Sub-distributor for Central Power Supply System with Central Battery and Microprocessor-Based Function Control System

multiControl *plus* Sub-distributor – Single wire power supply

Illustration

RP-Technik Notstromsysteme

Customer order No.:	
Manufacturer No.:	
Commissioning / Object:	
Device No.:	

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Subject to technical and eidtorial changes.

Inhalt

multiControl *plus* Sub-distributor – Single wire power supply

Setup & Commissioning

1 General

This instruction manual is aimed at electrically skilled people according to DIN VDE 0105 or authorised technical staff and explains the safe and professional handling of the central battery system. The general safety regulations and the local accident prevention regulations which are valid for the area of use as well as safety instructions have to be observed. The instruction manual, especially the chapter safety, has to be read completely prior to any works on the system.

1.1 Further applicable documents

Components from other manufacturers are mounted in the systems. The manufacturers of these components carried out a hazard assessment and declared their compliance with existing European and national regulations.

1.2 Liability and warranty

This instruction manual was created considering existing standards. It has to be kept near the system and easily accessible for all staff working on and with the system.
Additionally, all laws, standards and regulations of the country, in which the system is mounted and operated, have to be observed.
The manufacturer does not assume liability or warranty for damages or consequential damages occurring through:

- non-intended use
- non-authorised or non-professional changes of the connections, settings or programming of the system
- non-observance of rules and regulations for safe operation
- Operation of unauthorised or unsuitable devices on the Low Power System

1.3 Copyright protection

1.4 Spare parts

Only original spare parts of the manufacturer must be used. Wrong or defective spare parts can lead to damages, malfunctions or total failure of the system. Furthermore, the use of unauthorised spare parts voids all guarantee, warranty, service, compensation, and liability claims.

1.5 Disposal

Packaging materials are no waste but reusable materials which have to be recycled.

Batteries and electronic components contain materials which can lead to damages to health and the environment when inappropriately disposed. National rules and regulations for the appropriate disposal of used batteries and electronic components have to be observed!

2 Safety

The sub-distributor is safe to operate and complies with valid and recognised rules of engineering at the time of its development and production. There is, however, the risk of danger when the system is used by non-professional staff or when it is used in a non-professional or non-intended way.
The system and the connected parts must only be operated in perfect condition. The following have to be observed:

- safety instructions and hazard notes in the instruction manual
- specified work and safety instructions of the operator

Errors which influence the function or safety of the system have to be reported to the responsible person and cleared immediately.

2.1 Content of the instruction manual

Each person working on or with the system has to read and understand the instruction manual completely prior to any work on the system or battery, even when this person has already worked with this system or a similar one or has been trained by the manufacturer.

2.2 Changes and modifications of the system

Any changes or extensions to the system, which are not authorised by the manufacturer, are prohibited in order to avoid hazards and to guarantee an optimal performance of the system. Extensions, modifications or maintainance works, which are not described in the instruction manual, have to be carried out by trained service personnel only!

2.3 Responsibility of the operator

As described in point 1.2, this instruction manual has to be kept near the system and easily accessible for all staff working on and with the system.
The system must only be operated in technically perfect and operationally reliable condition. Additionally, prior to its commissioning, the system has to be checked for intactness.

2.4 Staff requirements

Only skilled technicians or authorised qualified personnel are permitted to work on or with the system after being briefed about possible hazards.
Staff are considered qualified if they are able to judge the work to be done and recognise possible hazards based on their training, expertise and experiences as well as their knowledge of the respective regulations.

If the staff lacks the necessary knowledge, they need to get a professional instruction. You also have to make sure that the tasks are clearly defined and understood and the works are carried out under supervision of skilled technicians.

2.5 Safe at work

Observance of safety notes and instructions is the basis of safe working and thus damage to persons and property while working on and with the system can be avoided.

The following organisational measures have to be defined in writing and observed:

- safety measures during the work e.g. disconnecting the power supply and securing it against reconnection, standby lighting
- protection and safety devices against hazards from neighbouring parts of the system
- protection and safety devices for personnel working on the system
- obligation to inform and report on beginning, duration and ending of the works

Observe ESD-protection while working on the system!

2.6 Personal protection equipment

Always wear protection gear while working on and with the system:

protective clothing (tight-fitting, low tensile strength, no wide sleeves, no rings or other jewellery)
safety shoes (ESD-shoes according to standard EN 345)

3 Preface

Thank you very much for buying a "multiControl *plus* Sub-distributor – single wire power supply (MCUV-E)".

The MCUV-E represents the latest series of sub-distributors for multiControl plus systems.
It offers the possibility to outsource individual circuit modules (DIN rail module TSM32) of the multiControl plus or midiControl *plus* in a separate housing. For large objects, this offers the possibility of saving cable ways and thus installation material.

Power is supplied in single-wire technology by AC/DC switching in the multiControl plus/midiControl *plus* main system. This means that the MCUV-E is supplied with AC voltage as long as the main system is operating in mains mode. During a mains failure or test operation, the MCUV-E is supplied with DC voltage. Thus, in contrast to conventional systems with two supply lines (AC line and DC line), only one supply line (AC / DC line) is required, which can be achieved further savings of installation material.

Each subdistributor has 4 separate CCIFs, allowing 4 closed loop loops to be individually monitored on each MCUV-E.

On request, the MCUV-E can be ordered with an integrated SAM24 module.

As an option, an additional power supply from a local general light distributor is available. In this way, a tenant-related energy supply of the luminaires connected to the MCUV-E can be realized. When the system is ready for operation, the luminaires are supplied by the supply of the local general light distributor. Only when the voltage from the general light distributor or priority emergency or test operation by the main system fails, the luminaires are supplied from the main system via single wire power supply.
This system complies with the standards DIN EN 50171, DIN EN 50172, DIN VDE 0100-560, DIN VDE 0108-100 as well as DIN VDE 0100-718 (versions relevant on delivery) and guarantees the correct functioning of your emergency lighting system by means of a state-of-the-art micro-processor-controlled function control system. This documentation has been created for you to quickly commission and operate the system in an uncomplicated way.

We recommend the following course of action:

1. Observe the relevant danger signs and safety instructions (chapter 4)
2. Make yourself familiar with the design of the MCUV-E system (chapter 6)
3. Commission the system (chapter 8)

The exact circuit diagram along with other information on your system can be found in the attachment of this document.

Note: For maintenance works and modifications the system has to be de-energised by a specialist. The necessary steps are described in chapter 9.

3.1 Installation location and environmental conditions

The system and the battery system can be operated at an altitude of up to 2000m above standard elevation zero, without any power reduction, and must be placed in an appropriate room satisfying the following environmental condition:

- Air temperature: 0°C to 35 °C
- Humidity: up to 85% max. (non-condensing, refer to DIN EN 50171)

Also, please make sure that the room fulfills the conditions corresponding to the protection class of the system (see DIN EN 60529 and 60598).
The LAR of the respective federal states is used for distributors of the safety lighting! The EltBauVO only applies in connection with battery systems and associated power supply systems and the construction of electrical rooms.

Note: The system must be located in the building such that the allowed cable lengths allowed for emergency lighting circuits will not be exceeded.

4 Danger and information signs

Please strongly obey the safety instructions when installing and using your multiControl *plus* Sub-distributor system.

	• Observe instructions and keep them located near the battery system for future reference! • Work on the battery system should only be carried out by qualified personnel! • No guaranty in cases of non-observance of instruction manual, repair using non-original parts or unauthorised intervention!
	• Do not smoke! Do not use any naked flame or other sources of ignition. There is the danger of explosion and fire hazards!
	• While working on batteries wear protective eye-glasses and clothing! • Observe the accident prevention rules as well as DIN VDE 0510, VDE 0105 part 1 (version relevant on delivery)!
	• Any acid splashes on the skin or in the eyes must be flushed with plenty of water immediately. Then seek medical assistance. Spillages on clothing should be rinsed out with water!
	• Explosion and fire hazard, avoid short circuits! Caution! Metal parts of the battery are always energised; therefore do not place items or tools on the battery!
	• Electrolyte is strongly corrosive and acidic. In normal working conditions the contact with electrolyte is nearly impossible; electrolyte may leak from the vent valves in case of overcharging the battery or in case of mechanical damage to the container. In case of any contact with electrolyte please flush with water abundantly and seek medical assistance.
	Batteries / cells are heavy! Ensure adequate mounting security and always use adequate handling equipment for transportation.
	Disposal of batteries Batteries marked with the recycling symbol should be processed via a recognised recycling agency. By agreement, they might be returned to the manufacturer. Batteries must not be mixed with domestic or industrial waste.

5 Scope of delivery

Included in the delivery of the multiControl *plus* Sub-distributor – single wire power supply system are:

- 1x system multiControl *plus* Sub-distributor – single wire power supply in wall mounted cabinet
- 1x brief instruction (this document)

Other tools and materials necessary for installation (brought by the installer):

- measuring device for voltage measurements of up to 500VAC or 300VDC
- slotted screw driver width 5.5mm
- hexagon socket wrench SW13 or slotted screw driver 10mm
- Phillips screw driver PZ2
- ¼“-tool with torque variable between 0 and 22Nm

6 System overview

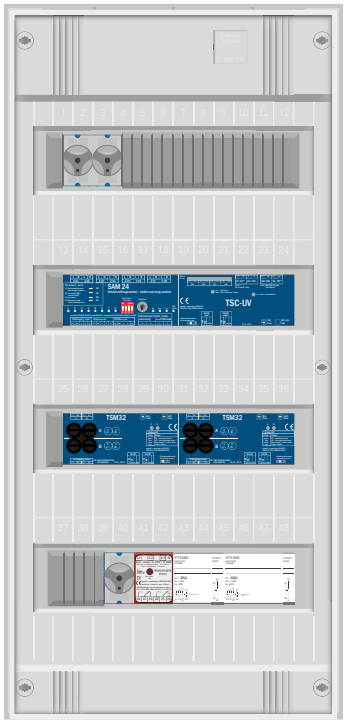


Figure 1: Front view

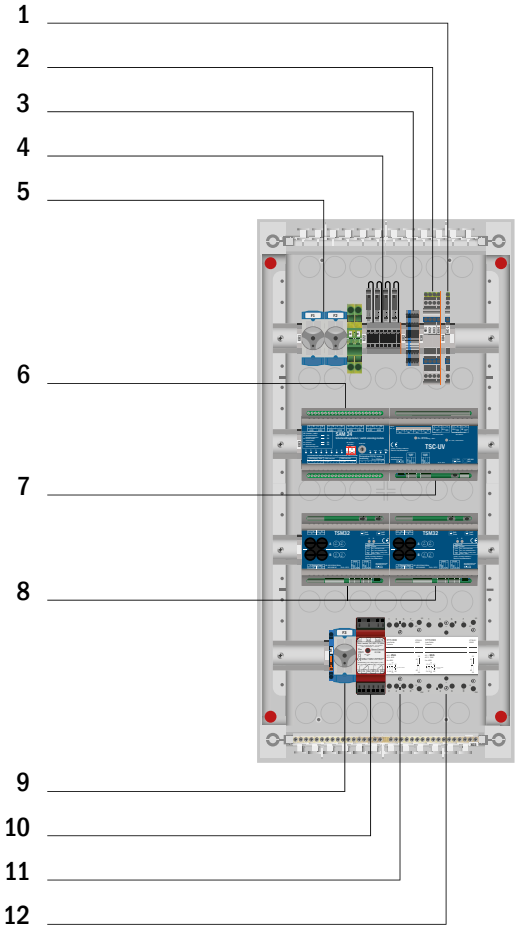


Figure 2: Inside view

1	AC-local supply*
2	Connection consumer
3	Connection data (RS485)
4	Connection critical circuit (CCIF)
5	Connection and fuse of single wire power supply
6	SAM24*
7	TSC-UV
8	TSM32
9	Fuse AC-local*
10	PC230*
11	K1*
12	K2*

*option

Similar to illustration.

7 Mounting and installation of the sub-distributor

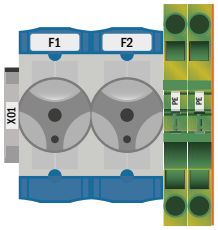
7.1 Connection of power supply

7.1.1 Single wire power supply (terminal X01)

Make sure that the mains power line is de-energised and dimensioned according to the maximum connected load. Connect the mains line to the mains terminals (Figure 1; No. 5) for which you have to remove the mains fuses. A through-wiring to the next MCUV-E is possible.

Caution: The mains power line gets energised at a later time (see chapter 8).

System type	F1 L/B+	F2 N/B-	type
MCUV-E02	16A	16A	D01



Fuse power supply

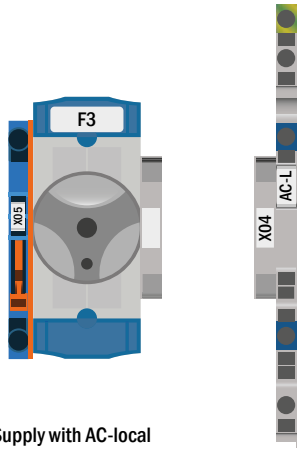
Figure 3: Connection power supply

7.1.2 AC-local supply (option, terminal X04)

Make sure that the mains power line is de-energised and dimensioned according to the maximum connected load.
Connect the supply line to the input fuse (Figure 1; No. 9) for which you have to remove the mains fuses.

Caution: The mains power line gets energised at a later time (see chapter 8).

System type	F3	type
MCUV-E02	16A	D01



Supply with AC-local

Figure 4: Mains connection (F3)

7.1.3 RS485 interface (terminal X02)

The RS485 interface is used for the data connection between the main system and the sub-distributor. To do this, use a shielded 4-core BUS cable (for example, J-Y(St)-Y)! A further wiring to the next MCUV-E is possible. The wiring of an additional branch line, from terminal block X02, is not permitted.

The use of NYM cables or similar is not permitted!

Note: The maximum cable length of all RS485 bus lines connected to the main system must not exceed a total length of 1000m in addition.

Note: During all installation work on the RS485 bus, the entire system must be de-energized.

Note: The whole communications strand of a MCUV-E must not be tapped from a COM2 of the SAM24.

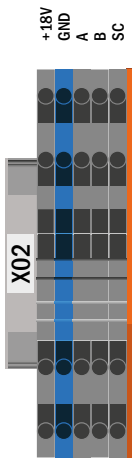


Figure 5: Connection data cable RS485

7.1.4 SAM24 switching inputs (option, terminal X03)

Combined with the switch query module, circuits or luminaires can be switched. Optionally, the MCUV-E can be equipped with a SAM24 module. To connect the 8 galvanic isolated switching inputs E1-E8, print terminals are available on the SAM24 module. A switching voltage (220/230V AC 50/60Hz, 24-255V DC) must be connected.

Detailed information on the SAM24 module can be found in the corresponding product information.

The connection is made directly to the SAM24 module.
The PE cores are connected to the busbar.

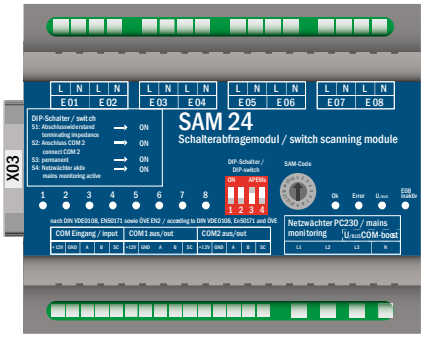


Figure 6: Connection SAM24 switching inputs

7.1.5 Connection CCIF (terminal X22)

The four integrated CCIFs are used to monitor separate quiescent current loops.

CCIF: The CCIF registers the interruption of the quiescent current loop and a clumping (short circuit of the line) and switches on the non-maintaind circuits / luminaires of the system. The quiescent current loop has 5V DC voltage. Refractory cable material is not necessary if the terminator is mounted on the last line monitor.

Applying voltage to these terminals is not permitted and will destroy the system!

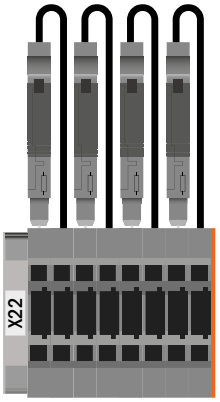


Figure 7: Connection quiescent current loop

7.1.6 Output circuits (terminal X30)

Figure 8 shows the terminal block X30 to which the consumer circuits (luminaires) can be connected. Pay attention to the correct polarity and use mains-compatible cables; comply with the standards MLAR, EltBauVo as well as DIN VDE 0100.

Note: The circuits to be connected have to be checked for installation errors such as short circuit and earth fault prior to connection.
Note: grey = Phase; blue = neutral conductor

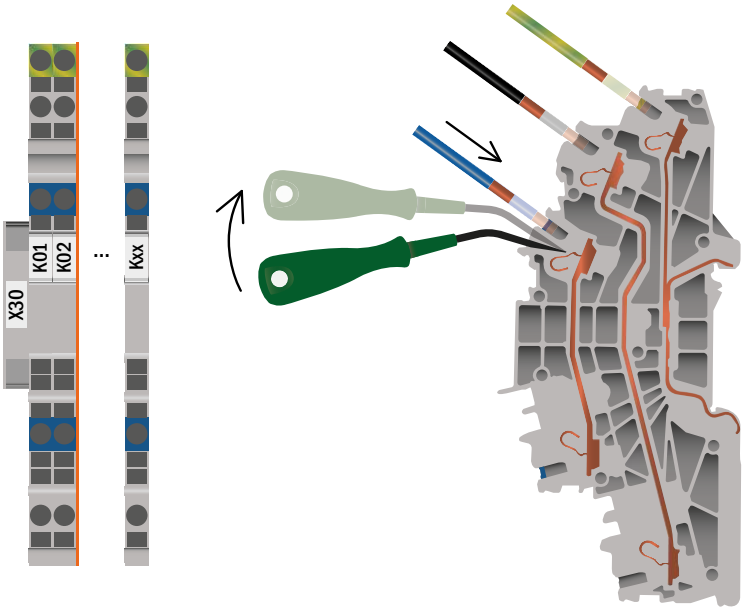


Figure 8: Connection output circuits - X30

8 Commissioning of the sub-distributor

8.1 Commissioning of the sub-distributor with single wire power supply

To commission the sub-distributor, the housing must be opened. Figure 1 shows schematically the view of the open sub-distributor. Now proceed as follows:

1. **De-energize the main system.** Under help of the documentation, de-energize the **main system**.

2. **Prepare supply voltage.** Insert the fuses "outgoing sub-distributor - ABUV" in the **main system**.

3. **Set up the power supply.** Energize the supply line between the main system and the multiControl sub-distributor by putting the main system back into operation. Check the correct assignment of the power supply to F1 / F2 or X01 by the following measurements. In case of a connection error, cancel commissioning:

At AC supply through the main system:

Voltage between L/+ and N/-	230V AC
Voltage between L/+ and PE	230V AC
Voltage between PE and N/-	0V

At DC supply through the main system:

Voltage between L/+ and N/-	240V DC – Pay attention to polarity!

4. **Switch on the sub-distributor.** Switch in the mains fuse F1/F2, the sub-distributor will start automatically.

Note: Please note that when the main system is ready for operation, the circuits in the MCUV-E switch on after the start. Perform installation work only on a de-energized system and pay attention to the 5 safety rules!

Note: When restarting the device, this must remain switched off for at least 20 seconds! Non-observance may cause communication problems during the start-up phase of the system.

8.2 Commissioning of the sub-distributor – single wire power supply and AC-local supply

1. **De-energize the main system.** Under help of the documentation, de-energize the **main system**.

2. **Prepare supply voltage.** Insert the fuses "outgoing sub-distributor - ABUV" in the **main system**.

3. **Set up the power supply. (Single wire power supply of the main system).** Energize the supply line between the main system and the multiControl sub-distributor by putting the main system back into operation. Check the correct assignment of the power supply to F1 / F2 or X01 by the following measurements. In case of a connection error, cancel commissioning:

At AC supply through main system:

Voltage between L/+ and N/-	230V AC
Voltage between L/+ and PE	230V AC
Voltage between PE and N/-	0V

At DC suppy through main system:
Voltage between L/+ and N/- 240V DC – Pay attention to polarity!

4. **Set up the power supply (AC-local supply).** Energize the supply line between the general light distributor and the multiControl sub-distributor by using the fuse in the general light distributor. Check the correct assignment of the power supply to F3 or X04 by the following measurements. In case of a connection error, cancel commissioning:

Voltage between L and N	230V AC
Voltage between L and PE	230V AC
Voltage between PE and N	0V

5. **Switch on the sub-distributor.** Switch in the mains fuse F1/F2, the sub-distributor will start automatically.

6. **Switch on the AC-local supply voltage.** Insert fuse F3.

Note: If only the voltage of the AC-local supply is switched on, all circuits are switched to a safe state after 10 seconds.

Note: Please note that when the main system is ready for operation, the circuits in the MCUV-E switch on after the start. Perform installation work only on a de-energized system and pay attention to the 5 safety rules!

Note: When restarting the device, this must remain switched off for at least 20 seconds! Non-observance may cause communication problems during the start-up phase of the system.

9 Disconnect voltage of the multiControl Sub-distributor

9.1 Disconnect voltage of the multiControl Sub-distributor at the Sub-distributor

Before carrying out maintenance and installation work or modifications to the system, it must be properly disconnected from voltage. To do this, proceed as follows:

1. Set the operating mode selector switch (BAS) of the main system to charging mode. Set the mode selector switch on your **main system** to charging mode (position "0"). As an alternative to the mode selector switch of the main system, the emergency mode switch (NOT-AUS BAS) of the sub-distribution can be used (see 13.2 DIN Rail controller for sub-distributor TSC-UV).

2. Remove the fuses F1/F2. Remove the fuses.

Note: The supply line remains energized!

9.2 Disconnect voltage of the multiControl Sub-distributor at the main system

Before carrying out maintenance and installation work or modifications to the system, it must be properly disconnected from voltage. To do this, proceed as follows:

1. **Set the operating mode selector switch (BAS) of the main system to charging mode**. Set the mode selector switch on your **main system** to charging mode (position "0").

2. **Disconnect voltage of the supply line between main system and sub-distributor.** Remove every fuse of the „Outgoing Sub-distributor (ABUV) in your **main system**. The sub-distributor is now de-energized and turned off.

Note: The supply line to the sub-distributor is now de-energized.

9.3 Disconnect voltage of the multiControl Sub-distributor at the Sub-distributor with AC-local

1. **Set the operating mode selector switch (BAS) of the main system to charging mode**. Set the mode selector switch on your **main system** to charging mode (position "0"). As an alternative to the mode selector switch of the main system, the emergency mode switch (NOT-AUS BAS) of the sub-distribution can be used (see 13.2 DIN Rail controller for sub-distributor TSC-UV).

2. **Remove the fuse F3** and disconnect the N-disconnect terminal (X05).

3. **Remove the fuses F1/F2**. Remove the fuses.

Note: If the supply from the main system to the MCUV-E (F1/F2) is disconnected from the supply of the general light distributor (F3/N-disconnect terminal), the circuits switch to a safe state (active (mains)).

9.4 Disconnect voltage of the multiControl Sub-distributor at the main system with AC-local

1. **Set the operating mode selector switch (BAS) of the main system to charging mode**. Set the mode selector switch on your **main system** to charging mode (position "0"). As an alternative to the mode selector switch of the main system, the emergency mode switch (NOT-AUS BAS) of the sub-distribution can be used (see 13.2 DIN Rail controller for sub-distributor TSC-UV).

2. **Remove the fuse in the general light distributor**. Remove the pre-fuse of the MCUV-E in the general light distributor.

3. **Disconnect voltage of the supply line between main system and sub-distributor**. Remove every fuses of „Outgoing Sub-distributor“ MCUV in your main system. The Sub-distributor is now de-energized and turned off.

Note: If the supply line from the main system to the MCUV-E is disconnected from the supply of the general light distributor, the circuits switch to a safe state (active (mains)).

10 Servicing and inspections

Once a year you should also check (visual inspection):

- check naked screw joints (earthing, mains supply, battery cables) for tightness

10.1 First inspection

The first inspection has to be carried out according to E DIN EN 50171 (VDE 0558-508):2013-07 by the installation technician when commissioning the system.
First inspections have to be carried out in compliance with the local, national regulations and comprise the following points:

- check the correct selection of modules. Observe the selectivity of the distribution network of the emergency power supply
- check the correct selection and setting of the automatic transfer and switching device (ATSD)
- visual check of the settings of the protection devices
- check the function by disconnecting from mains
- check the mounting rooms in terms of fire protection, equipment and facilities.

Inspections must only be carried out by electrically skilled technicians, who are trained and qualified.

10.2 Repeating inspection

The repeating inspection has to be carried out in compliance with the local/national regulations. If there are no local/national regulations, the following intervals are recommended:

automatic transfer and switching device (ATSD):

- function test with load transfer: **weekly**
  An automatic function test must be programmed by the installation technician/operator upon installation/commissioning (see documentation of the main system)
- test through imitation of a mains failure: **half-yearly**
  disconnection from mains supply through disconnecting the pre-fuse of the system or pushing the mains switch (chapter 7.1.1 (Figure 3)). The switch has to be switched on again after the function test.

protection devices:

- visual inspection of the settings: **yearly**
  1. check the battery voltage as well as the symmetry voltage with a measuring device (see chapter 5)
  2. check the battery current by imitating a mains failure (see "testing through imitation of a mains failure") with a measuring device (see chapter 5) or a suitable and calibrated clamp-on ammeter

protection against electric shock

- measured at mains input: every 3 years
- in output circuits with residual current-operated protective device (RCD) through function test, proof of triggering with rated residual operating current: **half-yearly**
  Only with installed service socket (SSD)

10.3 Inspection before commissioning

After mounting the central power supply system, the installation technician must carry out the inspections according to HD 60364-6 chapter 61.

Part of them is the visual inspection of the stationary electrical system before the central emergency power supply system is commissioned as well as testing and measuring, preferably in this order:

- conductivity of the cables
- insulation resistance of the electrical system
- protection through SELV, PELV or protective separation
- protection through automatic switch-off of the power supply
- additional protection
- voltage polarity
- phase sequence of the external conductors
- function and operation test
- voltage drop

If an error is detected during the testing and measuring, this and each previous test, which might have been influenced by this error, have to be repeated after clearing the error.

If the installation technician of the central emergency power supply system is not the installation technician of the stationary electrical system, he must be provided with the test log of the first inspection of the stationary electrical system, which the emergency power supply system is meant for, before he can carry out the first inspection of the emergency power supply system.

The observance of the requirements as defined in the instruction manual of the manufacturer has to be proven and confirmed prior to testing and measuring by visual inspection. Particularly the following has to be inspected:

- the condition of the mounting location, marking and equipment according to standards (operating devices, means of body protection, tools, utilities)
- protection against intrusion of solid foreign objects and liquids
- protection against external mechanical impact
- observance of the surrounding temperature (lower and upper limit)
- observance of the maximal humidity
- ensuring the necessary ventilation
- EMV-environment (A or B)
- checking if special operating conditions can disturb the operational safety and functionality of the central emergency power supply system such as vibrations, extraordinary shocks, corrosive atmosphere, strong electric or magnetic fields, explosion hazard
- the existence of necessary operation and maintenance areas for the central emergency power supply system
- the correct selection of modules of the emergency power supply system and check if the requirements of the user according to 5.2 have been met by the manufacturer
- checking the settings of the protection devices

If a system fails an inspection according to E DIN EN 50171 (VDE 0558-508):2013-07 paragraph 8.2.4 sub-paragraph g) [6], it **must not** be commissioned!

[6] checking the battery concerning sufficient capacity, the emergency power supply system must be operated during the battery discharge with the rated output current over the rated operating time. Systems, which do fail this test, have to be tested again. If the requirements are not met in this test either, the system must not be commissioned

10.4 Procedure in case of failure

If you notice malfunctions of the battery set or the charger unit, call the customer service immediately. A service contract with your dealer enables an early recognition of failures.

11 General information on your system

System type:	
Mounted by:	Date:
Commissioned by:	Date:
Safety signs fixed by:	Date:

12 Technical data

device type	
connection supply voltage	230V AC / 216V DC +/-10%
power supply frequency	50Hz +/- 4%
consumer connection power (DC) in W	2100
consumer connection power (AC) in VA	3000
deep discharge 1	1.71V / Cell
deep discharge 2	1.53V / Cell
working mode	Maintained or mode non-maintained connecting in switchmode
mains monitoring by AC-local input	1 phases again N and critical circuits CC MB for switched and unswitched maintained lightload with voltage supply of UV
initiation by AC-local	≤ 85% U_{Nenn}
function test capacity test	by main system
noise suppression	N at VDE 0875
ambient temperature	0-35°C
dimension in mm HxWxD	
protection class	
wire come in	
number of circuits / TSM32	/
number of SAM-modules	0
number of switch inputs	0
fuse supply voltage	16A 16A D01
fuse AC-local	16A D01
fuse circuit module TSM32	fuse ceramic 5x20mm, 5AT
conductor cross section	
supply voltage	0,5-10mm² rigid
final circuit	0,25-4mm² rigid
data cable	0,25-1mm² rigid
critical circuit (CCIF)	0,25-4mm² rigid
supply voltage AC-local	0,25-4mm² rigid
SAM-switch inputs	0,5-1,5mm² rigid

by main system

13 Module descriptions

Several modules which are integrated in your system or optionally available are briefly described in the following paragraphs. These data can also be downloaded from your dealer's homepage.

13.1 Electric circuit module TSM32

Characteristics at a glance:

- 216V DC output voltage in battery operation
- 2x3A outout current per module / 650VA connected load
- 2 electric circuits per module
- Mixed mode in the circuit
- Single luminaire or circuit monitoring in the circuit
- Final circuit fuse:
  - TSM32 5x20mm, 5AT
- Dimension: 86 x 105 x 60mm (HxWxD)

Figure 9: TSM32

The DIN rail circuit module – TSM32 is a circuit module for emergency lighting systems of type multiControl *plus.* The power supply to the circuits of the TSM32 via an AC/DC change-over which is installed in the main system. Each circuit module supplies and monitored two circuits, each with a maximum of 20 safety and/or safety escape sign luminaire. The circuit module is able to realize a single light request as well as a self-calibrating current monitoring. The mixed operation of safety and safety escape sign luminaires in a circuit in the types of non-maintained-, maintained- and switched modified non-maintained lighting without the installation of a separate data line is possible.

Each circuit of the TSM32 can be switched with switching commands via a switch scanning module (SAM24). The following types of switching are provided here: non-maintained lighting (DS), maintained lighting (BS) and switched modified non-maintained lighting (gMB).

The circuit modules are connected to the central battery system via the RS485 BUS. All programming is carried out seperately on the central computer for each circuit, for further information please refer to the documentation of you emergency lighting system.

On the front of the circuit module each circuit is protected with a 5AT fuse.

Visualization of states via LED. The visualization of the states for each circuit is separately done via a respective LED (A/B):

Status-LED permanent green:	Circuit is switched on (DS, DS)
Status-LED flashing (once every 3s) green:	Circuit is switched off (DS-OFF, System in charging mode)
Status-LED permanent blue:	Circuit is switched on (MB, gMB)
Status-LED flashing blue:	Circuit is switched on (MB-overrun time)
Status-LED permanent yellow:	Circuit is switched on (battery mode)
Status-LED flashing yellow:	Circuit is switched on (battery mode-overrun time)
Status-LED permanent/flashing red:	Circuit is faulty (p.e. luminaire fault, fuse fault, communication fault)

13.2 DIN Rail controller for sub-distributor TSC-UV

Characteristics at a glance:

- Microprocessor-based function control system
- Monitoring the mains and battery voltage of an MCUV-Exx-LE even in case of communication failure to the main system
- Locel mode selector
- Dimension: 86 x 105 x 60mm (HxWxD)

Figure 10: TSC-UV

The DIN Rail controller for sub-distribution - TSC-UV is a control and switching module for sub-distribution of emergency lighting systems of type multiControl plus.
The TSC-UV includes 4 separate quiescent current loops (CCIF), designated KK1, KK2, KK3 and KK4. The assignment of the quiescent current loops to the circuits of the associated MCUV-E takes place via the internal web interface. The triggering of the modified standby mode (MB) takes place in case of an interruption or lumping of the line of the quiescent current loop. The operating status is visualized via the respective LED "KK - ok" as follows:

LED „KK - ok“ lights up permanently	Quiescent current loop is closed
LED „KK - ok“ flashing	Quiescent current loop triggered (interruption/lumping)

Pay attention to the following during installation:

- Set 10kΩ terminating resistor
- Distance between terminating resistor and TSC-UV (per output) ≤ 500m
- Cable type J-Y(ST)Y 2x2x0,8mm²
- Internal analyses of the terminating resistor value is between 5-15kΩ

Furthermore, the TSC-UV has separate monitoring for rental electricity supply (AC local) with integrated mains monitor. An additional AC feed can be made by a local general light distributor and thus a tenant-related electricity billing can be realized. Only in emergency operation of the main system (modified readiness by triggering the quiescent current loop, battery or test mode) or failure of the local general light distributor is switched to the single wire power supply of the main system. Switching takes place via a contactor changeover.

The mains monitoring function is visualized via the "Netz / mains lokal ok" LED as follows:

LED „Netz / mains lokal ok“ on	local mains ok, Power supply is taken from the local general light distributor
LED „Netz / mains lokal ok“ off	Local mains outside the limits, Power supply is taken from the main system

To simplify installation and maintenance work, the TSC-UV has its own mode selector switch (BAS) as a button. This BAS can switch off and on the TSC-UV circuits belonging to the TSM32 in case of maintained light, modified standby and battery operation.
The TSC-UV is connected to the main system via the RS485 BUS. In case of a communication fault, all circuits in this sub-distribution are switched to modified standby mode. Because there is no communication to switch off the circuits, this can be realized via the "NOT-AUS / BAS" button as follows:

Circuits off (charging mode)	Press „NOT-AUS/BAS“ for 3 seconds until the LED „TSC-UV“ is flashing fast → release the button
Circuits on (ready to operate)	Press „NOT-AUS/BAS“ for 3 seconds until the LED „TSC-UV“ is flashing fast → release the button

After conversion, the operating mode can be recognized via the LED „TSC-UV“

internal BAS is ready to operate	Lights up permanently (Factory setting)
internal BAS is charging mode	flashing (0,1s on/1s off)

Note: The function is used for the load-free release of the TSM. Despite switched off circuits, a functional or capacity test, including preheating, is possible at any time. Only with removed output fuses on the DIN rail circuit module – TSM32 are the final circuits de-energized! Each restart of the system or disconnection and connection of the power supply to the sub-distributor will reset the charging mode and switches the circuits on again.
After completing the work, the correct operating mode must be restored.

13.3 Switch query module – SAM24

Characteristics at a glance:

- 8 (7+1) reverse-polarity tolerant control inputs for detecting the switching status of the general lighting
- Integrated mains monitor (active through DIP-switch)
- 2 COM ports for feed-through or star-shaped wiring
- Integrated repeater function for COM port 2 (COMboost)
- Integrated terminating resistor (active through DIP-switch)
- Integrated function monitoring of the BUS line
- dimension: 86 x 105 x 60mm (HxWxD)

Figure 11: SAM24

The interface module SAM24 allows the direct interfacing of an emergency lighting system with a general lighting installation. It is to monitor the operation status of the general lighting system in order to achieve a joint switching of emergency lights and the general lighting when mains-operated. Normally-closed contacts as well as normally-open contacts of the general lighting can be monitored; it is also possible to directly connect phases of the general lighting in order to activate the emergency lighting in case of a general lighting failure. Up to 16 SAM24 interface modules can be connected to the emergency lighting system via the BUS line, which provides a sufficient number of inputs.

Normally-open contacts can also be used for monitoring fuses of the general lighting. The setup or programming is carried out at the emergency lighting device (ds/mb setting). Switching the general lighting will produce a status change being recognized at the control inputs E01 - E08 which is transferred via BUS line to the power supply system. The emergency lighting system can be programmed to switch on or off certain emergency lighting circuits upon status change of each input.

The lighting interface module is connected to the BUS interface and the respective voltage supply of the power supply system (e.g. MULTI-CONTROL). The voltage inputs should always be operated in pairs (E01-E02 / E03-E04 / E05-E06 and E07-E08) with the same mains voltage or low voltage potential.

Interface function:
The SAM24 provides 8 galvanically isolated multi-voltage inputs accomodating voltages in the range between 18V to 255V (DC) or 185V to 255V (AC). The state (HI/LO) of each input is indicated by a yellow LED at the front of the SAM24 (LED on = voltage recognized). If ouy want to use input channel no. 8 for voltage monitoring, set DIP switch no. 4 to OFF. Now up to 8 separated voltage inputs can be connected and monitored.

3-phase mains monitor function:
The SAM24 module can be used for monitoring a 3-phase mains (3 x 230V to neutral) of the general lighting. The integrated 3-phase mains monitor can be activated by setting DIP switch no. 4 to ON. This also deactivates the voltage monitoring function of channel 8. The 3-phase mains monitoring function detects phase failures as well as a neutral conductor breach are registered and indicated. Theswitching thresholds are in accordance with valid European and German standards.

Voltage range of the COM ports	+9 to +24V to GND
Power consumption at 18V	18mA
BUS-line (data line)	A, B, SC (shield)
Cable type	Recommended data cable J-Y(St)Y 02x2x0,8mm²
Control inputs	E01-E08 (L/N)
Control voltages	AC 185V – 255V / 50Hz or DC 18V – 255V
Turn coding switch	Address of the respective SAM24 module (01-16)
DIP-switch 1-4 (functions)	1 – terminating resistor (ON) ⟶ for last module on COM1 2 – terminating resistor (ON) ⟶ for first module on COM2 3 – module active (ON) 4 – input 8 active (OFF) / mains monitor active (ON)

14 Revision history

multiControl *plus* Sub-distributor – Single wire power supply – Setup & Commissioning		
version	date of issue	Most important changes compared to previous version
1.0	30.01.2018	-
1.3.1	18.06.2018	Restart of the system

15 Circuit table

Circuit	Location	P(VA)	Number of luminaires
1			
2			
3			
4			
5			
6			
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