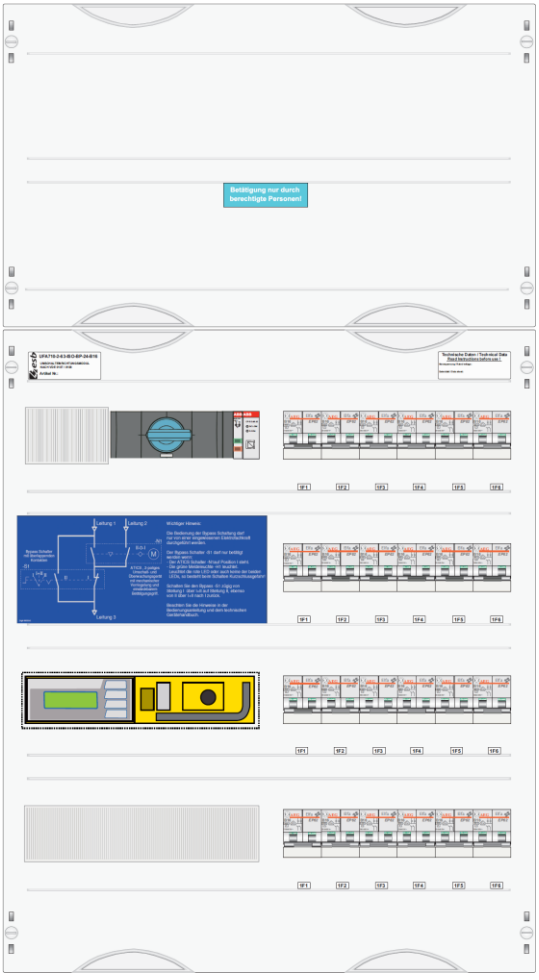
Manual

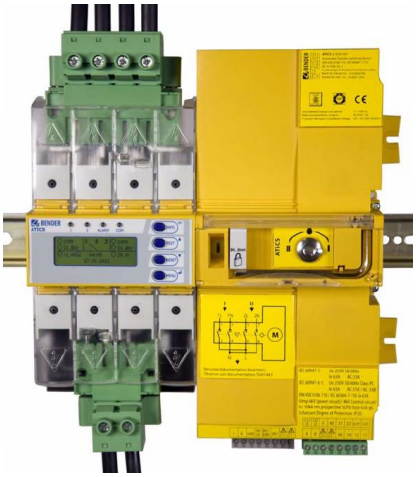
of ATICS® modules type

UFA710-2-63-ISO-…
UFA710-2-63-ISO-BP-…

UFA710-2-80-ISO-…
UFA710-2-80-ISO-BP-…

2-pole
automatic changeover and monitoring modules with insulation monitoring and insulation fault location system for medically used rooms





Imprint

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1. How to use this operating manual effectively

1.1. How to use this manual

This operating manual describes how to operate the UFA710... changeover and monitoring module. It is designed for skilled persons working in electrical engineering and electronics; and in particular for those, installing and operating electrical equipment in the medical sector.

Before using the equipment, please read this operating manual, the supplement entitled "Important safety instructions for Bender Products" and the instruction leaflets supplied with the individual system components. This document must be kept in an easily accessible location near to the equipment.

Should you have any further questions, please contact our Technical Sales Department. We are also happy to provide on-site service. Please contact our Service Department for more information.

In this manual, the two redundant supplies for the power supply will be designated "preferred supply" or "line 1" and "second supply" or "line 2". Devices with displays use the terms "line 1" and "line 2" in the text they indicate.

This manual has been compiled with great care. Nevertheless errors and omissions cannot be entirely excluded. The Bender Group cannot accept any liability for injury to persons or damage to property resulting from errors or mistakes in this operating manual.

1.2. Explanations of symbols and notes

The following terms and symbols are used to denote hazards and instructions in Bender documentation:

This symbol indicates an immediate risk to life and limb.
Failure to observe the associated instructions and take appropriate precautions will result in death, severe bodily injury or substantial damage to property.

This symbol indicates a potential risk to life and limb.
Failure to observe these warnings and take appropriate precautions may result in death, severe bodily injury or substantial damage to property.

This symbol indicates a potentially dangerous situation.
Failure to observe the associated instructions and take appropriate precautions may result in minor bodily injury or damage to property.

This symbol indicates important information about the correct use of the equipment purchased.
Failure to observe the associated instructions can result in equipment malfunctioning or cause problems in the environment in which it is being used

This symbol indicates tips for using the equipment and particularly useful information. This type of information will help you to optimise your use of the equipment.

2. Safety instructions

2.1. Intended use

Changeover devices are used everywhere there is dependence on high availability from the power supply. The ATICS® transfer switching device is intended for the application described in the chapter "System description". 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, computer centres
- Fire extinguisher and sprinkler systems

Several versions of the ATICS® are available. They differ for example by changing over from the two or four-pole systems or by the load current (see chapter "ATICS® tasks" on page 15). Please heed the limits of the area of application indicated in the technical specifications. Use which deviates from or is beyond the scope of these technical specifications is considered non-compliant.
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.

2.2. Skilled persons

Only appropriately qualified personnel may work on Bender devices. Persons who are familiar with the assembly, commissioning and operation of the equipment and have undergone appropriate training are considered skilled persons. Such persons must have read this manual and understood all instructions relating to safety.

2.3. Device-specific safety instruction

Failure to adjust the settings may result in malfunction.
The settings must be changed in order to adapt the ATICS® transfer switching device to the existing equipment. When doing so, follow the instructions in chapter "5. Commissioning, settings and testing“.

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.
In particular note the information on the pages: 12, 13, 14, 20, 52 and 76 in the technical operating manual TGH1443 of the ATICS® device.

2.4. 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.

- Only use Bender equipment:
  - 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 equipment. Failure to observe this requirement can result in fire, electric shock and injury.
- Information plates must always be clearly legible. Replace damaged or illegible plates immediately.
- Make sure that the dimension of the UPS (special safety power supply source), the generator set and the whole wiring is adequate. Abide by the relevant, applicable national and international standards. If there is 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.

2.5. Delivery conditions, guarantee, warranty and liability

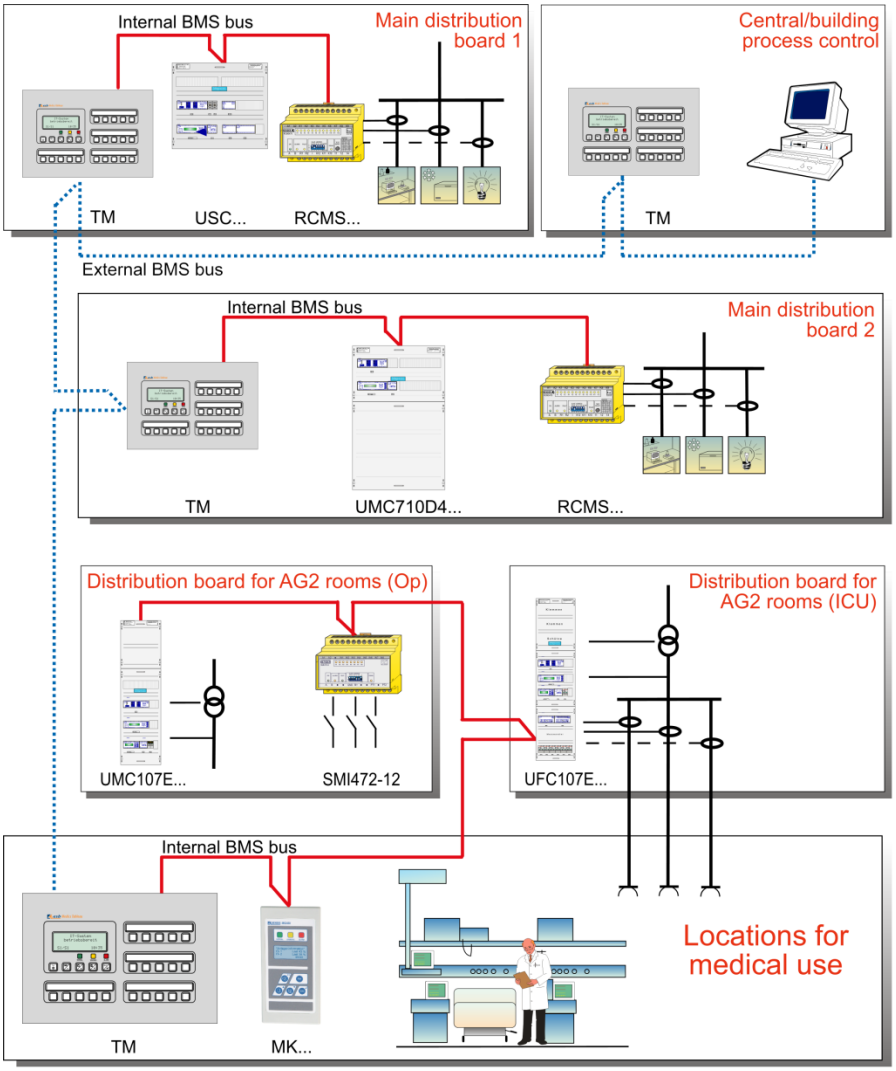
The conditions of sale and delivery set out by ***Bender*** GmbH shall apply.
Conditions of sale and delivery can be obtained from ***Bender*** GmbH in printed or electronic format.

3. System description

3.1. MEDICS®

The UFA710... change over and monitoring module is a part of the MEDICS® system. MEDICS® does not refer to a single product, but rather an intelligent system for safe power supplies in medical locations.

Example of a section of a hospital with the MEDICS® system



Legende zum Beispiel

MK...	Alarm indicator and test combination
RCMS...	Residual current monitoring system for TN-S systems
SMI472	Signal converter for third-party technical equipment (e. g. med. gases, UPS)
TM	Alarm and control panel
UFA710-2...	Change over and monitoring module ATICS® for IT-Systems
UMC107E..	Change over and monitoring module with contactors for IT-Systems
UFA710-2...	Change over and monitoring module ATICS® for IT-Systems with EDS... insulation fault location system.
UFC107E...	Change over and monitoring module for IT systems with EDS... insulation fault location system
UMC710D...	Changeover and monitoring module for main distribution boards
USC710D...	Control module for changeover modules (preferably in main distribution boards)

MEDICS® includes::

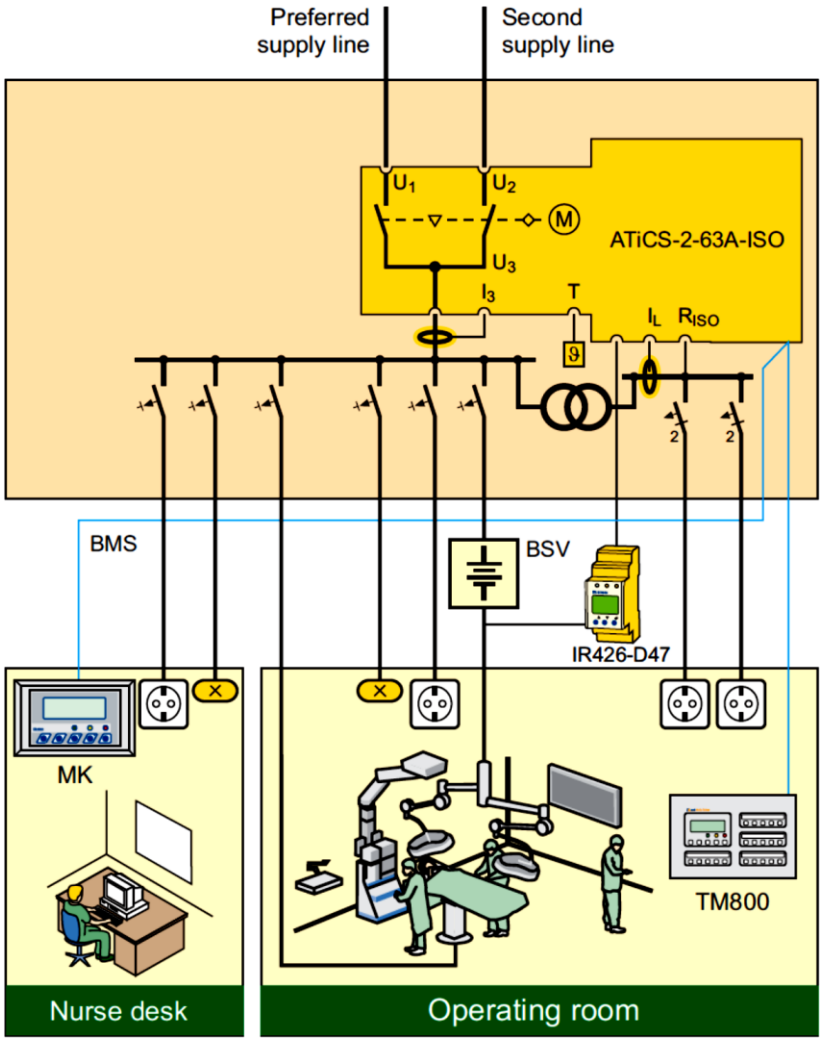
- AC and 3(N) AC changeover and monitoring modules. Examples of modules in the MEDICS® system include UMC..., USC..., UFC... and EDS.... insulation fault location systems.
- Display and operating units such as alarm indicator and operator panels or alarm indicator and test combinations.
- Communication between these components takes place via the BMS bus (two-wire connection).
- The connection of third-party technical equipment by means of protocol converters (gateways), via digital inputs and relay outputs.

The real strength of MEDICS® is to be found in communication between all involved components and the resulting information provided to the user. Readiness for operation is monitored constantly; and operating states, irregularities, faults and equipment failures are displayed. From the user's point of view, this means high operational reliability.

3.2. Example applications

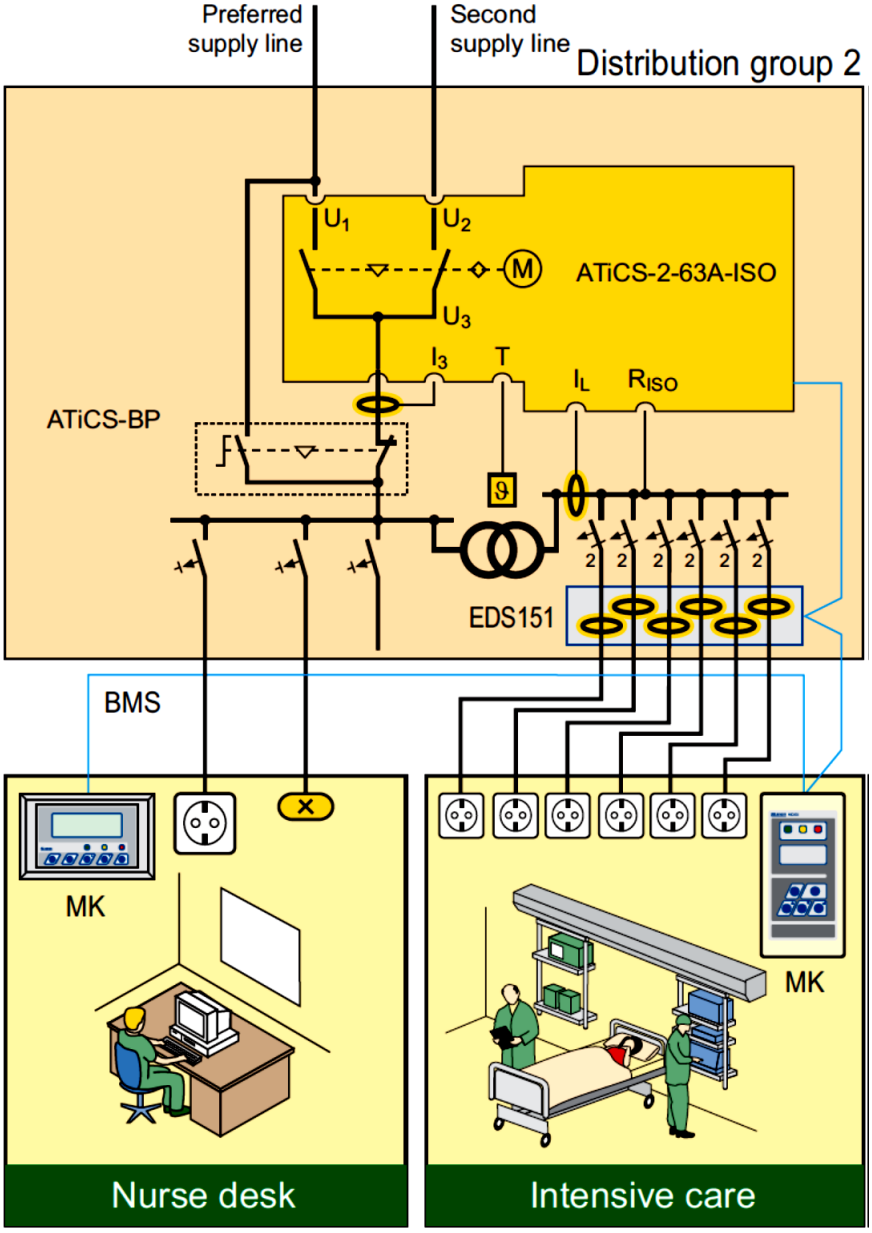
3.2.1. Example application operating theatre

- UMA710 Module, Changeover between the preferred and redundant line while monitoring the medical IT system with transformer load and temperature monitoring
- IR426-D47: Monitoring the operating theatre light IT system (optional)
- MK2430 / MK800 / TM800: Alarm for at least two points with independent power supplies for functional safety



3.2.2. Example intensive care unit

- UFA Module, Changeover between the preferred and redundant line while monitoring the
- medical IT system with transformer load and temperature monitoring including a bypass switch
- EDS151 Insulation fault locator for fast insulation fault location (recommended)
- ATICS-BP: Bypass switch for uninterrupted test / maintenance (recommended)
- MK2430 / MK800 / TM800: Alarm for at least two points with independent power supplies for functional safety



3.3. Features of the UFA710…

The ATICS® transfer switching device has the following features:

- Continuous monitoring of the internal electronic and the circuitry with automatic alarm
- Preventive safety due to an automatic reminder of mandatory testing procedures
- Maximum reliability of the switching
  - Patented switching system with mechanical and electrical interlocking
  - Short circuit proof contacts with the mechanic of a moulded case circuit breaker
  - Insensitive to voltage fluctuation and vibration due to stable switch position and permanent contact pressure
- Easy to use and a good overview due to a clear menu structure and user interface
- The right information at the right time with clear alarm text and a backlit graphic display as well as via the BMS bus
- Can manually be operated and can be locked for maintenance in position “0”
- Automatic logging of events e.g. switching, testing, parameter changes
- External functional test or replacement of the ATICS® via an optional bypass switch
- The ATICS® switch is pluggable
- Electronic and switching elements all in one enclosure respectively on a mounting rack
- Chang over and IT-System monitoring in one unit
- Insulation fault location system (EDS) for 6 ... 36 sub circuits
- Optional bypass switch
- Communication of components with one another via BMS bus
- Communication with remote alarm indicator and test combinations and TM alarm indicator and operator panels via BMS bus
- Can be used in systems in accordance with IEC 60364-7-710:2002-11, sections 556.5.2.2, 556.7 and 556.8 and DIN VDE 0100-710 (VDE 0100 Part 710):2002-11, section 710.564.6 with a changeover period = 15 s or = 0.5 s
- Functional Safety according to IEC 61508 for use in special safety environment according to SIL2
- Easy field wiring, completely prewired and type tested assembly

The UFA710 module is a configured unit and is only certified and tested in this assembly. Do not make any changes to the components, their password-protected settings or the wiring without consulting Bender first. In each case you should make the settings that are required for adaptation to the application case in question and local conditions.

3.4. The automatic changeover module UFA710…

3.4.1. The transfer switching device

If the preferred supply fails, the ATICS® ensures the power supply is changed over safely. The switch contacts are offset on a rotating shaft. This design prevents simultaneous switching of line 1 and line 2. The switch has three positions:

1 Line 1 switched on
0 Both lines switched off
2 Line 2 switched on

Either line 1 or line 2 can be set as the preferred line

- In the normal condition (fault-free operation) the preferred supply is connected. The ATICS® will switch 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 supply" is reconfigured to the other line

- The ATICS® switches from the redundant line back to the preferred line if
  – the voltage on the preferred line is restored
  - the return transfer delay time T(2->1) has expired and no switching back interlocking function is enabled
  - or immediately after pressing the "RESET" button or when the redundant line fails (even when the switching-back interlocking function is enabled)
  – the setting "Preferred supply" is reconfigured to the other line
  – the digital input is configured to "TEST" and this input is reset
  – a transfer switching device test is enabled and the test time has expired

- With the optional ATICS-ES energy storage device only: The ATICS® changes to switch position "0" and stays there if the following conditions are simultaneously met:
  – Line1 and Line 2 have failed
  – Automatic mode is set
  – No short-circuit is present downstream of the transfer switching device
  – The setting "Load disconnection" is set to "on" and the external ATICS-ES energy storage device is connected

May malfunction 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 Part 710) Section 710.537.6 automatic changeover devices (see also chapter "Commissioning, settings and testing").

The factory settings guarantee a changeover period of t = 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 ≤ 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 transfer switching device, the transfer switching device must not continually change back and forth between the two lines. This can occur when the short-circuit current is small and the transfer switching device switches faster than the short circuit breaker trips. The ATICS® monitors the load current downstream of the 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 change 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.

Typical time diagrams can be found in the following chapters of the ATICS® switch user manual TGH1443 issued by Bender GmbH.

TGH1443, chapter 3.5.1.1
Time diagram: Changeover between the preferred and redundant line
Example: Line 1 is set as the preferred line.

TGH1443, chapter 3.5.1.2
Time diagram: Staggered switching after total power failure
The external ATICS-ES energy storage device (optional, see "Ordering information") is required for the staggered switching. If there is no voltage on either of the power supplies, the ATICS® switches to position "0". When the power is restored, the ATICS® switches on the supply again with the set delay time T(start).
Example: Line 1 is set as the preferred line.

TGH1443, chapter 3.5.1.3
Time diagram: Changeover to generator mode

3.4.2. Insulation monitoring of the IT-System

Insulation monitoring
The integrated insulation monitoring device measures the insulation resistance on AC IT systems, which may also contain DC voltage components. Adaptation to the system leakage capacitances occurs automatically. The measuring time increases as the system leakage capacitances increase.

Load current measurement
The load current on the IT system is measured using an STW2 measuring current transformer.

Temperature monitoring
The temperature in the transformer winding is measured via PTC thermistors.

Evaluation
If any of the measured values does not fall within the limits, an alarm is triggered. A message 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.

Locating current injector
When an insulation fault is detected on an IT system, the integrated locating current injector generates a defined locating current signal to locate the insulation fault. The locating current is limited to 1 mA. This feature can be switched on or off (see chapter "7.4.4.4 Settings menu 4: IT system").

The locating current flowing between the IT system and earth can cause controller faults in sensitive parts of the system, such as the PLC or relay. It must therefore be ensured that the locating current is compatible with the monitoring

3.4.3. 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. The ATICS® also continuously monitors:

- The switch position of the switch and coils 1 and 2 of the switch
- Power supplies 1 and 2, which supply the electronics from the systems concerned
- Internal microcontrollers and memory modules
- Important connecting wires, such as:
  - Measuring current transformer connection
  - Temperature sensor connection
  - Power supply and PE connection
- For alarm and test combinations, and alarm indicator and operator panels, device failure monitoring can also be programmed via the BMS bus (necessary for functional safety).

On systems with generator: total power failure possible
If the preferred line fails, the ATICS® starts the generator which is 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. Therefore, regularly test the generator and the changeover function to make sure they are working properly (see checklist in the Appendix to this manual).

3.4.4. Power supply

The coils of the switching device 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 of redundant supply from the 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. Optionally, the external ATICS-ES energy storage device can be connected to supply the two coils and the electronic system. It is then possible to change over to switch position "0". If several ATICS® are installed on one system, they can be switched to the preferred line one-by-one starting from switch position "0" on voltage recovery. This prevents peak loads occurring which would otherwise occur if the lines of several transfer switching devices were switched on simultaneously.

3.4.5. Manual mode

In manual mode, changeover can be achieved using an Allen key. The changing over to switch position "0" can be locked with a padlock.

3.4.6. Bypass mode (optional)

By using the optional bypass switch (S1) the changeover and monitoring module can be set into the bypass mode. In this case the switch will bypass the ATICS® (N1) unit. The ATICS® switch can then be tested or replaced without power interruption downstream to the changeover and monitoring module.

Only skilled persons may work or operate the changeover and monitoring module. Skilled means, persons who are familiar with the assembly, commissioning and operation of the equipment and have undergone appropriate training. Such persons must have read this manual and understood all instructions relating to safety.
Please refer to the chapter “operation of the bypass mode”.

4. System components

In the appendix of this manual you will find the data sheets, technical manuals and further detailed information on all system components.

Description	Identification	Function
ATICS-2-xx-ISO	N1	Automatic changeover and monitoring unit, 63A or 80A nominal current including IT-system monitoring
CP-D24/0.24 (or AN410)	T1	Auxiliary power supply for remote alarm indicator MK-series
BV384213 (STW2)	T4	Measuring current transformer for the actual load current on transformer secondary
STW3	T3	Measuring current transformer for the total load current and to identify a short circuit condition
ES710…	ES710…	IT-System transformer, 3150VA upto 8000VA, According to DIN VDE 0100-710
Fuse	F1, F2,	Short circuit protection
MK2430-xx	MK2430-xx	for remote alarm indicator MK-series
EDS151	N21, (N22, …)	Insulation fault locator, mounted between or behind the branch circuit breaker
Bypass switch (optional)	S1	To bypass the load contacts of the ATICS® switch, with auxiliary contacts
E219-2CD48 (optional with bypass switch)	H1	indicator, red + green to indicate the bypass mode

The changeover and monitoring modules are designed to be mounted on DIN rails but can also be mounted on mounting plates.

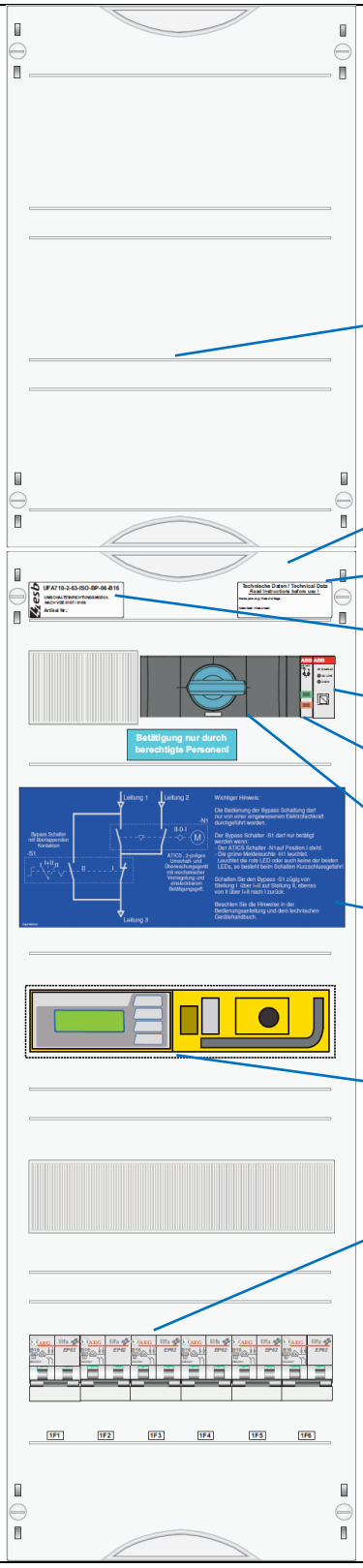
Multiple DIN rails are mounted on mounting racks of at least one vertical section of 250mm in width. Other mounting arrangements with multiple vertical sections are also possible.

Depending on the number of sections the DIN rails may also differ. E.g. a wall mounted enclosure with 6 DIN rails in one vertical section or a switchgear cabinet with 10 or 12 DIN rails per vertical and multiple sections in a free standing cabinet.

The following mounting racks will show some typical arrangements only.
The optional bypass switch is also being showed in these examples.

4.1. Front view of atypical UFA710-2-xx-ISO-BP-06-…

Example: front view UFA710-2-xx-ISO-BP-06… on a single section mounting rack by ABB/Striebel & John.



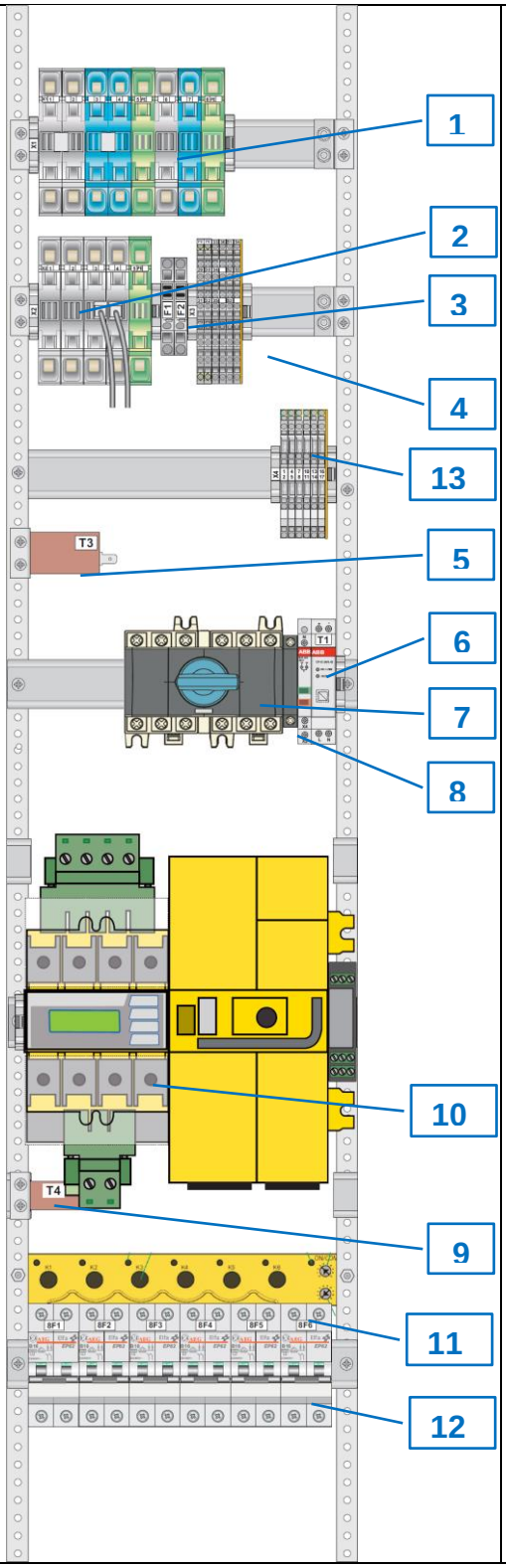
Legend

1. Cover of the terminal area
2. Cover with all mounted components
3. Label wth technical data
4. Type labled
5. Aux. supply, T1
6. indicator, H1 (optional), for bypass-circuitry
7. bypass switch S1 (optional)
8. label (optional), for bypass-circuitry with important operating instructions
9. automatic changeover and monitoring unit ATICS®, N1
10. branch circuit breaker, 2-pole (shown 6 only)

This is only an example of a typical mounting rack arrangement only. Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing.

4.2. Typical mounting arrangement UFA710-2-xx-ISO-BP-06-…

Example: UFA710-2-xx-ISO-BP-06… on a single section mounting rack by ABB/Striebel & John.



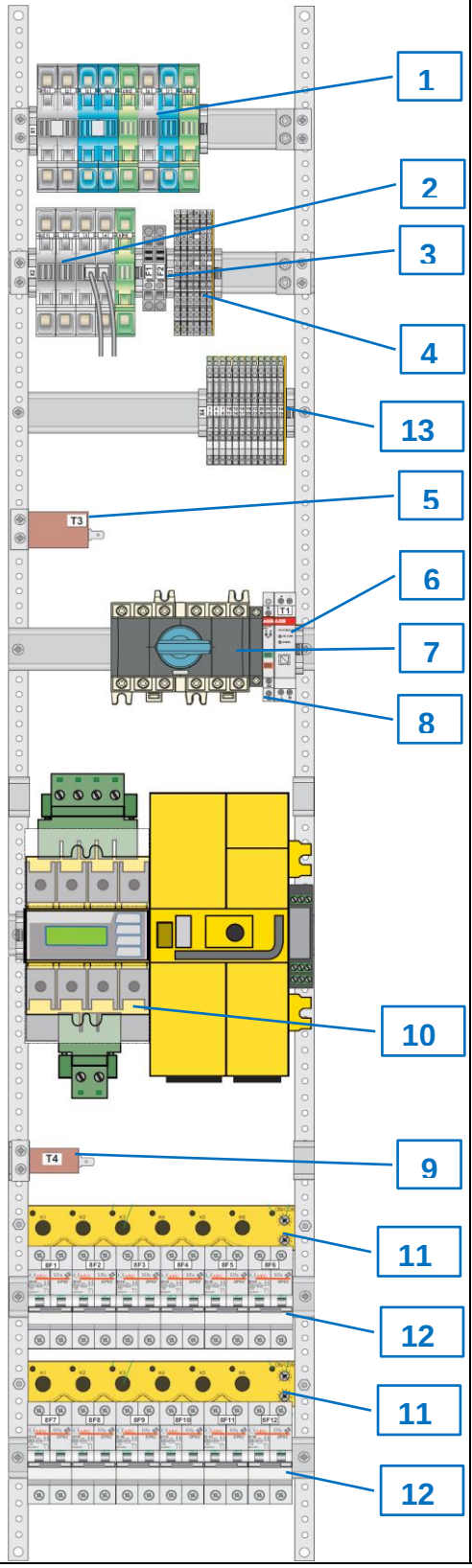
Legend

1. terminals X1, in-coming
2. terminals X2, IT-System transformer
3. fuses, F1, F2 (see also chapter 7.3)
4. terminals X3, interfacing
5. measuring current transformer T3 (for load current monitoring)
6. aux. supply T1, DC 24V
7. bypass switch S1 (optional)
8. indicator H1 (optional), for bypass circuitry
9. current transformer T4 (for short circuit detection)
10. automatic changeover and monitoring unit ATICS®, N1
11. N21, Insulation fault locator EDS151, 6 channels
12. branch circuit breakers, 2-pole, F1…F6 (shown 6 only)
13. terminals X4, out-going from breakers

This is only an example of a typical mounting rack arrangement only. Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing.

4.3. Further typical mounting arrangements

UFA710-2-xx-ISO-BP-12-…
Example: UFA710-2-xx-ISO-BP-12… on a single section mounting rack by ABB/Striebel & John.

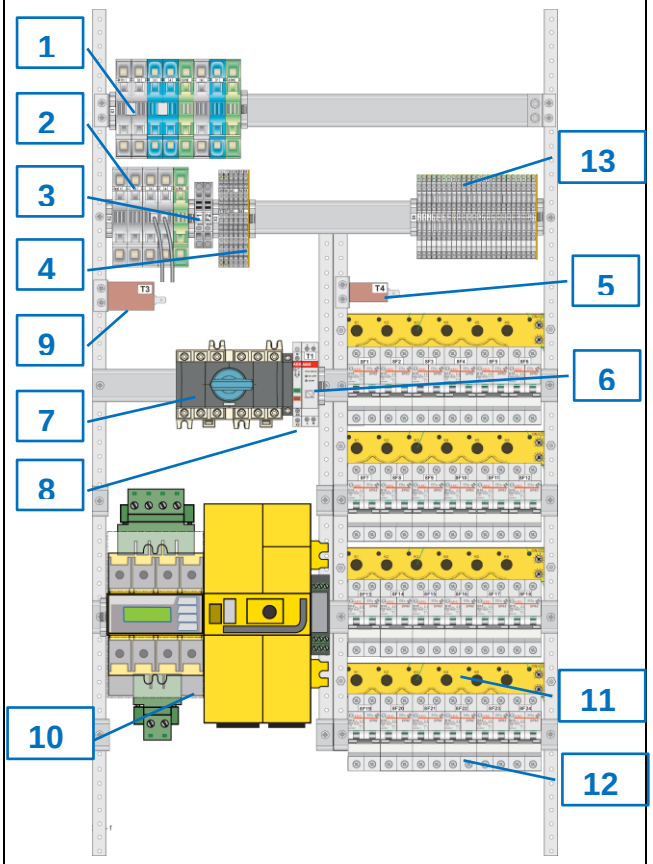


Legend

1. terminals X1, in-coming
2. terminals X2, IT-System transformer
3. fuses, F1, F2 (see also chapter 7.3)
4. terminals X3, interfacing
5. measuring current transformer T3 (for load current monitoring)
6. aux. supply T1, DC 24V
7. bypass switch S1 (optional)
8. indicator H1 (optional), for bypass circuitry
9. current transformer T4 (for short circuit detection)
10. automatic changeover and monitoring unit ATICS®, N1
11. N21, Insulation fault locator EDS151, 6 channels
12. branch circuit breakers, 2-pole, F1…F12 (shown 12 only)
13. terminals X4, out-going from breakers

This is only an example of a typical mounting rack arrangement only. Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing.

UFA710-2-xx-ISO-BP-24-…
Example: UFA710-2-xx-ISO-BP-12… on a double section mounting rack by ABB/Striebel & John.

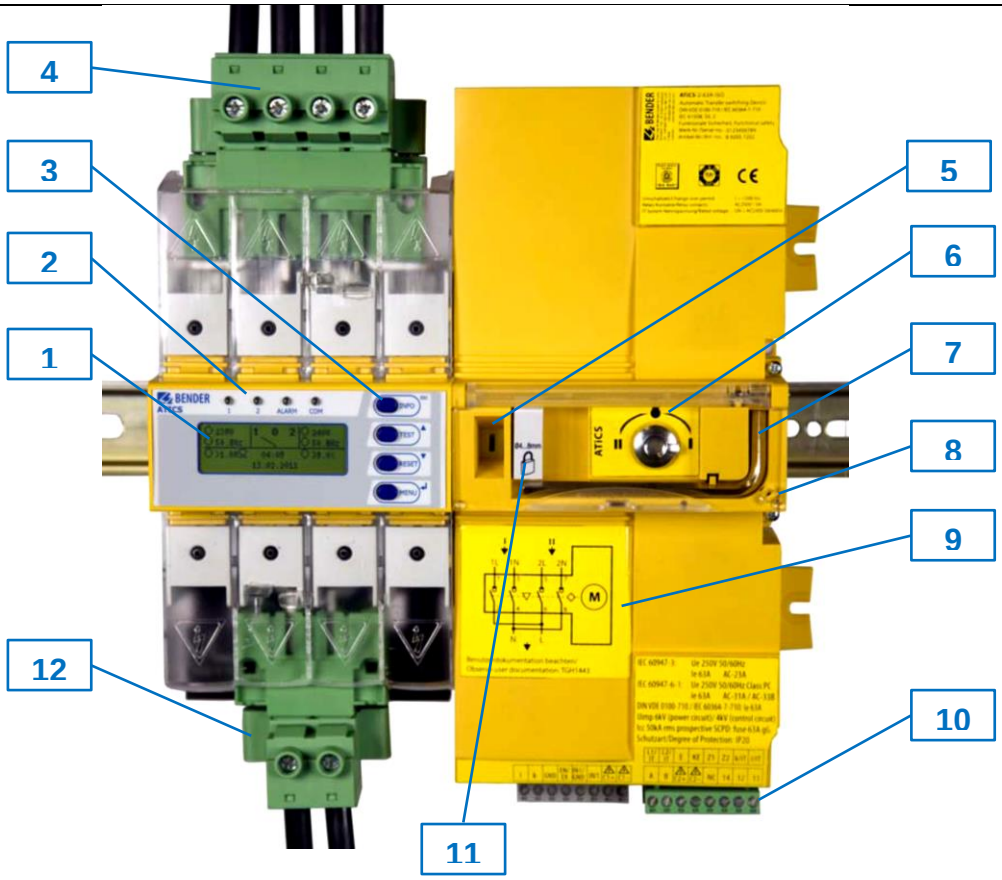


Legend

1. terminals X1, in-coming
2. terminals X2, IT-System transformer
3. fuses, F1, F2 (see also chapter 7.3)
4. terminals X3, interfacing
5. measuring current transformer T3 (for load current monitoring)
6. aux. supply T1, DC 24V
7. bypass switch S1 (optional)
8. indicator H1 (optional), for bypass circuitry
9. current transformer T4 (for short circuit detection)
10. automatic changeover and monitoring unit ATICS®, N1
11. N21, Insulation fault locator EDS151, 6 channels
12. branch circuit breakers, 2-pole, F1…F24 (shown 24 only)
13. terminals X4, out-going from breakers

This is only an example of a typical mounting rack arrangement only. Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing.

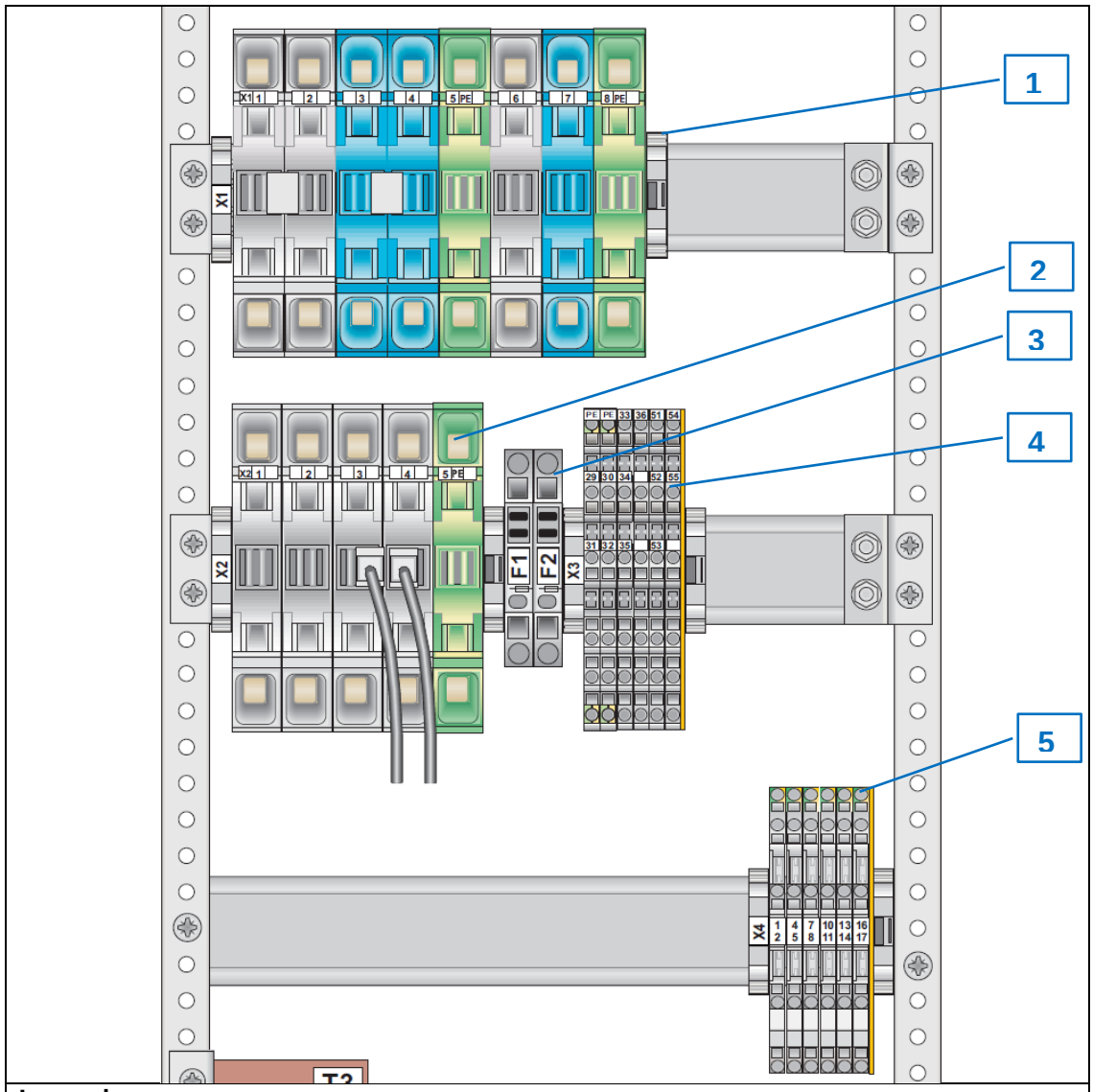
4.4. Automatic changeover and monitoring unit ATICS®



1. LCD Display, indication of status, and alarm messages and user menu 2. Status and alarm-LEDs 3. Push buttons/controls 4. green terminal plug, connection of line 1 and 2 5. inspection window for the switch position 6. manual operation of the ATICS® switch showing also the switch position 7. Allen key wrench for manual operation	8. transparent cover for the changeover switch (when opened in manual mode) lead-sealable 9. wiring schematic for line 1, 2 and 3 10. three coded connector plugs 11. latch for a patch lock to lock-up in position 0 12. green terminal plug, connection of line 3

For mounting and connection of the changeover and monitoring unit ATICS® read chapter 4 of the technical user manual TGH1443

4.5. Typical terminal setup



Legend

1. In-coming terminals X1
2. IT-System transformer terminals X2
3. F1, F2: fuses (see also chapter 7.3)
4. Interfacing terminals X3
5. Out-going branch circuit breaker terminals X4

This is only an example of a typical mounting rack arrangement only. Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing.

5. Installation of UFA710-2-xx-ISO-xx-…

5.1. Safety Advice

The safe use of this electrical equipment implies that it has been wired-up and commissioned by electrical skilled personnel.

Only skilled persons may work on this module. Skilled means, persons who are familiar with the assembly, commissioning and operation of the equipment and have undergone appropriate training. Such persons must have read this manual and understood all instructions relating to safety.

- The latest standards and regulations have to be followed.
- The national safety and accident prevention regulations have to be followed.
- The power has to be turned off before working on this electrical equipment.
- Precautions have to be made that the equipment can not be turned back on by accident.
- The connection/wiring is only allowed in compliance to the wiring diagram and its comments.

If the comments and wiring diagrams are not being followed, the wiring been changed or not recommended accessory is being used, injury, fire, electrical shock and other damage can occur.

The unique and individual wiring diagram and elevation drawings of this module as well as the data sheets of the installed components, are also part of this operation manual and must be carefully read as well.

5.1.1. Short circuit protection

Please observe the requirements of IEC 60364-7-710:2002-11 and DIN VDE 0100-710 (VDE 0100 Part 710) when selecting fuses for the supply cables and outgoing circuits of the changeover modules:

- Section: 710.512.1.6.2 (VDE), sections 710.5.3.1, 710.512.1.6 (IEC), Transformers for the IT system: Where transformers, their primary supply conductor and secondary outgoing line are concerned, overcurrent protective devices are only permitted for short-circuit protection. The transformer supply cable from the changeover module and the transformer outgoing cable to the next distribution board section should be laid so that they are short-circuit proof and earth fault proof. Recommended cable/wire: Halogen-free, flexible single core, double insulated rubber wire type NSHXAFö 1.8/3kV.

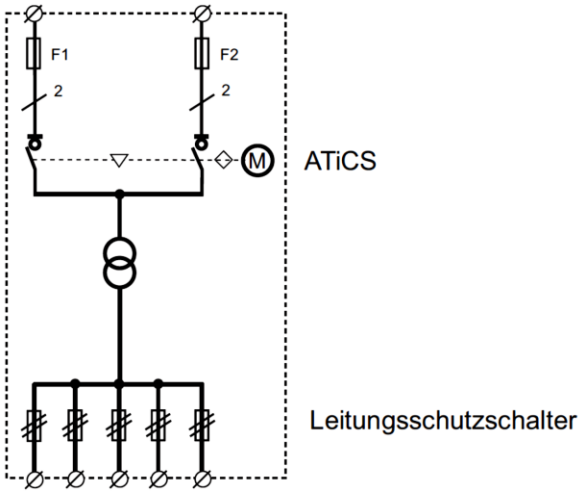
- Section: 710.53.2 (VDE), section 710.413.1 (IEC), Protection of the cable system in Group 2 locations: The choice of protective devices must ensure that when the anticipated short-circuit current occur, the protective device upstream of a fault will selectively trip the protective devices that are further upstream.

- Section 710.537.6.2. (VDE), section 710.413.1.1 (IEC), Connecting several load groups downstream of a changeover module must not lead to all the load groups failing in the event of a fault. As a result, the choice of fuses F should ensure both short-circuit protection for the transformer and selectivity for the overcurrent devices connected downstream in the IT systems

When selecting fuses, please observe both the maximum permissible values laid down by the guidelines that apply to the location of use and national and international standards, in order to ensure that the contactor contacts cannot weld. The considerations presented below are based on the standard DIN VDE 0100-710 (VDE 0100 Part 710):2002-11, section 710.537.6.

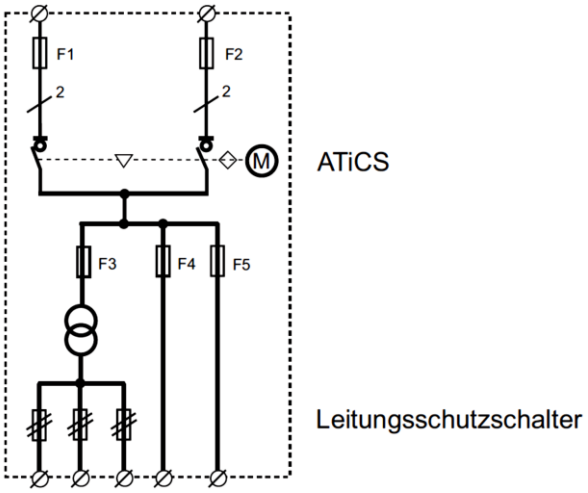
Selecting the fuse with one consumer only.

- The circuitry has only one consumer (IT-System transformer)
- The minimum rating of the fuse has to be given by the transformer manufacturer
- The nominal current of the ATICS® unit must be higher or at least equal to the nominal current of the IT-system transformer.
- The maximum possible fuse F1 and F2 up-stream is given by the technical data of the ATICS® unit



Selecting the fuse with more than one consumer.

- This circuitry branches off in multiple consumers. This implies that there is a fuse for each consumer behind the ATICS® unit.
- Nevertheless the maximum possible fuse F1 and F2 up-stream is given by the technical data of the ATICS® unit.
- The fuse F1 and F2 must be selected that there is a discrimination to the fuses F3, F4 and F5.
- Therefore the fuse F3 must be at least two ranges lower than the ATICS® nominal current.
- The total current of the changeover arrangement is the total expected load current of all connected consumers.



5.2. Changeover module

5.2.1. Typical connection

Connect the changeover module to the typical terminals:

Function	Terminal description
Preferred supply line, line 1 *)	Phase, L = X1:1 Neutral, N = X1:3 Earth, PE = X1:5PE
Second supply line, line 2 *)	Phase, L = X1:6 Neutral, N = X1:7 Earth, PE = X1:8PE
IT-System transformer *)	Primary, L = X2:1 Primary, N = X2:2 Secondary, L1 = X2:3 Secondary, L2 = X2:4 Shield, PA/S = X2:5PE Temperature monitoring X3:36+37
Remote alarm indicator, control panel (MK2430-xx, MK800-xx)	Internal BMS-Bus, A = X3:29, B = X3:30 Internal BMS-Bus, A = X3:31, B = X3:32 The terminals can also be used to terminate the bus with a 120ohm resistor. Shield S = PE (The shield shall be earthed on one side of the cable only.) Aux. Supply voltage, +24V = X3:33, 0V = X3:34
Alarm contact	Volt-free changeover contact, X3:51, 52, 53 (programmable)
„Bypass ON“ contact	Volt-free N.O. contact, X3:54, 55 (optional, for bypass only)
Alarm and control panel (TM, FM, TCP)	Aux. supply voltage AC 230V, L1 = X3:61+63, L2 = 62+64, PE
IT-System branch circuits	Terminal block X4

*) Select the cross section according to the applicable national and international standards.
(e.g. DIN VDE 0100 part 430)

Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing

5.2.2. Wiring diagram UFA710-2-xx-ISO, …-BP

The complete wiring diagram can be found in the appendix of this manual.

Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing

5.3. Notes for connecting the module

On any of the below please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing.

5.3.1. Transformer

The power supply of Group 2 location is supplied via an isolating transformer. For protection against indirect contact, one of the following measures is to be used for the transformer:

- Protective insulation according to DIN VDE 0100-410 (VDE 0100 Part 410):2007-06, 413.2 (Use of a protection class II transformer)
- Protection by non-conductive location according to DIN VDE 0100-410 (VDE 0100 Part 410):2007-06, section 413.3
- Protection by a local, earth-free equipotential bonding according to DIN VDE 0100-410 (VDE 0100 Part 410):2007-06, section 413.4
- Protection by special installation. For this measure, please note the following:
  - The protection class I transformer must be installed isolated and must not be connected to the PE conductor. In Bender's ES710 range of transformers, the fixing angles are isolated from the transformer core.
  - A warning label is to be affixed to the transformer and its cover as follows: **Warning! Accessible parts of the transformer may be live. You must always verify that there is no voltage present before touching parts of it.**
  - The transformer is to be installed behind a cover, which can only be opened using a tool or a special key. It must only be accessed by skilled persons.
  - The shield winding can be connected to the PE conductor. It must be ensured that the connecting wire is installed so that it is short-circuit proof and earth-fault proof.

5.3.2. Temperature sensor

Bender IT system transformers are equipped with the temperature sensors required according to their insulation class. These temperature sensors (maximum of 6 sensors connected in series) are connected to terminals X3:35 to Z1 and X3:36 to Z2.

5.3.3. Out-going branch circuit breakers

The UFA module are equipped with 2-pole branch circuit breakers to provide the IT-System supply. The load circuits can be connected to terminal block X4. Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing.

5.3.4. Remote alarm indicator

Ex works, the following pairs of terminals are provided for the connection of BMS bus devices:
X3:29 for A and X3:30 for B, X3:31 for A and X3:32 for B
Remote alarm indicator, control panels and other Bender-BMS-bus devices can be connected to these terminals.

1. A BMS device or an existing BMS bus with several devices is connected to terminals X3:29 and X3:30: The last device at the other end of the bus must be terminated with 120ohm. Terminals

X3:31 and X3:32 remain terminated.

2. An existing BMS bus that has already been terminated on both ends, is disconnected; one open branch is connected to terminals X3:29 and X3:30, while the other one is connected to terminals X3:31 and X3:32: The 120 Ω resistor, provided ex works, must be removed and the open bus branches must be connected to the specified terminals.

Please read the information on cable routing in the "BMS bus" instruction leaflet as well as the individual, job or project related BMS bus wiring schematic if applicable.

The power supply unit T1 (DC 24V, 420mA) can supply power to a maximum of three MK2430 alarm indicator and test combinations via the terminals X3:33 =+24V and X3:34=0V. In this respect, please refer to the documentation for the relevant devices. The power supply unit T1 is not suitable for supplying power to TM... operator panels. Alarm and control panels /e.g. TM, FM, TCP series) can be supplied via the 230V terminals X3:61, 62, 63, 64 (where applicable).

5.3.5. Building management and SCADA system

If messages from the UFA changeover and monitoring module are to be transmitted to a SCADA system, you have the following options:

- Protocol converter (Gateways)
- OPC-Server
- Common alarm via the relay outputs of the ATICS® unit
- Conversion between BMS bus and digital inputs and outputs by means of alarm indicator and operator panels (e.g. TM, FM, TCP) or signal converters (e.g.SMO480-12, SMO482-12, SMI 472-12).

5.3.6. Insulation fault locator EDS151

The EDS151 insulation fault locator is designed for the application in medical locations to localise insulation faults in AC, AC/DC and DC IT systems. The locating current required for insulation fault location is provided by the ISOMETER® isoMED427P or the ATICS® transfer switching device or the locating current injector PGH474. The EDS151 is equipped with six measuring current transformers and will detect/evaluate the injected locating current. Multiple EDS151 can be used at the same time.

5.3.7. Bypass-switch (optional)

By using the optional bypass switch (S1) the changeover and monitoring module can be set into the bypass mode. In this case the switch will bypass the ATICS® (N1) unit. The ATICS® switch can then be tested or replaced without power interruption downstream to the changeover and monitoring module.

Only skilled persons may work or operate the changeover and monitoring module. Skilled means, persons who are familiar with the assembly, commissioning and operation of the equipment and have undergone appropriate training. Such persons must have read this manual and understood all instructions relating to safety.

Please refer to the chapter “operation of the bypass mode” of this manual.

6. Commissioning, settings and testing

6.1. Design and installation notes

Note for the design:

- During installation and connection, abide by the relevant standards and regulations and follow the operating manuals for the device.
- Provide for MK… alarm indicator and test combinations or TM… alarm indicator and operator panels at least two places. These show messages from the ATICS® transfer switching device and monitor one another for failure.
  Example of locations for the MK… or TM… in a hospital:
  - Medical locations
  - Continuously manned area (e.g. nurse service area)
  - Technical area
- Provide a fail-safe power supply for the MK… or TM… or TCP
- 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 the medical field is supplied from line 3 of the transfer switching device.
  The MK… in the technical area is supplied from a fail-safe battery-backed line..

Notes on parameter settings:
MK… resp. TM…or TCP must display at least the following faults detected by the ATICS®:

- Failure line 1, failure line 2
- Device error, device failure ATICS®
- Failure of the other MK… or TM… or TCP
- Insulation fault, overload, over temperature of the IT-System
- EDS channels with circuit and/or room name (where applicable)
- Device error with complete text or error code

An overview of the ATICS® messages on the BMS bus (channel use) can be found in the technical user manual TGH1443.

6.2. Setting and testing according to the checklist

The settings made at the factory take into account a total changeover period t ≤ 0.5 s and switching back to the preferred supply within 10 seconds on voltage recovery.
Typical time diagrams can be found in the following chapters of the ATICS® switch user manual TGH1443 issued by Bender GmbH.
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 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 Part 710) Section 710.537.6 (automatic changeover devices):

- 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 on the checklist. Please carry out all the work outlined in the list and log each test step. The checklist can be found in the attached documentation. Keep the checklist with this manual in the vicinity of the device.

6.3. Avoiding errors

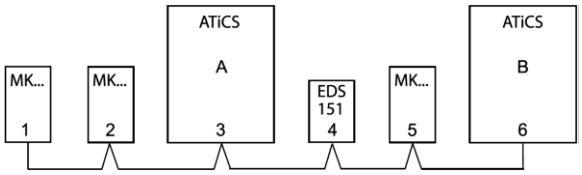
Risk of missing or false messages on the display on MK… , TM… or FTC…
MK… alarm indicator and test combinations, TM… alarm indicator and operator panels or FTC… protocol converters or BMS Ethernet gateways COM460IP, which, together with an ATICS®, are connected to a BMS bus must be loaded with the latest operating software (e.g. MK800/TM800 V 4.0 or higher, MK2430 V3.0 or higher). Older MK…, TM… or FTC… cannot interpret the alarms of the ATICS®. They must either be updated or replaced.
The TMK-SET configuration software must also be the latest version.

Communication via the BMS bus can only be guaranteed when there is only one terminating resistor at the beginning and the end of the BMS bus. Additional terminating resistors can lead to malfunctions and therefore must not be used.
Please also note the information in the "BMS bus" instruction leaflet.

6.4. Example on how to set the addresses

Please also note the information in the "BMS bus" instruction leaflet.

Two ATICS® units and multiple remote alarm indicators and fault location:



Unit	Parameter	Address setting
ATICS® for area A	Bus- Address	3
first MK… (central monitoring)	Address	1
	Test- Address	3, 6
	Alarm- Address	2*, 3, 4**, 5, 6
second MK… for area A	Address	2
	Test- Address	3
	Alarm- Address	1*, 3, 4**
EDS151	Bus- Address	4
ATICS® for area B	Bus- Address	6
first MK… for area B	Address	5
	Test- Address	6
	Alarm-Address	6

* These alarm addresses are required to monitor each other.
** Each EDS channel shall be programmed individually to identify the branch circuit and the room in which the load is being supplied.

6.5. Operation of the ATICS® unit

A brief commissioning instruction for the skilled personal is enclosed with the documentation. Please refer to the document TKA1443. For detailed instruction of the changeover and monitoring unit ATICS® read the technical user manual TGH1443.

6.6. Use of the bypass circuitry (optional)

By using the optional bypass switch (S1) the changeover and monitoring module can be set into the bypass mode. In this case the switch will bypass the ATICS® (N1) unit. The ATICS® switch can then be tested or replaced without power interruption downstream to the changeover and monitoring module.
Next to the bypass switch S1 is a green and red indicator H1 as well as the auxiliary power supply T1.

The green indicator is showing that the ATICS® unit is in position “I”. Only if the green indicator is ON the bypass circuitry can be operated. In a fault free condition line 1 is in use and voltage is applied.

The bypass switch S1 must be operated only if:

- - The ATICS® switch N1 is on position “I”
- - The green indicator H1 is ON.
- - If the red LED is ON or both are OFF there is a risk of short circuiting the supply.

Warning

The bypass switch must not be operated if the green indicator is OFF !
A failure to observe this may result in a short circuit when switching S1 to position “I+II” and may result in the loss of power to the connected loads.

Important instruction:

- If a power failure of line 1 occurs while the switch S1 is set to bypass mode in position “II” the switch must not be operated again! In this case the ATICS® unit must be manually switched to position “0” using the Allen key wrench.
- Before the clear cover of the ATICS® unit is being firmly closed the bypass switch S1 has to be set to position “I” again. If this instruction is not being followed the ATICS® will automatically changeover to line 2 as soon as the cover is being firmly closed. Closing the clear cover will activate the automatic mode of the ATICS® unit.

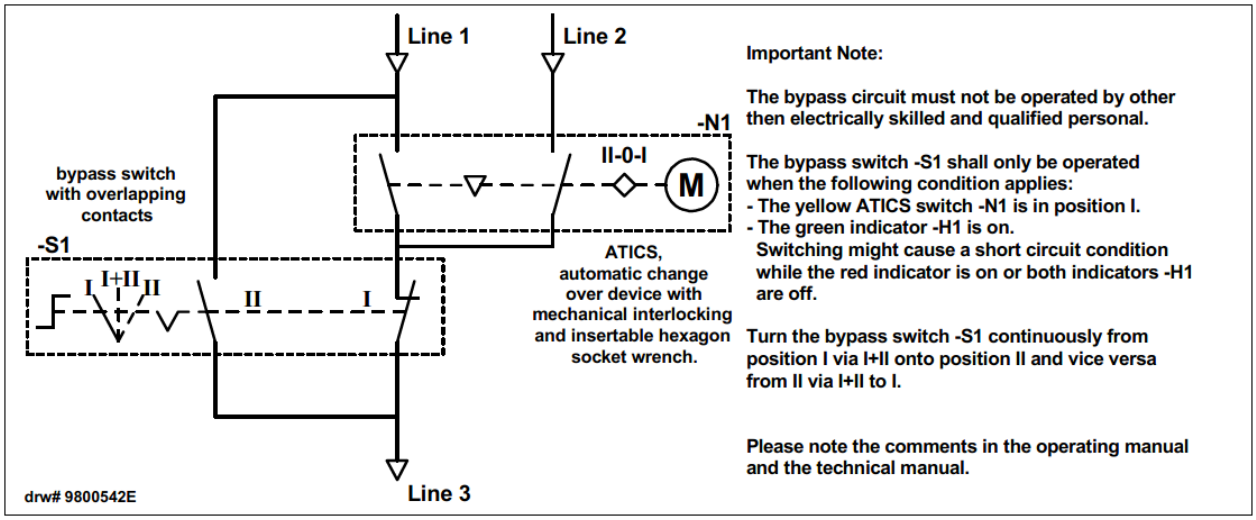
After each and every switching operation the normal operating condition has to be verified and logged in a protocol.

Only skilled persons may work or operate the changeover and monitoring module. Skilled means, persons who are familiar with the assembly, commissioning and operation of the equipment and have undergone appropriate training. Such persons must have read this manual and understood all instructions relating to safety.

Turn the bypass switch continuously from position “I” via “I+II” to position “II” to bypass the ATICS® unit. Turn the bypass switch continuously from position “II” via “I+II” to position “I” to run the ATICS® unit again in the none-bypass/normal mode.

The time in which the bypass is active in position “II” must be minimized.

Before operating the bypass circuitry note the instruction on the blue label on the cover:



7. Troubleshooting

7.1. Fault and alarm messages ATICS®

If a fault occurs, the message 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 fault messages
- Fault messages with error code or service code

7.1.1. Alarm messages:

Fault/message	Description	Action
Failure Line xx (xx stands for: 1, 2, AV, SV, UPS, BSV), Under voltage 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 on the system - Check the setting for voltage and hysteresis
Failure Line 2	Generator delivers no voltage within the set time	- Measure voltage on line xx - Check cause - Eliminate fault on the system - Check the setting for voltage and hysteresis
Insulation fault	IT-System insulation/earth fault	- Look for insulation fault - Eliminate fault on the system
Overload	Current consumption too high	- Check setting for transformer load current - Switch off any loads which are not urgently needed
Over temperature	Temperature on the IT system transformer is too high	Switch off any loads which are not urgently needed
CT connection	Measuring current transformer STW2 (T4), isolating transformer load, channel 10	- Check connecting wire of measuring current transformer
CT short-circuit	Measuring current transformer STW2 (T4), isolating transformer load, channel 10	- Check connecting wire of measuring current transformer
Mains power connection	Connection to the IT system interrupted or voltage in the system being monitored below 150 V	- Check connection of ports L1/IT, L2/IT to the IT system - Check voltage in the IT system
Earth connection	Connection to PE interrupted	Check that the E and KE are connected to the protective earth conductor by two separate lines on.
Device error + Error code	For details about actions to be taken refer to table section "Error code/service code". 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 changeover switch defective	Replace the ATICS®
Overcurrent I3	Overcurrent detected by measuring current transformer STW3 (T3)	- Eliminate the cause of overcurrent - Eliminate any damage
CT connection	Measuring current transformer STW3 (T3), channel 7	- Check connecting wire of measuring current transformer

CT short-circuit	Measuring current transformer STW3 (T3), channel 7	- Check connecting wire of measuring current transformer
No Master	There is no device with master function (device with address "1") or backup master available on the RS-485 interface	- Check BMS bus connection cable. - Check whether master has failed or whether its address has changed
Service __ (date)	Reminder for next service	- Agree date with Bender Service
Test __ (date)	Reminder for next test	- Plan date for test - Carry out test
Manual mode	Message "Manual mode" although manual mode has not been activated	- Check the connections of the digital input
Error during the changeover process	When the test set-ups do not supply enough current for switching the coils of the ATICS	- Only use test set-ups that provide the necessary peak current.

7.1.2. Messages with Error Code or Service code

Error Code/ Service code	Description	Action
1.xx, 9.xx	Fault message from the internal memory monitoring	- Contact Bender-Service
3.11	Max. number of hours exceeded	- Plan device replacement Alarm can be cancelled "Reset menu 3: Changeover" see the technical manual TGH1443.
3.12	Max. number of changeovers exceeded	- Plan device replacement Alarm can be cancelled "Reset menu 3: Changeover" see the technical manual TGH1443.
3.13	Changeover due to overcurrent or short circuit. These changeovers reduce the life of the device. Currents which are measured in excess of 150 times the rated current are evaluated as over currents or short-circuit currents	- Have personnel assess the short-circuit load. Contact Bender Service. Alarm can be cancelled see the technical manual TGH1443
3.5	Service has been carried out. This is not a fault message. Display only on service logger	- No action required
6.xx, 7.xx, 8.xx	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 … 8.66	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.	- RESET -> execute alarm, - then test the changeover function. - If fault persists: replace the device. - Only use test set-ups that can supply the necessary peak current

In case a failure occurs, proceed as follows:

1. Activate manual mode, if necessary. (refer to the technical manual TGH1443)
2. Make a note of what happened prior to the fault: operator inputs, device error messages, environmental conditions, etc.
3. Keep the device type, article and device serial number of the ATICS® to hand.
4. Keep the **project number, job number and drawing number,** according to the type label of the changeover module or the ***Bender*** switchgear cabinet to hand.
5. Speak to Bender Service, describe the type of fault and quote the three-digit error code

Please read the chapter „Frequently asked questions“ of he technical manual TGH1443 by Bender.

7.2. Replacements

7.2.1. Replacing the ATICS® unit

Replacing the ATICS® unit might be necessary if:

- ATICS® has reached the end of life time or
- an event has occurred which jeopardises safety: e.g. overvoltage, switching if there is a short circuit or component failure.

If a replacement of the ATICS® unit is necessary after consulting our service or commissioning department the technical manual TGH1443 by Bender must be read first.

Only skilled persons may work or operate the changeover and monitoring module. Skilled means, persons who are familiar with the assembly, commissioning and operation of the equipment and have undergone appropriate training. Such persons must have read this manual and understood all instructions relating to safety.

Danger to life caused by electric shock !
While touching electrically live parts the risk of electrical shock exists.
Make sure that no voltage is being present before working on any electrical connection.

- The latest standards and regulations have to be followed.
- The national safety and accident prevention regulations have to be followed.
- The power has to be turned off before working on this electrical equipment.
- Precautions have to be made that the equipment can not be turned back on by accident.
- The connection/wiring is only allowed in compliance to the wiring diagram and its comments.
- If the comments and wiring diagrams are not being followed, the wiring been changed or not recommended accessory is being used, injury, fire, electrical shock and other damage can occur.
- If the ATICS® is being bypassed by the bypass switch S1, special precautions have to be complied with in accordance to the national and international standards for working under electrically live conditions.

7.2.2. Replacing the ATICS® unit when a bypass switch is installed

With the bypass switch S1 the out-going line 3 can be supplied without interruption and the ATICS® unit can be replaced. The same precautions apply as written in the previous chapter above.
The chapter “Use of the bypass circuitry” must read as well.

The bypass switch must not be operated if the green indicator is OFF !
A failure to observe this may result in a short circuit when switching S1 to position “I+II” and may result in the loss of power to the connected loads.

Conditions and settings of the ATICS® unit for the use of the bypass switch S1:

- The wiring must be done in accordance to the provided wiring diagram:
- In the menu of the ATICS® unit under menu „4. settings“ and under menu „6. Dig. input" the following settings have to be made:
  - „1. Function" Bypass
  - „2. Voltage“ 0V
  - „3. T(on)“ 100ms
  - „4. T(off)“ 100ms
- Note the bypass label.

The green plugs of the ATICS® unit must be held on the isolated part only. A failure not to do this will result in danger of electric shock.

7.3. Fuses F1, F2

The changeover and monitoring module UFA is equipped with two fuses (F1, F2) as a short circuit protection of the ATICS® unit.

If one of the fuse is tripped, there may be a defect in the changeover module. These fuses should only be replaced after consulting the Bender Service department.

Technical data of the fuses	
Tripping current	4A, slow acting
Breaking capacity	10kA
ELU Type	189140
Dimensions	6,25 x 32mm

Optional the changeover and monitoring module UFA can be equipped with an additional 2-pole circuit breaker F3. This breaker protects an 230V auxiliary output for supplying alarm and control panels (e.g. FM-, TM-, TCP-series) An overload or short circuit situation will trip this breaker. The 230V auxiliary output is provided on terminal X3:61, 62, 63, 64.

Please refer to the attached individual, job or project related documentation like wiring diagram and elevation drawing.

8. Periodic verification and Service

8.1. Periodic verification

The following periodic verification must be performed on electrical installations in compliance with the local or national regulations that apply. We recommend for your Bender products:

Test	To be performed by	Interval
Functional test of IT system monitoring (insulation, load current, transformer temperature and connection monitoring) by pressing the TEST button on the remote alarm indicator or on the alarm and control panel.	Medical personnel	once every working day
Functional test of the changeover module***)** Test of the automatic changeover modules. Please observe the information in chapter "Testing the changeover module"!	Skilled person	every 6 months
Functional test of the IT system monitoring ***)** (insulation, load current, transformer temperature and connection monitoring) on the insulation monitoring device.	Skilled person	every 6 months
Testing the set values and the changeover periods ***)**	Skilled person	every 12 months
Testing of the changeover module***)**, the IT system monitoring***)**, the connection to the SCADA system ***)** (Supervisory Control And Data Acquisition) if applicable and the interaction of the components in the system. This test includes the following services: - Inspection: Marking, display elements, mechanical components, wiring, parameterisation, connection of third-party equipment, evaluation of fault memory - Measurement: Internal/external supply voltages/potentials, bus voltage, bus protocol, bus scan - Practice test: Device function, device communication - Documentation: Test results, recommendations for remedial action	Bender-Service	every 24 months

***)** This test must only be performed by an electrically skilled person who has been commissioned to do so in agreement with the person responsible for the medical location

Before carrying out the tests, please refer to the instructions relating to the functional tests in the attached checklist.

If no national directives apply, you should perform the tests recommended by IEC 60364-7-710:2002-11, section 710.62 and DIN VDE 0100-710 (VDE 0100 Part 710):2002-11, section 710.62.

8.2. Commissioning and service

For on-site commissioning of the changeover and monitoring module or switchgear systems by ***Bender*** contact:

Bender GmbH
Londorferstraße 10 • 35305 Grünberg • Germany
Tel: +49 6401 807-0 • Fax: +49 6401 807-259

E-Mail: info@Bender.de • www.Bender.de

For the periodic verification of the changeover and monitoring module or switchgear systems by the Bender Service department contact:

Service-Hotline:
0700-BenderHelp (Telefon and Fax)

Bender GmbH
Carl-Benz-Straße 10 • 35305 Grünberg • Germany
Tel: +49 6401 807-760 • Fax: +49 6401 807-629

E-Mail: info@bender-service.com • www.bender-de.com

8.3. Maintenance

The changeover and monitoring module does not contain any parts that require maintenance. Despite this, the intervals specified for periodic verification should be adhered to.
We do recommend to check and tighten all terminal screws (e.g. on the ATICS® unit, bypass switch,…) when doing the periodic verification by skilled personnel.

9. Data

9.1. TÜV-Test report

The independent testing laboratory TÜV Süddeutschland, Bau und Betrieb GmbH, München, tested the changeover and monitoring module of the ATICS® series.

Technischer Bericht
Elektrische Sicherheit
Sicht- und Funktionsprüfung

Industrie Service

Mehr Sicherheit. Mehr Wert.

Service-Auftrags-Nr.: 12849448
Kundenauftrags-Nr.: 1599736

Fa. Dipl.-Ing. W. Bender GmbH & Co. KG
Londorfer Str. 65

D – 35305 Grünberg

Hersteller
ATiCS Umschalt- u. Überwachungsgerät
Fa. Dipl.-Ing. W. Bender GmbH & Co. KG
Londorfer Str. 65
D - 35305 Grünberg

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

Gegenstand:	ATiCS Umschalt- und Überwachungsgerät Typ ATiCS-2-63A-ISO inkl. Modulträger UMA710-2-63-ISO-BP / UFA710-2-63-ISO-BP
Sachverständiger:	Raimund Gebhart
Zeitraum:	31.03.2011 bis 15.09.2011
Grundlage der Prüfung:	Auftrag 4591540 vom 16.11.2010
Art der Untersuchung:	Prüfung auf Übereinstimmung des ATiCS – Umschalt- und Überwachungsgerät inkl. Modulträger mit den Mindestanforderungen der DIN VDE 0100 Teil 710, Abschnitt 710.521.6 und Abschnitt 710.537.6.2
Zusammenfassung:	Die Umschalteinrichtung für medizinisch genutzte Räume vom Typ ATiCS (genau Bezeichnung siehe oben) erfüllen die Anforderungen an selbsttätige Umschalteinrichtungen im Hauptverteiler und im Verteiler für medizinisch genutzte Bereiche der Gruppe 2 gemäß DIN VDE 0100 Teil 710, Abschnitt 710.521.6 und Abschnitt 710.537.6.2. **(weitere wichtige Hinweise siehe Bericht)**

Datum: 15.09.2011

Unsere Zeichen:
IS-EGT-MUO/geb

Dokument:
Bender_ATiCS_110915_Funktionsbewertung Teil 710_SUE-Rev01.doc

Das Dokument besteht aus 4 Seiten.
Seite 1 von 4

Die Prüfergebnisse beziehen sich ausschließlich auf die untersuchten Prüfgegenstände.

München, 15.09.2011

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 unter www.tuev-sued.de/impressum

Aufsichtsrat:
Karsten Xander (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
TÜV®

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

The complete test report is available upon request.

9.2. Standards

The changeover and monitoring module conforms to the following standards:

- DIN VDE 0100-710 (VDE 0100 part 710):2002-11
- DIN VDE 0100-725 (VDE 0100 part 725):1991-11
- DIN VDE 0100-718 (VDE 0100-718):2005-10
- ÖVE/ÖNORM E8007:2007-12
- IEC 60364-7-710:2002-11
- DIN EN 60439-1 (VDE 0660 part 500):2005-01

Additional for the ATICS® unit:

- DIN EN 61508-1 (VDE 0803-1):2002-11 *)
- DIN EN 61508-2 (VDE 0803-2):2002-12 *)
- DIN EN 61508-3 (VDE 0803-3):2002-12 *)
- EN 61508-2:2001, IEC 61508-2:1998 *)
- EN 61508-2:2001, IEC 61508-2:2000 *)
- EN 61508-3:2001, IEC 61508-3:1998 *)
- DIN EN 60947-6-1 (VDE 0660-114):2006-07
- EN 60947-6-1:2005, IEC 60947-6-1:2005

Design and monitoring of the IT-system transformer:

DIN EN 61558-1 (VDE 0570-1):2006-07

- DIN EN 61558-1/correction 1 (VDE 0570-1/ correction 1):2008-11
- DIN EN 61558-1/ correction 2 (VDE 0570-1/ correction 2):2008-12
- DIN EN 61558-1/A1 (VDE 0570-1/A1):2009-11
- E DIN IEC 61558-2-15 (VDE 0570 Teil 2-15):2008-08

The marked *) standards were applied by the test of the TÜV Süd.

9.3. Manufacturer's certificate

As part of the scope of supply for the changeover and monitoring module, you will find a manufacturer's certificate in chapter "9. Manufacturer's certificate, checklist, circuit documentation" of this manual.

9.4. Technical data

Insulation coordination acc. toIEC 60664-1 *)	
Rated insulation voltage	AC 250V
Rated impulse voltage/pollution degree	4 kV/3
Nominal insulation voltage	400V
Voltage ranges*)	
Nominal system voltage Un	AC 230 V
Nominal frequency fn	50...60 Hz
Supply voltage Us	from the system to be monitored
Frequency range of Us	50...60Hz
Current during the changeover process	17A / <30ms
Power section / switching elements *)	
Nominal system voltage Ue	AC 230V
Frequency of Ue	48 ... 62Hz
Nominal current Ie	ATICS-2-63A-xxx-xx: 63A ATICS-2-80A-xxx-xx: 80A
Crest-Factor	<=1.2
Number of switching cycles (mechanical)	>8000
Voltage monitoring *)	
Frequency range fn	40...70Hz
Under voltage response value (Alarm 1)	160…207V
Over voltage response value (Alarm 2)	240…275V
Response delay ton	50ms ... 100s
Delay of release toff	200ms…100s
Insulation monitoring (only ATICS-2-xx-ISO-xx) *)	
Nominal system voltage (operating range)	195…265V
Measuring range	10kΩ…1MΩ
Response value Ran1 (ALARM 1)	50 ... 250kΩ
Relative uncertainty	+/- 15%
Hysteresis	<= 25%
Response time tan at RF = 0,5 x Ran und Ce = 1 µF	< 5s
Max. system leakage capacitance Ce	< 5µF
Measuring voltage Um	DC 12V
Measuring current Im max. (at RF = 0 Ω)	< 120µA
Permissible extraneous DC voltage Ufg	DC 375 V
Automatic self-test	each hour
Isolationsfehlersuche (only ATICS-2-xx-ISO-xx) *)	
Locating current IT	1mA
Test pulse / Pause	2s / 4s
Load current monitoring (IT system transformer) *)	
Measuring current transformers	BV384213 (STW2), STW3, SWL-100A
Measuring range IL (trueRMS)	10…110% of the response value
Adjustable response value	5...(50) 100A
Hysteresis	5…30%
Temperaturüberwachung des IT-System Transformators *)	
Response value	4 kΩ
Release value	1,6 kΩ
Measuring time	<2s
PTC resistors according to DIN 44081	max. 6 in series

ATICS-Input *)

Digital inputs, galv. isolated	1
Operation mode	adjustable
Function	adjustable

ATICS-Output *)

Contact, galv. isolated	1 volt free changeover contact
Operation mode	adjustable
Function	adjustable

BMS interface

Interface / Protocol	RS-485/BMS
Baud rate	9.6kBit/s
Max. cable length (w/o add. bus amplifier)	≤ 1200 m
Recommended cable: twisted pair, one end of shield connected to PE	min. J-Y(St)Y 2 x 0,8
Termination resistor	120 Ω (0,25 W)
ATICS® BMS-Bus device address	2…90

Connection type power section

Terminals	DIN rail terminals
Cage-clamp spring terminal (at Ie < 65 A, AC3)	1,5 ... 35 mm²
Screw type terminals tightening torque	0,5 ... 0,6 Nm
Cage-clamp spring terminal (at Ie ≥ 65 A, AC3)	6 ... 35 mm²
Screw type terminals tightening torque	0,5 ... 0,6 Nm

Connection type control section

Terminals	DIN rail terminals
Cage-clamp spring terminal	0,8 ... 2,5 mm²

General Data

EMV immunity	EN 61000-6-2
EMV emission	EN 61000-6-4
Ambient temperature, in use	-25 °C ... +55°C
Climate in use (IEC 60721-3-3)	3K5 (no condensing, no icing)
Climate at transport (IEC 60721-3-2)	2K3 (no condensing, no icing)
Climate for storing (IEC 60721-3-1)	1K4 (no condensing, no icing)
Operation mode	continuous operation
Position	upright
Protection rating components (DIN EN 60529)	IP30
Protection rating terminals (DIN EN 60529)	IP20
Mounting on DIN rail	see table „Dimensions and weights“
Protection class	SK I (earthed)
Consumption	ATICS-2-63A-xxx-xx: ca.16W ATICS-2-80A-xxx-xx: ca.28W
Weight approx.	see table „Dimensions and weights“

***)** For further details refer to the technical manual TGH1443 of the ATICS® changeover and monitoring unit by Bender.

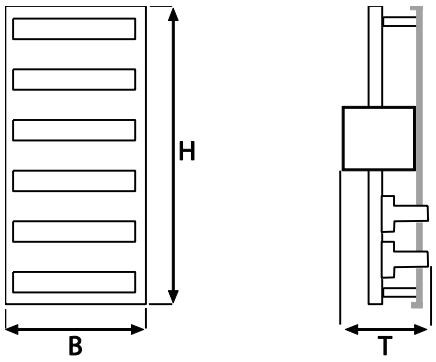
9.4.1. Dimensions and weights

The changeover and monitoring module are designed to be mounted on DIN rails but can also be mounted on mounting plates.

Multiple DIN rails are mounted on mounting racks of at least one vertical section of 250mm in width. Other mounting arrangements with multiple vertical sections are also possible.

Depending on the number of sections the DIN rails may also differ. E.g. a wall mounted enclosure with 6 DIN rails in one vertical section or a switchgear cabinet with 10 or 12 DIN rails per vertical and multiple sections in a free standing cabinet.

The following mounting racks will show some typical arrangements only.



type	section /rows	dimensions in mm			recommended enclosure depth	weight ca.
	qty	width (B)	height (H)	depth (T)	mm	kg
UFA710-2-xx-ISO-06-B16	1/8	250	1200	190	300	12
UFA710-2-xx-ISO-12-B16	1/9	250	1350	190	300	14
UFA710-2-xx-ISO-18-B16	2/6	500	900	190	300	16
UFA710-2-xx-ISO-24-B16	2/6	500	900	190	300	18
UFA710-2-xx-ISO-BP-06-B16	1/8	250	1200	190	300	13
UFA710-2-xx-ISO-BP-12-B16	1/9	250	1350	190	300	15
UFA710-2-xx-ISO-BP-18-B16	2/6	500	900	190	300	17
UFA710-2-xx-ISO-BP-24-B16	2/6	500	900	190	300	19

A section has a width of 250mm. One row has a height of 150 mm. The slot in a cover is 216x45mm WxH to accommodate a DIN rail mounted installation devices according to DIN 43880.

9.5. Utilisation data

Type	Nominal current (AC3) changeover module	Max. admissible current accord. to DIN VDE 0100-710	Upstream fuse max.	consumption ca.	Drawing number of the typical module	Article-Nr. ***bender*** *systembau*
UFA710-2-63-ISO-06-B16	63A	63A	80A, gG	16W	9700012	107681
UFA710-2-63-ISO-12-B16	63A	63A	80A, gG	17W	9700097	107682
UFA710-2-63-ISO-18-B16	63A	63A	80A, gG	18W	9700099	107683
UFA710-2-63-ISO-24-B16	63A	63A	80A, gG	19W	9700100	107684
UFA710-2-63-ISO-BP-06-B16	63A	63A	80A, gG	16W	9700011	107665
UFA710-2-63-ISO-BP-12-B16	63A	63A	80A, gG	17W	9700098	107666
UFA710-2-63-ISO-BP-18-B16	63A	63A	80A, gG	18W	9700101	107667
UFA710-2-63-ISO-BP-24-B16	63A	63A	80A, gG	19W	9700102	107668
UFA710-2-80-ISO-06-B16	80A	80A	100A, gG	28W	9700103	107689
UFA710-2-80-ISO-12-B16	80A	80A	100A, gG	29W	9700104	107690
UFA710-2-80-ISO-18-B16	80A	80A	100A, gG	30W	9700105	107691
UFA710-2-80-ISO-24-B16	80A	80A	100A, gG	31W	9700106	107692
UFA710-2-80-ISO-BP-06-B16	80A	80A	100A, gG	28W	9700107	107673
UFA710-2-80-ISO-BP-12-B16	80A	80A	100A, gG	29W	9700108	107674
UFA710-2-80-ISO-BP-18-B16	80A	80A	100A, gG	30W	9700109	107675
UFA710-2-80-ISO-BP-24-B16	80A	80A	100A, gG	31W	9700110	107676

10. Manufacturers certificate, checklist, documentation

The following individually compiled documents are provided with the changeover and monitoring module:

- Testing protocol/manufacturers certificate
- Checklist for commissioning
- Connection diagram
- Wiring diagram (showing all potentials/phases)
- If applicable individual project related
  - Elevation drawings
  - Wiring schematics for the BMS-bus

The appropriate technical data sheets of the components are also provided with the module.

11. Appendix

All of the provided data sheets and technical manuals are part of this user manual and must be read and followed. Specially the notes and instruction related to technical and safety issues.

Provided documentation:

- BMS-Bus leaflet
- Safety Advice
- ATICS®-Technical manual TGH 1443 (as PDF on CD-ROM)
- ATICS®- Quick reference guide "Installation and connection TKA1443-1
- ATICS®- Quick reference guide "Commissioning and operation" TKA1443-2
- ATICS®-Checklist for commissioning
- Data sheet BV384213 (STW2), STW3
- Data sheet CP-D24/…A
- If applicable individual project related:
  - Connection diagrams
  - Wiring diagram (showing all potentials/phases)
  - Elevation drawings
  - Wiring schematics for the BMS bus