

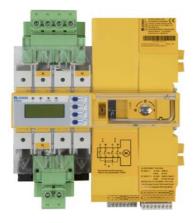






ATICS-...-DIO ATICS-2-63A-DIO, ATICS-2-80A-DIO, ATICS-4-80A-DIO, ATICS-4-125A-DIO, ATICS-4-160A-DIO

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 instructions

1.1 How to use this manual



This manual is intended for qualified personnel working in electrical engineering and electron-

Part of the device documentation, in addition to this manual, are the enclosed "Safety instructions for Bender products".



Read the manual before mounting, connecting and commissioning the device. Always 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.

Information can help to optimise the use of the product.

1.2.1 Signs and symbols



Disposa



Recycling



Temperature range



Protect from moisture





RoHS directives

1.3 Training courses and seminars

www.bender.de/en -> Know-how -> Seminars.

1.4 Delivery conditions

Bender sale and delivery conditions apply. These can be obtained from Bender in printed or electronic format.

The following applies to software products:



"Software clause in respect of the licensing of standard software as part of deliveries, modifications and changes to general delivery conditions for products and services in the electrical industry."



1.5 Inspection, transport and storage

Check the shipping and device packaging for transport damage and scope of delivery. The following must be observed when storing the devices:







1.6 Warranty and liability

Warranty and liability claims in the event of injury to persons or damage to property are excluded in 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.
- Use of accessories and spare parts not recommended by Bender.
- Catastrophes caused by external influences and force majeure.
- Mounting and installation with device combinations not 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.

1.7 Disposal of Bender devices

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







For more information on the disposal of Bender devices, refer to

www.bender.de/en -> Service & support.

1.8 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 electrocution due to electric shock!

Touching live parts of the system carries the risk of:

- · A fatal electric shock
- Damage to the electrical installation
- Destruction of the device



Before installing and connecting the device, make sure that the installation has been de-energised. Observe the rules for working on electrical installations.

1.9 General safety instructions

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.
- · The device may not be opened.
- 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 is 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.

1.10 Device-specific safety instructions



WARNING! Failure to adjust the settings may result in malfunction.

The settings must be changed in order to adapt the ATICS® automatic transfer switching device to the existing equipment. When doing so, follow the instructions chapter "Design and Installation" on p. 43.



WARNING! Functional safety according to IEC 61508 can only be guaranteed when used properly. Please follow the instructions given in this operating manual and in the check list.





2 Intended use

Transfer switching devices are used everywhere there is dependence on high availability from the power supply. The ATICS® automatic transfer switching device is intended for the application described in the chapter "System description" on p. 13. 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 the ATICS® are available. They differ for example by switching over from two- or four-pole systems or by the load current (see "ATICS® tasks" on p. 15). Please heed the limits of the range of application indicated in the technical data.

In order to meet the requirements of applicable standards, customised parameter settings must be made on the equipment in order to adapt it to local equipment and operating conditions.

Intended use includes following all the instructions in the operating manual and complying with the test intervals.

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





3 System description

3.1 Properties

3.1.1 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 in industry and other sensitive environments like hospitals.

3.1.2 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

3.1.3 Messages

- Status indication of operating, warning and alarm messages via the integrated graphic display and external indication on MK2430/MK800/TM800 or CP9xx alarm indicator and operator panels
- 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

3.1.4 Other functions

- Automatic monitoring of all programme and data storage as well as essential internal components and connecting wires for proper functioning
- 4 programmable relay outputs (alarm relay)
- · 4 programmable digital inputs

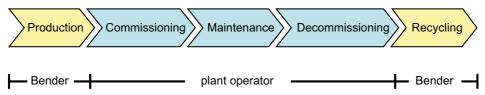
3.2 Functional safety

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



3.2.1 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:

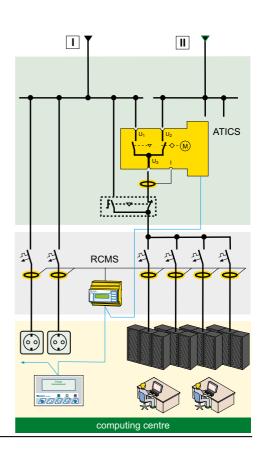


For detailed information refer to:

- Chapter "Commissioning, settings and testing" on p. 43.
- chapter "Periodic verification and service" on p. 89.

3.3 Application example

- Preferred supply
- Redundant supply (e.g. generator)
 - ATICS-2-63A-DIO: Changeover between preferred and redundant line
 - MK2430/MK800/TM800/CP9xx: 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





3.4 ATICS® tasks

The ATICS® automatic transfer switching device has the following tasks:

- Two-pole or four-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 MK... alarm indicator and test combinations, and with TM... or CP9xx... 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

3.5 The ATICS® functions

3.5.1 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" on p. 67 or chapter "Settings menu 5: Dig. input" on p. 74).

- 1. In the normal operating condition (fault-free operation) the preferred supply is connected. The 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. The 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->1) has elapsed and no switch-back lock is enabled
 - or immediately after pressing the "RESET" button or when 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 device is active and the test period has elapsed



WARNING! Malfunction possible if delay times are not adjusted.

The response delay t(on), the return transfer delay time t(2->1), the delay on release t(off) and the dead time t(0) of the ATICS® are adjustable and 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" auf S. 43).

The factory settings guarantee a changeover period of $t \le 0.5$ seconds 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 $t \le 0.5$ 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. The 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, the 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.

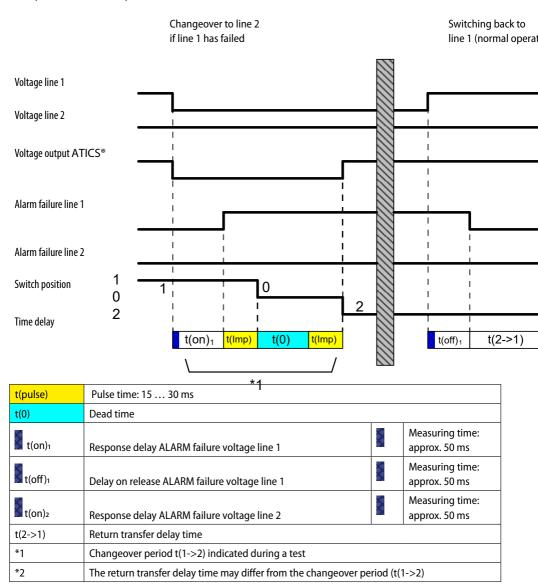




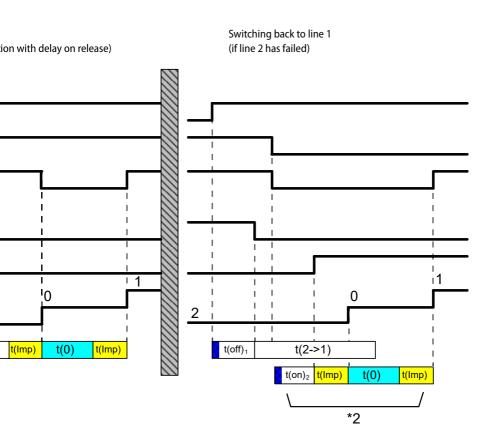
3.5.1.1 Time diagram: Changeover between preferred and redundant line

Time diagrams: Times are not shown to scale.

Example: Line 1 is set as preferred line.





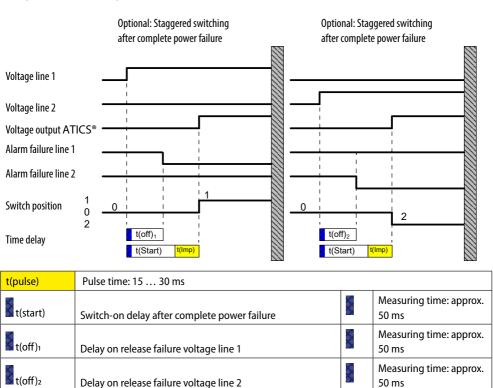




3.5.1.2 Time diagram: Staggered switching after complete power failure

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 the ATICS® to position "0" using an Allen key. When power is restored, the ATICS® switches on the supply again with the set delay time t(start).

Example: Line 1 is set as preferred line.



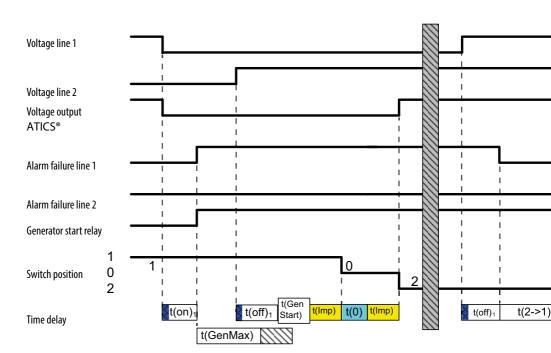
After a complete power failure and restart of the ATICS®, t(off) and t(start) start simultaneously. The time that is longer determines the behaviour. After switching on, the ATICS® performs a quick measurement of the voltage with t(off) = 100 ms. If the voltage is within the permissible range, the value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





3.5.1.3 Time diagram: Changeover to generator mode

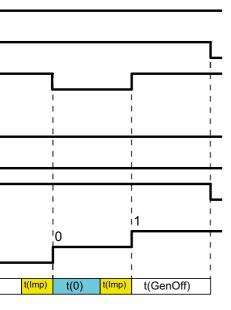




t(pulse)	Pulse time: 15 30 ms
t(0)	Dead time
t(on)1	Response delay ALARM failure voltage line 1
t(off)1	Delay on release ALARM failure voltage line 1
t(off) ₂	Delay on release ALARM failure voltage line 2
t(2->1)	Return transfer delay time
t(GenStart)	Generator start-up delay, delayed changeover to generator. Measured from voltage line 2
t(GenOff)	Generator disconnecting delay time, delayed switching-off of the generator
t(GenMax)	Generator start-up time. Time until generator supplies correct voltage. The message "Failure line 2" is



Switching back to line 1 (normal operation with delay on release)



888	Measuring time: approx. 50 ms
	Measuring time: approx. 50 ms
	Measuring time: approx. 50 ms
k	
suppressed until then.	



3.5.2 Monitoring the device functions

The control circuits are designed in such a way that, even though it is almost certain that a particular fault will occur, it cannot cause the power supply at the output of the automatic transfer switching device to fail.

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 the 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" on p. 43).



Warning for systems with generator: Complete power failure may occur.

If the preferred line fails, the ATICS® will start the generator connected to the redundant line. If the generator does not start, the line downstream of the transfer switching device will be dead. When the generator is switched off, the ATICS® cannot check the redundant line. Test the generator at regular intervals and the transfer switching device to make sure they are working properly (see checklist, included in the scope of delivery).

3.5.3 Power supply

The coils of the changeover switch 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.

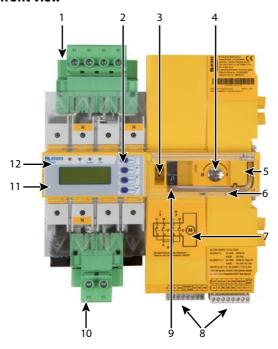
If both lines fail, the changeover switch remains in the last switch position. Switch the ATICS® to position "0" using an Allen key. When power is restored, the ATICS® switches on the supply again with the set delay time t(start). If several ATICS® are installed in one system, they can be switched to 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.

3.5.4 Manual mode

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



3.6 ATICS-2-DIO front view

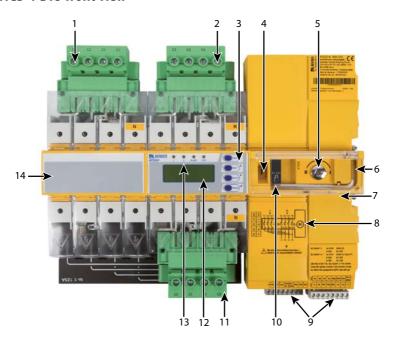


Legend

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



3.7 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	



4 Mounting and connection



RISK of electrocution 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 has been de-energised. Observe the rules for working on electrical installations.

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

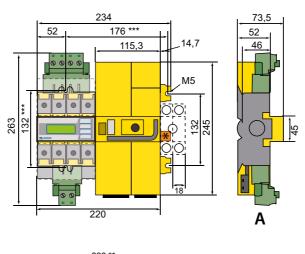
In manual mode, ATICS® can be held in switch position "0" and locked with a padlock.

4.1 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.

4.1.1 Dimension diagrams

A: ATICS-...-DIO side view



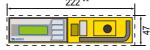
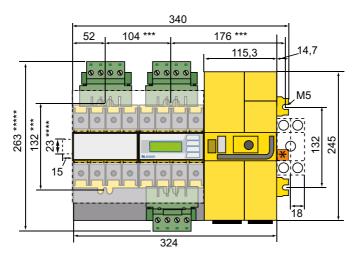


Abb. 4-1 ATICS-2-DIO

*	Additional space required for auxiliary contact when using the bypass switch	
**	Adapt the cutout to the terminal cover	
***	Dimensions for screw mounting on plate	





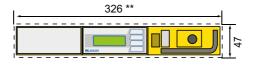


Abb. 4-2 ATICS-2-DIO

*	Additional space required for auxiliary contact when using the bypass switch	
**	Adapt the cutout to the terminal cover	
***	Dimensions for screw mounting on plate	
****	Additional space required for the connector plug of the measuring current transformer	
****	80 A/125 A version. 160 A version without plug connector	

Required tools

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

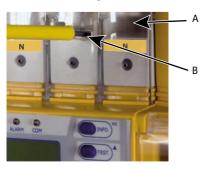
- Torx® screwdriver T20 or 6.5 x 1.2 mm
- Screwdriver 2.5 x 0.4 mm
- · Allen key 4 mm



RIsk of destruction by plastering! Liquid plaster may enter the device and block it. Do not seal the device with plaster.



4.1.2 Removing terminal cover



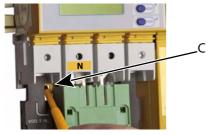
- Push back the locking hook (B) in the middle of the top and bottom terminal cover (A) by using a screwdriver.
- 2. Remove the terminal cover.

4.1.3 DIN rail mounting

Description applies to ATICS-...-DIO



CAUTION! Screws must be tightened, otherwise the vibrations generated during switching may damage the ATICS®.





- 1. Place the 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 Nm.
- 4. Fasten the terminal covers.
- 5. Tighten screws (D) (PZ1, 8,8 lb-in, 1 Nm).



4.1.4 Screw mounting on plate

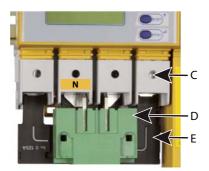
- Description applies to ATICS-...-DIO
- Observe dimension diagram of rear view.
 - Use M5 mounting screws





Caution: Screw heads or washers reduce voltage clearances. Provide for sufficient clearance to live conductors (voltage clearance) by using mounting screws with flat screw heads and flat washers. If mounted on electrically conductive material: The mounting plate has to be earthed and the area under the terminals has to be covered with insulating material.

It is the responsibility of the mounting staff to select the appropriate mounting plate and mounting screws and to keep the prescribed torque setting.



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

4.2 Connection

4.2.1 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.



4.2.2 Connecting the ATICS® safely



RISK of electrocution 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

Preventing unintended switch-on:





- · Open the transparent cover
- Wait until "manual mode" appears on the display
- · Set to switch position "0" using the Allen key
- · Lock the device using a padlock



RISK of electrocution due to electric shock!

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

Consider a stripping length of 20 mm and do not use ferrules when connecting lines 1, 2 and 3. Observe assignment of "ATICS" terminals". Note especially that the two supplies are always connected to the device from the top. Use a torque wrench to tighten the terminal screws. Check all the screws on a regular basis to make sure they are seated tightly.

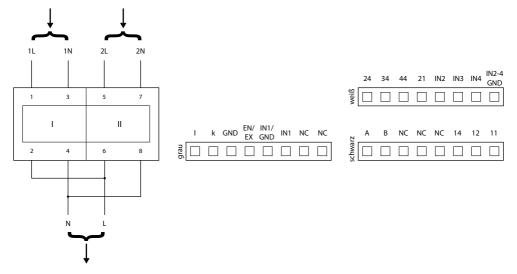


RISK of destruction!

- While insulation and voltage tests are carried out. Disconnect the device from the mains for the duration of the test.
- In the event of phase failure 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.
- If connected incorrectly. The terminals labelled GND must **not** be connected to PE.



ATICS-2-DIO terminals



Legend

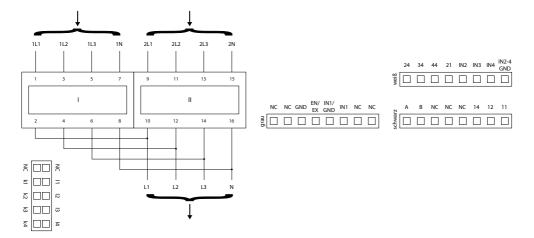
Terminal	Description
1, 3	Connection line 1 (input line) L, N
5, 7	Connection line 2 (input line) L, N
4, 6	Connection line 3 (output line) N, L
l, k (grey)	Connection measuring current transformer STW3/STW 4 (T3) for monitoring the load current downstream the transfer switching device (short-circuit monitoring)
GND, En/Ex (grey)	Connection must not be used. These terminals are exclusively intended for future extensions.
IN1/GND, IN1 (grey)	Digital input, configurable, e.g. to monitor the switch position of the transfer switching and monitoring device
NC, NC (grey)	Not used
24, 34, 44, 21 (white)	3 alarm relays (1 N/O contact each), 21 = common ground for the three alarm relays
IN2, IN3, IN4, IN2-4 GND (white)	3 digital inputs
A, B (black)	BMS bus connection
14, 12, 11 (black)	Alarm relay, configurable function



ATICS-4-125A-DIO and ATICS-4-160A-DIO only: 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-4-DIO terminals



Legend

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
NC, NC (grey)	Not used
GND, En/Ex (grey)	Connection must not be used. These terminals are exclusively intended for future extensions.
IN1/GND, IN1 (grey)	Digital input, configurable, e.g. to monitor the switch position of the transfer switching and monitoring device
NC, NC (grey)	Not used
24, 34, 44, 21 (white)	3 alarm relays (1 N/O contact each), 21 = common ground for the three alarm relays
IN2, IN3, IN4, IN2-4 GND (white)	3 digital inputs
A, B (black)	BMS bus connection
NC, NC, NC (black)	Not used
14, 12, 11 (black)	Alarm relay, configurable function
l1, l2, l3, l4, 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!



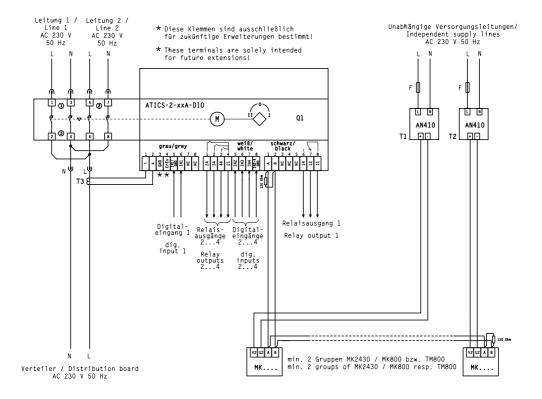
4.2.3 Connection examples ATICS® basic configuration



WARNING! Risk of destruction if connected incorrectly.

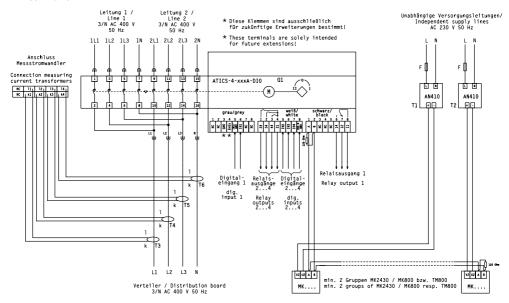
The terminals marked with "*" are intended for Bender-internal purposes only. If this is ignored, the ATICS® automatic transfer switching device may be damaged.

ATICS-2-DIO





ATICS-4-DIO





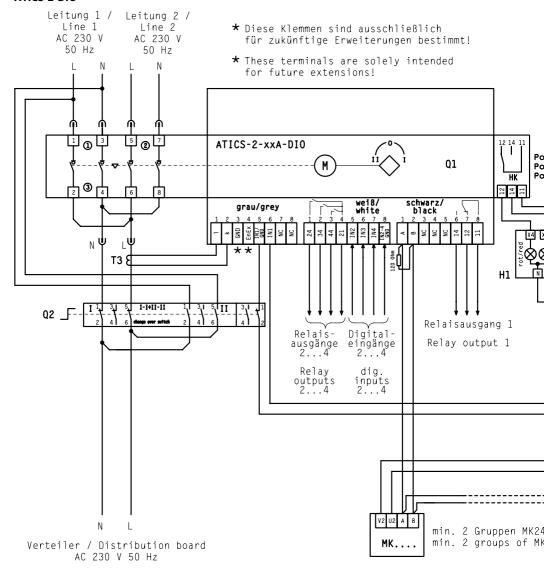
4.2.4 Connection examples: ATICS® with bypass switch



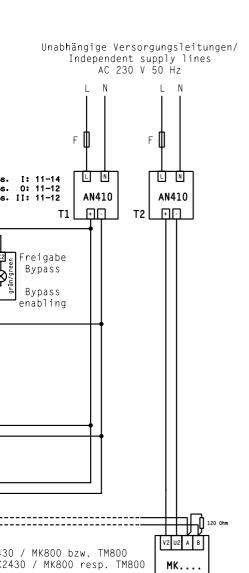
Warning! Risk of destruction if connected incorrectly.

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

ATICS-2-DIO

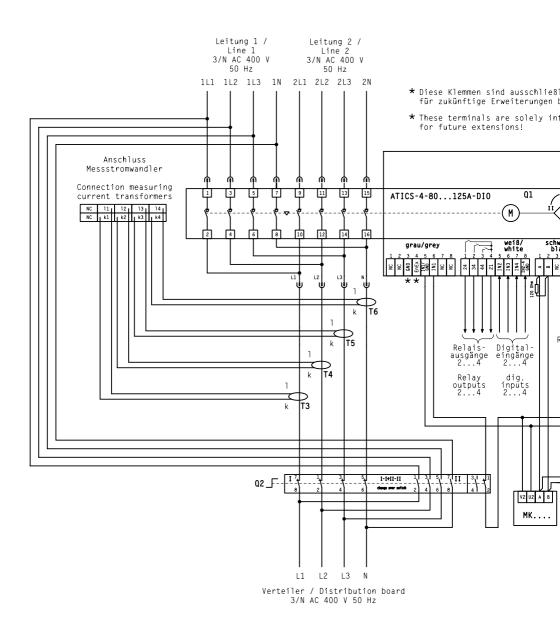




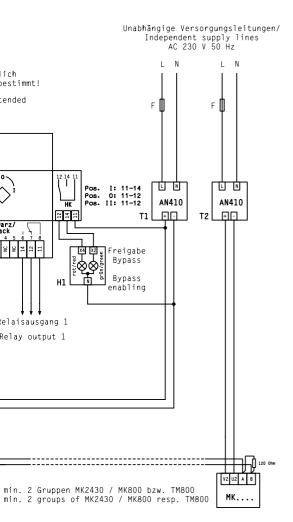




ATICS-4-DIO









4.2.5 Instructions for connection

4.2.5.1 BMS bus

Ex works, 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.

4.2.5.2 MK... alarm indicator and test combination, TM... alarm indicator and operator panels,

MK2430, MK800, CP9xx and TM800 are used. They have the following tasks:

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

4.2.5.3 SCADA systems (Supervisory Control and Data Acquisition)

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

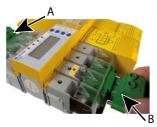
- Protocol converters (gateways, e.g. COM465...)
- · Common alarm via the ATICS® relay output
- Alarms via interconnected signal converters SMO480-12 or SMO482-12. TM800, SMO480-12 and SMO482-12 convert serial signals from Bender devices into potential-free relay contact alarms.

4.2.5.4 Bypass switch (optional)

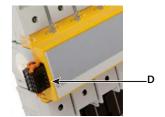
The ATICS-BP-... bypass switch makes it possible to test and change the ATICS® transfer switching device without interrupting the power supply to the line downstream of the transfer switching device. To make settings, refer to chapter "Operation with bypass switch" on p. 90.



4.2.6 Fastening, inserting and securing connections







Connect the terminals to the plug connectors (A, B) and the three connector plugs (C) according to the wiring diagram.

- Connect lines 1, 2 and 3 to the plug connectors (A,B). Observe the stripping length of 20 mm and do not use ferrules. Use a Torx® screwdriver T20 or a slotted screwdriver of 6.5 x 1.2 mm. Tightening torque: 2.5 Nm (≤ 25 mm²) or 4.5 Nm (≥ 25 mm²). ATICS-4-160A-DIO only: Stripping length 15 mm, optionally with/without ferrules, tightening torque 5 Nm. Ensure that the lines are short-circuit and earth-fault proof!
- Use a slotted screwdriver of 2.5 x 0.4 mm to connect the three connector plugs (C). Stripping length: 7 mm. Tightening torque: 0.22...0.25 Nm.
- Insert bottom green plug connector (B) and secure with mounting screws. ATICS-2-DIO:
 After that, insert top green plug connector (A) and secure with mounting screws. ATICS-4-DIO: After that, insert the two top green plug connectors and secure them with mounting screws.
- 2. Insert the three connector plugs (C).
- 3. **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



4.3 Other functions

4.3.1 Sealing the transparent cover



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

4.3.2 Manual mode



RISK of injury from rotating Allen key.

When the transparent cover is closed, the ATICS® is in automatic mode. The ATICS® detects this by the button being pressed under the transparent cover. When the transparent cover is opened, the button is no longer pressed and the ATICS® switches to manual mode. When the transparent cover is open, make sure that this button is not pressed accidentally. Check and make sure that the message "Manual mode" appears on the display. Only then can the Allen key be used to set the changeover switch to manual 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" on p. 74).

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

4.3.3 Lock transfer switching device with a padlock



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

It is only possible to lock the switch in manual mode (transparent cover open). The locking device can only be locked in switch position "0". Padlock shackle diameter: 4 mm...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.



5 Commissioning, settings and testing

5.1 Design and Installation



Risk of missing or incorrect displays on MK..., TM..., FTC... or CP9xx!

MK... alarm indicator and test combinations, TM... alarm indicator and operator panels or COM460... BMS-Ethernet gateways which, together with an 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 the ATICS® because the text modules required for the ATICS® are not integrated yet. These devices must either be updated or replaced. The TMK-SET configuration software must also be the latest version.



RISK that the ATICS® does not switch!

The 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(start) (P. 67) on the devices in such a way that after voltage recovery the devices switch to the preferred supply one by one.

Provide at least two places for MK... alarm indicator and test combinations or TM... alarm indicator and operator panels or CP9xx. These panels display messages from the ATICS® automatic transfer switching device and monitor each other for failure. This is an essential part of the safety concept (functional safety, SIL2). Application examples of MK... or TM... in hospitals:

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

Provide a fail-safe power supply for the MK... or TM... or CP9xx.

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

The MK... or 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.

5.1.1 Setting parameters of indicator devices

- Configure MK..., TM..., COM465, CP9xx 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... or TM... or CP9xx 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).

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

ATICS-2-DIO

BMS chan- nel	Entry in the menu 1. Alarm/meas.values	Description	Operating message	Alarm mes- sage	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 chapter "Messages with error code or service code" on p. 84)
7	7. I(3):35A	Load current TN system	Current	Current	Connection fault current transformer
8	8. Dig. input	Dig. input1	**	Alarm text**	
9	9. Dig. input	Dig. input2	**	Alarm text**	



BMS chan- nel	Entry in the menu 1. Alarm/meas.values	Description	Operating message	Alarm mes- sage	Error
10	10. Dig. input	Dig. input3	**	Alarm text**	
11	11. Dig. input	Dig. input4	**	Alarm text**	
12	No function				

^{*} Message dependent on the parameter assignment in the "Settings menu 1: Changeover" on p. 67 -> "System"

ATICS-4-DIO

BMS chan- nel	Entry in the menu 1. Alarm/meas.values	Description	Operating message	Alarm mes- sage	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
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 chapter "Messages with error code or service code" on p. 84)
7	7. I(3):35A	Load current in the TN system on phase L1	Current	Current	Connection fault current trans-former
8	8. I(3):35A	Load current in the TN system on phase L2	Current	Current	Connection fault current transformer

^{**} Message dependent on the input parameter assignment (see ""Messages for alarm on the digital input" on p. 46)



BMS chan- nel	Entry in the menu 1. Alarm/meas.values	Description	Operating message	Alarm mes- sage	Error
9	9. I(3):35A	Load current in the TN system on phase L3	Current	Current	Connection fault current transformer
10	10. I(3):35A	Load current in the TN system on phase L4	Current	Current	Connection fault current trans-former
11	11. Dig. input	Dig. input1	**	Current	
12	12. Dig. input	Dig. input 24 (common alarm)			

^{*} Message dependent on the parameter assignment in the "Settings menu 1: Changeover" on p. 67 -> "System"

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

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

Messages for alarm on the digital input

The following operating and alarm messages may appear depending on the settings in chapter "Settings menu 5: Dig. input" on p. 74:

Menu settings	Function of digital input	Alarm on BMS bus	BMS chan- nel
off	Digital input disabled	No alarm	-
M/A	Enable manual mode	Alarm "Manual mode"	5
Bypass	Bypass enabled	Alarm "Manual mode"	5
no2->1	Enable switch-back lock	Operating message "Switch-back lock"	4

^{**} Message dependent on the input parameter assignment (see ""Messages for alarm on the digital input" on p. 46)



Menu settings	Function of digital input	Alarm on BMS bus	BMS chan- nel
1<->2	Change preferred line	No alarm	
TEST	TEST- carry out changeover	No alarm	
ALARM	ATICS-2-DIO: Convert message at digital inputs 14 into alarms on the BMS bus.	Alarm "Digital input"	8, 9, 10, 11
ALARM	ATICS-4-DIO: Convert message at digital inputs 14 into alarms on the BMS bus. Channel 11 = Digln 1 Channel 12 = common alarm Digln 24 The common alarm code corresponds to the first message that triggers the common alarm.	Alarm "Digital input"	11, 12

5.1.3 Tests, decommissioning

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

Observe the alarms on the transfer switching device. The 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.

5.2 Setting and testing according to the checklist

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

The response delay t(on), the dead time t(0), the delay on release t(off) and the return transfer delay time t(2->1) of the 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 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(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(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(on), return transfer delay time t(2->1) and delay on release t(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(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 device are documented in the checklist. Please carry out all the work outlined in the list and log each test step.

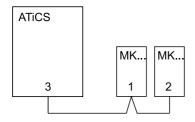
Keep the checklist with this manual in the vicinity of the device.

5.3 Addressing examples

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.

An automatic transfer switching and monitoring device with two MK...



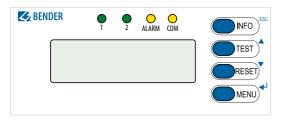
Device	Parameter	Address settings for an automatic transfer switching device
ATICS®	Bus address	3
MK	Address	1
	Alarm address	3, 2*
MK	Address	2
	Alarm address	3, 1*

^{*} These alarm addresses are used for mutual monitoring of the MK... or TM... for device failure.



6 Operation

6.1 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 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



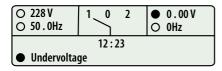
6.2 Quick reference guide

6.2.1 Display under normal operating conditions

Pos.	Description	
1	Line 1: Measured values of mains voltage and frequency	ATICS-2-DIO
2	Switch position of the automatic transfer switching device	O 228 V 1 0 2 O 231 V O 50 . 0 Hz O 160 kΩ 12:23 O 35% 07.08.2017
3	Line 2: Measured values of mains voltage and frequency	7 6 5 4
4	Display of the load in the IT system in %. The maximum load current is adjustable.	ATICS-4-DIO O 228 V
5	Alternative displays ¹	Alarmstatus / Alarm status:
6	Date	O kein Alarm / no alarm
7	Measured value of insulation resistance	¹ Date, alarms, switch-back lock, manual mode, bypass mode, countdown timer for return transfer time

6.2.2 Display during fault condition

There is an alarm message. Example: Line 2 has no voltage



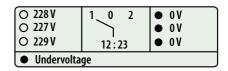


Abb. 6-1 ATICS-2-DIO

ATICS-4-DIO

- The yellow "Alarm" LED lights up.
- A detailed message appears on the LC display.



Press " button 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

Use the arrow buttons " \triangle , ∇ " to select previous or next message.

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

Press " button again to return to the main menu.

The alarm text displayed in case of failure of one line depends on the setting in the "System" menu in the "Settings menu 1: Changeover" on p. 67.

If individual alarm messages are programmed on a TM... alarm indicator and operator panel or a CP9xx or an MK... alarm indicator and test combination, the display of this device may differ from the display of the ATICS°.

ALARM

Undervoltage

Addr.:3 Chan:2

6.2.3 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"). Test menu:

Fxit

- 1. Autom. changeover
- 2. Manual changeover
- 3. Last changeover

Menu item	Function	Page
1. Autom. changeover	Test of the changeover function. Switches back automatically after time t(test).	<u>P. 53</u>
2. Manual changeover	Test of the changeover function. Switches back after pressing the "RE-SET" button.	<u>P. 53</u>
3. Last changeover	Save last changeover as test	<u>P. 54</u>
4. Generator	Start generator without switching over. Terminate test by pressing the "RESET" button.	<u>P. 55</u>
5. Test communication	Communication test via the BMS bus. To do this, simulate an alarm and send an alarm message via the BMS bus.	<u>P. 55</u>

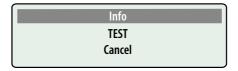


Test menus 2...4 are protected by a password (see chapter "Settings menu 10: Password" on p. 80). Password protection is only effective if the password has been enabled. When an attempt is made to open one of these menus, the password entry screen appears automatically:



- 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 menu items "Control> Test > Manual changeover", "Control > Test > Generator" and "Control > Test > Communication" cannot be accessed via gateway (COM465..., CP700, ...).
- 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:



- To run a test, the transfer switching device must be in automatic mode.
- During an "Autom. changeover" or "Manual changeover" test, the changeover period t(1->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" on p. 18.



6.2.3.1 Test menu 1: Autom. changeover

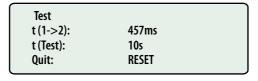


Autom. changeover

Test of the changeover function. The device switches to the redundant line. The changeover period t(1->2) is displayed. After the set time t(test) has elapsed, the device switches back to the preferred line.

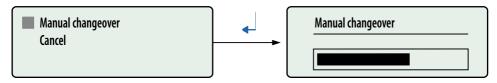
Cancel

Return to test menu



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.

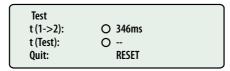
6.2.3.2 Test menu 2: Manual changeover



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 has been pressed.

Cancel

Return to test menu



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.



RISK that the test is accidentally not completed.

If the test menu 3: "Manual changeover" is left after switching over to the redundant line, then the ATICS® remains in this switch position and in "TEST" mode.

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



i Manual mode aborts manual test.

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

6.2.3.3 Test menu 3: Last changeover

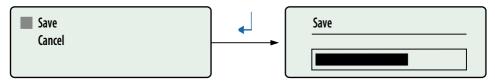
If the ATICS® has switched over due to a failure or a planned shutdown of the preferred line, the last switching operation can be saved as a test.



1. Date Date of the last changeover

2. Test Date on which the next test is due

Save Date of last changeover is saved as test date



- 1. Save Saves the date of last changeover as test date, as long as that date is later than the previous entry.
- 2. Cancel Return to test menu "Last changeover"

After saving, the date on which the next test is due is increased by the test interval (in this case, 6 months).

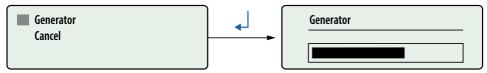


The date of the test is saved in the test logger to send a reminder for the next test once the test interval has elapsed. A changeover period is not saved. The messages from this test are also stored in the history memory.



6.2.3.4 Test menu 4: Generator

Executing this function makes sense only when a generator is connected to the redundant line and the corresponding settings have been carried out (see chapter "Settings menu 1: Changeover" on p. 67). To avoid voltage interruptions, in the test menu "Generator", the ATICS® does not switch to the redundant line. In order to test the generator and the changeover switch, select "Autom. changeover" or "Manual changeover".



Generator Generator start relay is switched. The generator starts. However, there is no changeover to the redundant line. The test is not terminated and the generator switched off again until the "RESET" button has been pressed. The display shows the test duration.

Cancel Return to test menu



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



RISK that the generator test is accidentally not completed.

If the test menu 5: "Generator" is left after the generator has started, the ATICS® remains in this switch position and in "TEST" mode. This means that the generator is not switched off.

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

6.2.3.5 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.

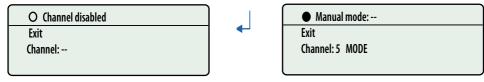


Select a channel:

- 1. Use the "▲" arrow button to go to the channel settings. Press the "◄ button.
- 2. Use the arrow buttons to select the channel for which the alarm message is to be simulated. Press the "- button to confirm your selection.

The alarm status will change from \bigcirc (no alarm) to \bigcirc (alarm). If the alarm status \bigcirc 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.



The 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: "5.1.2 ATICS® messages on the BMS bus (channel use)" on p. 44.

6.2.4 Reset function

A RESET is used to reset the alarm and fault messages for the device as well as to disable the switch-back lock of the changeover function. There are several ways to call up the reset menu:

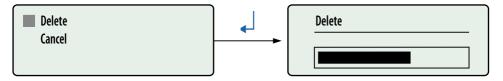
- Select standard display and then press the "RESET" button on the front panel of the device for at least one second.
- Select the "RESET" function from the Control menu. Reset menu:

Exit
1. Alarm
2. SwitchBackLock
3. Changeover

Menu item	Function	Page
1. Alarm	Reset alarm and fault messages on the device.	<u>P. 57</u>
2. SwitchBack- Lock	Disable the switch-back lock of the changeover function. The device switches back to the preferred line.	<u>P. 57</u>
3. Changeover	Change alarm value for the: - 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	<u>P. 57</u>



6.2.4.1 Reset menu 1: Alarm



Delete Reset alarm and fault messages on the device. The progress of the test is

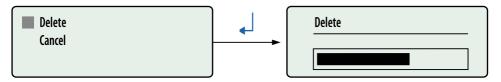
shown on the display. The RESET is required if one or more alarm-triggering parameters are not constantly monitored and thus the end of the alarm

condition has not been 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.

6.2.4.2 Reset menu 2: Switch-Back Lock



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 preferred 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 must be possible (menu "Settings > Interface > Settings > On").
- Via Modbus control commands: Using the command "Changeover to line 1 or line 2".
 Testing must be enabled (menu "Settings > Interface > Test > On").

6.2.4.3 Reset menu 3: Changeover



Caution! With increasing service life, the probability of component failure increases for every technical product.

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 the IEC 61508-2 standard, the device must be replaced.

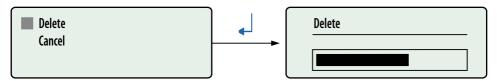


Regardless of the IEC 61508-2 standard, the safe function of the device is of course still guaranteed due to the cyclical self-monitoring functions.

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" on p. 89).

Menu	Description
Exit	Exit "Changeover" reset menu; go up one menu level
1. Changeover: xxx	Number of changeovers performed
2. Alarm: O 8000	Alarm value for maximum number of changeovers performed*
Delete	Increase alarm value by 500 changeovers
4. Operat. time: xxh	Operating hours counter (h=hours, d=days, mo=months)
5. Alarm: 0120mo	Alarm value for maximum number of operating months*
Delete	Increase value by 200 days (this is only possible when the alarm value is already exceeded).
7: Changeover I>: 0	Number of changeovers performed which were carried out with overcurrent of short-circuit current (see chapter "Menu 2: Changeover" on p. 64)
8. Alarm: O1	Alarm value for maximum permitted number of changeovers performed which were carried out with overcurrent or short-circuit current*
Delete	Increase alarm value by 1 changeover

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



Delete Set new alarm value. Clear alarm.

Cancel Return to reset menu

6.2.4.4 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".



7 Menu mode: Operation and setting

7.1 Switching on and calling up the main menu

When the device is connected to the power supply, the following information 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.

O 228 V O 50 . OHz	<u>'``</u>	2		231 V 50 . OHz
12:23 07.08.2017				

1	O 228 V	1, 0 2	O 231 V
	O 227 V		O 229 V
	O 229 V	12:23	O 231 V
	O 50.0Hz		O 50.0Hz

Abb. 7-1 ATICS-2-DIO

ATICS-4-DIO

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

Exit

- 1. Alarm / mess. values
- 2. Changeover
- 3. History / Logger

The following buttons can be used in the main menu:



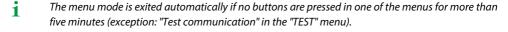
Select menu items



Confirm the selected menu item (Enter)

ESC

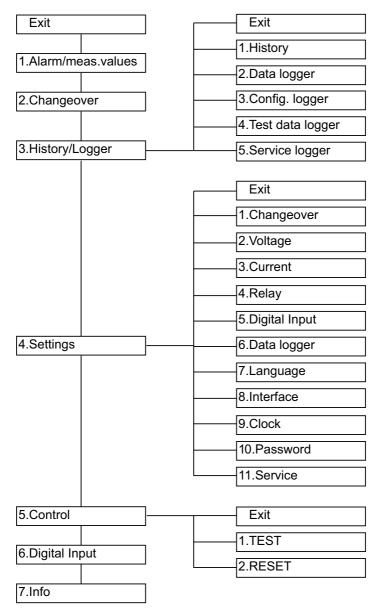
Exit function or go up one menu level





7.2 Menu overview diagram

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





7.3 Function of the main menu

Menu item	Function	Page
Exit	Exit menu mode	
1. Alarm/meas.values	Display saved status messages, alarm messages and measured values	<u>P. 61</u>
2. Changeover	Display information on the changeover function (number, test)	<u>P. 64</u>
3. History/Loggers	Display history memory, data logger, configuration logger, test logger and service logger	<u>P. 64</u>
4. Settings	Various settings for this device	<u>P. 66</u>
5. Control	Run TEST and RESET of this device	<u>P. 81</u>
6. Dig. input	Display voltage level of the digital input	<u>P. 81</u>
7. Info	Display information on device type and firmware versions	<u>P. 82</u>

7.3.1 Menu 1: Alarm/meas.values

Display current status messages, alarm messages and measured values. The device shows the alarm status for each menu item: $\bigcirc =$ no alarm, $\bigcirc =$ alarm.

7.3.1.1 Alarm/meas.values ATICS-2-DIO

Menu	Description
Exit	Exit "Alarm/meas. values" menu; go up one menu level
1. O Line 1: 228V	Line 1: Measured value mains voltage
2. Line 2: 183V	Line 2: Measured value mains voltage
3. O Position: 1	Switch position of the automatic transfer switching device
4. O t(2->1):	Return transfer delay time is enabled, seconds counting backwards
or 4. O Switch-back lock	or Switch-back lock enabled
5. O Automatic mode	O Automatic mode or manual mode
6. Status	Device error (e.g.: no BMS bus master present)
7. O I(3):35A	Load current in the TN system or "No CT connected" fault
8. O Dig.input:	Alarm digital input 1 (see chapter "Settings menu 5: Dig. input" on p. 74)
9. O Dig.input:	Alarm digital input 2 (see chapter "Settings menu 5: Dig. input" on p. 74)
10. O Dig.input:	Alarm digital input 3 (see chapter S. 74)
11. O Dig.input:	Alarm digital input 4 (see chapter "Settings menu 5: Dig. input" on p. 74)



Menu	Description
12. 🔘	No function
13. O Line 1: 50.0Hz	Line 1: Measured value frequency
14. O Line 2: 50.0Hz	Line 2: Measured value frequency

7.3.1.2 Alarm/meas.values ATICS-4-DIO

Menu	Description
Exit	Exit "Alarm/meas. values" menu; go up one menu level
1. O U1(1-N): 230V	Line 1: Measured values mains voltage phase 1 to N*
2. • U2(1-N): 0V	Line 2: Measured values mains voltage phase 1 to N* (here: Line 2 failed)
3. O Position: 1	Switch position of the automatic transfer switching device
4. O t(2->1): or 4. O Switch-back lock	Return transfer delay time is enabled, seconds counting backwards or Switch-back lock enabled
5. O Automatic mode	O Automatic mode or manual mode
6. Status	Device error (e.g.: no BMS bus master present)
7. O I(1):35A	Load current in the TN system on phase L1 or "No CT connected" fault
8. O I(2):33A	Load current in the TN system on phase L2 or "No CT connected" fault
9. O I(3):37A	Load current in the TN system on phase L3 or "No CT connected" fault
10. O I(N):0A	Load current in the TN system on neutral conductor N or "No CT connected" fault
11. O Dig.input:	Alarm digital input 1 (see chapter "Settings menu 5: Dig. input" on p. 74)
12. O Dig.input:	Alarm digital input 24 (see chapter "Settings menu 5: Dig. input" on p. 74)
13. O U1(1-N): 230V	Line 1: Measured value mains voltage phase L1 to neutral conductor N
14. O U1(2-N): 230V	Line 1: Measured value mains voltage phase L2 to neutral conductor N
15. O U1(3-N): 230V	Line 1: Measured value mains voltage phase L3 to neutral conductor N
16. O U1(1-2): 400V	Line 1: Measured values phase L1 to phase L2
17. O U1(2-3): 400V	Line 1: Measured values mains voltage phase L2 to phase L3
18. O U1(3-1): 400V	Line 1: Measured values mains voltage phase L3 to phase L1
19. O Line 1: 50.0Hz	Line 1: Measured value frequency
20. O Unbalance: 0%	Line 1: Unbalance of phases L1, L2, L3



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

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

Menü	Bedeutung
4. Ot(1->2): 356ms	Changeover period t(1->2) of the last test
7. O TEST: 02.07.19	Next TEST by (date)
8. O Service: 11.07.19	Next service by (date)
9. O I(3):5A	Load current TN system
31. O t(2->1):	Return transfer delay time is enabled, seconds counting backwards or switch-back lock enabled

^{*} In the event of an alarm, the phase voltage which has first been detected as faulty and which has triggered the alarm is indicated.

All messages (except measured value frequency) are also present on the BMS bus (see chapter "Messages with error code or service code" on p. 84).



7.3.2 Menu 2: Changeover

Display information on the changeover function (number, test). The device shows the alarm status for each menu item: \bigcirc = no alarm, \bigcirc = alarm.

Menu	Description
Exit	Exit "Changeover" menu; go up one menu level
1. Changeover: xxx	Number of changeovers performed
2. O Operat. time: xxh	Operating hours counter (h=hours, d=days, mo=months)
3. O 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) or 250 A (if an STW4 is used) are considered to be overcurrents or short-circuit currents.
4. O TEST: dd.mm.yy	Date for next test (changeover)
5. O Service: dd.mm.yy	Date for next service
6. O TEST: dd.mm.yy	Date of the last test (TEST) or last changeover (LAST SWITCH).

7.3.3 Menu 3: History/Loggers

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

See the technical specifications for information about the maximum number of events which can be saved from P. 95. Once the maximum number of events which can be saved is reached, the latest event overwrites the oldest entry (entry 1).

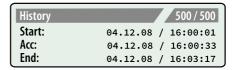
Menu item	Function
Exit	Exit "History/Loggers" menu; go up one menu level
1. History	The "History" menu provides information about alarm messages and tests performed. It also indicates whether an alarm is still pending or when it was acknowledged by pressing the "mute" button on a CP9xx, a TM alarm indicator and operator panel or an MK alarm indicator and test combination.
2. Data logger	Displays the history of measured values: Voltage line 1, voltage line 2, switch position of the transfer switching device, load current downstream of the transfer switching device I(3).

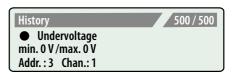


Menu item	Function	
3. Config.logger	Shows the history of all parameter changes, their origin, modified settings and the date of the change (can only be displayed on the device): Local Change has been made in the "Settings" menu on the device. External Change has been made via an external device (e.g. BMS-Ethernet gateway COM465). Auto Automatic change, in response to a change of another parameter. For an example, see chapter "Settings menu 4: Relay" on p. 71.	
4. Test logger	Displays the history of the tests carried out: date, time and changeover period. See chapter P. 18 and redundant line" on p. .	
5. Service logger	Displays the history of the service measures carried out: Date, time and service codes. Meaning of the displayed service code: see chapter "Messages with error code or service code" on p. 84.	

7.3.3.1 Operating example: History

- 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 the " button 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). Refer to the tables "8.1 Fault and alarm messages" on p. 83 for more information on possible displays.



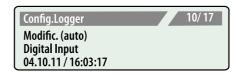


- 3. Press the "-" button again to return to the entry selection. Repeat these operating steps for all messages. Then press "ESC" to exit the menu.
 - The message "TEST" appears in the last line of the history memory alarm text display: Note that the current history memory entry was created as the result of a test initiated on this device.



7.3.3.2 Operating example: Config.logger

- Use the arrow buttons to select the required entry. In this case: The settings for the digital input are changed here.
- 2. Press " 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.

7.3.4 Menu 4: Settings

The settings menus are protected by a password (see chapter "Settings menu 10: Password" on p. 80). 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.



The following menu items are available for configuring the device:

Menu item	Function	Page
Exit	Exit settings menu "Settings"; go up one menu level	
1. Changeover	Adjust settings for changeover switch	<u>P. 67</u>
2. Voltage	Adjust settings for voltage monitoring	<u>P. 69</u>
3. Current	Adjust settings for current monitoring (short-circuit detection)	<u>P. 70</u>
4. Relay	Set mode of operation and function of alarm relay	<u>P. 71</u>
5. Dig. input	Set operating behaviour of the digital input	<u>P. 74</u>
6. Data loggers	Adjust settings for data loggers	<u>P. 76</u>
7. Languages	Select the operating language for the device (English, German, French, Polish)	<u>P. 78</u>
8. Interface	Set the BMS bus address of this device,	<u>P. 78</u>
	allow settings to be changed via the interface,	
	allow performing a test via the interface.	



Menu item	Function	Page
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. MK2430, MK800, TMalarm indicator and operator panel or CP9xx) synchronises all other devices every hour.	<u>P. 79</u>
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	<u>P. 80</u>
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.	P. 81

7.3.4.1 Settings menu 1: Changeover

The times set in this menu determine the timing of a changeover. Observe also the time diagrams in the chapter "The automatic transfer switching device" on p. 15.

Menu item	Function		
Exit	Exit settings menu "Change	Exit settings menu "Changeover"; go up one menu level	
1. t(start)	Delayed switch-on after complete power failure:		
	Setting range:	0 s100 s	
	Resolution of settings:	50 ms / 100 ms / 1 s / 5 s	
2. t(0)	Time delay in switch positio	n "0" (dead time):	
	Setting range:	140 ms100 s	
	Resolution of settings:	10 ms / 50 ms / 100 ms / 1 s / 5 s	
3. t(2->1)	3. t(2->1) Return transfer delay time to the preferred line:		
	Setting range:	0 s180 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 s180 min	
	Resolution of settings:	1 s / 5 s / 1 min	



Menu item	Function	
5. System	U1-U2 Line G L1-L2 AV-SV SV-AV SV-UPS UPS-SV SV-BSV BSV-SV	Voltage line 1 - Voltage line 2 Line 1 - Generator Line 1 - Line 2 Normal power supply source - Safety power supply source Safety power supply source - Normal power supply source Safety power supply source - Special safety power supply source Special safety power supply source - Safety power supply source Safety power supply - Battery-supported safety power supply Battery-supported safety power supply - Safety power supply luences the creation of the alarm text which is displayed in case of line:
		Undervoltage, overvoltage, voltage value Failure line 1, failure line 2 Fail.norm.supply, Fail.safet.supply Fail.safet.supply, Failure UPS Fail.safet.supply, Failure BSV eviations: supply source
6. SwitchBackLock	on off See chapter "Time of 18 and redundant I	Switch-back lock enabled Switch-back lock disabled liagram: Changeover between preferred and redundant line" on p. ine" on p.
7. Preferred line		Line 1 Line 2 line 1 is always the preferred line. arameter change can result in an immediate changeover.
8. Test interval	Interval for testing Setting range: Resolution of settin	the changeover function: off, 124 months g: 1 month
9. Reminder	Prewarning time fo Setting range: Resolution of settin	r test interval (set value smaller than test interval): off, 160 days ıg: 1 day



Menu item	Function	
10. Serviceinterv.	Service interval: Setting range: off, 648 months Resolution of setting: 6 months	
11. Reminder	Warning time for service interval (d=day): Setting range: off, 160 days Resolution of setting: 1 day	
12. t (GenStart)	Time delay for changeover to generator (measured from "Voltage line 2 = OK"): Setting range: 0 s100 s (only active when System=Line G) Resolution of settings: 1 s / 5 s	
13. t(GenMax)	Maximum generator start time. Monitoring whether the generator starts (time until "Voltage line 2 = OK"). Setting range: 0 s100 s (only active when System=Line G) Resolution of setting: 1 s / 5 s	
14. t(Gen.off)	Time delay for turning off the generator after switching back to the preferred line: Setting range: 2 s180 min (only active when System=Line G) Resolution of setting: 1 s / 5 s / 1 min	

7.3.4.2 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: 184 V". 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. The 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 the "\(^\alpha\)" arrow button to go to the line setting. Press the "\(^\alpha\)" button.
- 2. Use the arrow buttons to select one line (voltage 1, 2) or both lines (voltage 1...2). Press the "" button to confirm your selection.

Setting voltage for one line

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

Setting voltage for both lines

Voltage:	12	
Exit		
1. Undervolt.:		184V
2. Overvoltage:		250V



Adjusting the settings:

Menu	Description	
Exit	Exit settings menu "Voltage"; go up one menu level	
1. Undervolt.	Undervoltage; setting range:	160207 V
2. Overvolt.	Overvoltage; setting range:	240275 V
3. t(on)	Response delay*: Setting range: Resolution of settings:	50 ms100 s 50 ms / 100 ms / 1 s / 5 s / 10 s
4. t(off)	Delay on release*: Setting range: Resolution of settings:	200 ms100 s 50 ms / 100 ms / 1 s / 5 s / 10 s
5. Hysteresis	Setting range: Resolution of setting:	210 % 1 %
6. Unbalance (ATICS- 4-DIO only)	Setting range: Resolution of setting:	230 % 1 %
7. Phase sequence (ATICS-4-DIO only)	on: Phase sequence monitoring enabled off: Phase sequence monitoring disabled	

^{*} Observe also the time diagrams

7.3.4.3 Settings menu 3: Current

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

Settings menu 3: Current for ATICS-2-DIO

The current is detected via a measuring current transformer (T3 in the connection example P. 34).

Menu	Description
Exit	Exit settings menu "Current"; go up one menu level
1. Mode	on Current monitoring enabled off No current monitoring
2. Current trans- former	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.



Settings menu 3: Current for 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 the "▲" arrow button to go to the measuring current transformer setting.
 Press the "→" button.
- 2. Use the arrow buttons to select one (e.g. current 2) or all four measuring current transformers (current 1...4). Press the "- button to confirm your selection.

Configure one current transformer

Configure all four current transformers

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

Current:	14	
Exit		
1. Function:	on	
2. CT:	STW3	

Menu	Description
Exit	Exit settings menu "Current"; go up one menu level
1. Mode	on Current monitoring enabled off No current monitoring
2. Current trans- former	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.

7.3.4.4 Settings menu 4: Relay

In this menu, you can adjust settings for the mode of operation and function of the relay output (alarm relay). The function can be set for each relay as follows: alarm message, operating message. The "GenSt" function (generator start) can only be selected effectively for relay 1.

The setting of this function has an influence on the following menus. 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. 1s) 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 alarm relay 1 will always be set to "N/C-T". The other settings on the "Relay 1" menu are disabled. The alarm message "Failure line 2" is suppressed.

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...12 inactive

Select relay.

- 1. Use the "▲" arrow button to go to the alarm relay setting. Press the "→" button.
- 2. Use the arrow buttons to select one (e.g. relay 2) or all four alarm relays (relays 1...4). Press the "" button to confirm your selection.

Setting one relay

Setting all four relays ("GenSt" can be selected but is only set for relay 1; relay 2...4 are set to "ALARM").:

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

Relay:	14	
Exit		
1. Function:		ALARM
2. Relay mode:		N/C-T



Adjusting the settings:

Menu	Description	
Exit	Exit settings menu "Relay"; go up one menu level	
1. Function	ALARM Relay switches if at least one of the following menus 39 is set to "on" and the corresponding alarm message appears. Relay switches if at least one of the following menus 39 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. 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. GenSt Relay is used as Generator start relay (alarm relay 1 only)	
2. Relay mode	N/O N/O operation. Relay only switches in the event of an alarm. N/C N/C operation. Relay only switches in the event of an alarm. N/O-T N/O operation. Relay switches in the event of an alarm or a test. N/C-T N/C 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	
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 "Settings -> Dig. input" menu. off	



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.

7.3.4.5 Settings menu 5: Dig. input

In this menu, you can adjust settings for the mode of operation and function of the digital inputs. The digital inputs are galvanically separated. They are designed for an input signal 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".

Select digital input:

- 1. Use the "▲" arrow button to go to the digital input setting. Press the "↓" button.
- 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 the "- button to confirm your selection.

Setting one digital input

Setting all digital inputs

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

Digital input:	14
Exit	
1. Function:	off
2. Resp. value.:	24.0 V

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 R-OPL

0 V (can be changed)

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



Adjusting the settings:

Menu	Description	Description	
Exit	Exit settings menu "\	Exit settings menu "Voltage"; go up one menu level	
1. Functions	N оте: А ра	rameter change can result in an immediate changeover.	
	off	Digital input disabled	
	M/A	Manual/Automatic. Manual mode means that automatic changeover can no longer take place.	
	Bypass	Alarm "Bypass operation" but TEST changeover possible	
	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".	
	1<->2	Changes the preferred line	
	TEST	A test changeover is carried out. In generator mode, the genera tor start relay is also switched. The test is completed when the output is reset.	
	1	Switch to switch position 1*	
	0	Switch to switch position 0*	
	2	Switch to switch position 2*	
		* Requirement: Another dig. input is set to "M/A".	
	ALARM	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.	
	R-OPL	Generates an alarm "Insulation fault, operating theatre light". Other functions as for the setting "ALARM".	
2. Resp. value	0V 24V	At 0 V input is set. The selected function is carried out. At 24 V input is set. The selected function is carried out.	
3. t(on)	Response delay: Setting range:	100 ms100 s	
	Resolution of setting		
4. t(off)	Delay on release:	-	
(0)	Setting range:	100 ms100 s	
	Resolution of setting		



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.

7.3.4.6 Settings menu 6: Data loggers

ATICS-2-DIO data loggers

You can adjust the settings for six data loggers of the device in this menu. These data loggers (see chapter "7.3.3 Menu 3: History/Loggers" on p. 75) display the history of measured values:

Data logger	Description
1. Line 1	Line 1: Measured value mains voltage phase to neutral conductor N
2. Line 2	Line 1: 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

In this menu, you can adjust settings for the device's data loggers. These data loggers ("7.3.3 Menu 3: History/Loggers" on p. 64) display the history of measured values:

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



Data logger	Description
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
8. I(2)	Load current downstream of the transfer switching device on phase L2
8. I(3)	Load current downstream of the transfer switching device on phase L3
8. I(N)	Load current downstream of the transfer switching device on neutral conductor N

Selecting a data logger:

- 1. Use the "▲" arrow button to go to the data logger settings. Press the "◄" button.
- 2. Use the arrow buttons to select one data logger (1, 2, ...) or all data loggers (1...6). Press the "

 " button to confirm your selection.

Set one data logger:

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

Set all data loggers:

Nr.:	111	
Exit	_	_
1. Modific.:		10.00 %
2. Overwrite:		yes



Risk of 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 limit threshold of 10 A for the load currents is incorporated in the data loggers for the TN system downstream of the transfer switching 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.

Adjust settings and delete data loggers:

Menu	Description	
Exit	Exit settings menu "Data logger"; 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 %	



Menu	Description	
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 Cancel	Clear data logger Do not clear data logger.

7.3.4.7 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	Exit settings menu "Language"; go up one menu level	
1. English		
2. Deutsch	Colort language Changes tales offer this was distally	
3. Français	Select language. Changes take effect immediately.	
4. Polski		

7.3.4.8 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	Exit settings menu "Interface"; go up one menu level		
1. Address	Setting range: 290		
2. Settings	on	Allow settings to be changed via interface (e.g. a COM465 Ethernet gateway)	
	off	Do not allow settings to be changed via interface	
3. TEST	on	Allow a test to be carried out via interface (e.g. a COM465 Ethernet gateway)	
	off	Do not allow a test to be carried out via interface	



Menu	Description		
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.	
	\triangle	D ANGER! When this setting is selected, the conditions for functional safety (SIL2) are no longer met.	
	<u>^</u>	CAUTION! In the event of a power failure of more than eight hours, the time and date will be reset to the factory settings. If the "Clock" setting is not corrected, all functions depending on this setting (history memory, logger, test interval, service interval) will lead to unusable results.	
5. Profile	Stand. TEST	Standard setting for channel assignment for alarms/meas. values and BMS channels Alternative setting (see p. P. 46 and P. 64)	

7.3.4.9 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 (MK800, MK2430, CP9xx or TM...) synchronises all other devices every hour.

The time setting for the ATICS® is required for the rare case of use without a BMS bus. In this case, ATICS® displays the fault message "No master". The date format, date and time can be set. These settings remain stored for approx. eight hours following a supply interruption. The date and time will then be reset to the factory settings (01.01.2010, 00:00:00).

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



7.3.4.10 Settings menu 10: Password

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

Menu	Description	
Exit	Exit settings menu "Password"; go up one menu level	
1. Settings	Change the password for the "Settings" menu, switch the password "on/off". 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	Exit settings menu "Password - > Settings"; go up one menu level	
1. Password	Change the password for the "Settings" menu. Setting range: 000 999 Resolution of setting: 1	
2. Status	Enable/Disable the password protection for the "Settings" menu on Password protection is enabled. When an attempt is made to open one of the settings menus, the password entry screen appears automatically: Settings Enter password: 0 0 0 After entering a valid password, all settings menus (except the "Service" menu) are freely accessible until the menu mode is exited. off Password protection is disabled.	

Changing the password menu "TEST"

Menu	Description	
Exit	Exit settings menu "Password - > TEST"; go up one menu level	
1. Password	Change the password for the "TEST" menu. Setting range: 000 999 Resolution of setting: 1	



Menu	Description	
2. Status	Enable or disable the password protection for the "TEST" menu on Password protection of test menus 24 is enabled. When an attempt is made to open one of these menus, the password entry screen appears automatically:	
	Enter password: 0 0 0	
	off Password protection is disabled.	

7.3.4.11 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.

7.3.5 Menu 5: Control

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

Menu item	Function	Page
Exit	Exit "Control" menu; go up one menu level	
1. TEST	Call up test, see chapter "Test function"	<u>P. 51</u>
2. RESET	Call up reset, see chapter "Reset function"	<u>P. 56</u>

7.3.6 Menu 6: Dig. input

This menu indicates the voltage level of the digital input.

Exit "Dig. input" menu; go up one menu level.

O - - The digital input is disabled.

1...4 Number of the digital input.



OV 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 P. 74).



7.3.7 Menu 7: Info

This menu displays information about the device and the software. Press the arrow button "\nscale=" 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.

ATICS2-DIO-63 02.03.11 14:59 Address: 3 No.: 1234567890



8 Troubleshooting

8.1 Fault and alarm messages

In the event of an alarm, the messages of the ATICS® transfer switching device 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

8.1.1 Plain text messages

Fault/message	Description	Action	
Failure line xx (xx stands for: 1, 2, AV, SV, UPS, BSV), undervolt- age or overvoltage	Voltage is no longer available on line 1 or line 2 Channel 1 = Line 1, Channel 2 = Line 2	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) Voltage		
Device error + error code	For details about actions to be taken, refer to table section "8.1.2 Messages with error code or service code" on p. 84. The message is on channel 6 of the BMS bus.		
Short circuit distribution board	Short circuit detected	Eliminate short circuit	
Failure distribution board	No voltage on line 3, contact of the change- over switch defective. The fault can also be caused by an (impermissible) connection between GND, k or l and PE.	Replace ATICS®. Separate connection between GND, k or I and PE.	
Overcurrent I(3)	Overcurrent detected by measuring current transformer STW3	Eliminate cause of overcurrent. Eliminate any damage.	
CT connection	Short circuit or interruption of connecting wire has been detected. Measuring current transformer STW3, channel 7	Check connecting wire of measuring current transformer.	
No master	There is no device with master function or back-up master (device with address "1") available on the RS-485 interface	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" (see chapter "Settings menu 8: Interface" on p. 78) must be disabled.	
Service by (date)	Reminder for next service	Schedule appointment with the Bender service.	



Fault/message	Description	Action
Functional test by (date)	Reminder for next test	Schedule appointment for next test. Perform test.
Manual mode	Message "Manual mode" although manual mode has not been enabled	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.	Install line 1 and line 2 in a way that the direction of the phase sequence of both lines is clockwise (right).
Error during changeover process	Occurs when the test set-ups do not supply sufficient current to switch the coils of the ATICS®.	Only use test set-ups that provide the necessary peak current of 17 A.

8.1.2 Messages with error code or service code

Error code/service code	Description	Action
1.xx, 4.xx, 9.xx	Fault message from the internal memory monitoring.	Contact the Bender service.
3.10	Prewarning The max. number of operating hours will be reached in one year.	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" on p. 57)
3.11	Maximum number of operating hours exceeded for functional safety according to IEC 61508-2:2010.	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" on p. 57)
3.12	Maximum number of changeovers exceeded.	Plan device replacement. Alarm can be acknowledged (see chapter "Reset menu 3: Changeover" on p. 57)
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.	Have qualified personnel assess the short-circuit load. Contact the Bender service. Alarm can be acknowledged (see chapter "Reset menu 3: Changeover" on p. 57)



Error code/service code	Description	Action
3.50	Service alarm has been reset. Only displayed in the service logger menu.	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.	Replace device immediately.
8.51 8.52	Fault internal power supply unit.	 RESET -> execute 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 coils of the ATICS®. 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 I and PE.	 Check connection of the bridge on the output side, if necessary, re-tighten screws. RESET -> execute 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.



8.2 Frequently asked questions

A series of clicks is always heard at 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 the ATICS® not display the set time?

The time of the ATICS® is set by the BMS bus master. The time for the ATICS® only is 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 the 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" on p. 67)
- 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 changeover operations. The time delay is required to cool the system.

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

Already during the commissioning of 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", the 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?

ATICS® – like many Bender devices – 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® (version older than 1.20) in an ATICS® 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 in 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 the ATICS®.
- · Save these settings in a new report file.





9 Periodic verification and service

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

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
Function test of the IT system monitoring by pressing the test button on the corresponding operating units.	Medical personnel	Once every working day (recommend- ed by Bender)
For function test of the IT system monitoring on the monitoring device see ""Settings menu 1: Changeover" "8. Test interval" on p. 68	Electrically skilled person	Monthly (recommended by Bender)



Action	To be performed by	Interval
Services for the periodic verification of Bender products in electrical installations: • Function test of the transfer switching device • For checking the effectiveness of the protective measures monitored by Bender products as well as their disconnecting and switching functions, see "Settings menu 1: Changeover" "10. Serviceinterv." on p. 69 • Optimum configuration of the Bender products • Performing the tests by qualified persons • Documentation	Bender service or electrically skilled person	Every twelve months*

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

9.2 Maintenance

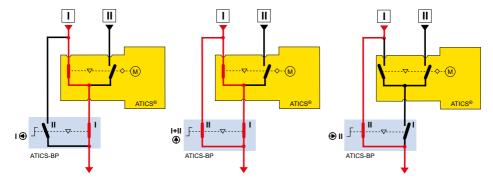
The intervals specified for periodic verification must be adhered to. We also recommend regularly checking the Allen screws on the ATICS® and the Torx® screws of the connectors on the incoming and outgoing lines of the automatic transfer switching device to make sure they are tight.

9.3 Cleaning

ATICS® may only be cleaned with a clean, dry, soft and antistatic cloth.

9.4 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 desired.



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.

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.





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. The bypass switch may only be operated when the green "Enable Bypass" light lights up.

If a voltage drop occurs on line 1 while the switch is set to "II" (=bypass), the switch must not be set to position "I+II" or "I". In this case, the ATICS® device must be switched to position "0" or "I" manually using the Allen key. Only after doing this, the bypass switch can be set to position "I" while the transparent cover (manual mode) is open. Afterwards, the transparent cover can be closed to enable the automatic mode. If the transparent cover is closed beforehand, the ATICS® device will automatically switch back to line 2.

Conditions for operation with the bypass switch

- Wiring must be carried out according to "Connection examples: ATICS* with bypass switch" on p. 36.
- The following must bet 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



RISK of electric shock when touching the contacts on line 1, 2 or 3.

Mains voltage at the contacts of line 1, 2 and 3. Only touch the insulated part of the connector.

9.5 Replacing the ATICS®

The plug connectors make it easy to replace the device if

- the 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.



Risk of electrocution 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 has been deenergised. If ATICS® is bypassed by an ATICS-BP-... bypass switch, the regulations which apply to working on live parts must be observed.



9.5.1 Removing the existing ATICS®

- Description applies to ATICS-...-DIO.
 - 1. Record settings on the 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 switch-on (see chapter "Connecting the ATICS® safely" on p. 31).
 - 3. Remove connections
 - 4. Remove the ATICS®



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.

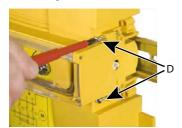
Afterwards, loosen the fastening screws of the bottom green plug connector and remove the connector (B).



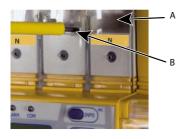
Remove the three connector plugs (C).



Removing the ATICS® in case of DIN rail mounting

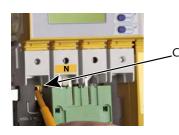


Undo screws (D).



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.





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

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

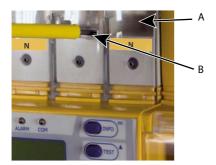


ATICS-2-DIO: Now use the screwdriver to pull the upper yellow slide lock (D) upwards and remove the ATICS®.

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

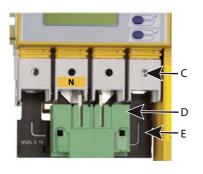


Removing the ATICS® in case of screw mounting



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.





Undo the Allen screws of the terminals (C).

Remove the green plug connectors (D) at top and bottom.

Remove the black bridge (E) at the bottom.

Undo the mounting screws and remove the ATICS® from the mounting plate.

9.5.2 Installing a new ATICS®

- **For mounting the ATICS*, see chapter "DIN rail mounting" on p. 29 or "Screw mounting on plate" on p. 30.
- For connection of the ATICS®, see chapter P. 31



10 Technical data

10.1 Tabular data

ļ	Insulation	coordination acc.	to IE	:C 60664-	1/IEC 60)664-3

Overvoltage category	III
Overvoltage category	۱۱۱
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)	
Supply voltage	
Rated operational voltage $U_{_{\rho}}$	230 V 50/60 Hz
Supply voltage U _s	from monitored system
Power consumption ATICS-2-63A-DIO	
Power consumption ATICS-2-80A-DIO	
Power consumption ATICS-4-80A-DIO	≤ 39 W
Power consumption ATICS-4-125A-DIO	
Power consumption ATICS-4-160A-DIO	
Current during changeover process	17 A/< 30 ms
Power section/switching elements	
Nominal system voltage $U_{\rm n}$ (operating range) ATICS-2-DIO/ATICS-4-DIO	AC 230 V/3NAC 400 V
Frequency range f_n	
Crest factor	
Number of switching cycles (mechanical)	
Short-circuit currents	
Short-circuit current $I_{\rm cc}$ and fusessee table "Ut	tilisation categories acc. to DIN EN 60947 on p. 98
Voltage monitoring/changeover	
Frequency range f_n	4070 Hz
Undervoltage response value (Alarm 1)	
Overvoltage response value (Alarm 2)	240
Response delay t	0 ms100 s (resolution of setting starting 50 ms)
Delay on release $t_{\text{off}}^{"}$	oms100 s (resolution of setting starting 50 ms)
Hysteresis	
Frequency measurement Display range measured value ATICS-2-DIO	
Display range measured value ATICS-2-DIO	
Operating uncertainty	+1 % +1 %
Change over period	
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 ATICS-DIO (versions 63 A and 80 A) with STV	N3130 A
Response value for short-circuit detection ATICS-DIO (versions 125 A and 160 A) with S	STW3250 A
Crest factor	min. 2
Hysteresis for short-circuit alarm	



Single wire ≥ 0.75 mm ²
Shielded cable
Cable: twisted pairs, shield connected to terminal I on one side, must not be earthed recommended: J-Y(St)Y min. n x 2 x 0
Displays and data memory
Displays and data inclinory
Display: graphic displaylanguages DE, EN, FR,
Alarm LEDsLine 1, Line 2, Alarm, Co
History memory
Data logger 500 data records/chann
Config. logger
Test logger
Service logger
input
Digital inputs
Galvanic separation
Control
Operating modeactive at 0 V (low) or 24 V (high), adjustab
Voltage range high/low
Adjustable functionswitch-back lock, manual/automatic mode, bypass mod
functional test, changeover to preferred lin
alarm input for operating theatre lights, alarm input for other devic
Relay output 1
Switching element
Operating mode adjustable
Adjustable functionsee "7.3.4.4 Settings menu 4: Relay" on p. 1
Electrical endurance under rated operating conditions, number of cycle10,00
Contact data according to IEC 61810
Rated operational current AC (resistive load, cos φ=1)
Rated operational current DC
Overvoltage category
Minimum contact rating
Relay outputs 24
Switching element
Operating mode adjustable
Adjustable functionsee "7.3.4.4 Settings menu 4: Relay" on p. T
Electrical endurance under rated operating conditions, number of cycles
Contact data according to IEC 61810
Rated operational current AC (resistive load, $\cos \phi = 1$)
Rated operational current DC
Overvoltage category
Minimum switching capacity120 m



BMS interface	
Interface/protocol	RS-485/BMS
Baud rate	
Cable length	≤ 1200 m
Cable: shielded, one end of shield connected to PE	CAT6/CAT7 min. AWG23*
* alternatively:twiste	d pair, one end of shield connected to PE J-Y(St)Y min. 2x0.8
Terminating resistor	
Device address, BMS bus	290
Environment/EMC	
EMC	EN 61326 (see CE declaration)
Classification of climatic conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	
Transport (IEC 60721-3-2)	
Long-term storage (IEC 60721-3-1)	
Operating temperature	
Classification of mechanical conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	
Transport (IEC 60721-3-2)	
Long-term storage (IEC 60721-3-1)	
Terminals	
Power section	
Connection directly to ATICS®, for plug connections and the 160 A version	screw-type terminals
rigid (flexible)/conductor sizes	
Stripping length	
Tightening torque (hexagon socket 4 mm)	5 Nm
Connection for plug connectors (125 A)	pluggable screw-type terminals
Conductor cross section, rigid min./max	
Conductor cross section, flexible min./max	1.5 mm ² /25 mm ²
Conductor cross section AWG/min./max	
Stripping length (do not use ferrules)	
Tightening torque (Torx® screwdriver T20 or slotted screwdriver 6.5 x 1.2 m	
	,
Torque setting for manual operation (hexagon socket 5 mm)	approx. 6 Nm
Electronics	
Connection	pluggable screw-type terminals
rigid/flexible/conductor sizes	0.141.5 mm ² /2816 AWG
General Control of the Control of th	_



Other

Operating mode	continuous operation
Mounting	
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	UL94V-0
Mounting	DIN rail acc. to IEC 60715
Screw mounting	4 x M5
Dimensions incl. terminals (W x H x D)	234 x 270 x 73
Weight ATICS-2-DIO	
Weight ATICS-4-DIO	approx. 4800 g

Short-circuit currents

	ATICS- 63A- DIO	ATICS- 2-80A- DIO	ATICS- 4-80A- DIO	ATICS- 4-125A- DIO	ATICS- 2-160A- DIO
Thermal current Ith (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.) Associated fuse rating (A gG)	30 80	30 100	50 80	50 125	40 160
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.) Rated peak withstand current I_{cm} (kA peak)	4	4 17	4 17	4 17	4 17

Utilisation categories acc. to DIN EN 60947

Туре	le AC-23A	le AC-23B	le AC-32A	le AC-32B	le AC-33B
ATICS-2-63A-DIO	63 A				
ATICS-2-80A-DIO	80 A				
ATICS-4-80A-DIO	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

10.2 TÜV test report according to VDE 0100 Part 710

Technischer Bericht

Elektrische Sicherheit

Sicht- und Funktionsprüfung

TÜV SÜD Industrie Service GmbH - Westendstr. 199 - 80686 Münche

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

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: Art der Untersuchung:

Auftrag 4620785 vom 24.10.2013

Prüfung auf Übereinstimmung des ATICS - Umschaltund 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

Bender_ATICS-DIO 131112 Funktionsber g-Teil 710-2012_SUE-Rev02.doc

Mehr Sicherheit.

Mehr Wert.

Das Dokument besteht aus 4 Seiten. Seite 1 von 4

Die auszugsweise Wedergabe des Dokumentes und die Verwendung zu Werbezwecken bedürfen der schriftlichen Genehmigung der TÜV SÜD Industrie Service GmbH.

Die Prüfergebnisse beziehen sich ausschließlich auf die untersuchten Prüfgegenstände.

München 19.12.2013

Thomas Wurl Niederlassung München Abteilung Elektrotechnik

Raimund Gebhart Der Sachverständige

Sitz: München Amtsgericht München HRB 96 869 USt-IdNr. DE129484218 Informationen gemäß § 2 Abs. 1 DL-InfoV

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

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

דטי∨®



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

10.3 TÜV certificate regarding functional safety

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ZERTIFIKAT

Nr. Z10 077738 0002 Rev. 01

Bender GmbH & Co. KG Zertifikatsinhaber:

Londorfer Straße 65 35305 Grünberg DEUTSCHLAND

077730 Fertigungsstätte(n):

Prüfzeichen:



Sicherheitsbauelemente Produkt:

Umschalteinrichtung

Modell(e): **ATICS**

Temperatur: -25°C...+55°C Parameter: 250VAC 50 / 60Hz Betriebsspannung:

Strom während Umschaltvorgang: 17A / <30ms

(Guido Neumann)

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

Zertifikats.

EN 61508-1:2010 (SIL2) Geprüft nach:

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. Umseitige Hinweise sind zu beachten.

Prüfbericht Nr.: BG83659T

Gültig bis: 2025-03-15

Datum, 2020-03-16

TÜV SÜD Product Service GmbH • Zertifizierstelle • Ridlerstraße 65 • 80339 München • Deutschland

TÜV®

ZERTIFIKAT

Seite 1 von 1



10.4 Standards and certifications

The transfer switching device conforms to the following standards:

- DIN VDE 0100-710 (VDE 0100 Part 710):2002-11*
- DIN VDE 0100-710 (VDE 0100 Part 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/Amendment 1 (VDE 0570-1/Amendment 1):2008-11
- DIN EN 61558-1/Amendment 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.

10.5 Ordering information

Туре	Description	Rated operational current I_e	Art. No.	Manual No.
ATICS-2-63A-DIO	2-pole transfer switching device, 4 dig. in- puts, 4 relay outputs, short-circuit detection in TN systems, with sealable contact covers	AC 63 A	B92057212	D00080
ATICS-2-80A-DIO	on the input and output sides, bridges on the output side and pluggable screw-type terminals for all connections. 1 unit measuring current transformer STW3	AC 80 A	B92057213	D00080
ATICS-4-80A-DIO	4-pole transfer switching device, 4 dig. inputs, 4 relay outputs, short-circuit detection in TN systems, with sealable contact covers	AC 80 A	B92057222	D00080
ATICS-4-125A-DIO	on the input and output sides, bridges on the output side and pluggable screw-type terminals for all connections. 4 units measuring current transformer STW3.	AC 125 A	B92057223	D00080



Туре	Description	Rated operational current I_e	Art. No.	Manual No.
ATICS-4-160A-DIO	4-pole transfer switching device, 4 dig. inputs, 4 relay outputs, short-circuit detection in TN systems, with sealable contact covers on the input and output sides, bridges on the output side, screw-type terminals (not pluggable) for lines I, II, III. Pluggable screw-type terminals for all other connections. 4 units measuring current transformer STW4.		B92057224	D00080
STW3	Measuring current transformer (short-circuit monitoring) for ATICS $^{\circ}$ < 100 A	AC 100 A	B98021000	
STW4	Measuring current transformer (short-circuit monitoring) for ATICS® > 100 A	AC 200 A	B98021001	
ATICS-BP-2-63A-SET	Bypass switch set (<i>I_e</i> : AC 63 A) comprising: Bypass switch 63 A single, 2-pole, sequence of operation: I-I+II-II, with auxiliary contact, bridge, terminal cover Auxiliary contact for ATICS® LEDs green/red for DIN rail mounting			D00162
ATICS-BP-2-80A-SET	Bypass switch set (<i>I_e</i> : AC 80 A) comprising: • Bypass switch 80 A single, 2-pole, sequence of operation: I-I+II-II, with auxiliary			D00162
ATICS-BP-4-80A-SET	Bypass switch set (<i>I</i> : AC 80 A) comprising: Bypass switch 80 A single, 4-pole, sequence of operation: I-I+II-II, with auxiliary			D00162
ATICS-BP-4-125A- SET	Bypass switch set (<i>I</i> : AC 125 A) comprising: Bypass switch 125 Å single, 4-pole, sequence of operation: I-I+II-II, with auxiliary contact, bridge, terminal cover Auxiliary contact for ATICS® LEDs green/red for DIN rail mounting			D00162
ATICS-BP-4-160A- SET	Bypass switch set (<i>I</i> : AC 160 A) comprising: Bypass switch 160 Å single, 4-pole, sequence of operation: I-I+II-II, with auxiliary contact, bridge, terminal cover Auxiliary contact for ATICS® LEDs green/red for DIN rail mounting			D00162



10.6 Additional documents

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

In addition, the following instructions apply:

- ATICS-BP-SET (bypass switch set for ATICS®)
- STW2, STW3, STW4 measuring current transformers
- · BMS bus Bender measuring device interface
- COM465... BMS-Ethernet gateway for the connection of the Bender measuring device interface to TCP/IP networks
- · MK2430 alarm indicator and test combination
- MK800 alarm indicator and test combination
- TMK-SET configuration software for MK2430, MK800 and TM800
- · CP9xx Control Panel

10.7 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	D333 V1.3x, D334 V1.3x, D335 V1.0x, D308 V1.2x	Changed: Chapter 10.1: Rated operational voltage Added: Chapter 10.1: Change over period Chapter 10.4: Norm IEC 60364-7-710:2021-05



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