Automatic Transfer Switch-Controller
NZM-XATS-C144

Powering Business Worldwide

Emergency On Call Service
Please call your local representative:
http://www.eaton.eu/aftersales
or
Hotline of the After Sales Service:
+49 (0) 180 5 223822 (de, en)
AfterSalesEGBonn@eaton.com

Original Operating Instructions
The German-language edition of this document is the original operating manual.

Translation of the original operating manual
All editions of this document other than those in German language are translations of the original German manual.

1st published 2011, edition date 01/12
2nd published 2012, edition date 03/12
3rd published 2014, edition date 01/14

Production: DHW
Translation: globaldocs GmbH

Printed on bleached cellulose. 100 % free from chlorine and acid.

Danger!
Dangerous electrical voltage!

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally retriggered
- Verify isolation from the supply
- Earth and short-circuit.
- Cover or enclose neighbouring units that are live.
- Only suitably qualified personnel in accordance with EN 50 110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalizing. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference do not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- The building's electrical installation must feature a switch or line switch, which must be positioned in the immediate vicinity of the device and be easily accessible for the operator. It must be marked as isolating device for the device: IEC/EN 61010 Sect. 6.12.2.1.
- Ensure a reliable electrical isolation of the low voltage for the 24 V supply. Only use power supply units complying with IEC 60 364-4-41 (VDE 0100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency switching off devices complying with IEC/EN 60 204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency switching off devices must not cause restart.
- Built-in devices for enclosures or cabinets must only be run and operated in an installed state, desk-top devices or portable devices only when the housing is closed.
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency switching off devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks, etc.).

Content

0 About This Manual

This manual describes the installation, programming and commissioning of Automatic Transfer Switch-Controller NZM-XATS-C144.

The current edition of this manual in other languages can be obtained from the Internet: www.eaton.com/moeller/support.

0.1 Target group

Automatic Transfer Switch-Controllers NZM-XATS-C144 must be fitted and connected only by qualified electricians or persons familiar with electrical installation.

0.2 Exclusion of liability

In the event of improper use the manufacturer accepts no liability for the device's electrical safety.

The products described in this document are subject to change. The descriptions and data in the catalog are therefore not binding.

0.3 Writing conventions

The symbols used in this manual have the following meanings:

▶ indicates actions to be taken.

NOTICE

Warns about the possibility of material damage.

CAUTION

Warns of the possibility of hazardous situations that may possibly cause injury.

WARNING

Warns of the possibility of hazardous situations that could result in serious injury or even death.

DANGER

Warns of hazardous situations that result in serious injury or death.

→ Draws your attention to interesting tips and supplementary information.

For greater clarity, the name of the current chapter is shown in the first headline and the name of the current section in the second headline.

0.4 List of revisions

Edition date	Page	Key word	New	Modification	Deleted
02/12	37	→ Figure 10		✓	
03/12	37	→ Figure 10		✓	
01/14	43	GC.2		✓	
	17	Key symbols corrected		✓	

1 General

1.1 Description

The NZM-XATS-C144 controls various switching devices, such as circuit-breakers with motor operator, transfer switches with motor operator or contactors for system transfer.

- Microprocessor-controlled automatic Automatic Transfer Switch-Controller
- Two measurement inputs for three-phase and neutral voltage measurement
- DC supply 12-24-48 V⎓
- AC power supply 220 – 240 V~.
- Two three-digit LED digital displays.
- 22 status and measurement LED displays.
- Membrane keyboard with 8 pushbuttons.
- Serial RS232 interface for setup, remote control and monitoring.
- Opto-isolated RS485 interface.
- Real-time clock with event logging.
- Non-volatile memory for events and statistical data.
- 8 programmable digital inputs.
- 7 programmable relay and outputs (5 N/O + 2 N/C / N/O).

1.2 Applications

- Transfer mains/mains, mains/generator or generator/generator.
- Actuation of switches with motor operator, motorized switches or contactors
- Generator management with automatic test and emergency changeover
- Monitoring of three-, two-, and single-phase power supply lines
- Monitoring of phase-to-phase voltage (L–L) and/or phase-to-earth voltage (L–N)
- Monitoring with independent enable and delay of
  - Minimum voltage
  - Maximum voltage
  - Phase failure
  - Load unbalance
  - Minimum frequency
  - Maximum frequency
- Voltage thresholds with programmable hysteresis

1.3 Installation

When mounting the device, observe the circuit-diagrams on the last pages of these instructions, → Section “5 Circuit diagrams”, Page 36.

Use the circuit diagram suitable for your application.

Set the parameter values according to the used circuit diagram, paying special attention to the configuration of the programmable inputs and outputs.

1.3.1 Notes about the power supplies

The NZM-XATS-C144 has two power supplies, i.e. it can be operated with both AC and DC or with only one of the two.

If both power supplies are connected, the device is supplied from the AC source. In this case only a small current is drawn from the DC source.

To ensure that the measurement remains active during transfer, the NZM-XATS-C144 should be connected to a backup battery or a UPS.

1.3.2 Dimensions and panel cutout

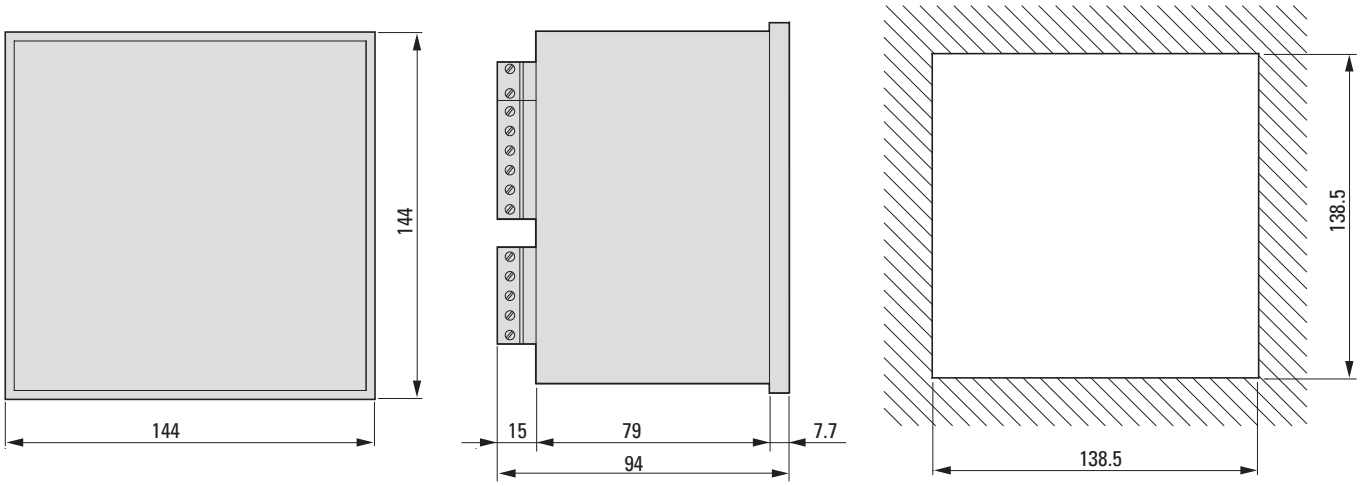

Figure 1: Dimensions and panel cutout

1.3.3 Flush mounting

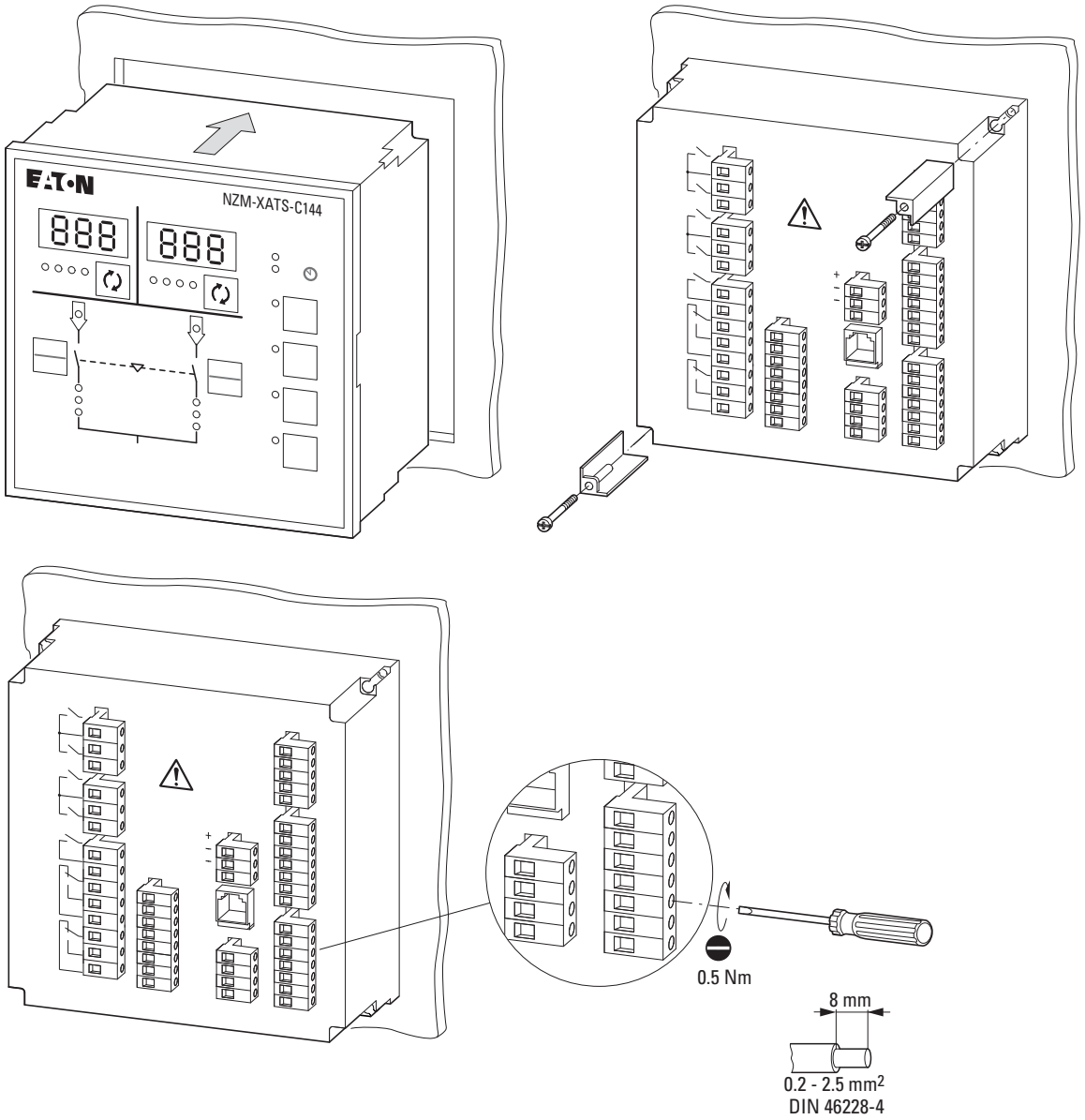

Figure 2: Flush mounting

2 Functions

2.1 Keypad

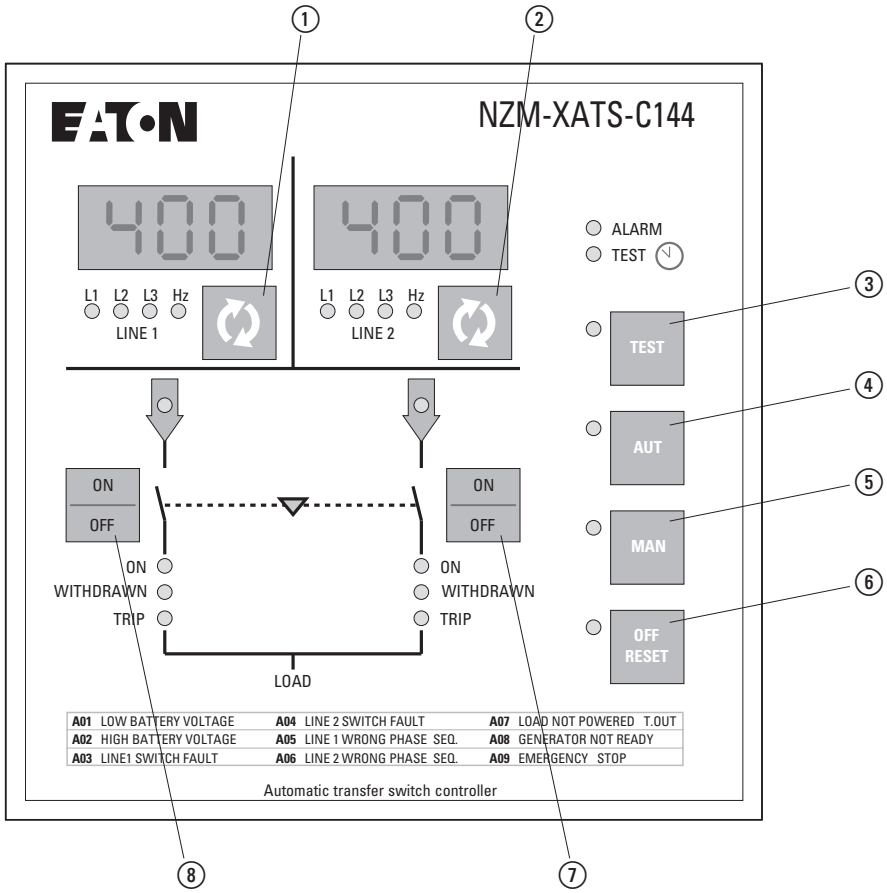

Figure 3: Keypad, pushbuttons

The device's keypad contains two LED displays that show the measured values of the two supply lines (LINE 1 and LINE 2) as well as two keys for switching between readings ① and ②.

With the four keys TEST, AUT, MAN, OFF/RESET (③ – ④ – ⑤ – ⑥) you can select the operating mode, which is indicated by the associated LEDs.

In the middle of the keypad there is a block diagram, which indicates whether the power sources are present and the status of the switching devices to the consumer.

The switching devices can be manually operated with two keys (⑦ and ⑧).

2.2 Measurement selection

▶ To view the measurements for each line in succession, repeatedly press the right key under each display (① and ②, → Figure 3).

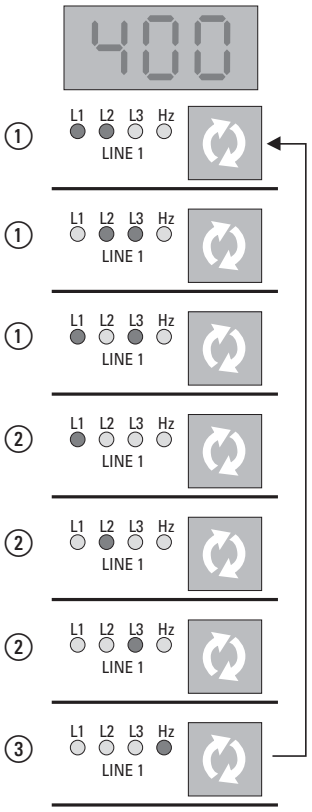

Figure 4: Reading display sequence

① Phase-to-phase voltage
② Phase-to-earth voltage
③ Frequency

For each line the phase-to-phase voltages (L-L) ①, the phase-to-earth voltages (L-N) ② and the frequency ③ can be displayed (→ Figure 4).

The red LEDs indicate which reading is being displayed. The readings depend on whether the device is configured for three-, two- or single-phase measurement.

If you do not press a key for one minute, the default reading is shown again. Depending on the voltage measurement setting this is either the first phase-to-phase voltage or the phase-to-earth voltage.

When an alarm signal or message is issued, the device displays the alarm code (→ Section "2.6 Alarms", Page 14). To temporarily hide the alarm signal and view the reading, press selection key ①.

2.3 Status LED

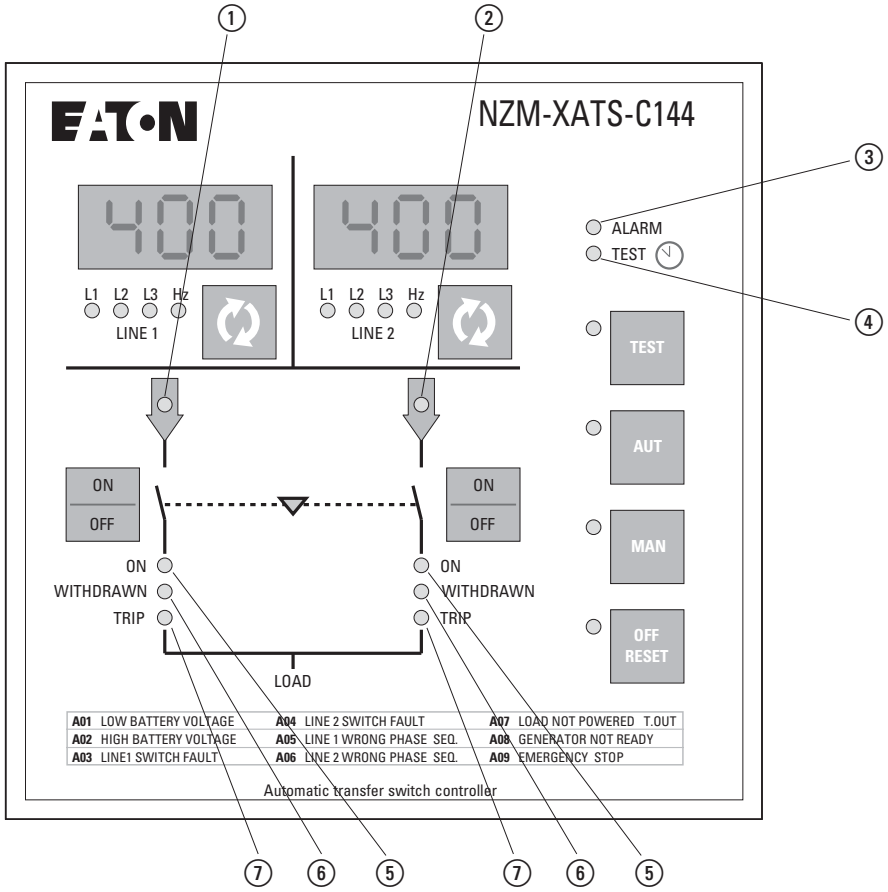

Figure 5: Keypad, LED

The keypad contains LEDs that indicate the status of NZM-XATS-C144 and/or the controlled switchgear.

The table below lists the meaning of each LED. Some LEDs have two colors, each of which have a different meaning.

LED	Color	On	Off	Flashing
①, ② (Line ok)	Red	Voltages and frequencies within the set limit values	Voltages or frequencies outside the set limit values	Delay time or error
⑤ (ON)	Green	Switching device closed	Switching device open	Switching device is being actuated
	Red			Alarm timeout
		If the auxiliary (feedback) signals have been correctly connected to the programmable inputs, the LEDs indicate the status of the switching devices. Otherwise they show the status of the control outputs.		
⑥ (WITHDRAWN)[1)]	Red	Circuit-breaker removed (drawer units)	Circuit-breaker inserted correctly (drawer units)	Circuit-breaker removed alarm
⑦ (TRIP)[1)]	Red	"Tripped" signal without alarm	No tripping	"Tripped" signal with alarm

LED	Color	On	Off	Flashing
③ (ALARM)	Red	–	No active alarm	One or more alarms active
④ (TEST)	Green	Automatic test active	Automatic test deactivated	Automatic test running
	Red			Real-time clock not set

1) If the corresponding signals have been correctly connected to the programmable inputs, the LEDs indicate the status of the circuit-breakers. Otherwise the LEDs remain off.

2.4 Selecting the operating mode

With the four keys TEST, AUT, MAN, OFF/RESET (③, ④, ⑤, ⑥) you can select the required operating mode, which is then indicated by the associated red LEDs.

The NZM-XATS-C144 remains in its selected operating mode when it is switched off and on again.

A flashing operating mode LED indicates that the NZM-XATS-C144 is communicating through the serial interface and performing any commands issued remotely, including a change of operating mode.

2.4.1 OFF-RESET mode

In this mode the NZM-XATS-C144 is disabled and does not perform any actions.

All displays and the status LED remain active.

If the transfer devices are pulse-controlled in OFF/RESET mode, both controllers remain disabled. If continuous signal actuation is used, the behavior can be selected with parameter P2.25 (→ Page 25).

Programming menus can be called up only in OFF/RESET mode.

Once the cause of an alarm has been rectified, active alarm signals can be cleared with the OFF/RESET key.

2.4.2 MAN mode

In MAN mode you can control the switching devices manually by pressing keys (⑦ and ⑧, → Figure 3, Page 8) for at least 300 ms.

Each keystroke changes the switching device's status. The command is not taken unless a time of at least one second has passed since the last switching operation.

When the manual command for closing one switching device is given at the NZM-XATS-C144 while the other is closed, the other switching device is opened before the actuated switching device is closed after the programmed delay time.

If the standby supply is provided by a generator, the generator can be switched on or off by pressing the MAN key for at least 5 seconds.

2.4.3 AUT mode

In automatic mode the NZM-XATS-C144 opens and closes the switching devices and switches the generator (if present) on and off without user interaction.

If the main supply values lie outside the limit values (red LED LINE 1/LINE 2 off, → Figure 5, Page 10 ① and ②), the NZM-XATS-C144 isolates the consumer from the main supply and switches in the standby supply after the set timed delay. The Automatic Transfer Switch-Controller controls both switching and lead time of the generator (if present) and the timed delay.

The NZM-XATS-C144 can be programmed to isolate the switching device from the main supply either before or after standby power is available.

When the main supply voltage returns to within its limit value again, the NZM-XATS-C144 switches the consumer back to main supply and, if applicable, controls generator cooling (run-on time).

The transfer times depend on the type of connection (mains/mains, mains/generator, generator/generator) and on the switchgear used (circuit-breakers with motor operator, motorized switch, or contactor).

2.4.4 TEST mode

In operating mode TEST the correct function of the generator can be verified without altering the mains supply voltage.

When you select TEST operating mode, the standby supply generator starts up immediately.

Both voltage measurements remain active and, if a deviation in the mains supply occurs during the test, the consumer is automatically transferred to the standby supply.

As long as the main supply voltage remains within its specified limits, the consumer remains connected to it and the generator operates without load (idle test).

To transfer the consumer to the generator supply for a load test, press keys ③ (TEST) and ⑦ (ON/OFF line 2) together for five seconds.

When a consumer has been switched to the generator in TEST mode – either due to a fault in the main supply or for a load test – it remains connected to the standby supply until you select AUT mode.

The delay and interlocking times are the same as in operating mode AUT.

2.4.5 Automatic generator test

The automatic test consists of a periodic generator start cycle intended to test the generator's efficiency when the NZM-XATS-C144 is in AUT mode.

The frequency and duration of the automatic test are user-definable. For a description of all automatic test parameters select menu P8 (→ Section "4.2.8 Menu P8 - Automatic generator test", Page 32).

The TEST LED on the keypad indicates that automatic testing is active. Activate or disable automatic testing with parameter P8.01 or by pressing key ② followed by key ③. This does not change the operating mode of the NZM-XATS-C144.

2.4.6 Simulation of main supply failure

In AUT mode you can simulate a main incoming supply power failure with a duration of one minute.

The NZM-XATS-C144 responds in the same way and with the delay times programmed for automatic mode. This lets you check for a correctly functioning transfer process.

In AUT mode press keys AUT and ON/OFF for line 2 together for ten seconds.

Throughout the procedure the display reads "F.SI" (fault simulation).

To terminate the simulation prematurely, press and hold both the AUT key and the ON/OFF key for line 2 for ten seconds or switch to the OFF/RESET mode.

2.5 Voltage measurements

All conditions that define whether or not a power source is suitable are user-definable in menu P1 (→ Section "4.2.1 Menu P1 – Rating data", Page 23) and in menus P3 and P4 (→ Section "4.2.3 Menu P3 – voltage monitor, line 1", Page 26 and → Section "4.2.4 Menu P4 – voltage monitor, line 2", Page 27).

In menu P1 you can set the system's ratings, such as rated operating voltage and frequency. These are used as reference values for setting the percentage thresholds.

You can set a voltage ratio (TV) when a lower voltage than the system's actual voltage is applied at the voltage inputs of the NZM-XATS-C144. In this case, too, the set and indicated threshold values refer to the system's actual values.

The NZM-XATS-C144 can be set for voltage measurements in three-phase systems with or without neutral conductor, in two-phase systems or in single-phase systems (P1.03, → Page 23).

For two- and three-phase systems you can select whether the phase-to-phase voltage, the phase-to-earth voltage or both will be monitored (P1.04, → Page 23). The rated operating voltage set with P1.01 must always equal the phase-to-phase voltage.

The table below lists the measurements taken in each of the lines. The OFF column indicates that the corresponding measurement can be disabled.

Metering	Description	OFF
Minimum voltage	One or more phases too low.	
Maximum voltage	One or more phases too high.	●
Phase failure	Threshold value below which the device responds faster than at normal undershoot.	●
Voltage unbalance	Voltage phases between the min./max. limit values but not symmetrical to each other.	●
Minimum frequency	Frequency too low.	●
Maximum frequency	Frequency too high.	●
Phase sequence	Phase direction reversed.	●

A specific timed delay is associated with each deviation. A supply fault is said to occur when the deviation is longer than the set delay.

When all line parameters are within the specified limit values again, the mains is considered usable again only after the delay time. This period is defined with two independent parameters. One of these defines the delay for the case that the standby supply is present (P3.16 or P4.16, → Page 26), and the other the (usually) shorter delay for the case that no standby supply exists (P3.15 or P4.15, → Page 26).

All measurements except for minimum voltage can be disabled independently of each other by setting the corresponding parameter to OFF.

The limit values for minimum and maximum voltage are defined with two threshold values. One of these defines the point from which the voltage is no longer regarded as acceptable (for example P3.01, drop-out value), and the other – which lies closer to the rated operating voltage – defines the point from which it is acceptable again (for example P3.02, pick-up value). The difference between these two threshold values is the hysteresis. You can specify, for example, that the voltage below 80 % rated operating voltage can no longer be used and that, to make it usable again, it must rise above 85 %, giving a hysteresis (or dead-band) of 5 %. The same principle applies to the maximum voltage.

For the frequency thresholds the hysteresis is fixed at 1 % rated frequency.

At phase failure the threshold value is the same as for minimum voltage.

2.6 Alarms

When an alarm occurs, the NZM-XATS-C144 displays either a code (→ Table 1) on the display or the alarm LED lights up.

Non-retentive alarms are displayed only as long as the alarm conditions apply. Retentive alarms must be acknowledged with a manual reset with the OFF/RESET key on the keypad. This also switches the NZM-XATS-C144 to OFF mode.

In the event of an alarm the programmable outputs configured as Alarm output (ALA) and as Ready (RDY) are deactivated (→ Section "4.2.6 Menu P6 – Programmable outputs", Page 30).

To disable an alarm, set the associated threshold value to OFF. Example: To disable alarm A01 set parameter P2.20 to OFF.

The table below lists the possible alarms and their meaning. Column MOD indicates the operating mode (**O**FF, **M**AN, **A**UT, **T**EST) in which the alarm can occur.

Table 1: Alarm codes

Code	Description	Explanation	MOD
A01	Battery voltage too low	Battery voltage outside thresholds for more than the set delay time (P2.20, P2.21 and P2.22, → Page 25).	O M A T
A02	Battery voltage too high		O M A T
A03	Timeout, switching device in line 1	The switching device has not executed the pickup/drop out command within the set time. When the alarm has triggered, the pick up/drop out command is cleared. The alarms are generated only when at least one of the two threshold values for the supply is present, i.e. lies above the programmed minimum threshold value (→ Section "4.2.3 Menu P3 – voltage monitor, line 1", Page 26 and → Section "4.2.4 Menu P4 – voltage monitor, line 2", Page 27).	A T
A04	Timeout, switching device in line 2		A T
A05	Incorrect phase sequence, line 1	The phase sequence readings for phases 1 and 2 do not correspond with the set phase sequence.	O M A T
A06	Incorrect phase sequence, line 2		O M A T
A07	Timeout, consumer without power	The consumer remains without power for longer than the time set with P2.11 (→ Page 24) because the supply cables were not available or because both switching devices remain open. The alarm is not triggered when opening was caused by the programmable input configured as standby (→ Section "4.2.5 Menu P5 – Programmable inputs", Page 28).	A T
A08	Generator not ready	Can be triggered by opening programmable input "Generator not ready" (GR.2) or when the required rated mains voltage is not present within the time specified with P2.11 (→ Page 24) after the generator has been switched on. If the alarm is generated by the external input, it is non-retentive. Otherwise it is retentive and must be reset with the RESET/OFF key. In systems with two generators A08 is shown on the display for line 1 or 2, depending on which generator has triggered the alarm.	O M A T
A09	Emergency	Alarm is triggered by opening the external emergency signal at programmable input configured as EME (→ Section "4.2.5 Menu P5 – Programmable inputs", Page 28). Both switching devices open.	O M A T
LED	WITHDRAWN Circuit-breaker removed, line 1/2	Triggered by closing of the programmable input configured as Withdrawn (functions DR.1 and DR.2, → Section "4.2.5 Menu P5 – Programmable inputs", Page 28). The commands for opening and closing the affected circuit-breakers are then disabled.	A T
LED	TRIP Protective device response Circuit-breaker, line 1/2 (trip)	Triggered by closing of the programmable input configured as Trip (functions TR.1 and TR.2, → Section "4.2.5 Menu P5 – Programmable inputs", Page 28). The commands for opening and closing the affected circuit-breakers are then disabled.	A T

2.7 Diagnostic alarms

The display of the NZM-XATS-C144 displays messages with information about performing a function or about an unusual situation.

When you press one of the measurement selection keys, the diagnostic display is briefly suppressed to display the reading.

Messages	Meaning
StA	Generator start
Coo	Generator cooling
FSi	Mains failure simulation
----	Interlock time running
toL	Load test running
Set rtc	Real-time clock must be set (P2.23, → Page 25)
Loc	Keypad blocked
Unl	Keypad unlocked
S.by	Device set to standby through external input
Lo SUP	Supply voltage too low

2.8 Keypad lock

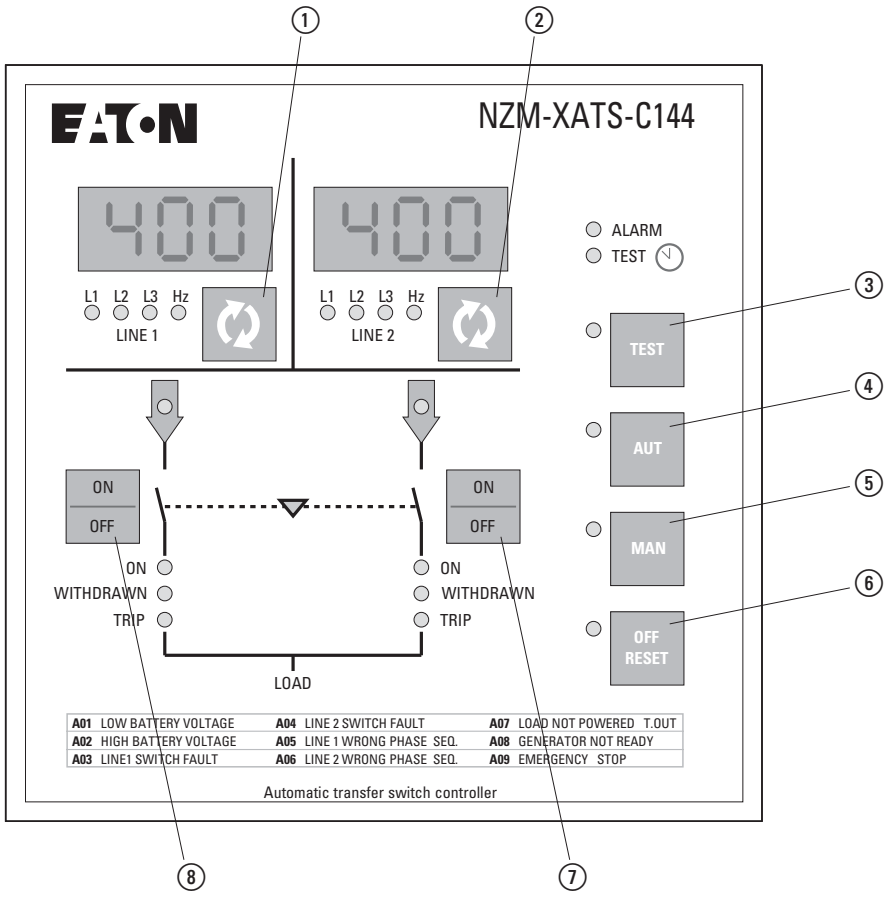

Figure 6: Control panel, keypad

The keys of the NZM-XATS-C144 can be locked through a programmable input, function LOC (→ Page 29) or with a specific key combination.

With the key lock active, only readings can be viewed. You can not change operating mode or manually operate the switching devices. Only keys ① and ② for measurement selection remain active.

When you press a locked key, the display shows "Loc".

- ▶ To lock or unlock the keypad, press and hold key ② and press key ① three times without releasing it at the end.
- ▶ Then release key ② and press it five times before releasing both keys.

When the keypad is locked, the display shows "Loc". When you unlock the keypad, the display shows "UnL".

2.9 Remote control

Through its serial interface the NZM-XATS-C144 can be connected with a PC to program and control the device remotely using the software NZM-XATS-CSOFT or a SCADA software that supports the Modbus protocol.

The NZM-XATS-C144 can be connected directly point-to-point through its serial RS232 interface and cable No. 51C2.

Through its RS485 interface the NZM-XATS-C144 can be connected in a multidrop configuration; see the circuit diagrams below (→ Section "5.8 RS485 interface for connecting", Page 45).

In addition the system can be configured for remote control through a standard or GSM modem. When a GSM modem is used, the AUTOCALL function can be used to send an SMS or e-mail notification message in the event of an alarm or event. For further details about connecting modems and the AUTOCALL function see manual MN01219006Z for software NZM-XATS-CSOFT.

3 Applications

3.1 Application line/generator

In the line/generator application (U–G, default setting), the consumer is normally connected to the mains supply (LINE 1).

After a voltage or frequency deviation a start signal is sent to the generator (LINE 2) after the delay specified with P2.15 (→ Page 25).

When the generator voltage lies within the programmed limit values, the consumer is switched to the generator.

When the mains supplies the required quality again, the consumer is switched back to mains supply and the generator continues to run for the duration specified with P2.16 (→ Page 25) to cool down.

The NZM-XATS-C144 sends a Start/Stop command to the generator through a programmable output and can receive digital signals from the generator through programmable inputs for indication of generator status (generator ready, ready to connect consumer, etc.).

An automatic generator test can be programmed, i.e. the generator can be started for a function test at specified times. This is also possible when the mains supply lies within its limit values. To enable automatic generator testing, the test interval, start time, weekday on which the test is to be run, test duration, etc. must be specified. To set up automatic testing, use setup menu P8 (→ Section "4.2.8 Menu P8 - Automatic generator test", Page 32).

→ Section "5 Circuit diagrams", Page 36

3.2 Application line/line

In the line/line application (U–U, utility–utility) the consumer is normally connected to the main supply and is switched to the standby power source when a deviation occurs in the main source or an external transfer signal is issued.

→ Section "5 Circuit diagrams", Page 36

3.3 Application generator/generator

In this case two generators are controlled, each with a programmable output with functions GC.1 and GC.2 (→ Section "4.2.6 Menu P6 – Programmable outputs", Page 30) and, if present, feedback signals.

In this application a generator transfer can be set up, i.e. the consumer can be switched from one generator to the other at regular intervals to balance out the load on the two generators.

You can also set a time of day at which the switch takes place to disconnect the consumer at a specific time (→ Section "4.2.8 Menu P8 - Automatic generator test", Page 32).

When a problem occurs at one of the generators, the consumer is automatically transferred to the other generator.

3.4 The EJP (Effacement Jours Pointe) function

This function allows the consumer to be switched from the main supply to standby power (usually a generator) for the duration of a tariff period with higher prices. For applications that require the EJP function two programmable inputs can be used to define functions S.GE (start generator) and E.TR (external transfer) (→ Section "4.2.5 Menu P5 – Programmable inputs", Page 28).

A generator start delay can be specified with parameter P2.26 (→ Page 25).

At the end of this tariff period the consumer is switched back to the main supply by opening the two input signals.

3.5 Actuation

3.5.1 Actuation of switching devices

The NZM-XATS-C144 can control various switching devices, such as circuit-breakers with motor operator, transfer switches with motor operator or contactors for system transfer.

Depending on the switchgear used in combination with the NZM-XATS-C144 the appropriate circuit diagram and the required configuration for the programmable inputs and outputs must be used.

By default the programmable outputs are configured for the use of circuit-breakers with motor operator (→ Section "5.2 Actuation of circuit-breakers with motor operator", Page 37).

The switchgear status feedback signals must be wired to the programmable inputs to ensure reliable system operation.

It is possible, however, to not implement this function and use the programmable inputs for other purposes. In this case the NZM-XATS-C144 responds as if the switching device executes the transmitted command immediately.

> *NOTICE*
>
> If feedback signals are not used, the NZM-XATS-C144 issues an Open command when it is switched on to bring the switching devices into a defined position.

If feedback signals are used, the NZM-XATS-C144 does not issue any commands to the switchgear when it is switched on as long as the status of the corresponding line (1 or 2) lies within the specified values.

The built-in control relays are not electrically or mechanically interlocked. An electrical interlock must be implemented by wiring the programmable inputs to functions FB.1 and FB.2 (→ Section "4.2.5 Menu P5 – Programmable inputs", Page 28).

CAUTION

For increased safety, implement a mechanical interlock of the circuit-breakers or contactors, observing also national regulations.

3.5.2 Actuation of circuit-breakers with motor operator

To actuate circuit-breakers with motor operator four programmable outputs (commands Open and Close for line 1 and for line 2) and two programmable inputs for status feedback from the circuit-breakers are required. Further optional programmable inputs for alarm signals, actuating protective devices (withdrawn and TRIP) may be required.

The Open and Close commands can be issued as continuous or pulse signals. The signaling mode can be selected with parameter P2.07 (→ Page 24). Signaling times are set with the two parameters P2.09 and P2.10 (→ Section "4.2.2 Menu P2 – General data", Page 24).

When a circuit-breaker does not respond to a close command, the NZM-XATS-C144 sends an Open signal followed by a further Close signal before issuing a timeout alarm if the circuit-breaker still fails to close.

The delay between the Open and Close commands for a circuit-breaker is 0.5 seconds.

When an Open command is sent to the circuit-breaker the programmable inputs configured as TRIP are ignored for a time window of 15 seconds. This prevents erroneous alarms when a circuit-breaker temporarily transmits a TRIP signal as the tripping coil opens.

3.5.3 Actuation of motorized switchgear

The application with motorized switching devices is similar to the actuation of circuit-breakers with motor operators. Here, however, only three outputs (commands for closing lines 1 and 2 and opening both lines) and two inputs for switching device status are required.

Required are functions CL.1, CL.2 and OP.A for the programmable outputs (→ Section "4.2.6 Menu P6 – Programmable outputs", Page 30) and functions FB.1 and FB.2 for the programmable inputs (→ Section "4.2.5 Menu P5 – Programmable inputs", Page 28).

Pulsed and continuous signal command mode can be selected. The signaling mode can be selected with parameter P2.07 (→ Page 24). Signaling times are set with the two parameters P2.09 and P2.10 (→ Section "4.2.2 Menu P2 – General data", Page 24).

3.5.4 Actuation of contactors

If two contactors are used, two programmable outputs (CL.1 and CL.2, → Section "4.2.6 Menu P6 – Programmable outputs", Page 30) and two programmable inputs (→ Section "4.2.5 Menu P5 – Programmable inputs", Page 28) are required for status feedback.

In this case parameter P2.07 must have the value for contactors (P2.07 = CNT, → Page 24).

4 Parameter setup

4.1 Setting the parameters (Setup)

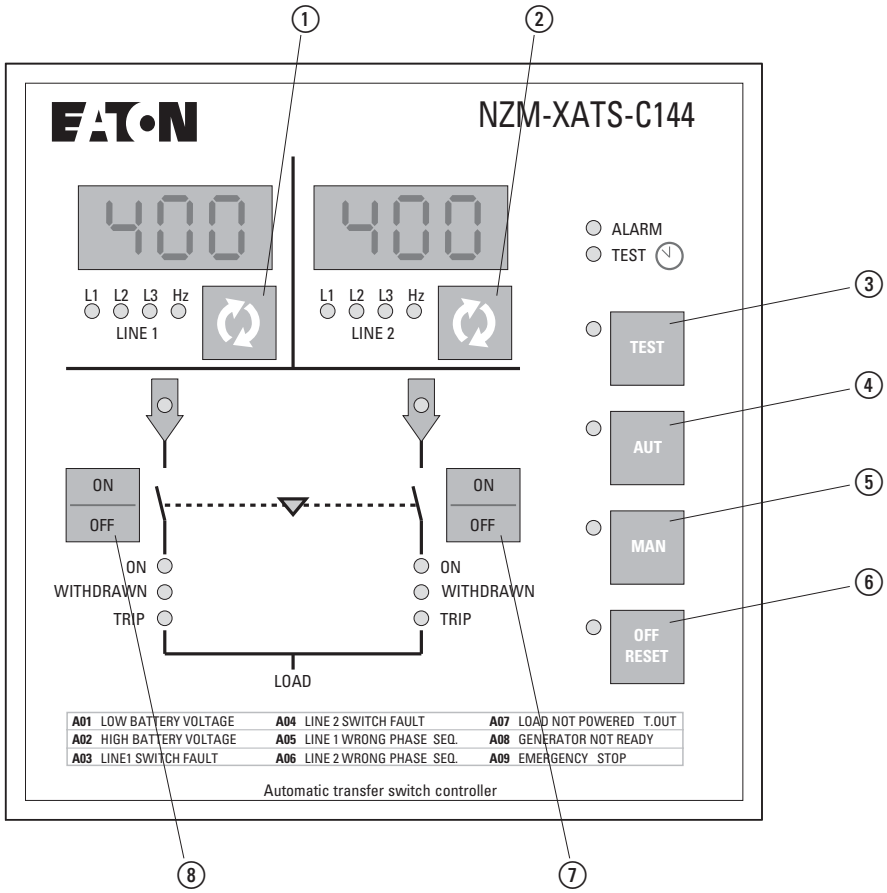

Figure 7: Keypad, pushbuttons

When the NZM-XATS-C144 is in OFF/RESET mode, press and hold keys ① and ⑥ at the same time for five seconds.

The display for LINE 1 shows the code of the first parameter P1.01, i.e. menu P1, parameter 01.

To move between the parameters within a menu, use keys ① and ⑧.

To select the previous or next menu, use keys ③ and ④.

The parameter designation is shown in the display for LINE 1 and the current setting on the display for LINE 2.

To change the value of the selected parameter, use keys ② and ⑦.

The setting is saved automatically when you select another parameter or exit the menu.

To exit the parameter setup menu, press key ⑥.

If you do not press a key for more than two minutes, the device automatically exits the setup menu without saving your changes.

4.2 Menu table

MENU	Description
P1	System rating data
P2	General data
P3	Voltage measurement, line 1
P4	Voltage measurement, line 2
P5	Programmable inputs
P6	Programmable outputs
P7	Communication ports
P8	Automatic generator test

4.2.1 Menu P1 – Rating data

PAR	Function	Range	Explanation	Default
P1.01	Rated operating voltage U_e of system (L-L)	100 - 690 V~	To calculate the thresholds for rated operating U_e, expressed in percent of U_e. For two- and three-phase systems set the phase-to-phase voltage (L-L).	400
P1.02	Voltage ratio TV	1.00 - 9.99	Translation ratio of set voltage to applied voltage	1.00
P1.03	Connection type	3.nE – three phases + neutral 3Ph – three phases 2Ph – two phases 1Ph – one phase	Specified the monitored network type. The setting “three phases” or “three phases + neutral” only has an effect on the display.	3.nE
P1.04	Type of voltage measurement	L-L – Phase-to-phase voltage L-n – Phase to neutral voltage LLn – Phase-to-phase voltage + phase-to-neutral voltage	Indicates whether the voltage measurement applies for phase-to-phase voltages, phase-to-neutral voltage or both.	L-L
P1.05	Rated frequency	50 Hz 60 Hz	Rated frequency used as reference for frequency threshold values.	50 Hz
P1.06	Rated operational battery voltage	OFF 12 – 12 V 24 – 24 V 48 – 48 V	Used for battery voltage alarms.	OFF

4.2.2 Menu P2 – General data

PAR	Function	Range	Explanation	Default
P2.01	Type of application	U-G = mains/generator U-U = mains/mains G-G = generator/generator	Specifies the application type, i.e. with or without generator, an allows management of the associated I/O signals.	U-G
P2.02	Phase sequence measurement	OFF – Switched off 123 – Direct 321 – Inverted	Checks the connected against the set phase sequence.	OFF
P2.03	Selection of main supply source	-1- line 1 -2- line 2	Specifies the main power supply source, i.e. the mains that supplies the consumer when both sources are available.	-1-
P2.04	Interlock time line 1 → line 2	0.1 - 90.0 s	Time between opening of switching device 1 and closing of switching device 2.	6.0 s
P2.05	Interlock time line 1 ← line 2	0.1 - 90.0 s	Time between opening of switching device 2 and closing of switching device 1.	6.0 s
P2.06	Transfer behavior	OBP – Open before presence OAP – Open after presence	OBP (Open Before Presence) means that in automatic mode the Open command is issued to a switching device when the affected line lies outside the limit values, irrespective of the status of the standby line. OAP (Open After Presence) means that the command for opening a switching device in operating mode AUT is sent only when the standby supply lies within the limit values.	OBP
P2.07	Type of switching device actuation	PUL – Pulse CON – Continuous CNT – Contactors	Specifies whether the programmable outputs are continuously active (application with switchgear without feedback function) or must be in pulse mode, i.e. active until the switching device is in the required position. When pulse mode is selected, the command is extended by a set time (→ P2.09 and P2.10) even after the position has been reached.	PUL
P2.08	Maximum time for switching device actuation (A03-A04 alarm delay)	1 - 900 s	If a switching device is not in the correct position after an Open or Close command after this time, alarm A03 or A04 is triggered. Works only when the switching device's auxiliary contacts are wired to the corresponding programmable inputs (FB.1 and FB.2, → Section "4.2.5 Menu P5 – Programmable inputs", Page 28).	5 s
P2.09	Open command duration	0.0 - 60.0 s	Minimum duration of an Open command. Where switching devices with motor operator are used, this time must be long enough to allow full tensioning of the springs. This setting is also used when the NZM-XATS-C144 is in continuous signal mode. For NZM and IZM at least 3 s.	10.0 s
P2.10	Close command duration	1.0 - 60.0 s	Duration of the Close command pulse signal.	1.0 s
P2.11	Max. time for which the consumer is without power (Response delay alarm A07)	OFF/1 - 3600 s	If both supply lines are unavailable for more than the time specified with P2.11 in automatic mode, alarm A07 is issued.	60 s
P2.12	Inhibit of automatic transfer to main supply	OFF – Switched off ON – Inhibit activated	When this parameter is set to ON, the Automatic Transfer Switch-Controller does not automatically transfer the consumer back to main supply once it has ben transferred to standby power.	OFF
P2.13	Delay time before transfer	OFF/1 - 300 s	Pre-transfer output delay time before a transfer from one supply line to the other.	OFF
P2.14	Delay time after transfer	OFF/1 - 300 s	Post-transfer output delay time after a transfer from one supply line to the other.	OFF

PAR	Function	Range	Explanation	Default
P2.15	Generator start delay	0 - 900 s	Time between the occurrence of a fault in line 1 and transmission of the Start signal to the standby line generator. This time is not affected by the switching device's opening time.	1 s
P2.16	Generator cooling time	1 - 3600 s	Time for which the generator remains operational for cooling after being isolated from the consumer.	120 s
P2.17	Generator start interval	OFF/1 h/2h/3h/4h/6h/8h/ 12h/1 d/2d/3d/4d/5d/6d/7d	With these parameters you can specify a timed transfer in generator/generator applications, whereby the priority is transferred between the two generators. P2.17 is the transfer interval between the two generators. The time of day at which the transfer takes place is defined with P2.18 and P2.19. If the transfer interval is more than 24 hours, a transfer takes place every n days. If it is more than 24 hours, the transfer takes place at the specified time and at the corresponding intervals. If, for example, the time is set to 12:30 and the transfer to an interval of six hours, transfers take place at 12:30, 18:30, 0:30, etc.	OFF
P2.18	Generator start hour	0 - 23		12
P2.19	Generator start minute	0 - 59		0
P2.20	Battery minimum voltage threshold	OFF/70 - 100 %	Specifies the minimum threshold value relative to the value of P1.06.	75 %
P2.21	Battery maximum voltage threshold	OFF/110 - 140 %	Specifies the maximum threshold value relative to the value of P1.06.	130 %
P2.22	Battery threshold value delay	0 - 60s	Response delay for the battery alarm, relative to P2.20 and P2.21. This also delays the global alarm output and the alarm LED.	10 s
P2.23	Set clock on startup	OFF/On	Specifies whether the NZM-XATS-C144 prompts the user to set the real-time clock when it is started up (message Set rtc). If the real-time clock of the NZM-XATS-C144 is not set, it returns to the default value.	ON
P2.24	Activate voltage measurement in MAN mode	OFF/On	Activates or disables voltage measurement in MAN mode. When measurement is active, no transfer between the two lines takes place. When measurement for the selected line (1 or 2) exceeds the set limit values, the NZM-XATS-C144 opens the switching device automatically. When the line returns to within its limit values, the NZM-XATS-C144 closes the switching device.	OFF
P2.25	Continuous command signal in RESET/OFF mode	OFF – Opens the command outputs Noc – Leaves the outputs unchanged	Specifies the behavior of the Open/Close command outputs in continuous signal mode when the NZM-XATS-C96 is in RESET/OFF mode. Used for applications with contactors.	Noc
P2.26	EJB start delay	OFF/1 - 3600 s	Delay between the EJP start signal and the actual start signal to the generator.	OFF

4.2.3 Menu P3 – voltage monitor, line 1

PAR	Function	Range	Explanation	Default
P3.01	Trip, minimum voltage threshold	70 - 98 %	The first two parameters specify the minimum voltage threshold value and the associated hysteresis on recovery. P3.02 can have a lower value than P3.01. P3.03 specifies the tripping delay (→ Section "2.5 Voltage measurements", Page 13).	85 %
P3.02	Recovery, minimum voltage threshold	75 - 100 %		90 %
P3.03	Delay, minimum voltage threshold	0.1 - 900 s		1.0 s
P3.04	Trip, maximum voltage threshold	102 - 120 %/OFF	These two parameters specify the maximum voltage threshold value and the associated hysteresis on recovery. P3.05 can have a higher value than P3.04. When P3.04 is OFF, maximum voltage measurement is disabled (→ Section "2.5 Voltage measurements", Page 13).	115 %
P3.05	Recovery, maximum voltage threshold	100 - 115 %		110 %
P3.06	Delay, maximum voltage threshold	0.1 - 900 s	Specifies the delay at maximum voltage.	1.0 s
P3.07	Phase failure threshold	60 - 85 %/OFF	Voltage threshold below which a phase failure causes a response, usually faster than the drop. The delay on phase failure is specified with P3.08.	70 %
P3.08	Delay, phase failure threshold	0.1 - 30.0 s		0.1 s
P3.09	Voltage asymmetry threshold	1 - 20 %/OFF	Specifies the maximum threshold value for asymmetry between the phases relative to rated operating voltage.	15 %
P3.10	Delay, voltage asymmetry threshold	0.1 - 900 s	Specifies the associated response delay. This measurement can be disabled by setting P3.09 to OFF.	5.0 s
P3.11	Minimum frequency threshold	OFF/80 - 100 % Fe	Threshold value (can be disabled) and response delay for minimum frequency.	95 %
P3.12	Delay, minimum frequency threshold	0.1 - 900 s		5.0 s
P3.13	Maximum frequency threshold	101 - 120 % Fe/OFF	Threshold value (can be disabled) and response delay for maximum frequency.	105 %
P3.14	Delay, maximum frequency threshold	0.1 - 900 s		3.0 s
P3.15	Restore line 1 if within limit value delay (if line 2 not available)	1 - 3600 s	Delay when line 1 lies within the limit values again and line 2 is not available. Normally shorter than P3.16 since when the consumer is without power, power must be urgently supplied.	10 s
P3.16	Restore line 1 if within limit value delay (if line 2 is available)	1 - 3600 s	Delay when line 1 lies within the limit values again and the consumer can be connected to line 2. Normally longer than P3.15 since when the consumer has power it is safe to wait longer before the restored supply is considered stable.	60 s

4.2.4 Menu P4 – voltage monitor, line 2

PAR	Function	Range	Explanation	Default
P4.01	Trip, minimum voltage threshold	70 - 98 %	The first two parameters specify the minimum voltage threshold value and the associated hysteresis on recovery. P4.02 can have a lower value than P4.01. P4.03 specifies the tripping delay (→ Section "2.5 Voltage measurements", Page 13).	85 %
P4.02	Recovery, minimum voltage threshold	75 - 100 %		90 %
P4.03	Delay, minimum voltage threshold	0.1 - 900 s		1.0 s
P4.04	Trip, maximum voltage threshold	102 - 120 %/OFF	These two parameters specify the maximum voltage threshold value and the associated hysteresis on recovery. P4.05 can have a higher value than P4.04. When P4.04 is OFF, maximum voltage measurement is disabled (→ Section "2.5 Voltage measurements", Page 13).	115 %
P4.05	Recovery, maximum voltage threshold	100 - 115 %		110 %
P4.06	Delay, maximum voltage threshold	0.1 - 900 s	Specifies the delay at maximum voltage.	1.0 s
P4.07	Phase failure threshold	60 - 85 %/OFF	Voltage threshold below which a phase failure causes a response, usually faster than the drop. The delay on phase failure is specified with P4.08.	70 %
P4.08	Delay, phase failure threshold	0.1 - 30.0 s		0.1 s
P4.09	Voltage asymmetry threshold	1 - 20%/OFF	Specifies the maximum threshold value for asymmetry between the phases relative to rated operating voltage.	15 %
P4.10	Delay, voltage asymmetry threshold	0.1 - 900 s	Specifies the associated response delay. This measurement can be disabled by setting P4.09 to OFF.	5.0 s
P4.11	Minimum frequency threshold	OFF/80 - 100 % Fe	Threshold value (can be disabled) and response delay for minimum frequency.	95 %
P4.12	Delay, minimum frequency threshold	0.1 - 900 s		5.0 s
P4.13	Maximum frequency threshold	101 - 120 % Fe/OFF	Threshold value (can be disabled) and response delay for maximum frequency.	105 %
P4.14	Delay, maximum frequency threshold	0.1 - 900 s		3.0 s
P4.15	Restore line 2 if within limit values (if line 1 is not available)	1 - 3600 s	Delay when line 1 lies within the limit values again and line 2 is not available. Normally shorter than P4.16 since when the consumer is without power, power must be urgently supplied.	10 s
P4.16	Restore line 2 if within limit values (if line 1 is available)	1 - 3600 s	Delay when line 1 lies within the limit values again and the consumer can be connected to line 2. Normally longer than P4.15 since when the consumer has power it is safe to wait longer before the restored supply is considered stable.	60 s

4.2.5 Menu P5 – Programmable inputs

PAR	Function	Terminal	Function	Default
P5.01	Function of programmable input 1	4.1	→ Table 2	FB.1
P5.02	Function of programmable input 2	4.2	→ Table 2	FB.2
P5.03	Function of programmable input 3	4.3	→ Table 2	TR.1
P5.04	Function of programmable input 4	4.4	→ Table 2	TR.2
P5.05	Function of programmable input 5	4.5	→ Table 2	E.TR
P506	Function of programmable input 6	4.6	→ Table 2	IN.R
P5.07	Function of programmable input 7	4.7	→ Table 2	OFF
P5.08	Function of programmable input 8	4.8	→ Table 2	OFF

Table 2: Functions of programmable inputs

COD	Function
OFF	Input not used
FB.1	Switching device on line 1 closed (feedback 1) Auxiliary contact that indicates to the NZM-XATS-C144 whether the switching device for line 1 is open or closed. If this signal is not connected, the NZM-XATS-C144 specifies the status of the switching device from the status of the control outputs.
FB.2	Switching device on line 2 closed (feedback 2) As FB.1 but for line 2
TR.1	Circuit-breaker, line 1 tripped (trip 1) When this contact is closed, an alarm “Tripped circuit-breaker, line 1” is generated.
TR.2	Circuit-breaker, line 2 tripped (trip 2) As TR.1 but for line 2
dr.1	Circuit-breaker, line 1 removed (Withdrawn 1) When this contact is open, an alarm “Circuit-breaker, line 1 removed” is generated.
dr.2	Circuit-breaker, line 2 removed (Withdrawn 2) As dr.1 but for line 2.
E.TR	Transfer to standby line When the contact is closed, a transfer to the standby line takes place even if the main supply voltage lies within the limit values. Can be used for changing the priorities between line 1 and line 2. The switching device for the standby supply remains active as long as the values for this line lie within the limit values. Can be used for the EJP function.
IN.R	Automatic transfer to main supply inhibited When this contact is closed, it prevents a transfer back to the main supply in AUT mode when the main supply lies within the limit values again. Used to prevent the back transfer at an unforeseeable time causing a further power interruption. When circuit-breakers IZM are used their Operational signalling switch can be used to ensure that the IZM of the main supply is operational. On motor operators NZM the Operational signal at terminal 75 can be used.
S.GE	Start generator When this contact is closed in AUT mode, the generator starts after the time set with P2.26. Can be used for the EJP function.
EME	Emergency When this N/C contact is open, both switching devices open and alarm A09 is triggered.

COD	Function
Size 1	Generator ready 1 This contact closes to indicate that the generator for line 1 is ready for operation. If this signal is missing, alarm A08 is issued.
Size 2	Generator ready 2 This contact closes to indicate that the generator for line 2 is ready for operation. If this signal is missing, alarm A08 is issued.
E.L1	Enable load 1 Issues the enable for connection of the consumer to line 1 in addition to the internal control.
E.L2	Enable load 2 As E.L1 but for line 2
E.C1	External control, line 1 This signal indicates that line 1 lies within the limit values. Replaces internal controls.
E.C2	External control 2 As E.C1 but for line 2
LOC	Keypad lock When this contact is closed all key functions on the keypad except for measurement indication are locked.
L.PA	Lock parameters When this contact is closed access to the setup menus is blocked.
L.rc	Lock remote control When this contact is closed, write access through serial interfaces is blocked.
S.by	Stand-by When this contact is activated, the transfer device opens and any generators are switched off.

4.2.6 Menu P6 – Programmable outputs

PAR	Function	Terminal	Function	Default
P6.01	Function of programmable output 1	1.1	→ Table 3	OP.1
P6.02	Function of programmable output 2	1.3	→ Table 3	CL.1
P6.03	Function of programmable output 3	2.1	→ Table 3	OP.2
P6.04	Function of programmable output 4	2.3	→ Table 3	CL.2
P6.05	Function of programmable output 5	3.1	→ Table 3	RDY
P6.06	Function of programmable output 6	3.3-3.4	→ Table 3	GC.2
P6.07	Function of programmable output 7	3.6-3.7	→ Table 3	ALA

Table 3: Function of programmable outputs

COD	Function
OFF	Output not used
OP.1	Open line 1 circuit-breaker (Open 1) This contact closes to open the circuit-breaker for line 1. Can remain activated after actuation or be released, depending on the setting of P2.07 (→ Page 24). (Do not use for contactors or motorized changeover switches.)
CL.1	Close line 1 switching device (Close 1) This contact closes to close the switching device for line 1. Can remain activated after actuation or be released, depending on the value of P2.07 (→ Page 24).
OP.2	Open line 2 circuit-breaker (Open 2) As OP.1 but for line 2.
CL.2	Close line 2 switching device (Close 2) As CL.1 but for line 2.
OP.A	Open both lines (Open All) Used to switch motorized changeover switches to their neutral position; both lines open
GC.1	Generator control 1 Start/Stop control for the generator in line 1. When this contact is closed, it issues the the Generator Off command. Used in generator/generator applications.
GC.2	Generator control 2 Start/Stop control for the generator in line 2. When this contact is closed, it issues the the Generator Off command. Used in mains/generator and generator/generator applications.
RDY	NZM-XATS-C144 ready Indicates that the device is in automatic mode, that no alarms are active and that it is ready for operation.
ALA	Global alarm Output active under standard conditions and deactivated when any alarm present.
L.SH	Shed of low-priority loads Isolates non-priority loads that are not supplied with standby power. Also controlled in manual mode. The contact closes before the Close standby line command and opens before the Close main line command.
PrE	Pre-transfer This output is active for the time specified with P2.13 (→ Page 24) before the consumer is transferred from one supply line to the other.

COD	Function
PoS	Post-transfer This output is active for the time specified with P2.14 (→ Page 24) after the consumer has been transferred from one supply line to the other.
L1.S	Line 1 status This output is active when all conditions for connecting the consumer to line 1 are fulfilled.
L2.S	Line 2 status This output is active when all conditions for connecting the consumer to line 2 are fulfilled.

4.2.7 Menu P7 – Communication port

PAR	Function	Range	Explanation	Default
P7.01	Address RS232	1 - 245	Define the transmission format and the protocol for the RS232 port.	1
P7.02	Baud rate RS232	2400 4800 9600 19200 38400		9600 baud
P7.03	Protocol RS232	RTU – Modbus RTU ASC – Modbus ASCII Mod – ASCII + ATL		RTU
P7.04	Parity RS232	Non Odd - Uneven EvE – Equal to		Non
P7.05	Address RS485	1 - 245	Define the transmission format and the protocol for the RS485 port.	1
P7.06	Baud rate RS485	2400 4800 9600 19200 38400		9600 baud
P7.07	Protocol RS485	Rtu – rtu ASC – ASCII Mod – ASCII + ATL		Rtu
P7.08	Parity RS485	Non Odd - Uneven EvE – Equal to		Non

4.2.8 Menu P8 - Automatic generator test

PAR	Function	Range - -	Explanation	Default
P8.01	Automatic test active	OFF/On	Activates or disables periodic automatic testing in applications with generator. This parameter can be changed directly at the keypad without calling up the setup menu (→ Section "2.4.5 Automatic generator test", Page 12). Its status is indicated by the TEST LED on the keypad (see status LED).	OFF
P8.02	Automatic test interval	1 - 60 days 1 - 60 days 1 - 60 dias	Specifies the minimum interval between automatic tests as a function of the values of the following parameters P8.03 to P8.09. If the test is not activated for the day on which the period ends, the interval is extended accordingly.	7 days
P8.03	Performed on Monday	OFF/Mon	Activates performance of the test on a specific weekday. OFF means that the test is not performed on that day. The real-time clock must be set for the test schedule to be maintained correctly.	Mon
P8.04	Performed on Tuesday	OFF/tuE		tuE
P8.05	Performed on Wednesday	OFF/UEd		UEd
P8.06	Performed on Thursday	OFF/thu		Thu
P8.07	Performed on Friday	OFF/Fri		Fri
P8.08	Performed on Saturday	OFF/SAt		SAt
P8.09	Performed on Sunday	OFF/Sun		Sun
P8.10	Start automatic test – hour	0 - 23	Defines the start time for automatic tests for a given day. The real-time clock must be correctly set.	12
P8.11	Start automatic test – minutes	0 - 59		0
P8.12	Automatic test – Duration	1 - 600 min	Defines the duration of automatic tests in minutes.	10 min
P8.13	Load transfer	OFF/ON	Specifies whether only the generator is started for the automatic test or whether the consumer is also transferred to the generator (On).	OFF

4.2.9 Setting the real-time clock (RTC)

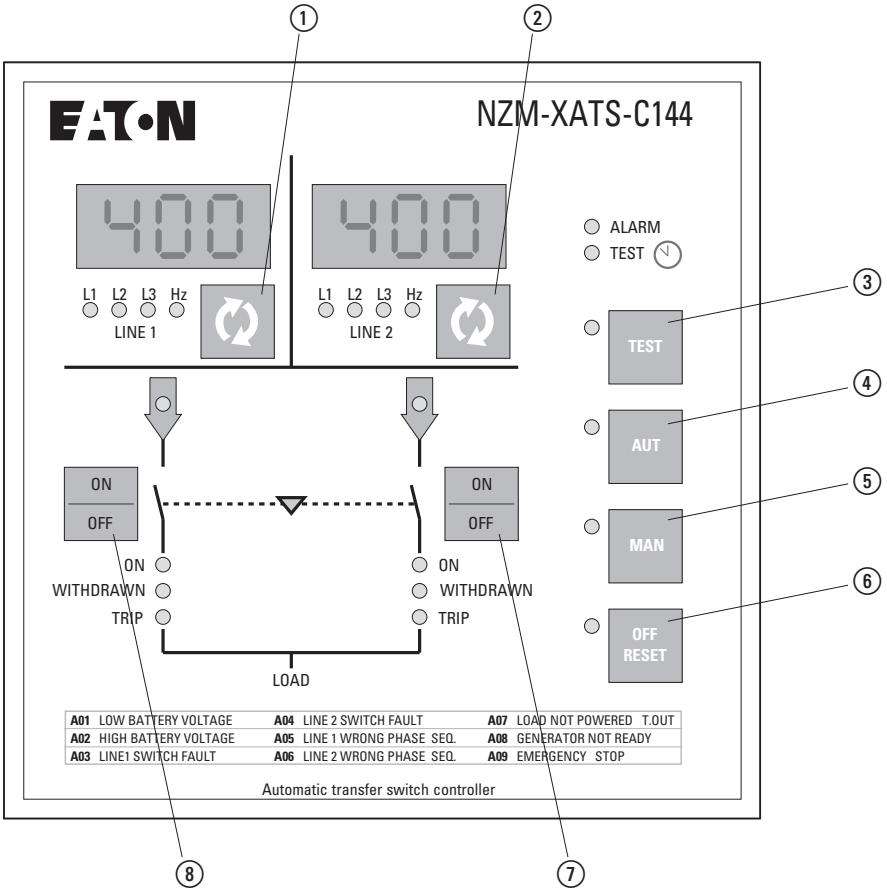

Figure 8: Keypad, pushbuttons

When the NZM-XATS-C144 is in OFF/RESET mode, press and hold keys ② and ⑥ at the same time for five seconds.

To move between the clock parameters, use keys ① and ⑧.

To change the value of the selected parameter, use keys ② and ⑦.

To exit the parameter settings function, press key ⑥.

PAR	Function	Range	Default
Hou	Hour	0 - 23	12
min	Minute	0 - 59	00
Sec	Seconds	0 - 59	00
dAt	Day	0 - 31	1
Mon	Month	0 - 12	1
yEA	Year	00 - 99	06

4.2.10 Viewing statistical data

The NZM-XATS-C144 records various statistical data, such as operating times and operations count in non-volatile memory.

To view the statistical data, press keys ① and ② at the same time for five seconds in any operating mode.

The data is then displayed with a code on both displays.

To view the value for the displayed code, press key ②. Both displays then show the numerical value of the six-digit data. After three seconds the code is shown again.

Time values below 10,000 hours are shown in hours and minutes in format hhhh.mm. Greater values are shown in hours only.

To select the available data, use keys ① and ⑧.

To exit the function, press key ⑥ (OFF/RESET). This does not change the operating mode.

The codes for operating times start with the letter "t", those for counts with letter "C".

To delete a data record, press and hold key ⑦ for five seconds (the display reads "CLEAR").

Depending on which position the data is cleared, all times or counts are reset to zero.

The table below lists the available statistical data.

Short designation	Explanation
t.L1 Loa	Total time for consumer connected to line 1 (line 1 switching device closed)
t.L2 Loa	Total time for consumer connected to line 2 (line 2 switching device closed)
t.no Loa	Total time for which the consumer was disconnected from both lines (both switching devices open)
t.L1 PrE	Total time for which line 1 was available (within limit values)
t.L2 PrE	Total time for which line 2 was available (within limit values)
t.L1 AbS	Total time for which line 1 was not available (outside limit values)
t.L2 AbS	Total time for which line 2 was not available (outside limit values)
t.totAL	Total operating time of NZM-XATS-C144
C.L1 Aut	Number of operations (closing) line 1 switching device in automatic mode
C. L2 Aut	Number of operations (closing) line 2 switching device in automatic mode
C.L1 Man	Number of operations (closing) line 1 switching device in manual mode
C.L2 Man	Number of operations (closing) line 2 switching device in manual mode

Short designation	Explanation
C.L1 Fau	Number of failed operations, line 1 switching device (Alarm A03)
C. L2 FAu	Number of failed operations, line 2 switching device (Alarm A04)
C.On OFF	Total number of activation/deactivation cycles of the NZM-XATS-C144

5 Circuit diagrams

5.1 Connections on rear side

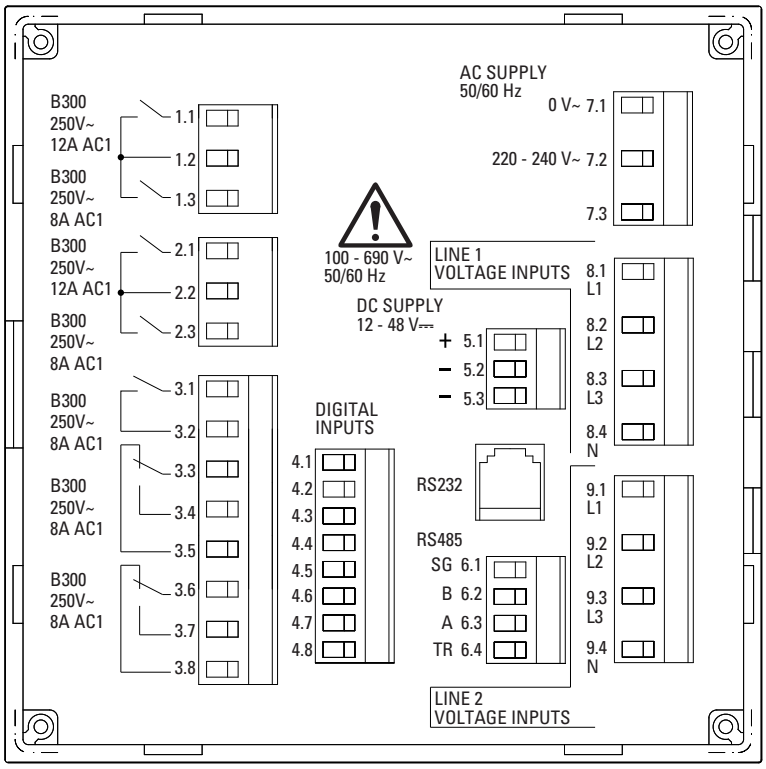

Figure 9: Connections on rear side

1.1 and 1.3: Programmable outputs (by default assigned for switching line 1)
2.1 and 2.3: Programmable outputs (by default assigned for switching line 2)
3.1 to 3.8: Programmable outputs
4.1 to 4.8: Programmable inputs
5.1 to 5.3: DC-power supply
6.1 to 6.4: Interface RS485
7.1 to 7.3: AC-power supply
8.1 to 8.4: Measuring inputs network 1
9.1 to 9.4: Measuring inputs network 2

5.2 Actuation of circuit-breakers with motor operator

5.2.1 Actuation of circuit-breakers NZM with motor operator NZM…-XR...

NZM-XATS-C144 supplied from battery.

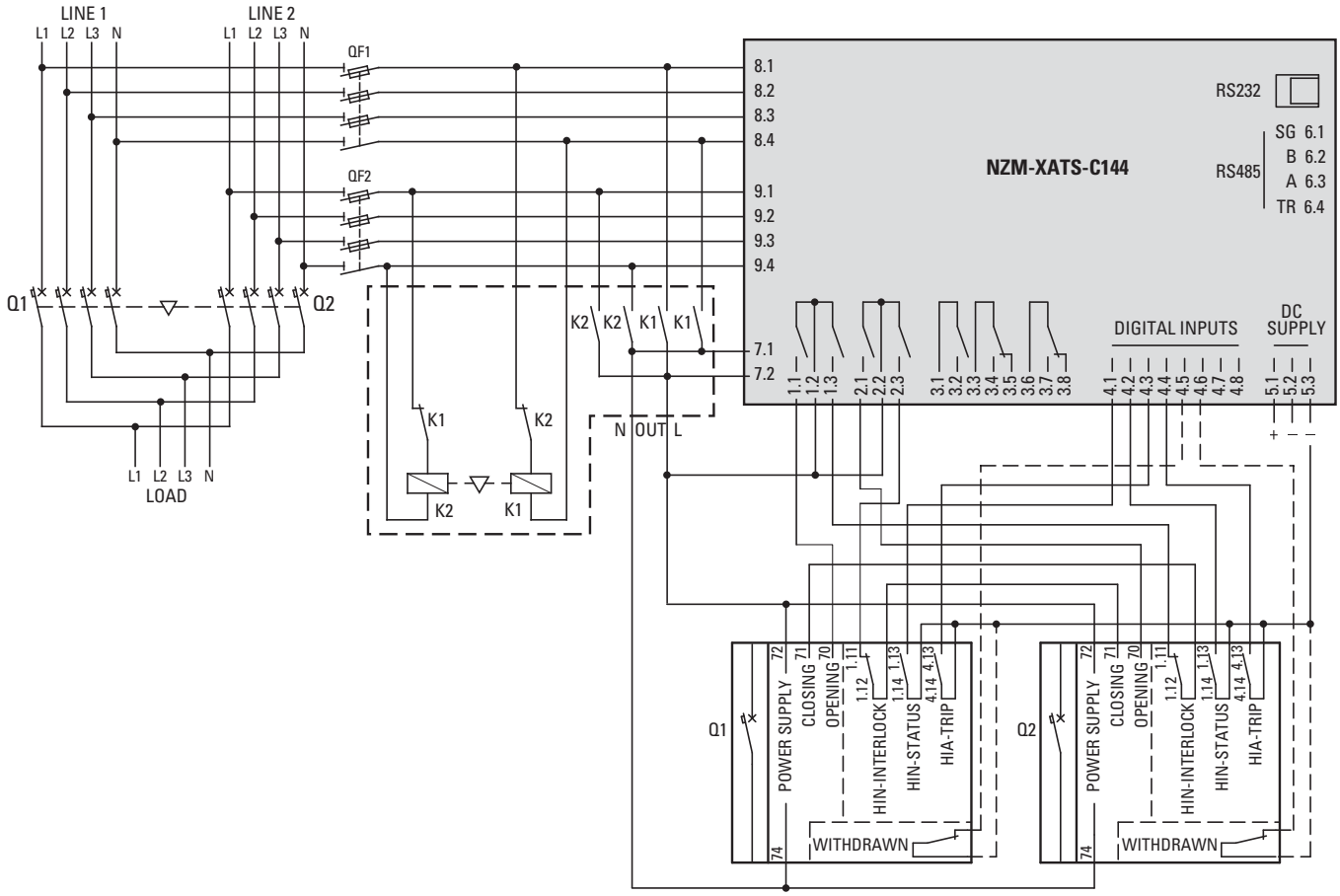

Figure 10:Actuation of circuit-breakers NZM with motor operator NZM-XATS-C144, battery-supplied

Q1: Circuit-breaker, main supply: NZM2, NZM3 or NZM4 + motor operator NZM…-XR…

Q2: Circuit-breaker, standby supply: NZM2, NZM3 or NZM4 + motor operator NZM…-XR…

QF1, QF2: Line protection

K1, K2: Contactors switch supply between main and standby supply: DILA-22(…)

Table 4: Values of parameters for circuit diagram shown

Terminal	Parameters	Value
1.1	P6.01	OP.1
1.3	P6.02	CL.1
2.1	P6.03	OP.2
2.3	P6.04	CL.2
4.1	P5.01	Fb.1
4.2	P5.02	Fb.2
4.3	P5.03	Tr.1
4.4	P5.04	Tr.2

5.2.2 Actuation of circuit-breakers IZMX16 with motor operator

NZM-XATS-C144 supplied from battery.

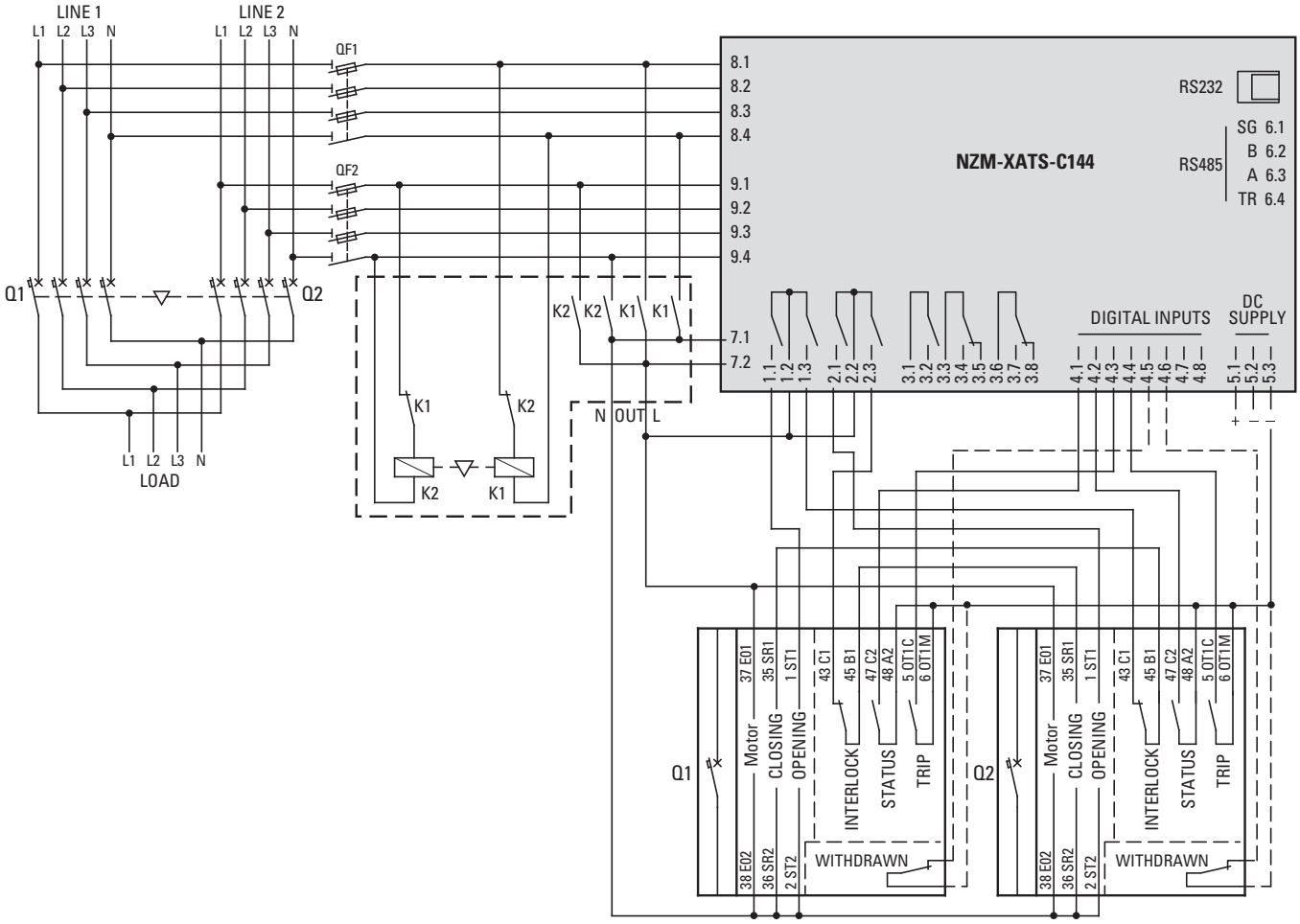

Figure 11: Actuation of circuit-breakers IZMX16 with motor operator – NZM-XATS-C144, battery-supplied

Q1: Circuit-breaker IZMX16, main supply

Q2: Circuit-breaker IZMX16, standby supply

QF1, QF2: Line protection

K1, K2: Contactors switch supply between main and standby supply

Table 5: Values of parameters for circuit diagram shown

Terminal	Parameters	Value
1.1	P6.01	OP.1
1.3	P6.02	CL.1
2.1	P6.03	OP.2
2.3	P6.04	CL.2
4.1	P5.01	Fb.1
4.2	P5.02	Fb.2
4.3	P5.03	Tr.1
4.4	P5.04	Tr.2

5.2.3 Actuation of circuit-breakers IZMX40 with motor operator

NZM-XATS-C144 supplied from battery.

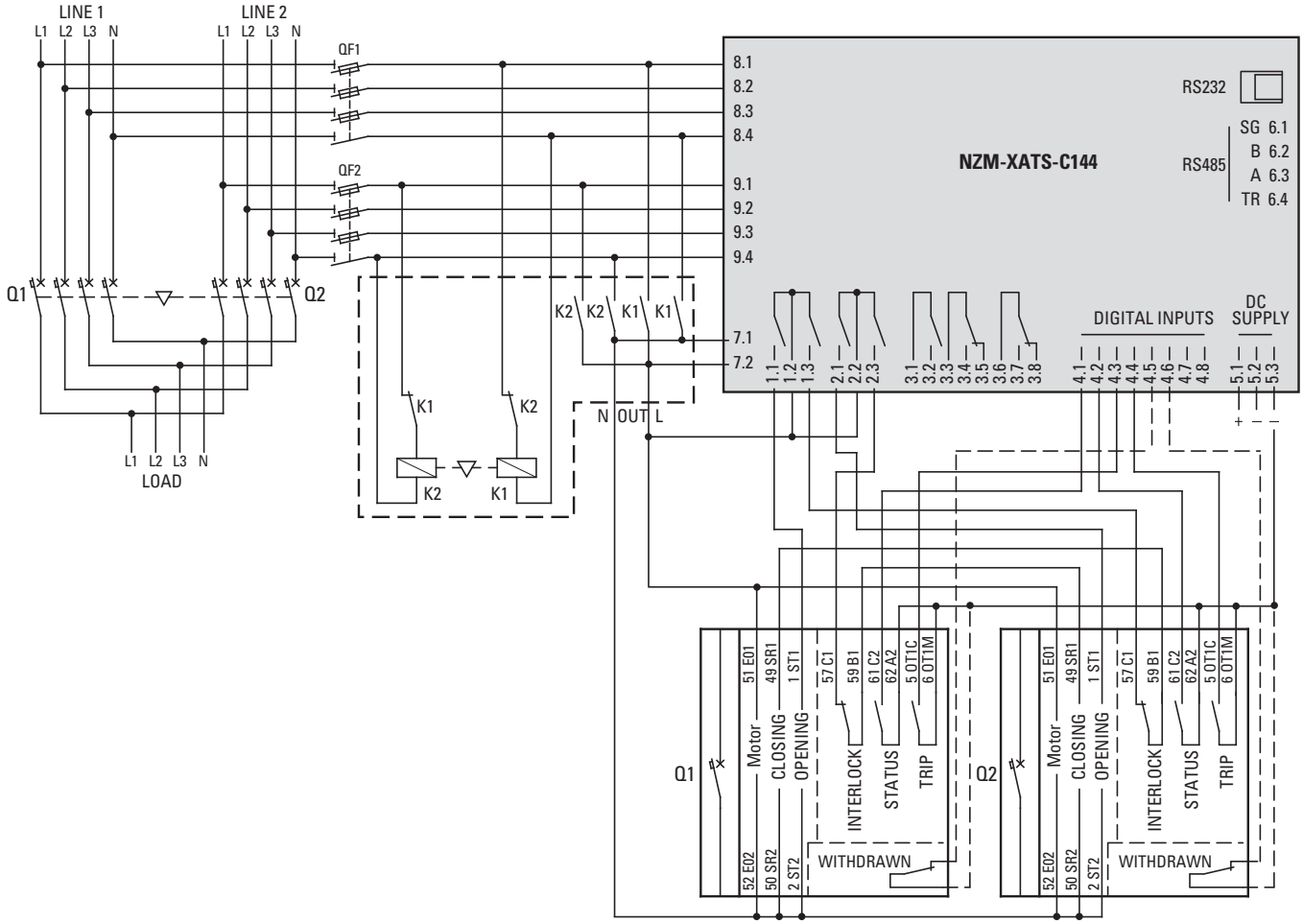

Figure 12:Actuation of circuit-breakers IZMX40 with motor operator – NZM-XATS-C144, battery-supplied

Q1: Circuit-breaker IZMX40 main supply network

Q2: Circuit-breaker IZMX40, standby supply

QF1, QF2: Line protection

K1, K2: Contactors switch supply between main and standby supply

Table 6: Values of parameters for circuit diagram shown

Terminal	Parameters	Value
1.1	P6.01	OP.1
1.3	P6.02	CL.1
2.1	P6.03	OP.2
2.3	P6.04	CL.2
4.1	P5.01	Fb.1
4.2	P5.02	Fb.2
4.3	P5.03	Tr.1
4.4	P5.04	Tr.2

5.2.4 Actuation of circuit-breakers with motor operator, general

NZM-XATS-C144 supplied from battery.

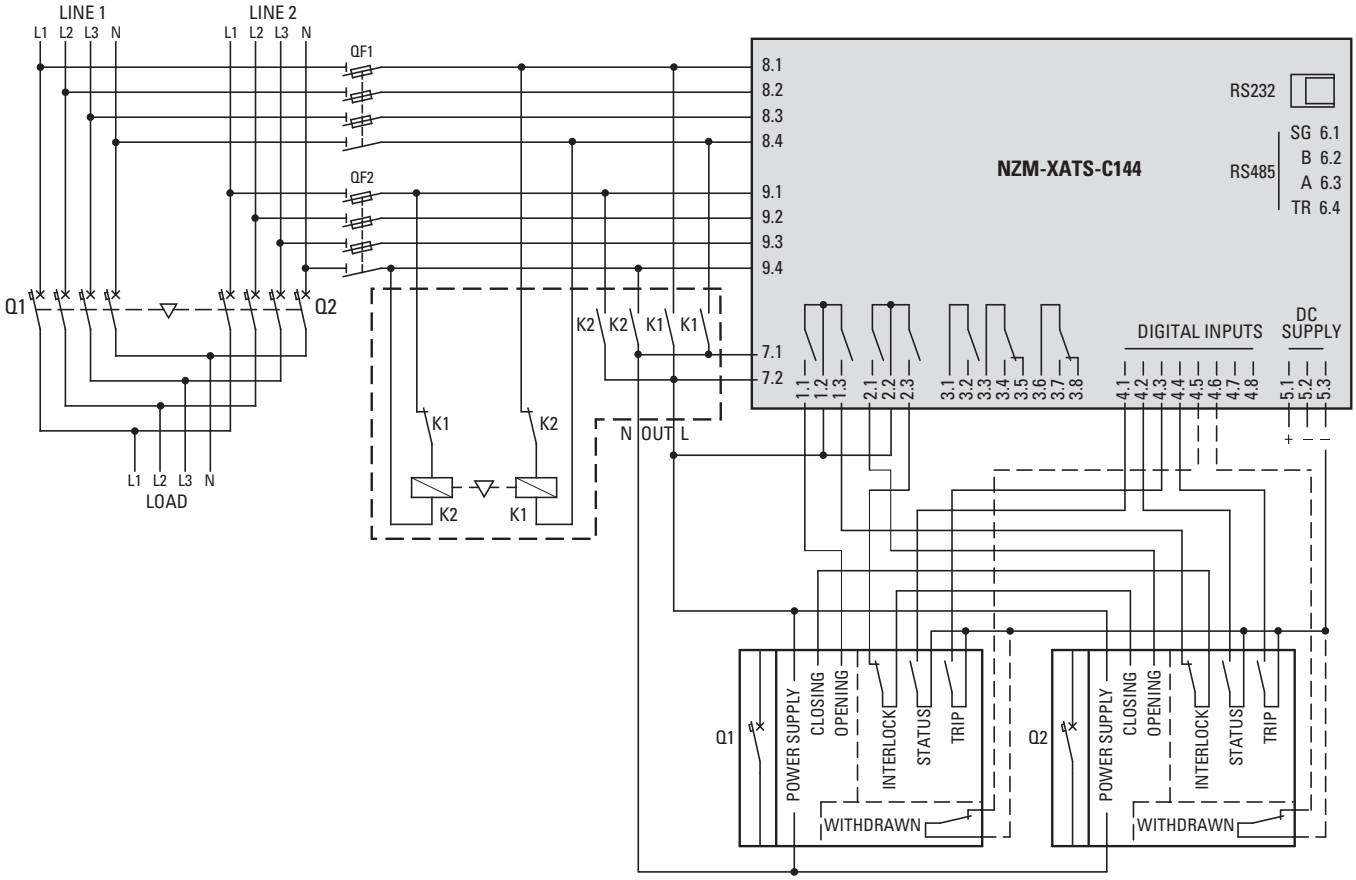

Figure 13:Actuation of circuit-breakers with motor operator – NZM-XATS-C144, battery-supplied

Q1: Circuit-breaker Main supply

Q2: Circuit-breaker, standby supply

QF1, QF2: Line protection

K1, K2: Contactors switch supply between main and standby supply

Table 7: Values of parameters for circuit diagram shown

Terminal	Parameters	Value
1.1	P6.01	OP.1
1.3	P6.02	CL.1
2.1	P6.03	OP.2
2.3	P6.04	CL.2
4.1	P5.01	Fb.1
4.2	P5.02	Fb.2
4.3	P5.03	Tr.1
4.4	P5.04	Tr.2

5.3 Actuation of motorized changeover switches

NZM-XATS-C144 supplied from battery.

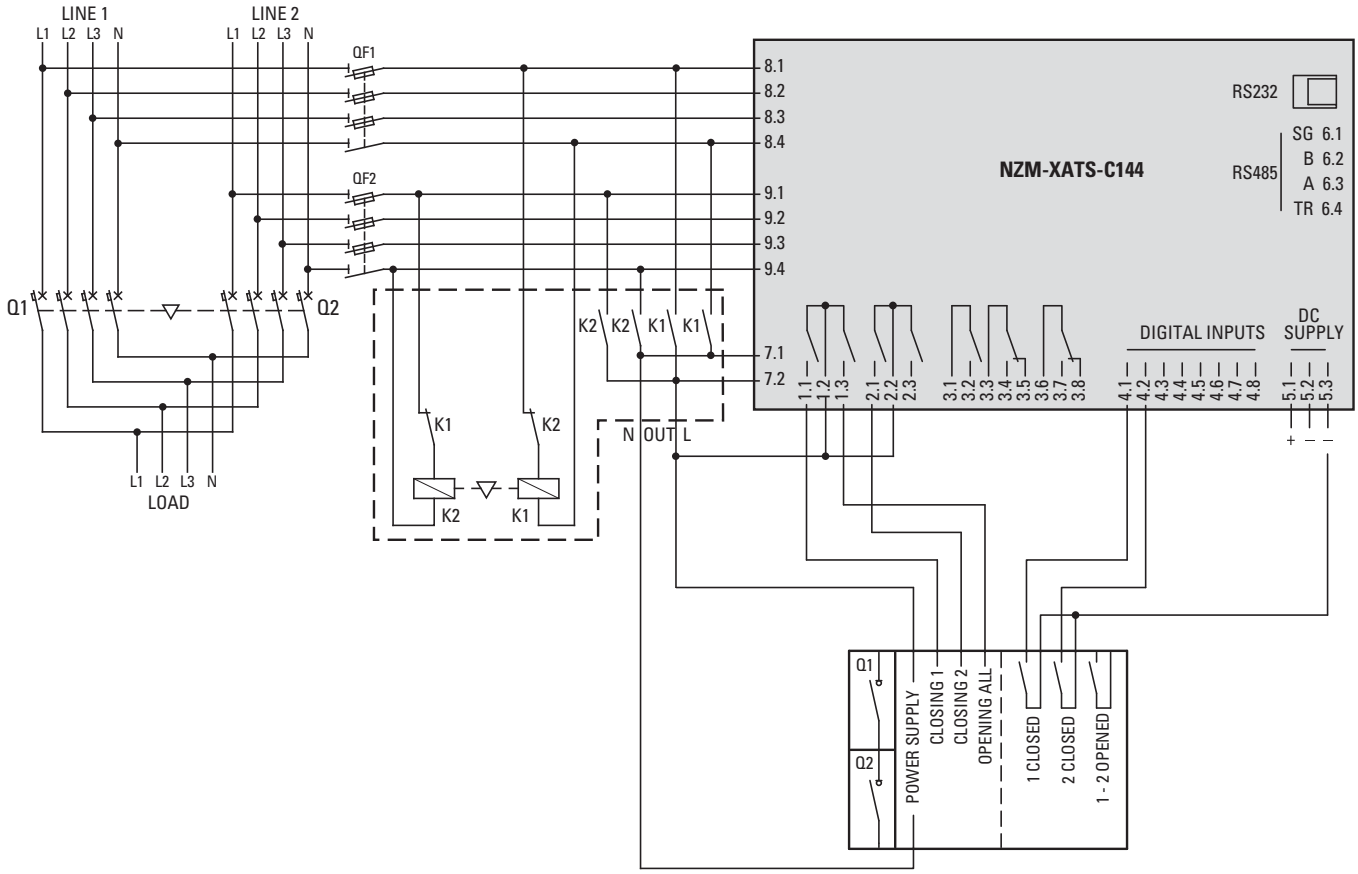

Figure 14: Actuation of motorized changeover switches – NZM-XATS-C144 supplied from battery

Q1, Q2: Changeover switch

QF1, QF2: Line protection

K1, K2: Contactors switch supply between main and standby supply

Table 8: Values of parameters for circuit diagram shown

Terminal	Parameters	Value
1.1	P6.01	CL.1
1.3	P6.02	OP.A
2.1	P6.03	CL.2
4.1	P5.01	Fb.1
4.2	P5.02	Fb.2

5.4 Actuation of contactors

NZM-XATS-C144 supplied from battery.

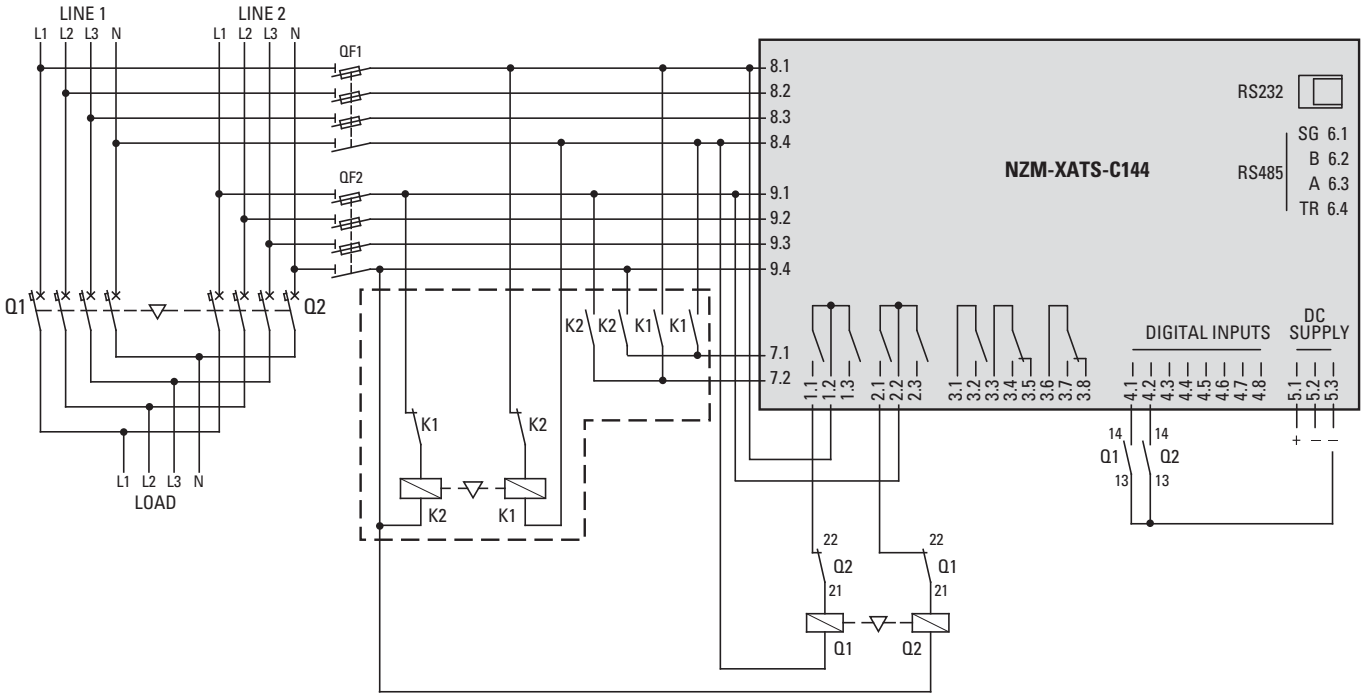

Figure 15:Actuation of contactors – NZM-XATS-C144 supplied by battery

Q1, Q2: Contactors

QF1, QF2: Line protection

K1, K2: Contactors switch supply between main and standby supply

Table 9: Values of parameters for circuit diagram shown

Terminal	Parameters	Value
1.1	P6.01	CL.1
2.1	P6.03	CL.2
4.1	P5.01	Fb.1
4.2	P5.02	Fb.2
–	P2.07	Cnt

5.5 Mains/generator control

AC auxiliary voltage controlled by NZM-XATS-C144.

Line 2 of generator.

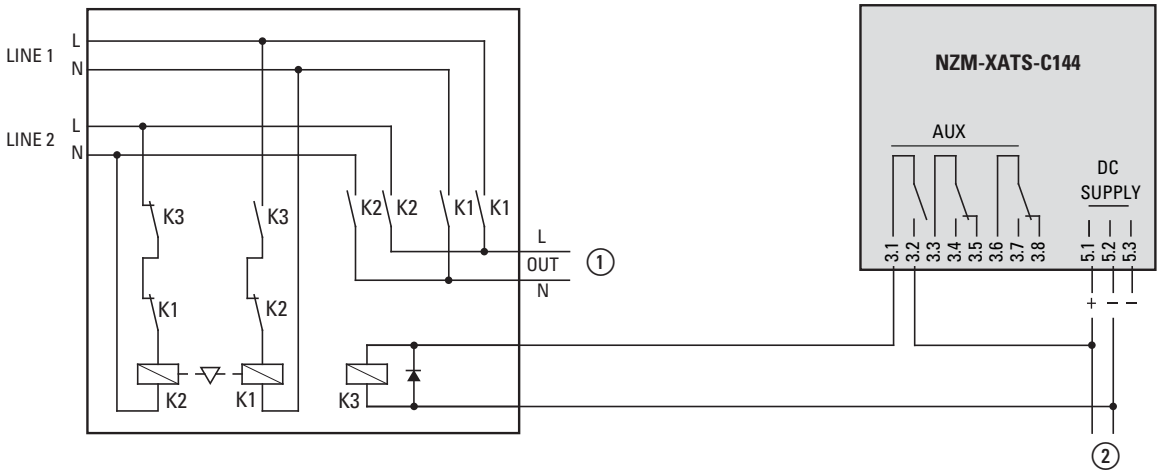

Figure 16:Mains/generator control

① Supply voltage for circuit-breaker's or transfer device's motor operator

② Supply voltage from battery

The programmable output at terminals 3.1–3.2 (parameter P6.5.1, → Section "4.2.6 Menu P6 – Programmable outputs", Page 30) must be programmed with function L1.S.

Set one programmable output with GC.2 such that the generator starts when the NZM-XATS-C144 is without power (→ Section "4.2.6 Menu P6 – Programmable outputs", Page 30).

5.6 Line/Line control without battery power supply

Auxiliary power supply control with NZM-XATS-C144 and optional DC PSU when a battery supply is not available.

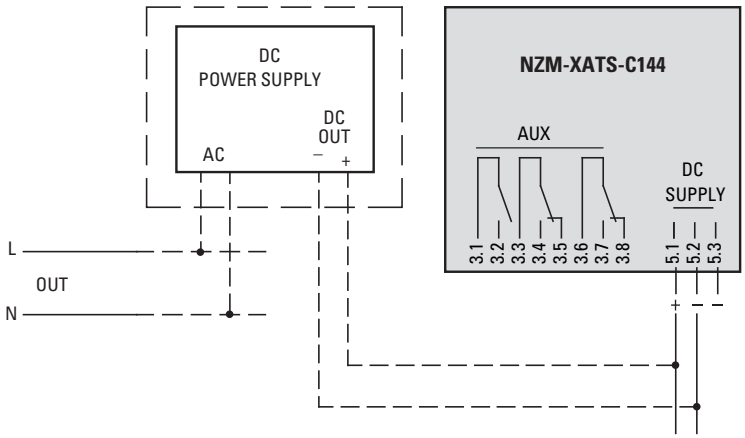

Figure 17:Line/Line control without battery power supply

5.7 Controller supply through additional undervoltage relay

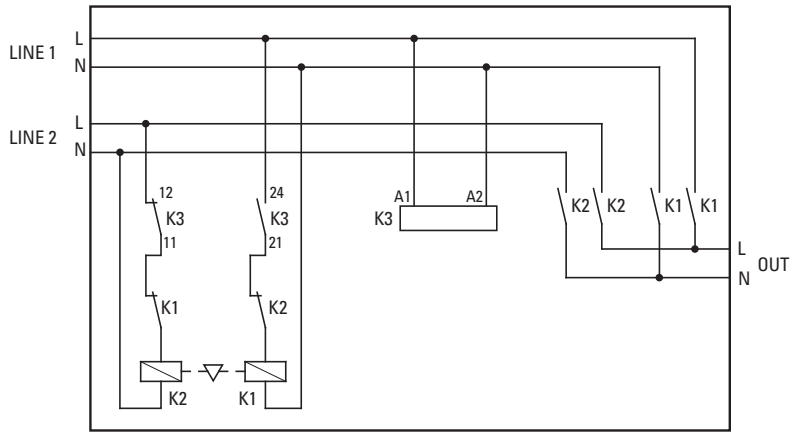

Figure 18:Controller supply through additional undervoltage relay

K1, K2: Contactors switch supply between main and standby supply

K3: Undervoltage relay

5.8 RS485 interface for connecting

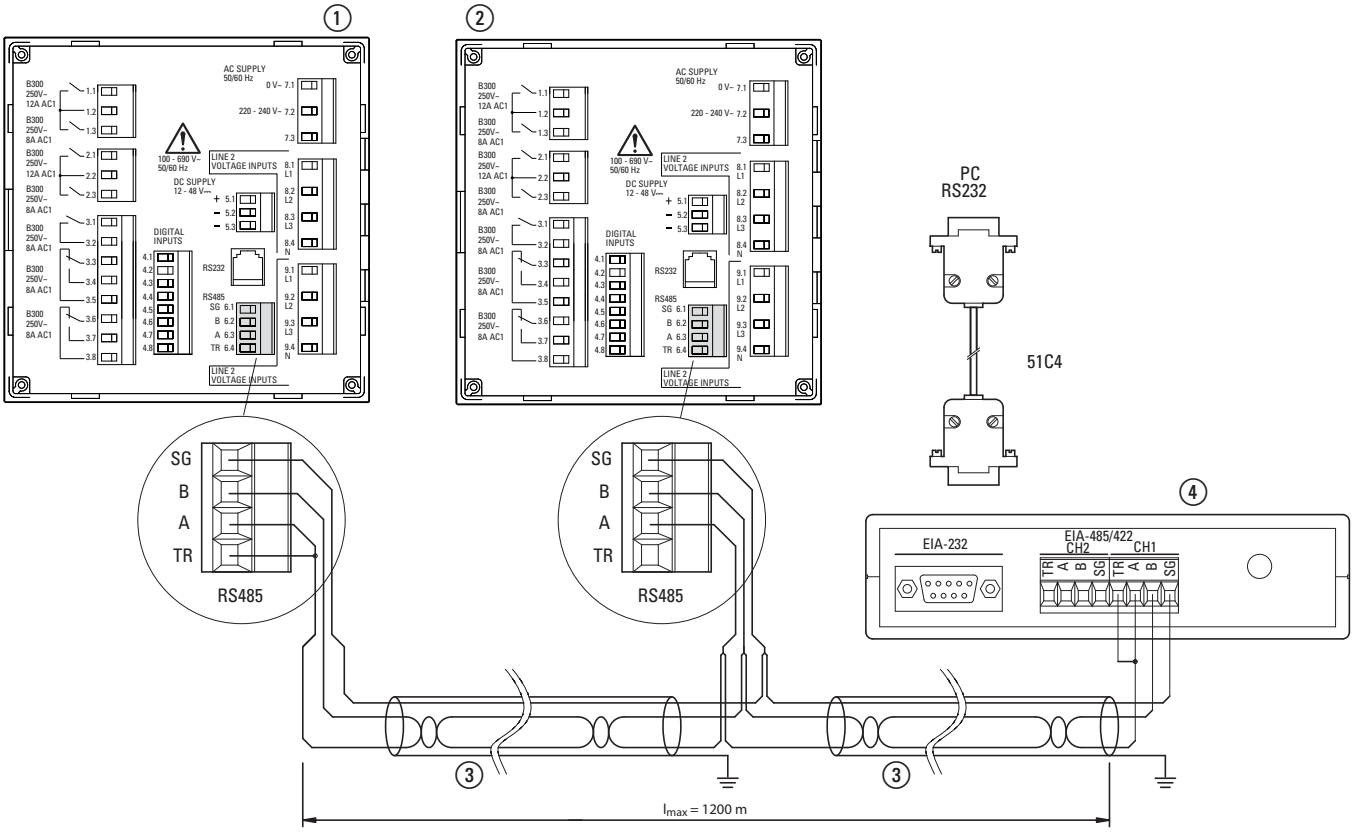

Figure 19:Connection RS485 interface

① NZM-XATS-C144 Number n, maximum 30
② NZM-XATS-C144 Number 1
③ Connection cable „Twisted Pair“, max. 1200 m long
④ Controlling unit, e.g. computer

6 Appendix

6.1 Technical data

Standby supply	
Rated operating voltage (U_S)	220 - 240 V~ 12 or 24 or 48 V⎓
Operating range	187 - 264 V~ 9 - 70 V⎓
Frequency	45 - 65 Hz
Maximum power consumption	9 VA (U_S = 240 V~)
Max. heat dissipation	6.3 W (U_S = 240 V~) 4.1 W (U_S = 48 V⎓)
Maximum current consumption	300 mA @ 12 V⎓ 180 mA @ 24 V⎓ 90 mA @ 48 V⎓
Safety on short-term interruption	50 ms
Measuring inputs	
Maximum rated operating voltage (U_e)	690 V~ phase-phase (400 V~ phase neutral conductor)
Measuring range U_L	600 V~ phase-phase (340 V~ phase neutral conductor)
Measuring range	80 - 800 V (phase-phase)
Frequency range	45 - 65 Hz
Measuring procedure	TRMS (RMS value)
Measurement input impedance	> 1.1 MΩ phase-phase and > 0.5 MΩ phase-neutral conductor
Connection procedure	Single-phase, two-phase, three-phase system
Measurement error	±0.25 % full scale ±1 digit
Digital inputs terminals 4 to 4.8	
Input type	Decrease
Input current	≤ 10 mA
Input signal logic state "0"	≤ 1.5 (normally 2.9 V)
Input signal logic state "1"	≥ 5.3 (typical 4.3 V)
Input signal delay	≥ 50 ms
Relay outputs terminals 1.1-1.2 and 2.1-2.2	
Contact type	1 N/O contact
Rated operational current at 250 V~	12 A
Rated contact current	16 A in AC1 250 V
Maximum current at terminals 1.2 and 2.2	12 A
Relay outputs terminals 1.2-1.3 and 2.2-2.3	
Contact type	1 N/O contact
Rated contact current	8 A in AC1 250 V~ 30 V⎓ 1 A
Maximum current on terminal 1.2 and 2.2	12 A

Relay outputs terminal 3.1-3.2	
Contact type	1 N/O contact
Rated contact current	8 A in AC1 250V 30 V⎓ 1 A
Relay outputs terminals 3.3-3.4-3.5 and 3.6-3.7-3.8	
Contact type	1 changeover contact
Rated contact current	8 A in AC1 250 V 30 V 1 A
Communication cables	
Serial interface RS232	Programmable baud rate 1200 to 38400 bits/s. Connection through RJ6/6
Serial interface RS485	Isolated with programmable baud rate 1200 to 8400 bits/s. Connection through plug-in terminals
Real-time clock	
Charging reserve	Storage capacitor
Operation without supply supply	Approx. 12 to 15 days
Insulation	
Rated insulation voltage U_i	690 V
Environmental Conditions	
Operating Temperature	-20 - +60 °C
Storage temperature	-30 - +80 °C
Relative humidity	< 90 % (IEC/EN 600-2-78)
Maximum pollution degree 3	3
Overvoltage category 3	
Measurement category	III
Installation altitude	≤ 2000 m
Climate sequence	Z/ABDM (IEC/EN 60068-2-61)
Mechanical shock resistance	15 g (IEC/EN 60068-2-27)
Vibration resistance 0.7g (IEC/EN 60068-2-6)	0.7 g (IEC/EN 60068-2-6)
Connections	
Terminal type:	Plug-in
Conductor cross-section (Min/Max)	0.2 - 2.5 mm^2
Tightening torque	0.5 Nm
Housing	
Material characteristic	Thermoplastic LEXAN 3412R
Model	Flush mounting
Degree of protection	IP41 front IP20 at terminals
Weight	1050 g
Approvals and conformity	
Fulfills standards	IEC/EN 60947-1, IEC/EN 60947-6-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, IEC/EN 61010-1