

# Changeover and monitoring module UMA710-2-xx-DIO, ...-BP



# Changeover and monitoring module

## UMA710-2-xx-DIO, ...BP

for safety-relevant environments



UMA710-2-xx-DIO-BP  
(example illustration)

### Device features

- Automatic transfer switching device ATICS® for monitoring (amongst others):
  - voltage of the incoming supplies
  - output voltage
  - correct switch position
  - switching times
  - functional safety acc. to IEC 61508 (SIL2)
- Uninterrupted testing and replacement when a bypass switch is included (bypass is recommended)
- Variable changeover period  $t \leq 0.5 \dots 15$  s
- Information exchange via bus technology
- Connection for alarm indicator and operator panels TM800/MK800/MK2430
- Short delivery times
- Time-efficient and cost-effective due to ready-to-connect distribution boards
- Screwless connection system
- Standard-compliant design
- Optional TÜV (Technical Inspection Association) test of the transfer switching device (in preparation)

### Application

The factory-made modules of the UMA710 series are used for switching ( $t \leq 0.5$ s) between two power supply sources (SV/AV or BSV/SV) in safety-relevant environments, such as medical locations. Alarm and status messages are indicated at alarm indicator and operator units via bus technology. The module can be mounted on all common equipment racks. The equipment racks can be provided by the customer when ordering.

### Tasks

The changeover and monitoring module UMA710 has the following tasks:

- Two-pole changeover of the power supply
- Voltage monitoring on the preferred supply
- Voltage monitoring on the redundant supply
- Voltage monitoring at the output of the transfer switching device (line 3)
- Monitoring of the changeover for correct switch position
- Internal functional test, including checking the switching times
- Communication with remote MK... alarm indicator and test combinations, and with TM... alarm indicator and operator panels via BMS bus
- Conformity with the time delay for the changeover process according to DIN VDE 0100-710 (VDE 0100 Part 710):2002-11
- Conformity with changeover period according to DIN VDE 0100-710 (VDE 0100 Part 710):2002-11 with a changeover period of less than 15 s or even less than 0.5 s

### Functions in accordance with DIN VDE 0100-710/HD 60364-7-710

- Voltage monitoring with an adjustable control function on the preferred supply line and on the second line and at the output of the transfer switching device
- Adjustable changeover period  $t \leq 0.5 \dots 15$  s for SV/AV or BSV/SV changeovers
- Protection against wrong operation by means of mech. and electr. multiple interlocking
- Cables are laid to resist short circuits and earth faults
- Control circuit with "single-fault safety" according to DIN VDE 0100-710 (VDE 0100-710):2002-11
- Automatic switching back on voltage recovery, configurable
- Functional test, including checking the switching times
- Insulation, load current and temperature monitoring for the IT system
- Connection monitoring of mains, PE and measuring current transformers

### Other safety-enhancing measures

- Continuous monitoring of all essential components and connecting wires for proper functioning
- Monitoring for short-circuits at the output of the transfer switching device with defined switching behaviour
- Maximum reliability when switching with:
  - Patented switching system with mechanical and electrical interlocking
  - Weld-resistant contacts with the mechanics of a circuit breaker
  - Insensitive to voltage fluctuations and vibrations due to stable switching position and permanent contact pressure
- Preventive safety due to an automatic reminder of mandatory testing procedures, service times, number of switching operations
- Bypass switch for uninterrupted testing/maintenance (recommended)
- Optional TÜV (Technical Inspection Association) test of the transfer switching device (in preparation)
- Tested functional safety acc. to IEC 61508 (SIL2) of the ATICS® switch (provide notification in at least two places)

### Functional description changeover

The changeover is controlled by the ATICS® device. If the preferred supply fails, the ATICS® ensures that the power supply is changed over safely. The switch contacts are offset on a rotating shaft. This design prevents simultaneous switching on of line 1 and line 2.

The switch has three positions:

- I – Line 1 is switched on
- 0 – Both lines are switched off
- II – Line 2 is switched on.

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 and the test function is executed via the menu
- A digital input is configured to "TEST" and this input is enabled
- The setting "Preferred line" 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, when:
  - the return transfer delay time  $T(2 \rightarrow 1)$  has elapsed and no switching back interlocking function is active
  - after pressing the "RESET" button and the switching back interlocking function has been deleted via the menu
  - when the redundant line fails (even when the switching back interlocking function is enabled)
- the setting "Preferred line" 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

Only when an ATICS-ES energy storage is included, the device switches to position "0" and remains there when the following conditions are met simultaneously:

- Line 1 and line 2 failed
- Automatic operation is selected
- There is no short-circuit downstream of the transfer switching device
- The setting "Load separation" "on" has been selected
- The external ATICS-ES energy storage has been connected

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

When there is a short circuit downstream of the transfer switching device, the switching device must not continually change back and forth between the two lines. This may 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 switching device in order to detect a possible short-circuit.

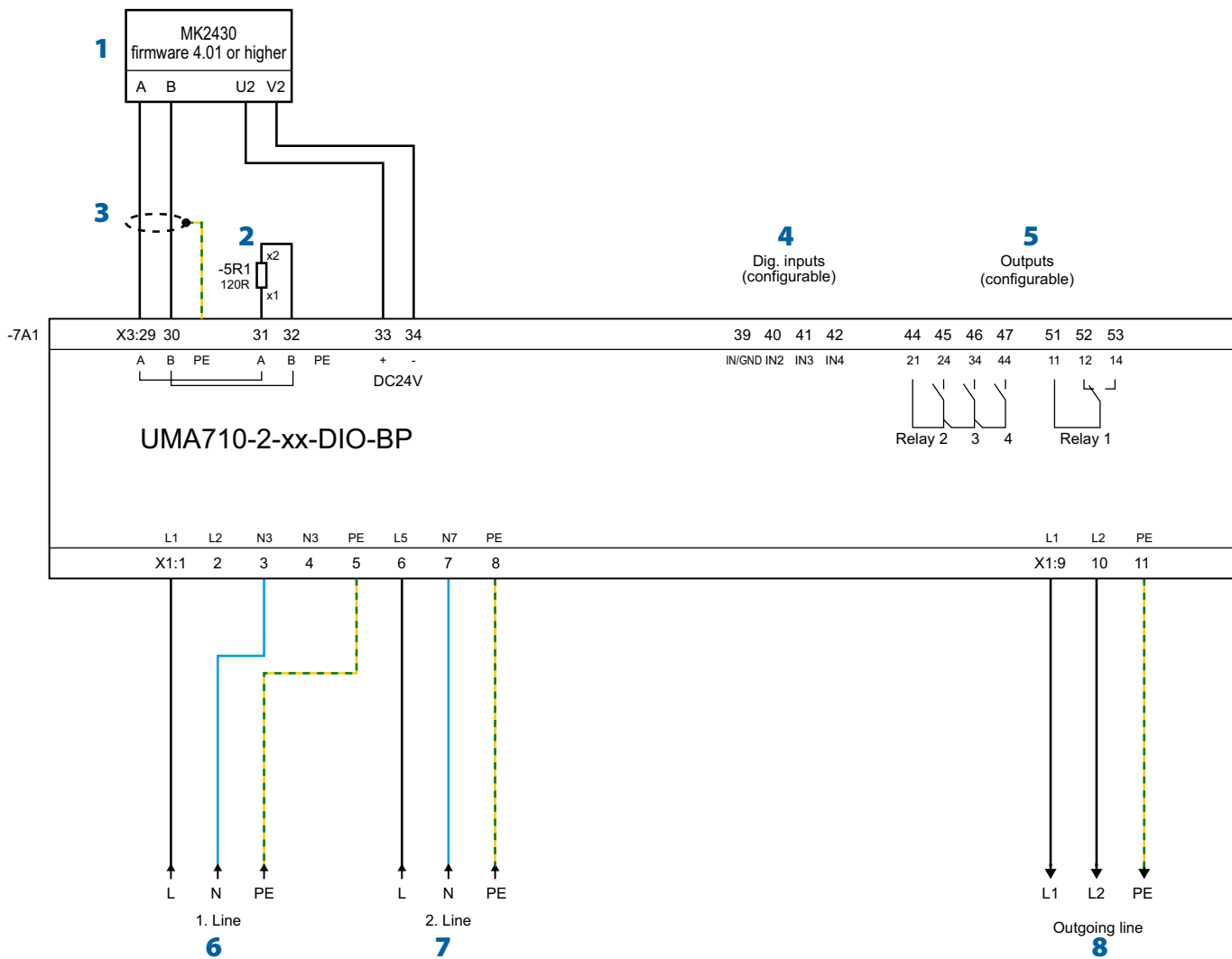
If the preferred line fails and a short-circuit current is detected at the same time, the ATICS® does not switch over immediately but only once the circuit breaker has tripped. If the ATICS® detects a supply failure or a fault, an alarm will appear on the LC display, the "ALARM" LED lights up, the alarm relay trips (if set) and this alarm is forwarded to other Bender devices, (such as an alarm indicator and test combination).

### Bypass switch

On the UMA710-2xx-DIO-BP changeover and monitoring module, uninterrupted testing or replacement of the ATICS® transfer switching and monitoring device can be carried out by means of the bypass switch. Please read the instructions for operation of the bypass switch in the manual.

### Clear text display of messages

Operating, warning and fault messages are indicated in clear text display format. The required alarm indicator and test combination MK2430, MK800 or the remote alarm indicator and operator panel TM800 must be installed in a place in the medical location where they are permanently supervised by the medical staff. The module and the alarm and indicator units are connected via a two-wire bus cable.

**Wiring diagram UMA710-2-xx-DIO-BP (example illustration)**


**1** - Alarm indicator and test combination MK...(firmware 4.01 or higher)

**2** - Remove terminating resistor if other bus devices are to be connected here

**3** - Shielded cable 2x2x0.8mm, (for A/B, U2/V2)

**4** - Digital inputs (3 inputs programmable, 1 for bypass)

**5** - Alarm contacts (3x N/O contacts, 1x changeover contact)

**6** - Preferred line (line 1) AC 230 V, 50 Hz

**7** - Redundant line (line 2) AC 230 V, 50 Hz

**8** - Outgoing line AC 230 V, 50 Hz

The image shows an example of a typical wiring diagram (black box).

Please observe the individual, job-related or project-related documentation provided.

**Technical data**

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

Overvoltage category	III
Rated operational voltage $U_e$	230 V

**Power section/switching elements**

Nominal system voltage $U_n$	AC 230 V (AC 160...276 V) (operating range)
Frequency range $f_n$	48...62 Hz

**Displays and data memory**

Display (languages DE, EN,FR)	graphic display
History memory	500 data records
Data logger	500 data records/channel
Config. logger	300 data records
Test logger	100 data records
Service logger	100 data records

**Inputs**

Digital inputs	1
Function adjustable:	function test, switching back interlocking function, manual/automatic mode, bypass operation, changeover of the preferred line, alarm input for operating theatre lights, alarm input for other devices

**Inputs and outputs**

Switching element	3x N/O contacts, 1x changeover contact, potential-free
Inputs	3x N/O operation/N/C operation
Function adjustable	alarm or operating message/ common alarm message/generator start

**BMS interface**

Interface/protocol	RS-485/BMS
--------------------	------------

**Environment/EMC**

EMC immunity acc. to	EN 61000-6-2
EMC emission acc. to	EN 61000-6-4
Operating temperature	-10 °C...+55 °C

**Classification of climatic conditions acc. to IEC 60721**

Stationary use	3K5
Transport	2K3
Long-term storage	1K4

**Classification of mechanical conditions acc. to IEC 60721**

Stationary use	3M4
Transport	2M1
Long-term storage	1M3

**Connection**

**Control section**

Connection type	cage-clamp spring terminals
Connection properties	rigid/flexible/conductor sizes
	0.08...2.5 mm <sup>2</sup>

**Power section**

Connection type	cage-clamp spring terminals
Connection properties	up to 125 A rigid/flexible/conductor sizes max.
	35/25 mm <sup>2</sup>
	up to 160 A rigid/flexible/conductor sizes max.
	70/50 mm <sup>2</sup>

**Miscellaneous**

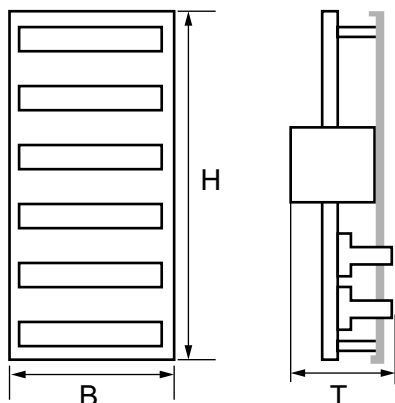
Operating mode	continuous operation
Mounting	vertical
Elevation illustration/circuit diagram	The documents are project-specifically made to suit the specific needs of each customer
Weight/power consumption	see ordering information

**Ordering information**

Nominal current (AC-3) of the changeover module	Max. permissible current acc. to DIN VDE 0100-710	Max. permissible back-up fuse	Power consumption approx.	Type	Art. No.
80 A	80 A	100 A, gG	28 W	UMA710-2-80-DIO-HA	B22040182
80 A	80 A	100 A, gG	31 W	UMA710-2-80-DIO-BP-HA	B22040183

Please observe the individual, job-related or project-related documentation provided.

**Dimensions and weights**



Type	Sections/rows	Dimensions in mm			Recommended cabinet depth	Weight approx.
	Quantity	Width (W)	Height (H)	Depth (D)		
UMA710-2-80-DIO-HA	1/6	250	900	190	300	10
UMA710-2-80-DIO-BP-HA	1/6	250	900	190	300	11

One row has a height of 150 mm. One section has a width of 250 mm. Provision of the equipment rack.



**Bender GmbH & Co. KG**

P.O.Box 1161 • 35301 Gruenberg • Germany  
Londorfer Straße 65 • 35305 Gruenberg • Germany  
Tel.: +49 6401 807-0 • Fax: +49 6401 807-259  
E-mail: [info@bender.de](mailto:info@bender.de) • [www.bender.de](http://www.bender.de)



**BENDER Group**