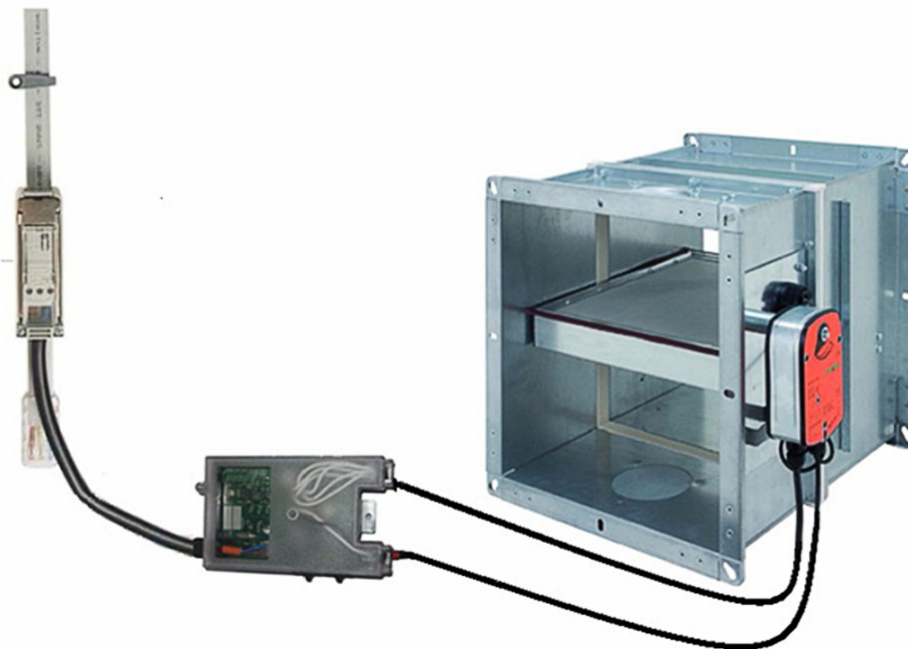


Signalling and Switching Bus

EasyBus



System KOMES

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Signalling and Switching Bus EasyBus

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Signalling and Switching Bus EasyBus

Description

The new signalling and switching bus system SCHAKO "Easy-Bus" for activating and monitoring electrical and mechanical fire dampers 24 V DC (standard) or 230 V AC (optional), smoke extraction dampers, smoke detectors and volumetric flow controllers with 0-10 V activation or air dampers with 2/3-point drives.

For the activation of smoke dampers, their general building supervisory approvals must be taken into account.

This includes observing, in particular, information on the activating units, layout and functional integrity of the electrical cable installations.

EasyBus

The maximum cable length per system is limited to 1,000 m. Up to 128 EasyBus modules can be connected per master unit. A total of up to 2 masters per PLC can communicate with one another. This allows operation of up to 256 EasyBus modules with one PLC. After that, an additional PLC is required.

The power supply and data transmission of the EasyMaster devices are supplied by the 230 V AC mains supply. Although a flat-ribbon cable from Woertz (Ecoline P3 3 x 2.5 mm²) is recommended, the wiring can also be executed with conventional cables. All three conductors are contacted automatically simultaneously, without using tools. The wiring technology uses a completely new connection technology.

An integrated lever system presses three contact blades simultaneously into the line.

This allows quick, simple and almost error-free wiring. The modulation is separated from the house network via a line filter. It reduces faults in the system or in other devices.

EasyECO

The Easy Eco System was designed for monitoring fire dampers with mechanical trigger without the need of wiring the limit switches.

The energy for sending the protocols is produced event-oriented by the movement of the fire damper. Thus, neither a battery nor electrical wiring is required for transmitting the individual position indications to the "EasyBus"



Fig. "Easy-Touch station" for visualising events, etc.

System design

Data transfer takes place in the form of electrical signals via the 230 V network, in which individual, group or central commands are possible. The connection of the users can be in line, stub or free form. The maximum cable length is 1,000 metres per system unit.

A total of up to 128 users can be connected to a master device. A total of up to 2 master devices such as Modbus/RTU (standard) can communicate with one another, thus allowing a system configuration of up to 256 EasyBus user per PLC.

The easy installation minimises costs. Owing to the minimum cable requirements, compared with previous installations, the fire load in the building is substantially reduced.

As standard, the EasyBus system is used in connection with a PLC. The required programming language is standardised worldwide (IEC 61131-3), and almost every switch cabinet builder or electrician has the required knowledge to carry out programming of this type.

Its modular design gives the system a clearer structure, allowing errors or faults to be localised very quickly and easily.

Signalling and Switching Bus EasyBus

For the individual areas, we are offering the following modules for signal processing and monitoring:

- **Easy-M** processes the EasyBus information and exchanges it with the building control network or PLC.
- **Easy-B or Easy-B230**, the main functionality of this module is to control a fire damper via 24 V or 230 V. The end position contacts are also monitored, and the current position is transmitted to the system in real time.
- **Easy-V** controls up to 2 volumetric flow controllers, using only one module, with continuous control via a 0-10 V activation.
- **Easy-R**, for controlling and monitoring up to 2 smoke detectors of type RMS-L or RMSII-L connected via a 9-pin Sub-D cable
- **Easy-ECO Tx** radio transmitter for cable- and battery-free transmission of position signals via an integrated energy generator (compatible with EnOcean)
- **Easy-Eco Receiver Rx** for receiving up to 8 signals from Easy-ECO limit switches. Its maximum free-field range is 30 metres.

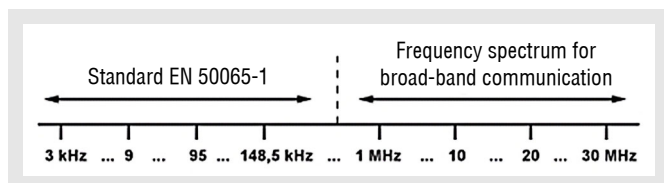
Description of the system

EasyBus utilises data transmission via an electric power line developed since 1950 as a low-cost alternative to traditional wiring.

Originally, it was desired to switch public lighting on and off according to demand without an additional dedicated control line.

Nowadays, supported by the European standard EN-50065-1, the frequency bands B and C are used in accordance with the diagram shown below.

GENELEC band	Frequency range	User
-	3 - 9 kHz	Energy supplier
A	9 - 95 kHz	Energy supplier
B	95 - 125 kHz	Customer installations
C	125 - 140 kHz	Customer installations
D	140 - 148.5 kHz	Customer installations



In all industrial sectors, modern production plants are to be found that work with many sensors and actuators, monitoring production sequences.

Control of automated jobs is done via computers. In most cases, programmable logic controls (PLC), a PC or a central unit connected to a bus are used.

EasyBus does away with the previously required cumbersome wiring work, in which each actuator and each sensor had to be connected individually to the control unit.

In the EasyBus system, the peripheral components are connected directly to the 230 V AC two-conductor distribution system, a standard cable without shielding. This produces a tree structure in which all sensors and actuators are connected to a central line.

Up to 128 slaves can be connected to a cable 1,000 m maximum in length, the components being supplied with power directly by the 230 V AC mains.

EasyBus transmits not only the command signals, but also the supply voltage (230 VAC).

The devices to be monitored are connected in parallel to this two-conductor bus and receive the electrical energy required for their operation likewise without additional cables. The bus architecture is freely configurable and only limited by its length (max. 1,000 m).

Advantages

- low-cost and easy to implement
- safe and reliable
- customer-specific adaptation possible
- easy adaptation and flexible extension
- easy, low-cost, independent of manufacturer
- complementary to other buses
- interoperability, exchangeability
- independent of supplier
- efficient wiring
- easy to error-free to plan, execute and test
- freely selectable customer-specific topology

Signalling and Switching Bus EasyBus

EasyBus system characteristics

Topology

- stub, tree or free wiring

Cable type

- unshielded 3-wire cable 3 x 2.5 mm²

Voltage type

- 230 V 50/60 Hz AC

Fuse protection

- residual current circuit breaker FI-LS 10 A (B characteristic)

Line length

- maximum 1,000 metres, incl. all branches per master device

Number of users

- maximum 128 users per master device

Number of master devices

- a maximum of 2 master devices communicate via a PLC, after that another PLC is required. However, all communication options are maintained.

Modulation

- On the master device, 9 different channels and two different frequencies can be selected for communication.

Addressing

- Fixed addresses of the master devices and of the users, addressing directly on the module via LCD display and buttons

Cycle time

- The cycle time of the network depends on the number of users. The cycle time is $(n + 1) \times 40$ ms, in which n is the number of stations.

Frequencies

- Frequency 1 = 132 kHz (standard)
- Frequency 2 = 110 kHz

Drives:

- Almost any drives, both 24 V DC and 230 V AC

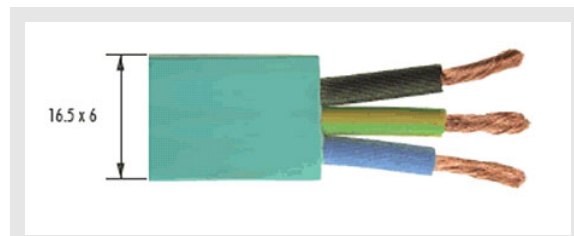
Communication:

- Master/Slave principle:
The master polls the stations one by one.
The master works cyclically (polling)

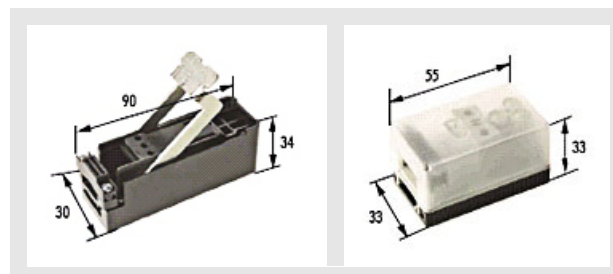
Installation

New quick connection technology: All three conductors are contacted automatically simultaneously, without using tools.

The wiring technology uses a completely new connection technology. An integrated lever system presses three contact blades simultaneously into the line.

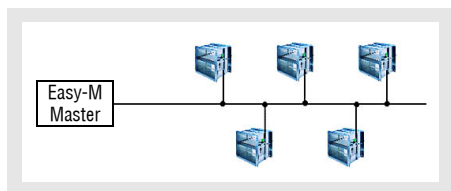


Secure against rotation thanks to groove in flat-ribbon cable

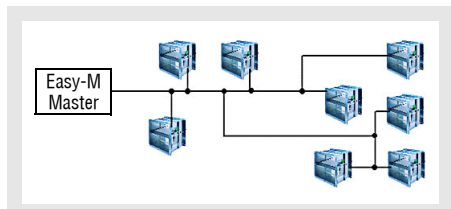


Bus topologies

Stub form



Tree structure



Signalling and Switching Bus EasyBus

The components in detail

EasyBus motherboard

The EasyBus system has a motherboard into which all additional modules are inserted. Thus, it is possible at any time to replace, for example, a fire protection module easily and without problems with a volumetric flow module without requiring wiring. The motherboard contains all components required for addressing, as a result of which addressing is maintained when the profile board is replaced.

The motherboard contains:

- 10-pin connector strips for connection to the profile boards, such as Easy-B or Easy-V
- Display and programming key for setting the address
- Input terminal for power supply and data connection of the module

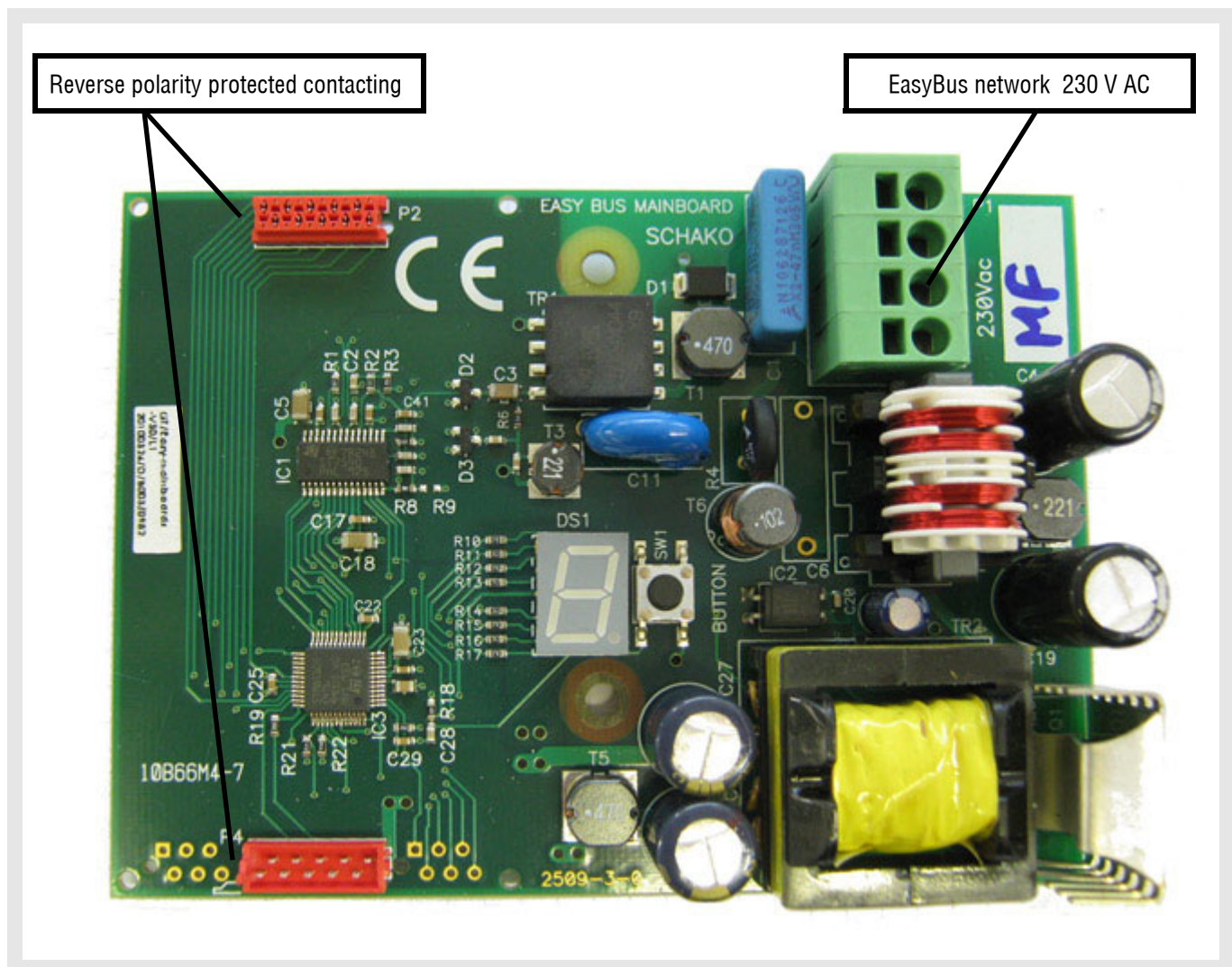


Fig.: EasyBus motherboard

Signalling and Switching Bus EasyBus

Easy-M module

The master device manages up to 128 users and forms the interface with a PLC. This allows the PLC to transmit other protocol types to an external building control system.

The master executes all tasks in connection with the data traffic of the EasyBus network and safeguards the connection to the control unit. The master also executes network monitoring and system diagnostics.

The module is clipped directly onto the transmission line via a connection module and immediately establishes contact with the flat-ribbon cable of the Ecoline P3 type.

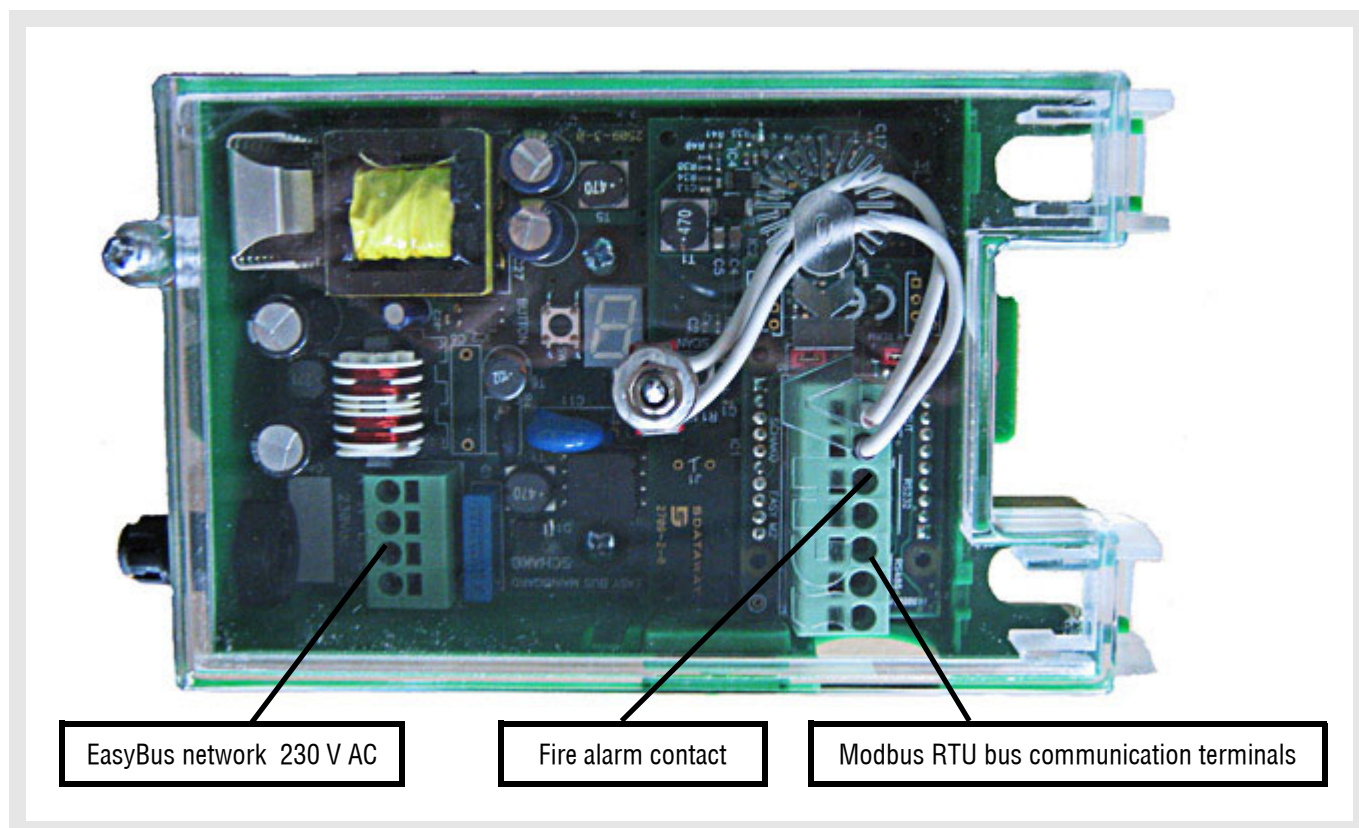


Fig. Easy-M

Signalling and Switching Bus EasyBus

Easy-B module

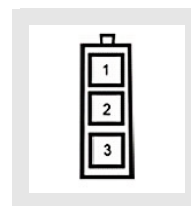
The Easy-B modules are used for connecting the 24 V fire dampers to the 230 V EasyBus network. Additionally, the module contains a temperature input as digital input.

The module is clipped directly onto the transmission line via a connection module and immediately establishes contact with the flat-ribbon cable of the Ecoline P3 type. This guarantees a quick, absolutely secure and low-cost implementation of the network.

Each smoke or fire damper is connected to the EasyBus via an Easy-B module.

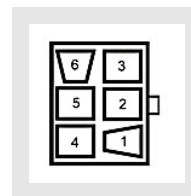
P2 – Motor control

1. Opening control (+24V) (conductor 2)
2. Ground (GND) (conductor 1)
3. Closing control (+24V) (smoke extraction, conductor 3)



P3 - End position switch

1. Damper open (>80°) (conductor 4)
2. Ground (GND) (conductor 5)
3. Ground (GND) (conductor 2)
4. Damper closed (<5°) (conductor 1)
5. not used (conductor 3 of damper)
6. not used (conductor 6 of damper)



P8 – Temperature detection

1. Temperature alarm contact (NC)
2. Supply (+24V)

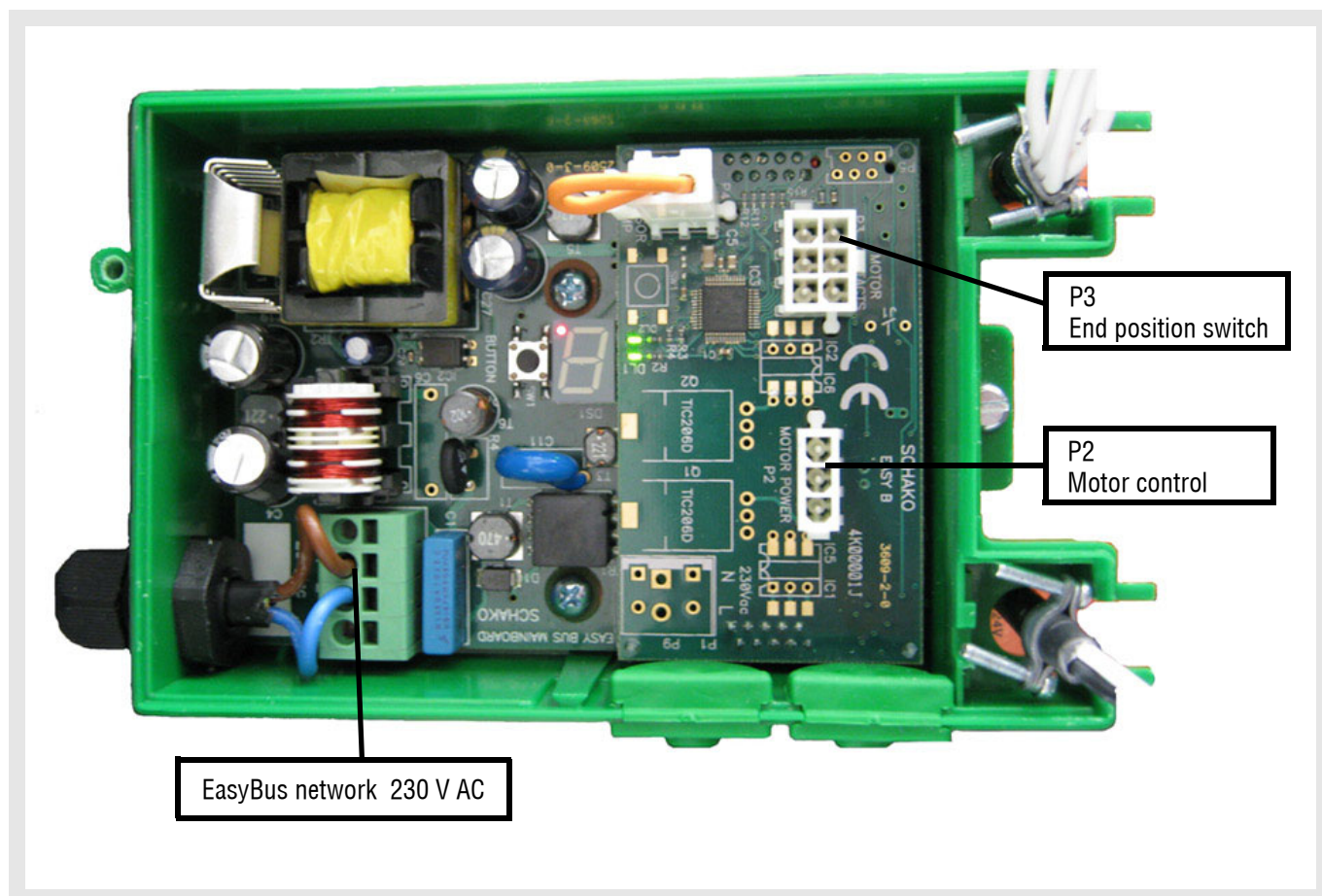


Fig.: Easy-B

Signalling and Switching Bus EasyBus

Easy-B 230 module

The Easy-B modules are used for connecting the 230 V fire dampers to the 230 V EasyBus network. Additionally, the module contains a temperature input as digital input.

The module is clipped directly onto the transmission line via a connection module and immediately establishes contact with the flat-ribbon cable of the Ecoline P3 type. This guarantees a quick, absolutely secure and low-cost implementation of the network.

Each smoke or fire damper is connected to the EasyBus via an Easy-B module.

P2 – Motor control

1. Opening control (230 V, conductor 2)
2. Neutral conductor (N, conductor 1)
3. Closing control (230 V, smoke extraction, conductor 3)

P3 - End position switch

1. Damper open (>80°) (conductor 4)
2. Ground (GND) (conductor 5)
3. Ground (GND) (conductor 2)
4. Damper closed (<5°) (conductor 1)
5. not used (conductor 3)
6. not used (conductor 6)

P8 – Temperature detection

1. Temperature alarm contact (NC)
2. Supply (+24V)

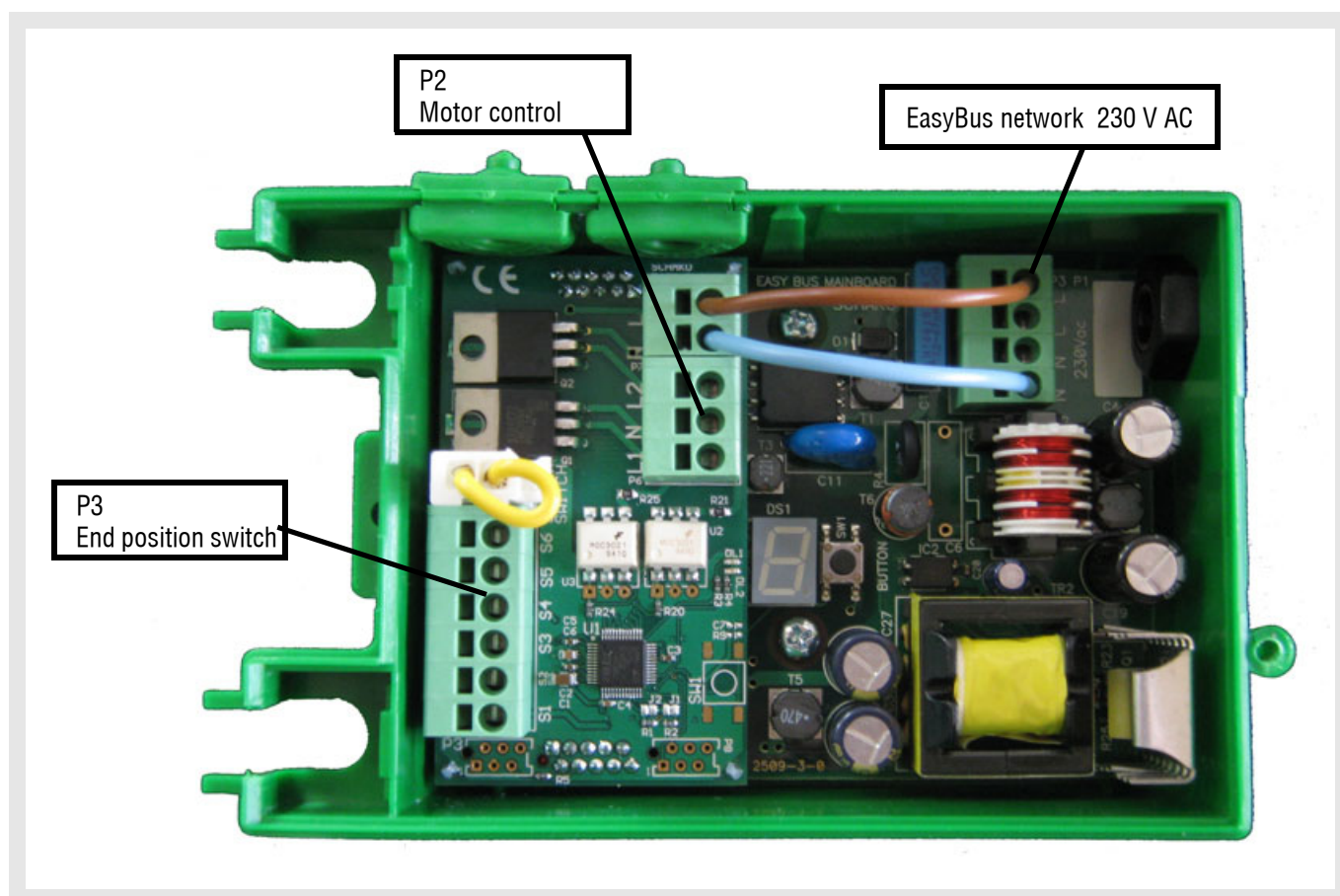


Fig.: Easy-B230

Signalling and Switching Bus EasyBus

Easy-V module incl. CO2 connections

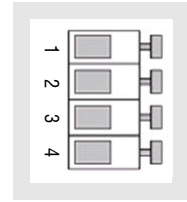
The Easy-V modules are used for connecting the VAV (Variable Air Valve) to the 230 V EasyBus network.
The 0-10V input can be used, for example, as input for a CO2 module for monitoring air quality, etc.

The module is clipped directly onto the transmission line via a connection module and immediately establishes contact with the flat-ribbon cable of the Ecoline P3 type.
This guarantees a quick, absolutely secure and low-cost implementation of the network.

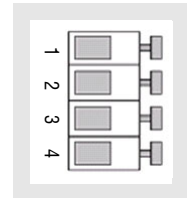
A maximum of 2 volumetric flow controllers can be connected to each Easy-V module.

VAV activation P1 + P4

1. Ground (GND)
2. 24 V DC
3. 0 to 10V DC output
4. 0 to 10V DC input

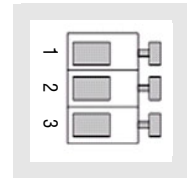


5. Ground (GND)
6. 24 V DC
7. 0 to 10V DC output
8. 0 to 10V DC input



Analogue inputs P2 + P5

1. Ground (GND)
2. 24 V DC
3. 0 to 10V DC input



4. Ground (GND)
5. 24 V DC
5. 0 to 10V DC input

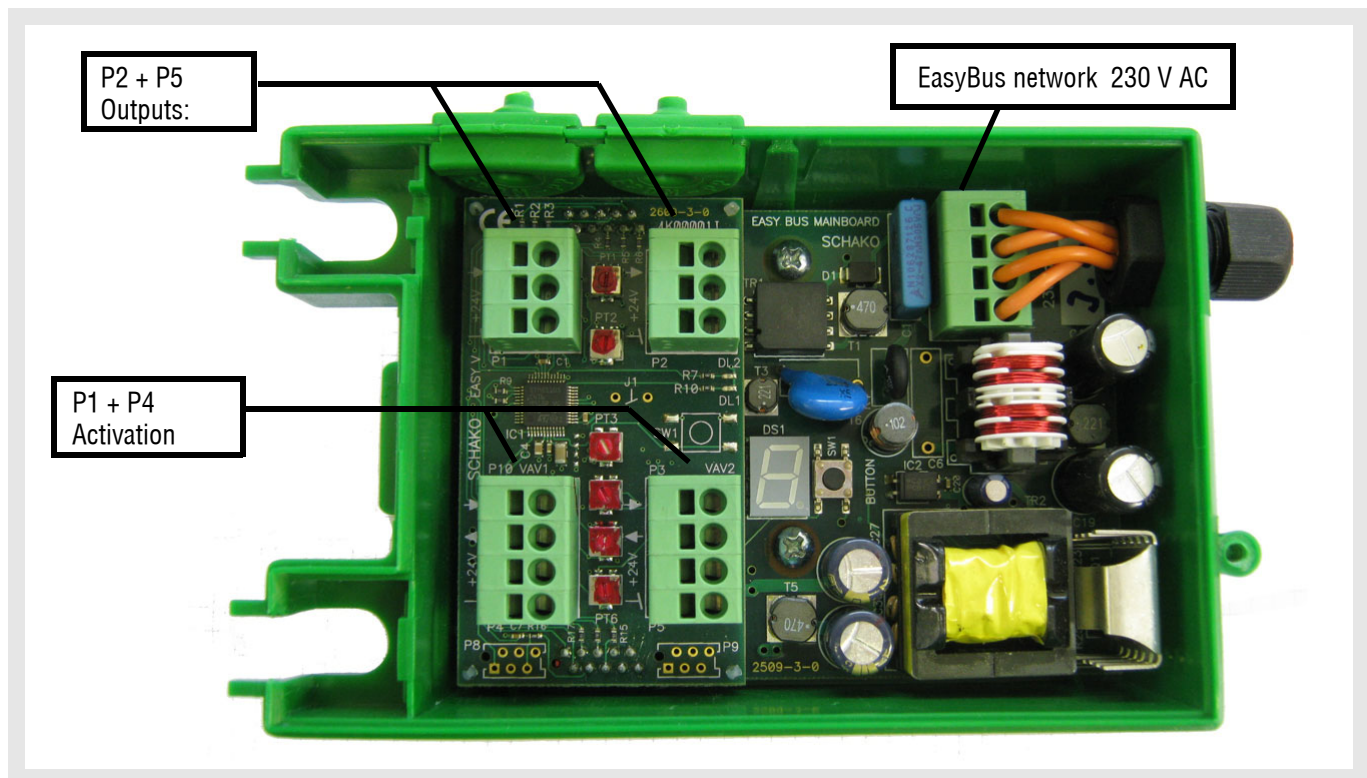
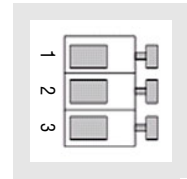


Fig.: Easy-V

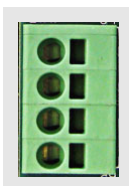
Signalling and Switching Bus EasyBus

Easy-V-MP module

(in preparation)

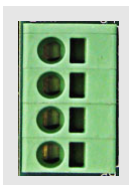
EasyBus P1 network plug

1. 230 V AC / 50 Hz power supply (L)
2. Neutral (N)



VAV1 network plug

1. Ground (GND)
2. 24 V DC
3. Input MP bus
4. Output MP bus (U5/MP)



VAV2 network plug

1. Ground (GND)
2. 24 V DC
3. Input MP bus
4. Output MP bus (U5/MP)

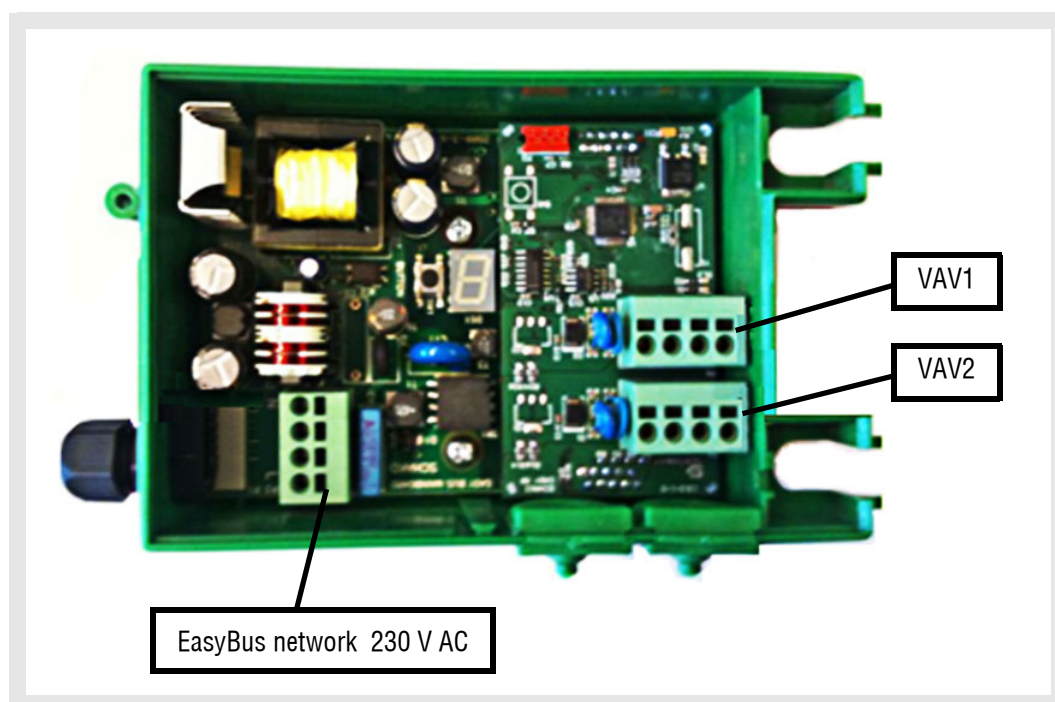


Fig.: Easy-V-MP

Signalling and Switching Bus EasyBus

Easy-R module

The Easy-R modules are used for connecting the RMS-L or RMSII-L (smoke detectors) to the 230 V EasyBus network.

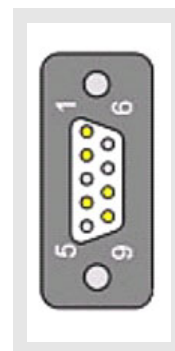
The module is clipped directly onto the transmission line via a connection module and immediately establishes contact with the flat-ribbon cable of the Ecoline P3 type. This guarantees a quick, absolutely secure and low-cost implementation of the network.

A maximum of 2 detectors can be connected to each Easy-R module.

The smoke detectors are simply plugged into the Easy-R module via a 9-pin Sub-D cable and are immediately functional.

P1 connection Sub-D RMS-L1 or RMSII-L1

1. GND
2. Work contact fault
3. Centre contact fault
4. Rest contact
5. Test
6. Rest contact alarm
7. Centre contact alarm
8. Work contact alarm
9. + 24 V DC



P2 connection Sub-D RMS-L2 or RMSII-L2

1. GND
2. Work contact fault
3. Centre contact fault
4. Rest contact
5. Test
6. Rest contact alarm
7. Centre contact alarm
8. Work contact alarm
9. + 24 V DC

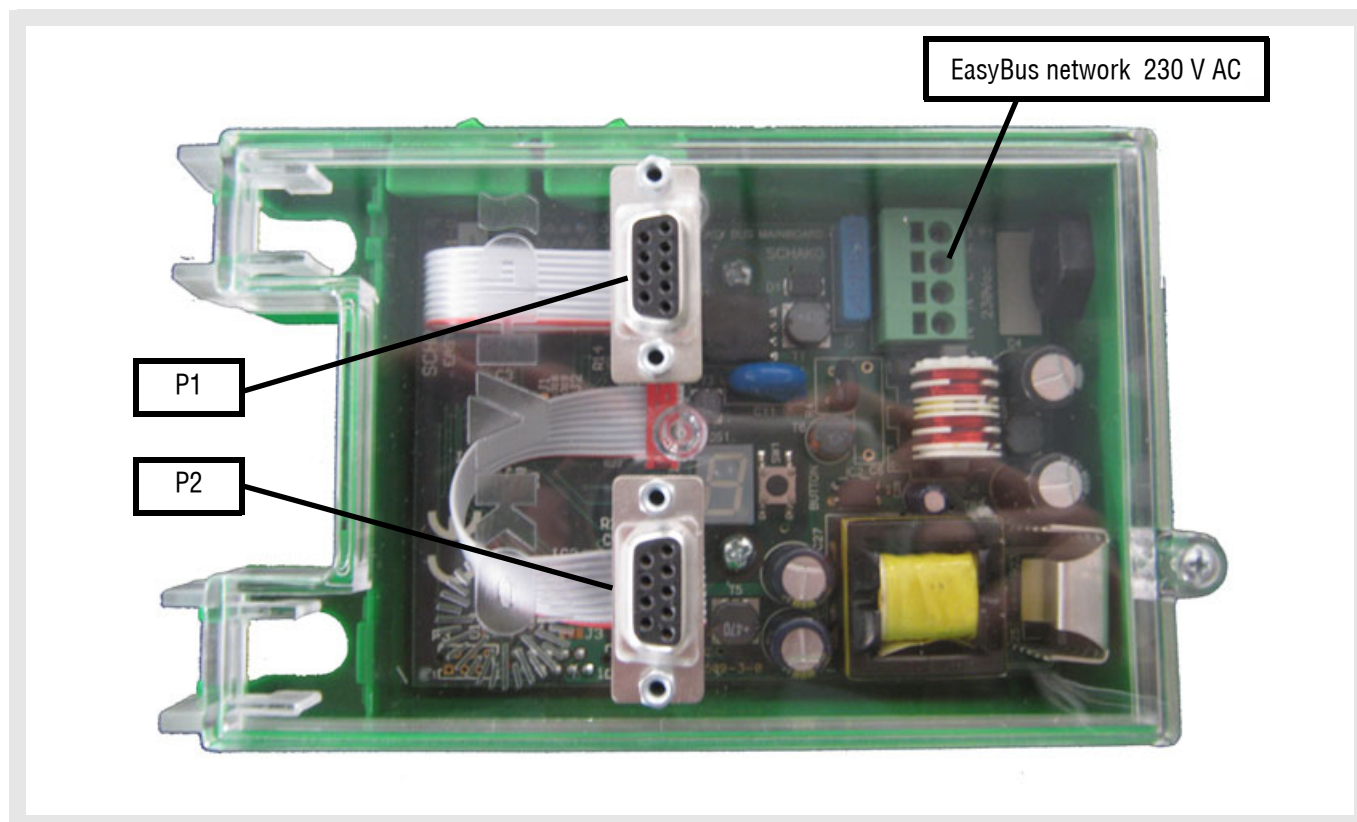
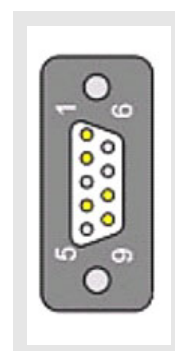


Fig.: Easy-R

Signalling and Switching Bus EasyBus

Easy-Eco-Tx + Easy-Eco-Rx

The Easy-Eco limit switch is used for connecting non-motorised fire dampers to the EasyBus system.

The damper status is transmitted by radio. The energy is generated by actuating the damper, so that neither an electric connection nor a battery is required for sending signals. The system is transmitting on the basis of "EnOcean" and thus compatible with all "EnOcean" partners.

A maximum of 8 Eco limit switches can be connected to an Easy-Eco-Rx receiver. For each system, the maximum number of 64 Easy receivers must not be exceeded.

Easy-Eco-Rx

The Easy-Eco-Rx module is used for connecting the Easy-Eco-Tx (radio limit switch) to the 230 V EasyBus network.

An Easy-Eco-Rx radio receiver can be used to manage up to 8 radio limit switches. Indoors a maximum distance of 30 metres from transmitter to receiver is possible, depending on the local conditions.

In case of power failure, end position changes can be still detected and saved for two more hours.

Technical data

Regulations	IEC/EN 60947-5-1, EN 61000-6-2, EN 301 489-1, EN 301 489-3, EN 300 220-3
Housing	Glass-fibre-reinforced, impact-resistant thermoplastic, self-extinguishing to UL 94-V0
Lid	Glass-fibre-reinforced, impact-resistant thermoplastic, self-extinguishing to UL 94-V0
Protection type	IP 67 to IEC/EN 60529
Protocol	EnOcean
Switching frequency	about 6,000 telegrams with repeats/h
Ambient temperature	-20 °C ... +65 °C
Power supply	Electrodynamic energy generator
Frequency	868.3 MHz
Transmission power	max. 10 mW
Data rate	120 kbps
Channel bandwidth	280 kHz
Range	max.300 m outdoors, max. 30 m indoors
Mech. service life	> 1 million operations
Actuation time	min. 80 ms
Note	No presence signal

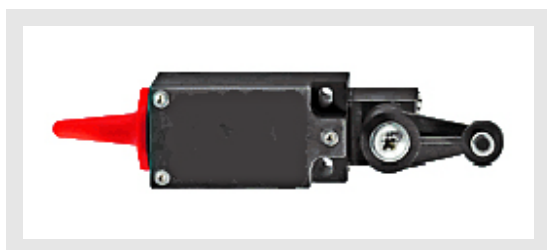


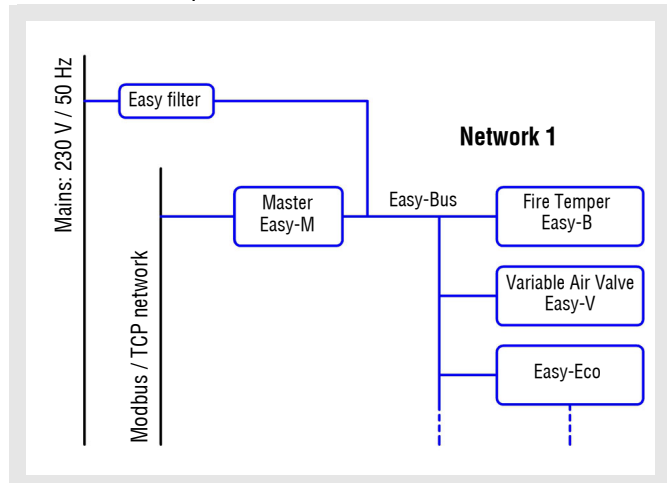
Fig.: Easy-Eco-Tx

Signalling and Switching Bus EasyBus

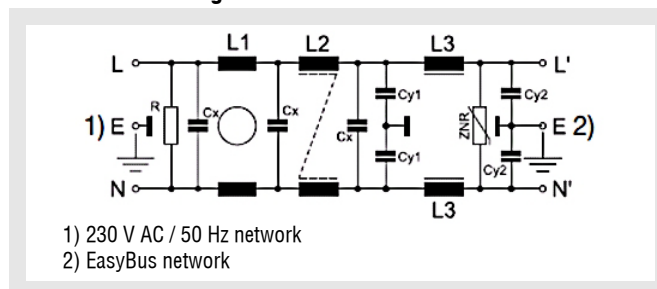
Easy filter

The filter is connected in the switch cabinet between the FI-LS and the master device and prevents accidental transmission of the data via the conventional power supply.

Connection example:



Internal circuit diagram



Dimensions

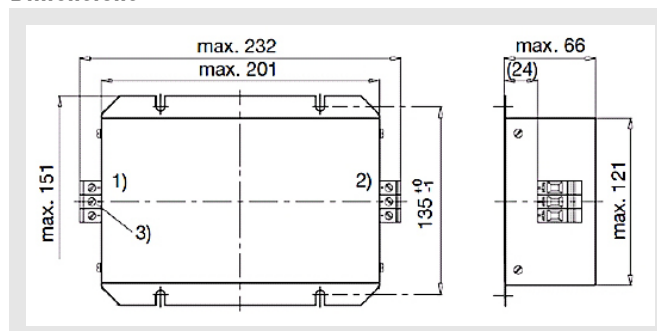
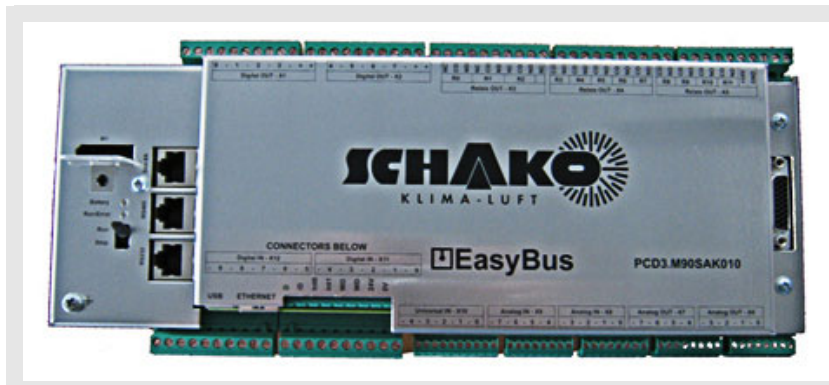


Fig.: Easy-F

Signalling and Switching Bus EasyBus

Easy Controller M90



Dimensions

Length: 315 mm
Width: 130 mm
Depth: 44 mm

Fastening

On the back, the controller has two fastening points for fastening to a DIN rail without tools.

Connections and interfaces

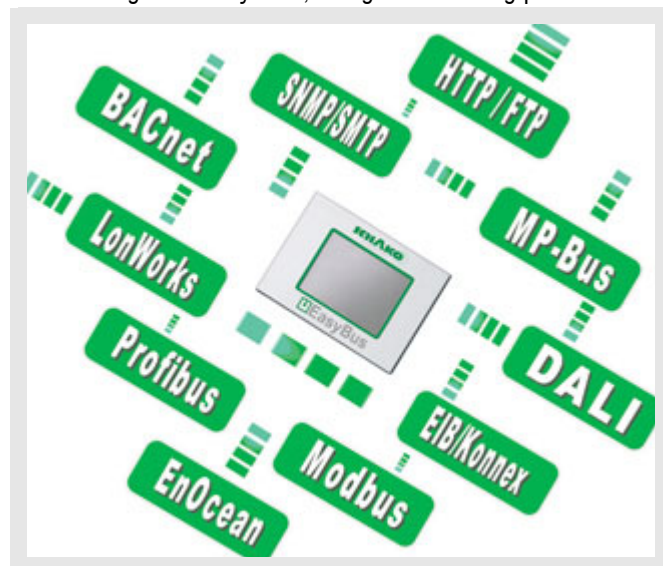
- 1x RS 232
- 1x RS 485
- 1x slot für PCD7.F1xx module
- 1 M1 slot for flash memory module
- 1 M2 slot for SD memory
- Renata CR2032 3V lithium battery
- 10 digital inputs
- 5 universal inputs
- 12 relay outputs 250 V AC, 4 A (4 of which with changeover contact)
- 8 digital outputs
- 8 analogue inputs, 0-10 V, 12 bits
- 8 analogue outputs, 0-10 V, 12 bits
- I/O Extension Module

Technical data

Supply voltage	24 V DC \pm 10%
Power consumption:	max. 12 W
Storage temperature:	-25...+70 °C
Ambient temperature:	0...+55 °C
Relative humidity:	10...95% r.h.
Protection type:	IP20
CE standards:	EMC
UL:	certified
	Rohs compliant (2002/95/CE)
Memory (SRAM):	1 MB
Integrated memory:	1 MB
Real-time clock	
USB 1.1 slave device	
Integrated Web/ FTP Server	
RS 485 port 2 up to 115.2 kBaud	
Ethernet-TCP/IP	10/100 Mbit/s
Programmable via SAIA PG5	

Protocols on Easy Controller M90

The Easy Controller can be used to transmit the data for example to a building control system, using the following protocols:



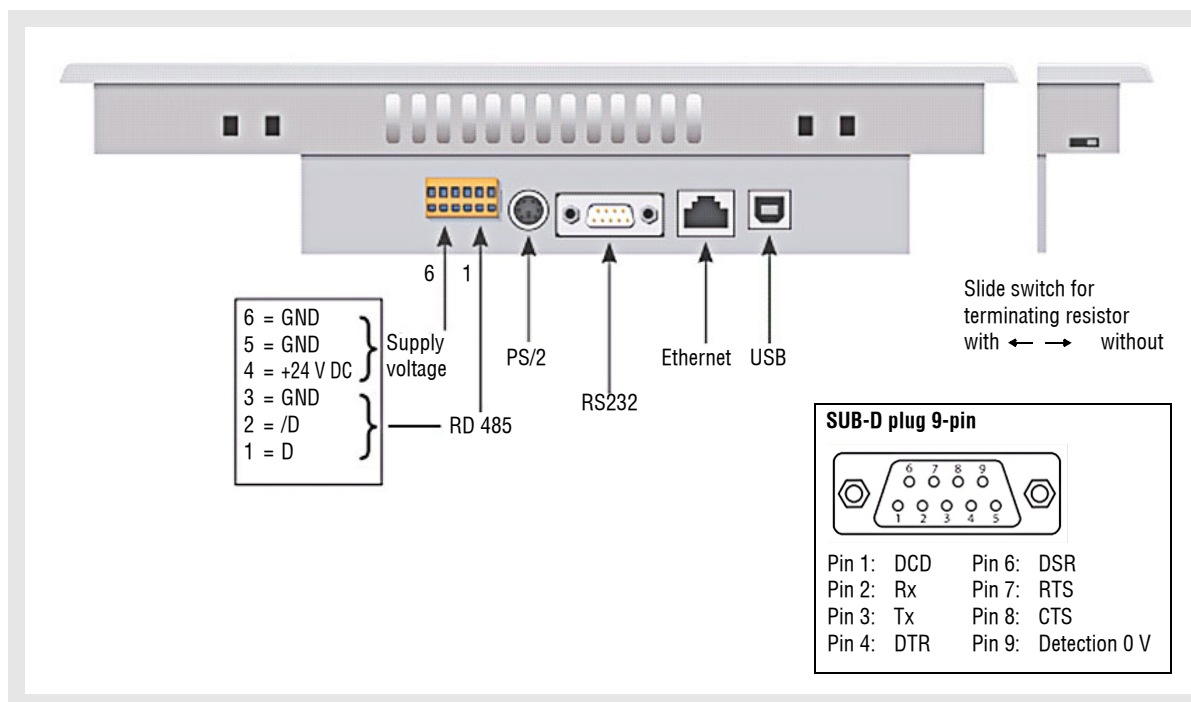
Signalling and Switching Bus EasyBus

Easy-Touch station

The 10.4" micro browser panel is equipped with a high-quality brilliant TFT touch display with VGA resolution.

A particular feature of the web panel is its small size. The frame around the display is much smaller than in customary operating units of these classes, resulting in a "useful surface area" of 10.4" at the installation size of an 8.4" device.

The stable aluminium front of the micro browser panel is provided with a continuous edge-free protective film, which prevents soiling.



<p>Processor / Server / OS</p> <ul style="list-style-type: none"> • Processor Coldfire • 4 MB flash memory for local web server • Web Server • Saia® NT OS • SD card (option) 	<p>Communication</p> <ul style="list-style-type: none"> • Ethernet • Serial RS 232/485 • USB Client • PS/2 (Comfort Line) 	<p>Display / Handling</p> <ul style="list-style-type: none"> • Resolution VGA • TFT technology • Mounting positions: vertical or horizontal • Surface without edges • Dirt collector

Signalling and Switching Bus EasyBus

Easy-Power 24/2.5

Compact module with 24 V DC output

- Short-circuit protection
- Overload-protected
- High overload possible without switch-off
- IP 20
- Mounting on DIN rail
- Extremely compact

Applications:

- for supplying power to the Easy-Controller M90
- for supplying power to the Easy-
- for supplying power to the Easy-Switch 5P



Easy-Switch 5P

For low-cost assembly of industrial Ethernet networks in line or star structure.

The compact « unmanaged » switch works by the « Plug & Work » principle.

Thanks to having the same size, it can be snapped onto the DIN rail, thus saving space.

The control unit is connected using the delivered patch cable. Its rugged design makes the switch suitable for use in rough industrial environment and in infrastructure automation.

Product properties

- Entry-level industrial Ethernet rail switch with Store and Forward switching mode
- Allows switched Ethernet networks to be assembled according to IEEE 802.3 with copper technology.
- The device is equipped with five 10/100 Mbits/s twisted-pair ports (RJ45 connections)
- Up to five end devices can be connected to the TP ports or further TP segments can be connected via twisted pair.
- Extremely lightweight and compact design with protection type IP 30
- Simple commissioning via «Plug & Work» using autonegotiation, autopolarity and autocrossing.
- Quick network diagnostics thanks to integrated LEDs on the TP ports
- DIN rail mounting and 24 VDC power supply for problem-free use in infrastructure automation and in rough industrial environment



Signalling and Switching Bus EasyBus

The housing

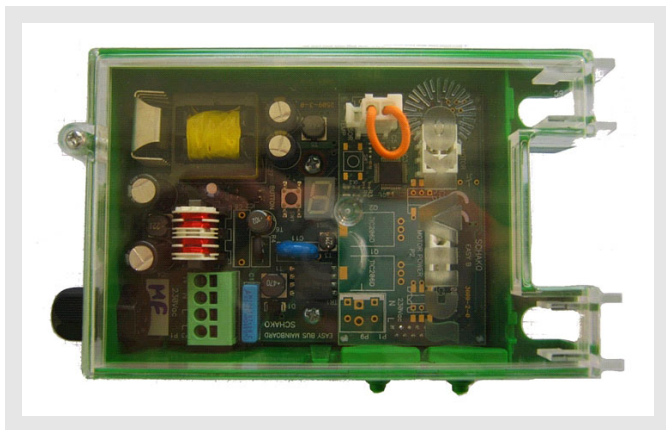
It is used for all field modules and has proven itself already many times in building installation technology.

Due to the sophisticated closure system, the housing can be opened/closed using just one screw.

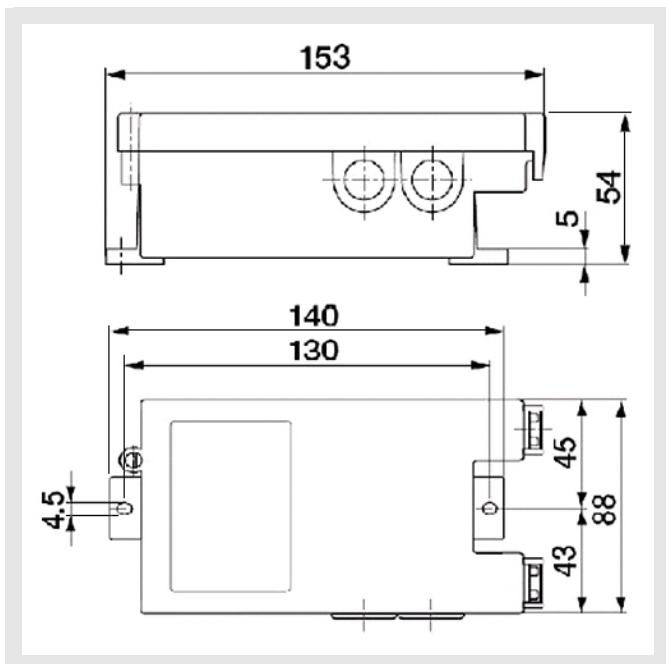
The translucent top part allows you to see the LEDs and status displays even when it is closed.

Technical data

Dimensions (WxHxD):	88x153x54mm
Protection class:	II
Protection type:	IP40
Ambient temperature:	0 ... +50 °C
Storage temperature:	-20 ... +80 °C
Weight:	approx. 500 g



Dimensions



Signalling and Switching Bus EasyBus

EasyBus cable


Outer casing	PVC according to CENELEC HD 21.1 S2, TM2	Thermoplastic PE Compound, halogen-free and no corrosive gases according to DIN VDE 0472 Part 813
Colour of the casing	Light-green RAL 6027	Light-green RAL 6027
Weight	185 g/m	185 g/m
Fire behaviour	Self-extinguishing according to IEC 60331-1	Self-extinguishing according to IEC 60331-1 Low fire propagation according to IEC 60332-3 Low smoke forming according to IEC 61034-1/2
Number x conductor cross-section	3 x 2.5 mm ²	3 x 2.5 mm ²
Wire colours	black, green-yellow, blue	black, green-yellow, blue
Conductor cross-section	2.5 mm ²	2.5 mm ²
Rated voltage	250 V	250 V
Current-carrying capacity	according to IEC 60364-5-523 and SEV NIN 42512.2	according to IEC 60364-5-523 and SEV NIN 42512.2


Connector / Power supply socket


Designation


Connector
3 x 2.5 mm², for branching

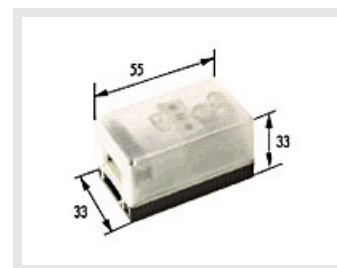
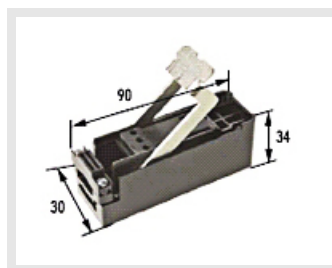
Power supply socket
3 x 2.5 mm², also suitable for branching, with screw connection

 Surrounding area:
dry UV-protected area

 Application temperature:
-15 ... +40 °C

 Installation temperature:
min. +5 °C

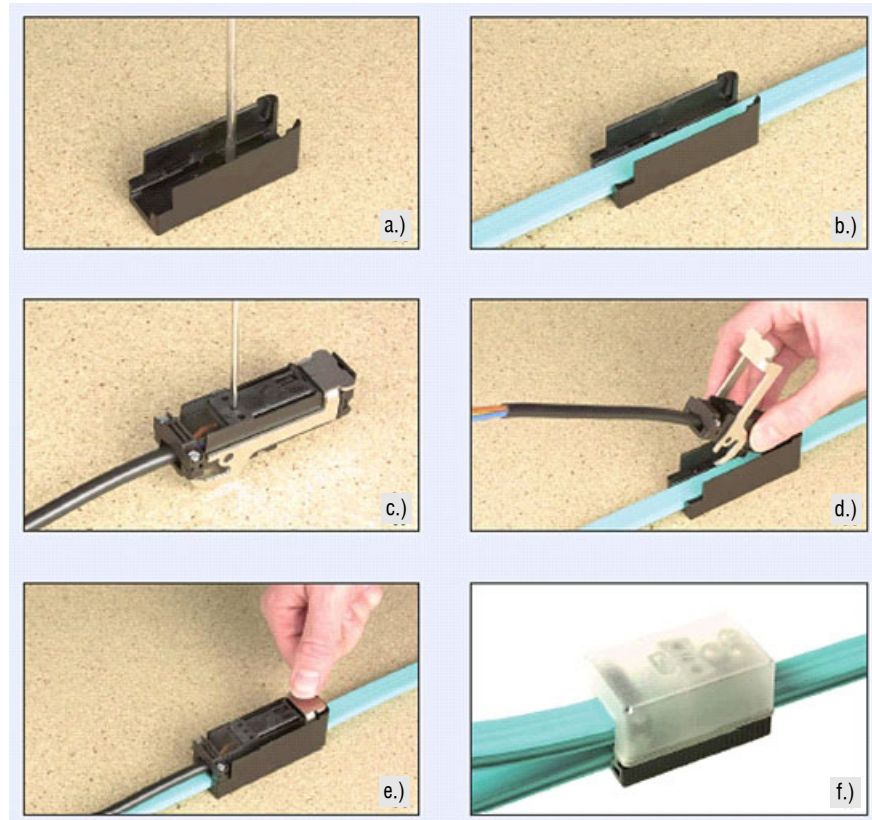
 Protection type: IP20



	Technical data	Technical data
Fire behaviour	UL 94-V2	UL 94-V2
Test regulations	IEC 60947-7-1	IEC 60998-1 / IEC 60998-2-5 / IEC 60947-7-1
Plastic parts	halogen-free	halogen-free
Metal parts	corrosion-protected	corrosion-protected
Number x conductor cross-section	3 x 2.5 mm ²	3 x 2.5 mm ²
Conductor receiving chamber	ø3.75 mm	ø3.75 mm
Pivot screws	/	Service torque 0.7 Nm Phillips-tip screwdriver no. 1
Clamping screws	M3, service torque 0.7 Nm Screwdriver no. 1	Service torque 0.7 Nm Screwdriver no. 1
Conductor cross-section	2.5 mm ²	2.5 mm ²
Rated voltage	250 V	250 V
Test current	24 A	24 A
Packaging unit	10 pieces	10 pieces

Signalling and Switching Bus EasyBus

Connection example



When you use ecoline-P3, some steps can be omitted!

- a.) Position the connector bottom part and screw it down, if necessary
- b.) Carefully slide in flat-ribbon cable. The rib in the connector bottom part shows the correct positioning of the cable (it must match the groove in the cable sheath, otherwise the cable cannot be slid in by applying normal force).
- c.) Cut output cable to correct length, remove sheath and introduce cable. Tighten screws.
- d.) Slide top part onto bottom part as far as it will go and until you hear it click into place.
- d.) Press down lever and lock it.
- f.) Power supply takes place without removing the insulation via a specific socket, which is also suitable for branching (flat cable/flat cable).

Signalling and Switching Bus EasyBus

Device configuration

When the device is started for the first time, it has to be configured.

To enter the programming mode, press the programming key for more than 1 s, after which a "P" will be shown on the display for 1 s.

You can select between different programming sections, such as Address (A), Channel (C) and Frequency (F) by briefly pressing the programming key (for less than 1 s).

When the desired program function is displayed, press the programming key for more than 1 s, to enter the corresponding function. When the display starts flashing, you can release the key.

Addressing

In the addressing mode, you can select the 1st place (hundreds) by pressing the key for less than 1 s. When the desired number is shown, press the key for more than 1 s to go to the 2nd place (tens). Here the procedure is the same as for the hundredth place and this is also true of the 3rd place (ones).

The decimal point will flash, depending on the place selected: for example for the 1st place it will flash once, for the 2nd place twice and for the 3rd place three times in a row.

Once all 3 places have been defined, the device will check whether the entered address is inside the validity range (1 to 128).

If the address is not valid, an "E" will appear for 1 s on the display, and the module will wait for the input of a valid address. If the address is correct, a "P" will be shown for 1 s, and the display returns to the operating mode.

Channel configuration

When you are in the channel configuration, you can select a channel from 1 to 9 by briefly < 1 s pressing the key. Once the correct channel has been selected, the channel can be confirmed by a long key press > 1 s, and a "P" will appear on the display for a brief period. Then the display automatically returns to the operating mode.

A total of 9 channels can be selected, of which channel 1 is pre-set ex works.

Frequency configuration

When you are in the frequency configuration, you can select the frequency by briefly < 1 s pressing the key. Once the correct frequency has been selected, the frequency can be confirmed by a long key press > 1 s, and a "P" will appear on the display for a brief period. Then the display automatically returns to the operating mode.

You can choose between two frequencies, which are assigned as follows:

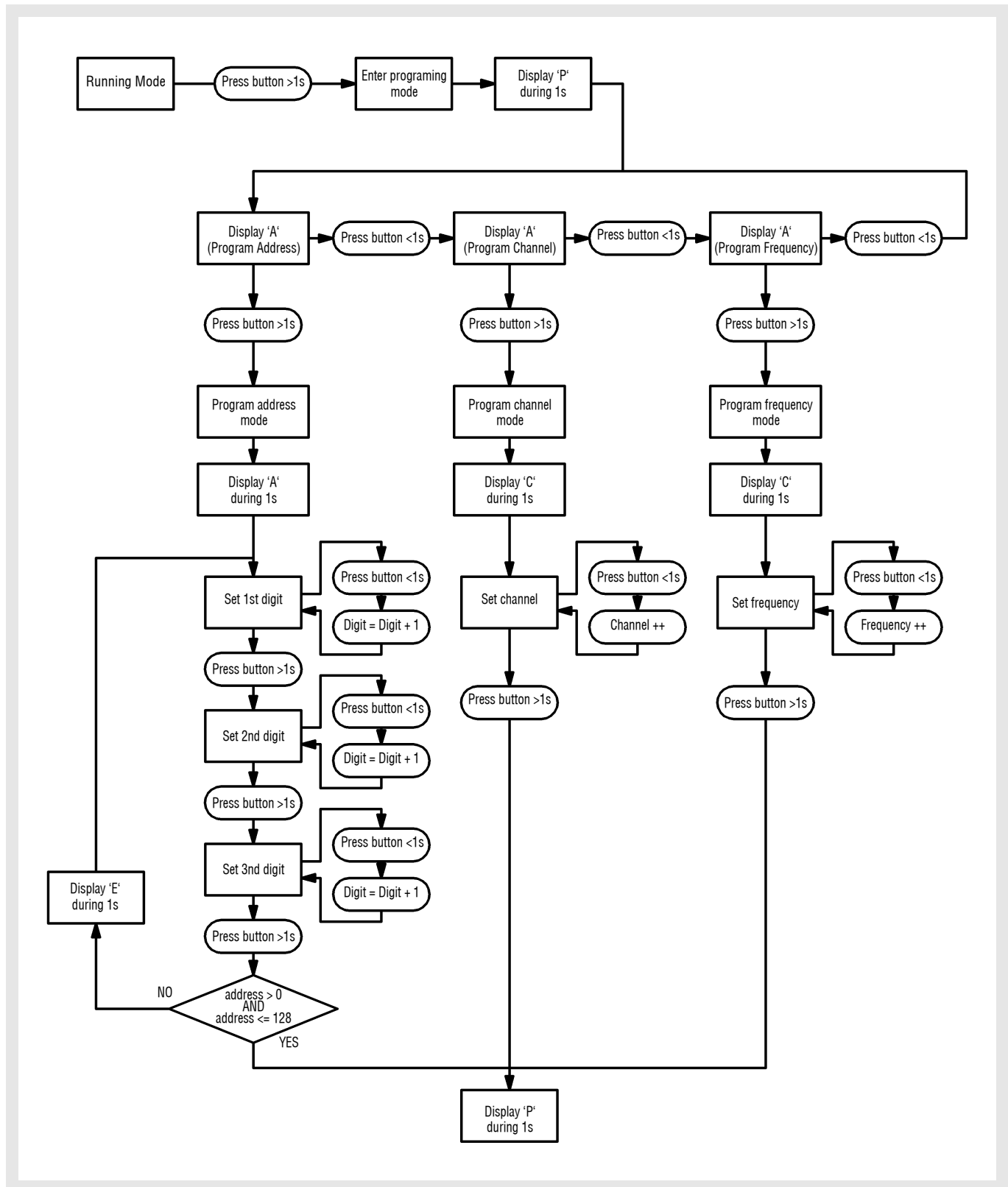
Display "1" = 132 KHz

Display "2" = 110 KHz

The factory presetting is 132 kHz.

Signalling and Switching Bus EasyBus

Configuration diagram



Signalling and Switching Bus EasyBus

The operating mode

During the operating mode, the module displays the currently set configuration every 10 s.

First an "A" is shown on the display, followed by the currently set address.

Then an "F" is shown on the display, followed by the currently set frequency.

Finally a "C" is shown on the display, followed by the currently set channel.

It is also possible to display the set configuration directly by briefly pressing the programming key.

Connecting the Easy-Eco-Tx to the Easy-Eco-Rx

The receiver must be configured for receiving the transmitter signals. An exact explanation is given in the following example:

- 1.) Press the "Teach-In" key on the Eco-Rx board for more than 1 second.
- 2.) LED 1 should now flash at a rate of 0.5 seconds to show that the receiver is ready for teach-in. LED 2 must not be lit.
- 3.) The transmitter must be confirmed by closing the fire damper and opening it again.
- 4.) If the programming procedure was completed correctly, and the limit switch was assigned to the receiver, the LEDs will be lit in normal mode again.
LED 1: shows the number of fire dampers
LED 2: permanently lit

Once 8 limit switches have been connected to a receiver, no more can be connected. If new connections have to be made, the receiver must first be deleted (see next chapter).

Press the "Teach-In" key for more than 1 second, to return to the operating mode.

Deleting a connection

To be able to delete the connections, you have to be in the programming mode, and the "Teach-In" key must be pressed for more than 1 second. Then you must hold down the "Teach-In" key again (> 2 s). LEDs 1 and 2 will flash briefly to indicate that the connections were deleted.

Specification text

The signalling and switching bus system EasyBus is used for monitoring and performing switching functions in actuators and its end positions for the "OPEN" and "CLOSED" positions. Data transfer takes place in the form of electrical signals via the 230 V AC EasyBus line (PLC), in which individual, group or central commands are possible. The bus line can be configured as stub or tree line or with free wiring.

Fields of application:

- Fire dampers
- Smoke dampers
- Multi-leaf dampers, throttle dampers
- Volumetric flow controller
- Smoke detectors
- Fans, etc.

With the programmable logic controller as "head", programming or assignment of the users is done according to DIN IEC 61131. This enables each electrical or electronics engineer trained in his field to carry out this programming.

The data can be transmitted to a superior BCS via a large number of interfaces. To visualise or control the data in a network, the Ethernet interface is used as standard.

On the EasyBus, control commands and the 230 V AC / 50 Hz supply voltage are operating simultaneously. Accordingly, the devices to be monitored are switched in parallel on the same 2-conductor cable and do not need any additional power supply lines. The bus architecture is only restricted by the bus length (max. 1,000 m) and the number of users (max. 128). The EasyBus has been tested according to DIN EN 50065-1.

Basis of our offer: The aim of the tender is to define technical equipment for the system operator that guarantees maximum operating safety and has a promising future. This means openness and flexibility in all directions, based on generally applicable technological standards. To sufficiently meet these targets, the following minimum requirements are established for the automation system. The automation system must cover all devices and functions defined by DIN ISO 16484. Its functional components are shown in individual items of the tender as follows:

1. MSR and automation devices
2. Communication and network
3. Operating / Observing / Visualising
4. Expandibility

Signalling and Switching Bus EasyBus

1. MSR and automation devices

For life cycles of more than 15 years and high reliability, the automation devices must be constructed in industrial quality according to the IEC standard 61131-2. It must be possible to process up to 1,024 physical data points, depending on performance class, on a controller (CPU) of the automation system via a wide range of digital and analogue interface modules (I/O level), while maintaining the full range of functions. The entire I/O level must be designed such that defective modules do not impair the functioning of the remaining I/O level or even result in a system failure. The mounting materials used in the switch cabinet (e.g. DIN mounting rails, terminals) must not affect the operating safety, reliability and standards. The assemblies will be specified, depending on the requirement of the I/O level. To this end, a wide range of different functional modules is available. Depending on the local situation, the flat or deep space-saving design of these modules allows flexible mounting of the I/O level. The system is expandable by virtue of decentralised commercially available I/O modules using standard interfaces such as CAN, TCP/IP or profibus. As standard, the following interfaces on the board of a CPU of the automation system must be made available for a wide range of communication tasks:

- Ethernet
- USB
- RS232/485/422
- Optionally, it must be possible to design at least 2 interface modules for further serial interfaces.

Each EPU must be equipped with commercially available plug-in battery, which will back up the user program and data for up to 3 years. The automation device must provide a sufficient amount of storage capacity for storage of documentations, applications and operating manuals. To this end, each CPU must have an internal RAM of up to 1 MB. It must be possible to expand the RAM to up to 4 GB. This purpose is met by a flash interface (max. 4 MB) and standard SD cards (max. 1 GB), which must be available on one or several slots of a CPU.

2. Communication and network:

An efficient network of complex infrastructures requires powerful system-overlapping functions and components in the automation system. It must be possible to integrate the network of the automation system in its full range of function into an Intranet or Internet via a Virtual Private Network (VPN) for a wide range of communication tasks. This integration can take place as VPN tunnel via DSL, ISDN, GPRS, or as analogue dialling. To this end, the automation system must have the following IP protocols:

- HTTP (Hyper Text Transfer)
- FTP (File Transfer Protocol)
- DHCP (Dynamic Host Configuration)
- PPP (Point to Point)
- DNS (Domain Name System)
- SNTP (Simple Network Time)
- SMTP (Simple Mail Transfer)
- SNMP (Simple Network Management)

For communication of the automation system from the management level down to the field level, the following standard protocols and bus specifications to be combined if desired must be made available on a CPU:

- BACNet/IP (BTL certified as B-BC)
- CAN
- DALI
- EnOcean
- KNXnet/IP (EIBnet/IP)
- LON/IP
- M-Bus (energy counter)
- MOD-Bus TCP/RTU/ASCII
- MP-Bus (Belimo)
- MPI (Siemens)
- N2-Bus (JCI)
- OPC
- P-Bus (Siemens PRU / PRV)
- Profibus DP/FMS
- S-Bus (make: Saia Burgess Controls Type)

The CPU must be equipped with an integrated web server with standardised CGI interface. The generally known web service must be able to have access to all resources and operating functions of the CPU. - Profibus DP/FMS - S-Bus (make: Saia Burgess Controls Type:)

Signalling and Switching Bus EasyBus

3. Operating / Observing / Visualising

Operating and observing must be possible beyond the system boundaries. This is why proprietary HMI operating systems are not admitted in new installations. The operating application must be on the local internal web server of the relevant CPU. The operating application must include the following functions:

- Fully graphic interface
- Alarm handling
- Trend displays
- E-mail sending including attachments of up to 1 MB

For compiling the websites with all its dynamic contents, the manufacturer must offer a tool which can be used without knowledge of the HTML syntax or programming knowledge. A touch web panel must be provided as local user guidance. It must be possible to assign them to the CPUs as desired. The associated number and size of the displays (3.5" - 15" in VGA/SVGA resolution) must be adapted to the local requirements. To incorporate also existing systems without industrial Ethernet technology into the operating concept, the web panel must have the following on-board specifications:

- TCP/IP, USB, RS232/485
- PS2 / SPI port: Optional
- Web / FTP Server
- Optional Browser
- Logic controller as gateway to existing proprietary bus systems

It must be possible to couple the automation system to a management level via an independent or standard, free database-based system. To this end, all previously described communication paths must be available.

4. Expandibility:

It must be possible to incorporate energy consumption, standards, protocols, new technologies, etc., required in the future, in the automation system without having to replace the complete controller of the automation system. This guarantees high investment protection for the future. This is why the user programs must be upward, sideways and downward compatible with other, older and newer series and systems having larger and smaller capacities. Program download must be possible via all previously requested standard interfaces. To this end, an interpreter will convert hardware-independent application programs into hardware-dependent machine codes. This allows existing modular systems to be extended without problems and to be processed using a programming tool of the latest version. For data handling using commercially available .NET-, JAVA-capable Windows / Linux or MAC applications, the automation system must be able to gain web-compliant control access via the CGI interface using HTTP or FTP. If desired, all engineering tools can be made freely accessible to the system operator for maintenance and expansion of the system configuration. The required training time and effort must be agreed upon beforehand.

Master device **Easy-M** in a plastic housing with a power supply unit and integrated LCD display for displaying the master status and events.

The master device Easy-M manages up to 128 EasyBus users at a maximum line length of 1,000 metres. The Easy-M module has its own bus address, channel configuration and frequency configuration for differentiating between different systems.

- Supply voltage 230 V AC
- Communication interface RS232/RS485
- Addressing via pushbutton on the module
- Plastic housing
- Connection 11 spring clamps+
- LEDs for optical display
- Protection type: IP 40
- Power consumption ≤ 8 W
- Temperature range -10...+60 °C

Product: SCHAKO type **Easy-M**

Signalling and Switching Bus EasyBus

Damper module **Easy-B** in a plastic housing with a power supply unit and integrated LCD display for displaying the bus address and events.

The fire protection module Easy-B controls and monitors dampers with 24 DC (optionally 230 V AC) spring return actuators and 3-point drives. The Easy-B module has its own bus address, channel configuration and frequency configuration for differentiating users from different systems.

- Supply voltage 230 V AC
- Plastic housing
- Connection 4 spring clamps for power supply
- Connection 2 AMP plug-in connections for connecting the drive
- Addressing via pushbutton on the module
- LEDs for optical display
- Protection type: IP 40
- Power consumption
- Temperature range -10...+60 °C

Product: SCHAKO **type Easy-B**

Smoke detection module **Easy-R** in a plastic housing with a power supply unit and integrated LCD display for displaying the bus address and events.

The smoke detection module Easy-R controls and monitors up to 2 smoke detectors of the RMS-L type (optionally external products having similar values). The Easy-R module has its own bus address, channel configuration and frequency configuration for differentiating users from different systems.

- Supply voltage 230 V AC
- Plastic housing
- Connection 4 spring clamps for power supply
- Connection two 9-pin Sub-D plug for connecting the detector
- Addressing via pushbutton on the module
- LEDs for optical display
- Protection type: IP 40
- Power consumption
- Temperature range -10...+60 °C

Product: SCHAKO **type Easy-R**

Volumetric flow module **Easy-V** in a plastic housing with a power supply unit and integrated LCD display for displaying the bus address and events.

The volumetric flow module Easy-V controls and monitors up to 2 volumetric flow drives from SCHAKO (optionally external products having similar values). The Easy-V module has its own bus address, channel configuration and frequency configuration for differentiating users from different systems.

- Supply voltage 230 V AC
- Plastic housing
- Connection 4 spring clamps for power supply
- Connection 14 spring clamps for activating up to 2 drives
- Addressing via pushbutton on the module
- LEDs for optical display
- Protection type: IP 40
- Power consumption
- Temperature range -10...+60 °C

Product: SCHAKO **type Easy-V**

Radio receiver module **Easy-Eco-Rx** in a plastic housing with a power supply unit and integrated LCD display for displaying the bus address and events.

The radio receiver module Easy-Eco-Rx monitors up to 8 radio limit switches (based on EnOcean technology). The Easy-Eco-Rx module has its own bus address, channel configuration and frequency configuration for differentiating users from different systems.

- Supply voltage 230 V AC
- Plastic housing
- Connection 4 spring clamps for power supply
- Addressing via pushbutton on the module
- LEDs for optical display
- Protection type: IP 40
- Power consumption
- Temperature range -10...+60 °C

Product: SCHAKO **type Easy-Eco-Rx**

Signalling and Switching Bus EasyBus

Radio limit switch **Easy-Eco-Tx** in a plastic housing with lever mechanism and integrated electronics for sending events.

The Easy-Eco-Tx radio limit switch is assigned to the Easy-Eco-Rx receiver and is addressed via a register of the receiver, thus effecting unambiguous assignment in the system.

- Plastic housing
- Addressing by trigger
- Protection type: IP
- Power consumption
- Temperature range -10...+60 °C

Product: SCHAKO type **Easy-Eco-Tx**

The **Easy-F** filter potted in a metal housing is used for filtering the signals on the network.

The Easy-F module has its own bus address, channel configuration and frequency configuration for differentiating users from different systems.

- Supply voltage 125/230 V AC, 50/60 Hz
- Metal housing
- Connection 4 torx screw terminals
- Connection 2 M6 threaded connection for PE
- Protection class I
- max. current 20 A
- Fastening: screw connection
- Temperature range -10...+60 °C

Product: SCHAKO type **Easy-F**

PLC - Programmable Logic Controller

Housing with processor unit NT.OS, 1 integrated Web/FTP Server, date/clock (RTC), data backup 1-3 years via lithium battery (replaceable), watchdog, interfaces: 1 Ethernet TCP/IP 1 USB port for PG5 1 RS485 (115 KBits/s) Profi-S Net 1 RS232 (115 KBits/s) RJ45 1 Profibus DP-Slave (1.5 Mbits/s) RJ45 Optional: 2 M1/M2 slots for backup and file system or BACnet PCD7.R5xx

- 1MB SRAM / on-board flash: 1MB (file system)
- Ethernet TCP/IP
- 1x RS 485

On the dedicated I/O board:

- 1x RS 232
- 1x RS 485
- 1 slot for PCD7.F1xx module
- 1 slot M1 for flash memory module PCD7.R5xx
- 1 slot M2 for SD card memory PCD7.R-SD up to 512 MB
- Renata CR2032 3V lithium battery + supervision
- 10 digital inputs
- 5 digital inputs can optionally be used as analogue 0-10 V input
- 12 relay outputs 250 V AC, 4 A (4 of which with changeover contact, 3 connections)

- 8 digital outputs
- 8 analogue inputs, 12-bit, 0...10 V / 0...20 mA / PT/Ni1000 / NTC10, selection via channel using a jumper.
- 8 analogue outputs, 0-10 V, 12 bits
- Input/output extension module plug
- Supply voltage 24 V DC $\pm 10\%$ (smoothed)
- Power consumption max. 12 W (no load current included)
- Storage temperature: -25°C ... +70° C
- Ambient temperature: 0...+55° C
- Relative humidity: 10 to 95%, non-condensing.
- Protection type: IP20
- CE standards: EMC (industrial level)
- UL: certified
- Rohs compliant (2002/95/CE)

Type: Saia PCD3.M90 OEM or equivalent

Web panel with embedded micro browser, display 10" TFT, VGA 640x480 pixels, 65,536 colours with touch screen, CCFL backlight, flash memory 4 Mbytes, Web/FTP Server, interfaces: 1 Ethernet TCP/IP RJ45 1 PS/2 1 USB 12 Mbits/s 1 RS232 1 RS485 mounting in faceplates (IP65).

Type: Saia PCD7.D410VTCF or equivalent

Power supply module switched by 24 V DC output incl. short-circuit protection and overload-protected, high overload capacity without switch-off, IP20 for mounting on DIN rail, standardised to EMC89/336/EEC and 93/68/EEC, safety according to VDE 0805 and VDE 0160, EMC according to EN 50082-2 and EN 55011

Input: single-phase 110...240 V AC

Output: 24 V DC / 2.5 A

Type: Saia Q.PS-AD2-2402 or equivalent

Industrial Ethernet switch for DIN rail mounting, 5 ports Ethernet 10/100 Mbits/s, 5 RJ45 autonegotiation, autopolarity, auto-crossing.

Line length: Twisted Pair 0..100 m Network structure: line/star structure displays/diagnostics: 1 green LED: P power

5 yellow LEDs: 10/100 data rate

5 green LEDs: DA/STAT data, link status power supply 9.6 V DC...32 V DC.

Type: Saia Q.NET-5TX or equivalent

Signalling and Switching Bus EasyBus

Flat-cable line for the Woertz ecoline P3 flat-cable system.
For installation in dry rooms and UV-protected areas. Same use as NYM according to VDE 0298-3. For permanent installation in false ceiling and false floor areas and in cable ducts and voids.

General

Outer casing	PVC to DIN VDE 0207-5 "YM2", CENELEC HD 21.1 S2 "TM2"
Fire behaviour	Self-extinguishing according to IEC 60332-1
Fire load	approx. 0.5 kWh/m
Conductor cross-section	3x2.5 mm ²
Rated voltage	250 V
Current-carrying capacity	according to IEC 60364-5-523
High-voltage current portion	
Copper conductor	Blank, extra fine wire according to DIN VDE 0295 class 6, CENELEC HD 383 S2 class 6
Wire insulation	PVC to DIN VDE 0207-4 "YI2", CENELEC HD 21.1 S2 "TI2"

Type: Ecoline P3 or equivalent

Flat-cable connection socket (supply) 3x2.5 for supplying high-voltage current with screw connection for Woertz eco-line - P3 flat-cable system.

For installation in dry rooms and UV-protected areas.
For permanent installation in false ceiling and false floor areas and in cable ducts and voids.

General

Test regulations	IEC 60998-1 / IEC 60998-2-5 / IEC 60947-7-1
Plastic parts	halogen-free
Metal parts	corrosion-protected
Fire behaviour	UL94-V2
Conductor cross-section	3x2.5 mm ²
Conductor receiving chamber	ø 3.75 mm

High-voltage current portion

Pivot screws	Service torque 0.7 Nm Phillips-tip screwdriver no. 1
Clamping screws	Service torque 0.7 Nm Screwdriver no. 1
Rated voltage	250 V
Test current	24 A

Type: Woertz Ecoline ESD or equivalent

Flat-cable connection socket 3x2.5 for branching high-voltage current with quick connection technology for Woertz ecoline - P3 flat-cable system.

For installation in dry rooms and UV-protected areas.
For permanent installation in false ceiling and false floor areas and in cable ducts and voids.

General

Test regulations	IEC 60947-7-1
Plastic parts	halogen-free
Metal parts	corrosion-protected
Fire behaviour	UL94-V2
Conductor cross-section	3x2.5 mm ²
Conductor receiving chamber	ø 3.75 mm

High-voltage current portion

Clamping screws	Service torque 0.7 Nm Phillips-tip screwdriver no. 1
Rated voltage	250 V
Test current	24 A

Type: Woertz Ecoline ASD or equivalent

Flat-cable end piece for the Woertz ecoline - P3 flat-cable system. To be mounted at each cable beginning and cable end, to ensure that the prescribed air and creepage distance are guaranteed.

For installation in dry rooms and UV-protected areas.

General

Properties	made of polycarbonate, halogen-free, transparent
Fire load	0.06 kWh
For conductor cross-section	3x2.5 mm ²

Type: Woertz Ecoline KEST or equivalent

Signalling and Switching Bus EasyBus

Commissioning of the EasyBus system

When commissioning an EasyBus system, you can select from the following three versions:

Without order details, version a.) Commissioning (standard) will be carried out.

Commissioning includes the following activities:

Version a.)

Commissioning (standard)

- Checking the wiring
- Checking the addressing
- Function programming work according to the description in the specification
- Performing a functional test (in a random check, about 10% of the connected field bus modules are triggered, and it is checked whether the display on the EasyBus system is correct and whether programming is as specified).
- Instruction of the operating personnel (if present)
- Preparing a commissioning log

Version b.)

Commissioning including a complete check of the assignment

- As version a.) plus:
- Complete 1:1 check of the assignment of the EasyBus components

Version c.)

Commissioning including a complete check of the assignment and connection of the EasyBus components to cables laid on-site.

- As version b.) plus:
- Connecting the EasyBus components to cables laid on-site. Connecting the EasyBus components mounted in the switch cabinet to terminals mounted on-site.

Product: SCHAKO type EasyBus commissioning

Switch cabinet (compact cabinet)

according to protection IP 66

Housing:

Stable sheet steel construction consisting of 1.25 mm or 1.5 mm sheet steel, canted and welded from a single piece, with circumferential protective channel at the door opening, rear well with countersunk bores for wall mounting support. Housing bottom with sheet steel flange plates.

Doors:

1.5-2 mm sheet steel, resting, with foamed seal, vertical mounting hole strips on both sides, screwed-down hinges. For single-door housings, change possible from right-hand to left-hand hinge, opening angle of 130° according to VDI (can be retrofitted to 180°), sash lock with double-bit key insert according to DIN 43668

Mounting plate:

2-3 mm sheet steel with perforations, depth-adjustable on studs, galvanised.

Assembly:

Includes assembly of all switch cabinet components and internal wiring except for the terminal blocks

Accessories:

Locking inserts, wall mounting supports, plastic flange plate, insulation tapes, circuit diagram bags, door lock, inspection window, control panels, heat exchangers, filter fans, radiators, pivoting frame, electronic accessories (with 600 mm wide cabinets only), rain roof, 180° hinge.

Surface finish:

Metal sheets cleaned, degreased, phosphated, dip-primed by electrophoresis and powder-coated with polyester powder RAL 7035.

Type: SCHAKO Easy-S or equivalent