



Operating Instructions Technical Parameters

multisio



5D6-ESBS-5DI6RO1DO



**Electronic impuls
metering device**



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Dear Customer

We would like to thank you for choosing a KBR GmbH quality product.

In order to familiarize yourself with the operation and programming of the device and always be able to use the whole functionality of this high-quality product, we recommend that you read this manual thoroughly. The individual chapters serve to explain the technical details of the device and show how to avoid damage by means of proper installation and commissioning.

The manual is included in the scope of delivery of the device and must be accessible for the user at all times (e.g. in the switchgear cabinet). Even when the device is resold to third parties, the manual remains part of the device.

Although we used the utmost care in assembling this manual, we would like to thank you in advance for notifying us about any errors or ambiguous descriptions that might be in it. You will find a form for corrections in the appendix.

Sincerely,

KBR GmbH Schwabach

Safety Precautions

This manual contains notes that must be observed for your personal safety and to avoid damage to equipment. Notes are identified by a warning sign or an info symbol according to the degree of hazard they represent.



Danger

means that death, major injuries or damage **will** occur in case the appropriate safety measures are not performed.



Warning

means that death, major injuries or damage **may** occur in case the appropriate safety measures are not performed.



Caution

means that minor injuries or damage may occur in case the appropriate safety measures are not performed.



Note

is an important information on the product, product handling or the respective part of the user manual to which special reference is made.

Disclaimer

The contents of this manual has been checked with the described hardware and software components. Certain deviations, however, cannot be excluded, so the manufacturer is not liable for complete conformity. The specifications made in this manual are checked on a regular basis, necessary corrections are included in the next revision.

We appreciate your corrections and comments.

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Subject to change

General Safety Precautions

In order to prevent operating errors, handling of the device is kept as simple as possible. This way, you will be able to use the device very soon.

In your own interest, however, you should read the following safety precautions carefully.



Warning

During installation, the applicable DIN / VDE regulations must be observed!

Mains connection, setup and operation of the device must only be performed by qualified personnel. Qualified personnel as understood in the safety precautions of this manual are persons authorized to setup, ground and mark equipment, systems and wiring systems in accordance with applicable standards.

To avoid the hazard of fire and electrical shock, the device must not be subjected to rain or other humidity!

Before the device is connected to the mains, you will have to check whether the local mains conditions comply with the specifications on the manufacturer's label. A wrong connection may destroy the device!

When connecting the device, the connection chart must be observed (see chapter "Connection chart") and the connection lines must be powerless. Only use proper line material and watch the correct polarity when wiring!

In order to ensure proper and safe operation of the product, it must be transported, stored, installed and mounted in accordance with the specifications and operated and maintained carefully.

A device showing visible damage must by all means be considered as unfit for operation and must be disconnected from the mains!

Error detection, repairs and maintenance work may only be carried out in our facilities or after contacting our service team. Every warranty obligation of the manufacturer expires if the device is opened without written consent from our service team. Proper operation can no longer be guaranteed!

Opening the device may expose parts under voltage. Capacitors in the device may still be loaded even if the device was disconnected from all voltage sources. It is generally not allowed to operate the open device!

In facilities subject to hazard of lightning, lightning protection must be provided for all input and output lines (recommendations see chapter "Protective measures")!

Product Liability

With these product, you have acquired a quality product.

In its manufacture, only components of the highest reliability and quality were used. Each device is subject to long-term testing before it is delivered.

For information on product liability, please refer to our General Terms and Conditions for electronic devices.

The warranted properties of the device apply only if it is operated in accordance with its intended use!

Disposal

Please dispose of defective, outdated or no longer used devices properly.
At your request, we will be pleased to dispose of the devices for you.

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1 Device memory, battery buffered

The device has an internal data memory, battery-buffered to preserve long-term data. This support battery (e.g. Varta CR 2032) is not installed in the device on delivery, to prevent the battery from losing its charge, but is included in the delivery.

a

Caution

Prior to first time use, please install the buffer battery in the device according to the description below, otherwise all data will be lost if the supply voltage should fail!

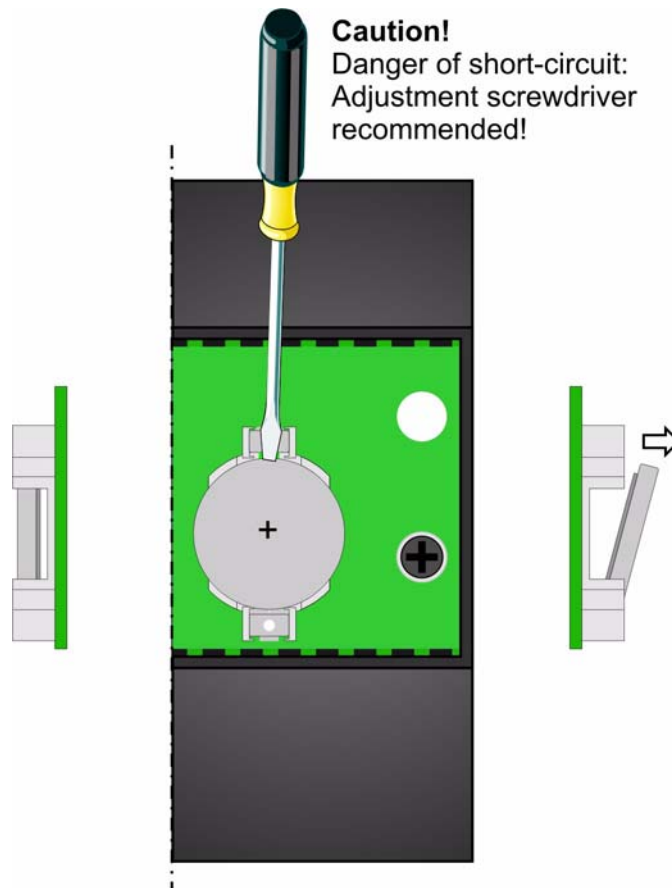
Inserting or replacing the memory battery:

1. Disconnect the device from the supply voltage.
2. Remove the top cover of the housing using a suitable tool (e.g. a small screwdriver).
3. Use the tool to remove the existing empty battery (if replacing) from the clamp holder.
4. Press the new battery into the clamp holder and make sure that it is properly in place and that the polarity is correct.
5. Replace the top cover of the housing and apply pressure until it clicks back into place.
6. Reconnect the device to the supply voltage.

a

Caution

Since not only the memory data are lost if the battery is removed and the supply voltage fails, but the time is also no longer correct, this must be reset through visual energy via the clock time command!



2 Explanation of terms

Below, you will find brief explanations of the terminology used in this manual.

Firmware:	Operating system software implemented in the microcontroller of the multio 5D6-ESBS-5DI6RO1DO.
Load profile memory:	Saves the actual values of the measuring periods with timestamp.
Measuring period max:	The measuring period containing the highest (maximum) value that occurred.
Period value	Cumulated value within a measurement period.
Measuring period:	Refers to the period of time used to form average values. Typical intervals are 15, 30, 60 minutes.
DIN rail:	Top hat rail / mounting rail acc. to DIN EN 50022

3 Implementation / range of function

The multio 5D6-ESBS-5DI6RO1DO is the central memory module for the **multio** signal recording system. It can record pulses from various pulse generators via five S_0 compatible inputs. The input pulses for each input are added together and divided into measuring periods, given a time stamp and stored in an internal ring buffer. For a measuring period duration of 15 minutes, this results in a recording duration of 40 days. A synchronous pulse input can be specified for direct synchronization, and addressed via a floating contact. The floating error message contact of the multio 5D6-ESBS-5DI6RO1DO can be used to monitor errors and for example passed on to a central process control (selectable via a KBR eBus NC or NO contact). The additionally available five floating relay outputs can be assigned to KBR eBus relay groups and used as NC or NO contacts (selectable via KBR eBus).

Furthermore, the device has a module bus interface to which up to five additional modules can be connected.

The following modules are available:

- **multio 2D2-4DI**

The hardware of the multio 2D2-4DI supports four **S_0 compatible** digital inputs, 5 LEDs and an 8-channel DIP switch.

The module detects a switch connected to the digital input as active if the switch is closed. An open switch is detected as passive.

The module can be addressed by the master device multio 5D6-ESBS-5DI6RO1DO via the module bus interface. The master has to configure the module and read out the data recorded by the module for further processing.

The multio 2D2-4DI can manage the digital inputs in two different ways. Each input can be configured separately as a pulse count input or as a status controlled input. The power LED indicates whether operating voltage is available. The operating voltage comes from the module bus interface. The module cannot run on its own.

- **multisiso 2D2-4TI**

The hardware of the multisiso 2D2-4TI supports four temperature inputs for PT-1000, 5 LEDs and an 8-channel DIP switch.

The module evaluates the measured values of the temperature sensors connected to terminals 70 and 71, etc.

The module can be addressed by the master device multisiso 5D6-ESBS-5DI6RO1DO via the module bus interface. The master has to configure the module and read out the data recorded by the module for further processing.

The power LED indicates whether operating voltage is available. The operating voltage comes from the module bus interface. The module cannot run on its own.

- **multisiso 2D2-4AI**

The hardware of the multisiso 2D2-4AI supports four analog inputs, 5 LEDs and a 4-channel DIP switch.

With the 4 analog measuring inputs, currents from 0 to 20 mA and voltages from 0 to 10 V can be measured. The 4 input LEDs give an indication of the status of the analog inputs (when used on the multisiso 5D6, the module is always in 0-20mA / 0-10V mode, i.e. the LEDs for inputs - 4 are always on).

The module can be addressed by the master device multisiso 5D6-ESBS-5DI6RO1DO via the module bus interface. The master has to configure the module and read out the data recorded by the module for further processing.

The power LED indicates whether operating voltage is available. The operating voltage comes from the module bus interface. The module cannot run on its own.

- **multisiso 1D2-4CI**

The hardware of the multisiso 1D2-4CI supports 4 analog current measuring inputs and 1 LED. Currents up to a maximum of 6A can be measured. One LED is available that indicates the various states of the device by flashing or being permanently lit up.

The module can be addressed by the master device multisiso 5D6-ESBS-5DI6RO1DO via the module bus interface. The master has to configure the module and read out the data recorded by the module for further processing.

The power LED indicates whether operating voltage is available. The operating voltage comes from the module bus interface. The module cannot run on its own.

Caution



It is essential that the multisiso 1D2-4CI is operated with series-connected current transformers! These must not be grounded in a secondary circuit.

For a power supply of up to 690V (phase-phase voltage), the series-connected current transformers must be designed for a test voltage of at least 2500VAC for 1 minute.

- **multisio 2D2-1TI2RO**

The hardware of the multisio 2D2-1TI2RO supports 1 temperature input for PT-1000, 2 floating relay outputs, 5 LEDs and an 8-channel DIP switch.

The module evaluates the measured values of the temperature sensor connected to terminals 50 and 51 and switches the relay according to the limits transmitted by the master device.

The relay outputs are used to control the fan or as an alarm relay.

Example:

Operating point fan = 28°C / hysteresis = 5°C

The fan relay switches on at 28°C and off at 23°C

Operating point alarm = 50°C / hysteresis = 5°C

The alarm relay switches on at 50°C and off at 45°C

The module can be addressed by the master device multisio 5D6-ESBS-5DI6RO1DO via the module bus interface. The master has to configure the module and read out the data recorded by the module for further processing.

The power LED indicates whether operating voltage is available. The operating voltage comes from the module bus interface. The module cannot run on its own.

- **multisio 2D2-4RO**

The hardware of the multisio 2D2-4RO supports 1 floating relay switch voltage input, 4 floating relay outputs, 5 LEDs and one 8-channel DIP switch.

The module can be addressed by the master device multisio 5D6-ESBS-5DI6RO1DO via the module bus interface. The master has to configure the module. Each relay output can be used separately as an error message output, message output for limit violations or digital output.

It can optionally be assigned to a KBR eBUS relay group.

The contacts are in a de-energized state of the equipment and are opened for steps that are not hooked up. Maximum switching capacity of 2A at 250V AC

The power LED indicates whether operating voltage is available. The operating voltage comes from the module bus interface. The module cannot run on its own.

- **multisio 2D2-4DO**

The hardware of the multisio 2D2-4DO supports four digital outputs, 5 LEDs and an 8-channel DIP switch.

The module provides digital pulses at its outputs corresponding to the configuration made via the module bus by the multisio 5D6-ESBS-5DI6RO1DO master device.

A voltage of max. 35V must be applied to the + input on each hardware output. In an On status, the digital output switches this voltage to the matching - terminal. It must be ensured by an external protective circuit that the current flowing does not exceed 50mA. With these parameters, the digital output is compatible to the S0 interface in accordance with DIN 43864.

Check that the polarity is correct when connecting.

It is possible to set every output to manual. If the DIP switch for the channel is set to "OFF", the output status is determined inside the module. If the DIP switch is set to "ON", the status for this output is kept to active, independent of the actual status of the output recorded.

The LEDs on the digital output module display the current status of the digital output. If the output is closed, then the LED is switched on. If the output is open, then the LED is switched off. A flashing LED indicates that the corresponding digital output is switched to manual operation.

Two-tariffs counter function (HT/LT)

The consumption during the various tariff periods is stored separately. Switching between the tariff periods is done either by a digital input, the KBR eBus (centrally from the Multimaster or the PC), or through the internal clock.

Configurable pulse inputs

The five configurable pulse inputs, implemented as an S₀ interface, can process pulses from pulse generators up to an input frequency of 16 Hertz (minimum pulse length 30 ms, pulse/idle time ratio 1:1). All five pulse inputs can be configured independently of one another. Both the pulse significance (number of pulses per unit) and the unit itself (Pulse/kWh, Pulse/l, Pulse/m³, Pulse/hPah or Pulse/Unit) can be configured. The cycle duration and the tariff can be stored in the energy form (current or similar). These functions are available via the KBR eBus.

Each pulse is visualized by a flashing LED.

The pulse inputs can be optionally used as:

- Pulse counter
- Heat counter (using additional modules with temperature inputs, e.g. multio 2D2-4TI or multio 2D2-1TI2RO)
- Digital input (status display)
- Synchronous pulse input
- Tariff switching
- Operating hours counter

Configurable pulse output (pulse totalizer)

The configurable pulse output can be optionally used as:

- Error message output
- Digital output
- Limit message
- Pulse generator
- Pulse totalizer, whereby the output listed as the S₀ interface can produce pulses up to an output frequency of 16 Hertz (minimum pulse length 30 ms, pulse/idle time ratio 1:1).
- Up to 9 pulse inputs can be added or subtracted (5 to the basic module + 4 to an expansion module). If the module bus is extended via multisys Gateway, a solution can now be offered to add remote counters. If you select just one pulse input as the source, you at the same time create a way of extending the pulse via the energy bus. A special characteristic must be taken into account here: Input pulses up to a frequency of max. 20 Hz are recorded. Output pulses have a maximum of 16 Hz, however. But in practice, this means that there will be no real restriction, because of the adjustment to a large extent to the pulse significance.

Serial port for connection to the KBR eBus

In its default configuration, the multio 5D6-ESBS-5DI6RO1DO has a serial port (RS-485) for operation with the KBR eBus.

Configuration of the unit, as well as reading out the instantaneous or storage data, is possible exclusively via the KBR eBus.

Extensive memory functions

The multio 5D6 has extensive memory functions:

- Cycle memory for recording cumulated input pulses (separate for each input) 5x 3840 cycle entries, depending on fittings with additional modules, up to 5x 3840 cycle entries.
- Event memory (4096 entries), for logging actions of the multio 5D6 such as mains failures, tariff switching actions, delete functions and many more.
- Operating logbook for logging events resulting from operating the device (with timestamp). These are as follows:
 - Each address assignment (date and new address)
 - Each parameter change (date and "parameter change")
 - Enabling and disabling the project parameter protection (date and "PPS enabled" / "PPS disabled")
 - Each loss and return of supply voltage (date and event)

User and device-specific events (limit violations, switching operations, errors etc.) are not stored in the operating logbook, but in the event memory.

These storage functions are exclusively available via the KBR eBus.

Synchronization

To synchronize the load profile memory, each separate digital input in the multio 5D6-ESBS-5DI6RO1DO can be configured as you choose. Here for example the synchronization signal of the energy supplier counter can be connected. The synchronization can also be controlled centrally via the KBR eBus.

Tariff switching

To switch the tariff, each separate digital input in the multio 5D6-ESBS-5DI6RO1DO can be configured as you choose. For example, the tariff switch signal of the energy supplier counter can be connected here. Tariff switching can also be controlled centrally via the KBR eBus as well as via the internal clock (see Chapter **Two tariff counter function**).

Software (required to configure and read out the memory)

The visual energy product range is available to conveniently program and store long-term data.

For questions on this device or on our software products please do not hesitate to contact us. We will be glad to assist you. Please see the cover sheet of this manual for your contact.

4.3 Terminal assignment

Terminals 40 and 41:	Relay contact, switching capacity 250V(AC) / 2A
Terminals 40 and 42:	Relay contact, switching capacity 250V(AC) / 2A
Terminals 40 and 43:	Relay contact, switching capacity 250V(AC) / 2A
Terminals 40 and 44:	Relay contact, switching capacity 250V(AC) / 2A
Terminals 40 and 45:	Relay contact, switching capacity 250V(AC) / 2A
Terminals 30 and 31:	Floating relay contact, switching capacity 250V(AC) / 2A To pass on error messages, e.g. to a master central process control.
Terminal 1 (L) / 2 (N) and PE:	Connection power supply The device can be operated with a voltage from 85V to 265V AC/DC 50/60 Hz.
Terminal 34 (+) and 35 (-):	Pulse output for pulse totalizer
Terminal 50 (+) and 51 (-):	Counter input 1 A floating contact of a pulse generator can be connected to this input
Terminal 52 (+) and 53 (-):	Counter input 2 A floating contact of a pulse generator can be connected to this input
Terminal 54 (+) and 55 (-):	Counter input 3 A floating contact of a pulse generator can be connected to this input
Terminal 56 (+) and 57 (-):	Counter input 4 A floating contact of a pulse generator can be connected to this input
Terminal 58 (+) and 59 (-):	Counter input 5 A floating contact of a pulse generator can be connected to this input
Terminal 92 (B) 91 (A) 90 (earth):	Bus connection For communication at the KBR eBus
Out	Module bus connection For communication with expansion modules

5 Commissioning

5.1 Enabling the scanning mode on the device

Remove the cover using a suitable screwdriver for the four indentations provided.

Hold down the button on the right above the memory battery (through the feedthrough in the display PCB) for approx. 3 seconds.

The LEDs flash.

During this phase, it is possible to assign an address via the KBR eBus PC software. Details of this can be found in the user manual for the corresponding software.

After the address has been successfully assigned, the device goes into normal operation.

5.2 LEDs

LED "Power" This LED lights up when the power supply of the device is connected. The device can be operated with a voltage from 85V to 265V.

LED "1 - 5" This LED always **flashes** when the corresponding **pulse input** is active.

5.3 Reset



Note

Reset procedure:

Disconnect the device from supply voltage.

Remove the cover using a suitable screwdriver at the four indentations provided.

Press down the button on the right above the memory battery (through the feedthrough in the display PCB) and keep held down.

Switch on the supply voltage again. The LEDs light up and remain on.

After the button has been released, the device is back in the "default status"; data and parameter memory are deleted.

5.4 Default settings after reset

Pulse significance counter channels 1 to 5	1 pulse / unit
Energy form counter channels 1 to 5	Current
Measuring period duration counter channels 1 to 5	15 min.
Assignment of counter channels 1 to 5	Main module, lines 1 to 5
Synchronization type counter channels 1 to 5	Via KBR eBus
Operating hours counter channels 1 to 5	No assignment, make contact logic
Inputs channels 1 to 5	No assignment, make contact logic
Relay outputs 1 to 5	Main module, lines 1 to 5, make contact logic, no relay group assignment
Daylight saving time	From month 03 to 10
Energy form of the ext. synchronous input	Current
Logic of the ext. synchronous input	Make contact logic
Tariff switching	Via KBR eBus
Tariff	HT

Default setting for tariff switching over time by internal clock	Start time: 00:00:00 for LT start End time: 00:00:00 AM for LT end
All measurements	Restart
Data storage	Deleting all data memories
Measuring period memory	Deleting all entries
Alarm relay	Error message dialog completely set, break contact logic
Password	Basic setting 9999 device can be accessed

Unchanged by a RESET

Bus address and time

5.5 Basic configuration when delivered

Bus address	0000
-------------	------

6 Storage

6.1 Device settings

All device settings and parameter data for storage utilization are stored in the device.

6.1.1 Long-term memory

The multisiso 5D6-ESBS-5DI6RO1DO offers the user the long-term memory described in the following section:

6.1.2 Cycle memory

The multisiso 5D6-ESBS-5DI6RO1DO has a cycle memory that can record max. 5 x 3840 entries, depending on the measuring period selected by the user (possible period values 60 / 30 / 15 / 1 minutes). This means that a period of 60 min. results in a storage duration of 160 days max. The measuring period can be programmed via the computer using the optionally available software. When fully equipped with 5 additional modules, the period memory is increased to a total of 25 x 3840 entries.



Note

Setting the device-internal clock time:

If the clock time of the multisiso 5D6-ESBS-5DI6RO1DO is adjusted by less than the duration of one period, the measurement for the instantaneous period is finished at the next synchronization event and saved.

If the clock time of the multisiso 5D6 is moved back by more than the duration of one period, the load profile memory is deleted and restarted.

In both cases, a clock adjustment event is created and saved in the event memory.

Adjusting the period duration

If the period duration is adjusted, the load profile memory is deleted and restarted. An adjustment event (adjustment of the period duration) is created and entered in the event memory.

6.1.3 Event memory

The event memory saves 4096 events with date, time and status in a ring buffer.

The following events are recorded:

Event	Acquisition
Tariff switching (via KBR eBus)	Switchover signal => HT with date and time Switchover signal => LT with date and time
Sync input	Missing synchronous pulse with date and clock time
Mains failures	With date, time and duration of the mains failure
Error	Error type with date and time
Changed settings / deletions	E.g. reset via KBR eBus / set clock time / deletions / general parameter changes



Note

The described memories can only be read or parameterized via the KBR eBus by means of optionally available software (e.g. Visual Energy).

6.2 Measuring period synchronization

The measuring period synchronization of the multisio 5D6-ESBS-5DI6RO1DO can be performed in four different ways. The measuring period synchronization is dependent on the energy form of the sync input on the multisio 5D6-ESBS-5DI6RO1DO and on the energy form of the individual inputs. This means that for example only those inputs that have the same energy form as the sync inputs on the device are synchronized.

The following 4 types of synchronization are possible:

6.2.1 Synchronization by internal clock only

The synchronization by internal clock is started with the manufacturer's reset. From this starting time on, the clock synchronizes the measuring cycle every 15 minutes, depending on the measuring period duration set. The synchronization time is always 00:00 (hh:mm) if the period duration fits into the 60 minute pattern.

6.2.2 Synchronization by the energy supplier's synchronous pulse

If the synchronous pulse is available as a floating contact from the energy supplier, it may be connected to an input that was configured as a synchronous pulse input. If the contact closes for at least 250 ms, it is detected as a synchronous pulse and the measuring period of the input that has the same energy form as the synchronization input is restarted.

Under certain operating conditions, the energy supplier may carry out an intermediate synchronization while a measuring period is still running. The multisio 5D6-ESBS-5DI6RO1DO terminates the instantaneous period measurement and saves the period value together with a timestamp.

Example:

Period duration is set to 15 min. i.e. 20 kW input power results in a period value of 20 kW (15 min period). If there is an intermediate synchronization 3 min after period start and this 3 min period is saved, the period value to be recorded will be 4 kW.

If the energy supplier's synchronous pulse does not take place, the error message **External synchronous pulse missing** will be displayed and the internal clock will continue with the time pattern.

6.2.3 Synchronization by the KBR eBus

Synchronization is carried out via a telegram created either by the computer or by the MULTIMASTER and sent via the KBR eBus to the selected recipients. This telegram contains the energy form of the input to be synchronized.

Under certain operating conditions, an intermediate synchronization may be carried out while a measuring period is still running. multisio 5D6-ESBS-5DI6RO1DO terminates the instantaneous period measurement and saves the period value together with a timestamp.

Example:

Period duration is set to 15 min. i.e. 20 kW input power results in a period value of 20 kW (15 min period).

If there is an intermediate synchronization 3 min after period start and this 3 min period is saved, the period value to be recorded will be 4 kW.

If the BUS synchronous pulse does not take place, the error message **External synchronous pulse missing** will be displayed and the internal clock will continue with the time pattern.

6.2.4 Synchronization when tariffs are changed

This type of synchronization makes it possible for the counter to change tariffs immediately after the tariff HT/LT has been switched, instead of waiting until the end of the measuring period. Tariff switching is carried out via a telegram created either by the computer or by the MULTIMASTER and sent via the KBR eBus to the selected recipients.

The internal clock synchronizes the measuring period. If there is a tariff change, depending on the configuration of the inputs, this event in addition synchronizes the measuring period.

Under certain operating conditions, the synchronization pulse and the internal measuring period synchronization may not be in accordance with the same time pattern. The multisio 5D6-ESBS-5DI6RO1DO terminates the instantaneous period measurement and saves the period value together with a timestamp.

Example:

Period duration is set to 15 min. i.e. 20 kW input power results in a period value of 20 kW (15 min period).

If synchronization takes place 3 min after period start and this 3 min period is saved, the period value to be recorded will be 4 kW.

7 Technical data

7.1 Operating and display elements

Operation	Pushbutton for reset and scan mode (accessible after removal of housing lid)
Control display	6 green LEDs: 5 x input status, 1 x operating status

7.2 Device memory

Main data and program memory	2 MB RAM battery-buffered/ 256k EPROM
Memory type	Ring buffer
Long-term memory for max. 160 days, min. 64 hours depending on memory configuration	Load profile memory: Maximum of 4*3840 entries; 60 / 30 / 15 / 1 – cycle duration configurable via operating software!
Event memory	A maximum of 4096 entries to record tariff switching commands, mains failures, error messages, etc.
Parameter memory	Non volatile
Password memory	Code, 4 digits

7.3 Power supply

Power supply	85 to 265V AC/DC; 50/60Hz
Power consumption	15 VA

7.4 Hardware inputs

Digital inputs	As pulse counter input 1 to 5	Digital input for floating contact, S ₀ compatible, pulse length ≥ 30ms
	As status input	Digital input for floating contact, S ₀ compatible e.g. for the synchronization of measuring period; pulse length ≥ 250ms

7.5 Electrical connection

Connection elements		Screw-type terminal																				
Max. permissible cross-section of connecting cables		2.5 mm ²																				
Input power supply	Fuse protection	F1: Recommended 1AT < fuse < 4 AT																				
KBR eBus connection	Connection material	For proper operation please only use shielded twisted-pair cables; e.g. I-Y(St)Y 2x2x0.8																				
Pulse inputs	Connection & Cables	Make sure the polarity is correct!																				
Synchronous input	Connection & Cables	Make sure the polarity is correct!																				
KBR eBus connection	Via RS-485	<table border="0"> <tr> <td>Device</td> <td></td> <td>MULTIMASTER</td> <td>or</td> <td>interface adapter</td> </tr> <tr> <td>terminal 90 (⊥)</td> <td>→</td> <td>Pin ⊥</td> <td>→</td> <td>see software manual</td> </tr> <tr> <td>terminal 91 (A)</td> <td>→</td> <td>Pin A</td> <td>→</td> <td>see software manual</td> </tr> <tr> <td>terminal 92 (B)</td> <td>→</td> <td>Pin B</td> <td>→</td> <td>see software manual</td> </tr> </table>	Device		MULTIMASTER	or	interface adapter	terminal 90 (⊥)	→	Pin ⊥	→	see software manual	terminal 91 (A)	→	Pin A	→	see software manual	terminal 92 (B)	→	Pin B	→	see software manual
Device		MULTIMASTER	or	interface adapter																		
terminal 90 (⊥)	→	Pin ⊥	→	see software manual																		
terminal 91 (A)	→	Pin A	→	see software manual																		
terminal 92 (B)	→	Pin B	→	see software manual																		

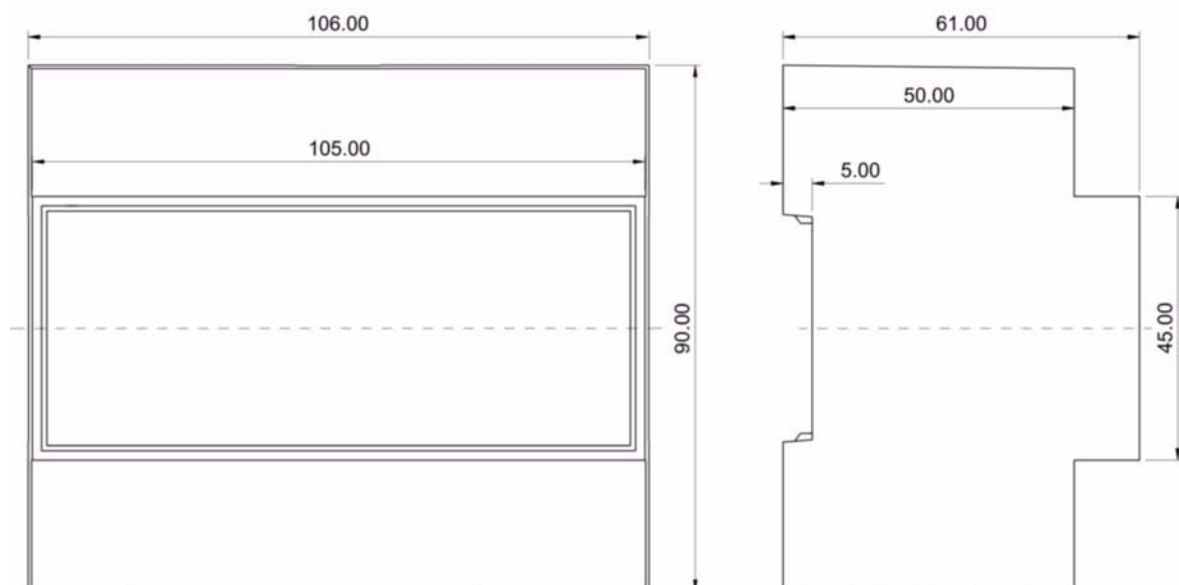
7.6 Hardware outputs

Interface	Serial interface	RS-485 for connection to the KBR eBus; a max. of 32 devices per bus segment, up to 1000 m without bus amplifier if cables suitably laid, for additional information see installation guidelines KBR eBus
	Transmission speed	38400 Baud
	Bus protocol	KBR eBus
	KBR eBus assignment	Can be addressed up to address 9999 via software, scanning mode can be activated on the device
Module bus interface	Serial interface	RS-485 (RJ12) for ready-made KBR system cable (modular cable 6-pin, unshielded), max. length 30 m if cables suitably installed
Relay outputs	Stages	5 relays
	Switching capacity	250V (AC) / 2A per relay, potential dependent on shared connection
Alarm relay	Switching capacity	250V (AC) / 2A potential-free
1 Digital output	S ₀ compatible	max. 35V / 50mA

7.7 Mechanical data

Top hat rail device	Housing measures	90 x 106 x 2.40 in (H x W x D)
	Mounting type	Wall mounting on DIN rail 7.5 mm deep, in accordance with DIN EN 50022 Suitable for distribution board mounting
	Weight	Approx. 650g

7.8 Dimensioned drawing



7.9 Environmental conditions / electrical safety

Ambient conditions	Standards	DIN EN 60721-3-3/A2: 1997-07; 3K5+3Z11; (IEC721-3-3; 3K5+3Z11)
	Operating temperature	-5°C ... +55°C
	Humidity	5% ... 95%
	Storage temperature	-25°C ... +70°C
Electrical safety	Standards and amendments	DIN EN 61010-1: Aug. 2002 (IEC1010-1/A2)
	Protection class	I, in accordance with DIN EN 61010-/Aug. 2002
	Overvoltage category	CAT III: U_{PH-PH} up to 400V
	Mode of protection	IP20 in accordance with DIN EN 40050 Part 9: 1993-05
	Electromagnetic compatibility	DIN EN 61000-6-2: 2000-03; (IEC 61000-6-2) DIN EN 61000-6-3: 2000-03; (IEC 61000-6-3); 2005 - 06

7.10 Serial interface

7.10.1 Operating modes and interface configuration

7.10.2 RS-485 bus operation

The RS-485 port of the multisio 5D6-ESBS-5DI6RO1DO is designed for operation at the KBR eBus. You can operate one or several multisio 5D6-ESBS-5DI6RO1DO devices together on the KBR eBus across great distances. Connecting the bus to a computer is typically done via the KBR eBus-TCP gateway. With the corresponding Windows® software, all bus devices can be configured and visualized. We will be glad to provide information on which other devices you can connect to the KBR eBus and on the functions of our software. Information on the structure and the technical parameters of the KBE eBUS can be found in our installation guide for the KBR eBus. Just send a request for this installation guide.

7.11 Protective measures

7.11.1 Overvoltage and lightning protection

We recommend that you install overvoltage protection in order to prevent damage to our high-quality electronic products. It is recommended to protect control voltage inputs and pulse lines.

8 Error detection

No function.

Check the power supply, back-up fuse and supply line.

No display of pulse inputs (LED's flash)

Check supply line. Check that the polarity of inputs is connected properly.

9 Appendix

9.1 General technical data of modules

Power supply:	Via module bus	24VDC / approx. 2W
	Connection	Modular socket contact RJ12:6P6C
Module bus interface:	Serial port	RS-485
	Module bus connection	RJ12 for ready-made KBR system cable, max. length 30 m if cables suitably laid
	Transmission speed	38400 bps
	Bus protocol	KBR-module bus
Mechanical data:		
Top hat rail device	Housing measures	90 x 36 x 2.40 in (H x W x D)
	Mounting type	Wall assembly on DIN rail 7.5 mm deep, in accordance with DIN EN 50022. Suitable for distribution board mounting
	Weight	Approx. 100g
Standards and Miscellaneous		
Environmental conditions:	Standards	DIN EN 60721-3-3/A2: 1997-07; 3K5+3Z11; (IEC721-3-3; 3K5+3Z11)
	Operating temperature	-5°C ... +55°C
	Humidity	5% ... 95%, non-condensing
	Storage temperature	-25°C ... +70°C
Electrical safety:	Standards	DIN EN 61010-1/A2: 2001 + B1: 2002-11 + B2: 2004-1; (IEC1010-1/A2)
	Mode of protection	IP20 in accordance with DIN EN 40050 Part 9:1993-05
	Electromagnetic compatibility	DIN EN 61000-6-3: 2001 + A11: 2004; (IEC61000-6-3) DIN EN 61000-6-2: 2001 (IEC61000-6-2)

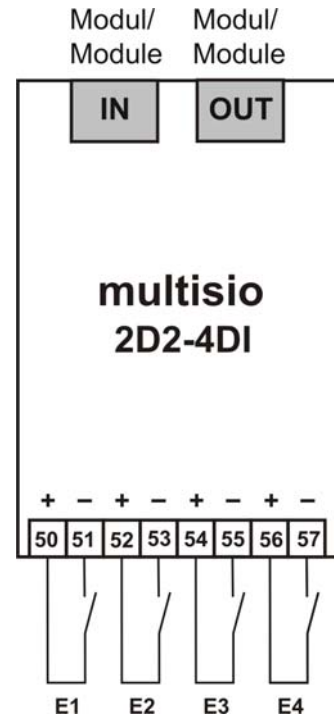
9.2 Digital input module multisio 2D2-4DI

9.2.1 Digital input module connection chart

Terminal assignment

Terminal 50:	Digital input 1 +
Terminal 51:	Digital input 1 -
Terminal 52:	Digital input 2 +
Terminal 53:	Digital input 2 -
Terminal 54:	Digital input 3 +
Terminal 55:	Digital input 3 -
Terminal 56:	Digital input 4 +
Terminal 57:	Digital input 4 -

IN / OUT: Module bus / supply voltage



b

Note:

The inputs of the module are designed as floating, S_0 compatible inputs. The minus - connection terminals are combined in the device.

9.2.2 Function of the scan button

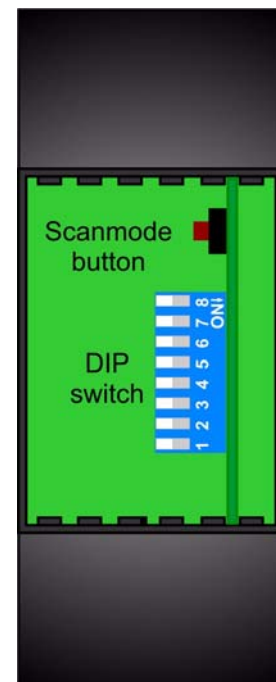
b

Note

If the scan button is briefly pressed, the module will change to scanning mode.

Switch setting in illustration:

OFF = white
ON = grey



9.2.3 Digital input module LED display

The LEDs on the digital input module display the current status of the digital input. If the input is active, then the LED is switched on. If the input is passive, the LED is switched off.

All 4 input LEDs flash in the KBR eBus scanning mode.
In the module detection mode, a running light is emitted with the input LEDs.

- LED1: Digital input 1
- LED2: Digital input 2
- LED3: Digital input 3
- LED4: Digital input 4

- Power LED: Operating voltage

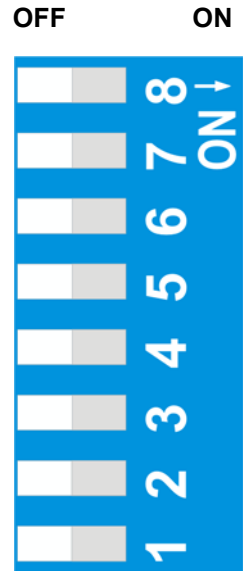


Module-specific technical data:		
Hardware inputs:		
4 Digital inputs	S ₀ compatible	< 2 mA = off, > 10 mA = on
	Output voltage	< 24 VDC, check that the polarity is correct
	Output current	<= 15 mA
	Plug-in terminal, 8 pins	
Display	LED	4x message 1x operational display
Operating unit	DIP switch	1x 8-channel, input configuration
	Buttons	Scan button - module bus

9.2.4 Function of the DIP switches

Manual operation:

Each input can be individually set to manual operation. If the DIP switch of a channel is set to "OFF", the input state is accepted. If the DIP switch of a channel is set to "ON", the input state is set to active, irrespective of the actual input state.



DIP	OFF	ON		
		OFF	ON	
S8	automatic	address		Input 4
S7	automatic	address		Input 3
S6	automatic	manual		Input 2
S5	automatic	manual		Input 1
S4	no function	OFF	ON	Input 4
		passive / off	active / on	
S3	no function	passive / off	active / on	Input 3
S2	no function	passive / off	active / on	Input 2
S1	no function	passive / off	active / on	Input 1

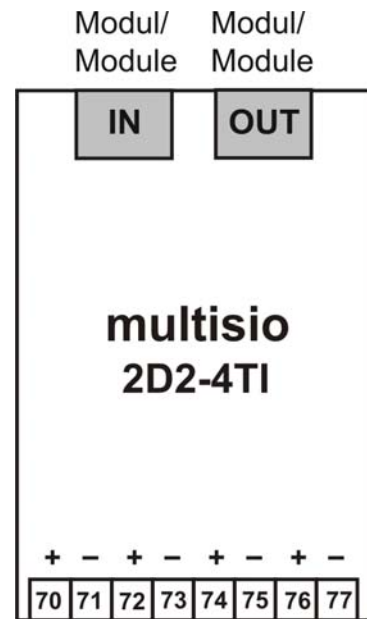
9.3 Temperature input module multio 2D2-4TI

9.3.1 Temperature module connection chart

Terminal assignment

Terminal 70:	Temperature input 1 +
Terminal 71:	Temperature input 1 -
Terminal 72:	Temperature input 2 +
Terminal 73:	Temperature input 2 -
Terminal 74:	Temperature input 3 +
Terminal 75:	Temperature input 3 -
Terminal 76:	Temperature input 4 +
Terminal 77:	Temperature input 4 -

IN / OUT: Module bus / supply voltage



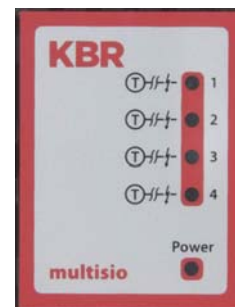
9.3.2 Temperature module LED display

All 4 input LEDs flash in the KBR eBus scanning mode.

In the module detection mode, a running light is emitted with the input LEDs.

LED1 for:	Input 1
LED2 for:	Input 2
LED3 for:	Input 3
LED4 for:	Input 4

Power LED: Operating voltage is applied



The LEDs on the 4-fold temperature module are on if a sensor is connected and the values are measured within the set limits. The LEDs go off if no sensor is connected or the sensor is short-circuited.

9.3.3 Function of the scan button

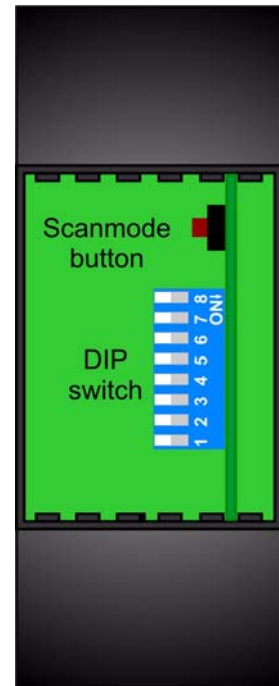
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Note

If the scan button is briefly pressed, the module will change to scanning mode.

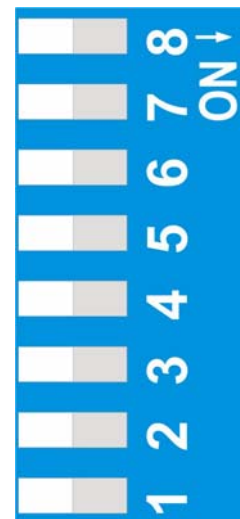
Switch setting in illustration:

OFF = white
ON = grey



9.3.4 Function of the DIP switch

- S8: OFF = no function, ON = line calibration with S4 released
- S7: OFF = no function, ON = line calibration with S3 released
- S6: OFF = no function, ON = line calibration with S2 released
- S5: OFF = no function, ON = line calibration with S1 released
- S4: OFF = no function, ON = no function
Switching from ON to OFF line calibration Input 4, if S8 is switched off
- S3: OFF = no function, ON = no function
Switching from ON to OFF line calibration Input 3, if S7 is switched on
- S2: OFF = no function, ON = no function
Switching from ON to OFF line calibration Input 2, if S6 is switched on
- S1: OFF = no function, ON = no function
Switching from ON to OFF line calibration Input 1, if S5 is switched on



a

Caution!

When switching DIP switches S1 to S4 from ON to OFF the connection lead of the corresponding input is calibrated. For the calibration an adapter (obtained from KBR) is connected instead of the sensor.

Module-specific technical data:		
Hardware inputs:		
4 Temperature inputs	Plug-in terminal 8-pin	For sensor PT-1000
Measuring range see nameplate	Design 1	-20°C to +80°C +/- 1°C
	Design 2	-40°C to + 40°C +/- 1°C
Display	LED	4x message 1x operational display
Operating unit	DIP switch	1x 8-channel, for sensor selection and line calibration
	Buttons	Scan button - module bus

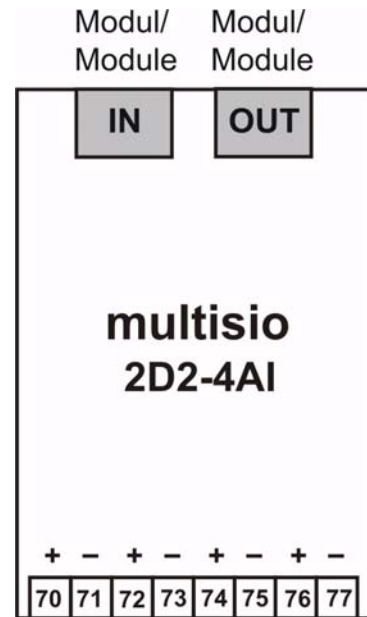
9.4 Analog input module multio 2D2-4AI

9.4.1 Analog input module connection chart

Terminal assignment

Terminal 70: Analog input 1 +
 Terminal 71: Analog input 1 -
 Terminal 72: Analog input 2 +
 Terminal 73: Analog input 2 -
 Terminal 74: Analog input 3 +
 Terminal 75: Analog input 3 -
 Terminal 76: Analog input 4 +
 Terminal 77: Analog input 4 -

IN / OUT: Module bus / supply voltage

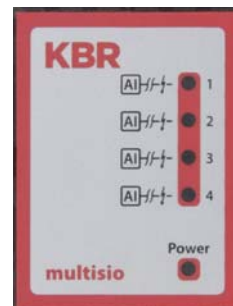


9.4.2 Analog input module LED display

All 4 input LEDs flash in the KBR eBus scanning mode.
 In the module detection mode, a running light is emitted with the input LEDs.

LED1 for: Input 1
 LED2 for: Input 2
 LED3 for: Input 3
 LED4 for: Input 4

Power LED: Operating voltage is applied



b

Note:

When used on the basic multio 5D6 device, the module is always in 0-20mA / 0-10V mode, i.e. the LEDs for inputs 1 - 4 are always on). Conversion of 4-20mA / 2-10V is undertaken in the basic multio 5D6 device.

9.4.3 Function of the scan button

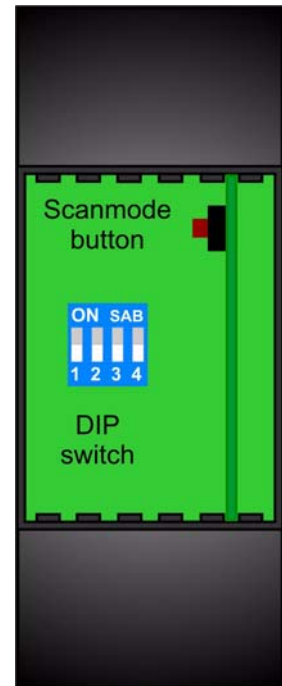
b

Note

If the scan button is briefly pressed, the module will change to scanning mode.

Switch setting in illustration = OFF

OFF = white
ON = grey



9.4.4 Function of the DIP switch

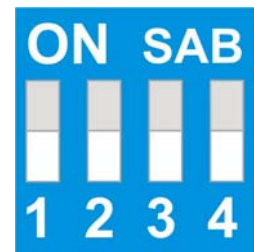
Switching inputs 1 to 4:

With switch position off:

- S1 = 0 / 2 – 10V
- S2 = 0 / 2 – 10V
- S3 = 0 / 2 – 10V
- S4 = 0 / 2 – 10V

With switch position on:

- S1 = 0 / 4 – 20mA
- S2 = 0 / 4 – 20mA
- S3 = 0 / 4 – 20mA
- S4 = 0 / 4 – 20mA



Switch setting in illustration = OFF:

OFF = white
ON = grey

Module-specific technical data:		
Hardware inputs:		
4 analog inputs	Measuring range	0/4 - 20 mA, 0/2 - 10 V
	Plug-in terminal 8-pin	
Display	LED	4x message 1x operational display
Operating unit	DIP switch	1x 4-channel, input configuration
	Buttons	Scan button - module bus

9.5 Current measuring module multisio 1D2-4CI

a

Caution

It is essential that the multisio 1D2-4CI is operated with series-connected current transformers! These must not be grounded in a secondary circuit.

Up to 690V power supply (phase-phase voltage), the series-connected current transformers must be designed for a test voltage of at least 2500VAC for 1 minute.

9.5.1 Current measuring module connection chart

Terminal assignment

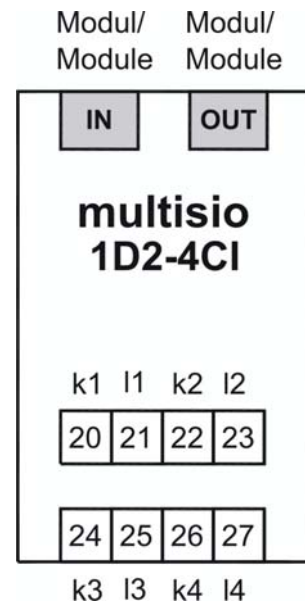
Upper terminal row:

Terminal 20: Current input k1
Terminal 21: Current input l1
Terminal 22: Current input k2
Terminal 23: Current input l2

Lower terminal row:

Terminal 24: Current input k3
Terminal 25: Current input l3
Terminal 26: Current input k4
Terminal 27: Current input l4

IN / OUT: Module bus / supply voltage



a

Note

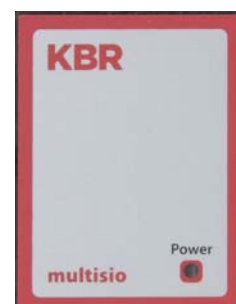
Connecting the current transformer must be done according to the numbering of the terminals, i.e. transformer 1 to terminal 20/21, transformer 2 to terminal 22/23 etc.!

The current inputs of the module are not electrically isolated from each other!

9.5.2 Current measuring module LED display

In KBR eBus scanning mode, the Power LED flashes quickly, in the detection mode slowly. The LEDs are lit up permanently in normal mode.

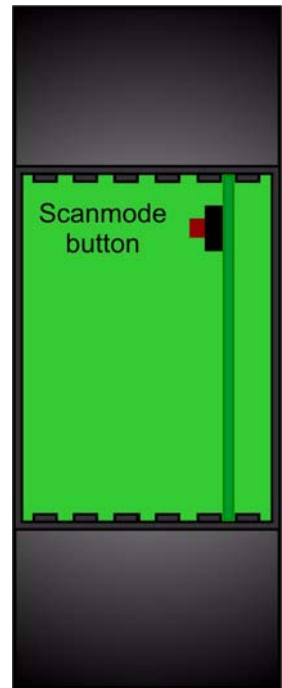
Power - LED: Operating voltage



9.5.3 Function of the scan button

b

Note
 If the scan button is briefly pressed (until all LEDs briefly light up), the module will change to scanning mode.



Module-specific technical data:		
Hardware inputs:		
4 current measuring inputs	Measuring range	0 to 6A AC
	Plug-in terminal 2x 4-pin	Permissible cross section of the connection lines 2.5mm ²
Measuring current input	Fuse protection	NONE!!!
		Always short-circuit current transformer terminals k and l prior to opening the circuit!
Display	LED	1x operational display / status display
Operating unit	Buttons	Scan button - module bus

9.6 Temperature module multisio 2D2-1TI2RO

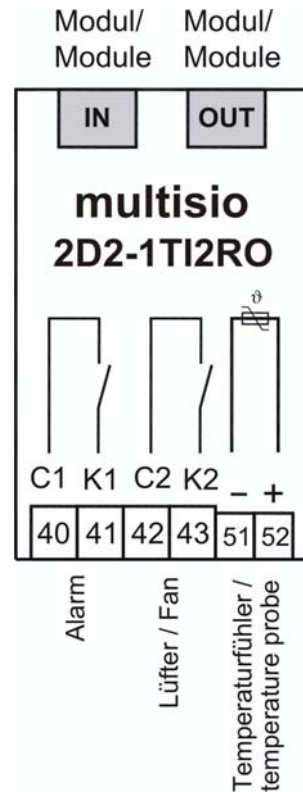
9.6.1 Temperature module connection chart

Terminal assignment

Terminal 40: Relay input	Alarm
Terminal 41: Relay output	Alarm
Terminal 42: Relay input	Fan
Terminal 43: Relay output	Fan

Terminal 51: Temperature input - PT1000
Terminal 52: Temperature input + PT1000

IN / OUT: Module bus / supply voltage



Note

The relay outputs of the module are designed as floating outputs.

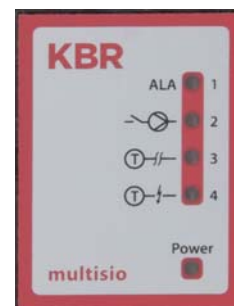
9.6.2 Temperature module LED display

All 4 input LEDs flash in the KBR eBus scanning mode.
In the module detection mode, a running light is emitted with the input LEDs.

The displays are:

LED1 on:	Alarm relay switched (contact open)
LED2 on:	Fan relay closed
LED3 on:	Temperature sensor interrupted
LED4 on:	Temperature sensor short circuit

Power LED: Operating voltage



9.6.3 Function of the scan button

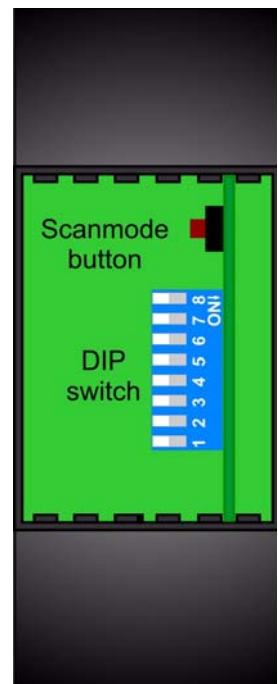
b

Note

If the scan button is briefly pressed (until all LEDs briefly light up), the module will change to scanning mode.

Switch setting in illustration:

OFF = white
ON = grey



9.6.4 Function of the DIP switch

With switch position off:

S8 = no function

S7 = no function

S6 = fan relay automatic

S5 = alarm relay automatic

S4 = no function

S3 = no function

S2 = fan relay off (if S6 set to manual)

S1 = alarm relay off (if S5 set to manual)

With switch position on:

S8 = no function

S7 = no function

S6 = fan relay manual

S5 = alarm relay manual

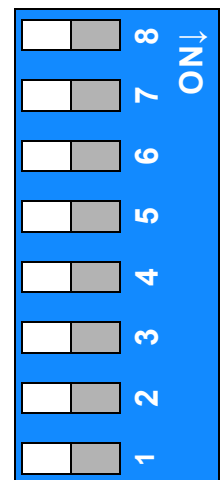
S4 = no function

S3 = no function

S2 = fan relay on (if S6 set to manual)

S1 = alarm relay on (if S5 set to manual)

Off On



Module-specific technical data:		
Hardware inputs:		
Temperature inputs	Measuring range	-20°C to +100°C +/- 2°C
	Plug-in terminal 2-pin	For PT-1000 sensor
Hardware outputs:		
2 Relay outputs	Plug-in terminal 4-pin	Floating
	Contact capacity	Each 500VA, 2A, 250V 50/60Hz
	Overvoltage category	CAT II
Display	LED	4x message 1x operational display
Operating unit	DIP switch	1x 8-channel, for manual operation
	Buttons	Scan button - module bus

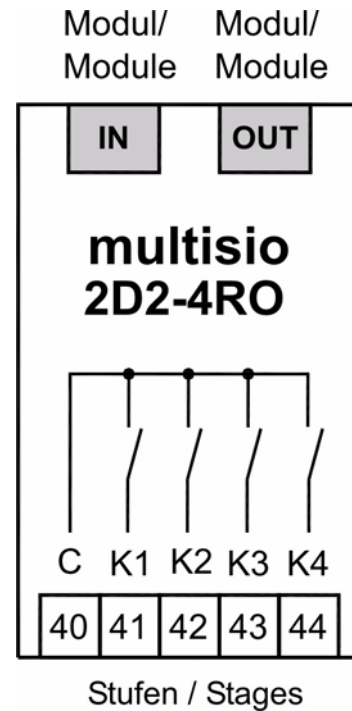
9.7 Relay output module multisiso 2D2-4RO

9.7.1 Relay module connection chart

Terminal assignment

- Terminal 40: Shared connection (C)
- Terminal 41: Output relay 1 (K1)
- Terminal 42: Output relay 2 (K2)
- Terminal 43: Output relay 3 (K3)
- Terminal 44: Output relay 4 (K1)

IN / OUT: Module bus / supply voltage



9.7.2 Relay output module LED display

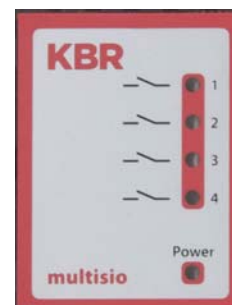
The LEDs on the output module relay display the current status of the relay output. If the output is active, then the LED is switched on. If the output is passive, the LED is switched off.

All 4 output LEDs flash in the KBR eBus scanning mode.
In the module detection mode, a running light is emitted with the output LEDs.

The displays are:

- LED1 for: Output relay 1 (K1) switched
- LED2 for: Output relay 2 (K2) switched
- LED3 for: Output relay 3 (K3) switched
- LED4 for: Output relay 4 (K4) switched

Power LED: Operating voltage



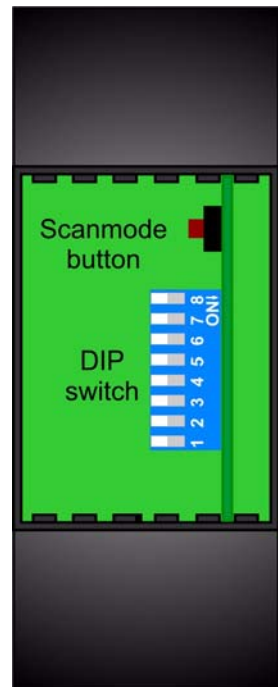
9.7.3 Function of the scan button

b

Note
 If the scan button is briefly pressed, the module will change to scanning mode.

Switch setting in illustration:

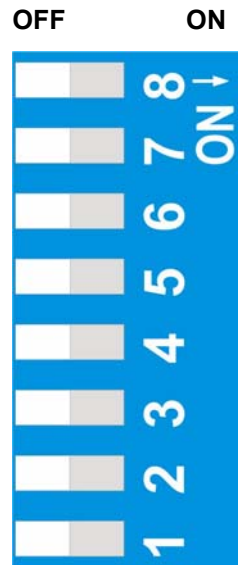
OFF = white
 ON = grey



9.7.4 Function of the DIP switch

Manual operation:

It is possible to set every output to manually active. If the DIP switch for the channel is set to "OFF", the output status is determined inside the module. If the DIP switch is set to "ON", the status for this output is kept to active, independent of the actual status of the output recorded.



DIP	OFF		ON	
	passive / off	active / on	passive / off	active / on
S8	automatic		assign	Output 4
S7	automatic		assign	Output 3
S6	automatic		assign	Output 2
S5	automatic		assign	Output 1
S4	no function	OFF	ON	Output 4
		passive / off	active / on	
S3	no function	passive / off	active / on	Output 3
S2	no function	passive / off	active / on	Output 2
S1	no function	passive / off	active / on	Output 1

Module-specific technical data:		
Hardware outputs:		
	Plug-in terminal 5-pin	
Supply voltage for relay outputs:	Terminal 40	Floating
4 Relay outputs	Terminal 41 to 44	Floating
	Contact capacity	each 500VA, 2A, 250V 50/60Hz
	Overvoltage category	CAT II
Display	LED	4x message 1x operational display
Operating unit	DIP switch	1x 8-channel, for manual operation
	Buttons	Scan button - module bus

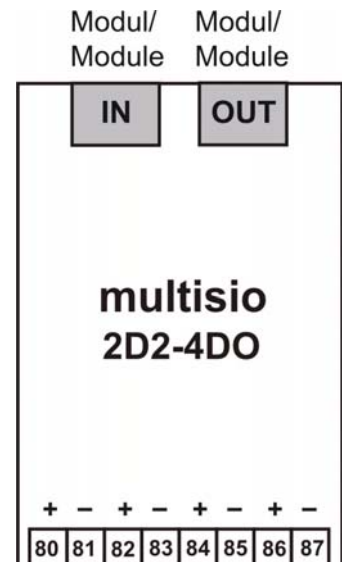
9.8 Digital output module multisio 2D2-4DO

9.8.1 Digital output module connection chart

Terminal assignment

Terminal 80:	Digital output 1 +
Terminal 81:	Digital output 1 -
Terminal 82:	Digital output 2 +
Terminal 83:	Digital output 2 -
Terminal 84:	Digital output 3 +
Terminal 85:	Digital output 3 -
Terminal 86:	Digital output 4 +
Terminal 87:	Digital output 4 -

IN / OUT: Module bus / supply voltage



9.8.2 Digital output module LED display

All 4 input LEDs flash in the KBR eBus scanning mode.
 In the module detection mode, a running light is emitted with the output LEDs.
 A flashing LED indicates that the corresponding digital output is switched to manual operation.

The displays are:

- LED1 for output 1
- LED2 for output 2
- LED3 for output 3
- LED4 for output 4

Power - LED on: Operating voltage is applied



The LEDs on the digital output module display the current status of the digital output. If the output is active, then the LED is switched on. If the output is passive, the LED is switched off.

9.8.3 Function of the scan button

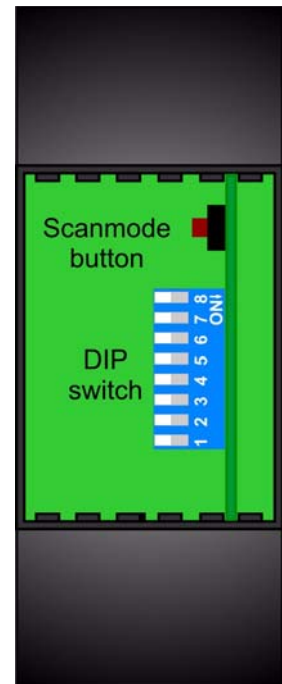
b

Note

If the scan button is briefly pressed, the module will change to scanning mode.

Switch setting in illustration:

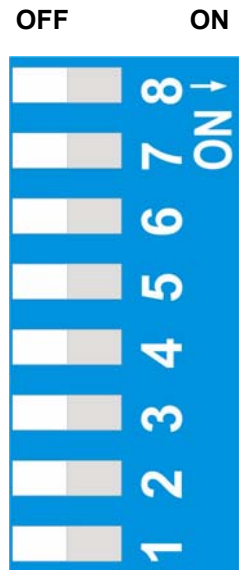
OFF = white
ON = grey



9.8.4 Function of the DIP switch

Manual operation:

It is possible to set every output to manually active. If the DIP switch for the channel is set to "OFF", the output status is determined inside the module. If the DIP switch is set to "ON", the status for this output is kept to active, independent of the actual status of the output recorded.



DIP	OFF		ON		
S8	automatic		assign		Output 4
S7	automatic		assign		Output 3
S6	automatic		assign		Output 2
S5	automatic		assign		Output 1
S4	no function	OFF	ON		Output 4
		passive / off	active / on		
S3	no function	passive / off	active / on		Output 3
S2	no function	passive / off	active / on		Output 2
S1	no function	passive / off	active / on		Output 1

Module-specific technical data:		
Hardware outputs:		
4 Digital outputs	S ₀ compatible	max. 35V / 50mA
	Plug-in terminal 8-pin	
Display	LED	4x message 1x operational display
Operating unit	DIP switch	1x 8-channel, output configuration
	Buttons	Scan button - module bus

**ERKLÄRUNG DER KONFORMITÄT
DECLARATION OF CONFORMITY
DÉCLARATION DE CONFORMITÉ**

Wir **KBR GmbH Schwabach**

We/Nous (Name des Anbieters / supplier's name / nom du fournisseur)

**Am Kieferschlag 7
D-91126 Schwabach**

(Anschrift / address / adresse)

erklären in alleiniger Verantwortung, dass das (die) Produkt(e) /
declare under our sole responsibility that the product(s) / Déclarons sous notre seule responsabilité, que le(s) produit(s)

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mit folgenden Europäischen Richtlinien übereinstimmt (übereinstimmen)
is (are) in conformity with the following directives / Répondet(ent) aux directives suivantes

Niederspannungsrichtlinie Nr.
Low Voltage Directive No.
Directive Basse Tension N°

EMV-Richtlinie Nr.
EMV Directive No.
EMV Directive N°

2006/95/EG
2006/95/EC
2006/95/CE

2004/108/EG
2004/108/EC
2004/108/CE

Dies wird nachgewiesen durch die Einhaltung folgender Norm(en)

This is documented by the accordance with the following standard(s) / Justifié par le respect de la (des) norme(s) suivante(s)

DIN EN 61010-1-2002;

DIN EN 61010-1/B1:2002

DIN EN 61010-1/B2:2004

DIN EN 61000-6-1:2007

DIN EN 61000-6-2:2006

DIN EN 61000-6-3:2007

DIN EN 61000-6-4:2007

(Titel und/oder Nr. sowie Ausgabedatum der Norm(en))

Title and/or number and date of issue of the standard(s)

Titre et/ou numéro et date d'édition de la (des) norme(s)



Schwabach, 14.03.2011

(Ort und Datum der Ausstellung)

Place and date of issue

Lieu et date de l'édition)



Geschäftsführer

General manager

