Gateway) to connect to other systems via Profibus DP or Modbus RTU

12. Diagrams

12.1. Connection Diagram, RZ-071-D

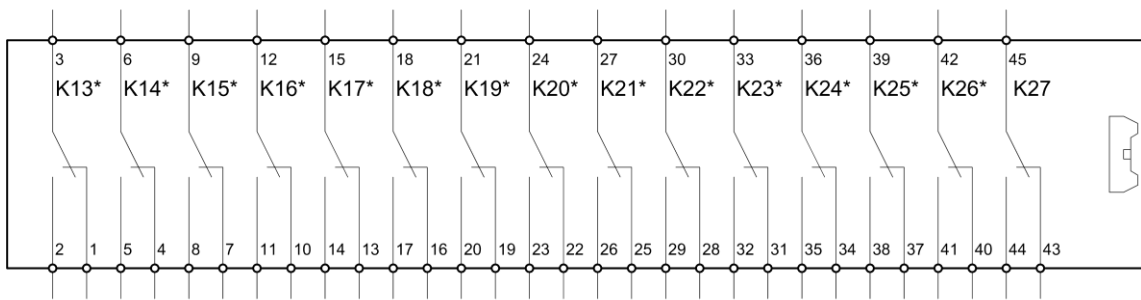


K12 gibt bei den Automaten ohne RZ071-E den Synchronisier Impuls aus. Dazu muss der Häkchenswitcher auf dem RZ 071-D über dem K12 auf 'K27' stehen. K12 kann dann nicht mehr parametrierbar werden.

K12 is the relay for the synchronizing pulse if you don't use a RZ 071-E! To enable this function, select 'K27' by the changer-over switch right above the K12 at the relay unit RZ071-D. In this case you cannot program the function of K12 anymore.

* Funktion parametrierbar / Function parameterized

12.2. Connections Diagram, RZ-071-E (optional)



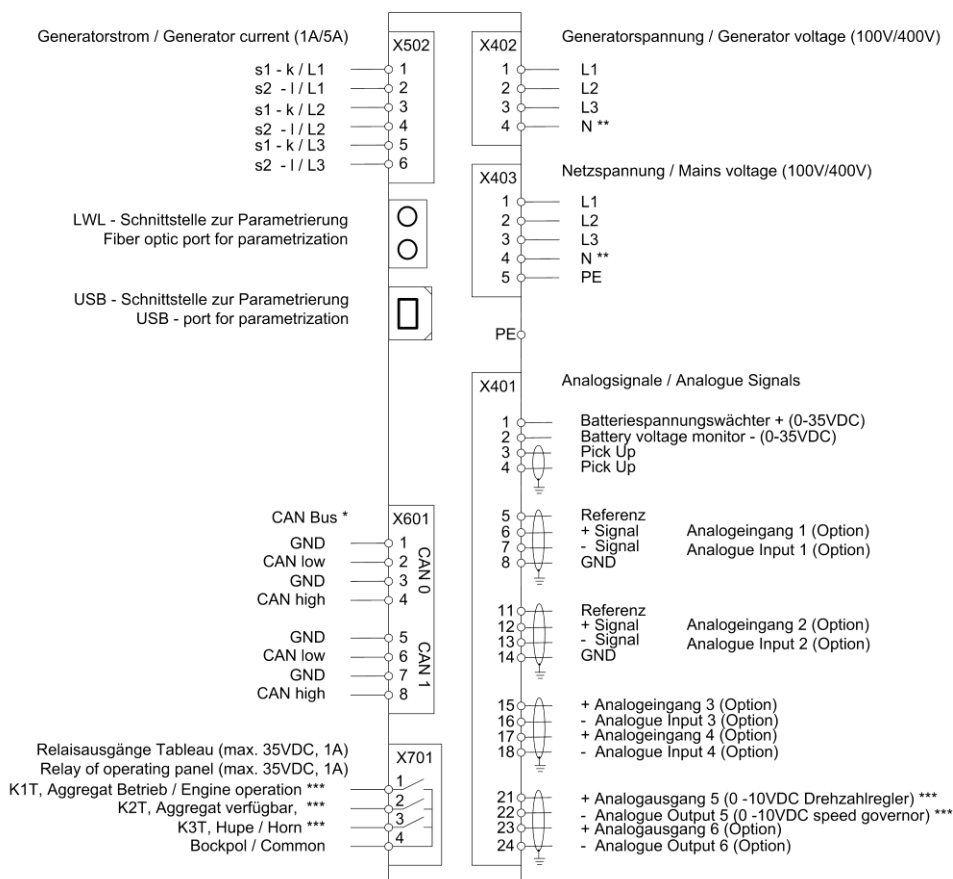
Verbindung zum RZ-071D
Connector to relay unit RZ-071D

RZ-071E

* Funktion parametrierbar / Function parameterized
K13-K27 max. 250VAC, 6A

K27 Synchronisierimpuls
K27 Synchronizing pulse

12.3. Connection Diagram, KEA 201 ERSY

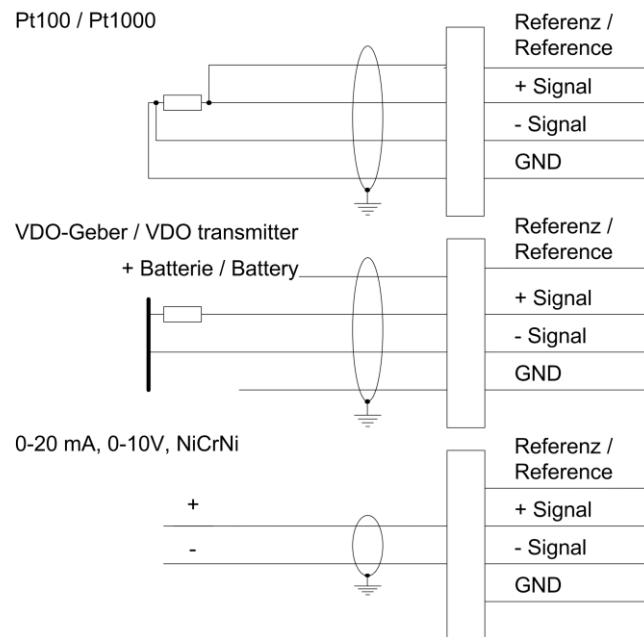


* CAN Bus Abschlusswiderstände eingeschaltet (Steckbrücke intern) / CAN bus termination activ (jumper intern)

** nur bei 400V Messung / only at 400V Measuring

*** Funktion parametrierbar / Function parameterized

12.4. Connections, analogue Inputs



13. Drilling Template, Scale 1:1 – print without scaling!

