



ATICS-2-...-DIO, ATICS-4-...-DIO

ATICS-2-63A-DIO, ATICS-2-80A-DIO

ATICS-4-80A-DIO, ATICS-4-125A-DIO, ATICS-4-160A-DIO

Automatic transfer switching devices for safety power supplies

Software version: D333 V1.3x, D334 V1.3x, D335 V1.0

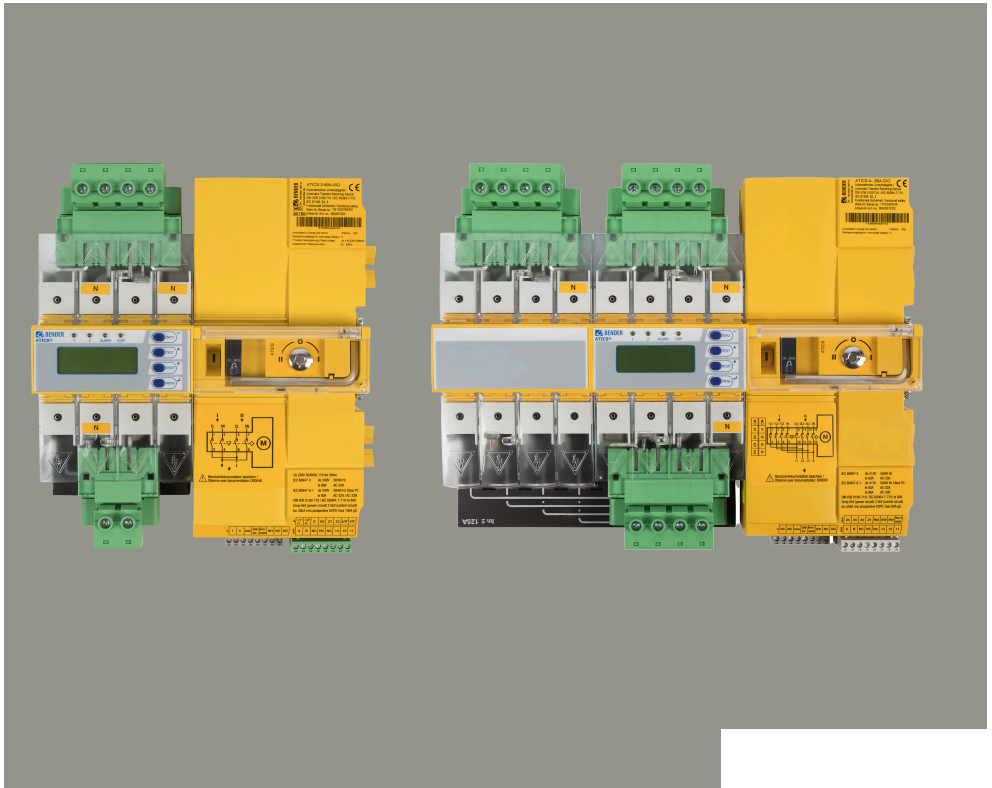


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1 General information

1.1 How to use the manual



NOTE

This manual is intended for qualified personnel working in electrical engineering and electronics! Part of the device documentation in addition to this manual is the enclosed supplement "Safety instructions for Bender products".



NOTE

Read the operating manual before mounting, connecting and commissioning the device. Keep the manual within easy reach for future reference.

1.2 Indication of important instructions and information



DANGER

Indicates a high risk of danger that will result in death or serious injury if not avoided.



WARNING

Indicates a medium risk of danger that can lead to death or serious injury if not avoided.



CAUTION

Indicates a low-level risk that can result in minor or moderate injury or damage to property if not avoided.



NOTE

Indicates important facts that do not result in immediate injuries. They can lead to malfunctions if the device is handled incorrectly.



Information can help to optimise the use of the product.

1.3 Service and Support

Information and contact details about customer service, repair service or field service for Bender devices are available on the following website: Fast assistance | Bender GmbH & Co. KG.

1.4 Training courses and seminars

Regular face-to-face or online seminars for customers and other interested parties:

www.bender.de > know-how > seminars.

1.5 Delivery conditions

The conditions of sale and delivery set out by Bender GmbH & Co. KG apply. These can be obtained in printed or electronic format.

1.6 Inspection, transport and storage

Check the shipping and device packaging for transport damage and scope of delivery. In the event of complaints, the company must be notified immediately, see "www.bender.de > service & support."

When storing the devices, observe the information under Environment / EMC in the technical data.

1.7 Warranty and liability

Warranty and liability claims for personal injury and property damage are excluded in the case of:

- Improper use of the device.
- Incorrect mounting, commissioning, operation and maintenance of the device.
- Failure to observe the instructions in this operating manual regarding transport, commissioning, operation and maintenance of the device.
- Unauthorised changes to the device made by parties other than the manufacturer.
- Non-observance of technical data.
- Repairs carried out incorrectly.
- The use of accessories or spare parts that are not provided, approved or recommended by the manufacturer.
- Catastrophes caused by external influences and force majeure.
- Mounting and installation with device combinations not approved or recommended by the manufacturer.

This operating manual and the enclosed safety instructions must be observed by all persons working with the device. Furthermore, the rules and regulations that apply for accident prevention at the place of use must be observed.

1.8 Disposal of Bender devices

Abide by the national regulations and laws governing the disposal of this device.



Bender GmbH & Co. KG is registered in the waste from electrical and electronic equipment (WEEE) register under the WEEE number: DE 43 124 402. For more information on the disposal of Bender devices, refer to www.bender.de > service & support.

2 Safety

If the device is used outside the Federal Republic of Germany, the applicable local standards and regulations must be complied with. In Europe, the European standard EN 50110 applies.



DANGER Risk of fatal injury due to electric shock!

Touching live parts of the system carries the risk of:

- Risk of electrocution due to electric shock
- Damage to the electrical installation
- Destruction of the device

Before installing the device and before working on its connections, make sure that the installation has been de-energised. The rules for working on electrical systems must be observed.

Bender devices are designed and built in accordance with the state of the art and accepted rules in respect of technical safety. However, the use of such devices may introduce risks to the life and limb of the user or third parties and/or result in damage to Bender devices or other property.

- Use Bender devices only
 - as intended
 - in perfect working order
 - in compliance with the accident prevention regulations and guidelines applicable at the location of use
- Eliminate all faults immediately which may endanger safety.
- Do not open the device.
- Do not make any unauthorised changes and only use replacement parts and optional accessories purchased from or recommended by the manufacturer of the devices. Failure to observe this requirement can result in fire, electric shock and injury.
- Reference signs must always be clearly legible. Replace damaged or illegible signs immediately..
- Make sure that the dimensions of the BSV (battery-supported safety power supply), the generator set and the whole wiring is adequate. Abide by the relevant, applicable national and international standards. In the event of an overload and short circuit, this is the only way to guarantee the necessary safety and to ensure that the safety devices respond selectively.
- If the device has been overloaded by overvoltage or a short-circuit current load, it must be checked and replaced if necessary.
- The overvoltage protective device required by the standards VDE 0100-443 and VDE 0100-534 must be installed in the electrical installation or system.

Device-specific safety instructions

Malfunction due to failure to adjust the settings

The settings must be changed in order to adapt the ATICS® automatic transfer switching and monitoring device to the existing equipment.

Follow the instructions in chapter "Design and installation", Page 34.

No functional safety according to IEC 61508 in case of improper use

Follow the instructions given in this operating manual and in the check list.

3 Intended use

Transfer switching devices are used everywhere there is dependence on high availability from the power supply. The ATICS® automatic transfer switching and monitoring device is intended for the application described in the chapter “System description”, Page 10. When the preferred supply fails, the ATICS® automatically switches to the second supply.

Areas of application:

- Group 1 and 2 medical locations according to DIN VDE 0100-710 and IEC 60364-7-710
- Hospital main distribution boards (DIN VDE 0100-710)
- Locations open to the public (DIN VDE 0100-718)
- Emergency power supplies
- Heating, air conditioning, ventilation, cooling
- EDP, data centres
- Fire extinguisher and sprinkler systems

Several versions of ATICS® are available. They differ for example by switching over from two- or four-pole systems or by the load current (see “ATICS® tasks”, Page 12).

In order to meet the requirements of the applicable standards, customised parameter settings must be made on the equipment in order to adapt it to local equipment and operating conditions. Please heed the limits of the range of application indicated in the technical data.

Intended use also includes

- the observation of all information in the operating manual and
- compliance with test intervals.

Any other use than that described in this manual is regarded as improper.

4 System description

4.1 Properties

4.1.1 Product description

The ATICS® automatic transfer switching devices provide all functions for changeover between two independent power supplies and for monitoring unearthed power supplies. The integration of both the electronic system and the switching elements in one flat, compact device reduces space requirements in the switchgear cabinet, minimises the amount of wiring, and reduces the fault probability. For maximum reliability, ATICS® was designed in strict accordance with the guidelines for functional safety.

Connectors at all connecting wires, in combination with the optional bypass switch, enable the ATICS® to be tested or replaced during service works without interruption of the power supply. ATICS® considerably enhances the safety level particularly in intensive care units and in operating theatres.

4.1.2 Changeover

- Automatic changeover to the second (redundant) line on loss of the preferred supply or when the values are outside the permissible voltage range
- Voltage monitoring line 1/2 (input) and line 3 (output)
- Automatic return to the preferred line on voltage recovery
- Monitoring for short circuits at the output or at the distribution board downstream of the transfer switching device avoids damaging switching operations
- Manual operation, with optional locking by means of a padlock

4.1.3 Messages

- Status indication of operating, warning and alarm messages via
 - integrated graphic display and
 - external indication on MK.../TM.../CP...
- Automatic reminder for prescribed tests and service intervals
- History memory for events, messages, tests and parameter changes
- Exchange of information with alarm indicator and operator panels via BMS bus

4.1.4 Other functions

- Automatic monitoring of all programme and data storage as well as essential internal components and connecting wires for proper functioning
- Programmable relay output (alarm relay)
- Programmable digital input

4.2 Functional safety

Functional safety according to IEC 61508 guarantees safety from risks due to malfunction when used properly. ATICS® is suitable for use in safety-related systems according to SIL2. SIL stands for "Safety Integrity Level".

4.2.1 Product life-cycle management

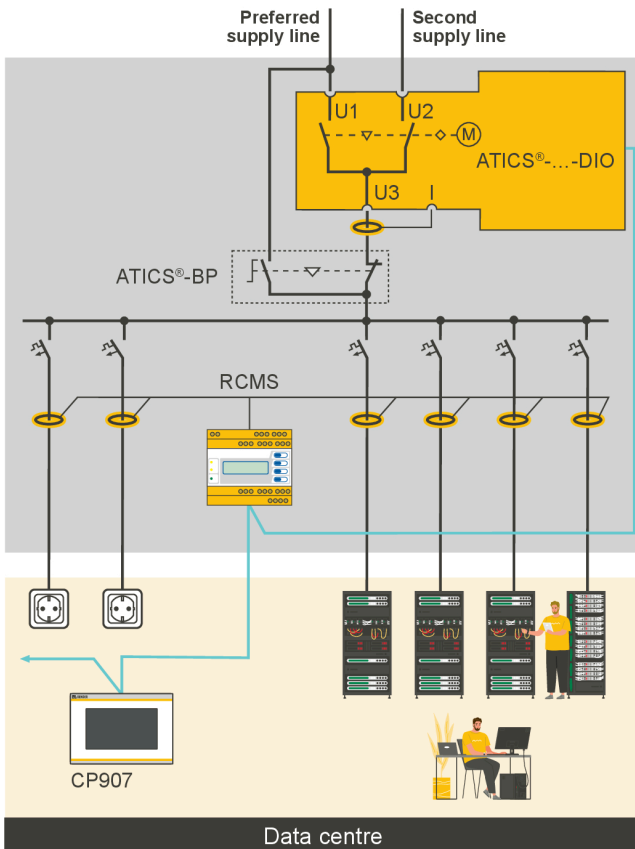
Safety must be guaranteed over the entire life cycle, from the time it is designed, developed, manufactured, commissioned, maintained to the time it is taken out of service. Responsibility during the life cycle:



For detailed information refer to:

- "Commissioning, settings and testing", Page 34
- "Periodic verification and service", Page 73

4.3 Application example



- **ATICS-2-63A-DIO**
Changeover between preferred and redundant line
- **MK.../CP...**
Alarm at at least two points with independent power supplies for functional safety
- **RCMS**
RCMS460 or RCMS490 residual current monitors for localising residual and operating currents in TT and TN-S systems

4.4 ATICS® tasks

- Two-pole changeover of the power supply
- Voltage monitoring of the preferred supply (line 1)
- Voltage monitoring of the second supply (line 2)
- Voltage monitoring at the automatic transfer switching device output (line 3)
- Monitoring of the changeover switch for correct switch position
- Internal functional testing, including checking the switching times
- Communication with remote alarm indicator and test combinations, and with alarm indicator and operator panels via BMS bus
- Option for adjusting the time delay for the changeover process according to DIN VDE 0100- 710 (VDE 0100 Part 710)
- Possible field of application in systems according to DIN VDE 0100-710 (VDE 0100 Part 710) with a changeover period ≤ 15 s or even ≤ 0.5 s

4.5 ATICS® functions

4.5.1 The automatic transfer switching device

If the preferred supply fails, the ATICS® ensures that the power supply is switched over safely.

The switch contacts are arranged offset on a rotating shaft. This design prevents simultaneous switching of line 1 and line 2.

The switch has three positions:

- 1: Line 1 is connected.
- 0: Both lines are disconnected.
- 2: Line 2 is connected.

Either line 1 or line 2 can be set as the preferred line (setting described in “Settings menu 1: Changeover”, Page 56 or chapter “Settings menu 5: Dig. input”, Page 61).

1. In the normal operating condition (fault-free operation) the preferred supply is connected. ATICS® switches to the redundant line if
 - the preferred line fails,
 - the “TEST” button is pressed,
 - a digital input is configured to “TEST” and this input is enabled,
 - the setting “Preferred line” is changed to the other line.
2. ATICS® switches from the redundant line back to the preferred line if
 - the voltage on the preferred line is restored and the return transfer delay time $t(2 \rightarrow 1)$ has elapsed and no switch-back lock is enabled,
 - the “RESET” button is pressed,
 - the redundant line fails (even when the switch-back lock is enabled),
 - the setting “Preferred line” is changed to the other line,
 - the digital input is configured to “TEST” and this input is reset,
 - a test of the automatic transfer switching and monitoring device is active and the test period has elapsed.

**WARNING Malfunction possible if delay times are not adjusted**

The response delay $t(\text{on})$, the return transfer delay time $t(2 \rightarrow 1)$, the delay on release $t(\text{off})$ and the dead time $t(0)$ of ATICS® must be adjusted to the requirements of the specific case, the short-circuit calculation and the requirements of DIN VDE 0100-710 (VDE 0100-710) for automatic transfer switching devices. See chapter "Commissioning, settings and testing", Page 34.

The factory settings guarantee a changeover period of $t \leq 0.5$ s and switching back within 10 seconds when voltage is restored on the preferred supply. Therefore, the ATICS® can be used in IT systems with a requirement for a changeover period $t \leq 0.5$ s (IT systems with operating theatre lights, endoscopic field illumination in operating theatres or other essential sources of light, etc.).

When there is a short circuit downstream of the automatic transfer switching device, the automatic transfer switching device must not continually change back and forth between the two lines. This can occur if the short-circuit current is small and the automatic transfer switching device switches faster than the short-circuit breaker trips. ATICS® monitors the load current downstream of the automatic transfer switching device in order to detect a possible short circuit. If the preferred line fails and a short-circuit current is detected at the same time ATICS® does not switch over immediately but only once the circuit breaker has tripped.

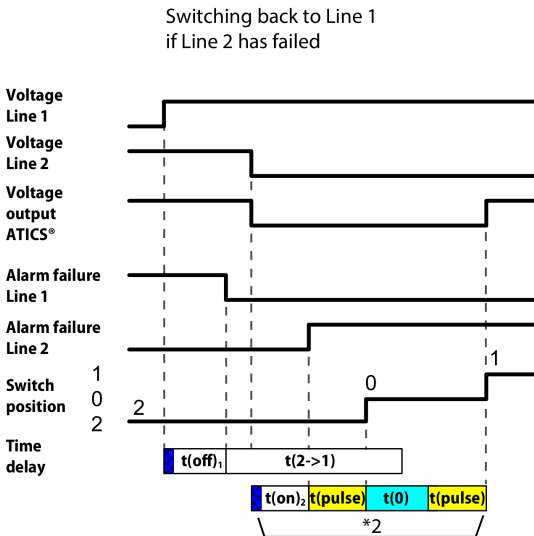
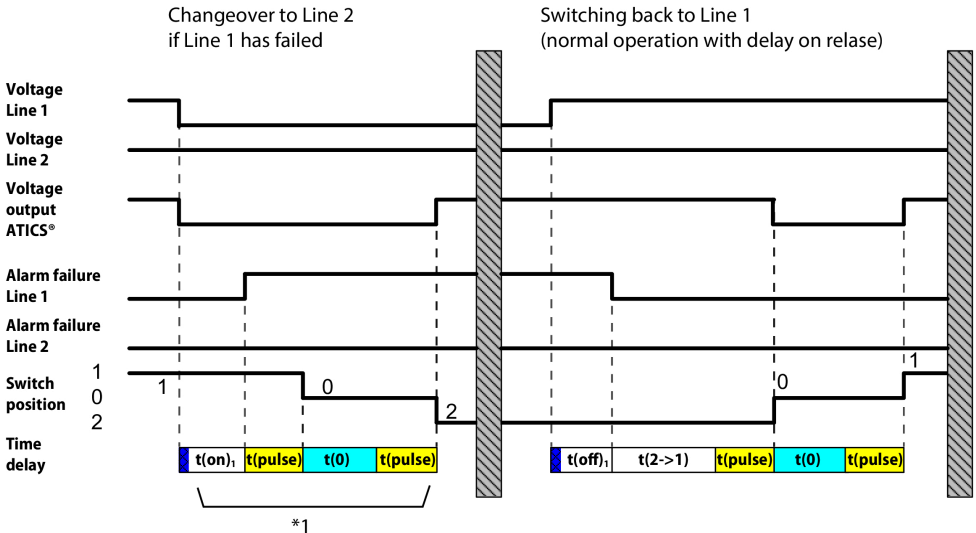
If the ATICS® detects a supply failure or a fault, an alarm appears on the LCD, the "ALARM" LED lights up, the alarm relay trips (if set) and this alarm is forwarded to other Bender devices (such as an alarm indicator and test combination) via the BMS bus.

Phase sequence direction errors are detected and indicated on the LC display. Even so ATICS® switches over to the redundant line.

4.5.1.1 Time diagram: Changeover between preferred and redundant line

i Time diagrams: Times are not shown to scale.

Example: Line 1 is set as preferred line.



Legend

- t(pulse)** Pulse time: 15 ... 30 ms
- t(0)** Dead time
- t(on)₁** Response delay ALARM failure voltage line 1
Measuring time: approx. 50 ms
- t(off)₁** Delay on release ALARM failure voltage line 1
Measuring time: approx. 50 ms
- t(on)₂** Response delay ALARM failure voltage line 2
Measuring time: approx. 50 ms
- t(2->1)** Return transfer delay time
- *1** Changeover period $t(1->2)$ indicated during a test
- *2** The return transfer delay time may differ from the changeover period $t(1->2)$

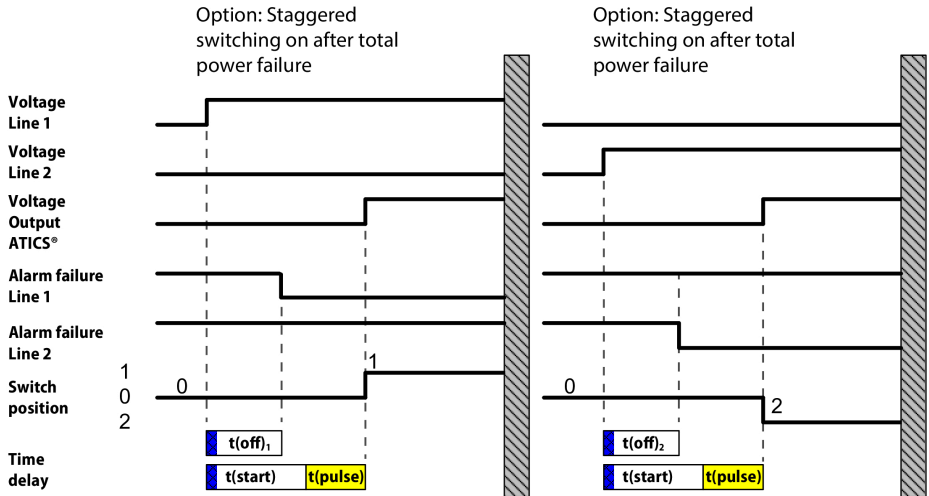
4.5.1.2 Time diagram: Staggered switching on after complete power failure

Switching on at staggered intervals after a complete power failure (no voltage on either of the power supplies) prevents all loads from being switched on at the same time.

Switch ATICS® to position "0" using the Allen key.

When power is restored, ATICS® switches on the supply again with the set delay time $t(\text{start})$.

Example: Line 1 is set as the preferred line.

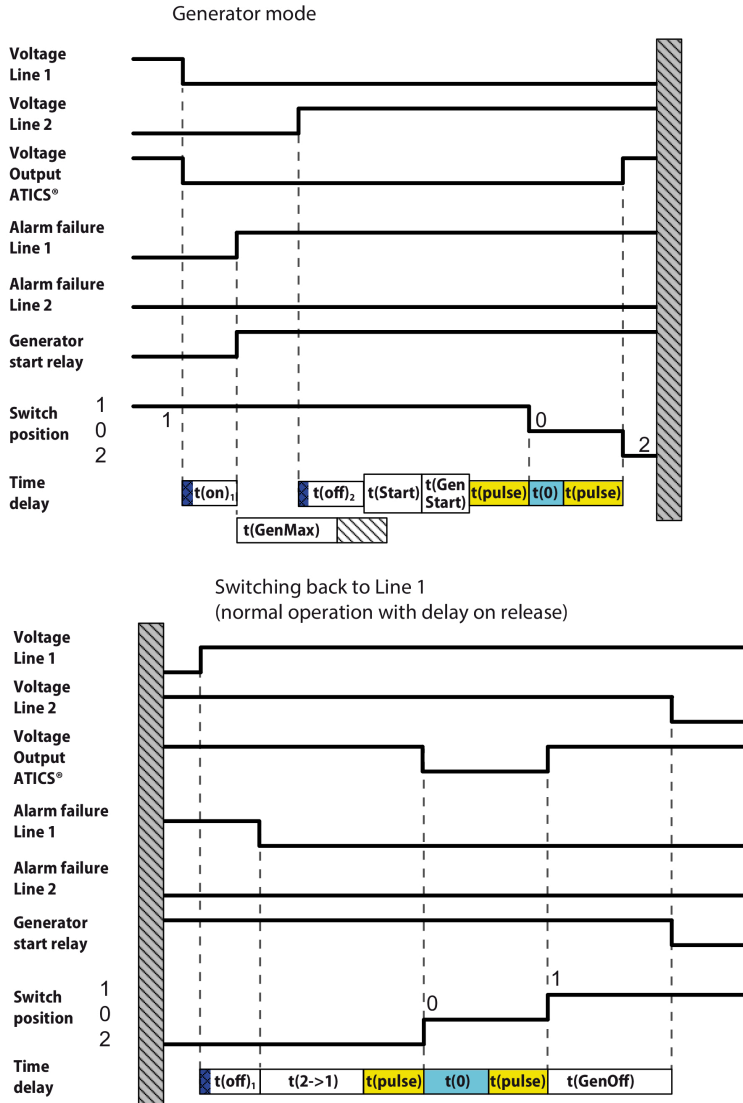


Legend

t(pulse)	Pulse time: 15 ... 30 ms	Measuring time: approx. 50 ms
t(start)	Switch-on delay after complete power failure	Measuring time: approx. 50 ms
t(off)₁	Delay on release failure voltage line 1	Measuring time: approx. 50 ms
t(off)₂	Delay on release failure voltage line 2	Measuring time: approx. 50 ms

After a complete power failure and restart of ATICS®, $t(\text{off})$ and $t(\text{start})$ start simultaneously. The time that is longer determines the behaviour. After switching on, ATICS® performs a quick measurement of the voltage with $t(\text{off}) = 100$ ms. If the voltage is within the permissible range, the set value of $t(\text{off})$ is ignored. If the voltage is too low, ATICS® waits until the set time $t(\text{off})$ has elapsed.

4.5.1.3 Time diagram: Changoover to generator mode



Legend

t(pulse)	Pulse time: 15 ... 30 ms
t(0)	Dead time
t(on)₁	Response delay ALARM failure voltage line 1 Measuring time: approx. 50 ms
t(Start)	Switch-on delay after complete power failure and restart of ATICS® Measuring time: approx. 50 ms
t(off)₁	Delay on release ALARM failure voltage line 1 Measuring time: approx. 50 ms
t(off)₂	Delay on release ALARM failure voltage line 2* Measuring time: approx. 50 ms
t(2->1)	Return transfer delay time
t(GenStart)	Generator start-up delay, delayed changeover to generator. Measured from voltage line 2 ok
t(GenOff)	Generator disconnecting delay, delayed switching-off of the generator
t(GenMax)	Generator start-up time. Time until generator supplies correct voltage. The message "Failure line 2" is suppressed until then.

* After switching on, ATICS® measures the voltage with t(off) = 100 ms. If the voltage is within the permissible range, the value set for t(off) is ignored. If the voltage is too low, ATICS® waits until t(off) has elapsed.

4.5.2 Monitoring the device functions

The control circuits are designed in such a way that a single fault, which must be expected to occur, cannot lead to failure of the power supply at the output of the automatic transfer switching device.

ATICS® tests the position of the switch as well as coils 1 and 2 of the switch once a day at around 12:00 pm.

ATICS® also continuously monitors:

- power supplies 1 and 2, which supply the electronics from the systems concerned
- internal microcontrollers and memory modules
- important connecting wires, such as measuring current transformer connection
- For alarm and test combinations and alarm indicator and operator panels, device failure monitoring can also be programmed via the BMS bus. (Required for functional safety, see chapter "Setting parameters of indicator devices", Page 34.)

4.5.3 Power supply

The coils of ATICS® are each supplied from the line which is not currently switched on. This ensures that it is possible to switch to the redundant line if the preferred line fails, for example.

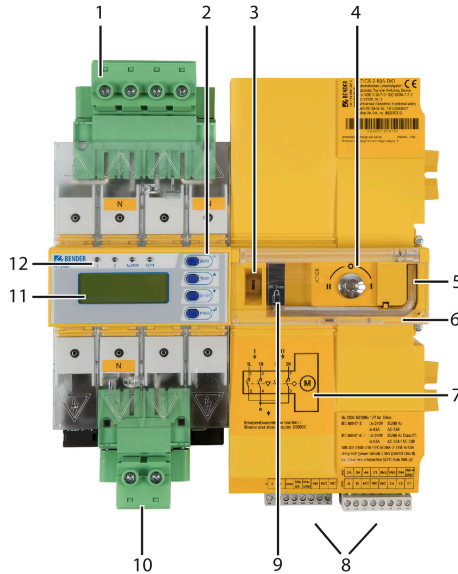
The power supply of the electronic system is redundant from lines 1 and 2. This ensures constant supply to the electronic system even when one line fails.

If both lines fail, ATICS® remains in the last switch position. Switch ATICS® to position "0" using an Allen key. When power is restored, ATICS® switches on the supply again with the set delay time t(start). If several ATICS® are installed in one system, they can be switched to the preferred line one-by-one starting from switch position "0" on voltage recovery. This prevents the peak loads that would occur if the lines of several transfer switching devices were switched on simultaneously.

4.5.4 Manual mode

In manual mode, changeover can be achieved using an Allen key. The switching device can be locked in position "0" with a padlock.

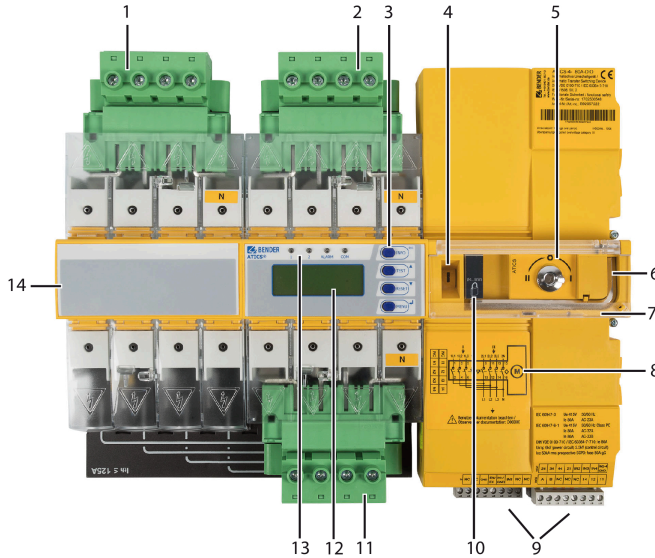
4.6 ATICS-2-DIO front view



Legend

- 1 Green plug connector for line 1 and line 2
- 2 Control buttons
- 3 Inspection window for switch position
- 4 Manual mode of the device, indicates the switch position
- 5 Allen key for manual mode
- 6 Transparent cover for changeover switch (manual mode), sealable
- 7 Wiring diagram for lines 1, 2 and 3
- 8 Three coded connector plugs
- 9 Locking device for switch position 0
- 10 Green plug connector for line 3
- 11 LCD
- 12 Operating and alarm LEDs

4.7 ATICS-4-DIO front view



Legend

- 1 Green plug connector for line 1
- 2 Green plug connector for line 2
- 3 Control buttons
- 4 Inspection window for switch position
- 5 Manual mode of the device, indicates the switch position
- 6 Allen key for manual mode
- 7 Transparent cover for changeover switch (manual mode), sealable
- 8 Wiring diagram for lines 1, 2 and 3
- 9 Three coded connector plugs
- 10 Locking device for switch position 0
- 11 Green plug connector for line 3
- 12 LCD
- 13 Operating and alarm LEDs
- 14 Connector plug for measuring current transformer

5 Mounting and connection



DANGER Danger to life due to electric shock

Touching live parts of the system carries the risk of electric shock.

- ▶ Before installing the device and prior to working on the device connections, make sure that the power supply is disconnected.
- ▶ Observe the rules for working on electrical installations.



Disturbance due to loud switching noise! Install ATICS® in a closed electrical operating area or in a sound-proof distribution board.

5.1 Mounting

ATICS® is suitable for DIN rail mounting or screw mounting on a plate. To guarantee protection against accidental contact, it must be installed behind a plastic cover.



NOTE

Risk of destruction by plastering

Liquid plaster may enter the device and block it.

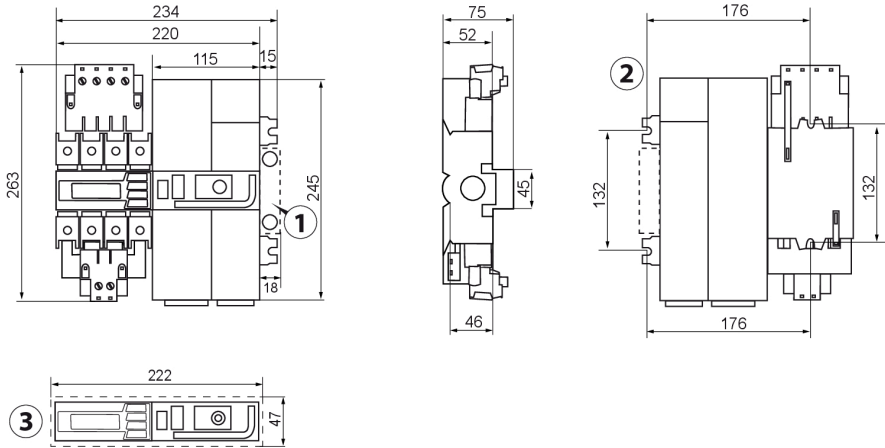
- ▶ Do not seal the device with plaster.

Required tools

Use the following tools to connect the power unit and the control cables:

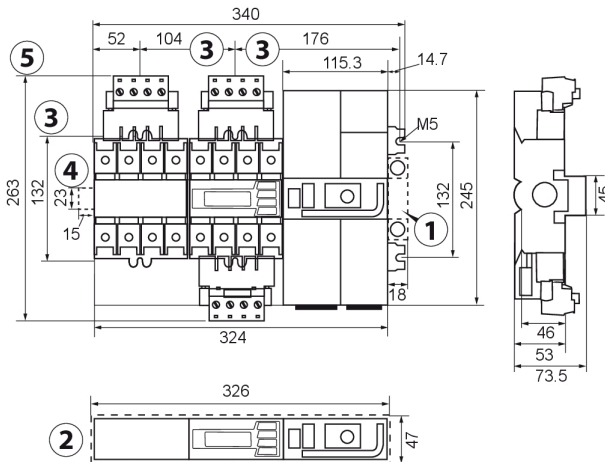
- Torx® screwdriver T20 or 6.5 x 1.2 mm
- Screwdriver 2.5 x 0.4 mm
- Allen key 4 mm

5.1.1 Dimension diagram ATICS-2-...-DIO



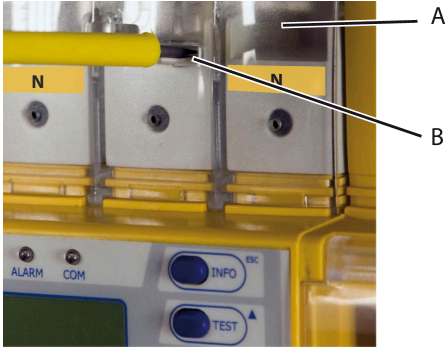
- 1 Additional space required for auxiliary contact when using the bypass switch
- 2 Rear view (dimensions for screw mounting on mounting plate)
- 3 Cutout for terminal cover

5.1.2 Dimension diagram ATICS-4-...-DIO



- 1 Additional space required for auxiliary contact when using the bypass switch
- 2 Cutout to the terminal cover
- 3 Dimensions for screw mounting on plate
- 4 Additional space required for the connector plug of the measuring current transformer
- 5 80 A / 125 A version; 160 A version without plug connector

5.1.3 Removing terminal cover



1. Push back the locking hook (B) in the middle of the top and bottom terminal cover (A) by using a screwdriver.
2. Remove the terminal cover.

5.1.4 DIN rail mounting

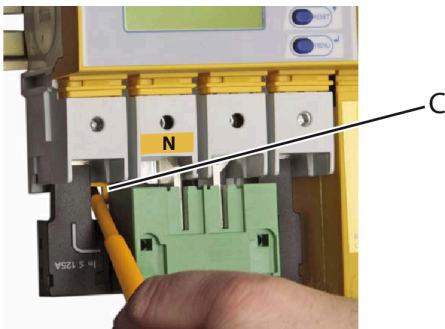


NOTE

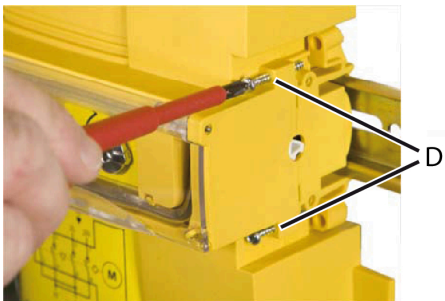
Material damage due to loose screws

If the screws are loose, ATICS® may be damaged by the vibrations generated during switching.

► Tighten the screws.



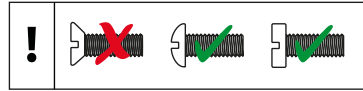
1. Place ATICS® on the top edge of the rail.
2. Use a screwdriver to pull down the lower yellow slide lock (C) and snap the ATICS® into place with slight pressure. Check that the slide lock has properly snapped into position by pulling slightly the lower part of the enclosure.
3. Fix all terminals with Allen screws terminals. Tightening torque: 5 N m.
4. Fasten the terminal covers.
5. Tighten screws (D) (PZ1, 8.8 lb-in, 1 N m).



5.1.5 Screw mounting on plate

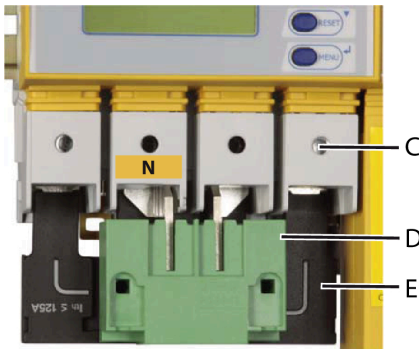


- Observe dimension diagram of rear view.
- Use M5 mounting screws.



CAUTION Reduced voltage clearances caused by screw heads or washers

- ▶ Use mounting screws with flat screw heads and flat washers to provide for sufficient clearance to live conductors (voltage clearance).
- ▶ If mounted on electrically conductive material: Earth the mounting plate and cover the area under the terminals with insulating material.



1. Undo the Allen screws of the terminals (C).
2. Remove the green plug connectors (D) top and bottom.
3. Remove the black bridge (E) bottom.
4. Fasten the ATICS® to the mounting plate with M5 mounting screws (22 lb-in, 2.5 N m) (see dimension diagram).
5. Insert the black bridge (E) bottom.
6. Plug in the green plug connectors (D) top and bottom.
7. Fix all terminals (C) with Allen screws. Tightening torque: 5 N m.
8. Fasten the terminal covers.

5.2 Connection

5.2.1 Short-circuit protection

The choice of back-up fuses F should ensure both short-circuit protection for the transformer and the selectivity to overcurrent devices downstream of the IT systems.

The connecting wires between the automatic transfer switching devices and the overcurrent protective device downstream are to be laid so that they are short-circuit and earth-fault proof.

When choosing back-up fuses, observe both the maximum permissible values in accordance with the applicable local regulations and national and international standards to make sure that the contacts are weld-free.

For recommendations on the use of the appropriate fuse, refer to the nameplate of ATICS® and to the ordering information in this manual.

5.2.2 Connecting ATICS® safely



DANGER Danger to life due to electric shock!

If any of the supplies are switched on, some of the system parts which are not yet fully installed may be live. Prevent unintended switch-on:



1. Open the transparent cover.
2. Wait until "manual mode" appears on the display.
3. Set to switch position "0" using the Allen key.
4. Lock the device using a padlock.



DANGER Danger to life due to electric shock!

Connecting wires can come loose and fall out if ferrules are too short, wire ends are tinned or the connection screws are not tight enough.

- For connection, strip 20 mm of insulation from cables 1, 2 and 3; do not use ferrules.
- Observe assignment of "ATICS® terminals".
- Always connect both supplies to the device from the top.
- Tighten the terminal screws to the specified torque. Check all screws regularly for tightness.



WARNING Risk of destruction during insulation and voltage tests

Disconnect the device from the mains for the duration of the test.



WARNING Risk of destruction if connected incorrectly

The terminals labelled GND must not be connected to PE.



WARNING Risk of destruction if phase fails in three-phase systems

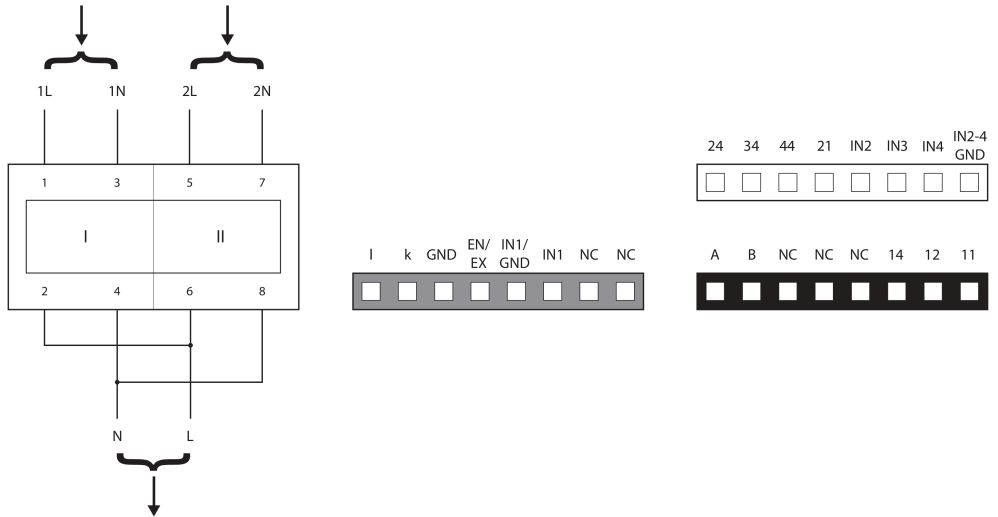
Even if just one of the phases fails, it may result in overvoltages which can damage the connected devices. Install a device for all-pole disconnection in the event of phase failure.



WARNING ATICS-4-125A-DIO and ATICS-4-160A-DIO: High temperatures may affect the terminals

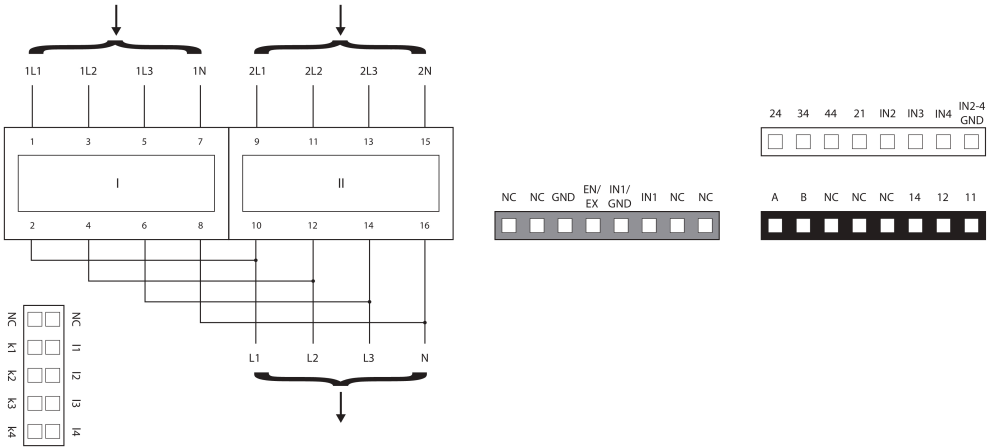
The terminals for the connection of line, 1, 2, 3 are designed for the specified rated operational current at room temperature.

Avoid higher temperatures or ensure that the load current is reduced.

ATICS® terminals


Colour	Terminal	Description
	1, 3	Connection line 1 (input line) L, N
	5, 7	Connection line 2 (input line) L, N
	4, 6	Connection line 3 (output line) N, L
grey	I, k	Connection measuring current transformer T3 (STW3/STW4) for monitoring the load current downstream the transfer switching and monitoring device (short-circuit monitoring)
	GND, EN/EX	Connection is intended only for ATICS-2-ISO-ES to connect ATICS-ES energy storage device or for Bender-internal purposes (12 V). In other cases the connection must not be used. Cable length ≤ 2 m
	IN1/GND, IN1	Digital input, configurable (see chapter "Settings menu 5: Dig. input", Page 61)
white	24, 34, 44, 21	3 alarm relays (1 n/o contact each), 21 = common ground for the three alarm relays
	IN2, IN3, IN4, IN2-4 GND	digital inputs
black	A, B	BMS bus connection
	14, 12, 11	Alarm relay, programmable function
	NC	Not used

Anschlussklemmen ATICS-4-DIO



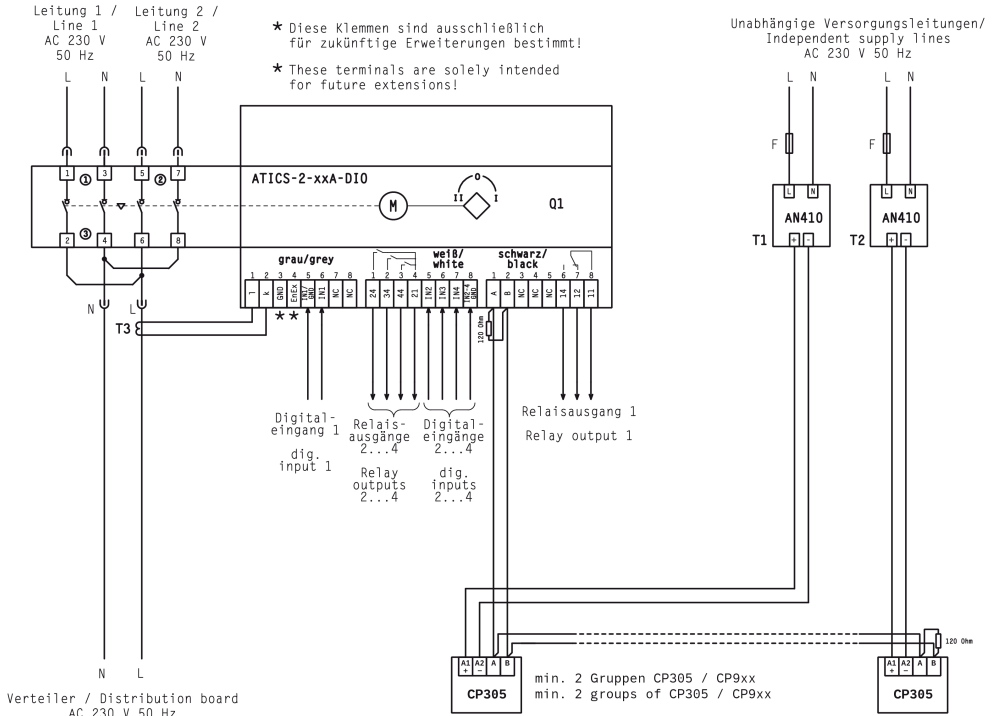
Colour	Terminal	Description
	1, 3, 5, 7	Connection line 1 (input line) 1L1, 1L2, 1L3, 1N
	9, 11, 13, 15	Connection line 2 (input line) 2L1, 2L2, 2L3, 2N
	10, 12, 14, 16	Connection line 3 (output line) L1, L2, L3, N
grey	GND, EN/EX	Do not use, intended for future extensions.
	IN1/GND, IN1	Digital input, configurable (see chapter "Settings menu 5: Dig. input", Page 61)
white	24, 34, 44, 21	3 alarm relays (1 n/o contact each), 21 = common ground for the three alarm relays
	IN2, IN3, IN4, IN2-4, GND	digital inputs
black	A, B	BMS bus connection
	14, 12, 11	Alarm relay, configurable function
	I1, I2, I3, I4, k1, k2, k3, k4	Connection measuring current transformers T1 ... T4 for monitoring the load current downstream the transfer switching device (short-circuit monitoring). Note: The plug must noticeably click into place!
	NC	Not used

5.2.3 ATICS® basic configuration

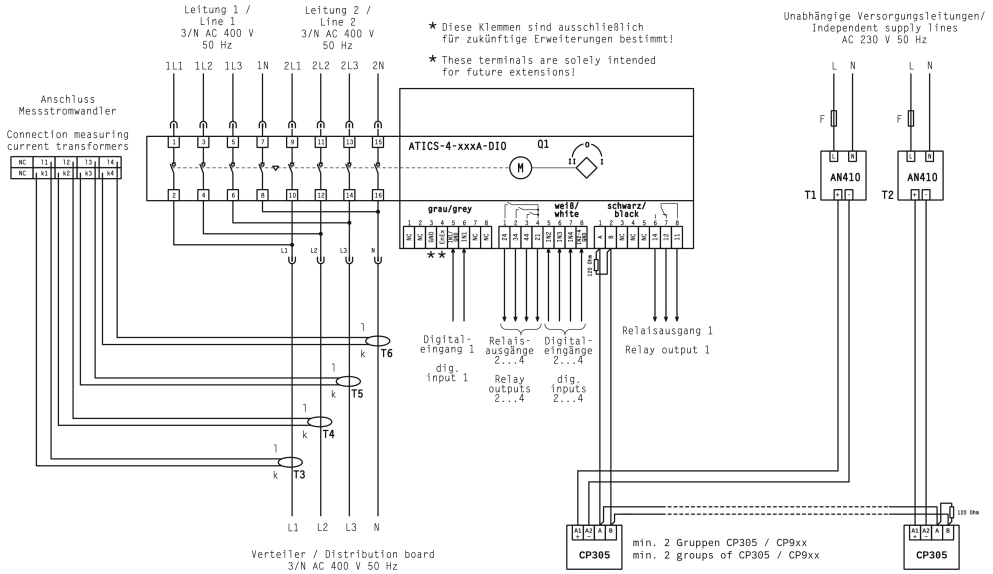


WARNING Risk of destruction if connected incorrectly

The terminals marked with "*" are intended for Bender-internal purposes only. If this is ignored, ATICS® may be damaged.



Img.: ATICS-2-DIO basic configuration



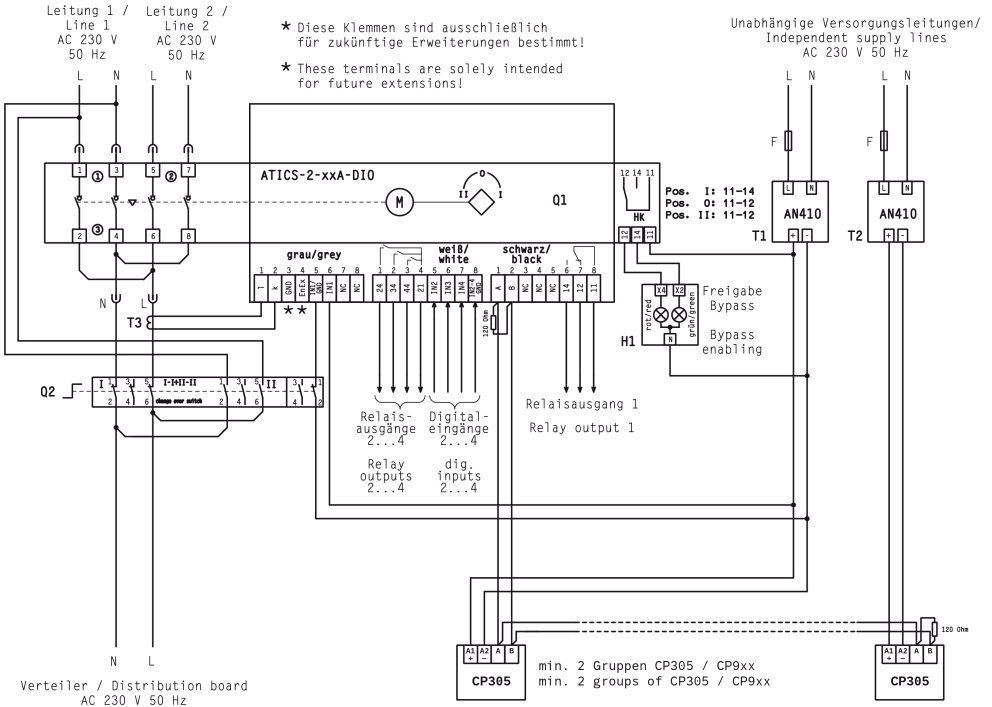
Img. 5-1: ATICS-4-DIO basic configuration

5.2.4 Connection example: ATICS® with bypass switch

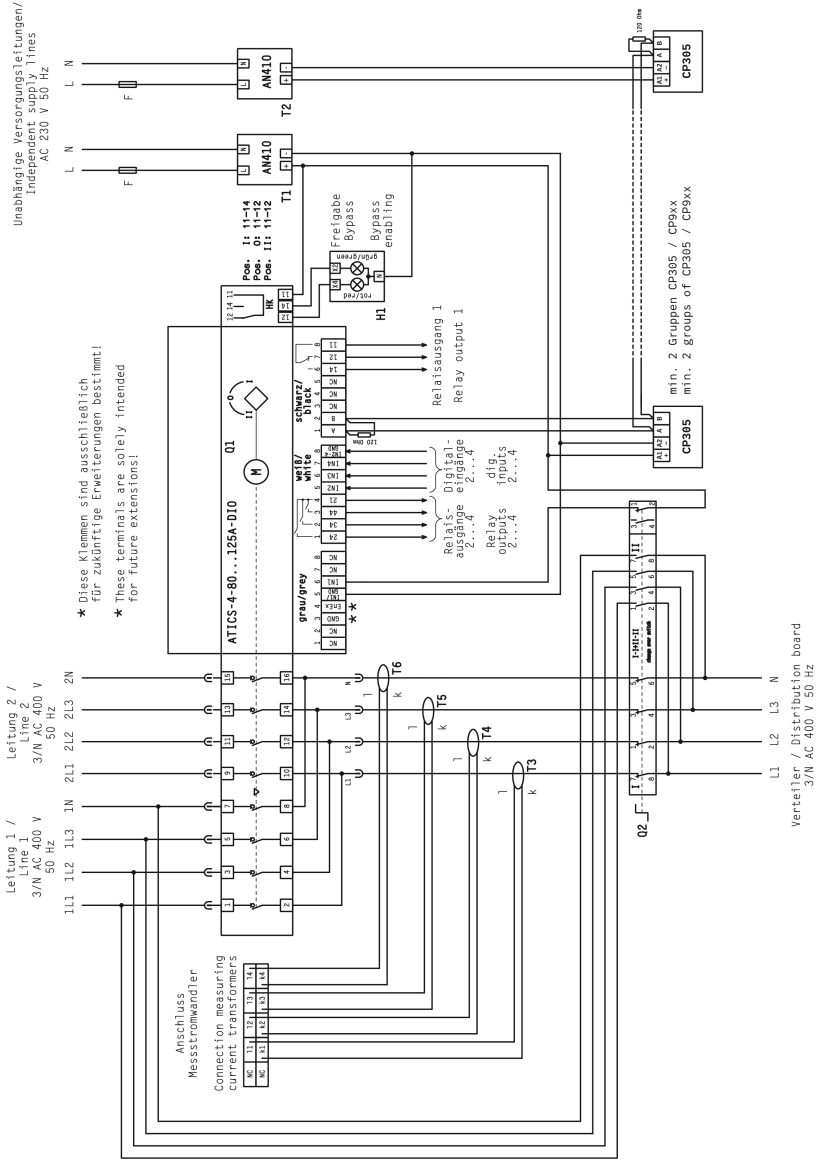


WARNING Risk of destruction if connected incorrectly

The terminals marked with "*" are intended for Bender-internal purposes only. If this is ignored, ATICS® may be damaged.



Img.: ATICS-2-DIO with bypass switch



★ Diese Klemmen sind ausschließlich für zukünftige Erweiterungen bestimmt!
★ These terminals are solely intended for future extensions!

Img.: ATICS-4-DIO with bypass switch

5.2.5 Instructions for connection

BMS bus

The terminals A and B are available for connecting BMS-enabled devices. Alarm indicator and test combinations, alarm indicator and operator panels or other bus-enabled Bender devices can be connected. The bus line must be terminated at both ends with resistors (120 Ω, 0.25 W). Please note the information in the “BMS bus” manual.

Alarm indicator and test combinations, alarm indicator and operator panels

Tasks:

- Display alarms from the ATICS® transfer switching device
- Mutual monitoring for failure

For compatible devices see “Ordering information”, Page 85.

SCADA systems (Supervisory Control and Data Acquisition)

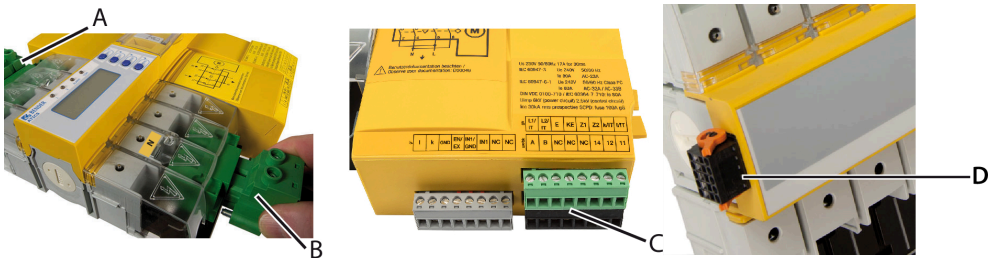
If messages from ATICS® are to be forwarded to a SCADA system, the following options are available:

- Protocol converters (gateways, e.g. COM465...)
- Common alarm via the ATICS® relay output
- Alarms via interconnected signal converters SMO480-12 or SMO482-12. TM800, SMO480-12 and SMO482-12 convert serial signals from Bender devices into potential-free relay contact alarms.

Bypass switch (optional)

The ATICS-BP-... bypass switch makes it possible to test and change the ATICS® transfer switching and monitoring device without interrupting the power supply to the line downstream of the transfer switching device. To make settings, refer to chapter “Operation with bypass switch”, Page 74.

5.2.6 Fastening, inserting and securing connections



1. Connect the terminals according to the wiring diagram to the plug connectors (A, B) and the three connector plugs (C).
 - For connecting lines 1, 2 and 3 to the plug connectors (A,B):
 - stripping length: 20 mm, no ferrules
 - ATICS-4-160A-DIO: 15 mm, with/without ferrules
 - tool: Torx® screwdriver T20 or a slotted screwdriver of 6.5 x 1.2 mm
 - tightening torque: 2.5 N m ($\leq 25 \text{ mm}^2$) or 4.5 N m ($> 25 \text{ mm}^2$)

- ATICS-4-160A-DIO: 5 N m
- Ensure that the lines are short-circuit and earth-fault proof!
- For connecting the lines to the three connector plugs (C):
 - stripping length: 7 mm
 - tool: slotted screwdriver of 2.5 x 0.4 mm
 - tightening torque: 0.22...0.25 N m
- 2. Insert bottom green plug connector (B) and secure with mounting screws.
- 3. Insert top green plug connector (A) and secure with mounting screws.
 - ATICS-4-DIO: 2x
- 4. Insert the three connector plugs (C).
- 5. ATICS-4-DIO only: Insert connection plugs of the measuring current transformers T1 ... T4 (D).
 - Note: Insert the plug until it noticeably clicks into place.

5.3 Other functions

5.3.1 Sealing the transparent cover



The transparent cover can only be sealed when it is closed (automatic mode).

5.3.2 Manual mode



CAUTION Risk of injury from rotating Allen key

If ATICS® is in automatic mode although the transparent cover is open, the inserted Allen key may rotate and cause injury.

- ▶ Before using the Allen key, check whether the message "Manual mode" appears on the display.
- ▶ Avoid pressing the button below the transparent cover so that ATICS® does not switch to automatic mode.

Enabling manual mode



Variant A: Open the transparent cover. Set the digital input. "M/A" function must be set (see chapter "Settings menu 5: Dig. input", Page 61).

Variant B: Place the handle on the Allen key, use the Allen key to switch over.

5.3.3 Lock ATICS® with a padlock



1. Pull out locking device.
2. Insert padlock and close it.

Locking is only possible in manual mode (transparent cover open). The locking device can only be locked in switch position "0". Padlock shackle diameter: 4...8 mm (3/16"...5/16"). The switch position cannot be changed until the lock has been removed and the locking device has been pushed in.

6 Commissioning, settings and testing

6.1 Design and installation

6.1.1 Safety advice

Ensure that the displays work correctly

MK... alarm indicator and test combinations, TM... alarm indicator and operator panels or BMS Ethernet gateways COM460..., which, together with ATICS®, are connected to a BMS bus must be provided with the latest operating software (e.g. MK800/TM800/MK2430 V 4.03 or higher). Older MK..., TM... or FTC... cannot interpret the alarms of ATICS® because the text modules required for ATICS® are not integrated yet. These devices must either be updated or replaced. The TMK-SET configuration software must also be the latest version.

Ensure that ATICS® switches

ATICS® requires enough current (2 pulses of 17 A for 30 ms) for a changeover. If there are several ATICS® in one system, it is possible that the current is insufficient, especially when feeding from a battery power supply.

Set the delay time $t(\text{start})$ ("Settings menu 1: Changeover", Page 56) on the devices in such a way that after voltage recovery the devices switch to the preferred supply one by one.

Provide sufficient alarm indicators

Provide at least two places for alarm indicator and test combinations or alarm indicator and operator panels. These panels display messages from ATICS® and monitor each other for failure. This is an essential part of the safety concept (functional safety, SIL2).

Application examples of MK.../TM.../CP... in hospitals:

- Medical locations
- Continuously manned area (e.g. nurse service area)
- Technical area

Provide a fail-safe power supply for the MK.../TM.../CP...

The MK.../TM.../CP... for the medical and technical area must be supplied with power from different lines and sources.

Example: The TM... in medical locations is supplied from line 3 of the automatic transfer switching device. The MK... in technical areas is supplied from a fail-safe battery-supported line.

6.1.2 Setting parameters of indicator devices



Configure MK.../TM.../CP.../COM465 in a meaningful way

In addition to the alarm, also configure a brief message of what to do or who to notify.

Examples:

- IT system overload. Switch off unnecessary loads.
- IT system insulation fault. Call Building Services Tel. -123.

Indicator devices must display at least the following faults detected by the ATICS®:

- Failure line 1, failure line 2
- Device error, device failure ATICS®
- Device error with complete text or error code

This is achieved by entering the ATICS® device address in the alarm address table. If necessary, individual messages can also be programmed for channels 1, 2, 5, 7...11. No individual text may be programmed for channel 6.

The failure of the other MK.../TM.../CP... must be reported.

MKs and TMs in technical areas are usually supposed to notify test and service reminders. For this purpose, for example, the setting “Display ATICS® warnings” must be enabled in the “TMK-SET” software in expert mode at “Parameters/Device Setup” tab “Parameter 2”. In medical locations, test and service reminders should not normally be notified. For this purpose, this setting must be disabled here (factory setting).

6.1.3 ATICS® messages on the BMS bus (channel use)

ATICS-2-DIO

BMS channel	Entry in the menu 1. Alarm/meas.values	Description	Operating message	Alarm message	Error
1	1. Line 1: 228V	Line 1	Voltage	Voltage*	--
2	2. Line 2: 183V	Line 2	Voltage	Voltage*	--
3	3. Position:1	Switch position	0, 1, 2	--	--
4	4. t(2->1):-- or Switch-back lock	Return transfer delay time is enabled, counting backwards or Switch-back lock	Seconds	--	--
5	5. Automatic mode	Manual mode/ Bypass/Automatic mode	--	Alarm text**	--
6	6. Status	e.g. device error	--		Error code (see “Messages with error code or service code”, Page 70.
7	7. I(3):35A	Load current TN system	Current	Current	Connection fault current transformer
8	8. Dig. input	Dig. input	--**	Alarm text**	--
9	9. Dig. input	Dig. input	--**	Alarm text**	--
10	10. Dig. input	Dig. input	--**	Alarm text**	--
11	11. Dig. input	Dig. input	--**	Alarm text**	--
12	No function				

* Message dependent on the parameter assignment in “Settings menu 1: Changeover”, Page 56 → “5. System”

** Message dependent on the input parameter assignment (see “Messages on the digital input”, Page 36)

ATICS-4-DIO

BMS channel	Entry in the menu 1. Alarm/meas.values	Description	Operating message	Alarm message	Error
1	1. Line 1: 228V	Line 1	Voltage	Voltage*	Phase seq. left, unbalance
2	2. Line 2: 183V	Line 2	Voltage	Voltage*	Phase seq. left, unbalance

BMS channel	Entry in the menu 1. Alarm/meas.values	Description	Operating message	Alarm message	Error
3	3. Position:1	Switch position	0, 1, 2	--	--
4	4. t(2->1):-- or Switch-back lock	Return transfer delay time is enabled, counting backwards or Switch-back lock	Seconds	--	--
5	5. Automatic mode	Manual mode/ Bypass/Automatic mode	--	Alarm text**	--
6	6. Status	e.g. device error	--		Error code (see "Messages with error code or service code", Page 70).
7	7. I(3):35A	Load current TN system phase L1	Current	Current	Connection fault current transformer
8	8. I(3):35A	Load current TN system phase L2	Current	Current	Connection fault current transformer
9	9. I(3):35A	Load current TN system phase L3	Current	Current	Connection fault current transformer
10	10. I(3):35A	Load current TN system phase L4	Current	Current	Connection fault current transformer
11	11. Dig. input	Dig. input 1	--**	Alarm text**	--
12	12. Dig. input	Dig. input 2...4 (common alarm)	--	--	--

* Message dependent on the parameter assignment in "Settings menu 1: Changeover", Page 56 → "5. System"

** Message dependent on the input parameter assignment (see "Messages on the digital input", Page 36)

The following different channel assignment applies to the test settings in the "Interface/Profile" menu:

BMS channel	Entry in the menu 1. Alarm/meas.values	Description	Operating message	Alarm message	Error
4	4. t(1->2)	Changeover period of the last test	Changeover period	--	--
7	7. TEST:tt.mm.yy	Next test due on (date)	Date	when due	--
8	8. Service:tt.mm.yy	Next service due on (date)	Date	when due	--

Messages on the digital input

The following operating and alarm messages may appear depending on the settings in chapter "Settings menu 5: Dig. input", Page 61:

Menu settings	Function of digital input	Alarm on BMS bus	BMS channel
off	Digital input disabled	No message	-
M/A	Enable manual mode	Alarm "Manual mode"	5

Menu settings	Function of digital input	Alarm on BMS bus	BMS channel
Bypass	Bypass enabled	Alarm "Manual mode"	5
no2->1	Enable switch-back lock	Operating message "Switch-back lock"	4
1<->2	Change preferred line	No message	
TEST	Carry out test changeover	No message	
ALARM	ATICS-2-DIO: Convert message at digital inputs 1...4 into alarms on the BMS bus.	Alarm "Digital input"	8, 9, 10, 11
ALARM	ATICS-4-DIO: Convert message at digital inputs 1...4 into alarms on the BMS bus. Channel 11 = DigIn 1 Channel 12 = common alarm DigIn 2...4 The common alarm code corresponds to the first message that triggers the common alarm.	Alarm "Digital input"	11, 12

6.1.4 Tests, decommissioning

- Abide by the relevant local or national regulations for periodic verification on electrical installations.
- If you notice changes on ATICS®, you must immediately start checking the transfer switching device.

Observe the alarms on the transfer switching device. ATICS® reports in good time when testing or servicing is necessary or if safe operation of the device according to IEC 61508 is no longer guaranteed (e.g. due to component fatigue) and action must be taken.

6.2 Setting and testing according to the checklist

The settings made at the factory take into account a total changeover period $t \leq 0.5$ s and switching back to the preferred supply within 10 s after voltage recovery.

The response delay $t(\text{on})$, the dead time $t(0)$, the delay on release $t(\text{off})$ and the return transfer delay time $t(2->1)$ of ATICS® are configurable and must be adjusted to the requirements of the specific application case and the requirements of DIN VDE 0100-710 (VDE 0100 Part 710) for automatic transfer switching devices. If the current monitoring (short-circuit detection) is disabled in the menu "Settings" → "Current", an additional short-circuit current calculation and configuration of the response time $t(\text{on})$ is required.

- The total off-time (from the point at which the fault occurs until the arc in the overcurrent protective device is cleared) must be less than the minimum delay for the changeover of the automatic transfer switching device.
Setting: Response delay $t(\text{on})$
- If several transfer switching devices are connected in series in a power supply system, it is recommended that they be time-graded.
Setting: Response delay $t(\text{on})$, return transfer delay time $t(2->1)$ and delay on release $t(\text{off})$.
- As part of the response delay (to be custom-set), you must, at the very least, take into account the periods of time when the circuit experiences short interruptions, and the response times of the short-circuit protection equipment upstream or downstream. Regardless of this, a switchover pause corresponding to the installation location should be taken into account, in order to avoid switching overvoltages.
Setting: Response delay $t(\text{on})$, dead time $t(0)$ and return transfer delay time $t(2->1)$.

The factory settings and system-specific settings of the ATICS® transfer switching and monitoring device are documented in the checklist. Please carry out all the work outlined in the list and log each test step.

Keep the checklist with this manual in the vicinity of the device.

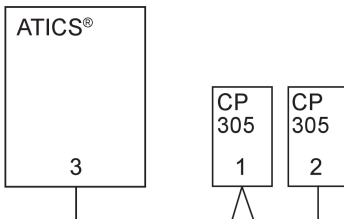
6.3 Addressing example



Use terminating resistors correctly

Communication via the BMS bus is only guaranteed when there is a terminating resistor at the beginning and at the end of the BMS bus. Other terminating resistors cause malfunction and must not be used. Please note the information in the "BMS bus" manual.

ATICS® with two MK...

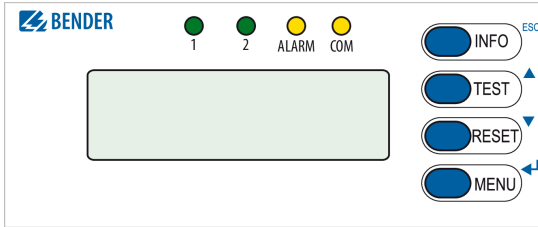


Device	Parameter	Address settings for an automatic transfer switching device
ATICS®	Bus address	3
MK.../CP305	Address	1
	Alarm address	3 / 2*
MK.../CP305	Address	2
	Alarm address	3 / 1*

* These alarm addresses are used for mutual monitoring of the MK.../CP305 for device failure.

7 Operation

7.1 Operating and display elements

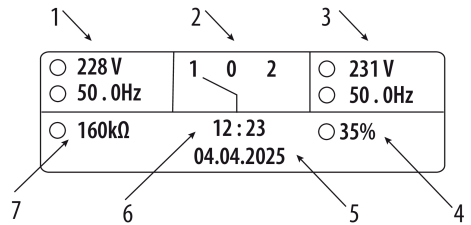


LED/Button	Description
LED "1"	lights up: Line 1 is ready
LED "2"	lights up: Line 2 is ready
LED "ALARM"	lights up: Alarm message present
LED "COM"	flashes: Communication via BMS bus
"INFO" "ESC"	Query standard information Exit menu function without changing parameters
"TEST" ▲	Call up test menu, change parameters, scroll
"RESET" ▼	Reset alarm and error messages, disable switch-back lock, change parameters, scroll
"MENU" ↵	Toggle between standard display, alarm display and MENU, confirm parameter changes

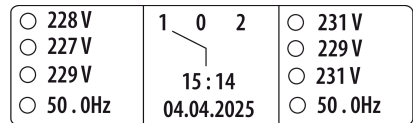
7.2 Quick reference guide

7.2.1 Display under normal operating conditions

- 1 Line 1: Measured values of mains voltage and frequency
- 2 Switch position of the automatic transfer switching device
- 3 Line 2: Measured values of mains voltage and frequency
- 4 Display of the load in the IT system in %. The maximum load current is adjustable.
- 5 Alarms or alternative displays*
- 6 Date
- 7



Img.: ATICS®-2 display: normal conditions



Img.: ATICS®-4 display: normal conditions

* Date, switch-back lock, manual mode, bypass mode, countdown timer for return transfer time

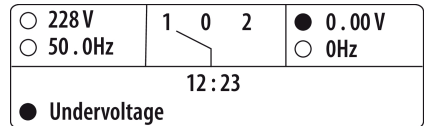
7.2.2 Display during fault condition

Alarm status:

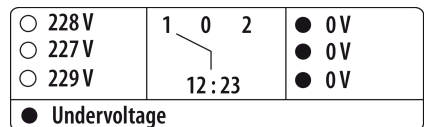
- no alarm
- alarm

There is an alarm message:

- The yellow “Alarm” LED lights up.
- A detailed message appears on the LC display.
Example: Line 2 has no voltage



Img.: ATICS®-2: no voltage on line 2



Img.: ATICS®-4: no voltage on line 2

Press \downarrow to display the current alarm:

- Line 1: ALARM
 - xx = serial number of the displayed alarm
 - yy = number of pending messages
- Line 2: Alarm status and alarm text
- Line 3: Measured value
- Line 4: Address and channel of the indicator device



Img.: Alarm message "Undervoltage"

Use the buttons \blacktriangle , \blacktriangledown to select previous or next message.

If no button is pressed for a few seconds, the standard display appears.

Press \downarrow again to return to the main menu.

i *The alarm text displayed in case of failure of one line depends on the setting in the "System" menu in "Settings menu 1: Changeover", Page 56.*

If individual alarm messages are programmed on an alarm indicator and operator panel or an alarm indicator and test combination, the display of this device may differ from the display of the ATICS®.

7.2.3 Test function

A test is used to check the device function. There are several ways to call up the test menu:

- Select standard display and then press the "TEST" button on the front panel of the device for at least one second.
- Call up "TEST" mode on the "Control" menu.

A test on the changeover function can also be triggered via a digital input (function similar to "Manual changeover").



Img.: Test menu

Menu item	Function	Reference
1. Autom. changeover	Test of the changeover function. Switches back automatically after time t(test).	"Test menu 1: Autom. changeover", Page 42
2. Manual changeover	Test of the changeover function. Switches back after pressing the "RESET" button.	"Test menu 2: Manual changeover", Page 43
3. Last changeover	Save last changeover as test.	"Test menu 3: Last changeover", Page 44
4. Generator	Start generator without switching over. Terminate test by pressing the "RESET" button.	"Test menu 4: Generator", Page 44
5. Test communication	Communication test via the BMS bus. To do this, simulate an alarm and send an alarm message via the BMS bus.	"Test menu 5: Test communication", Page 45

i Test menus 2...4 are protected by a password (see chapter "Settings menu 10: Password", Page 66. Password protection is only effective if the password has been enabled. When an attempt is made to open one of these menus, the password entry screen appears automatically:

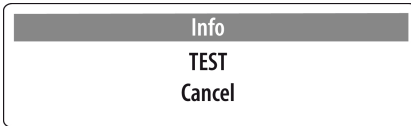


i During an "Autom. changeover" test or "Manual changeover" test, changeover does not take place until a delay time has elapsed which is indicated by the progress bar..

For technical reasons, the following menu items cannot be accessed via gateway (COM465..., CP700, ...):

- Control → Test → Manual changeover
- Control → Test → Generator
- Control → Test → Communication

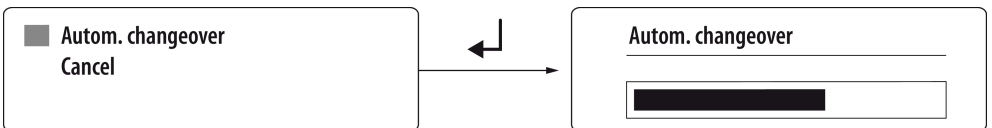
i If manual mode is selected for changeover (transparent cover open or digital input set to "manual changeover"), no changeover can take place at the test menu "Autom. changeover" or "Manual changeover". ATICS® then displays the following message:



i To run a test, the transfer switching and monitoring device must be in automatic mode.

i During an "Autom. changeover" or "Manual changeover" test, the changeover period $t(1 \rightarrow 2)$ is displayed. This is the time required for switching over from the preferred line to the redundant line. This time may differ from the return transfer time! See chapter "Time diagram: Changeover between preferred and redundant line", Page 14.

7.2.3.1 Test menu 1: Autom. changeover

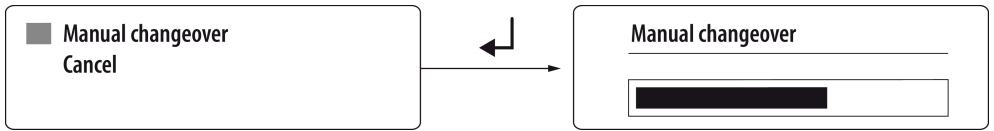


- Autom. changeover** Test of the changeover function. The device switches to the redundant line. The changeover period $t(1 \rightarrow 2)$ is displayed. After the set time $t(\text{test})$ has elapsed, the device switches back to the preferred line.
- Cancel** Return to test menu

Test	
t (1->2):	457ms
t (Test):	10s
Quit:	RESET

The date of the test is saved in the test logger to send a reminder for the next test once the test interval has elapsed. The messages from this test are also stored in the history memory.

7.2.3.2 Test menu 2: Manual changeover



Manual changeover Test of the changeover function. The device switches to the redundant line and remains in this switch position. The changeover period t(1->2) is displayed. The device does not switch back to the preferred line until the "RESET" button is pressed.

Cancel Return to test menu.

Test	
t (1->2):	○ 346ms
t (Test):	○ --
Cancel:	RESET

The date of the test is saved in the test logger to send a reminder for the next test once the test interval has elapsed. The messages from this test are also stored in the history memory.



NOTE

Test is accidentally not completed

If the test menu "Manual changeover" is left after switching over to the redundant line, then ATICS® remains in this switch position and in "TEST" mode.

1. Wait until "Quit: RESET" appears on the display.
2. Press the "RESET" button.
3. Check whether ATICS® has switched to the preferred line.



Manual mode aborts manual test

When the transparent cover is opened after switching over to the redundant line, ATICS® switches to manual mode. The test will be aborted. After closing the transparent cover, ATICS® switches back to the preferred line. No entry will be made in the test logger.

Test	
t (1->2):	<input type="radio"/> 110ms
t (Test):	<input type="radio"/> --
Cancel:	RESET

The display shows the test duration.


NOTE
Generator test is accidentally not completed

If the test menu "Generator" is left after the generator has started, then ATICS® remains in this switch position and in "TEST" mode. This means that the generator is not switched off.

1. Wait until "Quit: RESET" appears on the display.
2. Press the "RESET" button.
3. Check whether the generator is switched off.


NOTE
Complete power failure possible

If the preferred line fails, ATICS® will start the generator connected to the redundant line. If the generator does not start, the line downstream of the transfer switching and monitoring device will be dead. When the generator is switched off, ATICS® cannot check the redundant line.

- ▶ Test the generator and ATICS® at regular intervals to make sure they are working properly (see checklist, included in the scope of delivery).

7.2.3.5 Test menu 5: Test communication

Communication test via the BMS bus. In order to do this, a fault message is simulated. This alarm message is sent to evaluator devices (e.g. alarm indicator and operator panels, MK800, SMO...).

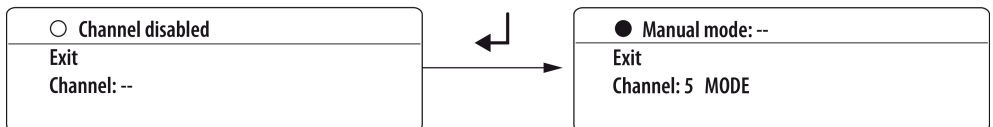
Check that these devices are responding to the alarm message as requested.

Select a channel:

1. Use ▲ button to go to the channel settings. Press ↵ to confirm.
2. Use the arrow buttons to select the channel for which the alarm message is to be simulated. Press ↵ to confirm.

The alarm status will change from (no alarm) to (alarm). If the alarm status is not displayed, the settings made for ATICS® will not permit simulation of this alarm.

Example of an alarm simulation: "Channel 5: MANUAL MODE" is selected.



i ATICS® stays in this menu until it is exited by pressing the “ESC” button. During this time, all the alarms on the BMS bus have the word “TEST”.

Only the alarm messages listed in the following table can be simulated: “ATICS® messages on the BMS bus (channel use)”, Page 35.

7.2.4 Reset function

Functions

- Resetting the alarm and fault messages for the device
- Disabling the switch-back lock of the changeover function

Calling up the reset menu

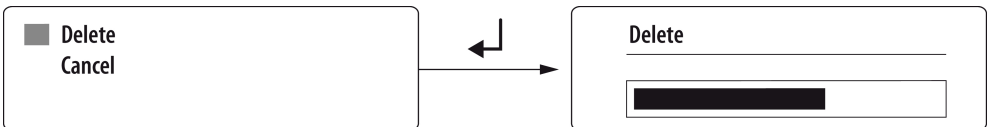
- Select standard display and then press the “RESET” button on the front panel of the device for at least one second; or
- Select the “RESET” function from the Control menu.



Img.: Reset menu

Menu item	Function	Reference
1. Alarm	Reset alarm and fault messages on the device.	“Reset menu 1: Alarm”, Page 46
2. SwitchBackLock	Disable the switch-back lock of the changeover function. The device switches back to the redundant line.	“Reset menu 2: SwitchBackLock”, Page 47
3. Changeover	Change alarm value for the: <ul style="list-style-type: none"> – Maximum number of changeover operations performed – Maximum number of operating hours – Maximum number of changeover operations performed which were carried out with overcurrent or short-circuit current 	“Reset menu 3: Changeover”, Page 47
4. Service alarm	Reset the service alarm.	“Reset menu 4: Service alarm”, Page 48

7.2.4.1 Reset menu 1: Alarm

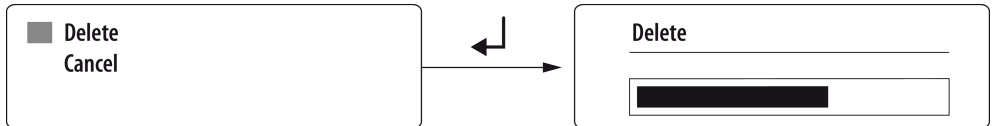


Delete Reset alarm and fault messages on the device. The progress of the test is shown on the display.
 The reset is required if one or more alarm-triggering parameters are not constantly monitored so that the end of the alarm condition was not detected.

Cancel Return to reset menu

For all pending alarms, the date and time of the reset are entered in the line "End" in the history memory. The "ALARM" LED goes out. If the fault persists, a new entry is written to the history memory. The "ALARM" LED remains lit.

7.2.4.2 Reset menu 2: SwitchBackLock



Delete Disable the switch-back lock of the changeover function. The progress of the test is shown on the display. The device switches back to the redundant line.

Cancel Return to reset menu



There are different possibilities to disable the switch-back lock via gateway (COM4xx, CP700 etc.):

- *Via menu: Select "RESET" → "Switch-back lock".
Requirement: Parameter setting enabled (menu "Settings" → "Interface" → "Settings" → "On").*
- *Via Modbus control commands: Using the command "Changeover to line 1 or line 2".
Requirement: Testing enabled (menu "Settings" → "Interface" → "Test" → "On").*

7.2.4.3 Reset menu 3: Changeover

Component failure possible with increasing service life! For operation according to IEC 61508-2, additional limit values are monitored (number of switching cycles, operating time, number of switching cycles in the event of a short circuit). If the set limit values are exceeded, the device displays a prewarning or an alarm. The alarm can be "deleted" by increasing the limit values.

To ensure continued operation in accordance with IEC 61508-2, replace the device.



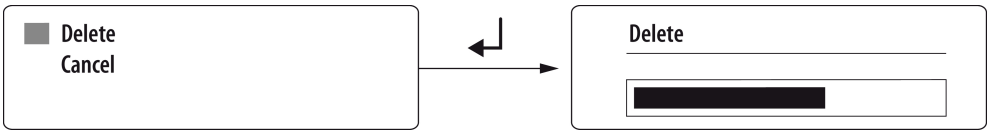
Regardless of the IEC 61508-2 standard, the safe function of the device is of course still guaranteed due to the cyclical self-monitoring functions.

Operation in accordance with DIN VDE 0100-710, DIN VDE 0100-718 or IEC 60364-7-710 is still possible if the prescribed measures are implemented (see chapter "Periodic verification and service", Page 73).

Menu	Description
Exit	Go up one menu level
1. <input type="radio"/> Changeover: xxx	Number of changeovers performed
2. Alarm: <input type="radio"/> 8000	Alarm value for maximum number of changeovers performed*
Delete	Alarmwert um 500 Umschaltungen erhöhen
4. <input type="radio"/> Operat. time: xxh	Operating hours counter (h = hours, d = days, mo = months)
5. Alarm: <input type="radio"/> 120mo	Alarm value for maximum number of operating hours (prewarning after 108 months)*

Menu	Description
Delete	The limit value for the permissible number of operating hours is increased by 13 months. The value is automatically increased by 13 months if the alarm has already been cleared once before and a successful test of the changeover process is carried out.
7: <input type="radio"/> Changeover I>: 0	Number of changeovers performed which were carried out with overcurrent of short-circuit current (see chapter "Menu 2: Changeover", Page 54)
8. Alarm: <input type="radio"/> 1	Alarm value for maximum permitted number of changeovers performed which were carried out with overcurrent or short-circuit current*
Delete	Increase alarm value for changeover in case of overcurrent or short-circuit current by 1 changeover

* for functional safety according to IEC 61508-2:2010



Delete Set new alarm value. Clear alarm.
Cancel Return to reset menu.

7.2.4.4 Reset menu 4: Service alarm

- Resetting the service prewarning suppresses the service prewarning until the next service appointment.
- Resetting the service alarm sets the date for the next service appointment to "current date + service interval".

8 Menu mode: Operation and setting

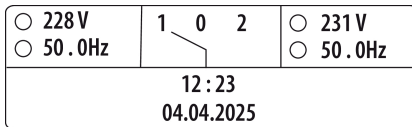
8.1 Switching on and calling up the main menu

When the device is connected to the power supply, the Bender logo appears on the display for approx. 3 seconds.

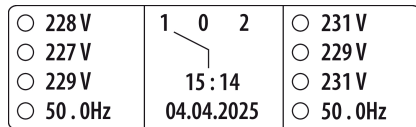


If the device has been without power for several days, time and date must be readjusted.

If there are no messages pending, the standard display will appear after the start.



Img.: ATICS®-2-DIO standard display



Img. 8-1: ATICS®-4-DIO standard display

Press the "MENU" button to open the main menu.



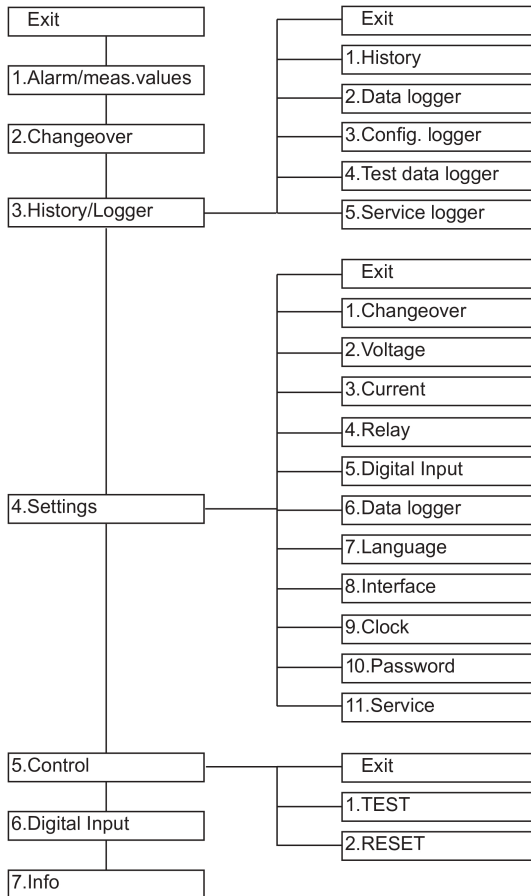
The following buttons can be used in the main menu:

- ▲, ▼ Select menu items
- ↵ Confirm the selected menu item (Enter)
- ESC Exit function or go up one menu level

The menu mode is exited automatically if no buttons are pressed in one of the menus for more than five minutes (exception: "Test communication" in the "TEST" menu).

8.2 Menu overview diagram

The following diagram will help you to navigate through the menus:



8.3 Function of the main menu

Menu item	Function	Reference
Exit	Exit menu mode	
1. Alarm/meas.values	Display saved status messages, alarm messages and measured values	"Menu 1: Alarm/meas.values", Page 51
2. Changeover	Display information on the changeover function (number, test)	"Menu 2: Changeover", Page 54
3. History/Loggers	Display history memory, data logger, configuration logger, test logger and service logger	"Menu 3: History/Loggers", Page 54
4. Settings	Various settings for this device	"Menu 4: Settings", Page 55
5. Control	Run test and reset of this device	"Menu 5: Control", Page 67
6. Dig. input	Display voltage level of the digital input	"Menu 6: Dig. input", Page 67
7. Info	Display information on device type and firmware versions	"Menu 7: Info", Page 67

8.3.1 Menu 1: Alarm/meas.values

Display current status messages, alarm messages and measured values.

The device shows the alarm status for each menu item: = no alarm, = alarm.

Alarm/meas.values ATICS®-2-DIO

Menu	Description
Exit	Go up one menu level
1. <input type="radio"/> Line 1: 228V	Line 1: Measured value mains voltage
2. <input checked="" type="radio"/> Line 2: 183V	Line 2: Measured value mains voltage
3. <input type="radio"/> Position: 1	Switch position of the automatic transfer switching device
4. <input type="radio"/> t(2->1):-- or	Return transfer delay time is enabled, seconds counting backwards or
Switch-back lock	Switch-back lock enabled
5. <input type="radio"/> Automatic mode	<input type="radio"/> Automatic mode or <input checked="" type="radio"/> manual mode
6. <input checked="" type="radio"/> Status	Device error (e.g.: no BMS bus master present)
7. <input type="radio"/> I(3):35A	Load current downstream of the transfer switching and monitoring device I(3) or "CT connection" fault
8. <input type="radio"/> Dig. input:	Alarm digital input 1 (see chapter "Settings menu 5: Dig. input", Page 61)
9. <input type="radio"/> Dig. input:	Alarm digital input 2 (see chapter "Settings menu 5: Dig. input", Page 61)

Menu	Description
10. <input type="radio"/> Dig. input:	Alarm digital input 3 (see chapter "Settings menu 5: Dig. input", Page 61)
11. <input type="radio"/> Dig. input:	Alarm digital input 4 (see chapter "Settings menu 5: Dig. input", Page 61)
12. <input type="radio"/>	No function
13. <input type="radio"/> Line 1: 50.0Hz	Line 1: Measured value frequency
14. <input type="radio"/> Line 2: 50.0Hz	Line 2: Measured value frequency

Alarm/meas.values ATICS®-4-DIO

Menu	Description	
Exit	Exit "Alarm/meas. values" menu; go up one menu level	
1. <input type="radio"/> U1(1-N): 230V	Line 1: Measured values mains voltage phase 1 to N"	
2. <input checked="" type="radio"/> U2(1-N): 0V	Line 2: Measured values mains voltage phase 1 to N" (here: Line 2 failed)	
3. <input type="radio"/> Position: 1	Switch position of the automatic transfer switching device	
4. <input type="radio"/>	t(2->1):-- or	Return transfer delay time is enabled, seconds counting backwards or
	Switch-back lock	Switch-back lock enabled
5. <input type="radio"/> Automatic mode	<input type="radio"/> Automatic mode oder <input checked="" type="radio"/> manual mode	
6. <input checked="" type="radio"/> Status	Device error (e.g.: no BMS bus master present)	
7. <input type="radio"/> I(1):35A	Load current in the TN system on phase L1 or "No CT connected" fault	
8. <input type="radio"/> I(2):33A	Load current in the TN system on phase L2 or "No CT connected" fault	
9. <input type="radio"/> I(3):37A	Load current in the TN system on phase L3 or "No CT connected" fault	
10. <input type="radio"/> I(N):0A	Load current in the TN system on neutral conductor N or "No CT connected" fault	
11. <input type="radio"/> Dig.input:	Alarm digital input 1 (see chapter "Menu 6: Dig. input", Page 67)	
12. <input type="radio"/> Dig.input:	Alarm digital input 2 ... 4 (see chapter "Menu 6: Dig. input", Page 67)	
13. <input type="radio"/> U1(1-N): 230V	Line 1: Measured value mains voltage phase L1 to neutral conductor N	
14. <input type="radio"/> U1(2-N): 230V	Line 1: Measured value mains voltage phase L2 to neutral conductor N	
15. <input type="radio"/> U1(3-N): 230V	Line 1: Measured value mains voltage phase L3 to neutral conductor N	
16. <input type="radio"/> U1(1-2): 400V	Line 1: Measured values phase L1 to phase L2	

Menu	Description
17. <input type="radio"/> U1(2-3): 400V	Line 1: Measured values mains voltage phase L2 to phase L3
18. <input type="radio"/> U1(3-1): 400V	Line 1: Measured values mains voltage phase L3 to phase L1
19. <input type="radio"/> Line 1: 50.0Hz	Line 1: Measured value frequency
20. <input type="radio"/> Unsymmetrie: 0%	Line 1: Unbalance of phases L1, L2, L3
21. <input type="radio"/> Phase seq: left	Line 1: Phase sequence of the phases L1, L2, L3
22. <input type="radio"/> U2(1-N): 230V	Line 2: Measured value mains voltage phase L1 to neutral conductor N
23. <input type="radio"/> U2(2-N): 230V	Line 2: Measured value mains voltage phase L2 to neutral conductor N
24. <input type="radio"/> U2(3-N): 230V	Line 2: Measured value mains voltage phase L3 to neutral conductor N
25. <input type="radio"/> U2(1-2): 400V	Line 2: Measured values phase L1 to phase L2
26. <input type="radio"/> U2(2-3): 400V	Line 2: Measured values mains voltage phase L2 to phase L3
27. <input type="radio"/> U2(3-1): 400V	Line 2: Measured values mains voltage phase L3 to phase L1
28. <input type="radio"/> Line 2: 50.0Hz	Line 2: Measured value frequency
29. <input type="radio"/> Unbalance: 0%	Line 2: Unbalance of phases L1, L2, L3
30. <input type="radio"/> Phase seq.: left	Line 2: Phase sequence of the phases L1, L2, L3
31. <input type="radio"/> t(1->2): 356ms	Changeover period t(1->2) of the last test

* In the event of an alarm, the phase voltage which was detected as faulty first and which triggered the alarm is indicated.

The following different channel assignment applies to the "Test" setting in the "Interface/Profile" menu:

Menu	Description
4. <input type="radio"/> t(1->2): 356ms	Changeover period t(1->2) of the last test
7. <input type="radio"/> TEST: 02.07.19	Next test by (date)
8. <input type="radio"/> Service: 11.07.19	Next service by (date)
9. <input type="radio"/> I(3):5A	Load current TN system
31. <input type="radio"/> t(2->1): --	Return transfer delay time is enabled, seconds counting backwards or switchback lock enabled

i All messages (except measured value frequency) are also present on the BMS bus (see chapter "Messages with error code or service code", Page 70).

8.3.2 Menu 2: Changeover

Display information on the changeover function (number, test).

The device shows the alarm status for each menu item: = no alarm, = alarm.

Menu	Description
Exit	Go up one menu level
1. <input type="radio"/> Changeover: xxx	Number of changeovers performed
2. <input type="radio"/> Operat. time: xxh	Operating hours counter (h = hours, d = days, mo = months)
3. <input type="radio"/> Changeover I>: xx	Number of changeovers performed which were carried out with overcurrent of short-circuit current. These changeovers reduce the service life of the ATICS® transfer switching device. Currents in excess of 130 A (if an STW3 is used) are considered to be overcurrents or short-circuit currents.
4. <input type="radio"/> TEST: tt.mm.jj	Date for next test (changeover)
5. <input type="radio"/> Service: tt.mm.jj	Date for next service
6. <input type="radio"/> TEST: tt.mm.jj	Date of the last test (TEST) or last changeover (LAST SWITCH)

8.3.3 Menu 3: History/Loggers

The device saves the history of alarm messages, measured values, settings, tests and service measures in different memories (logger).

For information on the maximum number of events that can be stored, see “Technical data”, Page 78. Once the maximum number of events which can be saved is reached, the latest event overwrites the oldest entry (entry 1).

Menu item	Function
Exit	Go up one menu level
1. History	The “History” menu provides information about alarm messages and tests performed. It also indicates whether an alarm is still pending or when it was acknowledged by pressing the “mute” button on an alarm indicator and operator panel or an alarm indicator and test combination.
2. Data logger	Displays the history of measured values: supply line 1, supply line 2, switch position of the transfer switching device, load current downstream of the transfer switching and monitoring device I(3).
3. Config. logger	Shows the history of all parameter changes, their origin, modified settings and the date of the change (can only be displayed on the device): Local Change has been made in the “Settings” menu on the device. External Change has been made via an external device (e.g. BMS-Ethernet gateway COM465...). Auto Automatic change, in response to a change of another parameter. For an example, see “Settings menu 4: Relay”, Page 59.
4. Test logger	Displays the history of the tests carried out: date, time and changeover period. See “Time diagram: Changeover between preferred and redundant line”, Page 14.
5. Service logger	Displays the history of the service measures carried out: Date, time and service codes. Meaning of the displayed service code: see “Messages with error code or service code”, Page 70.

Operating example: History

1. Use the arrow buttons to select the required entry. The most recent entry appears first on the display. Older messages can be selected using the arrow buttons.
2. Press \downarrow to call up the message text of the selected entry. The path the message took to reach the device is displayed (in this case: undervoltage, BMS bus address 3, channel 1).
For more information on possible displays see "Fault and alarm messages", Page 69.
3. Press \leftarrow again to return to the entry selection.

History		500 / 500
Start:	04.12.08 / 16:00:01	
Acc:	04.12.08 / 16:00:33	
End:	04.12.08 / 16:03:17	

History		500 / 500
● Undervoltage	min. 0V/max. 0V	
Addr.: 3	Chan.: 1	

Repeat these operating steps for all messages. Then press "ESC" to exit the menu.

The message "TEST" appears in the last line of the history memory alarm text display: Note that the current history memory entry was created as the result of a test initiated on this device.

Operating example: Config.Logger

1. Use the arrow buttons to select the required entry. In this case: The settings for the digital input are changed here.
2. Press \downarrow to call up the additional text for the selected entry.

The function of the digital input has been changed from "off" to "0". The last line contains an identification code for the type of modification (in this case: [4/1]). Channel 1 means that the first digital input has been changed. Please contact the Bender service and provide the identification number if the modification led to an undesirable behaviour of the device.

Config.Logger		10 / 17
Modific. (auto)	Digital Input	
04.04.25 / 16:03:17		

Config.Logger		10 / 17
Function	off -> 0	
Chan.: 1	(4/1)	

8.3.4 Menu 4: Settings

The settings menus are protected by a password (see chapter "Settings menu 10: Password", Page 66). Password protection is only effective if the password has been enabled. When opening one of those settings menus, the password entry screen appears automatically:

After entering a valid password, all settings menus (except the "Service" menu) are freely accessible until the menu mode is exited.

Settings
Enter password:
0 0 0

The following menu items are available for configuring the device:

Menu item	Function	Reference
Exit	Go up one menu level	
1. Changeover	Adjust settings for changeover switch	"Settings menu 1: Changeover", Page 56

Menu item	Function	Reference
2. Voltage	Adjust settings for voltage monitoring	"Settings menu 2: Voltage", Page 58
3. Current	Adjust settings for current monitoring (short-circuit detection)	"Settings menu 3: Current", Page 59
4. Relay	Set mode of operation and function of alarm relay	"Settings menu 4: Relay", Page 59
5. Dig. input	Set operating behaviour of the digital input	"Settings menu 5: Dig. input", Page 61
6. Data loggers	Adjust settings for data loggers	"Settings menu 6: Data loggers", Page 63
7. Languages	Select the operating language for the device (English, German, French, Polish)	"Settings menu 7: Language", Page 64
8. Interface	Set the BMS bus address of this device, allow settings to be changed via the interface, allow performing a test via the interface.	"Settings menu 8: Interface", Page 65
9. Clock	Set the date and time on the real-time clock on this device. The time setting is synchronised via the BMS bus. The device with address 1 (e.g. MK.../TM.../CP...) synchronises all other devices every hour.	"Settings menu 9: Clock", Page 65
10. Password	The device has two separate passwords for the "Settings" menu and the "TEST" menu. Adjustable in each case: change password, enable/disable password	"Settings menu 10: Password", Page 66
11. Service	Only intended for settings by authorised Bender service personnel. Call up information about the device status and make settings for specific operating conditions.	"Settings menu 11: Service", Page 67

8.3.4.1 Settings menu 1: Changeover

The times set in this menu determine the timing of a changeover. Observe also the time diagrams in chapter "The automatic transfer switching device", Page 12.

Menu item	Function
Exit	Go up one menu level
1. t(start)	Delayed switch-on after complete power failure: Setting range: 0...100 s Resolution of settings: 50 ms / 100 ms / 1 s / 5 s
2. t(0)	Time delay in switch position "0" (dead time): Setting range: 140 ms ... 100 s Resolution of settings: 10 ms / 50 ms / 100 ms / 1 s / 5 s
3. t(2->1)	Return transfer delay time to the preferred line: Setting range: 0 s ... 180 min Resolution of settings: 50 ms / 100 ms / 1 s / 5 s / 1 min
4. t(test)	Test time for "Autom. changeover": Setting range: 2 s ... 180 min Resolution of settings: 1 s / 5 s / 1 min

Menu item	Function												
5. System	<p>U1-U2 Voltage line 1 - Voltage line 2 Line G Line 1 - Generator L1-L2 Line 1 - Line 2 AV-SV Normal power supply source - Safety power supply source. SV-AV Safety power supply source - Normal power supply source SV-UPS Safety power supply source - Special safety power supply source UPS-SV Special safety power supply source - Safety power supply source SV-BSV Safety power supply source - Battery-supported safety power supply BSV-SV Battery-supported safety power supply - Safety power supply</p> <p>The setting also influences the creation of the alarm text which is displayed in case of voltage failure on a line:</p> <table> <tr> <td>Setting</td> <td>Alarm text</td> </tr> <tr> <td>U1-U2</td> <td>Undervoltage, overvoltage, voltage value</td> </tr> <tr> <td>Line G, L1-L2</td> <td>Failure line 1, failure line 2</td> </tr> <tr> <td>AV-SV, SV-AV</td> <td>Fail.norm.supply, Fail.safet.supply</td> </tr> <tr> <td>SV-UPS, UPS-SV</td> <td>Fail.safet.supply, Failure UPS</td> </tr> <tr> <td>SV-BSV, BSV-SV</td> <td>Fail.safet.supply, Failure BSV</td> </tr> </table> <p><i>Explanation of abbreviations:</i> AV = Normal power supply source SV = Safety power supply source UPS = Special safety power supply source BSV = Battery-supported safety power supply</p>	Setting	Alarm text	U1-U2	Undervoltage, overvoltage, voltage value	Line G, L1-L2	Failure line 1, failure line 2	AV-SV, SV-AV	Fail.norm.supply, Fail.safet.supply	SV-UPS, UPS-SV	Fail.safet.supply, Failure UPS	SV-BSV, BSV-SV	Fail.safet.supply, Failure BSV
Setting	Alarm text												
U1-U2	Undervoltage, overvoltage, voltage value												
Line G, L1-L2	Failure line 1, failure line 2												
AV-SV, SV-AV	Fail.norm.supply, Fail.safet.supply												
SV-UPS, UPS-SV	Fail.safet.supply, Failure UPS												
SV-BSV, BSV-SV	Fail.safet.supply, Failure BSV												
6. SwitchBackLock	<p>on Switch-back lock enabled off Switch-back lock disabled</p> <p>See "Time diagram: Changeover between preferred and redundant line", Page 14.</p>												
7. Preferred line	<p>1 Line 1 2 Line 2</p> <p>In generator mode, line 1 is always the preferred line.</p> <p>Note: A parameter change can result in an immediate changeover.</p>												
8. Test interval	<p>Interval for testing the changeover function: Setting range: Off, 1...24 months Resolution of setting: 1 month</p>												
9. Reminder	<p>Prewarning time for test interval (set value smaller than test interval): Setting range: off, 1...60 days Resolution of setting: 1 day</p>												
10. Serviceinterv.	<p>Service interval: Setting range: off, 6...48 months Resolution of setting: 6 months</p>												
11. Reminder	<p>Prewarning time for service interval (d = day): Setting range: off, 1...60 days Resolution of setting: 1 day</p>												
12. t(GenStart)	<p>Time delay for changeover to generator (measured from "Voltage line 2 = OK"): Setting range: 0...100 s (only active when System = Line G) Resolution of settings: 1 s / 5 s</p>												
13. t(GenMax)	<p>Maximum generator start time. Monitoring whether the generator starts (time until "Voltage line 2 = OK"). Setting range: 0 s...100 s (only active when System = Line G) Resolution of setting: 1 s / 5 s</p>												
14. t(Gen.off)	<p>Time delay for turning off the generator after switching back to the preferred line: Setting range: 2 s...180 min (only active when System = Line G) Resolution of setting: 1 s / 5 s / 1 min</p>												

8.3.4.2 Settings menu 2: Voltage

In this menu, you can make settings for voltage monitoring on line 1 and line 2 individually or together.

Example: Line 1 is set to "Undervolt.: 184V". If the voltage on line 1 falls below 184 V, the device displays an alarm message. If the voltage on line 2 is within the set range, a changeover to line 2 takes place. ATICS® returns to line 1 if the voltage on line 1 exceeds the pre-set value (in this case 184 V) plus the set hysteresis.

Selecting a line:

1. Use ▲ to go to the line setting. Press ↵ to confirm.
2. Use the arrow buttons to select one line (Voltage 1, 2) or both lines (Voltage 1...2). Press ↵ to confirm.

Voltage:	2
Exit	
1. Undervolt.:	184V
2. Overvoltage:	250V

Img.: Setting voltage for one line

Voltage:	1..2
Exit	
1. Undervolt.:	184V
2. Overvoltage:	250V

Img.: Setting voltage for both lines

Adjusting the settings:

Menu	Description
Exit	Go up one menu level
1. Undervolt.	Undervoltage; setting range: 160...207 V
2. Overvolt.	Overvoltage; setting range: 240...275 V
3. t(on)	Response delay*: Setting range: 50 ms ... 100 s Resolution of setting: 50 ms / 100 ms / 1 s / 5 s / 10 s
4. t(off)	Delay on release*: Setting range: 200 ms ... 100 s Resolution of setting: 50 ms / 100 ms / 1 s / 5 s / 10 s
5. Hysteresis	Setting range: 2...10 % Resolution of setting: 1 %
6. Unbalance (ATICS®-4-DIO only)	Setting range: 2...30 % Resolution of setting: 1 %
7. Phase sequence (ATICS®-4-DIO only)	on: Phase sequence monitoring enabled off: Phase sequence monitoring disabled

* Observe also the time diagrams

8.3.4.3 Settings menu 3: Current

In this menu, you can adjust settings for current monitoring (short-circuit detection) downstream of the transfer switching device.

Menu	Description
Exit	Go up one menu level
1. Mode	on Current monitoring enabled off No current monitoring
2. Current transformer	STW3 Bender measuring current transformer STW3 STW4 Bender measuring current transformer STW4
3. CT monitoring	on CT connection monitoring enabled off CT connection monitoring disabled Note: External interference from loads can cause false tripping. In this case, the function has to be disabled. The functional safety of the transfer switching device is in no way impaired by this.

ATICS®-2-DIO

The current is detected via a measuring current transformer (T3, see *Img.:* ATICS-2-DIO basic configuration, Page 27).

ATICS®-4-DIO

The current is detected via the measuring current transformers (T3...T6 in the connection example). If the optional fourth measuring current transformer T6 is not available, its function has to be disabled in the "Current 4" menu.

Select measuring current transformer:

- Use **▲** to go to the measuring current transformer setting. Press **↵** to confirm.
- Use the arrow buttons to select one (e.g. Current 2) or all four measuring current transformers (Current 1...4). Press **↵** to confirm.

Current:	2
Exit	
1. Function:	on
2. CT:	STW3

Img.: Configure one current transformer

Current:	1..4
Exit	
1. Function:	on
2. CT:	STW3

Img.: Configure all four current transformers

8.3.4.4 Settings menu 4: Relay

In this menu, you can adjust settings for the mode of operation and function of the relay output (alarm relay). These functions can be set: alarm message ("ALARM"), operating message ("Active"), generator start ("GenSt", only for relay 1).

If "ALARM" is set and then "Line 1: on" is selected, the relay switches if line 1 fails. If "Active" is set and then "Line 1: on" is selected, the relay switches if line 1 operating. The setting "on" can be selected for several menus simultaneously. The relay switches when at least one of the conditions is met.

If a new alarm appears while another is already pending, the relay is deenergised briefly (approx. 1 s) and is energised again. This "new value behaviour" ensures that new alarms are reported when alarm messages are forwarded to SCADA systems.

If "GenSt" is set, the operating mode for the alarm relay will always be set to "N/C-T" on. The other settings on the "Relay" menu are disabled. The alarm message "Failure line 2" is suppressed.

i If the setting "Line G" is selected in the "Changeover" → "System" settings menu, the alarm relay is permanently set to:

- 1. Function: GenSt
- 2. Relay mode: N/C-T
- Menu items 4...9: inactive

Select relay:

1. Use ▲ to go to the alarm relay setting. Press ↵ to confirm.
2. Use the arrow buttons to select one (e.g. relay 2) or all four alarm relays (relays 1...4). Press ↵ to confirm.

Relay:	2
Exit	
1. Function:	ALARM
2. Relay mode:	N/C-T

Img.: Setting one relay

Relay:	1..4
Exit	
1. Function:	ALARM
2. Relay mode:	N/C-T

Img.: Setting all four relays

Note: Function "GenSt" applies to relay 1 only; relays 2...4 are set to "ALARM".

Adjusting the settings:

Menu	Description	
Exit	Go up one menu level	
1. Function	ALARM	Relay switches if at least one of the following menus 3...9 is set to "on" and the corresponding alarm message appears.
	Active	Relay switches if at least one of the following menus 3...9 is set to "on" and the corresponding alarm message does not appear (operating message). If several of these menus are set to "on", none of them must have an alarm in order to be able to activate the relay.
	GenSt	<p>Application example: Function = "Active" Line 1 = "on", all other menus (line 2, device error, etc.) are set to "off". ▶ Relay is activated when line 1 is ready for operation.</p> <p>Relay is used as a generator start relay (alarm relay 1 only).</p>
2. Relay mode	N/O operation	Relay only switches in the event of an alarm.
	N/C operation	Relay only switches in the event of an alarm.
	N/O-T operation	Relay switches in the event of an alarm or a test.
	N/C-T operation	Relay switches in the event of an alarm or a test.
3. Line 1	on	Line 1
	off	
4. Line 2	on	Line 2
	off	
5. Manual mode	on	Relay switches in manual mode (transparent cover open or digital input "Manual mode" selected).
	off	

Menu	Description
6. Device error	on Internal device error 1.x, 3.x (except 3.50), 6.x, 7.x, 8.x, 9.x or BMS bus has no master, short-circuit distribution board, failure distribution board, test due, service due. off
7. Test interval	on Relay switches when a test is due (interval elapsed). off
8. Serviceinterv.	on Relay switches when service is due (interval elapsed). off
9. Dig. input	on Alarm digital input. To ensure that the relay responds to the digital input, the functions "ALARM" or "R-OPL" must be additionally set in the "Setting"s → "Digital Input" menu. off

i The reminders for the test (7. Test interval) or the service (8. Serviceinterv) are always triggered at 12:00 pm. If these messages appear at night, the time is set incorrectly on the device.

8.3.4.5 Settings menu 5: Dig. input

In this menu, you can adjust settings for the mode of operation and function of the digital input. The digital input is electrically isolated. It is designed for an input of AC/DC 24 V.

For each input, selection is possible when the input is set to: "24V" (high) or "0V" (low). In the "24V" setting, the selected function (e.g. alarm message) is carried out when there are 24 volts there. In the "0V" setting, the selected function is carried out when there are 0 volts there. It is for this reason that you should always set unused digital inputs to "off".

i By selecting the function of the digital input, the recommended response value is automatically adjusted:

- Test, M/A, 1, 0, 2 (switch positions) 24V (cannot be changed)
- no2->1, 1<->2, bypass, alarm and OPL 0 V (can be changed)

The "Bypass" setting can only be changed temporarily for test purposes. After restarting ATICS® this setting returns to "0V"!

Select digital input:

1. Use ▲ to go to the digital input setting. Press ↵ to confirm.
2. Use the arrow buttons to select one digital input (e.g. Dig. input 3) or all four digital inputs (Dig. input 1... 4). Press ↵ to confirm.

Digital input:	3
Exit	
1. Function:	off
2. Resp. value:	24.0 V

Img.: Setting one digital input

Digital input:	1 . . 4
Exit	
1. Function:	off
2. Resp. value:	24.0 V

Img.: Setting all digital inputs

Adjusting the settings:

Menu	Description
Exit	Go up one menu level
1. Functions	<p>NOTE: A parameter change can result in an immediate changeover.</p> <p>off Digital input disabled</p> <p>M/A Manual/Automatic. Manual mode means that automatic changeover can no longer take place.</p> <p>Bypass Alarm "Bypass operation" but test changeover possible</p> <p>no2->1 Switch-back lock. After switching to line 2, the changeover switch remains in this switch position. It remains there even when line 1 returns. Switching back to line 1 only takes place when the digital input is no longer set, line 2 fails or the "RESET" button has been pressed. The display shows the operating message "Switch-back lock".</p> <p>1<->2 Changes the preferred line</p> <p>TEST A test changeover is carried out. In generator mode, the generator start relay is also switched. The test is completed when the output is reset.</p> <p>1 / 0 / 2 Switch to respective switch position.</p> <p>ALARM Requirement: Another dig. input is set to "M/A". Generates a "Digital input alarm". An alarm relay of an external ISOMETER® can be connected here. The alarm message appears on the display and is passed on via the BMS bus. The alarm relay switches when adjusted accordingly. The alarm message has no effect on the changeover function.</p> <p>OPL Generates an alarm "Insulation fault, operating theatre light". Other functions as for the setting "ALARM".</p>
2. Resp. value	<p>0V At 0 V input is set. The selected function is carried out.</p> <p>24V At 24 V input is set. The selected function is carried out.</p>
3. t(on)	<p>Response delay:</p> <p>Setting range: 100 ms...100 s</p> <p>Resolution of setting: starting at 50 ms</p>
4. t(off)	<p>Delay on release:</p> <p>Setting range: 100 ms...100 s</p> <p>Resolution of setting: starting at 50 ms</p>

i The common alarm for the digital inputs 2...4 is signalled on channel 12 of the BMS bus. If one of these digital inputs is set to "ALARM" and activated, an alarm is output on channel 12. It cannot be recognised which digital input has tripped. Only one alarm is output. Priority is given to the alarm of the digital input with the lowest number.

Example:

Digital input 2 is set to "ALARM" and activated. Digital input 3 is set to "R-OPL" and activated. In this case, only the message of digital input 2 (ALARM) will be indicated on channel 12 of the BMS bus. Only when digital input 2 is no longer activated, the message of digital input 3 will be indicated (R-OPL).



Do not set inputs with contradictory functions simultaneously! For each of the four digital inputs a function can be set. This function is only carried out when the input is activated.

Example:

Digital input 1 is set to "1".

Digital input 2 is set to "2".

Digital input 3 is set to "0".

Digital input 4 is set to "M/A".

If the digital inputs 1 and 4 are activated, ATICS® switches to the switch position "I". If the digital inputs 2 and 3 are also activated, this has no effect. The function of the input activated first has priority. If digital input 1 is no longer activated, the function of the digital input with the next number up will be activated.

8.3.4.6 Settings menu 6: Data loggers

In this menu, you can make settings for the data loggers. These data loggers (see chapter "Menu 3: History/Loggers", Page 54) display the history of measured values:

ATICS®-2-DIO data loggers

Data logger	Description
1. Line 1	Line 1: Measured value mains voltage phase to neutral conductor N
2. Line 2	Line 2: Measured value mains voltage phase to neutral conductor N
3. Position	Switch position of the transfer switching device
4. I(3)	Load current downstream of the transfer switching device

ATICS®-4-DIO data loggers

Data logger	Description
1. U1(1-N)	Line 1: Measured value mains voltage phase L1 to neutral conductor N
2. U1(2-N)	Line 1: Measured value mains voltage phase L2 to neutral conductor N
3. U1(3-N)	Line 1: Measured value mains voltage phase L3 to neutral conductor N
4. U2(1-N)	Line 2: Measured value mains voltage phase L1 to neutral conductor N
5. U2(2-N)	Line 2: Measured value mains voltage phase L2 to neutral conductor N
6. U2(3-N)	Line 2: Measured value mains voltage phase L3 to neutral conductor N
7. Position: 1	Switch position of the transfer switching device
8. I(1)	Load current downstream of the transfer switching device on phase L1
9. I(2)	Load current downstream of the transfer switching device on phase L2
10. I(3)	Load current downstream of the transfer switching device on phase L3
11. I(N)	Load current downstream of the transfer switching device on neutral conductor N

i

Premature wear of the memory module

The service life of the 500 memory locations of the EEPROM memory is limited to approx. 100,000 memory accesses. If one change to a measured value is saved every second, the end of the service life of the EEPROM is reached after one year. If changes are saved every minute, the service life is increased to approx. 57 years. Select the settings in the "Datalogger" → "Modific." settings menu in a way that frequent saving over longer periods of time can be avoided.

To protect the memory module, a minimum threshold of 10 A for the load currents is incorporated in the data loggers for the TN system downstream the transfer switching and monitoring device. Values below this limit threshold are only stored once. A new measured value will be stored in the memory only when this limit threshold is exceeded.

Selecting a data logger:

- Use ▲ to go to the data logger settings. Press ↵ to confirm.
- Use the arrow buttons to select one data logger (1, 2, ...) or all data loggers (1...4 / 1...11). Press ↵ to confirm.

No.: 4	U2(1-N)
Exit	
1. Modific.:	10.00 %
2. Overwrite:	yes

Img.: Set one data logger (Example **ATICS®-4-DIO**)

No.:	1..11
Exit	
1. Modific.:	10.00 %
2. Overwrite:	yes

Img.: Set all data loggers (Example **ATICS®-4-DIO**)

Adjust settings and delete data loggers:

Menu	Description
Exit	Go up one menu level
1. Modific.	Once the measured value has been changed by the set % value, a new measured value is stored in the data logger. Setting range: 0 ... 100 % Resolution of setting: 1 %
2. Overwrite	yes Once the maximum number of measured values which can be saved has been reached, the current measured value overwrites the oldest entry. no Once the maximum number of measured values which can be saved has been reached, no further measured values are saved.
3. Delete	Delete Clear data logger. Cancel Do not clear data logger.


8.3.4.7 Settings menu 7: Language

Select the language for the menus and the messages to be displayed (alarm and operating messages) of the device.

Menu	Description
Exit	Go up one menu level
1. English	Select language. Changes take effect immediately.
2. Deutsch	
3. Français	
4. Polski	

8.3.4.8 Settings menu 8: Interface

Set the device address for the connection to the internal BMS bus. Change the device address concerned when several devices are connected to one BMS bus. One device (e.g. MK800) must have address 1 (master). All other devices are addressed in consecutive order: 2,3,4,... There should be no gaps between the addresses. This is the only way to ensure the function of the system.

Menu	Description	
Exit	Go up one menu level	
1. Address	Setting range:	2...90
2. Settings	on off	Allow settings to be changed via interface (e.g. a COM465... Ethernet gateway). Do not allow settings to be changed via interface.
3. TEST	on off	Allow a test to be carried out via interface (e.g. a COM465... Ethernet gateway). Do not allow a test to be carried out via interface.
4. Failure monitoring	on off	Reports when no (more) communication with the BMS master is detected. It is not monitored whether a BMS master is present. This setting is required when ATICS® is used as a "Stand-alone" device without BMS master.  NOTE When this setting is selected, the conditions for functional safety (SIL2) are no longer met.
5. Profile	Stand. TEST	Standard setting for channel assignment for alarms/measured values and BMS channels Alternative setting (see "ATICS® messages on the BMS bus (channel use)", Page 35 and "Menu 1: Alarm/meas.values", Page 51)

8.3.4.9 Settings menu 9: Clock

Time and date are required for displays in the "History/Loggers" menu. The time setting is synchronised via the BMS bus. The device with address 1 (MK.../TM.../CP...) synchronises all other devices every hour.

The time setting for ATICS® is required for the rare case of use without a BMS bus. In this case, ATICS® displays the fault message "No master".

Menu	Description	
Exit	Go up one menu level	
1. Format	d.m.y m-d-y	German format (day.month.year) American format
2. Date	Setting the date (e.g. dd.mm.yyyy)	
3. Time	Setting the time (hours and minutes)	


NOTE
After a power failure of more than eight hours

Time and date are reset to factory settings.

Correct these settings to ensure that all dependent functions (history memory, logger, test interval, service interval...) deliver usable results.

8.3.4.10 Settings menu 10: Password

The device has two separate passwords for the "Settings" menu and the "TEST" menu.

Menu	Description
Exit	Go up one menu level
1. Settings	Change the password for the "Settings" menu, enable/disable password. Factory setting: Password: 000 Status: off
2. TEST	Change the password for the "TEST" menu, enable/disable password. Factory setting: Password: 000 Status: off

Changing the password menu "Settings"

Menu	Description
Exit	Go up one menu level
1. Password	Change the password for the "Settings" menu. Setting range: 000 ... 999 Resolution of setting: 1
2. Status	<p>Enable or disable the password protection for the "Settings" menu.</p> <p>on Password protection is enabled. When an attempt is made to open one of the settings menus, the password entry screen appears automatically:</p> <div data-bbox="456 802 857 922" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Settings</p> <p>Enter password:</p> <p>0 0 0</p> </div> <p>After entering a valid password, all settings menus (except the "Service" menu) are freely accessible until the menu mode is exited.</p> <p>off Password protection is disabled.</p>

Changing the password menu "TEST"

Menu	Description
Exit	Go up one menu level
1. Password	Change the password for the "TEST" menu. Setting range: 000 ... 999 Resolution of setting: 1
2. Status	<p>Enable or disable the password protection for the "TEST" menu.</p> <p>on Password protection of test menus 2...4 is enabled. When an attempt is made to open one of these menus, the password entry screen appears automatically:</p> <div data-bbox="456 1299 857 1418" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>TEST</p> <p>Enter password:</p> <p>0 0 0</p> </div> <p>off Password protection is disabled.</p>

8.3.4.11 Settings menu 11: Service

The service menu is intended for settings by authorised Bender service personnel. It is only accessible to the Bender service. In the service menu, information about the device status can be called up and settings for specific operating conditions can be made.

8.3.5 Menu 5: Control

This menu offers various options for controlling individual devices or the entire system:

Menu item	Function	Reference
Exit	Go up one menu level	
1. TEST	Call up test	"Test function", Page 41
2. RESET	Call up reset	"Reset function", Page 46

8.3.6 Menu 6: Dig. input

This menu indicates the voltage level of the digital input.

Exit Go up one menu level..

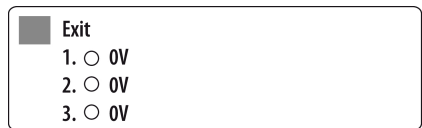
.. The digital input is disabled.

1...4 Number of the digital input.

0V Example: The response condition is not met. The input has not been set. The set function is not carried out.*

24.0V Example: The response condition is met and the response delay has elapsed. The input has been set. The set function is carried out.*

* Whether the input is set to 0 V or 24 V depends on the set response value (see chapter "Settings menu 5: Dig. input", Page 61).

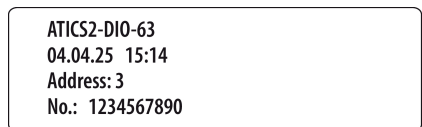


8.3.7 Menu 7: Info

This menu displays information about the device and the software. Press ▼ several times to display all the information. Please have this information ready in case you have any queries by telephone.

You can also reach the info menu by choosing standard display and then pressing the "INFO" button on the front panel of the device.

Line 1: Device type
 Line 2: Date, time
 Line 3: Address set on the BMS bus
 Line 4: Serial number of the device
 Line 5...6: Software versions of the four controllers of the device
 ... Bender address, website



... Exit. Exit standard information.

9 Troubleshooting

9.1 Fault and alarm messages

In the event of an alarm, the messages of ATICS® will enable you to narrow down the possible causes. Some messages may point to several causes.

The following possible faults are indicated by messages on the ATICS® display:

- Plain text messages
- Fault messages with error code

9.1.1 Plain text messages

Fault/message	Description	Action
Failure line xx (xx stands for: 1, 2, AV, SV, UPS, BSV), undervoltage or overvoltage	Voltage is no longer available on line 1 or line 2 Channel 1 = Line 1, Channel 2 = Line 2	<ul style="list-style-type: none"> • Measure voltage on line xx. • Check cause. • Eliminate fault in the system. • Check the setting for voltage and hysteresis.
Failure line 2 when set to System > Line G	Generator delivers no voltage within the set time t(GenMax)	
CT connection	Short circuit or interruption of connecting wire has been detected: <ul style="list-style-type: none"> • Measuring current transformer STW3, channel 7 	<ul style="list-style-type: none"> • Check connecting wire of measuring current transformer.
Device error + error code	For details about actions to be taken, refer to "Messages with error code or service code", Page 70. The message is on channel 6 of the BMS bus.	
Short circuit distribution board	Short circuit detected	<ul style="list-style-type: none"> • Eliminate short circuit
Failure distribution board	No voltage on line 3, contact of the changeover switch defective. The fault can also be caused by an (impermissible) connection between GND, k or l and PE.	<ul style="list-style-type: none"> • Replace ATICS®. • Separate connection between GND, k or l and PE.
Overcurrent I(3)	Overcurrent detected by measuring current transformer STW3	<ul style="list-style-type: none"> • Eliminate cause of overcurrent. • Eliminate any damage.
No master	There is no device with master function or back-up master (device with address "1") available on the RS-485 interface.	<ul style="list-style-type: none"> • Check BMS bus connection. • Check whether the master has failed or whether its address has changed. If the device is operated without a BMS bus, the "Failure monitoring" must be disabled, see chapter "Settings menu 8: Interface", Page 65.
Service by ___ (date)	Reminder for next service	<ul style="list-style-type: none"> • Schedule appointment with the Bender service.
Functional test by ___ (date)	Reminder for next test	<ul style="list-style-type: none"> • Schedule appointment for next test. • Perform test.
Manual mode	Message "Manual mode" although manual mode has not been enabled	<ul style="list-style-type: none"> • Check the connections of the digital input
Phase sequence	This line does not have a right phase sequence. If the direction of the phase sequence of line 1 is different from line 2, it may result in malfunctions or failure on connected three-phase devices.	<ul style="list-style-type: none"> • Install line 1 and line 2 in a way that the direction of the phase sequence of both lines is clockwise (right).

Fault/message	Description	Action
Error during changeover process	Occurs when the test set-ups do not supply sufficient current for switching the ATICS® coils.	<ul style="list-style-type: none"> Only use test set-ups that provide the necessary peak current of 17 A.

9.1.2 Messages with error code or service code

Error/service code	Description	Action
1.xx, 4.xx, 9.xx	Fault message from the internal memory monitoring.	<ul style="list-style-type: none"> Contact the Bender service.
3.10	Prewarning The max. number of operating hours will be reached in one year	<ul style="list-style-type: none"> For functional safety SIL 2 requirements according to IEC 61508-2, the replacement must be planned. Alarm can be acknowledged (see chapter "Reset menu 3: Changeover", Page 47)
3.11	Maximum number of operating hours exceeded for functional safety according to IEC 61508-2:2010.	<ul style="list-style-type: none"> For functional safety SIL 2 requirements according to IEC 61508-2, the replacement must be carried out. Alarm can be acknowledged (see chapter "Reset menu 3: Changeover", Page 47)
3.12	Maximum number of changeovers exceeded.	<ul style="list-style-type: none"> Plan device replacement. Alarm can be acknowledged (see chapter "Reset menu 3: Changeover", Page 47)
3.13	Changeover due to overcurrent or short circuit detected. These changeovers reduce the life of the device. Currents exceeding 130 A or 250 A are considered to be overcurrents or short-circuit currents.	<ul style="list-style-type: none"> Have qualified personnel assess the short-circuit load. Contact the Bender service. Alarm can be acknowledged (see chapter "Reset menu 3: Changeover", Page 47)
3.50	Service alarm has been reset. Only displayed in the service logger menu.	<ul style="list-style-type: none"> No action required.
6.xx, 7.xx, 8.1x	Device error. The internal self monitoring of the device has detected a fault which could impair the safe operation of the device.	<ul style="list-style-type: none"> Replace device immediately.
8.51 ... 8.52	Fault internal power supply unit.	<ul style="list-style-type: none"> Execute "RESET" → "Alarm", then test the changeover function. If fault persists: device replacement. Only use test set-ups that provide the necessary peak current of 17 A.
8.61 ... 8.66	Fault during changeover process. Occurs when the voltage on the new line fails during the changeover. Also occurs when the test set-ups do not supply sufficient current for switching the ATICS® coils. Can also be caused by missing or improperly installed bridge on the output side. The fault can also be caused by an (impermissible) connection between GND, k or l and PE.	<ul style="list-style-type: none"> Check connection of the bridge on the output side, if necessary, re-tighten screws. Execute "RESET" → "Alarm", then test the changeover function. If fault persists: device replacement. Only use test set-ups that provide the necessary peak current of 17 A. In the settings menu 1: Select changeover t(0) ≥ 160 ms. Delete this connection

If there is an error, proceed as follows:

1. If required, enable manual mode.
2. Note down what happened before the error: Operating steps, error messages of the device, environmental conditions, etc.
3. Have the article and serial number of the device at hand.
4. Contact the Bender service and state the type of error and the three-digit error code.

9.2 Frequently asked questions

A series of clicks is always heard around noon. What does that mean?

ATICS® carries out a coil trigger test once a day. The time is calculated as follows:

12:00:00 o'clock + (own BMS bus address × 10 s).

If set to "Generator" for the redundant line in the settings menu 1 "Changeover", the coil test for line 2 is only performed if line 2 is live.

When executing the function "TEST" → "Generator", the coil test for line 2 is carried out directly after starting the generator.

A thin vertical line runs across the display. Is the display defective?

No. The "Refresh function" of the display is being active refreshing the contents indicated.

Why does ATICS® not display the set time?

The time of ATICS® is set by the BMS bus master. The time is only required in the rare case when no BMS bus is used. In this case, ATICS® displays the fault message "No master".

How do I eliminate the message "No master"?

ATICS® is designed for applications where functional safety is of top priority. Therefore, this message is necessary. For applications where functional safety only plays a subordinate role, master monitoring can be disabled in the menu "Settings" → "Interface" → "Failure monitoring".

ATICS® does not switch over. In the last line on the display it indicates: "t(0): xx s".

ATICS® is waiting for the time delay t(0) to elapse and displays the remaining time in seconds. Only then can ATICS® switch over.

The time delay can be due to the following reasons:

- ATICS® is just switching. The set time delay in switch position "0" (dead time) is several seconds (see "Settings menu 1: Changeover", Page 56)
- ATICS® has just been supplied with voltage. After the time delay has elapsed, ATICS® is ready for operation.
- Within a short period of time, ATICS® carried out more than 12 changeovers. The time delay is required to cool the system.

ATICS®-4-DIO shows the alarm message "Phase sequence". What should be done?

When commissioning ATICS®-4-DIO, make sure that both the preferred line and the redundant line have the same phase sequence direction (right). This is particularly important when the performance of connected three-phase loads is dependent on the phase sequence direction.

Example: The three-phase motor runs in the wrong phase sequence direction (counter-clockwise). Despite the alarm message "Phase sequence", ATICS® switches over from the preferred line to the redundant line in the

event of failure of the preferred line. This ensures continued operation of loads that are not affected by the phase sequence.

Why does writing back reports/backups lead to error messages?

Like many Bender devices, ATICS® can be monitored and configured by means of a Bender gateway CP700, COM46x..., etc. The gateways are operated via a web user interface that is displayed using an internet browser.

One of the functions of these gateways is saving reports. A report is used to store the settings and measured values of a bus device. By creating a backup, data loss (e.g. by accidentally deleting settings) can be avoided. The backup can also be imported to another device of the same type. This may be necessary if a device is replaced or if several devices are to be configured for similar tasks.

ATICS® is continuously further developed and maintained. This also affects the content of the report file. If you try to save a report that was generated with an older ATICS® device (version older than 1.20) in an ATICS® device with a current firmware, this can lead to error messages. These error messages are displayed on the web user interface.

- Repeat the saving process of the report to ATICS® several times. This way, the majority of the parameters can still be transferred. The remaining error messages indicate the parameters that have to be changed manually.
- To conclude, check all settings saved in ATICS®.
- Save these settings in a new report file.

10 Periodic verification and service

10.1 Periodic verification

The use of Bender products ensures protective measures against certain hazards when operating electrical systems. The corresponding legal requirements are defined in the Ordinance on Industrial Safety and Health (BetrSichV) and the supplementary Technical Rules (TRBS):

Every company is obliged to draw up a risk assessment for its work equipment (electrical systems and equipment). With the help of the risk assessment, inspection intervals for the required periodic verification are to be determined.

As a guide, TRBS1201 refers to DGUV (German Social Accident Insurance) regulations 3 and 4 as well as to the supplementary DGUV regulations:

System/equipment	Inspection interval	Type of inspection	Inspected by
Electrical systems General	4 years	For safe condition. According to applicable electrotechnical rules	Qualified person
Electrical installations and stationary equipment in "Special installations or locations" (DIN VDE 0100 Group 700)	1 years		

According to TRBS1203, the tests must be carried out by a qualified person. The person carrying out the test must have the training and professional experience required and must be able to recognise, among other things, hazards caused by the inspection activity and the work equipment to be inspected.

The following periodic verification must be performed on electrical installations in compliance with the applicable local or national regulations. If no local/national regulations apply, at least periodic verification as recommended by DIN VDE 0100-710 (VDE 0100-710) should be performed.

Action	To be performed by	Interval
Services for the periodic verification of Bender products in electrical installations: <ul style="list-style-type: none"> • Function test of the transfer switching device. • Checking the effectiveness of the protective measures monitored by Bender products as well as their disconnecting and switching functions, see "Settings menu 1: Changeover", Page 56, table row "10. Serviceinterv.". • Optimum configuration of the Bender products • Testing by qualified persons • Documentation 	Bender service or electrically skilled person	annually*

* Time interval according to DIN VDE 0100-710 (VDE 0100-710):2012-10: 12 months

10.2 Maintenance

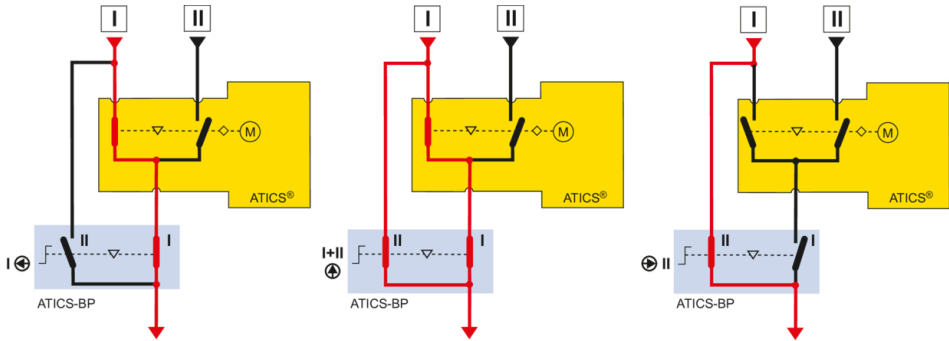
The intervals specified for periodic verification must be adhered to. We also recommend regularly checking the Allen screws on ATICS® and the Torx® screws of the connectors on the incoming and outgoing lines of the automatic transfer switching device to make sure they are tight.

10.3 Cleaning

The device may only be cleaned with a clean, dry, soft and antistatic cloth.

10.4 Operation with bypass switch

The ATICS®-BP... bypass switch enables a parallel supply of line 3. Without interrupting the voltage on line 3, ATICS® can be switched or exchanged as required.



The green indicator indicates position 1 of the ATICS® device, which at the same time indicates that the bypass switch can be operated. In fault-free condition, line 1 is in position 1 and voltage is applied.

i Only qualified personnel may operate the bypass switch. Set the bypass switch quickly from position "I" via "I+II" to position "II" and back from "II" via "I+II" to "I". The time during which the bypass switch is set to position "II" must be reduced to the bare minimum.



WARNING Risk of short circuit if "Enable bypass" light is ignored.

If ATICS® is not connected to the line to which the bypass switch is connected, a short circuit may occur between line 1 and line 2.

- ▶ Only operate the bypass switch when the green "Enable Bypass" light lights up.

If a voltage drop occurs on line 1 while the switch is set to "II" (bypass):

1. Initially leave the bypass switch in position "II".
Leave the transparent cover open so that ATICS® will not switch to line 2 automatically.
2. Switch ATICS® to position "0" or "I" using the Allen key.
3. Set the bypass switch to position "I".
4. Close the transparent cover to activate automatic mode.

Conditions for operation with the bypass switch

- Wiring must be carried out according to "Connection example: ATICS® with bypass switch", Page 29.
- The following must be set in "Settings menu 6: Dig. input":
 - 1. Function → Bypass
 - 2. Response value → 0 V
 - 3. t(on) response delay → 100 ms
 - 4. t(off) delay on release → 100 ms


WARNING Electric shock

Mains voltage is present at the contacts of lines 1, 2 and 3, which causes an electric shock if touched.

- ▶ Only touch the insulated part of the connector.

10.5 Replacing ATICS®

The plug connectors make it easy to replace the device if

- ATICS® has reached the end of its service life or
- an event has occurred which jeopardises safety: e.g. overvoltage, short-circuit switching, component failure.


DANGER Danger to life due to electric shock

Touching live parts of the system carries the risk of electric shock.

- ▶ Before installing and connecting the device, make sure that the installation is deenergised.
- ▶ If ATICS® is bypassed, observe the regulations for working on live parts.

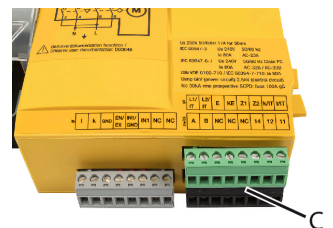
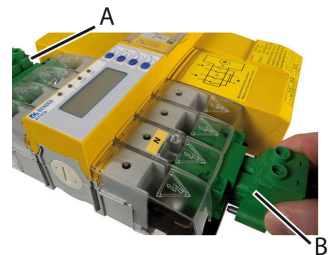
10.5.1 Removing existing ATICS®

Preparations

1. Record settings on existing ATICS®. The settings should match the entries in the checklist (see checklist, included in the scope of delivery).
2. Disconnect the device from the power supply or switch on the bypass switch. Switch existing ATICS® to manual operation, switch to position "0" and secure against unintentional switchon (see chapter "Connecting ATICS® safely", Page 24).

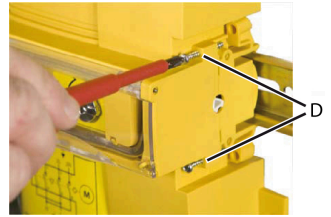
Remove connections

3. **ATICS-2-DIO:** Undo the mounting screws on the top green plug connector and remove the connector (A).
ATICS-4-DIO: Undo the mounting screws of the upper green plug connectors and remove the two plug connectors.
4. Undo the fastening screws of the bottom green plug connector and remove the connector (B).
5. Remove the three connector plugs (C).

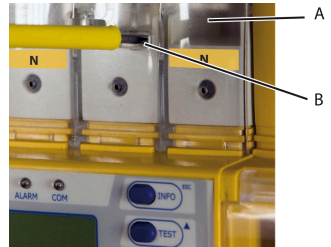


Removing ATICS® in case of DIN rail mounting

6. Undo screws (D).



7. Remove lower and upper terminal covers (A) by using a screwdriver to push back the locking hook (B) located approximately in the middle of the cover in each case.



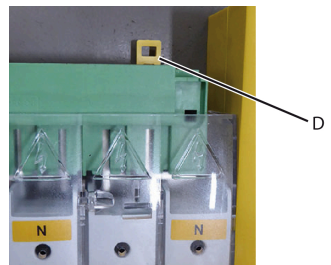
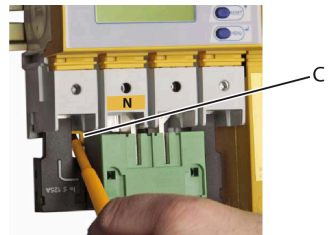
8. **ATICS-2-DIO:** Use a screwdriver to pull the lower yellow slide lock (C) downwards and raise ATICS® slightly from below.

ATICS-4-DIO: Remove lower green plug connector. Use a screwdriver to pull the two lower yellow slide lock (C) downwards and lift ATICS® slightly from below.



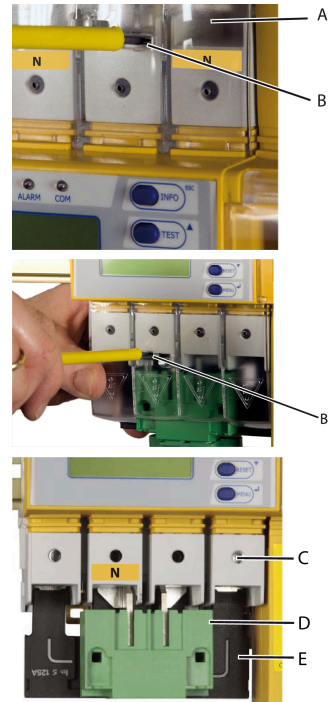
9. **ATICS-2-DIO:** Use the screwdriver to pull the upper yellow slide lock (D) upwards and remove ATICS®.

ATICS-4-DIO: Use the screwdriver to pull the two upper yellow slide locks (C) upwards and remove ATICS®.



Removing ATICS® in case of screw mounting

6. Remove lower and upper terminal covers (A) by using a screwdriver to push back the locking hook (B) in the middle of each cover.
7. Undo the Allen screws of the terminals (C).
8. Remove the green plug connectors (D) at top and bottom.
9. Remove the black bridge (E) at the bottom.
10. Undo the mounting screws and remove ATICS® from the mounting plate.

**10.5.2 Installing a new ATICS®****Mounting**

On DIN rail: see "DIN rail mounting", Page 22.

On plate: see "Screw mounting on plate", Page 23.

Connection

See "Connecting ATICS® safely", Page 24.

11 Technical data

11.1 Technical data ATICS®

Insulation coordination acc. to IEC 60664-1/IEC 60664-3

Overvoltage category	III
Pollution degree outside, inside	2
Rated insulation voltage ATICS-2-DIO/ATICS-4-DIO	250 V / 400 V
Protective separation between	Line 1 – Line 2; Line 1, 2, 3 – RS-485; Line 1, 2, 3 – digital inputs; Line 1, 2, 3 – relay outputs
Voltage test according to IEC 61010-1 (basic insulation/protective separation)	2.21 kV / 3.54 kV

Supply voltage

Supply voltage U_s	230 V (50/60 Hz)
Power consumption ATICS-2-63A-DIO	≤ 16 W
Power consumption ATICS-2-80A-DIO	≤ 23 W
Power consumption ATICS-4-80A-DIO	≤ 39 W
Power consumption ATICS-4-125A-DIO	≤ 87 W
Power consumption ATICS-4-160A-DIO	≤ 119 W
Current during changeover process	17 A / < 30 ms

Power section / switching elements

Rated operational voltage U_e ATICS-2-DIO / ATICS-4-DIO	AC 240 V / 3NAC 415 V
Frequency range f_n	48...62 Hz
Crest factor	≤ 1.2
Number of switching cycles (mechanical)	≥ 8000
Short-circuit currents	see table "Short-circuit currents", Page 82
Short-circuit current I_{cc} and fuses	see table "Utilisation categories acc. to DIN EN 60947", Page 82

Voltage monitoring / changeover

Frequency range f_n	40...70 Hz
Undervoltage response value (Alarm 1)	160...207 V (1 V steps)
Overvoltage response value (Alarm 2)	240...275 V (1 V steps)
Response delay t_{on}	50 ms...100 s (resolution of setting starting 50 ms)
Delay on release t_{off}	200 ms...100 s (resolution of setting starting 50 ms)
Hysteresis	2...10 % (1 % steps)
Frequency measurement	40...70 Hz (resolution 0.1 Hz)
Display range measured value ATICS-2-DIO	20...276 V
Display range measured value ATICS-4-DIO	20...520 V

Operating uncertainty	±1 %
Changeover period	$t < 500 \text{ ms} \dots 100 \text{ s}$

Current monitoring (output current)

Measuring current transformers	STW3, STW4
Measuring range I_n (TRMS)	STW3: 0... > 150 A, STW4: 0... > 260 A
Response value for short-circuit detection (versions 63 A and 80 A) with STW3	130 A
Response value for short-circuit detection (versions 125 A and 160 A) with STW3	250 A
Crest factor	min. 2
Hysteresis for short-circuit alarm	5 %

Cable length

Single wire $\geq 0.75 \text{ mm}^2$	0...1 m
Single wire, twisted $\geq 0.75 \text{ mm}^2$	1...10 m
Shielded cable	10...40 m
Cable: twisted pairs, shield connected to terminal I on one side, must not be earthed	recommended: J-Y(S)tY min. $n \times 2 \times 0.8$

Displays and data memory

Display: graphic display	languages DE, EN, FR, PL
Alarm LEDs	Line 1, Line 2, Alarm, Com
History memory	500 data records
Data logger	500 data records/channel
Config. logger	300 data records
Test logger	100 data records
Service logger	100 data records

Input

Digital inputs	4
Galvanic separation	yes
Control	via potential-free contacts
Operating mode	active at 0 V (low) or 24 V (high), adjustable
Voltage range high/low	AC/DC 10...30 V / AC/DC 0...0.5 V
Adjustable function	switch-back lock manual/automatic mode bypass mode functional test changeover to preferred line alarm input for operating theatre lights alarm input for other devices

Relay output 1

Switching element	1 potential-free changeover contact
Operating mode adjustable	n/o or n/c operation
Adjustable function	see "Settings menu 4: Relay", Page 59
Electrical endurance under rated operating conditions	10,000 cycles

Contact data according to IEC 61810

Rated operational current AC (resistive load, $\cos \varphi = 1$)	5 A / AC 250 V
Rated operational current DC	5 A / DC 30 V
Overvoltage category	III
Minimum contact rating	10 mA at DC > 5 V

Relaisausgang 2...4

Switching element	1 potential-free changeover contact
Operating mode adjustable	n/o or n/c operation
Adjustable function	see "Settings menu 4: Relay", Page 59
Electrical endurance under rated operating conditions	80,000 cycles

Contact data according to IEC 61810

Rated operational current AC (resistive load, $\cos \varphi = 1$)	5 A / AC 150 V
Rated operational current DC	5 A / DC 30 V
Overvoltage category	III
Minimum switching capacity	120 mW

BMS interface

Interface / protocol	RS-485 / BMS
Baud rate	9.6 kbit/s
Cable length	≤ 1200 m
Cable: shielded, one end of shield connected to PE	recommended: CAT6/CAT7 min. AWG23
alternative:	twisted pair, one end of shield connected to PE J-Y(St)Y min. 2×0.8
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	2...90

Environment/EMC

EMC	EN 61326 (see CE declaration)
Operating temperature	-25...+55 °C

Classification of climatic conditions acc. to IEC 60721

Stationary use (IEC 60721-3-3)	3K22
Transport (IEC 60721-3-2)	2K11
Long-term storage (IEC 60721-3-1)	1K22

Classification of mechanical conditions acc. to IEC 60721

Stationary use (IEC 60721-3-3)	3M11
Transport (IEC 60721-3-2)	2M4
Long-term storage (IEC 60721-3-1)	1M12

Terminals

Power section

Connection directly to ATICS®, for plug connections and the 160 A version	screw-type terminals
rigid (flexible)/conductor sizes	10...95 mm ² (6...70 mm ²) / AWG 8 (10)...000 (00)
Stripping length	15 mm
Tightening torque (hexagon socket 4 mm)	5 Nm
Connection for plug connectors (125 A)	pluggable screw-type terminals
Conductor cross section, rigid min./max	1.5 mm ² / 35 mm ²
Conductor cross section, flexible min./max.	1.5 mm ² / 25 mm ²
Conductor cross section AWG min./max	16 / 2
Stripping length (do not use ferrules)	20 mm
Tightening torque (Torx® screwdriver T20 or slotted screwdriver 6.5 × 1.2 mm)	2.5 Nm (≤ 25 mm ²) 4.5 Nm (> 25 mm ²)
Torque setting for manual operation (hexagon socket 5 mm)	approx. 6 Nm

Electronics

Connection	pluggable screw-type terminals
rigid/flexible/conductor sizes	0.14...1.5 mm ² / AWG 28...16
Stripping length	7 mm
Tightening torque (slotted screws, screwdriver 2.5 × 0.4 mm)	0.22...0.25 Nm

Other

Operating mode	continuous operation
Mounting	display-oriented
For use at altitudes up to	2000 m AMSL
Protection class	Class I
Protection class LCD under foil (DIN EN 60529)	IP40
Enclosure material	polycarbonate
Flammability class	UL 94 V-0
DIN rail mounting	acc. to IEC 60715
Screw mounting	4 × M5
Dimensions incl. terminals (W × H × D)	234 × 270 × 73
Weight ATICS-2-DIO	approx. 3400 g
Weight ATICS-4-DIO	approx. 4800 g

Short-circuit currents

	ATICS-2- 63A- DIO	ATICS-2- 80A- DIO	ATICS-4- 80A- DIO	ATICS-4- 125A- DIO	ATICS-4- 160A- DIO
Thermal current I_{th} (40 °C)	63 A	80 A	80 A	125 A	160 A
Current rated as conditional short circuit with gG fuses according to DIN					
Conditional short-circuit current I_{cc} (kA eff.)	30	30	50	50	40
Associated fuse rating (A gG)	80	100	80	125	160
Current rated as conditional short circuit with circuit breaker that ensures tripping in less than 0.3 s					
Current rated as short-time withstand I_{cw} 0.3 s (kA eff.)	7	7	7	7	7
Short-circuit operation (single switch)					
Current rated as short-time withstand I_{cw} 1 s (kA eff.)	4	4	4	4	4
Rated peak withstand current I_{cm} (kA peak)	17	17	17	17	17

Utilisation categories acc. to DIN EN 60947

Type	I_e AC-23A	I_e AC-23B	$I_e I_e$ AC-32A	$I_e I_e$ AC-32B	I_e AC-33B
ATICS-2-63A-DIO	63 A	63 A	63 A	63 A	63 A
ATICS-2-80A-DIO	80 A	80 A	80 A	80 A	80 A
ATICS-4-80A-DIO	80 A	80 A	80 A	80 A	80 A
ATICS-4-125A-DIO	125 A	125 A	100 A	125 A	125 A
ATICS-4-160A-DIO	125 A	160 A	100 A	160 A	125 A

11.2 TÜV test report according to VDE 0100 Part 710

Technischer Bericht Elektrische Sicherheit Sicht- und Funktionsprüfung

TÜV SÜD Industrie Service GmbH – Westendstr. 199 - 80686 München

Fa. Bender GmbH & Co. KG
Londorfer Str. 65

D – 35305 Grünberg

Hersteller
ATICS Umschalt- u. Überwachungsgerät
Fa. Bender GmbH & Co. KG
Londorfer Str. 65
D - 35305 Grünberg

Service-Auftrags-Nr.: 15346146
Kundenauftrags-Nr.: 2093963

Hersteller
Modulträger
Fa. bendersystembau GmbH
Robert-Bosch-Straße 10
D – 35305 Grünberg



Industrie Service

**Mehr Sicherheit.
Mehr Wert.**

Das Original dieses Berichts ist auch, wenn ein Wasserzeichen sichtbar ist oder wenn er mit einem großen Stempel der TÜV SÜD Industrie Service GmbH gekennzeichnet ist.

Gegenstand: ATICS Umschalt- und Überwachungsgerät
Typ ATICS-4-80A-DIO inkl. Modulträger
UMA710-4-80-DIO

Sachverständiger: Raimund Gebhart

Zeitraum: 12.11.2013 bis 10.12.2013

Grundlage der Prüfung: Auftrag 4620785 vom 24.10.2013

Art der Untersuchung: Prüfung auf Übereinstimmung des ATICS – Umschalt- und Überwachungsgerät inkl. Modulträger mit den Mindestanforderungen der DIN VDE 0100 Teil 710/10-2012, Abschnitt 710.536.101

Zusammenfassung: Die Umschalteinrichtung für medizinisch genutzte Räume vom Typ ATICS (genau Bezeichnung siehe oben) erfüllt die Anforderungen an selbsttätige Umschalteinrichtungen für medizinisch genutzte Bereiche der Gruppe 2 gemäß DIN VDE 0100 Teil 710/10-2012, Abschnitt 710.536.101

Hinweis: Bedingt durch die konzeptuell nahezu baugleiche Ausführung der Modulträger UMA710-4-63-DIO, UMA710-4-125-DIO, sowie UMA710-4-160-DIO mit dem UMA-4-80-DIO sehen wir keine Bedenken, das obige Ergebnis auch auf diese Varianten zu übertragen.
(weitere wichtige Hinweise siehe Bericht)

Datum: 19.12.2013

Unsere Zeichen:
IS-EG1-MUC/geb

Dokument:
Bender_ATICS-
DIO_131112_Funktionsbewertun
g-Teil 710-2012_SUE-Rev02.doc

Das Dokument besteht aus
4 Seiten.
Seite 1 von 4

Die auszugsweise Wiedergabe des Dokumentes und die Verwendung zu Zwecken, die über den schriftlichen Genehmigungs der TÜV SÜD Industrie Service GmbH.

Die Prüfergebnisse beziehen sich ausschließlich auf die untersuchten Prüfgegenstände.

München, 19.12.2013

Thomas Wurr
Niederlassung München
Abteilung Elektrotechnik

Raimund Gebhart
Der Sachverständige



Sitz: München
Amtsgericht München HRB 96 869
USt-IdNr. DE12984218
Informationen gemäß § 2 Abs. 1 DL-InfoV
unter www.tuev-sued.de/impresum

Aufsichtsrat:
Peter Kardel (Stellv. Vorsitzender)
Geschäftsführer:
Friedr. Neuwieser (Sprecher),
Dr. Ulrich Klotz, Thomas Kainz

Telefon: +49 89 5791-2432
Telefax: +49 89 5791-2425
www.tuev-sued.de/is

TÜV®

TÜV SÜD Industrie Service GmbH
Niederlassung München
Abteilung Elektrotechnik
Westendstraße 199
80686 München
Deutschland

11.3 TÜV certificate regarding functional safety

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆



ZERTIFIKAT

Nr. Z10 077738 0002 Rev. 02

Zertifikatsinhaber: Bender GmbH & Co. KG
 Lendorfer Straße 65
 35305 Grünberg
 DEUTSCHLAND

Prüfzeichen:



Produkt: Sicherheitsbauelemente
 Umschaltvorrichtung

Modell(e): ATICS

Parameter: Temperatur: -25°C..+55°C
 Betriebsspannung: 250VAC 50 / 60Hz
 Strom während Umschaltvorgang: 17A / <30ms

Der Bericht BG83832T und die Benutzerdokumentation in den aktuell gültigen Versionen sind zwingende Bestandteile dieses Zertifikats.

Geprüft nach: EN 61508-1:2010 (SIL2)
 EN 61508-2:2010 (SIL2)
 EN 61508-3:2010 (SIL2)

Das Produkt wurde auf freiwilliger Basis auf die Einhaltung der grundlegenden Anforderungen geprüft und kann mit dem oben abgebildeten Prüfzeichen gekennzeichnet werden. Eine Veränderung der Darstellung des Prüfzeichens ist nicht erlaubt. Die Übertragung eines Zertifikates durch den Zertifikatsinhaber an Dritte ist unzulässig. Das Zertifikat ist gültig bis zum angegebenen Zeitpunkt, sofern es nicht früher gekündigt wird. Alle anwendbaren Anforderungen der Prüf-, Zertifizierungs-, Validierungs- und Verifizierungsordnung der TÜV SÜD Gruppe müssen erfüllt sein. Details siehe bitte: www.tuvsud.com/ps-zert

Prüfbericht Nr.: BG83659T

Gültig bis: 2030-02-11

Datum, 2025-02-13

(Günter Greil)

11.4 Standards and certifications

The transfer switching and monitoring device conforms to the following standards:

- DIN VDE 0100-710 (VDE 0100-710):2002-11*
- DIN VDE 0100-710 (VDE 0100-710):2012-10*
- DIN VDE 0100-710 (VDE 0100-710) supplement 1:2014-06
- DIN VDE 0100-718 (VDE 0100-718):2014-06
- ÖVE/ÖNORM E 8007:2007-12-01
- IEC 60364-7-710:2002-11*
- IEC 60364-7-710:2021-05
- DIN EN 61508-1 (VDE 0803-1):2011-02*
- IEC 61508-1 (2010-04) Ed. 2.0*
- DIN EN 61508-2 (VDE 0803-2):2011-02*
- IEC 61508-2 (2010-04) Ed. 2.0*
- DIN EN 61508-3 (VDE 0803-3):2011-02*
- IEC 61508-3 (2010-04) Ed. 2.0*
- DIN EN 60947-6-1 (VDE 0660-114):2014-09
- IEC 60947-6-1 (2013-12) Ed. 2.1

Standard-compliant isolating transformer monitoring according to:

- DIN EN 61558-1 (VDE 0570-1):2006-07
- DIN EN 61558-1/Berichtigung 1 (VDE 0570-1/Amendment 1):2008-11
- DIN EN 61558-1/Berichtigung 2 (VDE 0570-1/Amendment 2):2008-12
- DIN EN 61558-1/A1 (VDE 0570-1/A1):2009-11

The standards marked with * were part of the test conducted by TÜV Süd.



The EU Declaration of Conformity is available at the following Internet address:

bender.de/fileadmin/content/Products/CE/CEKO_Atics.pdf

11.5 Ordering information

ATICS®-...-DIO Variants

ATICS®-...-DIO 2-pole

Type	Version	Rated operational current I_e	Scope of delivery	Art. No.
ATICS-2-63A-DIO	2-pole	AC 63 A	1 x STW3, bridge, connectors, terminal cover	B92057212
ATICS-2-80A-DIO	2-pole	AC 80 A	1 x STW3, bridge, connectors, terminal cover	B92057213
ATICS-BP-2-63A-SET	Bypass switch set	AC 63 A	Bridge, terminal cover, auxiliary contacts, LEDs green/red	B92057252

Type	Version	Rated operational current I_e	Scope of delivery	Art. No.
ATICS-BP-2-80A-SET	Bypass switch set	AC 80 A	Bridge, terminal cover, auxiliary contacts, LEDs green/red	B92057253

ATICS®-...-DIO 4-pole

Type	Version	Rated operational current I_e	Scope of delivery	Art. No.
ATICS-4-80A-DIO	4-pole	AC 80 A	4 x STW3, bridge, connectors, terminal cover	B92057222
ATICS-4-125A-DIO	4-pole	AC 125 A	4 x STW3, bridge, connectors, terminal cover	B92057223
ATICS-4-160A-DIO	4-pole	AC 160 A	4 x STW4, bridge, terminal cover	B92057224
ATICS-BP-2-80A-SET	Bypass switch set	AC 80 A	Bridge, terminal cover, auxiliary contacts, LEDs green/red	B92057260
ATICS-BP-4-125A-SET	Bypass switch set	AC 125 A	Bridge, terminal cover, auxiliary contacts, LEDs green/red	B92057262
ATICS-BP-4-160A-SET	Bypass switch set	AC 160 A	Bridge, terminal cover, auxiliary contacts, LEDs green/red	B92057264

Compatible alarm indicator and operator panels

Type	Description	Art. No.	Manual No.
CP907	COMTRAXX® CP907 7" white	B95061080	D00349
CP907 without flush-mounting enclosure		B95061093	D00349
CP915	COMTRAXX® CP915 15,6" white	B95061081	D00349
CP915	COMTRAXX® CP915 15,6" grey	B95061085	D00349
CP924	COMTRAXX® CP924 24" white	B95061083	D00349
CP924	COMTRAXX® CP924 24" grey	B95061084	D00349
CP9xx	COMTRAXX® CP9xx (customised versions)		
TM800	Medics Tableau	dis-continued	D00165

Compatible alarm indicator and test combinations

Type	Description	Art. No.	Manual No.
CP305-IO	COMTRAXX® CP305 - Control Panel	B95100051	D00425
CP305-C	COMTRAXX® CP305 - Control Panel (customised parameter settings)	B22030051	D00425
MK2430...	COMTRAXX® MK2430 series	dis-continued	D00129

Type	Description	Art. No.	Manual No.
MK800...	COMTRAXX® MK800	dis-continued	D00053

Optional Accessories

Type	Description	Art. No.
STW3	Measuring current transformer (short-circuit monitoring) for ATICS® < 100 A	B98021000
STW4	Measuring current transformer (short-circuit monitoring) for ATICS® < 100 A	B98021001

11.6 Additional documents

- ATICS® quick-start guide "ATICS-...-DIO...DEEN" (D00080)
- ATICS® Checklist

In addition, the instructions for the accessories used apply.

11.7 Document revision history

Date	Document version	Valid from software version	State/Changes
04/2021	03	D333 V1.3x, D334 V1.3x, D335 V1.0x, D308 V1.2x	NEW: complete revision
11/2021	04	see above	Changed: Chapter 10.1: Rated operational voltage Added: Chapter 10.1: Change over period Chapter 10.4: Norm IEC 60364-7-710:2021-05
04/2024	05	see above	Transfer to editorial system, editorial revision. Chapter 10.1 Periodic verification: Removed: Function test of the IT system monitoring Chapter 11.1 Technical data ATICS®: Corrections for Supply voltage and Power section/switching elements Successor devices included: MK... > CP305; TM8000 > CP9xx
03/2025	06	see above	Updated <ul style="list-style-type: none"> • "TÜV certificate regarding functional safety", Page 84 • "Application example", Page 11 (design) • "Dimension diagram ATICS-4-...-DIO", Page 21 (design)
04/2025	07	see above	Rated operational voltage corrected



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