

## Tebis : an electrical installation with bus technology and control

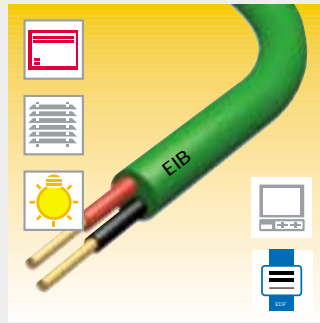
an installation system for ever increasing needs for control, command and management features in professional premises and buildings of services organisations.



## Electrical installation with bus technology

This installation concept brings the following benefits :

- integrate within one system services and functions which previously worked independently from each other,
- make modifications easier,
- make the electrical installation more reliable, reducing the chance of electrocution,
- tailoring the switch commands to ensure greater user comfort.



The command bus transmits information to each of the appliances.

The above features require the installation of two separate circuits, a supply circuit to distribute energy and the control circuit to carry information and instructions.

Having two distinct circuit offers many advantages :

• **the supply cabling is simplified**

The only devices cabled on the LV (240Vac) side are the loads requiring power (lights, garge, door,...)

The control for these loads (by push switches, thermostats.) are connected to the bus circuit.

- **Freedom** to assign functions and applications. An electrical installation based on the bus control concept, makes it possible to assign an ON/OFF, dimming, rising or lowering function without changing he wiring.

This control can then apply to a single receiver, to a group of receivers or to all receivers (general control) used for lighting, door opening or heating.

- **Remote controls integration.** Adding radio or infrared receivers connected to the bus combines the technological benefits. The bus + radio + infrared combination makes it possible to act on all receivers controlled by the control bus using the remote control keys.

- **Grouping of instructions** One order (from a push-button...) can control a set of lights or other loads or both at once (a scenario).

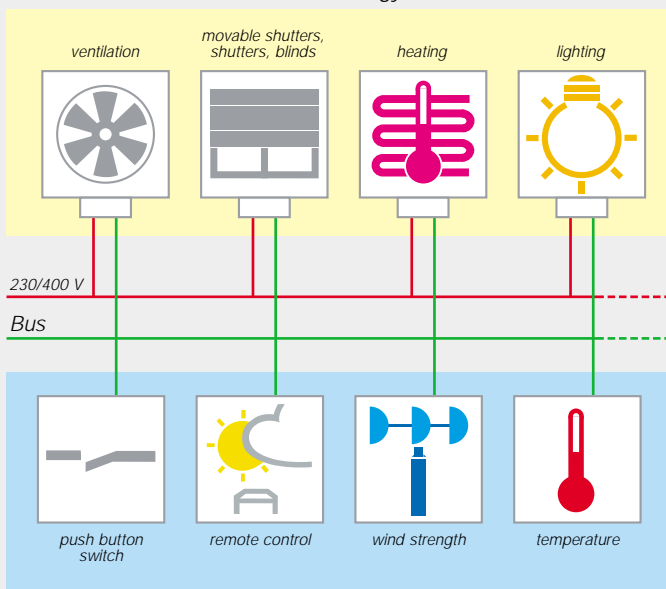
- **Flexibility** Using Tebis to control loads, the electrical installation can be modified and the use or configuration of the building can be changed, without changing the LV wiring.

**Electrical installation with bus technology is :**

- **a developing concept** After its success in industrial applications, this installation concept is spreading to include domestic and commercial premises.

- **a concept with numerous advantages**
  - adapts easily to the requirements of current and future users
  - gives greater conceptual freedom to the architect
  - easy installation by the electrician

*Electrical installation with bus technology*



— the power circuit  
— the control bus

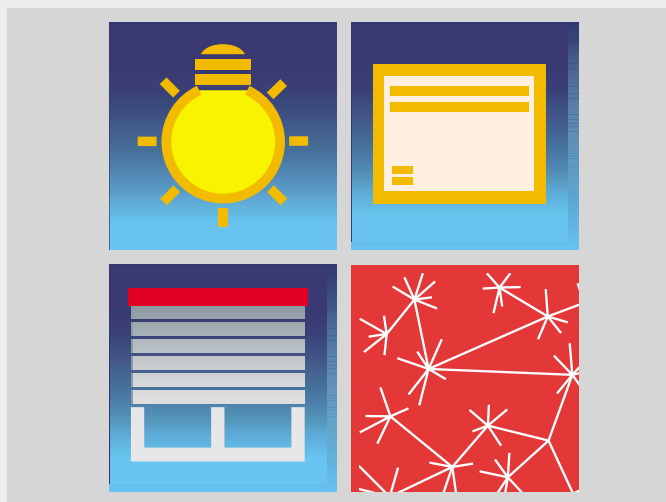
Tebis is based on simple principles :

- **The input devices** react to orders, controls and measures. they act on an ON/OFF order from a switch, measure the variation of ambient temperature or of light level, and transmit orders to the bus.
- **The output devices** receive all information and orders travelling to the bus and execute orders adressed to them.
- **The installation bus** is the twisted-pair cable which serves as the information network.

## Tebis : for professional premises and buildings of service organisations

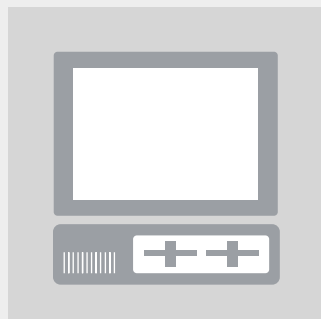
Designed by electricians for electricians, Tebis is an electrical installation system designed to suit the ever increasing needs for control, command and management features in professional premises and buildings of service organisations

- offices
- schools
- hotel and associated business
- health organisations
- local communities
- (...)



### Tebis : electrical installation with bus technology and control

- Tebis can be used to create ambient lighting as desired.
- The heating regulator is used to set heating into comfort or economy mode, override heaters to frost setting or to "off" position.
- Shutters can be controlled individually, by group or all together. From push-buttons, or even from a wind meter.
- In addition to the individual controls each Tebis product offers also simultaneous control of several different loads (for example : lighting & heating) from one single push-button or sensor.



Tebis is an open system providing **building technical management** functions such as :

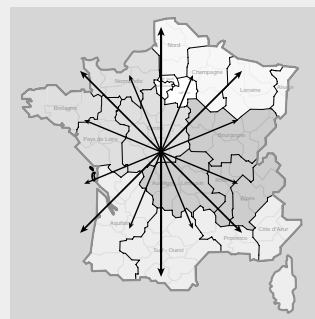
- supervision of installation
- power rates management
- metering
- remote processing, remote services
- remote maintenance
- (...)

Tebis is compatible with EIB and JBUS standards



Tebis makes it possible to freely associate **environment control for dependent people** with the technical management of installations

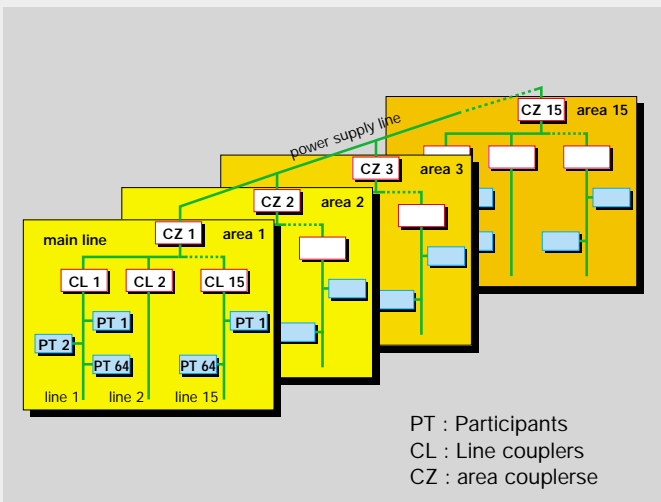
- rehabilitation centres
- home for special care
- (...)



Tebis provides simple answers to **local communities** seeking the best solution suited to each type of building as well remote access to multiple sites

- RS 232 modem product reference TH 004

# Tebis : the devices

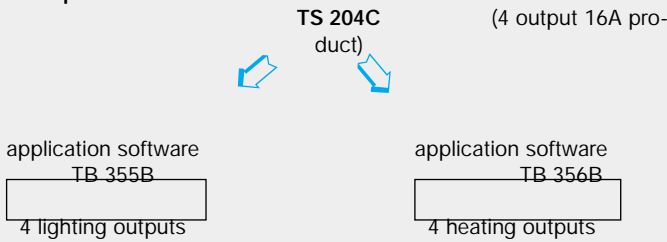


Tebis products exchange information on an installation BUS operating under standard protocol EIB.

The number of tebis products and the lengths of BUS which can be implemented cover most usual applications in professional premises and buildings of service organisations.

The same Tebis product can perform different functions and the association of a product and application software determines the fulfilled function.

**Example**



The fitter uses ETS software common to all members of EIBA to download the application software to the product via the BUS.



Designed to run under Windows, ETS software simplifies the various phases of study, design, implementation, documentation and even diagnosis. The 'product' database is specific to each manufacturer member of EIBA.

**You may get ETS software**, by contacting the EIBA s.c. Association at this address :rue de Neerveld, Neerveldstraat 105, B-1200 Brussels - Belgium (idaho.eiba.com).

- You may get Tebis products database in two ways :**
- by downloading th database from Hager's Internet site at : [www.hager.fr](http://www.hager.fr),or
  - by contacting your commercial agency

**Three types of tebis products can be implemented**



**modular**  
(e.g. 4 outputs 16 A modular TS 204C)



**non-modular**  
(e.g.: lighting distributor enclosure TC 124)



**projecting**  
(e.g. : temperature regulator TF 014 wit its BCU TA 004)

## Tebis TS is easy to use

### Tebis TS: a system which is easy to install

- All the control units are linked to 2 bus wires via input modules
- All the electrical loads are linked to the output modules
- The allocation of links between the push buttons and the loads are carried out by means of an easy to use modular device called a configurator
- The configurator will make it possible to define, for each input, which outputs

are to be commanded and in which way (relay, dimmer, up, down, etc.)

After downloading this data to the different products, the installation is functional. Changes or future developments to adapt the installation to the needs of the client are achieved by simply reprogramming.



A system easy to configure



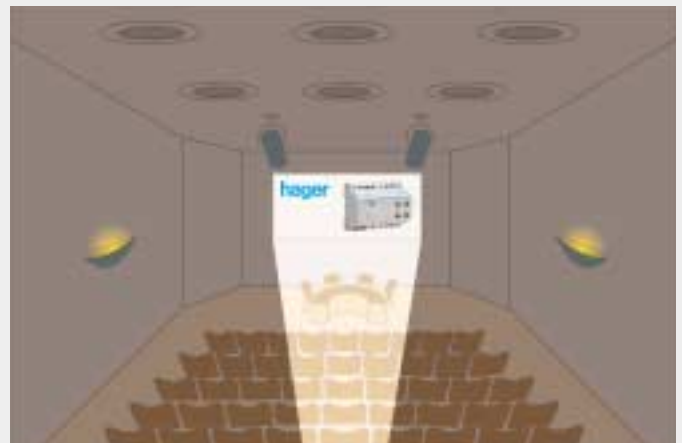
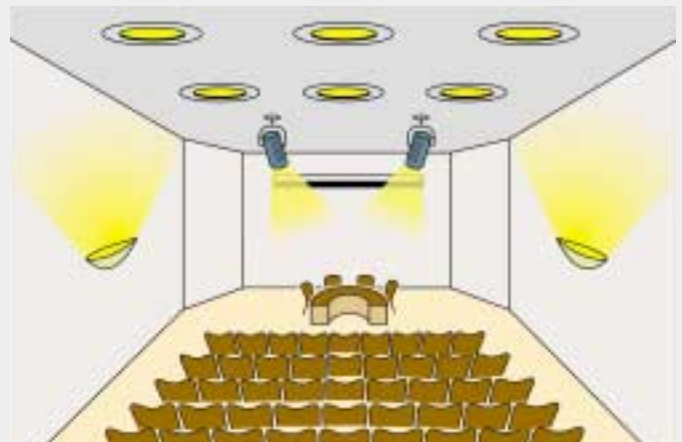
The configurator defines or modifies the electrical installation

### Some applications:

the "leaving home" scenario. A single gesture is enough to:

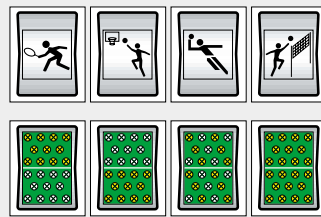
- Turn out all the lights
- Lower all the shutters
- Reduce the heating
- Etc.

The scenario, which can be changed at will, can be activated with a push button in the hall, at the garage door or by radio remote control.



### In a sports room

the lighting must be adapted to the activity taking place (tennis, volleyball, basketball, etc.) as well as for the occasion (matches, training, preparation, etc).



1/2. 1/2. training. matches

By assigning a push button to each sport, it is possible to implement the most suitable lighting for the sport being played with a single action, without being obliged to change several switches which are each dedicated to a part of the playing area.

### The "projection" scenario

This makes it possible to move straight from a meeting sequence to a projection sequence and vice-versa with a single command. As well as managing the lighting, this command can also drive the motorised screen and supply power to the projector.

To assist Specifiers and Installers, Hager run complementary training sessions. Talk to your Hager representative for a current schedule of seminars.

### Benefits that can be sold to the final user:

- Tebis TS offers the highest level of comfort possible
- Tebis TS ensures that inevitable future modifications can be handled at least cost and are easy to do
- Tebis TS offers the most economical control of electricity
- Using remote controls to simplify your life
- Adding new push buttons without touching your decor
- Access all loads from anywhere

## Tebis : services for your project

The implementation of a Tebis project includes two steps :

- the personnel of the electrical installation contractor is trained to acquire the necessary technical qualification, and
- additionally, a competent partner subcontractor can provide services to be included in the initial estimate.

Depending on the need for project integration (including supervision, access control,...) a co-contracting specialist may bring its special expertise.

Tebis is compatible with EIB and JBUS standards.



### Contact your commercial agency !

From the time of the feasibility study and from project design through implementation, the local team ensures project quality and technical solutions performance and results, with the assistance of the Technical Support Staff.

The local team will coordinate the various companies taking part in such a project.

In order to learn about the performance of a BUS control/command electrical installation, project participants may attend a complete training course offered by Hager and tailored to individual needs.

Hager offers the EIBA approved training course (ref. N° IM10) on EIB Bus principles of operation and ETS software application to Tebis system design and startup.

For further information and for course registration, contact your local commercial agency.



### Implementation handbook

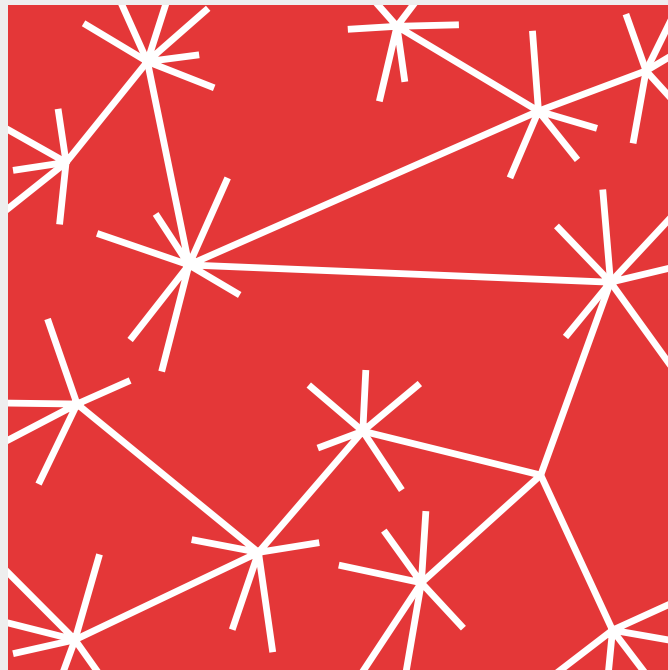
Included in the CD-Rom of catalogues, this handbook provides all Tebis product user's instructions, as well as the full technical presentation of each application software. It is an essential tool for designing and implementing a Tebis installation.





















The 2002 general catalogue includes :

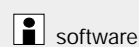
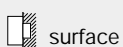
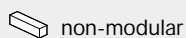
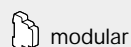
- **products,**  
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## Tebis

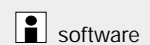
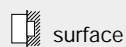
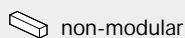
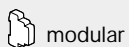
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## Tebis System devices

### Tebis supply

Tebis power supply is essential to supply the cable bus with the required voltage for product operation and information exchange. Tebis supply is self-protected against short-circuits and overloads

### Bus coupler

Flush-mounted device in a wall box, Ø 60 mm, fixing with a screw.  
Application units such as switch sensors, movement sensors and RS232 interfaces can be connected

### Line Coupler

Line couplers allow inter-connecting several lines in large buildings and managing information exchange.

□ for technical information, see pages 25 to 27

Designation	Characteristics	Width ■ 17,5 mm	Qty.	Ref.
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TS 100

### Programming Unit

Functions :  
- numbering the inputs  
- sets the relationships between the input and output devices  
- displays the relations and the type of control  
- downloading of the program  
- saving the program

supply :  
- 240Vac 50Hz  
- 29Vdc Bus

6 1 TS 100



TS 110

### Supply

Functions :  
- supplies the 29V system voltage for an installation comprising up to 128 products  
- opens circuit in case of short-circuit or overload

supply :  
- 240Vac 50Hz  
output :  
- 29Vdc extra low voltage  
- 640mA, max load

7 1 TS 110



TS 111

### Supply 320 mA

output :  
- 29 V ∴ TBTS filtered in front face

4 1 TS 111

output voltage :  
- 320 mA,  
- opens circuit case of short-circuit or overload

supply voltage :  
230 V ~ 50 Hz



TA 006

### Coupler of line

Software application :  
- TA 301 "coupler of line"

intended for ensuring :  
- inter-connection between line of network and a main line, or between main line and a secondary line and  
- galvanic insulation between the lines  
- includes the filtering table managing the transmission of messages between the lines and limiting traffic on the power supply network.

4 1 TA 006

power supply :  
Product supply via the EIB Bus on data rail



TA 004  
10

### Bus coupler, flush-mounted

Flush-mounted device in a wall box, Ø 60 mm, fixing with a screw.  
Application units such as switch sensors, movement sensors and RS232 interfaces can be connected  
**power supply :**  
Product supply via the EIB Bus

1 TA 004

## Tebis Inputs devices

### Flush mounting inputs

EIB Bus input interfaces to include contacts free of potential such as push-buttons, switches.. These products are fitted at the back of wall-mounted

equipment, in flush-mounting Ø boxes.

### Modular inputs






EIB Bus input interfaces to include 230V contacts of modular equipment.

They are equipped with light indicators displaying the state of inputs and push-buttons to simulate the connected control unit.

### Impulse inputs

EIB Bus input interfaces to include contacts impulses coming from meters.

□ for technical information, see page 28 and 29

	Description	Characteristics	Width in ■ 17,5 mm	Qty	Ref.
	<p><b>2 push-button input device</b></p> <p>h. 38 x l. 35 x p. 12 mm</p> <p>Application software :</p> <ul style="list-style-type: none"> <li>- TB 352 "2 inputs to periodic transmission"</li> <li>- TB 353 "1 dimming control"</li> <li>- TB 354 "1 blinds control"</li> </ul>	<p>2 inputs :</p> <ul style="list-style-type: none"> <li>- for voltage free contacts,</li> <li>- the device supplies the voltage required to test the contacts :</li> </ul> <p>U max. 5 V In 0,5 mA</p> <p>power supply voltage : Bus 29V ELVS</p>		1	TS 302
	<p><b>4 push-button input device</b></p> <p>h. 38 x l. 35 x p. 12 mm</p> <p>Application software :</p> <ul style="list-style-type: none"> <li>- TB 337 "4 periodic transmission inputs"</li> <li>- TB 338 "2 dimming controls"</li> <li>- TB 339 "2 blinds controls "</li> <li>- TB 340 "1 dimming control + 1 blinds control"</li> <li>- TB 358 "1 blinds control and 2 on/off controls"</li> <li>- TB 362 "1 dimming control and 2 on/off controls"</li> </ul>	<p>4 inputs :</p> <ul style="list-style-type: none"> <li>- for voltage free contacts ,</li> <li>- the device supplies the voltage required to test the contacts :</li> </ul> <p>U max. 5 V In 0,5 mA</p> <p>power supply voltage : Bus 29V ELVS</p>		1	TS 304
	<p><b>6 inputs 230 V modular</b></p> <p>Application software :</p> <ul style="list-style-type: none"> <li>- TB 350 "6 universal inputs"</li> <li>- TB 351 "6 inputs tariff"</li> </ul>	<p>6 inputs</p> <p>Un : 230 V ~ 50 Hz</p> <p>In (inputs 1,2,3) : 2 mA</p> <p>In (inputs 4,5,6) : 10 mA</p> <p>The inputs 4,5 and 6 can receive up to 10 push-buttons with light indicator in parrallel.</p> <p>power supply voltage : 230 V ~ /50 Hz</p>	6	1	TB 030
	<p><b>4 impulse inputs modular</b></p> <p>Application software :</p> <ul style="list-style-type: none"> <li>- TB 326 "4 inputs counting and 1 calibrated input"</li> </ul>	<p>4 inputs :</p> <ul style="list-style-type: none"> <li>- binary inputs for counting impulses</li> </ul> <p>U nominal : 11 V ∴ (opened contact)</p> <p>I max. 10 mA (closed contact)</p> <p>power supply voltage : 230 V ~ 50 Hz ou 12 V ∴ 48 mA</p>	5	1	TB 004
	<p><b>6 input device, DIN-rail mounted 240V ac</b></p> <p>functions :</p> <ul style="list-style-type: none"> <li>- interprets orders at 240Vac ( ie. from timers, wind meters, PE cells, PIR's, push buttons with indicator lamps) and transmits them to the output devices to control lighting, shutters or other electrical oads.</li> </ul>	<p>Inputs :</p> <ul style="list-style-type: none"> <li>- 6 terminals rated at 240Vac</li> </ul> <p>Supply :</p> <ul style="list-style-type: none"> <li>- 29V dc bus</li> </ul> <p>Installation :</p> <ul style="list-style-type: none"> <li>- DIN-rail</li> </ul>	6	1	TS 310

## Tebis Remote control

**Remote control**

Transmitter for ON/OFF, dimming or blind controls  
Transmitter and receiver can be located in different rooms.  
Several transmitters can send orders to the same receiver.





**Range :**

- inside ≈ 50 m  
(only TU 202 : 25 m)
  - outside ≈ 100 m  
(only TU 202 : 50 m)
- frequency : 433 MHz.

**Radio receiver**

radio receiver receives orders from the radio remote controls and transmits them to the bus.  
Wall mounted with 4 screws.

□ for technical information, see page 30

	Description	Characteristics	Qty	Ref.
	<b>Radio remote control with 2 keys</b> h. 61 x l. 29 x p. 16 mm	key-ring type delivered with : - battery (CR 1620) - attaches to key ring	1	<b>TU 202</b>
	<b>Radio remote control with 4 keys</b> h. 111 x l. 51 x p. 18 mm	delivered with : - battery (CR 2430) - wall mounting bracket - a label for the function of each button	1	<b>TU 204</b>
	<b>24-channel radio remote control with 9 keys</b> h. 111 x l. 51 x p. 18 mm	delivered with : - battery (CR 2430) - wall mounting bracket - a label for the function of each button	1	<b>TU 209</b>
	<b>Radio receiver</b> Application software : - <b>TB 337</b> "4 periodic transmission inputs" - <b>TB 338</b> "2 dimming controls" - <b>TB 339</b> "2 blinds controls" - <b>TB 340</b> "1 blind control and 1 dimming control" - <b>TB 358</b> "2 on/off control and 1 blinds controls" - <b>TB 362</b> "2 dimming controls and 1 dimming control" h. 80 x L. 130 x p. 35 mm h. 130 x L. 130 x p. 35 mm	- frequency 433 MHz  power supply voltage : Bus 29V ELVS  4 inputs 12 inputs	1 1	<b>TS 350</b> <b>TS 351</b>

## Tebis TS Remote telephone interface



TS 003

This product provides ON or OFF commands for 3 different electrical circuits ( lighting, hot water boiler, household appliances, watering, alarms, shutters.....) from any touch-tone telephone.  
Functions :  
- 3 channels  
- voice guide in 4 languages  
- can be used with a telephone

answering machine  
- secret access code  
- timed switch-off ( 1 to 100 hours )  
- manual ON/OFF on the front of the product  
- EC approval for use on PSTNs (Public Telephone Switched Networks )  
Coding device : To use TS 003 from a telephone without vocal

frequency.

<b>Remote telephone interface</b> 3 channels	supply voltage : 230V~ 50/60Hz  output : 3 changeover contacts 5A - 250V~	5	1	<b>TS 003</b>
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## Tebis Outputs devices

### Modular outputs

EIB Bus output interfaces for on-off control of electrical equipment. They have indicator lights displaying the state of the outputs, an auto/manu selector and push-buttons to test each output.

### Modular outputs with pilot wire

EIB Bus output interfaces for heating equipment control. The electrical pilot wire is GIFAM compatible 3 or 4 orders. They have indicator lights displaying the selected set-point, an auto/manu selector and push-buttons for testing each output.

□ for technical information, see page 31 and 32

	Description	Characteristics	Width in ■ 17,5 mm	Qty	Ref.
 <p>TS 204C</p>	<p><b>4 16A modular outputs</b></p> <p>Application software</p> <ul style="list-style-type: none"> <li>- TB 355B "4 lighting outputs"</li> <li>- TB 356B "4 heating outputs"</li> </ul>	<p>4 outputs :</p> <ul style="list-style-type: none"> <li>- volt-free contacts</li> <li>In : 16 A AC 1</li> <li>Un : 230 V ~ 50 Hz</li> </ul> <p>power supply :</p> <p>Product supply via the EIB Bus</p>	4	1	TS 204C
 <p>TS 206A</p>	<p><b>6 6A modular outputs</b></p> <p>Application software</p> <ul style="list-style-type: none"> <li>- TB 346B "6 lighting outputs"</li> </ul>	<p>6 outputs :</p> <ul style="list-style-type: none"> <li>- volt-free contacts</li> <li>Un : 230 V ~ 50 Hz</li> </ul> <p>power supply :</p> <p>Product supply via the EIB Bus</p>	4	1	TS 206A
		<p>In : 4 A AC 1 not suitable for compensated parallel fluo tubes</p>	4	1	TS 206A
		<p>In : 10 A AC 1 not suitable for compensated parallel fluo tubes</p>	4	1	TS 206B
		<p>In : 16 A AC 1</p>	4	1	TS 206C
 <p>TB 042</p>	<p><b>4 outputs heater experimental</b></p> <p>Application software</p> <ul style="list-style-type: none"> <li>- TB 341 "4outputs heater wire-thread pilots annual programming"</li> <li>- TB 342 "4 outputs heater wire-thread pilots simple transmitter"</li> <li>- TB 343 "4 outputs heater wire-thread pilots commands"</li> </ul>	<p>4 outputs "pilot" wire :</p> <ul style="list-style-type: none"> <li>Un : 230 V ~ 50 Hz</li> <li>I max. : 0,5 A</li> <li>compatible GIFAM 3 or 4 orders</li> </ul> <p>power supply :</p> <p>230 V ~ 50 Hz</p>	6	1	TB 042
 <p>TS 400</p>	<p><b>4 way indicator panel</b></p> <p>Functions :</p> <ul style="list-style-type: none"> <li>- reproduces on/off contact status of associated output by LED indication</li> </ul>	<p>supply :</p> <ul style="list-style-type: none"> <li>- 29Vdc Bus</li> </ul> <p>installation :</p> <ul style="list-style-type: none"> <li>- surface mounted</li> </ul>		1	TS 400

## Tebis Dimming

### Dimmer

EIB Bus output interface for dimming different light sources. It includes pushbuttons, an auto/manu selector and indicators lights for :




- configuring the type of load
- displaying the faults, and
- testing the operation of the load

### 1-10 V dimmer actuator

It is designed to control an area of lighting devices equipped with electronic ballasts for dimming or with remote dimmers. EV101, EV103.  
One contact per way controls light switch-on/switch-off and the 1-10V voltage makes it possible to set the level of brightness from 0 to 100%

It has indicator lights for the display of outputs on/off state, an auto/manu selector and pushbuttons to test each output.

□ for technical characteristics, see page 34 and 35

	Description	Characteristics	Width ■ 17,5 mm	Qty	Ref.
 TS 210	<b>Dimmer 600 W</b>  application software : - TK 335B "1 dimming output"	1 output : for 35 °C incandescent : 20 - 600 W halogen BT : 20 - 600 W halogen TBT + transfo ferromagnetic : 20 - 600 VA halogen TBT + transfo electronic : 25 - 600 VA.  power supply : 230 V ~ 50 Hz			
		600 W	4	1	TS 210
		300 W	4	1	TS 210A
 TK 030	<b>Actuators of dimmers 3-ways channels 1/10V</b>  Application software : - TK 330 "3 dimming controls"	3 ways : - contact : I max : 16 A AC 1, Un : 230 V ~ 50 Hz - dimming output : 1-10V variable voltage level  power supply : 230 V ~ 50 Hz		6	1 TK 030
 TK 013	<b>Not modular dimmer</b>  h. 42 x l. 28 x p. 243 mm  Application software : - TK 304 "dimming actuator"	1 ways : - contact : I max : 6 A AC 1, Un : 230 V ~ 50 Hz - dimming output : 1-10V variable voltage level  power supply :Product supply via the EIB Bus			1 TK 013

## Tebis Shutters and blinds

### Actuator of blinds/shutters

it is designed to control shutters (rising, lowering, stop), awnings or blinds (rising, lowering stop, inclination of the blinds). It has indicator lights for the display of output state, an auto/manu selector and pushbuttons to test each output.

### Actuator of blinds/shutters non modular

This Tehalit product is designed to control shutters (rising, lowering, stop), awnings or blinds (rising, lowering stop, inclination of the blinds). It is non modular and can be fitted into a duct or false ceiling.

□ for technical characteristics, see page 33



TS 224



G 4803

Description	Characteristics	Width in ■ 17,5 mm	Qty	Ref.
<b>4 voltage contacts 230 V AC for blinds</b>  Application software - <b>TK 336B</b> "4 blinds or shutters controls"	4 outputs : Un : 230 V ~ 50 Hz In : 6 A AC1  connect a system voltage 29V	4	1	<b>TS 224</b>
<b>4 voltage contacts 24 V DC for shutters</b>  Application software - <b>TK 336B</b> "4 blinds or shutters controls"	4 outputs : Un : 24 V ... In : 6 A AC1  connect a system voltage 29V	4	1	<b>TS 225</b>
<b>2-way blind actuator non modular</b>  Application software - <b>TK 337</b> "2 blinds or shutters controls" h. 60 x l. 360 x d. 60 mm	2 outputs : Un : 230 V ~ 50 Hz In : 6 A AC1  power supply : 230 V ~ 50 Hz		1	<b>G 4803</b>

## Tebis Lighting distributors

### Distribution boxes

Single-phase or three-phase boxes dedicated to lighting management for mounting in false ceilings.




They comprise inputs and outputs for connecting control points and lights by means of fast connector system.

They offer also lighting management and supervision features.

### Connectors and cables

This is the connection system suited to distribution boxes. It ensures safe and fast assembly of pre-mounted cables; alternatively, the connection system can be used for mounting custom cables to the desired length

□ for technical information, see pages 36 and 37

	Description	Characteristics	Qty	Ref.
 TC 033	<b>Three phase lighting distributor</b> <b>3 inputs / 3 outputs</b>  h. 54,4 x l. 279 x d. 159 mm  Application software - TC 313 "3 inputs 3 outputs with authorization, priority and operation time indication"	3 inputs : - Un : 230 V ~ 50 Hz, In : 6 mA - levels : 0 ... 20 V ~ → 0 187 ... 253 V ~ → 1  3 outputs : - Un : 230 V ~ 50 Hz - In : 16 A AC1  power supply : 380 V ~ 50 Hz	1	TC 033
 TC 122	<b>Single-phase lighting distributor</b> <b>2 inputs / 2 outputs</b>  h. 54,4 x l. 279 x d. 159 mm  Application software - TC 310 "2 inputs 2 outputs with authorization, priority and operation time indication"	2 inputs : - Un : 230 V ~ 50 Hz, In : 6 mA - levels : 0 ... 20 V ~ → 0 187 ... 253 V ~ → 1  2 outputs : - Un : 230 V ~ 50 Hz - In : 16 A AC1  power supply : 230 V ~ 50 Hz	1	TC 122
 TC 124	<b>Single-phase lighting distributor</b> <b>2 inputs / 4 outputs</b>  h. 54,4 x l. 279 x d. 159 mm  Application software - TC 311 "2 inputs 4 outputs with authorization, priority and operation time indication"	2 inputs : - Un : 230 V ~ 50 Hz, In : 6 mA - levels : 0 ... 20 V ~ → 0 187 ... 253 V ~ → 1  4 outputs : - Un : 230 V ~ 50 Hz - In : 16 A AC1  power supply : 230 V ~ 50 Hz	1	TC 124

## Tebis Lighting distributors

	<i>Description</i>	<i>Characteristics</i>	<i>Length</i>	<i>Qty.</i>	<i>Ref</i>
	three phase power connector for TC 033	1 male connector + 1 female connector - 5 black poles		10	TC 900
	one phase power connector for TC 122 and TC 124	1 male connector + 1 female connector - 3 black poles		10	TC 910
	input connector	3 green pole 1 male connector +squeezestightens blankwhite cable		10	TC 920
	output connector	3 white pole 1 male connector +squeezestightens blankwhite cable		10	TC 930
	EIB Bus connector	1 male connector + 1 female connector - 2 black poles		10	TC 940
	EIB Bus connector in T	2 black poles		10	TC 950
<b>Cables</b>					
	three phase power cable H05VV - F5 G 2,5 for TC 033	fitted with 2 connectors 5 poles, black, 1 male + 1 female	7 m	5	TC 903
	one phase power cable H05VV - F3 G 2,5 for TC 122 and TC 124	fitted with 2 connectors 3 poles, black, 1 male + 1 female	7 m	5	TC 913
	input cable H05VV - F3 G 1,5	fitted on one end with a male connector 3 poles, green	8 m	5	TC 923
	output cable H05VV - F3 G 1,5	fitted on one end with a male connector 3 poles, white	8 m	5	TC 933
	output cable H05VV - F3 G 1,5	fitted on one end with a male connector 3 poles, white	0,5 m	5	TC 934
	output cable H05VV - F3 G 1,5	fitted on one end with a male connector 3 poles, white	4 m	10	TC 935
	shunt terminal with lock for output cable	fitted with one male 3-pole terminal and three white female 3-pole terminals	-	5	TC 964
	EIB Bus cable	fitted with 2 connectors 2 poles black, 1 male + 1 female	7 m	5	TC 943
<b>Shutters</b>					
	three phase power shutter for TC 033	5 poles, black		10	TC 962
	single phase power shutter for TC 122 and TC 124	3 poles, black		20	TC 963
	shutter of input	3 poles, green		20	TC 960
	shutter of output	3 poles, white		20	TC 961
	shutter of output	3 poles, white		20	TC 963

## Tebis Thermostats

**Temperature transmitter**  
Projecting device for interior or modular mounting designed to associate an external probe or "thimble". Transmitters send the temperature value to the bus.

**Brightness sensor**  
This sensor is used to measure the level of interior brightness. Depending on the associated software, it transmits the lux value to the bus or warn that the threshold value is exceeded, or it can also control the brightness of an area in association with variable lights.

**Wind safety detector**  
The wind detector supplies an output voltage based on wind speed compared against the threshold value set on the device. This information is used to move blinds and awnings in safety position.

□ for technical information see pages 38 and 39

Description	Characteristics	Width in ■ 17,5 mm	Qty.	Ref.
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TE 001

**Standard temperature transmitter**  
  
Software application :  
- TE 300 "universal temperature transmitter"

- outside temperature measurement from external probe  
- transmits periodically to the bus the temperature value in °C and/or warn that the threshold value is exceeded  
- range of measurement  
-30 to +50° C

3 1 TE 001

power supply :  
connected to the EIB via the data rail

can be associated with the product EK 086 or EK 083



EK 086

**Outside temperature sensor**  
h. 50 x l. 52 x p. 35 mm

can be associated to the product TE 001, fixed on facade of buildings

1 EK 086



EK 083

**Universal probe**

can be associated with the product TE 001 for the control of floor temperature, of hot water outflow circuit using a flange,...)

1 EK 083



TA 004

**Local temperature transmitter with no waiver**  
h. 81 x l. 81 x p. 27 mm  
  
Software application :  
- TE 302 "Local temperature transmitter with no waiver"


- local temperature measurement from built-in probe  
- transmits periodically to the bus the temperature value in °C  
- range of measurement  
+5 to +40° C  
(supplied without BCU TA 004)

1 delivered without BCU TE 006

power supply :  
via the BCU TA 004

TE 006

**Tebis  
Wind gauge**

<i>Description</i>	<i>Characteristics</i>	<i>Width in ■ 17,5 mm</i>	<i>Qty.</i>	<i>Ref.</i>
	<p><b>Wind gauge</b></p> <p>Comprises a wind gauge with fixing set and connection enclosure</p> <p>output contact : 230 V ~ 4 A internal protection over fuse 4A inertly</p> <p>adjustment of wind speed limit : up to 55km/h (range ex-works 25km/h)</p> <p>supply voltage : 230 V ~ 50 Hz</p> <p>connection to the 230V input of the TB 030 product</p>		1	<b>TG 050</b>

TG 050

## Tebis Regulators

### Regulator of underfloor heating

Supplies load orders for floor heating to the output devices based on outside temperature, rates orders and rules of loads selected.

### Regulator of room temperature

Measures and controls the local temperature for an area with direct electrical heating (convectors, radiant panels, radiant ceiling, thin slab...) or hot water (radiators, underfloor, heating...)



### Room temperature regulator with air-conditioning option

Measures and controls the room temperature of a hot and cold-air conditioned area (fan-convectors, multi-splits, cold ceilings...)

### Lighting regulator

Measures and controls the level of interior light. Maintains a level of constant brightness, regardless of daylight variations in buildings such as offices or classrooms.

□ for technical information, see pages 40 and 41

	Description	Characteristics	Width in ■	Qty.	Ref.
 TF 005	<b>Regulator of underfloor heating</b>  Application software - TF 302 "universal temperature transmitter"	4 rules of load : - night winter - night half-season - frost free - day restart  power supply : connected to the EIB via the data rail	3	1	<b>TF 005</b>
 TA 004 TF 012	<b>Room temperature regulator with override</b>  h. 81 x l. 81 x d. 27 mm  Application software - TF 312 "regulator of ambient temperature"	settable digital regulator PI with 4 set-points : comfort, eco, low and frost-free Limits energy based on reading of outside temperature. Measurement accuracy : +/-0,3°C  comprises : - 1 built-in probe - 1 pushbutton of override - 1 wheel for adjusting set-point (supplied without BCU TA 004)  power supply : via the BCU TA 004		1	<b>TF 012</b> delivered without BCU
 TA 004 TF 014	<b>Room temperature regulator without override</b>  h. 81 x l. 81 x d. 27 mm  Application software - TF 312 "regulator of ambient temperature"	settable digital regulator PI with 4 set-points : comfort, eco, low and frost-free Limits energy based on reading of outside temperature. Measurement accuracy : +/-0,3°C  comprises : - 1 built-in probe (supplied without BCU TA 004)  power supply : via the BCU TA 004		1	<b>TF 014</b> delivered without BCU

## Tebis Controllers

	<i>Description</i>	<i>Characteristics</i>	<i>Width in</i> ■ <i>Qty.</i> <i>17,5 mm</i>	<i>Ref.</i>
 <p>TA 004</p> <p>TF 016</p>	<p><b>Room temperature with air-conditioning option controller</b></p> <p>h. 84 x l. 84 x d. 16 mm</p> <p>Application software - <b>TF 313</b> : "Ambient temperature with air-conditioning option controller"</p>	<p>Settable digital regulator PI with 4 heating set-points and 4 air-conditioning set-points : comfort, eco, low and frost-free Controls heating and overheating for air-conditioning Measurement accuracy : +/-5°C Comprises : - 1 built-in probe - 1 pushbutton of override - 1 wheel for adjusting set-point (supplied without BCU TA 004)</p> <p>power supply : via the BCU TA 004</p>	1 delivered without BCU	<b>TF 016</b>
 <p>TK 022</p>	<p><b>Lighting controller</b></p> <p>Application software - <b>TK 340</b></p>	<p>- 2 outputs for ballast 0/10 V - 2 outputs contacts 16 A for galvanic cutoff - 2 inputs for sensors TK 023 - power supply for EIB</p>	4 1	<b>TK 022</b>
 <p>TK 023</p>	<p><b>Lighting sensor</b></p> <p>to be associated with the regulator <b>TK 022</b></p>	<p>- size : Ø 54 x h 20 mm - link to <b>TK 022</b> : 2 x 0,8 mm<sup>2</sup></p>	non modular 1	<b>TK 023</b>

## Tebis Programming of application controllers

**weekly timeswitch**  
modular product with LCD display and programming on product front face.

**Synchronizer**  
master clock transmitting time to the bus and synchronizing the various time switches.

**Application controllers :**

**annual programming**  
make it possible to control up to 100 different areas in a service building (lighting/heating/ventilation areas...), each one having its annual program. Each area has also permanent and temporary overrides. Programs are set using graphic means under

Windows.

**Power cutoff system**  
It is designed to shed loads of electrical equipment connected to the bus according to the yellow and green A5 power rates.

The unballasting is revolving or permanent and allows to define operation priorities.  
The device is configured under Windows.

□ for technical information, see pages 42 and 43

Description	Characteristics	Width in ■ 17,5 mm	Qty.	Ref.
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TF 002

<b>Weekly time switch 2 channels</b> Application software - TF 309 "time switch 2 channels"	power supply : connected to the EIB via the data rail	3	1	TF 002
--	---	---	---	--------



TF 003

<b>Synchronizer</b> Application software - TF 310 "synchronizer"	power supply : connected to the EIB via the data rail	3	1	TF 003
--	---	---	---	--------



TJ 100B

<b>Annual time switch</b>  100 channels	power supply : - 29 V supplied by the TS 111 power supply	6	1	TJ 100B	
50 channels					TJ 102B
20 channels					TJ 104B
delivered with the configuration software Windows3.X or 95/98					



TJ 110

<b>Power cutoff system</b>  1000 channels EDF rate : yellow - green	power supply : - 29 V supplied by the TS 111 power supply	6	1	TJ 110	
150 channels EDF rate : yellow - green					TJ 112
50 channels EDF rate : blue - yellow					TJ 114
supplied with configuration software Windows3.X or 95/98					

## Tebis Display and communication software

### Display

Based on PC imaging, the device can be used to control and display the operation of technical equipment of a building connected to the bus, such as :

- heating (selection of set-points, temperature display...)
- lighting (general switch-off command, state of outputs...)

- domestic hot water
- ventilation

### Interface RS 232

This interface converts the EIB signal into signals usable by a series connection of PC COM type.

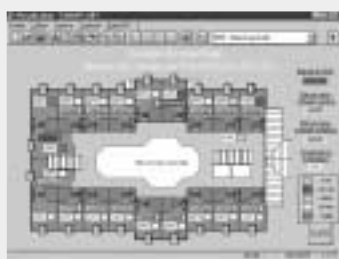
Two versions are available : modular and projecting

### Interface RS 232 Modem

This interface converts the EIB signal into signals usable by a telephone modem.

The device links two EIB lines by means of public or private telephone network.

☐ for technical information see page 44



TJ 600

Description	Characteristics	Width in mm	Qty.	Ref.	
		17,5 mm			
<b>Display editor</b>	Windows 98 and NT compatible software is used to create page screens including graphics and animations for the different sites (includes no access to the bus). Screen pages thus created will be used by software TJ601, 602 or 603		1	<b>TJ 600</b>	
<b>Display</b>	Includes software floppies for Windows 98 and NT in runtime version, a key for the parallel port, the access cable and the projecting version of RS232 device.				
<b>up to 200 addresses</b>			1	<b>TJ 601</b>	
<b>up to 400 addresses</b>			1	<b>TJ 602</b>	
<b>more than 400 addresses</b>			1	<b>TJ 603</b>	
<b>modular RS 232</b>	it is linked to the PC via a flush 9-pole D-Sub socket. the serial data cable to the PC can be fixed with a strain relief at the top or the bottom. The D-Sub socket and the data cable have a detachable cover.  power supply : connected to the EIB via the data rail		3	1	<b>TH 001</b>
<b>Interface RS 232</b>	connection of RS232 cable by means of 9-point female socket SUB-D with possible locking by screw (supplied without BCU MT004)  power supply : par la BCU TA 004		1	delivered without BCU	<b>TH 002</b>
h. 81 x l. 81 x d. 43 mm					
<b>RS 232 modem</b>	connection : - bus EIB by specific connector supplied in packing - the modem and its cable are connected to the 9-point female socket SUB-D with possible locking by screw (cable and modem not provided)  power supply : by a transformer 230 V ~ 6 V ~: supplied in the pack		1		<b>TH 004</b>
h. 146 x l. 80 x d. 55 mm					
Application software : - <b>TH 300</b> "RS 232 Modem"					
supplied with numbering software Windows3.X or 95/98					



TH 001



TA 004

TH 002



TH 004

## Tebis Commands

**Quadruple push-button**  
Communication pushbutton connected only to the bus for the control of 4 distinct circuits and display of status by 4 indicator lights.

**Modular scenario script of lighting**  
Makes it possible to record 4 standard configurations of lighting :  
dimming, blinds or shutters.  
The selection of scenarios is by means of a communication pushbutton.

**Office logical functions modular**  
Used to perform a logical combination of different messages going through the bus.

□ for technical information see page 45

Description	Characteristics	Width in ■ 17,5 mm	Qty.	Ref.
 <p>TA 004 TK 005</p>	<p><b>Quadruple push-button</b></p> <p>communication pushbutton for the control of 4 distinct circuits :</p> <p>Applications software :</p> <ul style="list-style-type: none"> <li>- TK 302 "4 on /stop controllers"</li> <li>- TK 309 "4 dimming controllers"</li> <li>- TK 310 "4 blinds controllers"</li> <li>- TK 311 " 1 dimming controllers with preselecting "</li> <li>- TK 312 "2 dimming controllers and 2 blinds controller "</li> <li>- TK 313 "4 lighting scénarios"</li> </ul> <p>Possible display of the state of controlled devices by 4 indicator lights (supplied without BCU TA 004)</p> <p>power supply : by the BCU TA 004</p>	h x l 70 x 70mm	1 supplied without BCU	<b>TK 005</b>
 <p>TK 015</p>	<p><b>Modular scenario script of lighting</b></p> <p>stores up 4 scenarios for the number of outputs specified in application software.</p> <p>Applications software :</p> <ul style="list-style-type: none"> <li>- TK 315 "8 on/stop controller or 8 blinds controller"</li> <li>- TK 316 "8 dimming controller"</li> <li>- TK 317 " 2 on/stop controller and 4 dimming controller "</li> </ul> <p>power supply : connected to the EIB via the data rail</p>	1	1	<b>TK 015</b>
 <p>TK 016</p>	<p><b>Office logical functions modular</b></p> <p>stores logical combinations to be applied on reception of some messages and issues results of the operation.</p> <p>Application software :</p> <ul style="list-style-type: none"> <li>- TK 318 "1 function office AND + 1 function office OR"</li> <li>- TK 319 "4 function offices reverser"</li> </ul> <p>power supply : connected to the EIB via the data rail</p>	1	1	<b>TK 016</b>

## Tebis Accessories

**Bus wire**

4 kV wire interconnecting the different participants and conveying power supply and information.

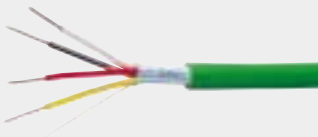
**Printed circuit bottom of rail**



The printed circuit bottom of rail replaces the bus wire for interconnecting modular Tebis products with bottom of rail connection.

**Connectors**

Connectors ensure the continuity between the bus wire and the bottom of rail printed circuit.

□ for technical information, see page 24



	Description	Characteristics	Width in ■ 17,5 mm	Qty.	Ref.
 TG 018	<b>Bus cable</b>	EIB-Y (ST) Y 2 x 2 x 0,8 mm test voltage 4 kV			
	length 100 m			1	TG 018
	length 500 m	this wire makes possible installation close to the low voltage conductors.		1	TG 019

	Description	Characteristics	Width in ■	Qty.	Ref.
 TG 022	<b>Printed circuit bottom of rail</b>				
	length 180 mm	for rail mounting with a depth of 7,5 mm	10	5	TG 020
	length 214 mm		12	5	TG 021
	length 240 mm		13	5	TG 022
 TG 023	length 214 mm / 214 mm	for rail mounting with a depth of 15 mm	12	3	TG 028
	length 428 mm / 428 mm		24	3	TG 023
	length 464 mm / 464 mm (printed circuit / raiser)		24 + reserve	3	TG 024

**Mounting of printed circuit bottom of rail :**  
in the enclosures hereafter

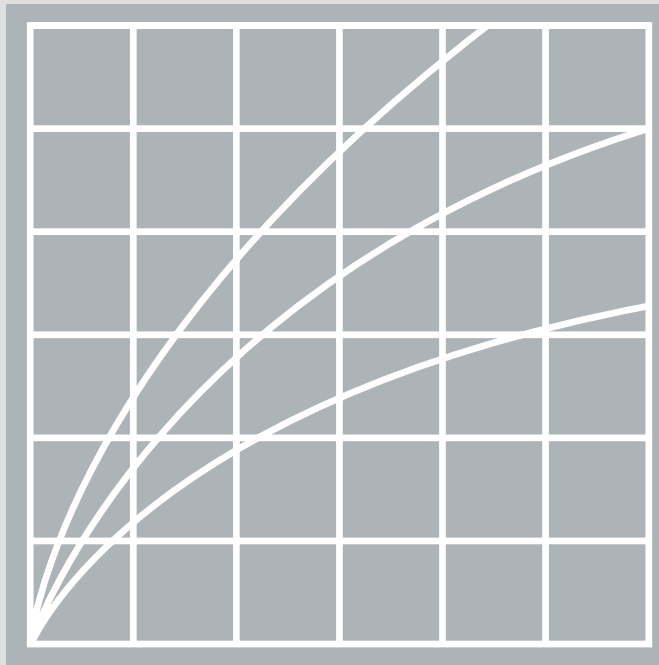
	length of a DIN rail :			
	10 ■	12 ■	13 ■	24 ■
Gamma			TG 022	
Volta		TG 022		
Vector IP 55		TG 021		
Vega D				TG 023
Univers	TG 020			TG 023
Quadro				TG 023
Vector IP 65		TG 022		

## Tebis Accessories

	<i>Description</i>	<i>Characteristics</i>	<i>Width in ■ 17,5 mm</i>	<i>Qty.</i>	<i>Ref.</i>
 <p>TG 027</p>	<b>Modular connector</b>	it is clipped on the printed circuit bottom of rail and allows to connect two connection terminals TG008 to make 8 bus wire outputs.	1	1	<b>TG 027</b>
 <p>TG 011</p>	<b>RS 232 wire</b>	Wire equipped with a male and female SUB D 9-point connector to connect a 9-point series PC output to a RS232 modular or projecting device.	length 2 m	1	<b>TG 011</b>
 <p>TG 008</p>	<b>Connectors for twisted pair termination</b>	2 plug-in terminals for 4 connections.  Connection capacity : 0,6 to 0,8mm single-core wire.		50	<b>TG 008</b>
 <p>TG 007</p>	<b>Rail plug</b>	It is used to cover any free slot of a printed circuit bottom of rail	27	5	<b>TG 007</b>
 <p>TG 014</p>	<b>Frame for one pushbutton set</b>	Frame for one communication pushbutton TK005	h x l 81 x 81 mm	1	<b>TG 014</b>
 <p>TG 015</p>	<b>Frame for two pushbutton set</b>	Frame for two communication pushbuttons	h x l 81 x 152 mm	1	<b>TG 015</b>

## Technical information

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# Tebis : Network basic components

## Description

All Tebis devices require connection to communication means (Bus cable, bottom of rail printed circuit) and a power supply. One must also conform to several physical limits and rules to ensure trouble free implementation.

## Principle of operation

### 1. The line

The EIB line is the system's smallest entity. It includes a filtered power supply and communicating devices (heating, lighting,...)



The limits of such a line are as follows :

- maximum number of devices : 64,
- maximum distance between power supply and device : 350 m,
- maximum distance between two devices : 700 m,
- maximum total length of all sections of Bus cable, end to end : 1000 m.

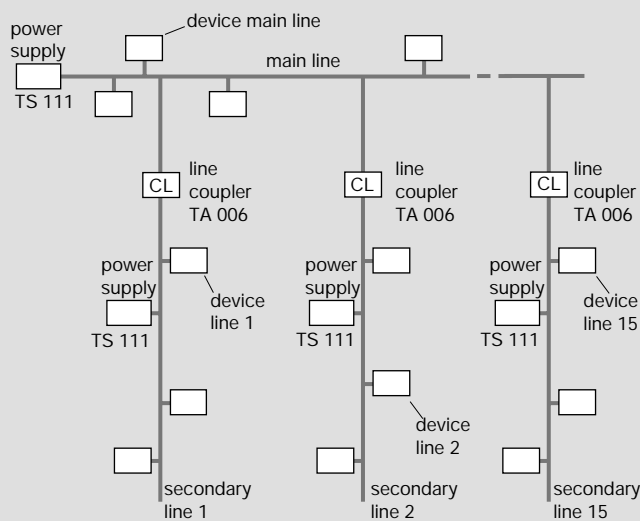
All the Tebis devices installed in areas at room temperature (in false ceiling or ducts) shall be connected to the EIB Bus cable. Devices installed in enclosure are connected either to the EIB Bus cable, or to the printed circuit bottom of rail.

Adding a section of Bus cable at any location is feasible.

### 2. The area

In order to extend the installation beyond the capacity of a line, line couplers inter-connecting several lines will be used. This requires defining a main line to which 15 secondary lines will be connected.

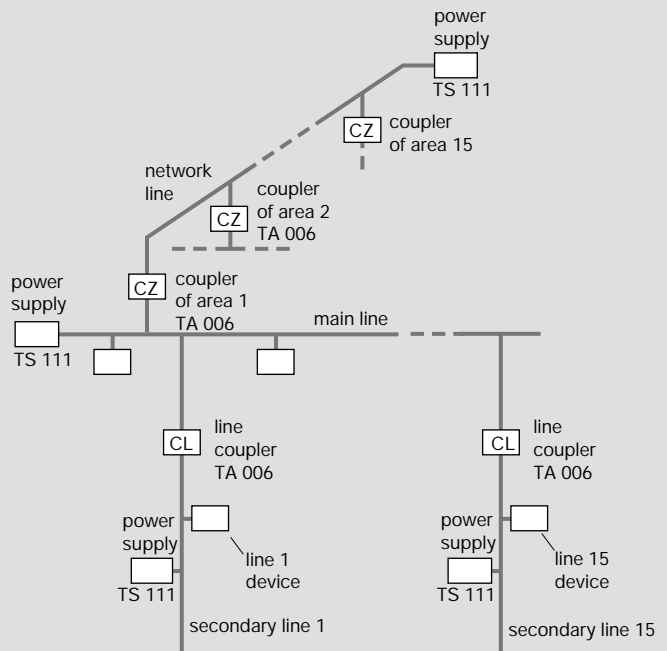
Such a structure is called an EIB area.



In this structure, all the devices can communicate. The maximum capacity of this area is 1024 devices with a 16km Bus cable.

### 3. The network

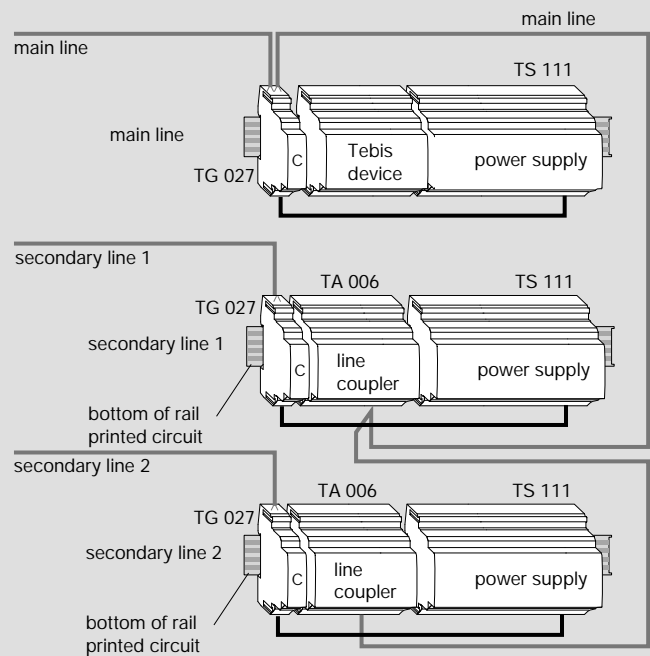
For installations where more devices is required, the network line can be used to extend the capacity and create 15 inter-connected areas.



The maximum capacity of the structure is then over 15,000 devices and a length of Bus cable greater than 240km.

### Mounting in enclosure

The basic components (i.e. power supply, couplers and connectors) are mounted in enclosures according to the following diagram :



**Power supply unit TS 111**

**Technical specifications**

**Electrical characteristics**

- supply voltage :230 V~ 50/60 Hz
- output voltage :29 V 320 mA TBTS (protected against short-circuits)
- power consumption : 15 VA
- opens circuit case of short-circuit or overload

**Environment**

- operation temperature : -5 °C to +45 °C
- storage temperature : -20 °C to +70 °C

**Connection capacity**

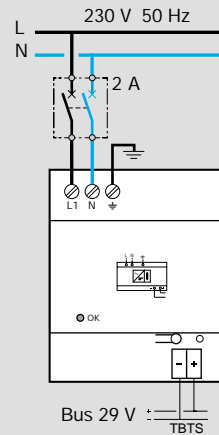
- flexible : 0,75 to 2,5<sup>□</sup>
- rigid : 0,75 to 4<sup>□</sup>
- connection to the bus by plugable TG008 terminal

**Function**

The power supply TS 111 generates the system voltage, which is necessary for the operation of the Tebis devices.

The system voltage generated by the TS 111 meets the requirements of SELV protection measures ( safety extra-low voltage).

**Electrical connection**



# Tebis : Network basic components

## Line coupler TA 006

### Power supply

Product supply via the EIB BuS 29 V ∴

### Environment :

- operation temperature : -5 °C to +45 °C,
- storage temperature : -20 °C to +70 °C.

### Connection :

- main line connection by means of plug-out terminal TG008
- secondary line connection by means of contact on a printed circuit at rail bottom

### Galvanic insulation

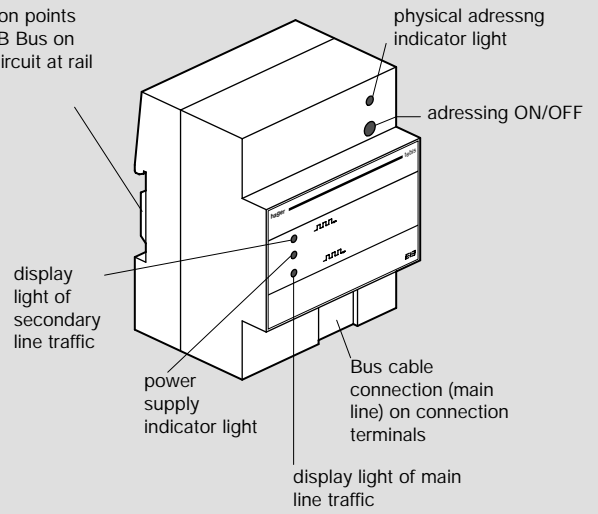
between inter-connected lines through coupler : 600V

### Operation characteristics

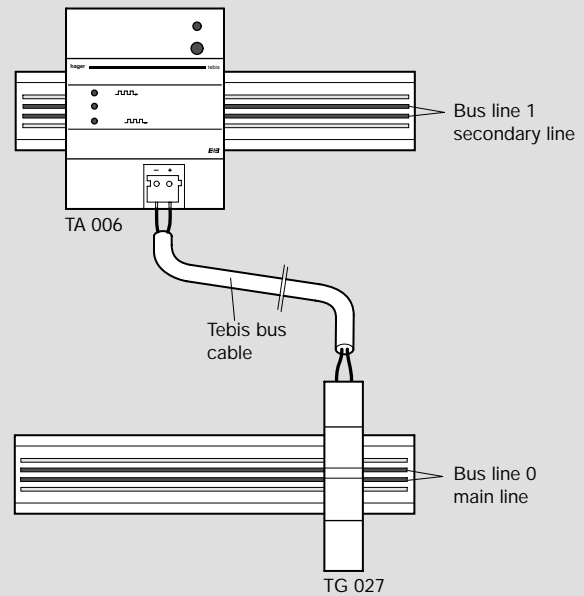
The coupler can be used as a line coupler or as an area coupler. Used as a line coupler it joins up a line with a main line; as an area coupler it connects a main line with a secondary line. In doing so, it ensures the lines are isolated from each other.

## Product presentation

connection points to the EIB Bus on printed circuit at rail bottom



## Installation / Implementation



example of a connection between the main line and a secondary line.

**Flush mounting 2- and 4- input devices TS 302, TS 304**

**Technical characteristics**

**Alimentation**

Product supply via the EIB Bus 29 V ...

**Environment**

- operation temperature : 0 to +45 °C
- storage temperature : -20 to +70 °C
- ingress protection : IP 20

**Connection**

- main line connection by means of plug-out terminal TG008
- connection of the entries by plugable connector, the connecting cable connector/device is supplied with the product.

It includes :

- the plugable connector
- csa conductor 22mm $\approx$  - length : 200mm

**Electrical characteristics**

- connectable type of contacts : push-buttons and switches
- inquiry voltage 5 V is generated by the device
- contact current : 0,5 mA

**Operation characteristics**

- min. closing time : 50 ms
- length of cable extendible up to 5m by twisted pair wire.

**Function**

Up to 2 conventional push buttons or switches or other voltage free contacts can be connected with the push button input TS 302.

Up to 4 conventional push buttons or switches or other voltage free contacts can be connected with the push button input TS 304.

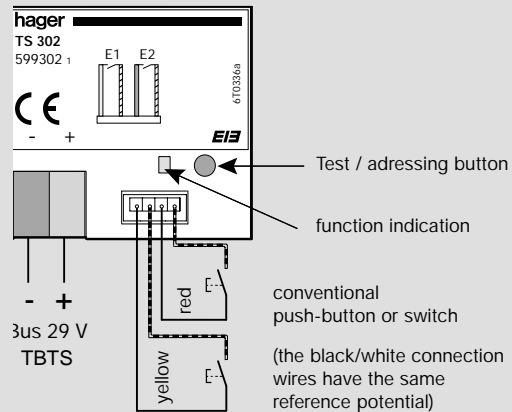
These devices are put into a flush mounting box -> 60mm, e.g. behind a connected switch.

These devices transfer operation information and controls to the assigned outputs over the system's line.

**Dimensions**

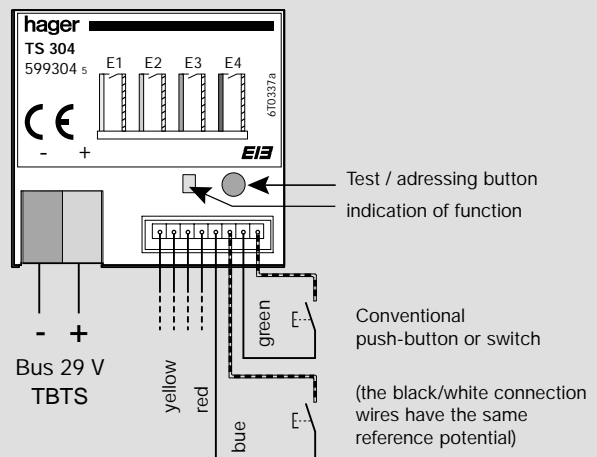
size : 38 x 35 x 12 mm

**Presentation TS 302**



**Note :** for the connection of one push-button, isolate the 2 input wires which are not used.

**Presentation TS 304**



**Note :** for the connection of one push-button, isolate the 2 input wires which are not used.

**4 impulse input modular TB 004**

**Alimentation :**

Product supply via the EIB Bus 29 V ~  
power supply  $U_n = 230\text{ V} \sim / 50\text{ Hz}$ ,  $I_{\text{max.}} = 55\text{ mA}$  or,  
DC power supply  $U_n = 12\text{ V} \dots$ ,  $I_{\text{max.}} = 48\text{ mA}$ .

**Environment :**

- operation temperature :  $-5\text{ }^\circ\text{C}$  to  $+45\text{ }^\circ\text{C}$ ,
- storage temperature :  $-20\text{ }^\circ\text{C}$  to  $+70\text{ }^\circ\text{C}$ ,
- ingress protection : IP 20.

**Connection :**

- connection to the bus by contact of the data rail,
- connection of network, 12 V ~ and inputs by terminals with screw :  
capacity : 6<sup>□</sup> flexible  
10<sup>□</sup> rigid,
- max. distance between impulse transmitter and input : 10 m.

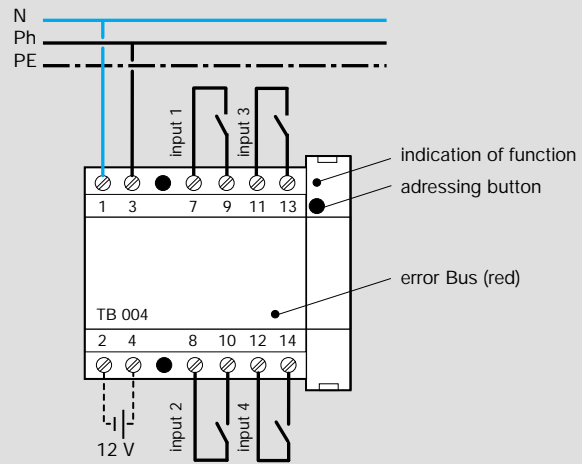
**4 binary inputs :**

- $U_{\text{max.}} = 11\text{ V} \dots$  (open contact),
- $I_{\text{max.}} = 10\text{ mA}$  (closed contact).

**transmitters of impulses to be connected :**

- type of meter output : contact free of potential with closing, reed relay contact, transistor, optocoupler (make sure that the polarity of inputs is matched),
- impulse : minimum time of 6ms, minimum period of 120ms with a maximum frequency of 1 impulse per 120ms period.
- in case of 230 V network power supply :
  - 4 kV reinforced insulation between the 230V power supply network (terminals 1 and 3) and the Bus EIB.
  - 4 kV reinforced insulation between the 230V power supply network and inputs terminals.
- in case of 12 V DC power supply :
  - this power supply must have at least one 2kV simple insulation in relation to the 230V power supply and the Bus EIB,
  - the insulation must enter the terminals of transmitters and the 230V power supply, a minimum 2kV simple insulation is required.

**Electrical connection**



**6 inputs 230 V modular TB 030**

**Power supply :**

- product supply via the EIB Bus 29 V ~
- power supply :  $230\text{ V} \sim / 50\text{ Hz}$ .

**Environment :**

- operation temperature :  $0\text{ }^\circ\text{C}$  to  $+45\text{ }^\circ\text{C}$ ,
- storage temperature :  $-20\text{ }^\circ\text{C}$  to  $+70\text{ }^\circ\text{C}$ ,
- ingress protection : IP 40.

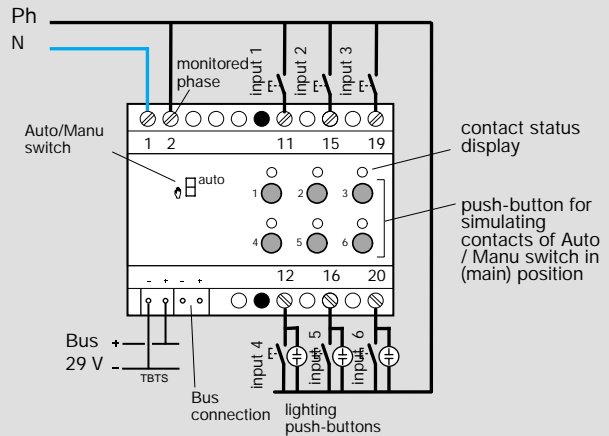
**Connection :**

- main line connection by means of plug-out terminal TG008
- 230 V ~ power supply connection of output contacts by cage terminals  
max. capacity : flexible : 1<sup>□</sup> to 6<sup>□</sup>  
rigid : 1,5<sup>□</sup> to 10<sup>□</sup>.

**Input characteristics**

- $U_n : 230\text{ V} \sim -15\% 50/60\text{ Hz}$  (opened contact), inputs may be connected to different lines
- $I_n : 1\text{ mA}$  (closed contact),
- level for inputs E1 to E3 :
  - 0 ...  $30\text{ V} \sim \rightarrow 0$
  - 80 ...  $230\text{ V} \sim \rightarrow 1$ ,
- level for inputs E4 to E6 and detection :
  - 0 ...  $130\text{ V} \sim \rightarrow 0$
  - 80 ...  $230\text{ V} \sim \rightarrow 1$ ,
- max. length between sensor and input : 100 m.
- connection of lighted push-buttons to inputs E4 to E6 : up to 10 push-buttons with light indicator in parallel (1mA per neon light)

**Electrical connection**



**Note :** the inputs can be connected to different phases.

**Consequences of network failure**

Power supply network failures do not affect inputs connected to the same phase as the device's power supply phase (no undesirable order is issued). The status of inputs is systematically re-transmitted following network failure.

**Radio receiver 4 inputs TS 350**

**technical characteristics**

**Power supply**

Product supply via the EIB Bus 29V ...

**Environment**

- operation temperature : 0 to +45 °C
- storage temperature : -20 to +70 °C
- ingress protection : IP 54

**Functional specifications**

- frequency : 433 Mhz
- encoding :open-ended encoding + encryption
- transmission of remote control orders to the bus (4 channels max./receiver)
- EN 300 220-1 compliant

**Dimensions**

- housing : 130 x 80 x 35 mm
- housing fastening c-c distance : 63 x 113
- antenna : 110 mm

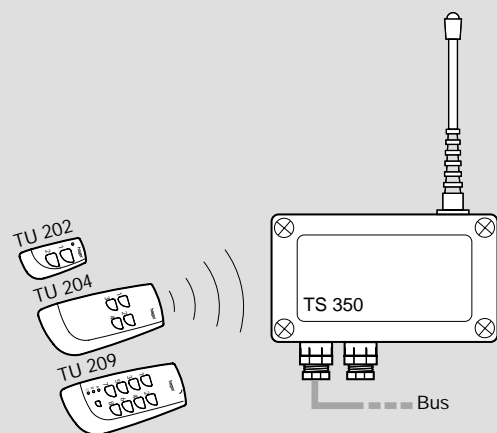
**Installation**

wall mounted with 4 screws

**Operating principle**

The TS 350 receiver receives orders from the radio remote controls and transmits them to the bus.

It is to be used in combination with remote controls TU202, TU204 and TU209 to control electrical equipment such as lighting, roller shutters, hating, etc...

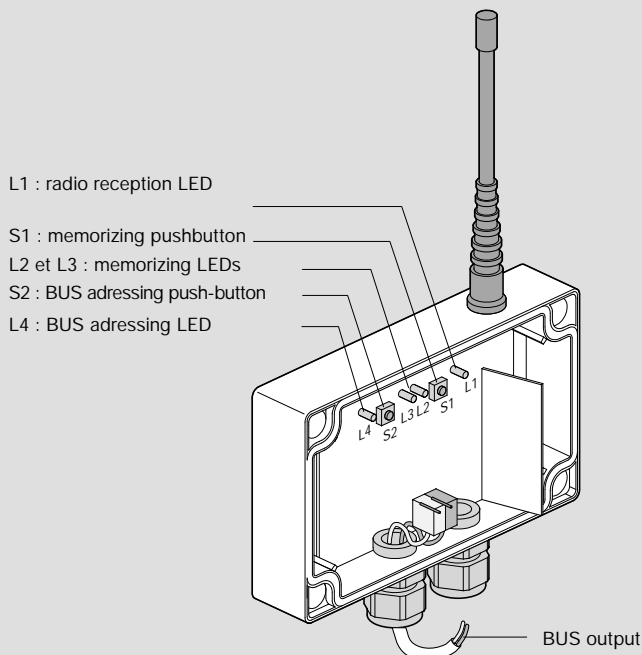


A TS 350 receiver can be used to interface 4 different orders on the bus via 4 remote control keys. These four keys may be considered to be four inputs.

The TS350 is a projecting device connected to the Bus 29V EIB; The Bus supplies it with power and manages its communication with the output modules. If the number of radio orders exceeds 4, it is necessary to add receivers (1 receiver for each set of 4 orders)

the radio receiver TS351 offers the features of 3 devices TS350 (3x4 inputs) included in one single box, with 3 groups of keys and indicators lights for each block of 4 inputs.

**Product presentation**



**Implementation**

Radio reception LED L1 shows disturbances due to environment :  
 - slightly on : OK  
 - ON : disturbed environment

In case of implementation of several receivers, maintain a sufficient distance between them about 30cm.

## Tebis : Output devices

### 6 outputs 6 A TS 206A - TS 206B - TS 206C

**Power supply**

Product supply via the EIB Bus 29V ...

**Electrical characteristics**

- supply voltage : system voltage 29 V,
- watt loss : 7W max.

**Environment :**

- operation temperature : -10 to +45 °C,
- storage temperature : -20 to +70 °C,
- ingress protection : IP 20.

**Connection :**

- capacity : 1 to 6<sup>□</sup> flexible  
1,5 to 10<sup>□</sup> rigid,
- connection to the bus by plugable TG008 terminal

**Operating data**

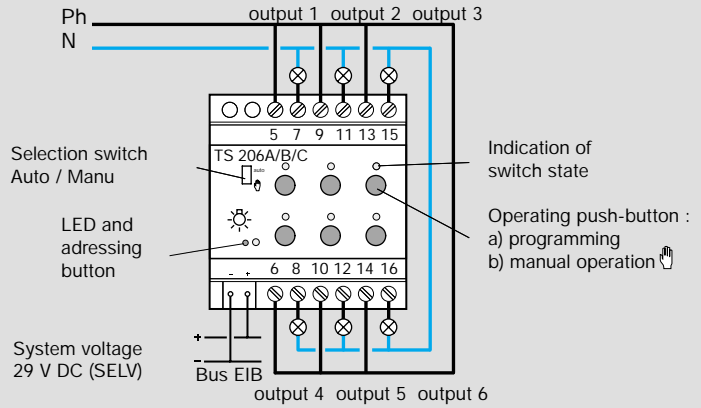
Contacts loading capacity indicator :

- **TS 206A** AC1 : 4 A
- **TS 206B** AC1 : 10 A
- **TS 206C** AC1 : 16 A
- incandescent : 1000 W,
- halogen & VLV halogen : 1000 W.

**Electrical endurance :**

- 6 A AC1 : 100,000 operations
- incandescent 1000 W : 50,000 operations
- halogen & VLV halogen 1000 W : 100,000 operations

**Electrical connection**



### 4 outputs 16 A TS 204C

**Power supply**

Product supply via the EIB Bus 29V ...

**Electrical characteristics**

- supply voltage : system voltage 29 V,
- watt loss : 7W max.

**Environment :**

- operation temperature : 0 to +45 °C,
- storage temperature : -20 to +70 °C,
- ingress protection : IP 20.

**Connection :**

- capacity : 1 à 6<sup>□</sup> flexible  
1,5 à 10<sup>□</sup> rigid,
- connection to the bus by plugable TG008 terminal

**Operating data**

Contacts loading capacity indicator :

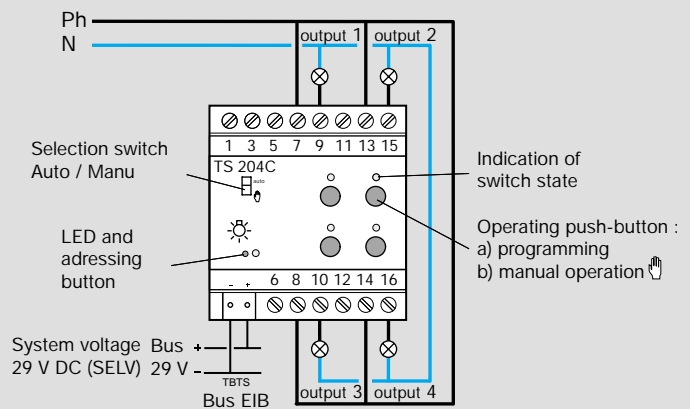
- 250 V / 16 A AC1 (360,000 operations),
- maximum power for 250,000 operations :
 

incandescent lamps	2000 W
VLV halogen (electronic)	2600 W
fluorescent with electronic ballast	60 x 18 W
	30 x 36 W
	18 x 58 W
- maximum power for 200,000 operations :
 

halogen 230 V	1600 W
---------------	--------
- maximum power for 60,000 operations :
 

fluorescent parallel compensated lamps (22µF)	
5 lamps	1 x 18 W
5 lamps	1 x 36 W
3 lamps	1 x 58 W.

**Electrical connection**



**Function**

Output device with 4NO or 6NO contacts to switch lighting or socket circuits or other consumers.

These devices are controlled over the system line by allocated bus inputs.

These devices also provide a manual override facility and a visual indicator ON/OFF.

**Installation instructions**

1. Record operation temperature. Mount device in lower part of the enclosure.
2. Connect system voltage..
3. Connect outputs
4. Follow the operating instructions of the system.

**Note :** the outputs can be connected to different phases.

**4 heating experimental outputs TB 042**

**Technical characteristics**

**Power supply :**

Product supply via the EIB Bus 29V ...  
- power supply : 230 V ~ / 50 Hz.

**Electrical characteristics :**

- absorbed power 5 VA,  
- watts loss : 8 W.

**Environment :**

- operation temperature : 0 to +45 °C,  
- storage temperature : -20 to +70 °C,  
- ingress protection : IP 40.

**Connection :**

- main line connection by means of plug-out terminal TG008  
- 230 V ~ power supply and connected via cage terminals  
max. capacity : 1 to 6<sup>□</sup> flexible  
1,5 to 10<sup>□</sup> rigid

**Outputs characteristics :**

- Un : 230 V ~ (one phase is a requirement),  
- Imax : 0,5 A,  
- electrical endurance : > 6 000 000 operation  
- pilot wire output control signals :  
conform to GIFAM specifications

set-point	signal	processing
comfort		no signal
eco		full cycle
frost free		negative half-cycle
stop		positive half-cycle

**Display of set-points for each way**

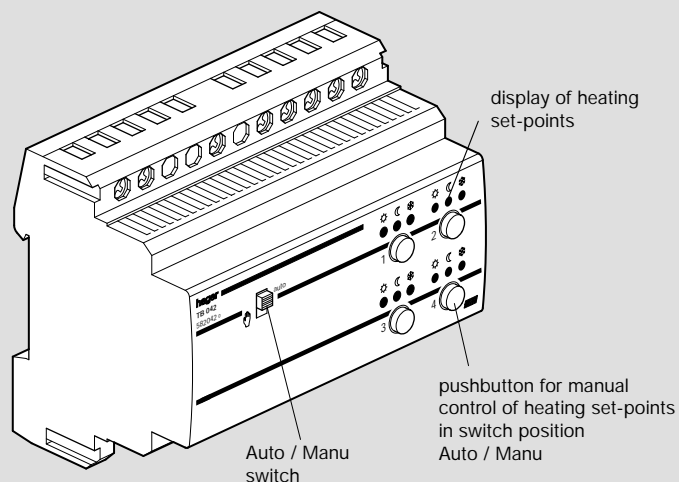
comfort		●	●
eco	●		●
frost-free	●	●	
stop	●	●	●

**Product signalling**

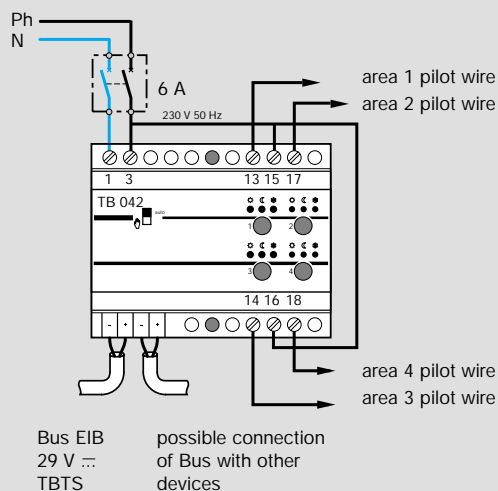
● the comfort indicator of output 1 flickers  
● ● the device is an addressing mode.

The four comfort indicators flicker :  
- no voltage on bus  
 - the product was discharged with ETS2  
- downloaded software is not compatible with hardware base

**Product presentation**



**Installation / Implementation**



Pressing simultaneously the four manual control pushbuttons located on front face sets into the physical addressing mode. The product will remain in physical addressing mode until it is addressed and the four pushbuttons are pressed.

## Tebis : shutters and blinds

### 4 voltage contacts 230V AC for blinds TS 224

**Power supply :**

- Product supply via the EIB Bus 29V ...
- consumption : 5 mA
- max. power dissipation : < 1 W

**Environment :**

- operation temperature : 0 °C to +45 °C
- storage temperature : -20 °C to +70 °C
- Ingress protection : IP 20

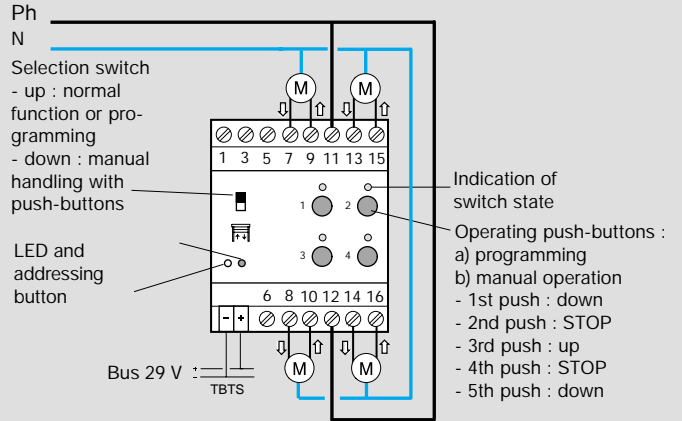
**Connection :**

- main line connection by means of plug-out terminal TG008
- 230 V~ supply and outpt contacts connection by cage terminals  
max. capacity : 1<sup>□</sup> to 6<sup>□</sup> flexible  
1,5<sup>□</sup> to 10<sup>□</sup> rigid

**Contacts characteristics :**

- I max = 6 A cos φ 0,6 per 100 000 operations
- displaying status of way :
- indicator light on : motor moving (up or down)
- indicator light off : motor stopped

**Electrical connection**



**nota :** terminals 11 and 12 can be connected to different phases. Never connect two motors in parrallel

### 4 voltage contacts 24V AC for shutters TS 225

**Electrical characteristics**

**Power supply :**

- Product supply via the EIB Bus 29V ...
- consumption : 5 mA
- max. power dissipation: < 1 W

**Environment :**

- operation temperature : 0 °C to +45 °C
- storage temperature : -20 °C to +70 °C
- Ingress protection : IP 20

**Connection :**

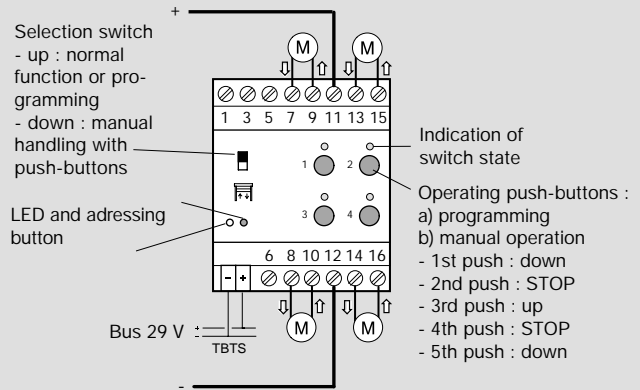
- main line connection by means of plug-out terminal TG008
- 24 V ... supply and outpt contacts connection by cage terminals

- max. capacity : 1<sup>□</sup> to 6<sup>□</sup> flexible  
1,5<sup>□</sup> to 10<sup>□</sup> rigid

**Contacts characteristics :**

- I max = 1 A 24 V ...
- displaying status of way :
- indicator light on : motor moving (up or down)
- indicator light off : motor stopped

**Electrical connection**



**nota :** terminals 11 and 12 are connected to 24V source

**3-channel dimmer actuator TK030**

**Power supply**

- Product supply via the EIB Bus 29V ...
- power supply : 230 V~ / 50 Hz +10 % -15 %
- absorbed power : 5 VA,
- max. power dissipation : 10 W.

**Environment**

- operation temperature : 0 °C to +45 °C,
- storage temperature : -20 °C to +70 °C,
- ingress protection : IP 40.

**Connection :**

- main line connection by means of plug-out terminal TG008
- 230 V~ supply and /10 controls connection by cage terminals, ma. capacity : 1<sup>□</sup> to 6<sup>□</sup> flexible, 1,5<sup>□</sup> to 10<sup>□</sup> rigid

**Contacts characteristics**

- Control 1-10 V :
  - 1/10 V output current : 50 mA max.
  - max. connection length : 50 m max.
- Output contact :
  - contact's loading capacity indicator : 250 V / 16 A AC1 (360 000 operations),
  - maxi. power per output for 250,000 operations :
 

incandescent	2000 W
VLV halogen (electronic)	2600 W
uncompensated fluorescent lamps	34 x 18 W
(cosφ = 0,3)	17 x 36 W
fluorescent with electronic ballast	60 x 18 W
	30 x 36 W
	18 x 58 W,
  - maxi. power per output for 200,000 operations :
 

halogen	1600 W,
---------	---------
  - maxi 230 V power per output for 60,000 operations :
 

fluorescent parallel compensated lamps	5 lamps 1 x 18 W
(totale capacity value)	5 lamps 1 x 36 W

 not to exceed 22 µF) 3 lamps 1 x 58 W.
- Indication of switch state :
  - indicator light on : lamps are switched on,
  - indicator light off : lamps are switched off.
- Product signalling :
  - the indicator light of channel 1 flickers :
 

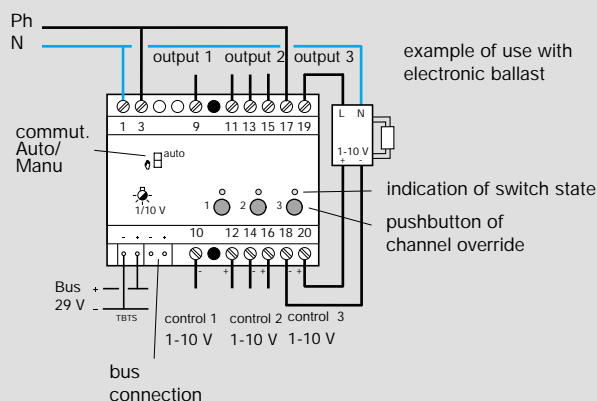
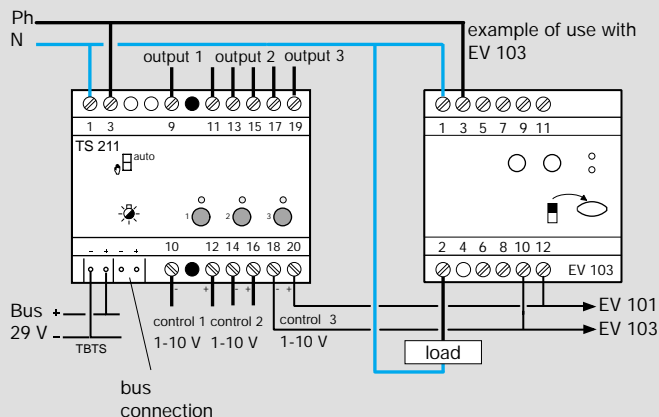
●	●	●
---	---	---

 the product is in physical addressing mode
  - the three indicator lights flicker :
 

●	●	●
---	---	---

 - no voltage on Bus  
 - the product was discharged with ETS2,  
 - downloaded software is not compatible with hardware base
- Maintaining TBTS voltage domain of EIB Bus:  
 In order to maintain the voltage domain of EIB Bus, it is necessary to use dimmers or electronic ballast ensuring 2kV minimum insulation on 1/10V controls.

**Electrical connection**



# Tebis : Dimmer

## Dimmers TS 210 - TS 210A

### Technical characteristics

#### Power supply :

- Product supply via the EIB Bus 29V ...
- power supply : 230 V~ / 50 Hz
- max. power dissipation : < 5 W
- consumption with no load : 0,5 VA

#### Environment :

- operation temperature : 0 °C to +45 °C
- storage temperature : -20 °C to +70 °C
- ingress protection : IP 20

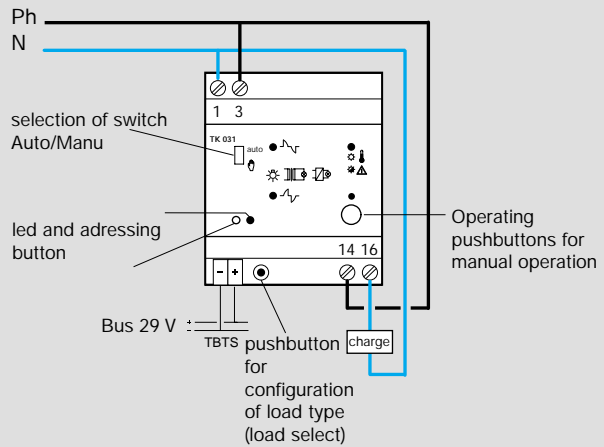
#### Connection :

- main line connection by means of plug-out terminal TG008
- 230 V~ supply and output contacts connection by cage terminals  
max. capacity : 1,5 to 6<sup>□</sup> flexible  
1,5 t 10<sup>□</sup> rigid

### Technical Characteristics

	TS 210 TS 210A	operation temperature		
		35 °C (TS 210)	45 °C (TS 210)	45 °C (TS 210A)
type of load	mini load	maxi load		
incandescent	20 W	600 W	500 W	300 W
halogen BT	20 W	600 W	500 W	300 W
VLV hal. + dim. convent.transfo	transfo 20 VA load 15 W	transfo 600 VA load 480 W	transfo 500 VA load 400 W	300 VA 250 W
VLV hal. + electro- nic transfo	transfo 25 VA load 20 W	transfo 600 VA load 540 W	transfo 500 VA load 450 W	300 VA 270 W

### Electrical connection



**Note :** before using the TS 210A et TS 210 devices, we have to specify the load type which is connected . The supply voltage of the module and of the load must be joined downstream from the same differential protection (RCB)

## Not modular dimmer 1 channel TK 013

#### Power supply :

Product supply via the EIB Bus 29V ...

#### Environment :

- operation temperature : -5 °C to +45 °C
- storage temperature : -20 °C to +70 °C
- ingress protection : IP 20

#### Connection :

- main line connection by means of plug-out terminal TG008
- 230 V~ supply connection by no-screw terminals :  
max. capacity : 1,5<sup>□</sup> flexible  
2,5<sup>□</sup> rigid
- 1 - 10 V output contacts connection by 1-10V by no-screw terminals :  
max. capacity : 1,5<sup>□</sup> flexible  
2,5<sup>□</sup> rigid

Size : l 243 x l 42 x h 28 mm

#### Output characteristics :

- Un : 230 V~
- I max. : 6 A AC 1
- maximum connection capacity with electronic ballasts for dimming :
- 58 W fluo tubes : 10 simple ballasts
- 36 W fluo tubes : 20 simple ballasts
- 18 W fluo tubes : 20 simple ballasts

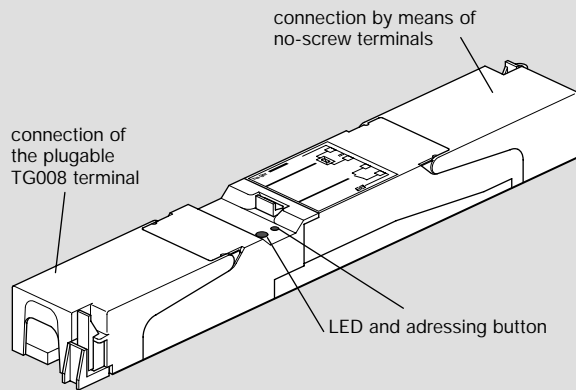
#### 1 - 10 V Control :

- quantity of connectable electronic ballasts for dimming : 50

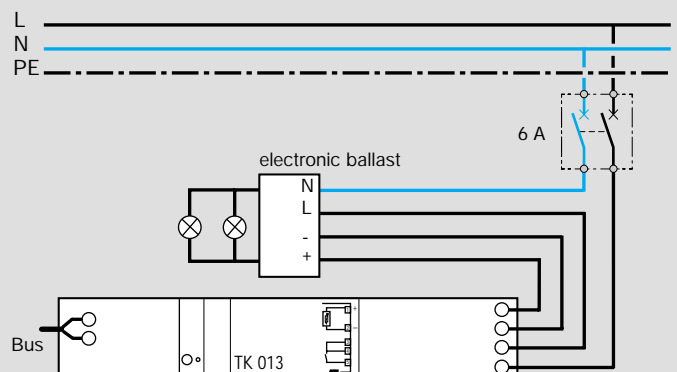
#### Operating data :

1-10V Bus EIB controlled dimmer used to control dimming of lights equipped with electronic ballasts in an area (fluo tubes, halogen lamps,...)

### Product presentation



### Electrical connection



# Tebis : Lighting distributor

## Lighting distributors TC 033, TC 122, TC 124

### Technical specifications

#### Alimentation

TC 033 : Un : 380 V~ +10 % / -18 % 16 A maxi. 50/60 Hz  
 TC 122 et TC 124 : Un : 230 V~ +10 % / -18 % 16 A maxi. 50/60 Hz

#### Environment

- operation temperature : 0 to +45 °C
- storage temperature : -10 to +65 °C
- ingress protection :  
 IP 20  
 IP 30 (provide all connectors are used or plugged with suitable plugs shock resistance)
- power connection : 2 joules (IK 07)

#### Connection

- Bus connection by 2-pole black connectors
  - pre-manufactured cables TC 943
  - connectors alone TC 940, TC 950
- power circuit connection by 3-pole black connectors
  - pre-manufactured cables TC 913
  - connectors alone TC 910
- power circuit connection by 5-pole black connectors
  - pre-manufactured cables TC 903
  - connectors alone TC 900
- input connection by 3-pole black connectors
  - pre-manufactured cables TC 923
  - connectors alone TC 920
- output connection by 3-pole black connectors
  - pre-manufactured cables TC 933, TC 934, TC 935
  - connectors alone TC 930

#### Input characteristics

- Un : 230 V~ 50/60 Hz
- In : 6 mA
- levels : 0..... 20 V~ -> 0  
 187..... 253 V~ -> 1
- rebound time : 40 ms
- mini time period between 2 changes of state : 100 ms
- maximum length 30m in 3 x 1,5<sup>2</sup>

#### Outputs characteristics

- contact normally open
  - Un : 230 V~ 50/60 Hz
  - I max : 16 A AC1
  - maximum power per output for 250 000 operations :
- |  |           |
|--|-----------|
| incandescent                           | 2000 W    |
| halogen 230 V (for 200 000 operations) | 1600 W    |
| halogène TBT (ferro)                   | 1600 VA   |
| halogène TBT (électronique)            | 2600 W    |
| uncompensated fluorescent              | 34 x 18 W |
| cos φ = 0,3                            | 17 x 36 W |
|  | 13 x 58 W |
| fluorescent with electronic ballast    | 60 x 18 W |
|  | 30 x 36 W |
|  | 18 x 58 W |

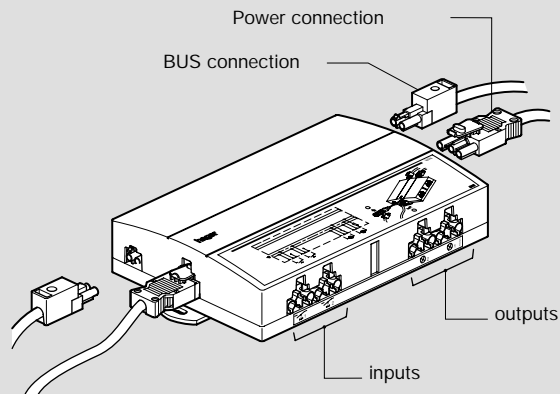
#### for 60 000 operations :

- |  |                  |
|--|------------------|
| fluorescent compensated parallel (total capacity value not to exceed 22µF) | 5 lamps 1 x 18 W |
|  | 5 lamps 2 x 18 W |
|  | 2 lamps 3 x 18 W |
|  | 2 lamps 4 x 18 W |
|  | 5 lamps 1 x 36 W |
|  | 2 lamps 2 x 36 W |
|  | 3 lamps 1 x 58 W |
|  | 1 lamps 2 x 58 W |

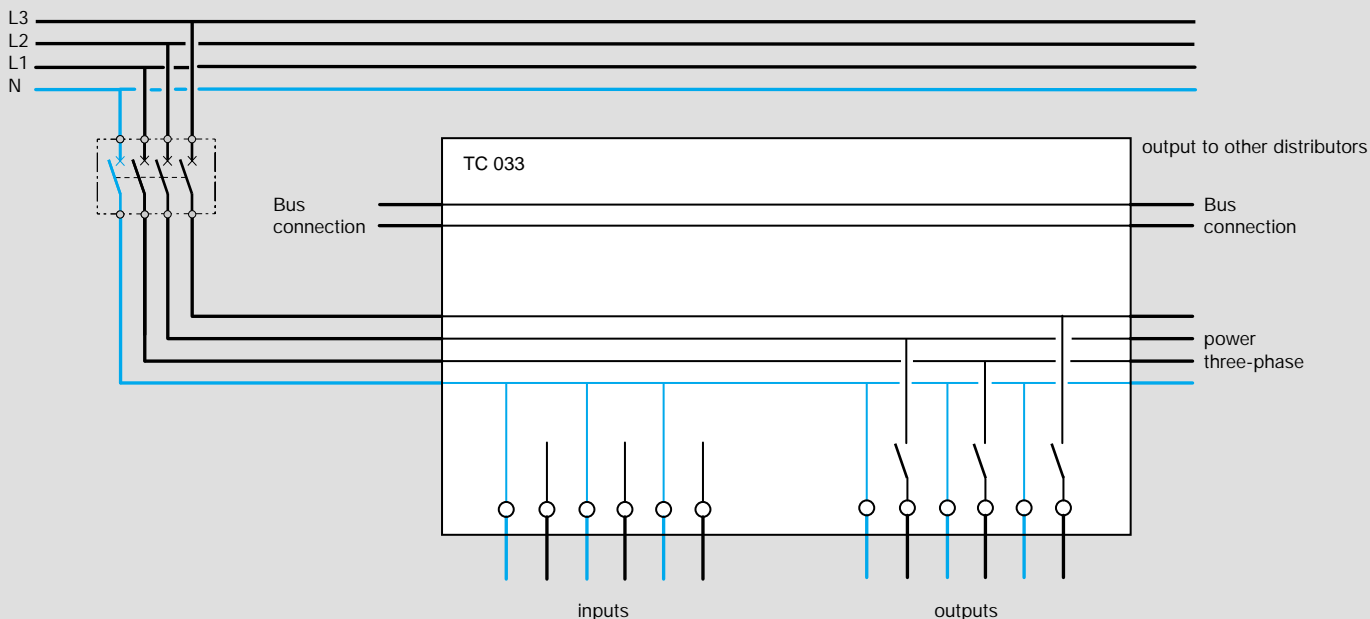
#### Size

Dimensions : L 276 x l 159 x h 55 mm

### Product presentation



### Electrical connection



**Connectors for lighting distribution boxes  
TC 900 to TC 964**

**Connection principle**

**Generalities**

The TC lighting installation system performs the following functions :  
 - the power circuit (single-phase current or three-phase current) is distributed between distributors from the upstream protection.  
 - pushbuttons are connected and the distributors supply power to the lights.

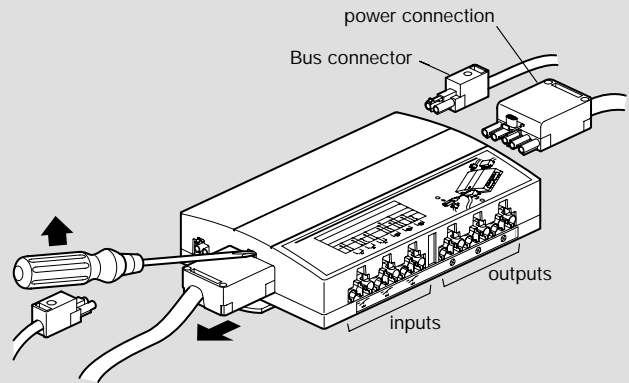
This system is specifically suited to an installation in false ceiling or in technical floor. A full associated connector range is available for simple and fast assembly.

The connection to distributors (power, Bus, control units and lights) is carried out by means of clip-on connectors.

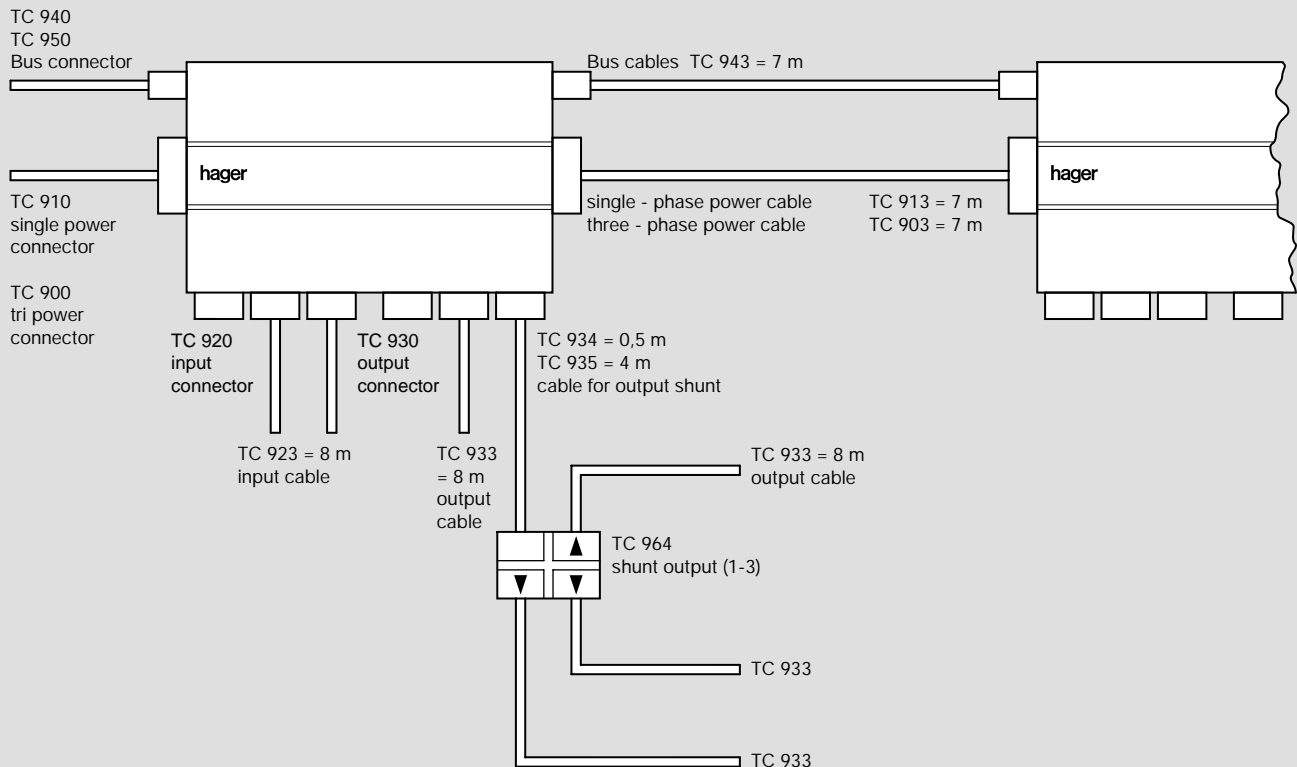
Visual keying (by colour coding) as well as mechanical keying is provided for each type of connection.

For greater safety, a mechanical locking is performed at the time of clipping. Unlocking is possible only by using a tool such as a screwdriver.

For an even faster installation, a wide range of pre-manufactured cables of standard length is offered.



**system presentation**



**Universal temperature transmitter TE 001**

**Power supply**

Product supply via the EIB Bus 29V ...

**Environment**

- operation temperature : -5 °C to +45 °C
- storage temperature : -20 °C to +70 °C
- ingress protection : IP 203

**Connection**

- probe connection by screw terminals, recommended Ø : 1,5<sup>□</sup> maximum length 50 m.

**Standards**

Construction characteristics : CEI 669-2-1

**Temperature transmitter**

- range of measurement : -30 °C to +50 °C
- measuring accuracy with calibration : +/- 1 °C
- correction range of calibration : +/- 2,5 °C

**Universal temperature sensor EK 083 or outside temperature probes EK 086 :**

- CTN 10 kΩ at + 25 °C
- conform fully to requirements of probes installation in a slab or outside

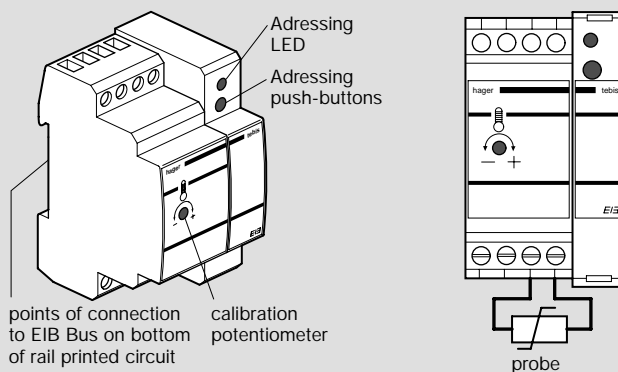
**Probe resistance according to temperature**

temperature	T (°C)	+50	+40	+30	+25	+20	+15	+10	+5	0	-5	-10	-15	-20	-30
probe	R (kΩ)	3,60	5,33	8,06	10	12,49	15,71	19,90	25,39	32,65	42,32	55,32	72,95	97,07	176,96

**Operation characteristics**

- outside temperature measurement from external probe
- temperature measurement of slab from universal probe
- temperature control of a heating floor
- any temperature safety function

**Product presentation**



**Universal temperature transmitter with no override TE 006**

**Power supply**

Product supply by the BCU TA 004

**Environment**

- operation temperature : -5 °C to +45 °C
- storage temperature : -20 °C to +70 °C
- ingress protection : IP 302

**Built-in room temperature probe**

- range of measurement : +5 °C to +40 °C
- measuring accuracy with calibration : +/- 0,3 °C
- calibration correction range : +/- 2,5 °C

**Standards**

Construction characteristics : CEI 669-2-1

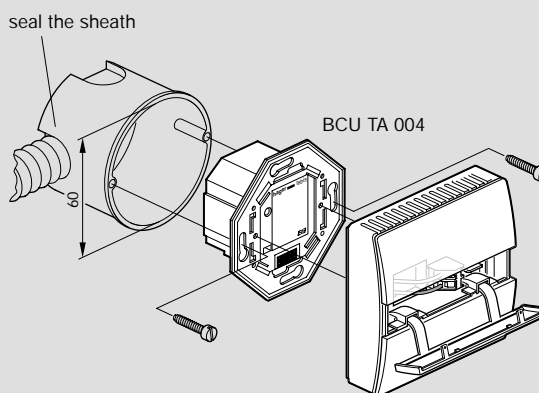
**Operation characteristics**

Room temperature measurement from a built-in probe

**Size**

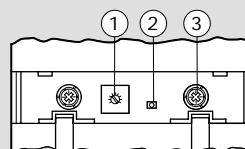
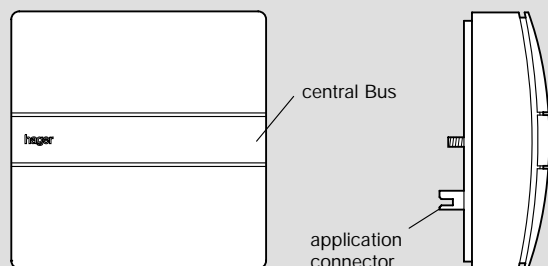
Dimensions : l 81 x l 81 x p 27 mm

**Installation / Implementation**



- seal the sheath to prevent air draining and distortion of local temperature measurement
- maintain application "connector" protection of BCU to protect it from dirt until the installation begins on site
- use flush-mounting box: Ø 60 mm ; fixing by screw.

**Product presentation**



- ① local temperature measurement calibration potentiometer
- ② fault warning (red micro-indicator)
- ③ fixing screws of regulator on BCU ref. Ø m 3 x 8 slotted head posidrive

# Light controller TK 022 Light sensor TK 023

## Technical specifications of Light controller TK 022

### Electrical characteristics

- power supply : 29V DC (SELV)

### Operating data

- typical operating range of control system : 200 ... 1200 lux
- Inputs : 2, for lighth sensor TK023
- Outputs : 2 passive, 0... 10V for electronic ballast units
- Load rating : < 30mA
- Max. cable length between TK 022 and TK 023 : 100 m max.
- Load circuit : 2, potential free contacts
- Switching voltage : 230 V~ 50Hz
- Making / Breaking capacity : 16A / AC1  
10A / AC3

### Environment

- operation temperature : -5 °C to +45 °C
- storage temperature : -20 °C to +70 °C

### Connection

- multicore : 0,5 mm<sup>2</sup> - 2,5 mm<sup>2</sup>
- single core : 0,5 mm<sup>2</sup> - 4 mm<sup>2</sup>

### Size

- dimensions : 4 modules (70 mm)

### Commissioning / operation

ETS2 (EIBA Tool software) is used to assign the physical address and the group addresses and to set the parameters.

## Technical specifications for Light sensor TK 023

### Operating data

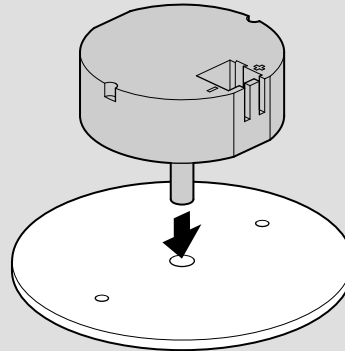
- maxi. cable length : 100 m max. between TK 022 and TK 023

### Environment

- operation temperature : -5 °C to +45 °C
- storage temperature : -20 °C to +70 °C

### Dimension

- dimension : Ø 54 x h 20 mm



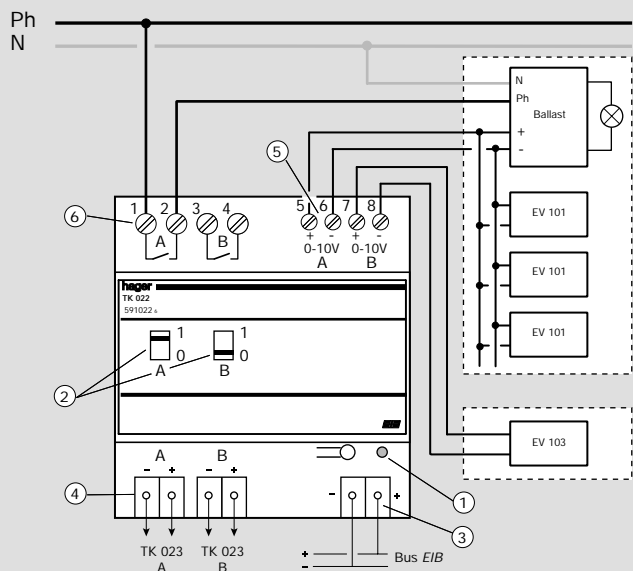
## Function

The TK022 is designed to switch and dim lighting circuits via the bus EIB in conjunction with electronic ballast units. It features two independent channels.

In conjunction with the light sensor TK0 23, the TK 022 can be used as a twin lighting controller for constant lighting control. The dimming telegrams are converted to 0 ... 10 V signals corresponding to 0 ... 100 % brightness. The device operates as a passive device, i.e. the 0 ... 10 V outputs behave as controlled resistors and the controlled electronic ballast units supply the current. The device requires no additional power supply.

Two relay contacts switch the circuits. The set-point for the lighting controller is set separately for each channel. The light sensor detects the light level in rooms. It is installed in a standard wiring box in ceiling and mounted with a cover (white) using screws. In conjunction with the lighting controller TK 022, the light sensor is used for constant lighting control

## Electrical connection



### Caption :

- ① LED and button for entering the physical address
- ② Switch position indicators
- ② Manual operation ON/OFF
- ③ EIB Bus
- ④ Light sensor with one connection terminal (white/yellow)
- ⑤ 0... 10V signal for electronic ballast unit
- ⑥ Load circuit

## Regulator for accumulation heating floor TF 005

### Technical characteristics

#### Power supply

Product supply via the EIB Bus 29V ...

#### Environment

- operation temperature : -5 to +45 °C
- storage temperature : -20 to +70 °C
- ingress protection : IP 40

#### Standards

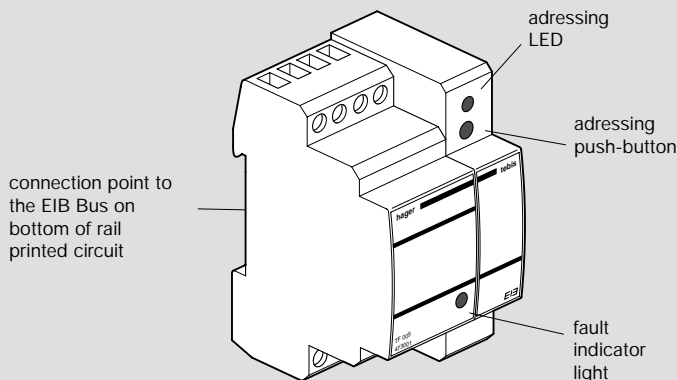
constructive Characteristics CEI 669-2-1

#### Operating data

Load control of floor accumulation heating according to the outside temperature (time based or proportional control) for :

- electrical heating of "basic+supplement" type
- basic heating of industrial type buildings (storage room, etc...)

## product presentation



## Installation / Implementation

This product is simply clipped on a DIN rail equipped with a printed circuit at bottom of rail. It has no connection terminal.

## Regulator of ambient temperature with option air conditioning TF 016

### Technical characteristics

#### Power supply

Product supplied by BCU TA 004

#### Environment

- operation temperature : 0 to +45 °C
- storage temperature : -20 to +70 °C
- ingress protection : IP 20

#### Built-in room temperature probe

- range of measurement : 0 to +40 °C
- resolution : 0,2 °C
- measuring accuracy : +/- 0,5 °C
- correction range of calibration : +/- 12,7 °C pe step of 0,1 °C

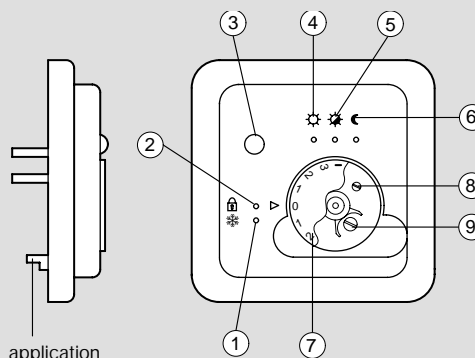
#### Operating characteristics

- local temperature control (PI type control) for :
    - all types of direct electrical heating such as : convector, radiant panel, heating floor and ceiling,....
    - all types of hot water heating such as : radiator, heating floor,...
    - all types of air-conditioning systems such as : fan-convector, multisplits, cold floor and ceiling...
  - display of 4 temperature set-points : Comfort ☀️, Eco 🌿, Lower ☾, frosts-free or overheating
  - set-point comfort adjustment wheel from + or -3°C
- The presence button signals the presence.

#### Size

Dimensions : l 84 x l 84 x p 16 mm

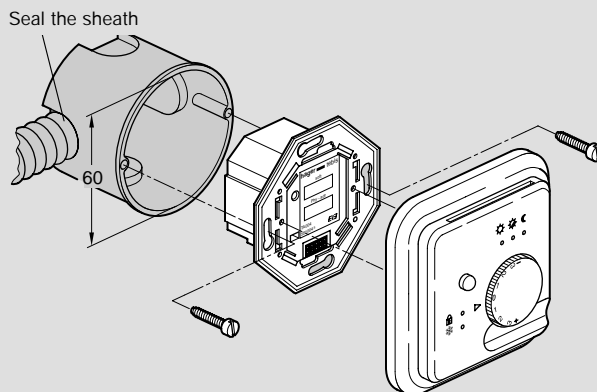
## Product presentation



application connector

- ① Red light indicating the frost-free set-point for heating or overheating of air-conditioning
- ② yellow indicator light of regulator's off state
- ③ presence button
- ④ green indicator light signalling the comfort set-point
- ⑤ green indicator light signalling the eco set-point
- ⑥ green indicator light signalling the lower set-point
- ⑦ set-point adjustment wheel
- ⑧ fixing screw of regulator on the BCU
- ⑨ fixing screw of the box on the base plate

## Installation / Implementation



- use flush-mounting box : Ø 60 mm, fixing by a screw
- seal the sheath to prevent air draining and distortion of local temperature measurement
- maintain application "connector" protection of BCU to protect it from dirt until the installation begins on site

# Tebis : Regulators

## Room temperature regulator TF 012, TF 014

### Technical characteristics

#### Power supply

product supplied by BCU TA 004

#### Environment

- operation temperature : -10 to +45 °C
- storage temperature : -20 to +70 °C
- ingress protection : IP 302

#### Built-in room temperature probe

- range of measurement : +5 to +40 °C
- measuring accuracy : +/- 0,3 °C
- correction range of calibration : +/- 2,5 °C

#### Standard

construction characteristics : CEI 669-2-1

#### Operating data TF 012

- local temperature control (PI type control) for :
  - all types of direct electrical heating such as : convector, heating floor, radiant ceiling...
  - hot water heating
- display of 4 temperature set-points : Comfort ☀, Eco, Lower C, frost-free \* and a withdraw function
- set-point comfort adjustment wheel, The presence buttons signals the presence.

#### Operating data TF 014

- local temperature control (PI type control) for :
  - all types of direct electrical heating such as : convector, thin slab, radiant ceiling ...
  - hot water heating
- display of 4 temperature set-points : Comfort ☀, Eco, Lower C, frost-free \* and a withdraw funtion

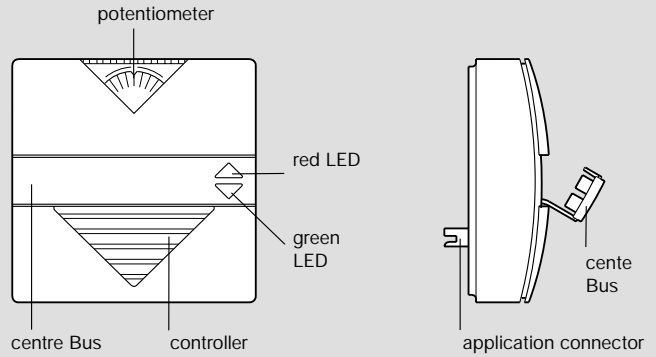
#### Current set-point display

	☀	ECO	C	*	withdraw
red indicator	▲	△	△	△	▲
green indicator	▽	▽	▽	▽	▽

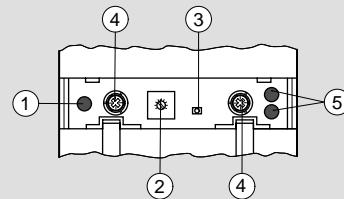
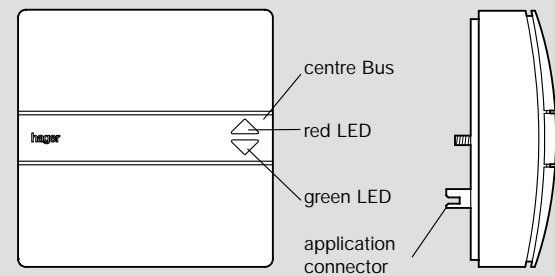
#### Size

dimensions : L 81 x l 81 x P 27 mm

### Product presentation TF 012



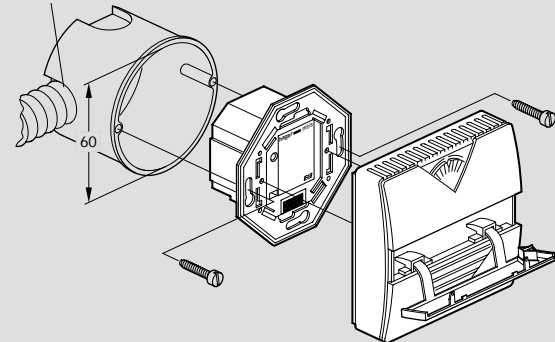
### Product presentation TF 014



- ① heating indicator reflecting the control output state of the regulator (yellow LED)
- ② room temperature measurement calibration potentiometer
- ③ fault indication (red micro-LED)
- ④ fixing screw of the regulator on the BCU Ref. M3x8 slotted head posidrive
- ⑤ indicators lights for display of the current set-point (red and green LED)

### Installation / Implementation

Seal the sheath



- used flush mountig box: Ø 60 mm, fixing by screw
- seal the sheath to prevent air draining and distorsion of local temperature measurement
- maintain application "connector" protection of BCU to protect it from dirt until the installation begins on site.

## Tebis : Programmer

### Weekly two-channels time switch TF 002

#### Power supply

Product supply via the EIB Bus 29V ...

#### Environnement

- working temperature : -5 °C to +45 °C
- storage temperature : -20 °C to +70 °C
- ingress protection : IP 20

#### Connection

Connection to the bus by a data rail

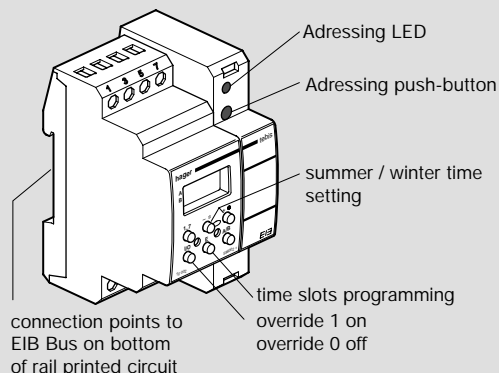
#### Operating characteristics

Weekly time switch with 2 independent channels including easy winter/summer time change, unlimited program storage, selection of temporary or permanent override, program display and control. Switching orders of both channels are issued directly on the communication network.

#### Main Characteristics

- cycle : weekly
- programming accuracy : 1 min
- programming capacity : 24 set-points to be distributed over both channels
- time accuracy : + or - 5 minutes / year
- in the event of Bus failure, the display disappears, but time is stored for 24h, program steps are saved permanently,
- override : - permanent : on or off for maintenance, vacation, ...
  - temporary : on or off for temporary override until the next program step
- summer / winter : two distinct keys + and - 1 hour are used to change winter/ summer time,
- display : the display mode makes it possible to check the program with no risk of modification or removal of set-points.
- grouping of days : makes it possible to store set-points common to several days and to save program steps.

### Product presentation



### Synchronizer TF 003

#### Power supply

via the EIB Bus 29V ...

#### Environment

- working temperature : -5 °C to +45 °C
- storage temperature : -20 °C to +70 °C
- ingress protection : IP 20

#### Connection

Connection to the bus by a data rail

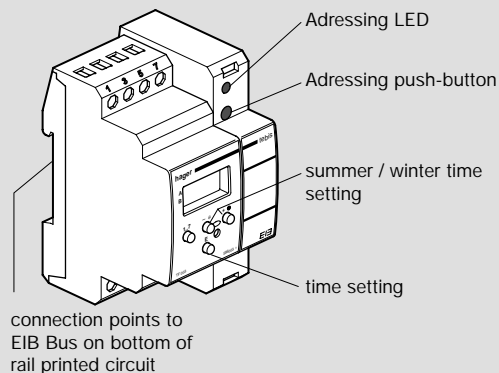
#### Operating Characteristics

Is used as reference clock for all weekly and annual time switches installed on the communication network.

#### Main Characteristics

- time setting accuracy : 1 min
- time accuracy: + or - 5 minutes / year
- summer / winter : two distinct keys + and - 1 hour are used to change winter / summer time,
- in the event of Bus failure, the display disappears, but time is stored for 24 hours.

### Product presentation



### Load shedding devices

- References TJ110, TJ112, TJ114 include respectively :
- the modular load shedding device 1000, 150 or 50 channels
  - the diskettes of Tebis application "load shedding" to be installed on PC
  - the 3-m long modular controller cable.

### annual time switches

- References TJ 100B, TJ 102B, TJ 104B include respectively :
- the modular annual time switch with 100, 50 or 20 channels
  - The Tebis application diskettes: annual programming to be installed on PC, and
  - the 3-m long modular controller cable.

### Power supply

- power supply from TS 111
  - Un = 29 V ~, I max = 114 mA (3,3 W - equivalent to 23 devices)
- Bus EIB powers the device

### Environment

- operation temperature : -5 °C to +45 °C
- storage temperature : -10 °C to +50 °C
- ingress protection : IP 20

### Connection

- connection to the Bus cable by plug-in type connection terminal TG008
- connection of 29 V ~ power supply and series link by terminals with screw
- Capacity : flexible 1,5<sup>□</sup>  
rigid 1,5<sup>□</sup>
- max. length of power supply cable : 5 m

### Standards

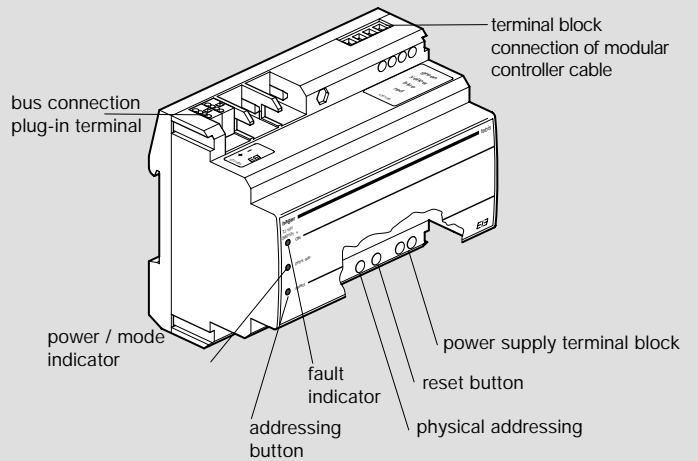
Construction characteristics : CEI 801

### Hardware architecture

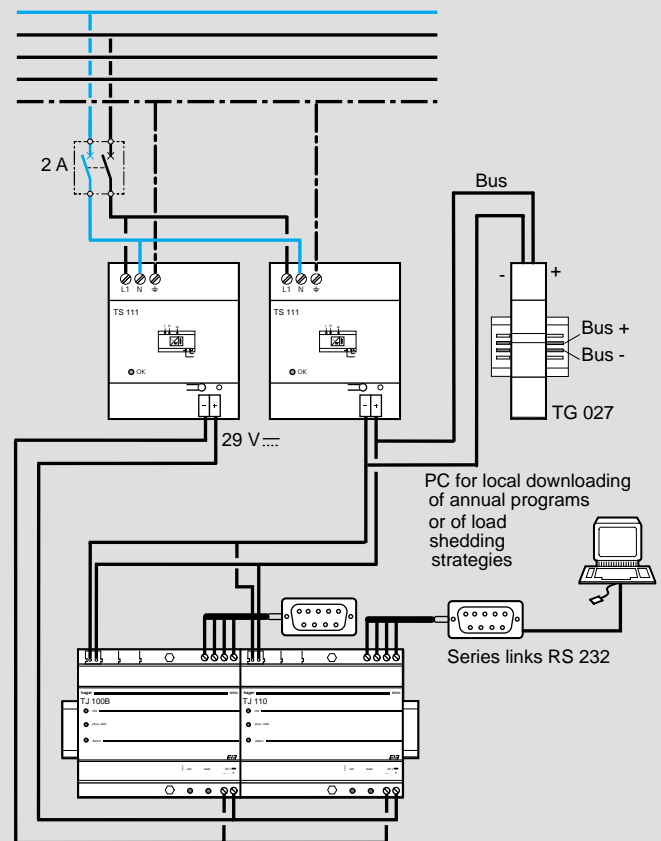
- micro-controller S 80C 165
- Flash EPROM 512 KB for resident software
- RAM 256 kB with battery backup, contains downloaded data
- time meter with backup in case of power supply failure : accuracy +/-0,5s per day at +25°C (up to 6,3s at +45°C)
- long life lithium battery for time meter and data :
  - back-up > 10 years of total failure at 20 °C
  - > 3 years of total failure at 45 °C

power/ mode indicator	fault indicator		
	off	flickering	permanently on
off	no power	"initialisation" state hardware fault is detected in self-test	undefined state permanent reset or EPROM access problem
flickering	off-line mode : no fault is detected		off-line mode : application mode error
permanently on	on-line mode : no fault is detected		on-line mode : application mode error

### Product presentation



### Electrical connection



# Tebis : Communication

## Modular RS 232 - TH 001

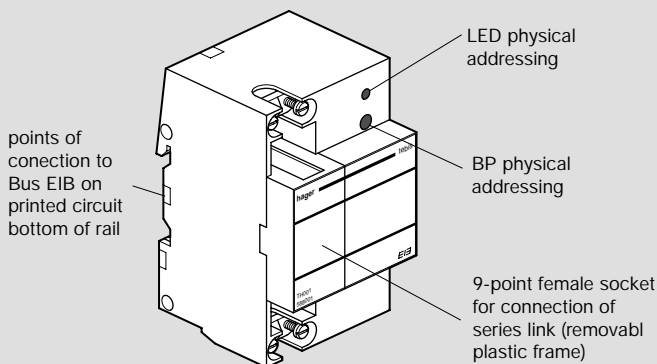
### Power supply

Remote supply by Bus EIB 29 V ...

### general characteristics

RS232 cable connection : 9-point female socket SUB-D with possible locking by screw

### Product presentation



## surface RS 232 - TH 002

### Power supply

via BCU TA 004

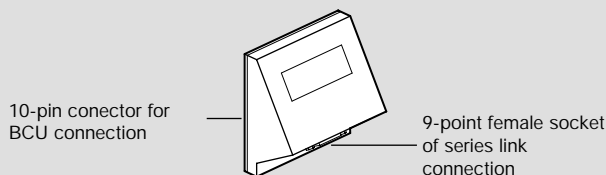
### general characteristics

RS232 cable connection : 9-point female socket SUB-D with possible locking by screw

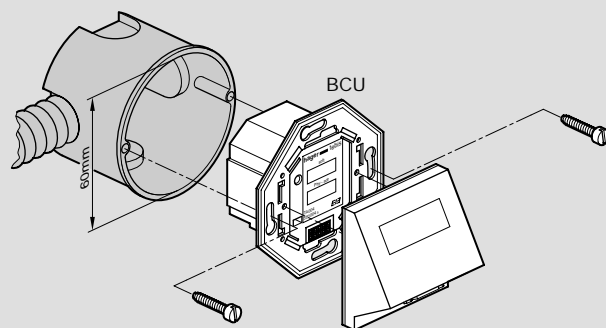
### Size

Dimensions : L 81 mm x l 81 mm x d 43 mm

### Product presentation



### Installation / Implementation



## RS 232 Modem TH 004

### Technical characteristics

#### Power supply :

- via Bus EIB 29 V ...,
- auxiliary power supply by power transformer ~ / ... 230 V ± 10 % 50 Hz / 6 V ... / 150 mA.

#### Environment :

- operation temperature : -5 to +45 °C,
- storage temperature : -25 to +55 °C.

### Connection

- to the network, by power transformer provided,
- to the modem : the product is equipped with a SUB-D- 9-point male connector (the connecting cable and the modem are to be provided)
- to Bus EIB by provided cable. One end is equipped with a connector RJ45, the other end with a 2-pole connector Wieland.

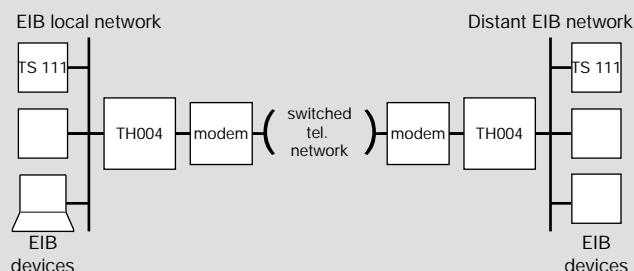
### Recommended modem to be used

- Hayes compatible ,
  - speed : 9600 Bds or more,
  - size of data : 8 + 1 stop bits.
- The TH 004 device pack includes :
- RS 232 Modem box,
  - device's power supply transformer,
  - device's fixing support,
  - 45cm long cable section for connection of RS232 modem to Bus EIB,
  - the Tebis application diskettes "Dialer" to be installed on PC,
  - one diskette including dialer's documentation

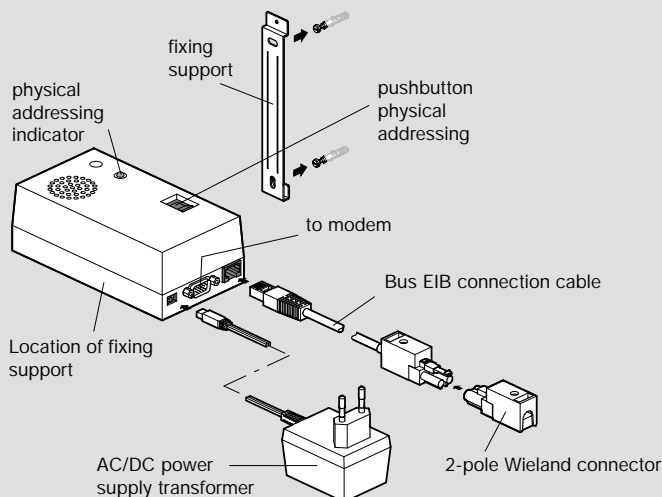
### Functional features

the device makes it possible to connect two distant EIB sites via the telephone network (each site must be equipped with a RS232 Modem and an associated modem, not provided in TH004 device pack).

### General diagram



### Product presentation



supply cable length = 2 m  
Bus connection cable length = 45 cm

### Size

Dimensions : L 146 x l 80 x h 54,8 mm

**Lighting scenario TK 015**

**Technical specifications**

**Power supply**

via Bus EIB 29 V ...

**Environment**

- operation temperature : 0 to +45 °C,
- storage temperature : -20 to +70 °C,
- ingress protection : IP 20.

**Connection**

To Bus by contact on printed circuit bottom of rail.

**Principle of operation**

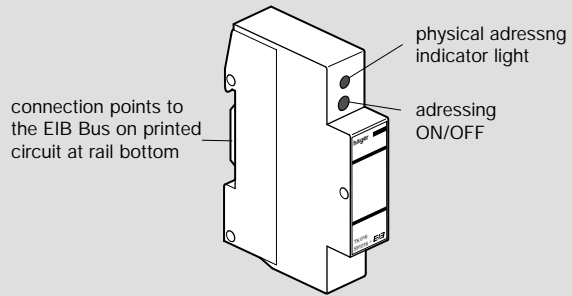
The device can store 4 standard lighting scenarios, each scenario controlling up to 8 groups of lights (a group is a set of lights operating always together).

Use the quadruple communication button to select one of four scenarios.

Depending on software used, 4 scenarios can be stored which define :

- the on/off state of each of the 8 lights groups
- the up/down state of each of the 8 groups of blinds or shutters
- the level of brightness for each of the 8 groups of lights
- the on/off state of each of 2 groups and the level of brightness for 4 groups of lights.

**Product presentation TK 015 and TK 016**



**Logical functions TK 016**

**Technical specifications**

**Power supply**

via Bus EIB 29 V ...

**Environment**

- operation temperature : 0 to +45 °C,
- storage temperature : -20 to +70 °C,
- ingress protection : IP 20.

**Functional features**

Can be used to create simple automatic controls with messages transmitted on EIB network.

Depending on software used, it is possible to set :

- a logical function AND and a logical function OR from 8 incoming messages
- a REVERSAL function for 4 incoming messages.

## Tebis TS : Description of the system

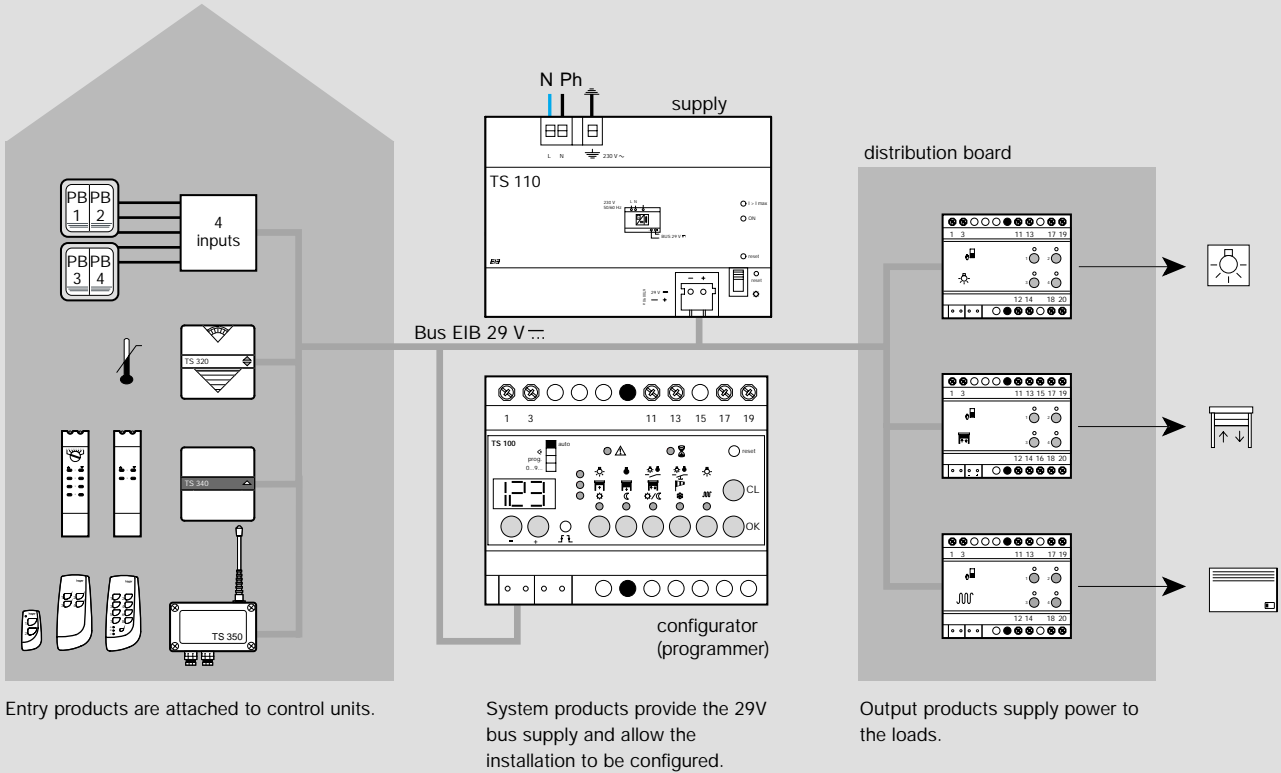
Tebis TS is a new installation system providing enhanced functionality for controlling lighting, shutters and heating.

Tebis TS offers simple solutions for complex and changing needs. The more demanding the user, the more evident the benefits. In a traditional installation, the functions are fixed once the cabling is finished. In the simplest installations, loads are directly connected to the control devices. As the users become more demanding, their needs change. Central or grouped controls are required, cabling and labour increase rapidly.

The method of wiring a Tebis TS installation is always identical, independent of the functions needed, which reduces the time for planning and installation.

Thus, with Tebis TS, any push button can deliver any command (on, off, up/down variation, as an individual, group, master or scenario command) to any installation load. These new possibilities simplify life for current and future occupants by freeing them from certain tasks while guaranteeing that the electrical installation has a high level of adaptation and development potential.

### How is a Tebis TS installation structured ?



#### Input products

Register the information coming from the control units (push button, switch, timer, etc). These orders are then carried via the bus cable to the output modules.

#### Output products

Interpret the information transmitted by the input products, convert them into action and power the connected loads. The output products are divided into three large families: lighting, shutters/blinds and heating.

#### System products

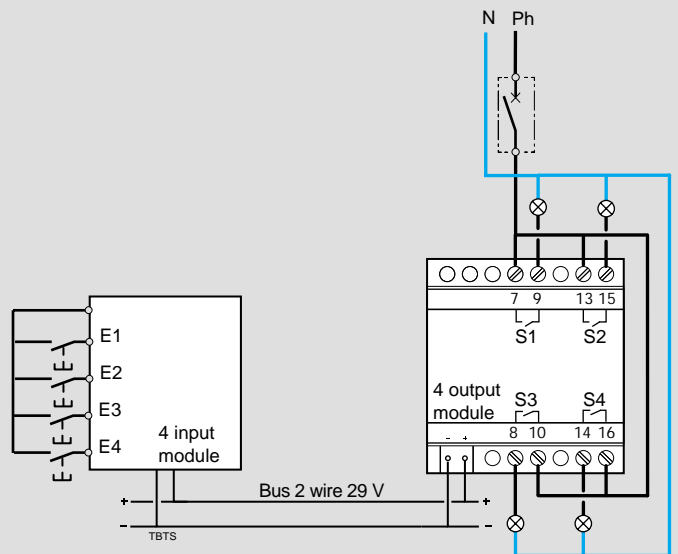
They are of two types:

- The power supply supplies the 29 V dc to power the bus.
- The configurator connects the input and output modules. In other words, it enables the operation of the installation.

#### Operating principle

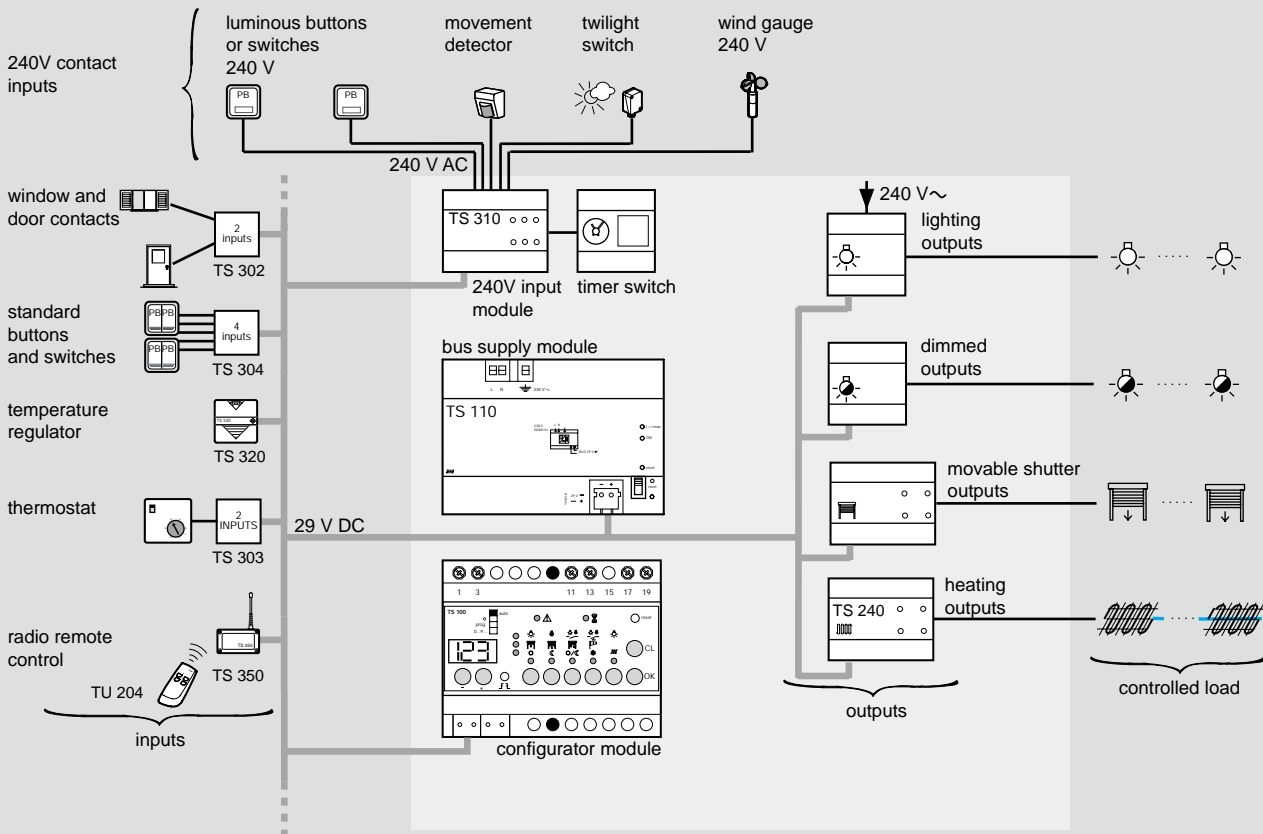
The Tebis TS installation differs from the traditional installation in that it separates control and power. The power circuit comprises the protection and the power supply to the electrical loads by means of the output modules. The control circuit (bus) joins all the input products and sends orders to the appropriate output contacts.

#### Electrical connection



The control circuit (bus) joins all the input modules together to which the control units and the output modules are attached. After wiring, simply program the installation according to the desired operation.

## The Tebis TS system



## Configuration principle

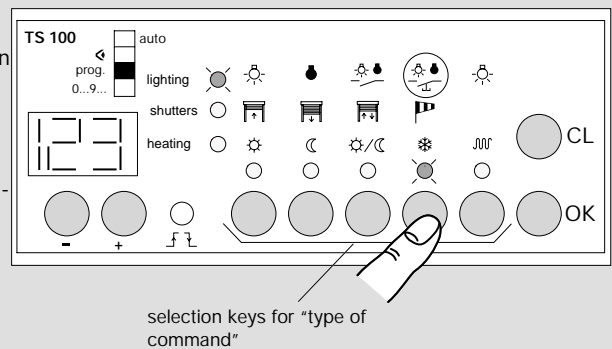
Configuration is concerned with associating each input with the outputs which are to be controlled as well as with the type of control. In other words, specifying the required action (on/off command, dimmer, up/down, etc.).

The choice of "type of control" is carried out directly on the configurator matrix. Using easily understandable symbols, the electrician can choose the essential functions in the three fields of application.

Whatever the functions may be, which are to be carried out, the configuration principle remains identical and is based on the creation of configuration links.

A configuration link connects an input to "n" outputs ( $n \geq 1$ ) by carrying a "type of control".

## Operation principle



selection keys for "type of command"

## Configuration

Is carried out at the end of the construction with the help of the TS 100 configurator. The TS 100 module is the only necessary programming tool required to carry out all the logical links which define the function of the installation.

The configuration takes place in 3 successive stages.

The mode selector of the configurator allows the passage from one stage to the other.

- |          |  |  |
|----------|--|--|
| auto     |  | The steps  |
| <        |  | - 0... 9... numbering of the inputs  |
| prog.    |  | - prog. programming of the links   |
| 0...9... |  | - auto downloading   |
|          |  | (the 4th position of the selector allows viewing of the established links) |

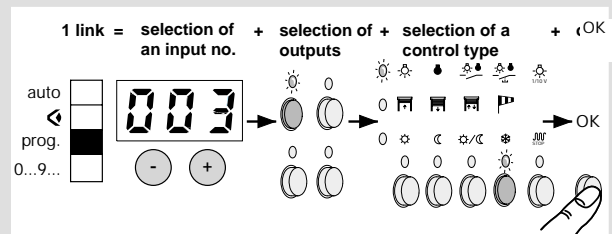
### 1. Numbering of the inputs

This operation gives a unique number to identify each input connected to the installation. Done by simply closing the input contacts once whilst in numbering mode

### 2. Programming the links

This involves creating all the configuration links (see the principle).

## Creation of a configuration link



The inputs and the types of control are selected on the configurator. The outputs are designated by the keys of the modules concerned.

### 3. Downloading of the program

When the selector is moved to Auto mode, the programming data is transferred to the different input and output products in the installation.

After downloading, the installation is operational. All the information is decentralised to each product. Each module is autonomous. The configurator simply facilitates subsequent program changes.

## Tebis TS : Switching functions







Tebis TS has been further enriched with version 8.0. The following functions are now available on any outputs:

- Priority commands (override), represented by the symbol "P" on the display
- Adjustable delay times from 1 sec to 12 hr represented by the symbol "t" on the display

- Dimming scenarios allow preset lighting levels to be called upon at the push of a button (dimmed loads only). Symbol "S"

The new functions are available on the configurator's display. Press the desired control function (☀️, 🔦) button for more than 3 seconds and the new functions appear.

### Applications, functions and product offers

Applications	Control units	Functions	Input products	Output products
Lighting		on, off, on/off, dimming delay time on or off scenario	TS 302 - TS 304 - TS 310 TS 350 - TS 351	TS 204(ON/OFF control) TS 210 - TS 211 - TS 210A - TS 204A - TS 204B TS 206A - TS 206B (dimmers)
		on, off priority on/off		
Shutters & blinds		up, down, stop delay time down*	TS 302 - TS 304 - TS 310 TS 350 - TG 050 - TS 351	TS 223 - TS 225 (shutters and canopy blinds) TS 224 - TS 226 (blinds with adjustable slats)
		up/down priority up/down wind safety		
Heating		comfort, minimum delay time comfort or minimum	TS 302 - TS 304 - TS 310 TS 350 - TS 351 TS 303 - TS 320	TS 244
		comfort/min, non-freeze stop, priority, comfort, min	TS 321 - TS 322 - TS 330	

The above functions can be integrated into the individual, group, master or scenario controls:

- The individual (local) control corresponds to : one or more inputs controlling a single output
- The group (zone) control corresponds to : one or more inputs controlling a group of outputs

- The master control corresponds to : one or more inputs controlling all the outputs






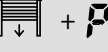
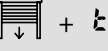
- The scenario function: this is a multi-action command which can act simultaneously on lighting, shutters and heating (see page 15).

### Tebis TS : Overview of the types control






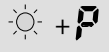
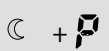
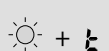
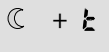
symbol on TS 100	type of control	input connected to
	<b>ON</b> A press of the button or closing of the contact always switches the assigned outputs ON	<b>Push Buttons</b> Switch contact (switch clock, twilight switch...)
	<b>OFF</b> A press of the button or closing of the contact always switches the assigned outputs OFF	<b>Push Buttons</b> Switch contact (switch clock, twilight switch...)
	<b>ON/OFF</b> Closing of the contact switches the assigned outputs ON. Opening of the contact switches the assigned outputs OFF	<b>Switch contacts</b> (switch clock, twilight switch...)
	<b>ON/OFF (remote switch control)</b> Each press of button changes the assigned output status ON/OFF , Assigned output is ON with one press of the button, OFF with next etc	<b>Push buttons</b> (tactile switches, remote controls...)
	<b>Dimming</b> A short press of the push button switches ON/OFF. A long press of the button dims <b>BRIGHTER/DARKER</b>	<b>Push buttons</b> (tactile switches, remote controls...)
	<b>Priority ON</b> Closing the contact switches the assigned outputs ON (remain ON whilst switch is closed). Opening contact assigns: OFF with inversion mode, remains ON if the hold mode is selected	<b>Switch contacts</b> (switch clock, twilight switch...)
	<b>Priority OFF</b> Closing the contact switches assigned outputs OFF (remain OFF whilst switch is closed). Opening contact assigns: ON with inversion mode, remains OFF if the hold mode is selected	<b>Switch contacts</b> (switch clock, twilight switch...)
	<b>Timer ON</b> A pressed button or closed contact always switches assigned output ON for time delay (1s to 12h) outputs switch OFF at end of time delay	<b>Push buttons</b> Switch contact (switch clock, twilight switch...)
	<b>Timer OFF</b> A pressed button or closed contact always switches assigned output OFF during time delay (1s to 12h) outputs switch ON at end of delay	<b>Push buttons</b> Switch contact (switch clock, twilight switch...)
	<b>Ambients</b> Press button or closed contacts restores preset levels on the assigned dimming outputs. Three different levels can be memorised	<b>Push Buttons</b> switch contact (switch clock, twilight switch...)

## Tebis TS : Switching functions

### Tebis TS : Overview of the types of control - Venetian blind or roller-shutter control

symbols on TS 100	type of control	input connected to
	<b>UP</b> A longer press of the push button or closing contact commands UP. Continues to the upper stop position until stopped. Short press stops movement. After stopping every short press adjusts the blade angle.	<b>Push Button</b> Switch control (switch clock, twilight switch, wind sensor...)
	<b>DOWN</b> A longer press of the push button or closing contact commands DOWN. Continues to the lower stop position until stopped. Short press stops movement. After stopping every short press adjusts the blade angle.	<b>Push Button</b> Switch control (switch clock, twilight switch, wind sensor...)
	<b>UP/DOWN</b> Closing contact commands DOWN (close). Open contact commands UP (open). Command will continue to stop position. Stopping movement is only possible through separate push buttons controlling UP or DOWN.	<b>Switch contacts</b> (switch clock, twilight switch...)
 *	<b>Wind Safety</b> Closing of the anemometer's contact commands UP to the upper stop position (security position). All controls are ignored until anemometer's contact opens	<b>Wind strength set TG 050</b>
	<b>Priority UP</b> Closing contacts commands UP. Remains UP whilst switch is closed. Opening contacts commands: DOWN in inversion mode, remains UP if hold mode is selected	<b>Switch</b>
	<b>Priority DOWN</b> Closing contacts commands DOWN. Remains DOWN whilst switch is closed. Opening contacts commands: UP in inversion mode, remains DOWN if hold mode is selected	<b>Switch</b>
	<b>Timer**</b> Press button or close contact commands UP to upper stop position. Preset time delay commands DOWN to stop position	<b>Switch</b>

### Tebis TS : Overview of the types of control - individual room temperature regulation

symbols on TS 100	type of control	input connected to
	<b>Day temperature</b> A press of the button or closing of the contact activates the day temperature	<b>Switch contacts</b> (switch clock, buttons)
	<b>Drop temperature</b> A press of the button or closing of the contact activates the drop temperature	<b>Switch contacts</b> (switch clock, buttons)
	<b>Day/Drop*</b> Temperature regulator: Short press of button for day/drop. Switch contact: closing contact activates day temperature, opening contact activates drop temperature	<b>Temperature regulator</b> Switch contact (switch clock..)
	<b>Frost protection*</b> Temperature regulator: Long press for frost protection. Next press returns to currently applicable state. Switch contact: closing contact activates frost protection. Opening contact returns to currently selected state	<b>Temperature regulator</b> Switch contact (window contact, switch clock...)
	<b>STOP*</b> Closing contact stops the heating, opening the contact re-activates the currently selected day, drop or frost protection temperature. This function has priority over the day, drop or frost protection temperature.	<b>Switch contacts</b> (switch clock, twilight switch...)
	<b>Priority Day Temperature</b> Closing contact activates day temperature and remains while switch is closed. Opening contact: changes to drop if inversion mode is selected, remains to day temperature if hold mode is selected	<b>Switch contacts</b> (switch clock, twilight switch..)
	<b>Priority Drop Temperature</b> Closing contact activates drop temperature and remains while switch is closed. Opening contact: changes to day if inversion mode is selected, remains to drop temperature if hold mode is selected	<b>Switch contacts</b> (switch clock, twilight switch..)
	<b>Timer Day Temperature</b> Press button or close contacts activates the day temperature during a time delay 1s to 12h. After time delay drop temperature is activated	<b>Push Button</b> Switch contact (switch clock, twilight switch..)
	<b>Timer Drop Temperature</b> Press button or close contacts activates the drop temperature during a time delay 1s to 12h. After time delay day temperature is activated	<b>Push Button</b> Switch contact (switch clock, twilight switch..)

\* The configuration unit TS 100 only allows one relationship with those type of control

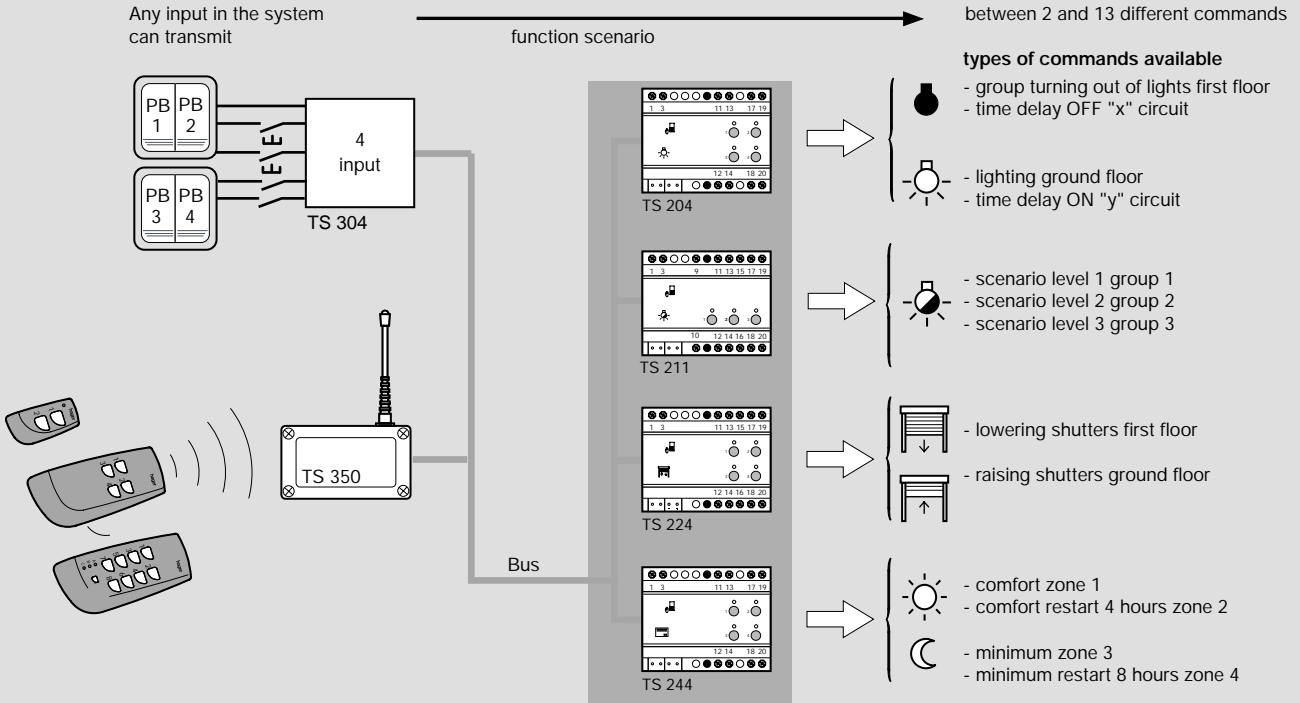
# Tebis TS : The scenario function

## The scenario function

The scenario function is a multi-action, multi-application command. It enables up to 13 different commands to be associated with any input in the system.

Example: in the evening it is dark and you are leaving your home. By pressing the PB at the front door, the garage door and/or the radio remote control, with one gesture you will be able to:

- Turn on the exterior lights on a timer
- Turn off all the lights in the house
- Turn on a controlled socket outlet to simulate your presence (radio and light)
- Lower all the shutters
- Switch all the heating to the minimum mode



## Advantages and application situations

The scenario function frees the user from small daily constraints each time s/he is obliged to carry out multiple and repetitive tasks. This is particularly the case for all small businesses. In the morning and evening it is necessary to operate the metal shutters, the lighting for the shop, the shop window, the storeroom and the shop sign, the power supply for the cash register, video cameras, etc. These successive operations can be replaced by a single command, thus eliminating any oversights.

In a Tebis TS installation, the scenario function can be allocated to any one of the system's inputs, including remote control. It enables the number of control points to be reduced and simplifies repetitive procedures; this increases the level of comfort for the user.

The diversity of activities in the service sector enables each user to imagine situations in his professional environment where he is called on to start up different technical equipment once or several times a day.

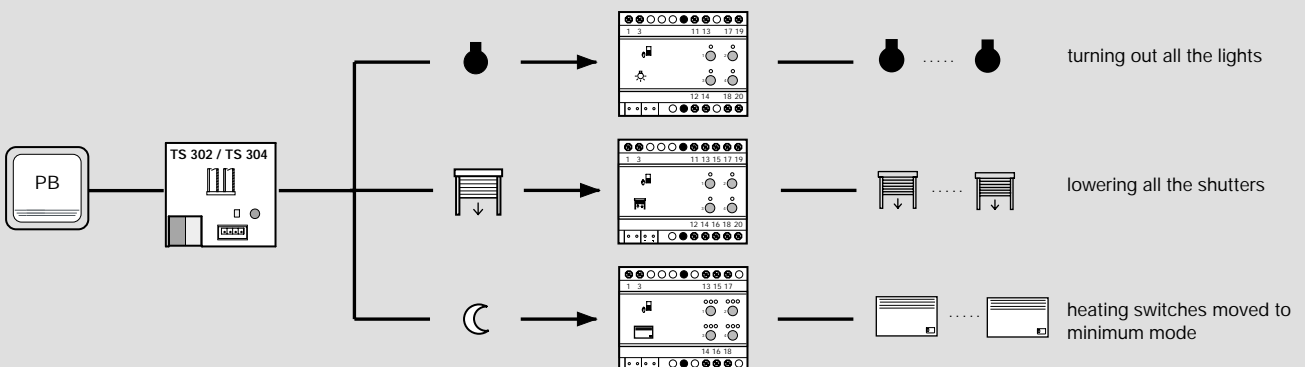
Examples in multi-purpose rooms: 1 PB per practical activity, occupancy scenario (non-occupancy of hotel room), projection scenario in a meeting room or classroom.

### Configuration

20 scenario functions are available per installation. The scenario functions exploit the "types of controls" corresponding to the first two columns in the configurator's matrix.

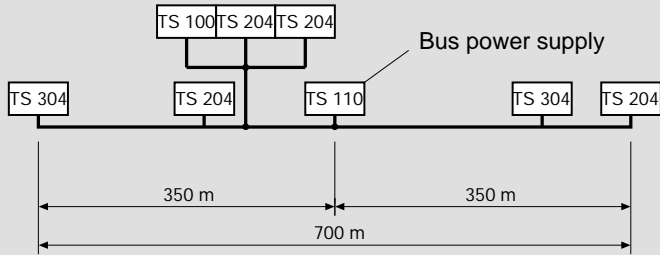
To program a scenario, you only need to ok the first configuration link by holding down the OK key > 2 secs. In these conditions the input number does not increment; this enables the association of several links to the one input. The final link of the scenario is recorded by pressing the key normally.

## "Leaving" scenario



**Tebis TS : technical data**

Maximum number of products per installation  
 - 64 products with a TS 111 power supply  
 - up to 128 products with a TS 110 power supply  
 Max. 300 input numbers  
 Total bus width : 1000m max.  
 Max. distance between the power supply and the TS products : 350m.



**Recommendations for implementing a TS installation**

1. Install the TS products in the base of the cabinet to avoid an excessively high operating temperature.
2. Connect all the input/output products to the 29 V bus.
3. Connect the electrical cables to the different outputs in the output modules.
4. Follow the configuration instructions for the system.

**Structure of the bus wiring**

It can be star-shaped, linear, tree or ring-shaped.

The EIB Y (ST) Y 2 x 2 x 0.8 (ref. TG 018, TG019) bus cable can be laid within immediate proximity of the low voltage network. However, you are advised to make provision for wall boxes which are separate or fitted with separating partitions for the bus cable connections and the LV cable connections. The EIB cable is insulated to 4 kV. (NFC 3209)

**Transmission technique**

EIB bifilary technique, metal-clad twisted pair.

Command information modulated symmetrically, superimposed on the system voltage of 29 V - (VLV), transmission of serial asynchronous data (time-division multiplex), CSMA/ CA access process, transmission speed 9600 BPS.

Immunity to interference in accordance with IEC and EIBA standards.

**Joints in the bus cable**

Where joints in the bus cable are required, we recommend (in order to minimise any conductor damage) the use of the EIB screwless terminal TG008 within a suitable junction box.

Cat.ref.	Page No.	Cat.ref.	Page No.
<b>E</b>		TJ 603	23
EK 083	18	TK 005	24
EK 086	18	TK 013	14
		TK 015	24
<b>G</b>		TK 016	24
G 4803	15	TK 022	21
		TK 023	21
<b>T</b>		TK 030	14
TA 004	10	TS 003	12
TA 006	10	TS 100	10
TB 004	11	TS 110	10
TB 030	11	TS 111	10
TB 042	13	TS 204C	13
TC 033	16	TS 206A	13
TC 122	16	TS 206B	13
TC 124	16	TS 206C	13
TC 900	17	TS 210	14
TC 903	17	TS 210A	14
TC 910	17	TS 224	15
TC 913	17	TS 225	15
TC 920	17	TS 302	11
TC 923	17	TS 304	11
TC 930	17	TS 310	11
TC 933	17	TS 350	12
TC 934	17	TS 351	12
TC 935	17	TS 400	13
TC 940	17	TU 202	12
TC 943	17	TU 204	12
TC 950	17	TU 209	12
TC 960	17		
TC 961	17		
TC 962	17		
TC 963	17		
TC 964	17		
TE 001	18		
TE 006	18		
TF 002	22		
TF 003	22		
TF 005	20		
TF 012	20		
TF 014	20		
TF 016	21		
TG 007	26		
TG 008	26		
TG 011	26		
TG 014	26		
TG 015	26		
TG 018	25		
TG 019	25		
TG 020	25		
TG 021	25		
TG 022	25		
TG 023	25		
TG 024	25		
TG 027	25		
TG 028	25		
TG 050	19		
TH 001	23		
TH 002	23		
TH 004	23		
TJ 100B	22		
TJ 102B	22		
TJ 104B	22		
TJ 110	22		
TJ 112	22		
TJ 114	22		
TJ 600	23		
TJ 601	23		
TJ 602	23		



The success is in the system

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