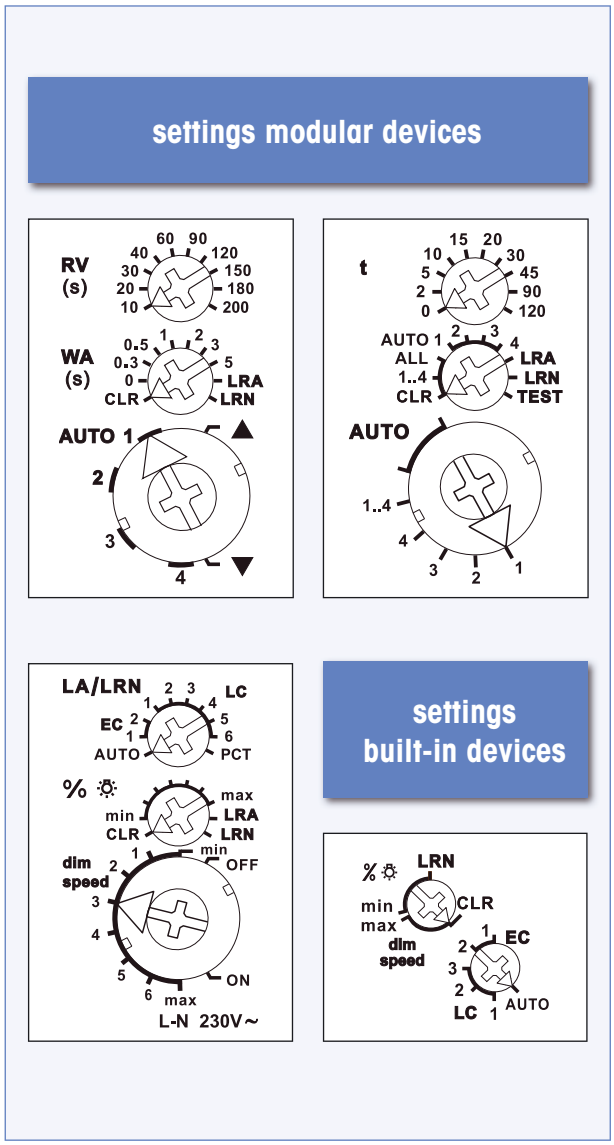

Contacts	FSR14-4x, FSB14, FHK14	FUD14, FUD14/800W [7]	FSG14/1-10V [b]	FSR14-2x[b], FMS14, FTN14[b] FFR14, FMZ14, FZK14 [b]	FSR14SSR
Contact material/contact gap	$AgSnO_2$/0.5mm	Power MOSFET	$AgSnO_2$/0.5mm	$AgSnO_2$/0.5mm	Opto-Triac
Test voltage control connections/contact	–	–	–	2000V	4000V
Rated switching capacity each contact	4A/250V AC	–	600VA [5]	16A/250V AC; FMZ14: 10A/250V AC	up to 400W [6]
incandescent lamps and halogen lamp load 230V [2]	1000W I on ≤ 10A/10ms	up to 400W; FUD14/800W: up to 800W [1] [3] [4]	–	2000W I on ≤ 70A/10ms	up to 400W [6]
Fluorescent lamp load with KVG* in lead-lag circuit or non compensated	500VA	–	–	1000VA	–
Fluorescent lamp load with KVG* shunt-compensated or with EVG*	250VA, I on ≤ 10A/10ms	–	600VA [5]	500VA	up to 400VA [6]
Compact fluorescent lamps with EVG* and energy saving lamps ESL	up to 200W [9]	up to 400W [9] [1]	–	up to 400W [9]	up to 400W [6] [9]
Inductive load cos φ = 0,6/230V AC inrush current ≤ 35A	650W [8]	–	–	650W [8]	–
230V LED lamps	up to 200W [9]	up to 400W [9] [1]	–	up to 400W [9]	up to 400W [6] [9]
Max. switching current DC1: 12V/24V DC	4A	–	–	8A (not FTN14 and FZK14)	–
Life at rated load, cos φ = 1 or for incandescent lamps 500W at 100/h	$>10^5$	–	$>10^5$	$>10^5$	∞
Service life at rated load, cos φ = 0,6 at 100/h	$>4x10^4$	–	$>4x10^4$	$>4x10^4$	∞
Max. operating cyles	10^3/h	–	10^3/h	10^3/h	10^3/h
Maximum conductor cross-section (3-fold terminal)	6mm² (4mm²)	6mm² (4mm²)	6mm² (4mm²)	6mm² (4mm²)	6mm²
Two conductors of same cross-section (3-fold terminal)	2.5mm² (1.5mm²)	2.5mm² (1.5mm²)	2.5mm² (1.5mm²)	2.5mm² (1.5mm²)	2.5mm² (1.5mm²)
Screw head	slotted/crosshead, pozidriv	slotted/crosshead, pozidriv	slotted/crosshead, pozidriv	slotted/crosshead, pozidriv	slotted/crosshead, pozidriv
Type of enclosure/terminals	IP50/IP20	IP50/IP20	IP50/IP20	IP50/IP20	IP50/IP20
Electronics					
Time on	100%	100%	100%	100%	100%
Max./min. temperature at mounting location	+50°C/-20°C	+50°C/-20°C	+50°C/-20°C	+50°C/-20°C	+50°C/-20°C
Standby loss (active power)	0.1W	0.3W	0.9W	0.05-0.5W	0.1W
Local control current at 230V control input	–	–	–	5mA	–
Max. parallel capacitance (approx. length) of local control lead at 230V AC	–	–	–	FTN14: 0.3µF (1000m)	–

* EVG = electronic ballast units; KVG = conventional ballast units

[b] Bistable relay as relay contact. After installation, wait for short automatic synchronisation before teaching-in the wireless pushbuttons.

[1] If the load exceeds 200W, a ventilation clearance of 1/2 pitch unit to adjacent devices must be maintained.

[2] Applies to lamps of max. 150W.

[3] Per dimmer or capacity enhancer it is only allowed to use max. 2 inductive (wound) transformers of the same type, furthermore no-load operation on the secondary part is not permitted. The dimmer might be destroyed. Therefore do not permit load breaking on the secondary part. Operation in parallel of inductive (wound) and capacative (electronic) transformers is not permitted!

[4] When calculating the load a loss of 20% for inductive (wound) transformers and a loss of 5% for capacitive (electronic) transformers must be considered in addition to the lamp load.

[5] Fluorescent lamps or LV halogen lamps with electronic ballast.

[6] Applies to one contact and the sum of both contacts.

[7] Capacity increase for all dimmable lamp types with Capacity Enhancer FLUD14.

[8] All actuators with 2 contacts: Inductive load cos φ = 0.6 as sum of both contacts 1000W max.

[9] Generally applies to energy saving lamps (ESL) and 230V LED lamps. Due to different lamp electronics, switch on/off problems and a restriction in the maximum number of lamps, however, the dimming ranges may be limited depending on the manufacturer; in particular when the connected load is very low (e.g. with 5W LEDs). The dimmer switch comfort settings EC1, EC2, LC1, LC2 and LC3 optimise the dimming range, however, the maximum power is then only up to 100W. In these comfort settings, no inductive (wound) transformers may be dimmed.

The second terminating resistor has to be plugged to the last actuator included in the FAM14 respectively FSNT14 scope of supply.

Eltako Wireless is based on the EnOcean wireless standard for 868MHz, frequency 868.3MHz, data rate 125kbps, modulation mode ASK, max. transmit power 7dBm (<10mW).

Compliance with: EN 61000-6-3, EN 61000-6-1 and EN 60669

Contacts	FUD61NP FUD61NPN FSUD	FUD70 FUD70S FKR70UD FLS70UD	FSR61, FMS61, FLC61, FSB61, FTN61, FMZ61, FHK61, FSR61LN, F2L61, FFR61, FZK61, FSR70, FSB70, FHK70, F2L70, FZK70, FSSA, FSVA	FSG70 FKR70/1-10 V FLS70/1-10 V	FSR61G FHK61SSR
Contact material/contact gap	Power MOSFET	Power MOSFET	$AgSnO_2$/0.5 mm [b]	$AgSnO_2$/0.5 mm [b]	Opto Triac
Spacing of control connections/contact	–	–	3 mm	–	–
Test voltage control connections/contact	–	–	2000 V	–	–
Rated switching capacity each contact	–	–	10 A/250 V AC FSR70W: 16 A/250 V AC	600 VA [4]	–
Incandescent lamp and halogen lamp load [1] 230 V, I on ≤ 70 A/10 ms	up to 300 W [2]	up to 400 W [2]	2000 W	–	up to 400 W
Fluorescent lamp load with KVG* in lead-lag circuit or non compensated	–		1000 VA	–	–
Fluorescent lamp load with KVG* shunt-compensated or with EVG*	–	–	500 VA	600 VA [4]	up to 400 VA
Compact fluorescent lamps with EVG* and energy saving lamps	up to 300 W [3] (not FUD61NP)	up to 400 W [3]	up to 400 W [3]	–	up to 400 W [3]
Inductive laod cos φ = 0.6/230 V AC inrush current ≤ 35 A	–	–	650 W [5]	–	–
Dimmable 230 V LED lamps	up to 300 W [3] (not FUD61NP)	up to 400 W [3]	up to 400 W [3]	–	up to 400 W [3]
Max. switching current DC1: 12 V/24 V DC	–	–	8 A (not NP, FSSA, FSVA and 70)	–	–
Service life at rated load, cos φ = 1 or incandescent lamps 500 W at 100/h	–	–	$> 10^5$	$> 10^5$	∞
Service life at rated load, cos φ = 0.6 at 100/h	–	–	$> 4 \times 10^4$	$> 4 \times 10^4$	–
Max. operating cyles	–	–	10^3/h	10^3/h	10^3/h
Maximum conductor cross-section	4 mm^2	4 mm^2	4 mm^2	4 mm^2	4 mm^2
Two conductors of same cross-section	1.5 mm^2	1.5 mm^2	1.5 mm^2	1.5 mm^2	1.5 mm^2
Screw head	slotted/cross-head	slotted/cross-head	slotted/cross-head	slotted/cross-head	slotted/cross-head
Type of enclosure/terminals	IP30/IP20	IP30/IP20	IP30/IP20	IP30/IP20	IP30/IP20
Electronics					
Time on	100 %	100 %	100 %	100 %	100 %
Max./min. temperature at mounting location	+50°C/-20°C	+50°C/-20°C	+50°C/-20°C	+50°C/-20°C	+50°C/-20°C
Standby loss (active power)	FUD61NP: 0.7 W; FUD61NPN: 0.5 W FSUD: 0.6 W	0.6 W	0.3 W - 0.9 W	1.7 W	0.7 W
Local control current at 230 V control input, only on Series 61	1 mA	–	3.5 mA; FSR61+FHK61/8-24 V UC, at 24 V DC: 0.2 mA	–	3.5 mA
Max. parallel capacitance (approx. length) of local control lead at 230 V AC	0.06 µF (200 m)	–	0.01 µF (30 m)	–	0.01 µF (30 m)

[b] Bistable relay as relay contact. After installation, wait for short automatic synchronisation before teaching-in the wireless pushbuttons.

[1] Applies to lamps of max. 150 W.

[2] Also max. 2 induction transformers of the same type (L load) and electronic transformers (C load).

[3] Generally applies to energy saving lamps (ESL) and 230 V LED lamps. Due to different lamp electronics, switch on/off problems and a restriction in the maximum number of lamps, however, the dimming ranges may be limited depending on the manufacturer; in particular when the connected load is very low (e.g. with 5 W LEDs). The dimmer switch comfort settings EC1, EC2, LC1, LC2 and LC3 optimise the dimming range, however, the maximum power is then only up to 100 W. In these comfort settings, no inductive (wound) transformers may be dimmed.

[4] Fluorescent lamps or LV halogen lamps with electronic ballast.

[5] All actuators with 2 contacts: Inductive load cos φ = 0.6 as sum of both contacts 1000 W max.

* EVG = electronic ballast units; KVG = conventional ballast units

Eltako Wireless is based on the EnOcean wireless standard for 868 MHz, frequency 868.3 MHz, data rate 125 kbps, modulation mode ASK, max. transmit power 7 dBm (< 10 mW).

Compliance with: EN 61000-6-3, EN 61000-6-1 and EN 60 669

Chart
Wireless Sensors that can be taught-in in Wireless Actuators

Sensors / Actuators	Pushbuttons and hand-held transmitters FT2S, FT4F FT4, FFT55Q FMT55, FHS8 FHS12, FMH2 FMH4, FMH8	Transmitter modules FSM12 F8S12 FSM61 FTS14EM FTS14FA FSU55D FSU14	Card switch, pull switch and smoke alarm FKF FKC FZS FRW	Window/ door contact FTK	Hoppe window handle FHF FTKE	Motion/ brightness sensors FBH63 FABH63 SR-MDSBAT	Brightness sensors FAH60 FAH63 FIH63AP	Temperature controller/ sensors FTR55H FTR55D FTF55, FUT55D FUTH55D FAFT60, FIFT63 thanos [3]	Control from a PC using software GFVS
F4HK14	X	X		X	X	X [4]		X	X
FAE14LPR	X	X		X	X	X [4]		X	X
FAE14SSR	X	X		X	X	X [4]		X	X
FFR14	X	X							X
FHK14	X	X		X	X	X [4]		X	X
FMS14	X	X	X						X
FMZ14	X	X	X	X	X				X
FSB14	X	X		X	X		X		X [2]
FSG14/1-10 V	X	X		X	X	X	X		X [2]
FSR14-2x	X	X	X	X	X	X	X		X
FSR14-4x	X	X	X	X	X	X	X		X
FSR14SSR	X	X	X	X	X	X	X		X
FTN14	X	X		X		X			X
FUD14/800 W	X	X		X	X	X	X		X [2]
FUD14	X	X		X	X	X	X		X [2]
FZK14			X	X	X	X [4]			
FADS60	X	X		X	X	X [4]			X
FFR61-230 V	X	X							X
FGM	X	X	X	X	X	X [4]			X
FHK61-230 V	X	X		X	X	X [4]		X	X
FHK61/8-24 V UC	X	X		X	X	X [4]		X	X
FHK61SSR	X	X		X	X	X [4]		X	X [2]
FHK70-230 V	X	X		X	X	X [4]		X	X
FKLD61	X	X				X	X		X [2]
FKR70/1-10 V	X	X				X	X		X
FKR70UD-230 V	X	X				X	X		X
FLC61NP-230 V	X	X	X			X	X		X
FLS70/1-10 V	X	X				X			X [2]
FLS70UD-230 V	X	X				X			X [2]
FMD70-230 V	X	X				X	X		X [2]
FMS61NP-230 V	X	X							X
FMZ61-230 V	X	X	X	X	X				X
FSB61NP-230 V	X	X		X	X		X		X [2]
FSB70-230 V	X	X		X	X		X		X [2]
FSG70/1-10 V	X	X							X
FSR61-230 V	X	X	X	X	X	X [4]	X		X
FSR61/8-24 V UC	X	X	X	X	X	X [4]	X		X
FSR61G-230 V	X	X	X	X	X	X [4]	X		X
FSR61LN	X	X	X	X	X	X [4]	X		X
FSR61NP-230 V	X	X	X	X	X	X [4]	X		X
FSR61VA	X	X	X	X	X	X [4]	X		X
FSR70-230 V	X	X	X	X	X	X [4]	X		X
FSR70S-230 V	X	X	X			X [4]	X		X
FSSA-230 V	X	X							X
FSUD-230 V	X	X							X [2]
FSVA-230 V	X	X							X
FTN61NP-230 V	X	X		X		X			X
FUA55LED	X	X		X	X	X			X
FUD61NP-230 V	X	X				X	X		X [2]
FUD61NPN-230 V	X	X				X	X		X [2]
FUD70-230 V	X	X				X	X		X [2]
FUD70S-230 V	X	X							X [2]
FUTH55D				X	X				
FZK61NP-230 V			X	X	X	X [4]			
FZK70-230 V			X	X	X	X [4]			
F2L61-230 V	X	X		X	X			X	X
F2L70-230 V	X	X		X	X			X	X

[1] Only FTR55H, FTR55D, FUT55D and FUTH55D [2] Also controllable by activation telegrams from the FVS software 01.08.2013
[3] thanos LSR, LSRQ and SSR can be taught-in in all actuators and in the FVS software [4] Only motion detection

Operating distances between sensors and actuators

Compared with hard-wired systems, EnOcean wireless systems are highly flexible and simple to install.
The following instructions simplify installation. You will find detailed instructions on wireless network planning in the 12-page booklet "EnOcean Wireless Systems – Range planning Guide" that you can download from www.enocean.com.

1. Wireless signal range

Wireless signals are electromagnetic waves. The field strength at the receiver decreases the further the distance away from the transmitter. **The wireless range is therefore limited. Obstacles standing in the radio field the also shorten range compared with line-of-sight links:**

Obstacle	Reduced range
Wood, plaster, glass uncoated, with no metal	0 - 10 %
Brick, particle board	5 - 35 %
Concrete with iron reinforcement bars	10 - 90 %
Metal, aluminium cladding	*see 2.*

The geometric shape of a room determines the radio range since propagation is not in the form of a beam but requires a certain volume of space (the radio beam from the transmitter and receiver ellipsoidal at their points of focus). Narrow corridors with solid walls are bad for propagation.

External antennas typically have better radio characteristics than flush-mounted receivers installed in walls. The type of fitted for the antennas and the spacing from ceilings, floors and walls all play a role.

People and obstacles in a room may reduce range.

It is therefore essential to integrated some reserve when performing range planning to ensure the reliable functioning of the wireless system even in poor conditions.

A sturdy, reliable installation in a building is achieved by integrating sufficient range reserves.
Recommendations from everyday practice:

Range	Conditions
> 30 m	Under excellent conditions: Large free room, optimum antenna design and good antenna position.
> 20 m (planning safety)	If there are furniture and persons in the room, through up to 5 dry plasterboard walls or 2 brick/aerated concrete walls: For transmitters and receivers with good antenna design and good antenna position.
> 10 m (planning safety)	If there are furniture and persons in the room, through up to 5 plasterboard drywalls or 2 brick/aerated concrete walls: For receivers fitted in wall or in ceiling. Or small receiver with internal antenna. Or together with switch/wire antenna on/near metal. Or a narrow corridor.
Dependent on reinforcement and antenna design	Vertical through 1-2 ceilings

2. Partitioning

So-called radio shadows form behind metal surfaces, e.g. behind metal partition walls and metal ceilings, behind metal foils of heat insulation and solid reinforcement in concrete walls. Single thin metal strips have very little influence, for example the profile sections in a plasterboard drywall.

It has been observed that radio communications also works with **metal room dividers.** This occurs by reflections: metal and concrete walls reflect radio waves and they travel to neighbouring corridors or rooms through openings, e.g. in a wooden door or a glass partition. The range may be strongly reduced depending on the location. An additional repeater at a suitable location can easily offer alternative radio paths.

Important conditions that reduce radio range:

- Metal partition walls or hollow walls filled with insulation wool backed by metal foil
- Suspended ceilings with panels made of metal or carbon fibre
- Steel furniture or glass with metal coating
- Fitting the pushbutton on a metal wall (typical range loss: 30%)
- Use of metal pushbutton frames (typical range loss: 30%)

Firewalls, staircases and building services areas should be regarded as partitions.

A partition can be avoided by repositioning the transmitter/receiver antenna out of the radio shadow or by using a repeater.

Operating distances between sensors and actuators

3. Penetration angle

The angle at which the transmitted signal impinges on the wall plays a special role. Signals should penetrate masonry as vertically as possible. Wall niches must be avoided.

4. Antenna installation

The receive antenna or a **receiver with an integrated antenna** should not be installed on the same side of the wall as the transmitter. It is better to install the antenna on adjacent or opposite walls. The antennas should be spaced from the room corner at a distance of >10 cm as far as possible.

The ideal installation location for the receive antenna is a central position in the room.

A **"magnet foot antenna"** (e.g. Eltako FA200 or FA250) must adhere on a metallic surface that is as large as possible in order to create a sufficient opposite pole. For example, the simplest installation can be on a ventilation pipe.

5. Spacings between receiver and other interference sources

The spacing between the receiver and other transmitters (e.g. GSM/DECT/Wireless LAN) and high-frequency interference sources (computer, audio and video systems) should be >50 cm.

Eltako transmitters, on the other hand, can be installed without any problem next to other transmitters and interference sources.

6. Use of repeaters

In case of problems with reception quality, it may be helpful to use a wireless repeater. The Eltako Repeater FRP61 (see page **Z**-1) requires no configuration, only a mains connection. If receives the wireless signal and passes it on. This almost doubles the range. Eltako repeaters are switchable to 2-level function and allow more than two repeaters to be cascaded.

7. Field strength measuring instrument

The field strength measuring instrument EPM300 (see page **Z**-8) helps to find the best position for transmitter and receiver. Moreover, it can be used to test link interferences in installed devices and even identify an interfering transmitter.

8. Installation in residential buildings

Here there is no real necessity to overcome large radio links. If necessary, a central wireless repeater can be installed to amplify the signal.

9. Installation in industrial buildings

To cover large premises, a wireless gateway is typically used as an automation bus (TCP/IP, EIB/KNX, LON, etc.). Planning with a range radius of 10-12 m offers sufficient security, even if there are the usual changes to the environmental conditions later.

Communication within Eltako Wireless Building

All Eltako wireless sensors and Eltako wireless actuators communicate within the Eltako wireless network by means of wireless telegrams that are formatted using the world-wide standard of EnOcean Alliance. These are the EEPs as described below; some of them are partly modified to a certain extent. The feedback from the bidirectional actuators to confirm the switch position correspond to those of the PTM200 wireless modules but without the telegram sent when the button is released.

Sensor telegrams

FABH63+FBH55+FBH63+FIBH63 (EEP: similar to 07-08-01)

(EEP: similar to 07-08-01, expanded brightness range, no Occupancy Button in DB0_Bit0)

ORG =	0x07
Data_byte3 =	-
Data_byte2 =	brightness 0 – 2048 lux, linear n = 0x00 – 0xFF
Data_byte1 =	-
Data_byte0 =	DB0_Bit3 = LRN Button (0 = teach-in telegram, 1 = data telegram) DB0_Bit1 = motion (0 = motion , 1 = no motion) for data telegram: 0x0D (motion), 0x0F (no motion) for teach-in telegram: 0x85

Teach-in telegram BD3..DB0: 0x20, 0x08, 0x0D, 0x85

FAFT60+FIFT63AP (EEP: 07-04-02 plus Data_byte3)

ORG =	0x07
Data_byte3 =	charge state of energy accumulator (e.g 2.5 V = 0x59 … 4 V = 0x9B)
Data_byte2 =	rel. humidity 0 .. 100%, linear 0x00 – 0xFA, i.e. (0..250 dez.)
Data_byte1 =	Actual temperature -20°C .. +60°C, linear 0x00 - 0xFA, i.e. (0..250 dez.)
Data_byte0 =	DB0_Bit3 = LRN Button (0 = teach-in telegram, 1 = data telegram) for data telegram: 0x0F, for teach-in telegram: 0x87

Teach-in telegram BD3..DB0: 0x10, 0x10, 0x0D, 0x87

FAH60+FAH63+FIH63 (EEP: 07-06-01 plus Data_byte3)

ORG =	0x07
Data_byte3 =	brightness 0 – 100 lux, linear n = 0x00 – 0xFF (only valid if DB2 = 0x00)
Data_byte2 =	brightness 300 – 30.000 lux, linear n = 0x00 – 0xFF
Data_byte1 =	-
Data_byte0 =	DB0_Bit3 = LRN Button (0 = teach-in telegram, 1 = data telegram) for data telegram: 0x0F, for teach-in telegram: 0x87

Teach-in telegram BD3..DB0: 0x18, 0x08, 0x0D, 0x87

FASM60+FSM12+FSM61+FSU12D+FSU55D

ORG =	0x05
Data_byte3 =	0x70/0x50

FCO2TF63 (EEP: 07-09-04)

ORG =	0x07
Data_byte3 =	humidity 0..100% (corresponds 0..200)
Data_byte2 =	CO_2 value 0..2550 ppm (corresponds 0..255)
Data_byte1 =	temperature 0..51°C (corresponds 0..255)

Teach-in telegram DB3..DB0: 0x24, 0x20, 0x0D, 0x80

FKC+FKF

ORG =	0x05
Data_byte3 =	0x10/status (hex) KCG = 0x20
0x00	KCS = 0x30

FRW

ORG =	0x05
Data_byte3 =	0x10 = alarm 0x00 = alarm-end 0x30 = battery voltage < 7.2 V

FSS12+FWZ12+FWZ61 (EEP: 07-12-01)

ORG =	0x07	
Data_byte3 to Data_byte1 form a 24-bit binary coded number		
Data_byte3 =	Data Byte 3 (MSB)	0…16777215
Data_byte2 =	Data Byte 2	0…16777215
Data_byte1 =	Data Byte 1 (LSB)	0…16777215
Data_byte0 =	DB0_Bit4 = tariff switchover (0 = normal rate, 1 = off-peak rate) DB0_Bit3 = LRN Button (0 = teach-in telegram, 1 = data telegram) DB0_Bit2 = switchover data content: 1 = momentary power in watts, 0 = meter status in 0.1 KW/h DB0_Bit1 = 0 (fix) DB0_Bit0 = 1 (fix) Possible values in data telegram: DB0 = 0x09 -> meter status normal rate in 0,1 KW/h DB0 = 0x19 -> meter status off-peak rate in 0,1KW/h DB0 = 0x0C -> momentary power in W, normal rate active DB0 = 0x1C -> momentary power in W, off-peak rate active	

Teach-in telegram BD3..DB0: 0x48, 0x08, 0x0D, 0x80 (is sent once at every power-up)

FT4+FT4F+FT55 with rocker

ORG =	0x05
Data_byte3 =	0x70/0x50

FT4+FT4F+FT55 with double rocker

ORG =	0x05
Data_byte3 =	0x70/0x50/0x30/0x10

FTF55 (EEP: 07-02-05)

ORG =	0x07
Data_byte3 =	-
Data_byte2 =	-
Data_byte1 =	actual temperature 0 – 40°C, linear 0xFF - 0x00
Data_byte0 =	DB0_Bit3 = LRN Button (0 = teach-in telegram, 1 = data telegram) for data telegram: 0x0F, for teach-in telegram: 0x87

Teach-in telegram BD3..DB0: 0x08, 0x28, 0x0D, 0x87

FHF

ORG =	0x05
Data_byte3 =	0xF0 (window closed) 0xE0 or 0xC0 (window fully open) 0x0D (tilted window)

FTK (EEP: 06-00-01)

ORG =	0x06
Data_byte3 =	contact closed -> 0x09 contact open -> 0x08 teach-in telegram -> 0x00
Data_byte2 =	-
Data_byte1 =	-
Data_byte0 =	-

Teach-in telegram BD3..DB0: 0x00, 0x00, 0x00, 0x00

Sensor telegrams

FTKE

ORG = 0x05
Data_byte3 = 0xF0 (window closed)
0xE0 (window open)

FTR55D+FTR55H (EEP: 07-10-06 plus Data_byte3)

ORG = 0x07
Data_byte3 = night reduction 0-5°K in 1° steps
0x00 = 0°K, 0x06 = 1°K,
0x0C = 2°K, 0x13 = 3°K, 0x19 = 4°K, 0x1F = 5°K
Data_byte2 = reference temperature 0 – 40°C, linear 0x00 - 0xFF
Adjustable range: FTR55D: 8°C – 40°C
FTR55H: 12°C – 28°C
Data_byte1 = actual temperature 0 – 40°C, linear 0xFF - 0x00
Data_byte0 = DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)
for data telegram: 0x0F, for teach-in telegram: 0x87

Teach-in telegram BD3..DB0: 0x40, 0x30, 0x0D, 0x87

FTS12EM (only telegrams for the Eltako-RS485-Bus)

The pushbutton input module generates FT4 telegrams within the RS485 Bus. The basis ID's 1, 11, 21, 31, 41, 51, 61, 71, 81 and 91 are used depending on the preset ID range.

ORG = 0x05
Data_byte3 = control of +A1 -> 0x70 (basis-ID+0)
control of +A3 -> 0x50 (basis-ID+1)
control of +A4 -> 0x70 (basis-ID+2)
New from week 30/2011 -> 0x30
control of +A5 -> 0x50 (basis-ID+3)
New from week 30/2011 -> 0x10
control of +A6 -> 0x70 (basis-ID+4)
control of +E1 -> 0x70 (basis-ID+5)
control of +E3 -> 0x50 (basis-ID+6)
control of +E4 -> 0x70 (basis-ID+7)
New from week 30/2011 -> 0x30
Ansteuerung von +E5 -> 0x50 (basis-ID+8)
New from week 30/2011 -> 0x10
Ansteuerung von +E6 -> 0x50 (basis-ID+9)

If the control of a control input will be finished, a telegram with the respective ID and **Data_byte3 = 0x00** will be created.

Data_byte2 = not used (0x00)
Data_byte1 = not used (0x00)
Data_byte0 = not used (0x00)

FWS61 (EEP: A5-13-01 u. 02)

The FWS61 has two telegrams to one data set, which are sent successively.

In the telegrams last Byte (UU oder YY) it can be identified, which telegram part is involved.

Telegram part 1: 0xRRSSTTUU

- RR is the twilight sensor which supplies data from 0-1000 Lux (0-255)
  e.g.: 0x7A = 122; 122*1000/255 = 478 lux
- SS is the temperature which lies between -40°C (corresponding 0) and +80°C (255)
  e.g.: 0x2C = 44; 44*120/255 = 20,7 à lower 40 after that 40-20,7 = 19.3°C
  e.g.: 0x6F = 111; 111*120/255 = 52,2 à not lower then 40 after that 52.2-40 = 12,2°C
- TT is the wind speed which lies between 0m/s (corresponding 0) and 70m/s (255)
  e.g.: 0x55 = 85; 85*70/255 = 23 m/s
- UU is either 0x1A with "rain" or 0x18 with "no rain".

Telegram part 2: 0xVVWWXXYY

- VV is the solar value of the west sensor 0(0)-150 kLux(255)
  e.g.: 0x44 = 68; 68*150/255 = 40 klux
- WW is the solar value of the south sensor 0 (0)-150 kLux (255)
- XX is the value of the east sensor 0 (0)-150 kLux (255)
- YY is always 0x28

Teach-in telegram BD3..DB0: 0x4C080D80

DSZ14DRS, DSZ14WDRS, FWZ14 (EEP: 07-12-01)

ORG = 0x07
Data_byte3 to Data_byte1 form a 24-bit binary coded number

Data_byte3 = Data Byte 3 (MSB) 0…16777215
Data_byte2 = Data Byte 2 0…16777215
Data_byte1 = Data Byte 1 (LSB) 0…16777215
Data_byte0 = DB0_Bit4 = tariff changeover
(0 = Normal rate, 1= Off-peak rate)
DB0_Bit3 = LRN pushbutton (0 = teach-in telegram, 1 = data telegram)
DB0_Bit2 = Data content switchover:
1 = momentary power in watts,
0 = meter status in 0.1 KW/h
DB0_Bit1 = 0 (fix)
DB0_Bit0 = 1 (fix)
Possible values in data telegram:
DB0 = 0x09 -> meter status normal rate in 0.1 KW/h
DB0 = 0x19 -> meter status off-peak rate in 0.1KW/h
DB0 = 0x0C -> momentary power in W, normal rate active
DB0 = 0x1C -> momentary power in W, off-peak rate active
Teach-in telegram DB3..DB0: 0x48, 0x08, 0x0D, 0x80 (is sent once at every power-up)

ID = Base-ID of FAM14 + device address of DSZ14(W)DRS

In addition, the meter serial number printed on the meter is transmitted every 10 minutes.

The data is divided into 2 consecutive telegrams.

1. part: DB0 = 0x8F -> meter serial number = S-AABBCC (A,B,C = 0..9)
DB1 = 0x00 -> the first 2 digits of the serial number in DB3
DB2 = 0x00
DB3 = AA

2. part: DB0 = 0x8F -> meter serial number = S-AABBCC (A,B,C = 0..9)
DB1 = 0x01 -> the last 4 digits of the serial number in DB2 and DB3
DB2 = BB
DB3 = CC

FSR61VA, FSR70W, FSVA-230V (EEP: 07-12-01)

ORG = 0x07
Data_byte3 to Data_byte1 form a 24-bit binary coded number

Data_byte3 = Data Byte 3 (MSB) 0…16777215
Data_byte2 = Data Byte 2 0…16777215
Data_byte1 = Data Byte 1 (LSB) 0…16777215
Data_byte0 = DB0_Bit4 = 0 (fixed)
DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)
DB0_Bit2 = switchover data content:
1 = momentary power in watts
DB0_Bit1 = 0 (fixed)
DB0_Bit0 = 1 (fixed)
Possible values in data telegram:
DB0 = 0x0C -> momentary power in W, normal rate active

Teach-in telegram BD3..DB0: 0x48, 0x08, 0x0D, 0x80 (is sent once on every power-up)

FZS

ORG = 0x05
Data_byte3 = 0x10/0x00

Activation telegrams from the GFVS software

FLC61-230 V

Direct switching command, FUNC=38, Command 1, (like EEP 07-38-08).

There is the possibility to **block*** the switching state with absolut priority so that it cannot be changed by other taught-in pushbuttons.

ORG = 0x07
Data_byte3 = 0x01
Data_byte2 = no used
Data_byte1 = no used
Data_byte0 = DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)
DBO_Bit2 = 1: **block* switching state**,
0: do not block switching state
DBO_Bit0 = 1: switching output ON,
0: switching output OFF

Data telegrams have to look like date:
0x01, 0x00, 0x00, **0x09** (switching output ON, not blocked)
0x01, 0x00, 0x00, **0x08** (switching output OFF, not blocked)
0x01, 0x00, 0x00, **0x0D** (switching output ON, blocked)
0x01, 0x00, 0x00, **0x0C** (switching output OFF, blocked)

FSB12, FSB14

Direct drive command with specification of runtime in s. FUNC=3F, Typ=7F (universal). Separately for each channel.

ORG = 0x07
Data_byte3 = -
Data_byte2 = runtime in seconds 1-255 dec,
the runtime setting on the device is ignored.Data_
byte1 = command:
0x00 = Stop
0x01 = Up
0x02 = Down
Data_byte0 = DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)

Teach-in telegram BD3..DB0 must look like this: 0xFF, 0xF8, 0x0D, 0x80
It is possible to interrupt at any time by pressing taught-in buttons!

FSB61

Direct drive command with specification of runtime in s. FUNC=3F, Typ=7F (universal).

ORG = 0x07
Data_byte3 = -
Data_byte2 = runtime in seconds 1-255 dec,
the runtime setting on the device is ignored.Data_
byte1 = command:
0x00 = Stop
0x01 = Up
0x02 = Down
Data_byte0 = DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)

Teach-in telegram BD3..DB0 must look like this: 0xFF, 0xF8, 0x0D, 0x80
It is possible to interrupt at any time by pressing taught-in buttons!

FHK61SSR

Direct transfer of PWM value from 0 to 100%.

ORG = 0x07
Data_byte3 = 0x02
Data_byte2 = PWM value in % from 0 to 100 dec.
Data_byte1 = PWM basic time T in 10 second steps
from 1-100 dec., e.g. 12:T = 120 seconds
Data_byte0 = DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)
DB0_Bit1 = 1: Repeater on, 0: Repeater off.
DB0_Bit0 = 1: PWM on, 0: PWM off.

Teach-in telegram DB3..DB0 have to look like this: 0xE0, 0x40, 0x00, 0x80
Data telegrams DB3..DB0 have to look like this for example:
0x02, 0x2D, 0x0A, 0x09 (PWM on with 45% and T = 100 seconds, repeater off)
0x02, 0x64, 0x18, 0x09 (PWM on with 100% and T = 240 seconds, repeater off)
0x02, 0x14, 0x12, 0x0B (PWM on with 20% and T = 180 seconds, repeater on)

FSR12-4x-12 VDC, FSR14-2x, FSR14-4x, FSR14SSR

Direct switching command, FUNC=38, Command 1, (like EEP 07-38-08). Separately for each channel.

There is the possibility to **block*** the switching state with absolut priority so that it cannot be changed by other taught-in pushbuttons.

ORG = 0x07
Data_byte3 = 0x01
Data_byte2 = no used
Data_byte1 = no used
Data_byte0 = DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)
DBO_Bit2 = 1: **block* switching state**,
0: do not block switching state
DBO_Bit0 = 1: switching output ON,
0: switching output OFF

Data telegrams have to look like date:
0x01, 0x00, 0x00, **0x09** (switching output ON, not blocked)
0x01, 0x00, 0x00, **0x08** (switching output OFF, not blocked)
0x01, 0x00, 0x00, **0x0D** (switching output ON, blocked)
0x01, 0x00, 0x00, **0x0C** (switching output OFF, blocked)

FUD12NPN, FUD61NP, FUD61NPN, FMD70, FUD70, FSUD-230V

Direct transfer of dimming value from 0 to 100%, similar to FUNC=38, Command 2.

ORG = 0x07
Data_byte3 = 0x02
Data_byte2 = dimming value in % from 0 to 100 dec.
Data_byte1 = dimming speed
0x00 = the dimming speed set on the dimmer is used.
0x01 = very fast dimming speed …. to …
0xFF = very slow dimming speed
Data_byte0 = DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)
DB0_Bit0 = 1: Dimmer ON, 0: Dimmer OFF.

Teach-in telegram BD3..DB0 must look like this: 0x02, 0x00, 0x00, 0x00

Data telegrams BD3..DB0 must look like this, for example:

0x02, 0x32, 0x00, 0x09 (dimmer on at 50% and internal dimming speed)
0x02, 0x64, 0x01, 0x09 (dimmer on at 100% and fastest dimming speed)
0x02, 0x14, 0xFF, 0x09 (dimmer on at 20% and slowest dimming speed)
0x02, 0x.., 0x.., 0x08 (dimmer off)

FUD14, FUD14-800W, FSG14/1-10V

Direct transfer of dimming value from 0 to 100%, similar to FUNC=38, Command 2.

ORG = 0x07
Data_byte3 = 0x02
Data_byte2 = dimming value in % from 0 to 100 dec.
Data_byte1 = dimming speed
0x00 = the dimming speed set on the dimmer is used.
0x01 = very fast dimming speed …. to …
0xFF = very slow dimming speed
Data_byte0 = DB0_Bit3 = LRN Button
(0 = teach-in telegram, 1 = data telegram)
DB0_Bit0 = 1: Dimmer ON, 0: Dimmer OFF.
DBO_Bit2 = 1: **Block dimming value**
0: Dimming value not blocked

Teach-in telegram BD3..DB0 must look like this: 0x02, 0x00, 0x00, 0x00

Data telegrams BD3..DB0 must look like this, for example:

0x02, 0x32, 0x00, 0x09 (dimmer on at 50% and internal dimming speed)
0x02, 0x64, 0x01, 0x09 (dimmer on at 100% and fastest dimming speed)
0x02, 0x14, 0xFF, 0x09 (dimmer on at 20% and slowest dimming speed)
0x02, 0x.., 0x.., 0x08 (dimmer off)

Confirmation telegrams of bidirectional actuators

FADS60-230V

Every time the internal switching relay changes state, a PTM200 telegram containing the unique ID of the integrated TCM300 is sent after approx. 300-400 ms. With central commands (ZE/ZA), the relay state is also sent if the state already matches the required state.

ORG = 0x05
Data_byte3 = 0x70 = relay ON, 0x50 = relay OFF
Remark: ON 0x00 (would be equivalent to button released) is never sent!

FFR61-230V, FZK61NP-230V

Every time the state of the internal switching relay 1 changes, the internal switching relay 1 sends a PTM200 telegram containing the unique ID of the integrated TCM300 after approx. 300 ms. Relay 2 sends the same telegram after approx. 1000 ms.

ORG = 0x05
Data_byte3 = 0x70 = channel 1 ON, 0x50 = channel 1 OFF
0x30 = channel 2 ON, 0x10 = channel 2 OFF
Remark: ON 0x00 (would be equivalent to button released) is never sent!

FHK61-230V, FHK61/8-24V

Every time the internal switching relay changes state, a PTM200 telegram containing the unique ID of the integrated TCM300 is sent after approx. 300 ms.

ORG = 0x05
Data_byte3 = 0x70 = relay ON, 0x50 = relay OFF
Remark: ON 0x00 (would be equivalent to button released) is never sent.

FHK61SSR

Every time a PWM data telegram is received the same telegram is send with the unique ID of the integrated TCM 300.

At activation or deactivation of the thaw signal input a PTM200 telegram containing the unique ID of the integrated TCM 300 will be send.

Cyclically every 15 minutes a status signal will be send.

ORG = 0x05
Data_byte3 = 0x70 = thaw signal input active,
0x50 = thaw signal input inactive

FMS61NP-230V

Every time the internal switching relay 1 changes state, a PTM200 telegram containing the unique ID of the integrated TCM300 is sent after approx. 300 ms. Relay 2 sends this message after approx. 1000 ms.

With central commands (ZE/ZA), the relay state is also sent if the state already corresponds to the desired state.

ORG = 0x05
Data_byte3 = 0x70 = channel 1 ON, 0x50 = channel 1 OFF
0x30 = channel 2 ON, 0x10 = channel 2 OFF
Remark: ON 0x00 (would be equivalent to button released) is never sent.

FMZ61-230V

Every time the the internal switching relay changes state, a PTM200 telegram containing the unique ID of the integrated TCM300 is sent after approx. 300-400 ms.

With central commands (ZE/ZA), the relay state is also sent if the state already corresponds to the desired state.

ORG = 0x05
Data_byte3 = 0x70 = relay ON, 0x50 = relay OFF
Remark: ON 0x00 (would be equivalent to button released) is never sent.

FSB61NP-230V

ORG= 0x05
Data_byte3 = 0x70 = upper stop position,
0x50 = lower stop position,
0x01 = Start up, 0x02 = Start down

If the actuator is stopped before the end of RV, only the actual elapsed time is sent indicating the direction in a ORG7 message with the same ID! This is also the info that the engine has stopped now.

ORG = 0x07
Data_byte3 = driving time in 100 ms MSB
Data_byte2 = driving time in 100 ms LSB
Data_byte1 = 0x01 = driven up or 0x02 = driven down
Data_byte0 = 0x0A (not blocked) or 0x0E (blocked)
Remark: The RV time must be set on the device so that the end position is always reached. If the roller shutter is already at an end position, the relay is switched on receipt of a drive command anyway (0x01 or 0x02 is sent) and it is switched off on expiry of the RV. (0x70 or 0x50 is sent).

FSB70

When the top or bottom end position is reached on expiry of the RV time set on the device, a PTM telegram containing the unique ID of the integrated TCM300 after approx. 300-400 ms.

ORG = 0x05
Data_byte3 = 0x70 = top end position,
0x50 = bottom end position
0x00 = motor running, or roller shutter stopped at some indefinite position since it was stopped manually
Remark: The RV time must be set on the device so that the end position is always reached. If the roller shutter is already at an end position, the relay is switched on receipt of a drive command anyway (0x00 is sent) and it is switched off on expiry of the RV. (0x70 or 0x50 is sent).

FSR61NP-230V, FSR61-230V, FSR61/8-24V, FSR61LN-230V, FSR61VA-10A, FSR70-230V, FSR70W-16A, FTN61NP-230V, FLC61NP-230V, FSSA-230V, FSVA-230V

Every time the the internal switching relay state changes, a PTM200 telegram containing the unique ID of the integrated TCM300 is sent after approx. 300-400 ms. With central commands (ZE/ZA) the relay state is also sent if the state already corresponds to the required state.

ORG = 0x05
Data_byte3 = 0x70 = relay ON, 0x50 = relay OFF
Remark: ON 0x00 (would be equivalent to button released) is never sent.

FUD61NP-230V, FUD61NPN-230V, FUD70, FSG70/1-10V, FSUD-230V

Every time the dimmer is switched on or off, a PTM200 telegram containing the unique ID of the integrated TCM300 is sent after approx. 300-400 ms.

ORG = 0x05
Data_byte3 = 0x70 = dimmer ON, 0x50 = dimmer OFF

In addition, approx. 1 second after reaching the required dimming value, a 4BS telegram containing the unique ID of the integrated TCM300 is also sent.

ORG = 0x07
Data_byte3 = 0x02
Data_byte2 = dimming value in % of 0-100 dec .
Data_byte1 = 0x00
Data_byte0 = 0x08 = dimmer OFF, 0x09 = dimmer ON.
Caution: No teach-in telegram containing ORG=7 can be generated.
Caution: Two telegram kinds (ORG=5, ORG=7) containing the same ID are sent!

To teach-in reply confirmation telegrams of bidirectional actuators into other actuators or into the software GFVS the local control input has to be used to change the switching position and to simultanously send the confirmation telegrams.

Series 14 confirmation telegram

As soon as Series 14 actuators receive a device address, the FAM14 can request actuators for confirmation telegrams. The confirmation telegrams are then radioed by the FAM14. The ID of the radioed telegrams is identical to the Base ID of the TCM300 in the FAM14 plus the device address. Multichannel actuators have consecutive device addresses corresponding to the number of channels.

Note: Depending on the number of actuators on the bus, there may be a time lapse of up to 10 seconds before a confirmation telegram is requested and radioed. If fast confirmation is expected by certain actuators, a device list for confirmation telegrams must be generated via the PCT14. The actuator must be entered several times in the device list. The FAM14 must then be operated in operating mode 5.

Confirmation telegrams of bidirectional actuators

FUD14, FUD14-800W, FSG14/1-10V

Here you can select 2 confirmation telegrams in the PCT14 configuration independently of each other.

1. PTM200 telegram ORG=0x05
Data_byte3: 0x70 = Dimmer ON, 0x50 = Dimmer OFF

2. 4BS telegram with dimming value
ORG = 0x07
Data_byte3 = 0x02
Data_byte2 = Dimming value in %
Data_byte1 = 0x00
Data_byte0 = 0x08 = Dimmer OFF, 0x09 = Dimmer ON

FSB14

Per channel: PTM200 telegram
ORG=0x05
Data_byte3 = 0x70 = end position top, 0x50 = end position bottom
0x01 = Start up,
0x02 = Start down

If the actuator is stopped before the end of RV, only the actual elapsed time is sent indicating the direction in a ORG7 message with the same ID! This is also the info that the engine has stopped now.

ORG = 0x07
Data_byte3 = driving time in 100ms MSB
Data_byte2 = driving time in 100ms LSB
Data_byte1 = 0x01 = driven up or 0x02 = driven down
Data_byte0 = 0x0A (not blocked) or 0x0E (blocked)

Remark: The RV time must be set on the device so that the end position is always reached. If the roller shutter is already at an end position, the relay is switched on receipt of a drive command anyway (0x01 or 0x02 is sent) and it is switched off on expiry of the RV. (0x70 or 0x50 is sent).

F4HK14, FHK14, FAE14LPR, FAE14SSR

Per channel: PTM200 telegram
ORG=0x05
Data_byte3 = 0x70 = normal mode, 0x50 = night reduction (-4°K)
0x30 = setback mode (-2°K), 0x10 = OFF (frost protection active)
In addition every telegram received from a taught-on temperature sensor (e.g. B. FTR55H) is repeated as a confirmation telegram.

FMSR14

The FMSR14 evaluates the MS multisensor data which is fed to the Eltako wireless network by the FWS61 transmitter module. The data contains measured values for sunlight from 3 cardinal points, light values to evaluate twilight, and wind speed in m/s.

In addition there are signals for rain and frost.

The device occupies 5 device addresses, providing confirmation telegrams for each of the 3 parameters and the 2 signals containing confirmation telegrams with an individual ID.

Limits can be set using the PCT14 configuration for the measured values of sunlight, twilight and wind speed. If these parameters are exceeded or overshot, telegrams containing Data_byte3 = 0x70 or 0x50 (selectable) are generated.

As soon as the limits are no longer exceeded or overshot, a telegram containing Data_byte3 = 0x00 is generated.

The signals for frost and rain are also converted into telegrams containing Data_byte3 = 0x70 or 0x50 (selectable).

When the signals are cancelled, telegrams containing Data_byte3 = 0x00 are generated.

FSU14

The 8 timer channels correspond to the 8 device addresses of the FSU14. Switch on/off commands are generated in the form of confirmation telegrams depending on the programmed switching times for the individual channels:

PTM200 telegrams ORG=0x05
Data_byte3 = 0x70 = switch ON, 0x50 = switch OFF

FSR14-2x, FSR14-4x, FSR14SSR, FFR14, FMS14, FMZ14, FTN14, FZK14

With multichannel actuators per channel:

PTM200 telegram ORG=0x05
Data_byte3: 0x70 = relay ON, 0x50 = relay OFF

To teach-in reply confirmation telegrams of bidirectional actuators into other actuators or into the software GFVS the local control input has to be used to change the switching position and to simultanously send the confirmation telegrams.