
CATALOG | 2018

Time, staircase lighting, twilight switches and thermostats

Solutions for comfort, energy saving
and simple automations



To control the activation of electrical loads in an installation, and consequently, improve their use and ensuring energy-efficient management, ABB offers a wide range of switches to control the electric utilities as needed to suit the requirements of a vast variety of applications.

Continual investments in research and development have made ABB a reference point as manufacturer of ground-breaking products that fully reflect the installation requirements of even the most demanding customers.

ABB's target is to supply the market with products that are pioneering as to design, energy efficiency, safety, functionality and environmental impact. High performance, the utmost reliability over time, silent operation and a compact design are amongst the principal characteristics featured by the AT electro-mechanical time switches, D Line and D 365 digital time switches, T Line twilight switches and TWA astronomical twilight switches, E 232 staircase lighting switches and THS modular thermostats.

ABB's System pro M compact® load management devices are thus the ideal solution for every requirement in the residential, services-providing and industrial sectors.

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AT electro-mechanical time switches

AT electro-mechanical time switches are especially needed in systems where the loads are operated with quite long intervals between ON and OFF, e.g. 15-30 minutes for the daily versions and 2 hours for the weekly ones.

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01 AT electro-mechanical time switch AT1e

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02 AT electro-mechanical time switch AT2

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03 AT electro-mechanical time switch AT2e-R

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04 AT electro-mechanical time switch AT72e

Analogue electro-mechanical time switches control circuit opening and closing, according to a daily or weekly time program. They are available in 1 (daily) or 2 (daily and weekly) modules. They can be operated according to a user-defined program or they can be set to a permanent ON or permanent OFF (only 2 modules devices) function.

The -R type are equipped with an internal battery, which enables them to maintain the programmed schedule in case of temporary power supply failures.

These switches are suitable for installation in residential and commercial buildings to control the lighting systems of shops, fountains and public gardens, schools or offices, heating and irrigation systems.



Main features

Compact solution: DIN-Rail version with 15 minutes minimum switching time in only 2 modules is the perfect solution to save space in your cabinet!

Safe and effective: DIN-Rail version in 2 modules offer the possibility to force in OFF the contact status of the loads during maintenance not losing the programming schedule.

Easy programming: In the DIN-Rail version in 2 modules, day and night can be easily identified thanks to the white and black colours on the frontal dial. Easy wiring thanks to the wiring diagrams printed on product case: no fear to lose the leaflet!

Reliable: R version equipped with a built-in battery, to keep the time switch synchronized and running even in case of a blackout or power down

Completeness of range: Available in daily and weekly version, with or without power reserve.

Other features of the range

- Daily and weekly versions (with and without running reserve) in a simple and compact design
- Minimum switching time:
 - 15' for AT1, AT1-R, AT2e and AT2e-R (daily versions)
 - 30' for AT2 and AT2-R (daily versions)
 - 210' for AT2-7R (weekly version)
 - 105' for AT2e-7R (weekly version)
- 150 hours running reserve for AT2 and AT2e ranges and 100 hours for AT1 family



How many modules do you need?

1 module is the right choice when you need to save space on the DIN rail, but the switching dial is not fully readable.

2 modules are ideal for a fully readable dial and thus an easier programming.

When you must to use the running reserve?

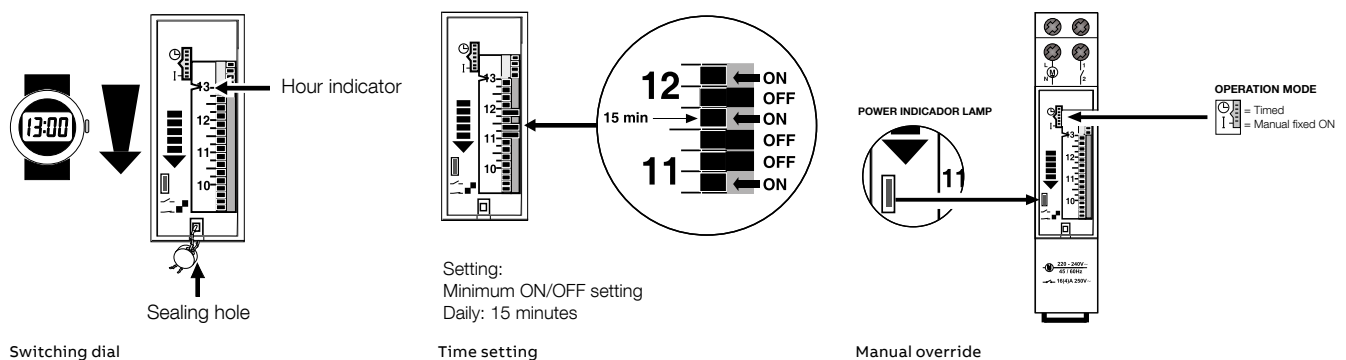
Always! The running reserve keeps the time switch synchronized even during blackouts. Time switch without running reserve is more economical, but it needs to be programmed again after a power failure. It is only suitable when the installation has an UPS.

AT electro-mechanical time switches

Technical specifications

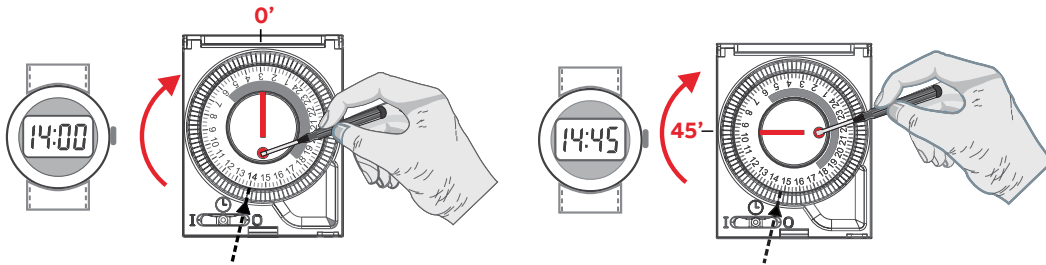
		AT1e	AT1e-R	AT2	AT2-R	AT2-7R	AT2e	AT2e-R	AT2e-7R
Rated voltage	V	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%
Contact type		1NO	1NO	1NO/NC	1NO/NC	1NO/NC	1NO/NC	1NO/NC	1NO/NC
Contact capacity: resistive load	A	16	16	16	16	16	16	16	16
Inductive load	A	4	4	4	4	4	4	4	4
Rated frequency	Hz	45-60	45-60	50-60	50-60	50-60	50-60	50-60	50-60
Time base		quartz	quartz	quartz	quartz	quartz	quartz	quartz	quartz
Setting step (tappet)	min	15	15	30	30	210	15	15	105
Number of tappets		96	96	48	48	48	96	96	96
Running reserve	h	-	100	-	150	150	-	150	150
Power consumption	VA	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Max switching power	W	3500	3500	3500	3500	3500	3500	3500	3500
Max terminal size for cable	mm ²	4	4	2.5	2.5	2.5	4	4	4
Tightening torque	Nm	0.8	0.8	0.5	0.5	0.5	0.5	0.5	0.5
Terminals		with captive screws	with captive screws	with captive screws	with captive screws	with captive screws	with captive screws	with captive screws	with captive screws
Mounting		on DIN rail	on DIN rail	on DIN rail	on DIN rail	on DIN rail	on DIN rail	on DIN rail	on DIN rail
Operating temperature	°C	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50
Storage temperature	°C	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50
Modules		1	1	2	2	2	2	2	2
Reference Standards		EN 60730-1; EN 60730-2-7	EN 60730-1; EN 60730-2-7	EN 60730-1; EN 60730-2-7	EN 60730-1; EN 60730-2-7	EN 60730-1; EN 60730-2-7	EN 60730-1; EN 60730-2-7	EN 60730-1; EN 60730-2-7	EN 60730-1; EN 60730-2-7

How to program AT1e - AT1e-R

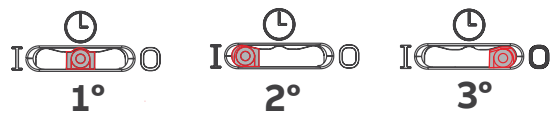
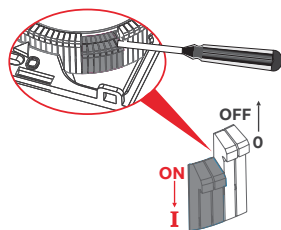
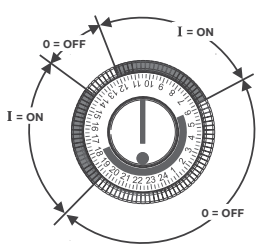


How to program AT2 - AT2-R - AT2-7R and AT2e AT2e-R AT2e-7R

Time setting



Programming



- 1° - ⌚ Time (ON/OFF)
- 2° - I For ON
- 3° - O For OFF

Manual mode

Operating principle

The AT electro-mechanical time switches enable to control the circuit opening/closing according to a daily or weekly program or to manually set permanent ON/OFF operation.

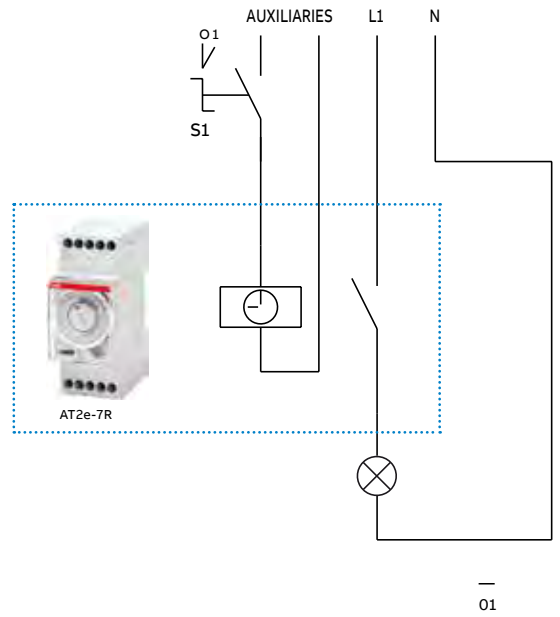
Application environments

The AT electro-mechanical time switches are particularly indicated in any environment and situation where it is necessary to program system load operation according to a daily or weekly frequency (shop lighting system, public buildings, heating systems, irrigation systems, etc.).

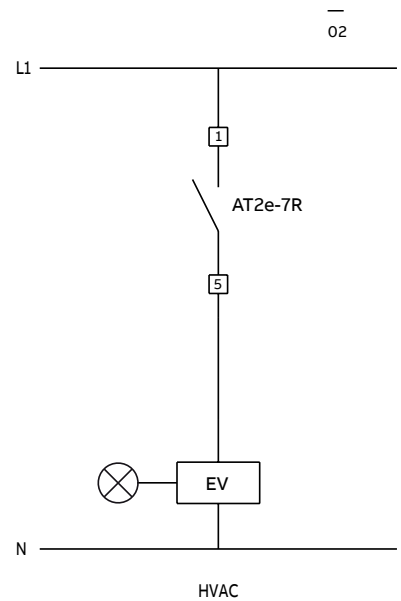
Installation example

As shown in the below picture possible applications to use the AT2e-7R electro-mechanical time switch are as a comfortable and reliable solution to control lighting, heating or ventilation systems in commercial and residential applications. In the diagram on the right hand side a specific application for heating and ventilation application is showed.

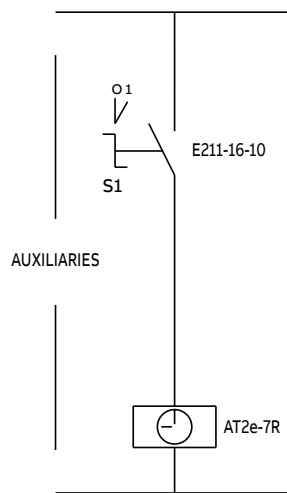
- 01 Operating principle of AT electro-mechanical time switches
- 02 Installation example of AT electro-mechanical time switches



— 01



— 02





AT72e electro-mechanical time switches for panel mounting

AT72e electro-mechanical time switches are especially needed in systems where a DIN rail installation is not available or convenient. Thanks to the accessibility of the dial on the front, AT72e time switches ensure precise programming for a maximum of safety and reliability.

The electro-mechanical time switches are available in a daily and weekly versions. They are also equipped with an auxiliary ON-OFF switch to force contact position during installation and maintenance.

The -R type version is equipped with an internal battery, so the individual programmed schedule is followed even in case of lengthy power outages. These switches are a flexible and comfortable solution to control pumps, motors, machinery, lighting and watering circuits. Furthermore, both wall and panel mounting is possible.

When you must to use the running reserve?

Always! The running reserve keeps the time switch synchronized even during blackouts. Time switch without running reserve is more economical, but it needs to be programmed again after a power failure. It is only suitable when the installation has an UPS.



Main features

- DIN rail, flush, wall or panel mount
- Accurate and readable indication of the time
- Removable base with plug-in terminals for quick and easy replacement
- RoHS compliant

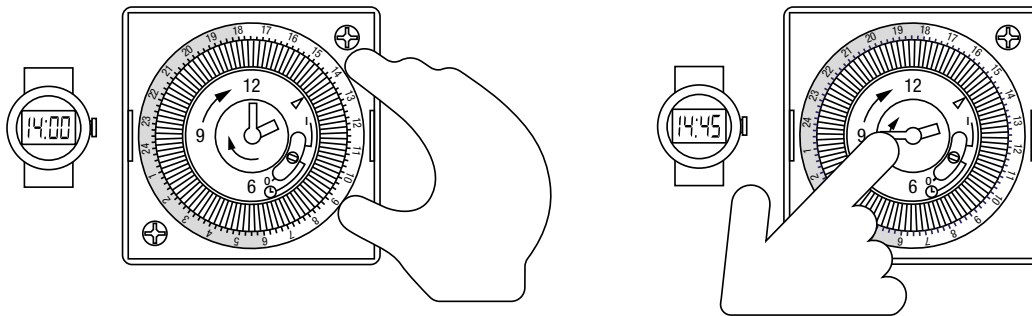
Other features of the range

- Overall dimensions of 72x72 mm
- Daily and weekly versions with and without reserve (72 hours of running reserve)
- Minimum switching time:
 - 15' for AT72e, ATP-R (daily versions)
 - 120' for ATP-7R (weekly version)

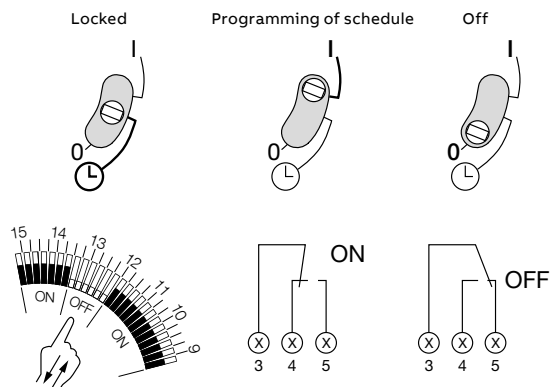
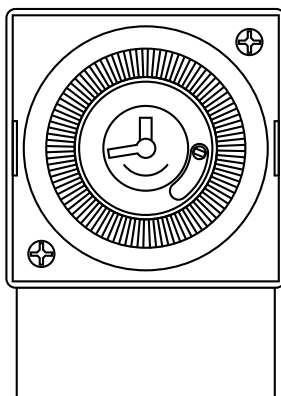
Technical specifications

AT72e, AT72e-R, AT72e-7R		
Rated voltage	V	230 AC ± 10%
Contact type		1NO/NC
Switching capacity		
- ohmic loads	A	16
- inductive loads	A	2
Rated frequency	Hz	50-60
Time base		quartz
Setting step (tappet)	min	15 (daily), 120 (weekly)
Number of tappets		96 (daily), 84 (weekly)
Power reserve	h	72
Power loss	VA	0.9
Max commutable power	W	3500
Max cross-section of terminal wire	mm ²	4
Tightening torque	Nm	0.8
Installation type		wall/panel
Protection degree		IP30
Operating temperature	°C	-10...+50
Storage temperature	°C	-10...+50
Standards		EN 60730-1; EN 60730-2-7

How to program AT72 - AT72-R - AT72-7R



Time setting



Programming of schedule

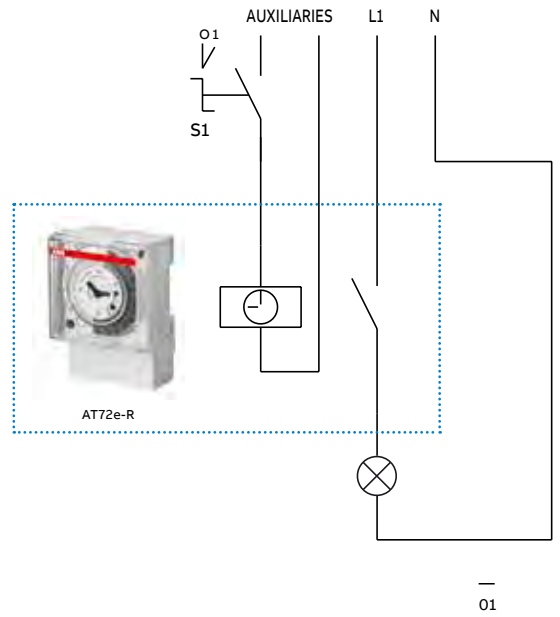
Operating principle

The AT72e electro-mechanical time switches enable to control the circuit opening/closing according to a daily or weekly program or to manually set permanent ON/OFF operation.

Application environments

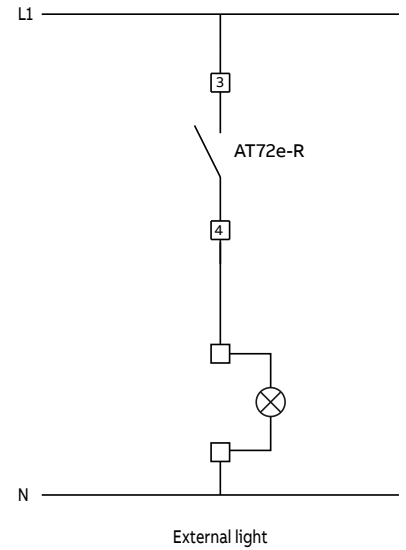
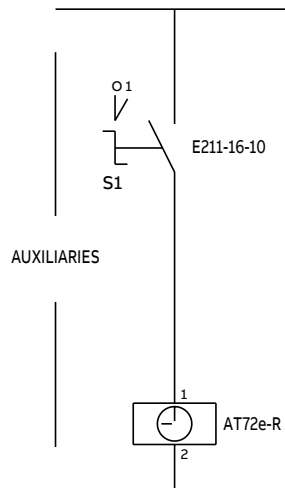
As shown in the diagrams on the side and on below picture, one of the possible applications is to control light both in residential and commercial buildings or small industries.

Another application example as showed in the picture is to use the AT72e-7R electro-mechanical time switch to control the irrigation system of gardens: the device can be indeed programmed to enable the daily activation of the irrigation pump at a pre-defined time.



Installation example

The AT72 electro-mechanical time switches are particularly suitable for any environment where a programmed system load operation is necessary according to a daily or weekly frequency (shop lighting system, public buildings, heating systems, irrigation systems, etc).



- 01 Operating principle of AT electro-mechanical time switches for panel mounting
- 02 Installation example of AT electro-mechanical time switches for panel mounting



D Line digital time switches

D Line is ABB's range of digital time switches. An exclusive design, featuring a backlit white LCD display, plus extremely easy use with two lines of text menu and just four pushbuttons, make the D Line products ideal for automating the functions of the installation.

Thanks to the pioneering way in which vacation periods can be managed, the new D Line allows you to override the normal weekly program for one or more periods of the year or even through different years.

The range includes versions with 1 and 2 channels, equipped with large capacity internal batteries so they are able to function during a blackout and an EEPROM permanent data store, to ensure that the scheduled program is followed and the date and hour settings are maintained even during a power failure.

The "PLUS" versions can copy one or more programs and transfer them to different devices by means of a flash drive, without wasting time and avoiding re-programming errors.

The "SYNCHRO" versions can be combined with the D DCF antenna, allowing the circuit-breaker to be automatically synchronized with the DCF77 Frankfurt timing signal, or with the D GPS antenna, which synchronizes with the signal received by the Global Positioning System and provides a more precise solution than the terrestrial transmissions. These versions are required when one or more circuit-breakers need to be kept synchronized, even when installed in unattended areas.



Operating principle

- Management of vacation periods, which can be programmed at different times of the year
- Multilanguage menu, with a choice of 11 different languages
- Zero cross switching, for a longer lasting relay and the actual load itself
- LCD display with high-level contrast, providing optimum visibility in all conditions thanks to timed backlighting
- 1 second minimum switching time
- Product warranty management: the internal clock and battery activate when the time switch is first installed
- Monitored maintenance for the connected equipment: the count-down function transmits an alert to the display after a preset number of operating hours

Available accessories

- DCF77 antenna
- GPS antenna
- Programming key
- - Programming software and USB interface

Range specifications

- Vast choice of programs: standard, cyclic, random and vacation
- Permanent or temporary override function, activated with a single touch
- Programming via menus with 4 simple keys
- The status of each contact is clearly displayed
- Full graphic display of the switching sequence established by the program for each of the channels of the day in question
- Generously sized 34 mm LCD display
- External inputs for connecting one or more remote controls, e.g.: circuit-breakers or push-buttons
- 64 memory locations
- Accuracy of ± 0.5 seconds/day
- Automatic summer/winter time switch-over
- 6 years running reserve (lithium battery)
- Sealable and loss-proof cover to prevent unauthorised access



Why are the new D Line time switches supplied without a preset date and time?

Unlike the models already preset in the factory, the D Line battery does not discharge as it maintains the settings during a long storage period. This allows the customer to benefit from full battery life, as the battery begins to operate when the keypad is pressed for the first time.

What does zero cross switching mean?

The device is able to monitor the network sinusoid and to switch the load at the exact instant in which the voltage is annulled. This allows extremely high maximum loads to be obtained while ensuring that both the relay and the load itself are longer lasting.

D Line digital time switches

The special functions of the new range

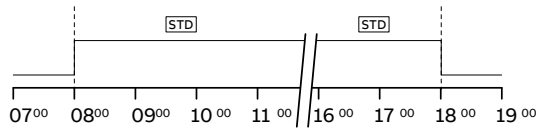
Standard program

The standard function allows one or more series of opening and closing operations to be performed so as to control loads such as the lighting and heating systems in a school.

The ON time and the OFF time can differ in an independent way in both channels (lighting ON from MON to FRI from 08:00 hrs to 18:00 hrs and heating ON from MON to FRI from 07:00 hrs to 10:00 hrs).

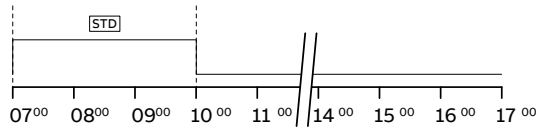
Lighting system in a school

In the example, the school's lighting system is ON from 08:00 hrs until 18:00 hrs.



Heating system in a school

In the example, the school's heating system is on from 07:00 hrs until 10:00 hrs.

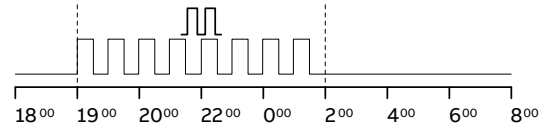


Cyclic program

The cyclic function allows a series of impulses or a timing cycle to be performed so as to control loads such as an illuminated sign or the school bells. The ON time and the OFF time can vary from 1 second to 23 hours, 59 minutes and 59 seconds.

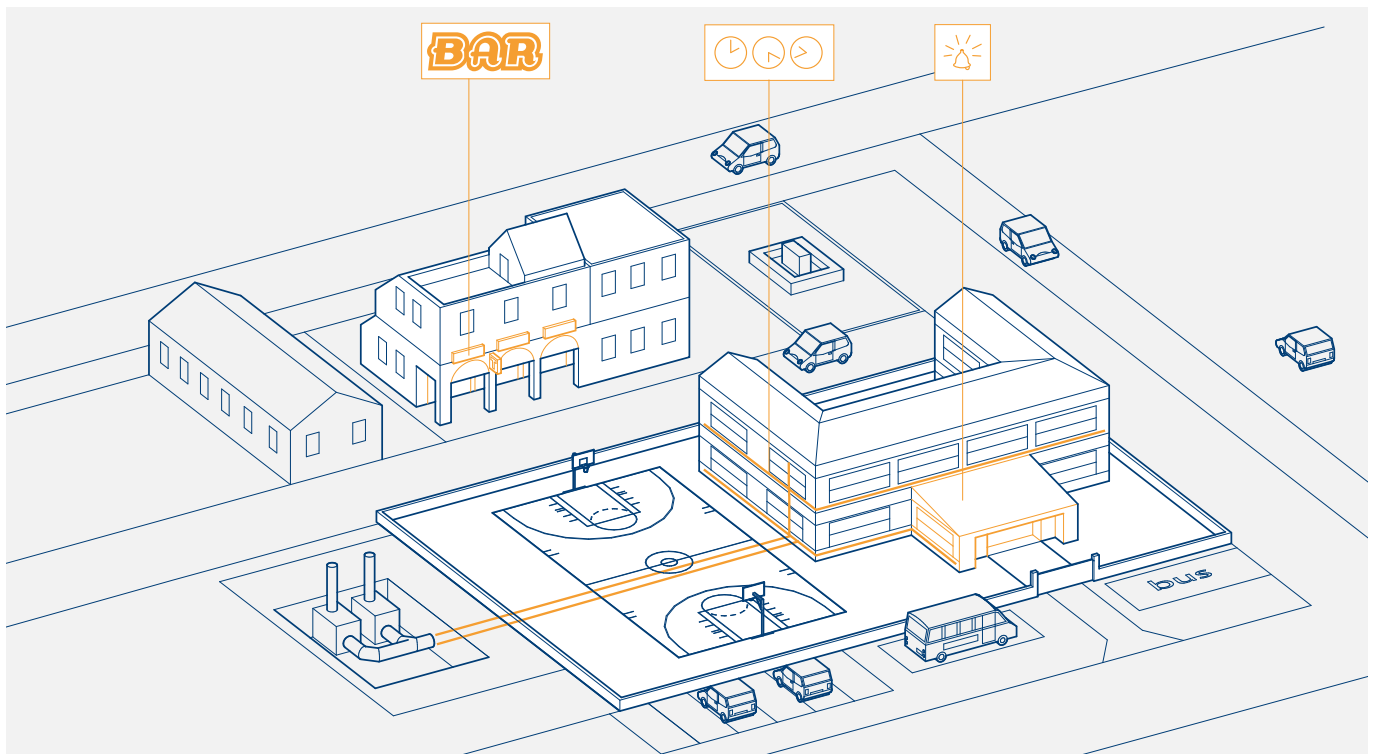
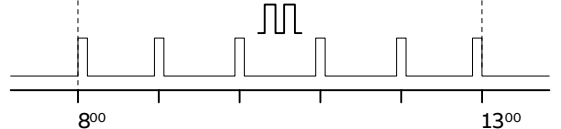
Illuminated sign

In the example, the illuminated sign comes on at 19:00 hrs and generates a series of impulses lasting for 10 seconds ON and OFF, until 02:00 hrs in the morning.



School bell

In the example, the school bell rings for 3 seconds every 50 minutes, from 08:00 hrs until 13:00 hrs.



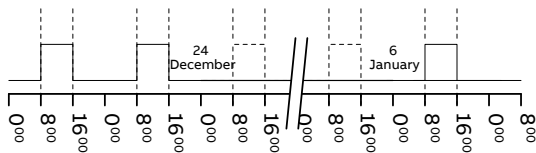
Vacation program

The vacation program allows the normal programs to be halted for an established period. This is very useful during the vacation period.

The vacation program can also manage periods spanning different years, such as the period from Christmas to Epiphany.

Heating system in an office

The example shows that the office heating system was turned OFF from 16:00 hrs on 24 december 2009 for the Christmas holiday period and ON again at 08:00 hrs on 6 January 2010 when the office opened again.

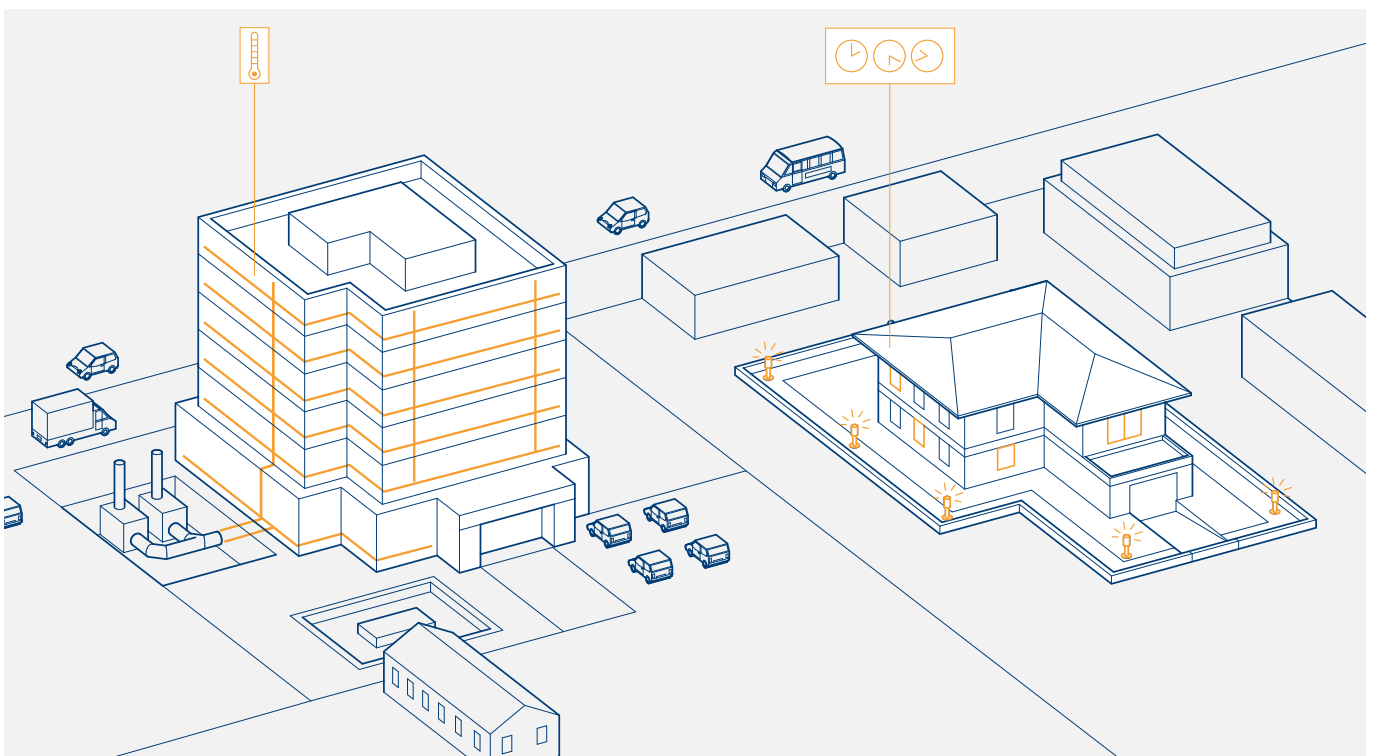
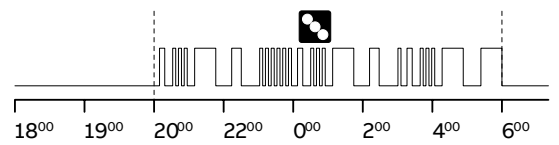


Random program

The random program allows you to turn the utility ON and OFF in the random mode, so as to simulate the presence of persons in unmanned places, for example.

Villa

The example shows how the random program simulates the presence of persons in a villa during the evening hours.



D Line digital time switches Accessories for Plus and Synchro

D KEY

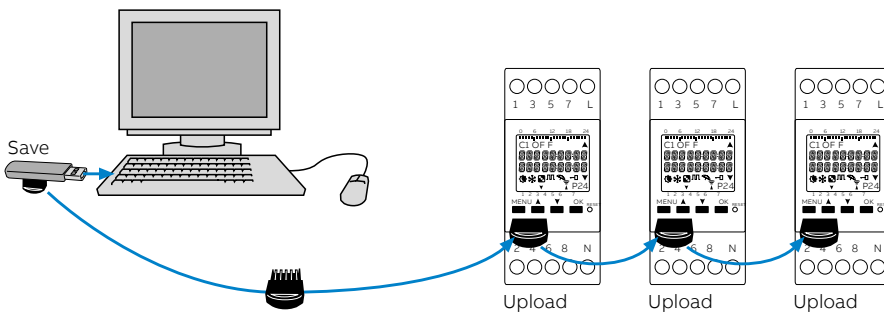
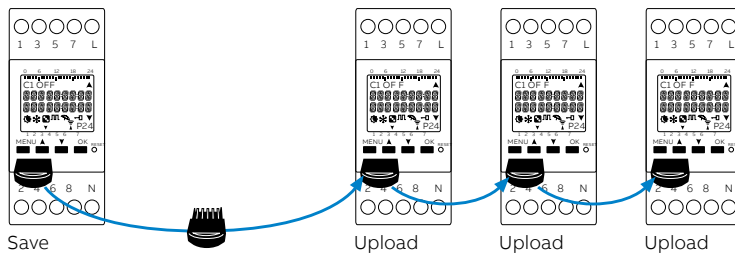
D KEY programming key for executing programs recorded in the key, transferring programs from the time switch to the key and vice versa, and for reading the programs in the key.

D SW software

You can program the D Line digital time switches from your PC thanks to D SW software, which allows you to work through the programming steps in a quick and simple way while comfortably seated at your desk.

This is because the program can be transferred to the programming key and then copied into several devices without the risk of re-programming errors.

Once created, the program can be saved in a file in the PDF format, ready to be printed and stored inside the switchboard.



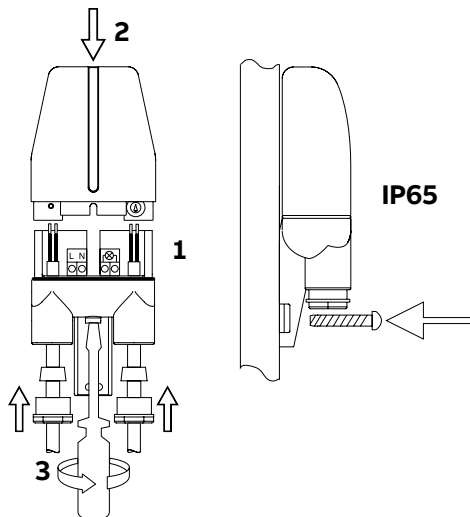
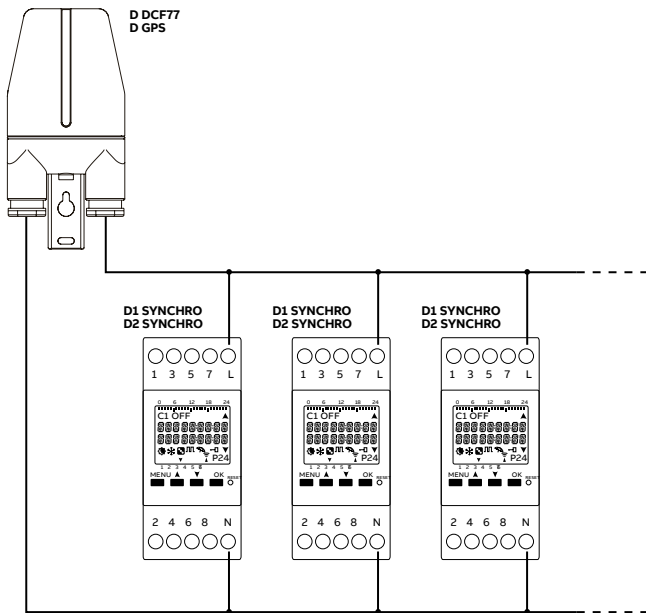
The programming key allows you to execute a program in the EMD external memory in the automatic mode, save the programs in the time switch or ones that have been created with the D SW programming software in the D KEY flash drive and then work through the procedures in reverse. The vacation programs can also be uploaded and downloaded to and from the D KEY.

D DCF77 antenna

This antenna receives the hourly texts transmitted by the DCF77 emitter situated in Mainflingen, Germany, in the Frankfurt region. The programmers are automatically positioned on the time, date and on the exact summer or winter time-frame. The antenna allows up to 10 programmers in series to be maintained in the synchronized state. The power of the emitter of Frankfurt am Main is 50 kW and its range is about 2,500 km. The signal is sometimes received in a discontinuous way and not all places could be covered owing to dead zones created by the territory, especially in countries that are fairly far from the emitter. Italy is fully covered. The reception is optimal when the marked antenna face is pointed towards Frankfurt.

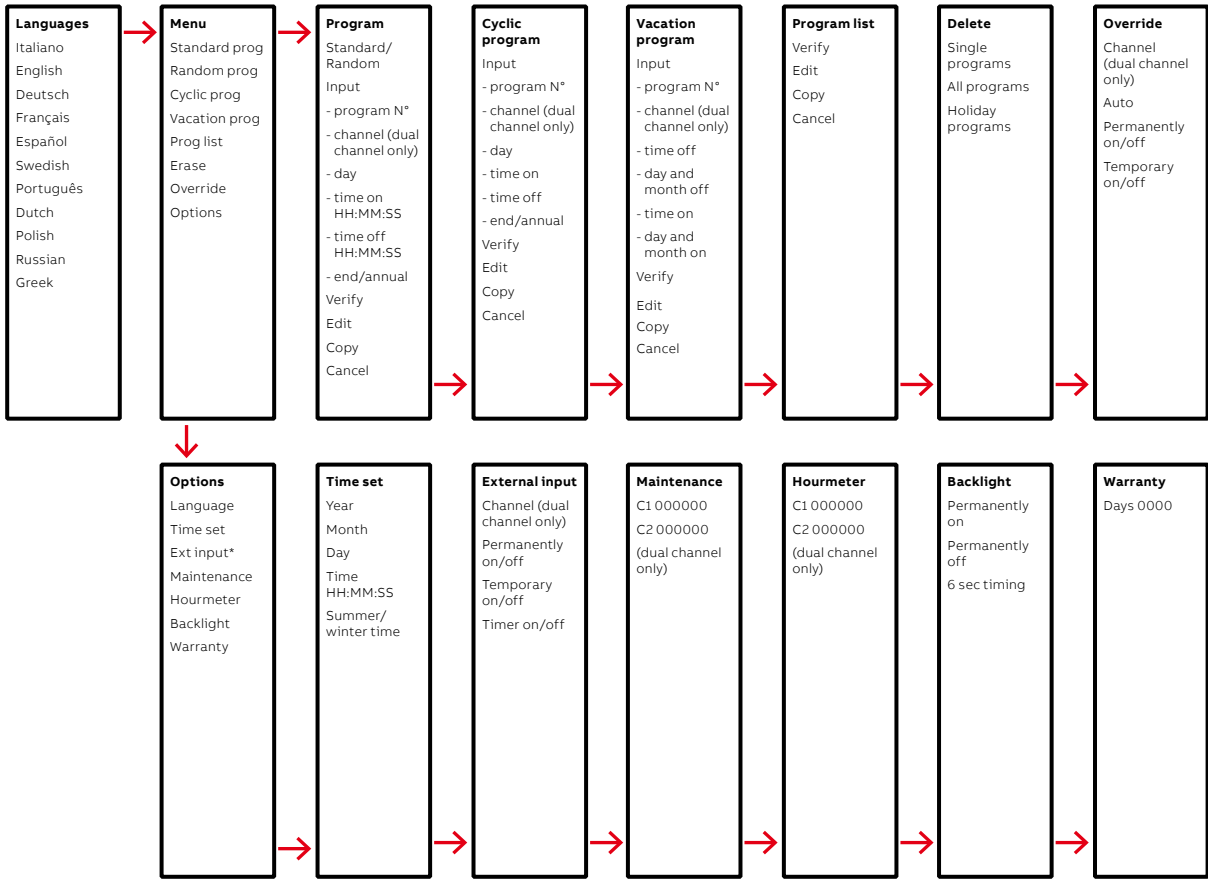
D GPS antenna

The D GPS antenna provides an accurate localization and time information in all weather conditions, both day and night in any part of the world, since the time is obtained from several sources at the same time, thus allowing the clock to compensate for delays. The synchronization received from the Global Positioning system provides a more accurate value than the terrestrial transmissions. The GPS system combines the time supplied by various atomic clocks installed on board the satellites of the system with the time given by a network of terrestrial stations and corrects the errors.

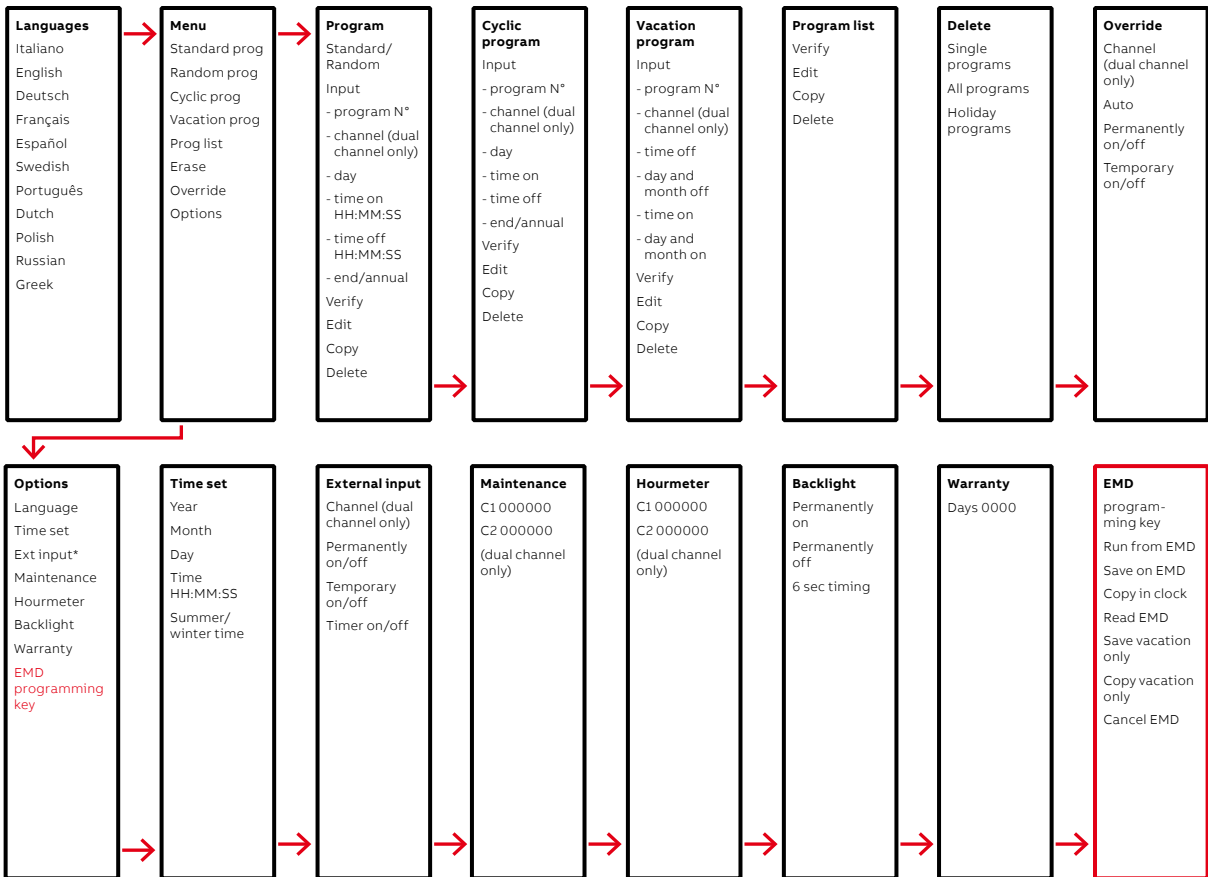


Up to 10 programmers can be piloted with the D DCF77 and D GPS antennas. The polarity is of no importance for the first programmer connected, unlike the following ones, which must comply with the polarity dictated by the first.

Programming menu without programming key

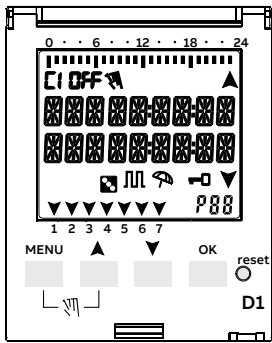


Programming menu with programming key

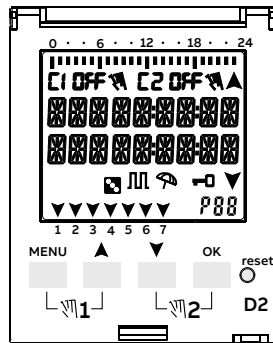


D Line digital time switches

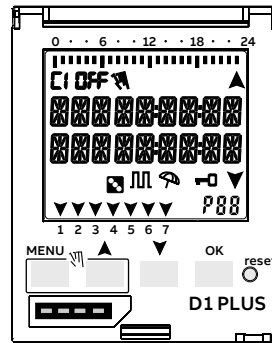
Display and function keys



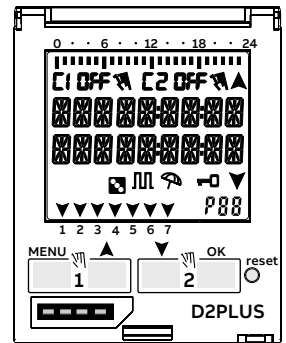
D1



D2



D1 PLUS,
D1 SYNCHRO



D2 PLUS,
D2 SYNCHRO

Display

	Channel 1/ Channel 2		OFF / Channel off
	Manual channel override		ON / Channel on
	Random program		Cyclic programs
	Vacation program		Keypad locked
	Indication of GPS or DCF77 signal reception		Browse up
	Selected program N° P01-P64		Browse down

Function keys

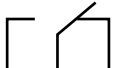
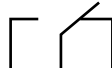
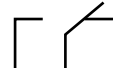
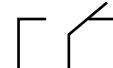
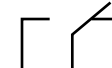

	Allows you to access the main menu (from the initial page)
	Allows you to quit any setting
	Scrolls up a list
	Increases a numerical value or changes a parameter
	Press key and hold and the status display of channel 1 will remain fixed until the key is released (in the normal operating mode)
	Scrolls down a list
	Decreases a numerical value or changes a parameter
	Press key and hold and the status display of channel 2 (dual channel models) will remain fixed until the key is released (in the normal operating mode)
	Confirms the proposed setting
	Resets the device (NOTE: The programs and settings entered from the outside will not be cancelled)

Key combination functions

Lock/release keys	
	2 seconds
Temporary manual override for channels 1 and 2. Press alternately to switch from TEMP ON to TEMP OFF	
Permanent manual override for channels 1 and 2. Press for 2 seconds to access the PERM mode and press alternately to switch from PERM ON to PERM OFF	
Returns to the AUTO mode (if any manual override has been activated)	

D Line digital time switches




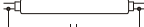

Technical specifications

		D1	D1 PLUS	D1 SYNCHRO	D2	D2 PLUS	D2 SYNCHRO
Rated voltage	V	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%	230 AC ± 10%
Rated pulse voltage		4	4	4	4	4	4
Contact type		Contact relay in free exchange from potential	Contact relay in free exchange from potential	Contact relay in free exchange from potential	Contact relay in free exchange from potential	Contact relay in free exchange from potential	Contact relay in free exchange from potential
Programming key			n	n		n	n
External input			n			n	
DCF77 antenna				n			n
GPS antenna				n			n
Programming software			n	n		n	n
250 V~ contact capacity							
Resistive loads	A	16 16	16 16	16 16	16 16	16 16	16 16
Inductive loads	A	10 2	10 2	10 2	10 2	10 2	10 2
Rated frequency	Hz	50-60	50-60	50-60	50-60	50-60	50-60
Time base		quartz	quartz	quartz	quartz	quartz	quartz
Minimum switching time	sec.	1	1	1	1	1	1
Max programs per cycle	n°	"64 (can be coupled into day blocks)"	"64 (can be coupled into day blocks)"	"64 (can be coupled into day blocks)"	"64 (can be coupled into day blocks)"	"64 (can be coupled into day blocks)"	"64 (can be coupled into day blocks)"
Running reserve	years	"6 from first start-up (lithium battery)"	"6 from first start-up (lithium battery)"	"6 from first start-up (lithium battery)"	"6 from first start-up (lithium battery)"	"6 from first start-up (lithium battery)"	"6 from first start-up (lithium battery)"
External input	n°	1	1	-	2	2	-
Activity suspension		"from 1 day to 12 months"	"from 1 day to 12 months"	"from 1 day to 12 months"	"from 1 day to 12 months"	"from 1 day to 12 months"	"from 1 day to 12 months"
Accuracy	sec./day	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5
Max power consumption	VA	6.5	6.5	6.5	7.8	7.8	7.8
Max switching power	VA	3500	3500	3500	3500	3500	3500
Incandescent lamp	W	3000	3000	3000	3000	3000	3000
Non-rephased fluorescent tube lamp	W	1100	1100	1100	1100	1100	1100
Fluorescent tube lamp rephased in parallel	W	900	900	900	900	900	900
Fluorescent tube lamp with electronic reactor	W	"7 ÷ 23 (max. 23 lamp.)"	"7 ÷ 23 (max. 23 lamp.)"	"7 ÷ 23 (max. 23 lamp.)"	"7 ÷ 23 (max. 23 lamp.)"	"7 ÷ 23 (max. 23 lamp.)"	"7 ÷ 23 (max. 23 lamp.)"
Fluorescent tube lamp rephased in series	W	1100	1100	1100	1100	1100	1100
Protection degree	IP	20	20	20	20	20	20
Max terminal section	mm ²	6	6	6	6	6	6
Terminals		"positive safety loss-proof screws"	"positive safety loss-proof screws"	"positive safety loss-proof screws"	"positive safety loss-proof screws"	"positive safety loss-proof screws"	"positive safety loss-proof screws"
Tightening torque	Nm	0.5	0.5	0.5	0.5	0.5	0.5
Installation type		DIN rail	DIN rail	DIN rail	DIN rail	DIN rail	DIN rail
Operating temperature	°C	-5 ... +55	-5 ... +55	-5 ... +55	-5 ... +55	-5 ... +55	-5 ... +55
Storage temperature	°C	-10 ... +65	-10 ... +65	-10 ... +65	-10 ... +65	-10 ... +65	-10 ... +65
Modules	n°	2	2	2	2	2	2

	D DCF77	D GPS
Rated voltage	230 AC \pm 20%	230 AC \pm 20%
Rated frequency	50/60	50/60
Power consumption	0.1	2
Operating temperature	-10...+70	-10...+40
Storage temperature	-30...+90	-40...+85
Power consumption	9.2	2
Time of the signal	1 transm./ min.	min. 30 transm./hour; max. 50 transm./hour
Protection degree	65	65
Max. number of connected devices	10	10
Max. wiring length	1000	1000
Terminal section	0.5...2.5	0.5...2.5
Installation	pole/wall	pole/wall

Maximum pilotable power

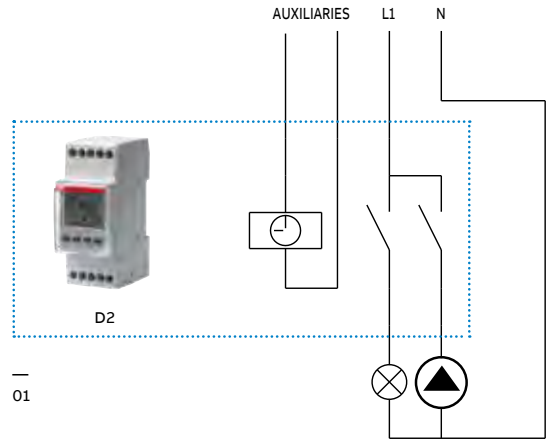
Models D1 - D1 PLUS - D1 SYNCHRO - D2 - D2 PLUS - D2 SYNCHRO

				
3000 W	3000 W	1100 W	900 W (125 μ F)	7 W \div 23 W (max. 23 lamp.)

- 01 Operating principle of D Line digital time switches
- 02 Installation example of D Line digital time switches

Operating principle

The D2 two-channel digital time switches enable to open and close circuits according to a daily or weekly program, controlling single loads or group of loads even when they require different time controls with a common time reference. In this example, the digital time switch D2 allows the operation of heating as well as lighting systems of a church when services are performed; when no service is performed, the device only controls the heating system.



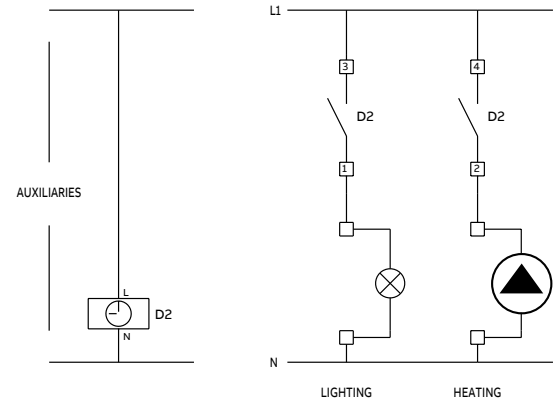
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Application environments

The D2 two-channel digital time switches are particularly indicated in environments and situations requiring the management of multiple loads according to a time program flexible enough to include or exclude their application based on the day of the week (offices, schools, public areas, etc.).

Installation example

As shown in the diagrams, one of the possible applications is to install the D2 two-channel digital time switch inside the power supply circuit of a church, where in the days when no service is performed only the heating system is activated (programmed ON one of the two channels) at a preset time, while on Sundays and when services are performed the lighting system is also switched ON (through a program on the second channel). According to the controlled system power, the activation is performed by an ESB contactor.



— 02





E 232 staircase lighting time-delay switches with switch-off warning

ABB's E 232 staircase lighting switches comprise electro-mechanical and electronic versions, with 3 or 4-wire wiring. These devices are ideal for timed management of lights in passageways (corridors, staircases, entrances, etc.).

Staircase lighting time-delay switches are generally controlled by pushbuttons equipped with glow lamps. Designed for a glow lamp current up to 150 mA, they can be used in buildings with several floors.

The E 232 staircase lighting switch is equipped with an electro-mechanical timer with a synchronous motor drive that guarantees highly reliable operation in whatever position it is installed.

The switch-off time can be regulated from 1 to 7 minutes at intervals of 15 seconds and is resettable after 30 seconds.

The E 232E staircase lighting switch has an electronic timing function. The most important features of the device are: a high switching capacity; 150 mA filament lamp current parallel to the pushbuttons; switch-off time adjustable from 0.5 to 20 minutes; simple use; the new, extremely silent, precise and reliable electronic motor. The electronics allow the device to automatically recognize 3-wire systems from 4-wire ones without the need for manual settings.

E 232E-8/230 devices feature an additional, separate control input with an universal voltage of 8 to 230 V AC/DC.

The "Multi 10" versions also feature the integrated alarm function (2 flashing alarm signals) in accordance with DIN 18015-2 standards and a rotary selector on the front with 10 functions to choose from, divided into 4 types: timed relay mode, latching relay mode, timed latching relay mode and permanently on mode.



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01 The additional switch-off warning can be added to the main modes of the Multi 10 versions

Technical specifications

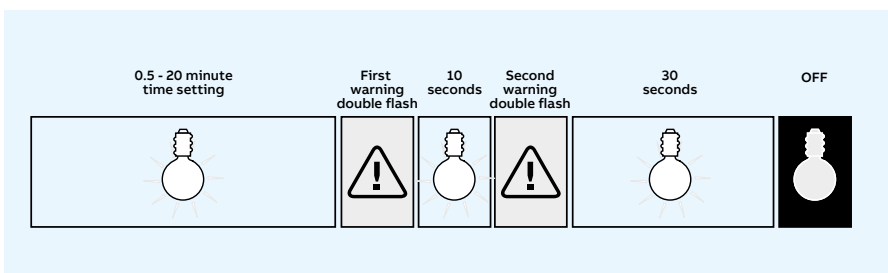
- Silent: thanks to the new electronic relay
- Practical: automatically recognizes 3 or 4-wire systems
- Powerful: switching capacity up to 3,600 VA lamp load thanks to the pioneering type of switching mode, and powers up to 150 mA glow lamp current of lighten pushbuttons thanks to the pioneering type of switchin mode, and powers up to 150 mA of lighted pushbuttons
- Flexible: 0.5 to 20 minute adjustable switch-off time
- Versatile: 8 to 230 V multivoltage auxiliary input

Further advantages of the new Multi 10 version




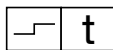

- Universal: four different functions, for every requirement
- Programmable: ten different operating modes
- Complete: with integrated switch-off warning



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01



This function prevents the staircase light from switching off and leaving the user suddenly in the dark, when he's halfway up the stairs. The function is displayed by a double flash of the lights, in accordance with DIN 18015-2 standards and is compatible with halogen or filament lamps.

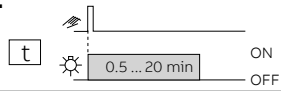
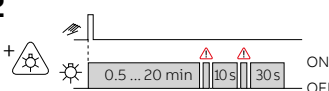
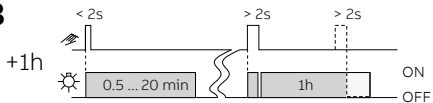
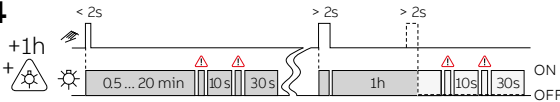
		Timed relay mode (positions 1 to 4)	
		Latching relay mode (position 5)	
		Timed latching relay mode (positions 6 to 9)	
		Permanently on mode (position 10)	

The “Multi 10” version also features the integrated alarm function (2 flashing alarm signals) in accordance with DIN 18015-2 standards and a rotary selector on the front with 10 functions to choose from, divided into 4 types, depending on the user’s requirements: timed relay mode, latching relay mode, timed latching relay mode and permanently on mode.

Timed relay mode (positions 1 to 4)

This mode allows the user to turn on the lights by briefly pressing one of the staircase light buttons. The light remains on until the automatic switch-off time setting has elapsed (the device goes back to counting from 0 if a staircase light button is pressed while the lights are on).

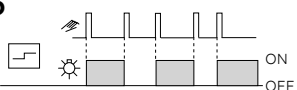
Timed relay mode (positions 1 to 4)

1		<ul style="list-style-type: none"> - Automatic staircase light switch - Lighting time reset by pressing keys again
2		<ul style="list-style-type: none"> - Automatic staircase light switch - Lighting time reset by pressing keys again - Switch-off warning
3		<ul style="list-style-type: none"> - Automatic staircase light switch - Lighting time reset by pressing keys again - 60-minute switch-on by pressing keys and holding down > 25
4		<ul style="list-style-type: none"> - Automatic staircase light switch - Lighting time reset by pressing keys again - Switch-off warning - 60-minute switch-on by pressing keys and holding down > 25

Latching relay mode (position 5)

This mode allows the user to turn on the lights by briefly pressing one of the staircase light buttons. The light remains on until the buttons are pressed again.

Latching relay mode (position 5)

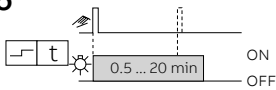
5		<ul style="list-style-type: none"> - Latching relay
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Timed latching relay mode (Positions 6 to 9)

This mode allows the user to turn on the lights by briefly pressing one of the staircase light buttons. The light remains on until the set time has elapsed or the staircase light buttons are pressed again.

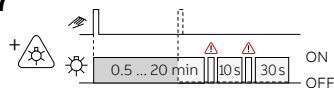
Timed latching relay mode (Positions 6 to 9)

6



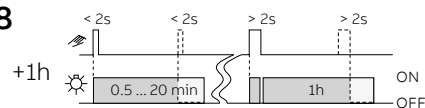
- Timed latching relay
- Switch-off in advance by pressing the keys

7



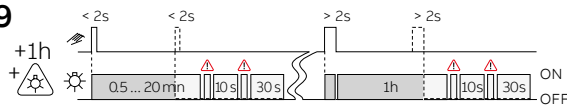
- Timed latching relay
- Switch-off in advance by pressing the keys
- Switch-off warning

8



- Timed latching relay
- Switch-off in advance by pressing the keys
- 60-minute switch-on by pressing keys and holding down > 25

9



- Timed latching relay
- Switch-off in advance by pressing the keys
- Switch-off warning
- 60-minute switch-on by pressing keys and holding down > 25

Permanently on mode (position 10)

The lights remain continuously on when the selector is set to position 10.

Permanently on mode (position 10)

10

- Continuous light



E 232 staircase lighting time-delay switches with switch-off warning

Technical specifications

		E 232-230	E 232E-230N	E 232E-8/230N	E 232E-230 Multi 10	E 232E-8/230 Multi 10
Type		electro-mechanical	electronic	electronic	electronic	electronic
Time range	min	1-7	from 0.5 to 20 stepless	"from 0.5 to 20 stepless"	"from 0.5 to 20 stepless"	"from 0.5 to 20 stepless"
Automatic recognition of 3/4-wire systems			■	■	■	■
Connection in series available		■	■	■	■	■
Steady-light switch		■	■	■	■	■
Switch-off warning (after flashing)					■	■
Switch-off warning (50% dimming)					■	■
30 sec. to 20 min adjustment					■	■
60 min long-time range					■	■
Switching on zero crossing of voltage					■	■
Count reset by pressing buttons		after 30 sec.	immediate	immediate	immediate	immediate
230 V AC control voltage		■	■	■	■	■
Rated frequency	Hz	50..60	50..60	50..60	50..60	50..60
Power consumption	VA	1	6	6	6	6
Additional universal voltage	V	-	-	8...230 AC/DC	-	8...230 AC/DC
Glow lamp current	mA	max. 150	max. 150	max. 150	max. 150	max. 150
Rated switching capacity						
- ohmic loads	A	16	16	16	16	16
- inductive loads	A	10	10	10	16	16
Filament lamp load	W	2300	2300	2300	3600	3600
Halogen lamp load	W	2300	2300	2300	3600	3600
Fluorescent lamp with capacitive reactor						
not compensated	VA	2300	2300	2300	3600	3600
compensated in series	VA	2300	2300	2300	3600	3600
compensated in parallel	VA	1300	400	400	1200	1200
duo circuit	VA	2300	2300	2300	3600	3600
Fluorescent lamps with electronic reactor	VA	300	300	300	1000	1000
Energy-efficient fluorescent lamps						
with capacitive reactor	VA	2,000	1,500	1,500	1,500	1,500
with electronic reactor	n°/W	9x7, 6x11, 5x15, 5x20	"9x7, 7x11, 7x15, 7x23"	"9x7, 7x11, 7x15, 7x23"	"34x7, 27x11, 24x15, 22x23"	"34x7, 27x11, 24x15, 22x23"
Contact material		Ag Sn O2	Ag Sn O2	Ag Sn O2	Ag Sn O2	Ag Sn O2
Contact gap	mm	≥ 3	< 3	< 3	< 3	< 3
Mechanical life	n°	> 106	3 x 107	3 x 107	3 x 107	3 x 107
Electrical life at rated load cosφ = 1	n°	> 105	2 x 105	2 x 105	2 x 105	2 x 105
Electrical life at rated load cosφ = 0,6	n°	> 104	4 x 104	4 x 104	4 x 104	4x104
Contact type		1NO	1NO	1NO	1NO	1NO
Terminal section	mm ²	10	13	13	13	13
Max cable section	mm ²	6	6	6	6	6
Min cable section	mm ²	0.5	0.5	0.5	0.5	0.5
Reset interval		resettable after 30 seconds	100%	100%	100%	100%
Housing material		heat-resistant, self-extinguishing, flame-retardant thermoplastic material				
Ambient temperature	°C	-10...+50	-25...+50	-25...+50	-25...+50	-25...+50
Protection degree		IP20	IP20	IP20	IP20	IP20
Insulation class after installation		II	II	II	II	II
Modules		1	1	1	1	1
Marking		VDE	VDE	VDE	VDE	VDE
Mounting		on DIN rail	on DIN rail	on DIN rail	on DIN rail	on DIN rail

Operating principle

Activated by a pulse command via a pushbutton, the E 232 staircase light switch turns on the installation's lights for a time T1. In order to avoid an unexpected darkness the Multi10 devices are equipped with a switch-off warning (double flash).

Application environments

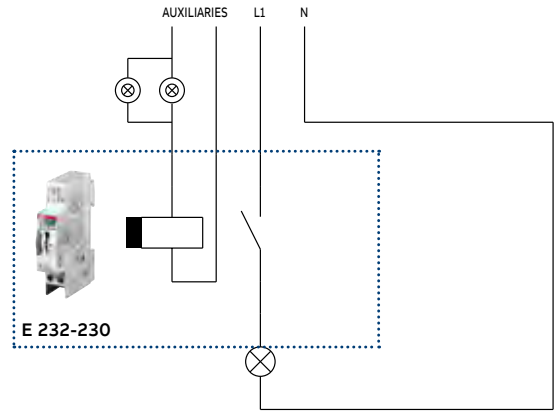
Installation of the E 232 staircase lighting with switch-off warning functionality is ideal wherever the lighting must be timed and unexpected darkness must be avoided (staircases and passageways in public places, cellars, garages, etc.).

Installation example

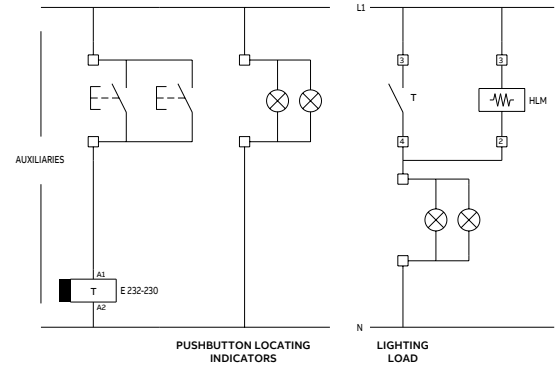
As illustrated, one among the possible applications concern installation of the E 232 staircase switch, in the staircase lighting plant of a multi-story building. Pushing the push-button, the timer of the E 232 switch turns on the lights for a settable T1 time.

01 Operating principle of E 232 staircase lighting time-delay switches with switch-off

02 Installation example of E 232 staircase lighting time-delay switches with switch-off



01



02



T Line twilight switches and TWA astronomical twilight switches

T Line twilight switches command lighting circuits according to the scheduled level of the ambient light detected by a dedicated sensor. As they allow to significantly reduce energy consumption, they are particularly useful in external places (garden, parking lots, entrances, courtyards, etc...)

T Line twilight switches range allow to switch ON and switch OFF lighting devices according to a scheduled level of the ambient light. They are used in combination with a sensor to detect if the ambient light is higher or lower than the set level. A switching delay prevents them from operating unnecessarily when the light intensity suddenly changes (e.g. lighting, moving vehicles, etc...).

The basic version T1, is preset at 10 lux from factory and is equipped with 2 signaling LEDs that indicate when the desired activation threshold has been reached and display the status of the contact. The operating instructions are printed on the side of the product.

The advanced version T1 PLUS, switches feature a setpoint that can be adjusted for 4 different scale values:

- 2...40 lux
- 20...200 lux
- 200...2000 lux
- 2000...15000 lux

This make them ideal for daytime applications where the lux values to detect is very high. T1 PLUS allows to adjust the relay tripping in a time ranging from 15-90 sec. for switching ON and 20-120 sec. for switching OFF. As T1, it is also equipped with 2 signaling LEDs that indicate when the desired activation threshold has been reached and display the status of the contact.

The T1 POLE version is designed for installation on the pole or wall. It provides excellent resistance to atmospheric agents and a long life time. As T1, T1 POLE is preset at 10 Lux.

Astronomical switches TWA-1 and TWA-2 with 1 and 2 channels respectively, automatically command lighting circuits according to sunrise and sunset. The switches are programmed by defining the longitude and latitude of the geographical area in which they are installed. These devices are particularly useful when usage of a twilight switch with external sensor is not recommended because it may be subject to malfunctions caused by air pollution, excessive brightness or vandalism.



Main features**DIN rail version**

- Adjustment range from 2 to 200 Lux
- 2 LED indicators: one for contact status and one for threshold set value
- Preset at 10 lux from factory
- Switching delay
- IP65 Protection degree
- Wiring diagram printed on the side of the product
- 1 module width
- Captive clamps screws

In addition to the PLUS version

- Adjustment range from 2 to 15,000 Lux
- Four different scales value for a more precise brightness regulation value
- Adjustable switching delay

Pole version

- Adjustment range from 2 to 200 Lux
- Preset at 10Lux from factory
- Switching delay
- IP65 protection degree
- Wiring and operation diagram printed on the back of the product
- Captive clamps screws
- Pole and wall mounting

Astro version

- Astronomical and standard programming
- 1 or 2 change over contact/s
- Manual and permanent override, activated with one touch on the front of the device
- Clear display visualizations of contacts status
- Automatic summer and winter time change
- Holiday program
- 56 stored memory locations
- Wiring diagram printed on the side of the product
- 2 modules width

Why are the switches given a 10 lux factory pre-setting?

Public lighting plays a crucial role in the social life and represents a mandatory investment for local administrations, without any direct economic return. They must, therefore, try to optimize such investments and how they are managed, while ensuring an efficient service. Since they are factory calibrated at 10 Lux, the standard value for street lighting, ABB twilight sensors are immediately ready for usage in outer lighting systems and do not require any adjustment

T Line twilight switches and TWA astronomical twilight switches

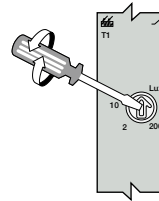
Technical specifications

		T1	T1 PLUS	TWA-1	TWA-2	T1 POLE
Rated supply voltage	V	110 ÷ 230 AC	110 ÷ 230 AC	230 AC ± 15%	230 AC ± 15%	110 ÷ 230 AC
Contact type		1NO	1NO	1NO/NC	2NO/NC	1NO polarized
Switching capacity						
- resistive load cosφ 1	A	16	16	16	16	16
- inductive load cosφ 0,6	A	3	3	10	10	3
- incandescent lamps	cosφ 1	max 3600 W	max 3600 W	-	-	max 3600 W
- fluorescent lamps	cosφ 0.8	max 3600 W	max 3600 W	-	-	max 3600 W
- fluorescent - duo./ electronic lamps	cosφ 0.9	max 300 W	max 300 W	-	-	max 300 W
Rated frequency	Hz	50-60	50-60	50-60	50-60	50-60
Switching delay						
- ON	s	30 ±10%	reg. 15...90 ±10%	±120 min on astronomical intervention	±120 min on astronomical intervention	30 ±10%
- OFF	s	40 ±10%	reg. 20...120 ±10%	±120 min on astronomical intervention	±120 min on astronomical intervention	40 ±10%
Brightness range (with tolerance of ±20%)	lux	2...200	2...40 20...200 200...2000 2000...15000	-	-	2...200
Time reference		-	-	quartz	quartz	-
Minimum switching time	min.	-	-	1	1	-
Max. operations per cycle		-	-	56	56	-
Running reserve	years	-	-	5	5	-
Operating accuracy		-	-	± 1.5 sec/24h	± 1.5 sec/24h	-
Astronomical time precision	min.	-	-	± 10	± 10	-
Protection degree						
- twilight switch		IP20	IP20	IP20	IP20	IP65
- sensor		IP65	IP65	-	-	IP65
Operating temperature						
- twilight switch	°C	-25...+55	-25...+55	-10...+55	-10...+55	-40...+70
- sensor	°C	-40...+70	-40...+70	-	-	-40...+70
Storage temperature						
- twilight switch	°C	-40...+70	-40...+70	-20...+60	-20...+60	-50...+80
- sensor	°C	-50...+80	-50...+80	-	-	-50...+80
Power consumption	VA	4.5	4.5	6	6	4.5
Max. commutable power	W	3500	3500	4000	4000	3500
Terminal size for cable	mm ²	2.5	2.5	1...6	1...6	2.5
Terminals		loss-proof screw	loss-proof screw	loss-proof screw	loss-proof screw	loss-proof screw
Tightening torque: terminals	Nm	0.5	0.5	1.2	1.2	-
screw sensor	Nm	0.4	0.4	-	-	0.4
Mounting		on DIN rail	on DIN rail	on DIN rail	on DIN rail	-
Switching status indication/ brightness range		red LED / green LED	red LED / green LED	display LCD	display LCD	-
Max wiring length	m	100	100	-	-	-
Modules	n°	1	1	2	2	-
Reference standards		EN 60669-1 EN 60669-2-1 EN 60730-1	EN 60669-1 EN 60669-2-1 EN 60730-1	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7	EN 60669-1 EN 60669-2-1 EN 60730-1

How to set

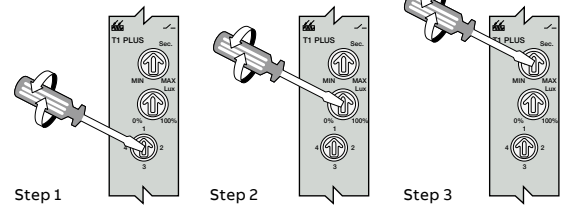
T1

Set the desired activation threshold (from 2 to 200 lux), using the lux control knob. N.B.: the position corresponding (with approximation) to the 10 lux activation threshold is marked on the front of the item. If the GREEN LED is illuminated, this indicates the activation status of the threshold. If the RED LED is illuminated, this indicates that the relay contact is closed (illumination lit up).



T1 PLUS

- 1 Set the desired lux scale (2-40; 20-200; 200-2.000; 2.000-15.000), using the lux scale control knob. If the GREEN LED is illuminated, this indicates the activation status of the threshold. If the RED LED is illuminated, this indicates that the relay contact is closed (illumination lit up).
- 2 Set the desired lux percentage (0% -> 100%), using the lux percentage control knob.
- 3 Set the switching delay (MIN -> MAX), using the switching delay control knob.

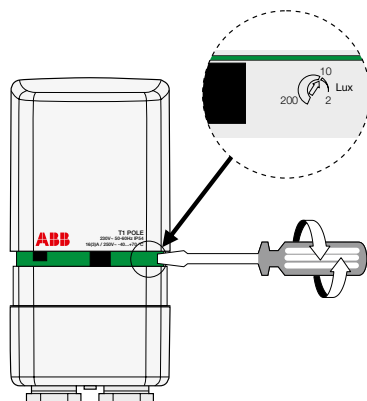


T1 POLE

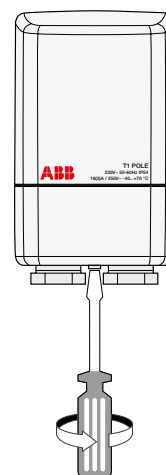
- 1 Switch on the power supply
- 2 Make the threshold adjustment (from 2 to 200 lux) by turning the trimmer. The lighting of the red LED represents the achievement of the threshold set (contact closed).
- 3 Secure the dome by lightening the captive screw inserted through the bottom of the base. Tighten the screw until the dome pressed on the gasket sufficiently to ensure a hermetic seal.

- 01 Threshold adjustment
- 02 Assembly diagram

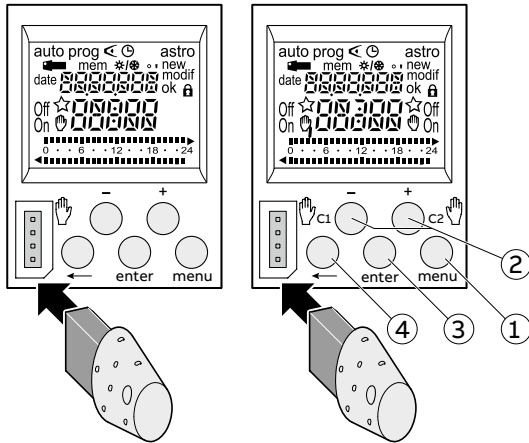
01



02

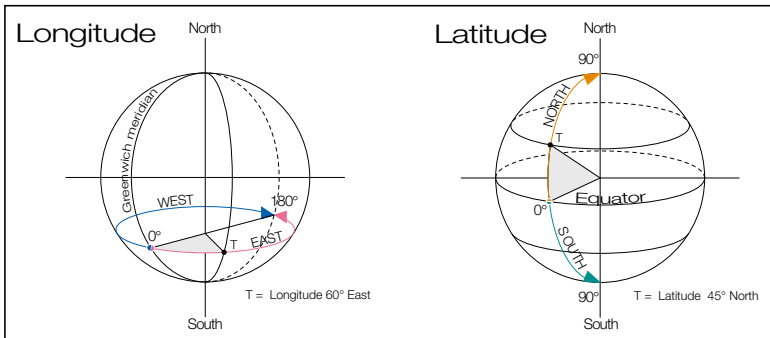


TWA-1 e TWA-2



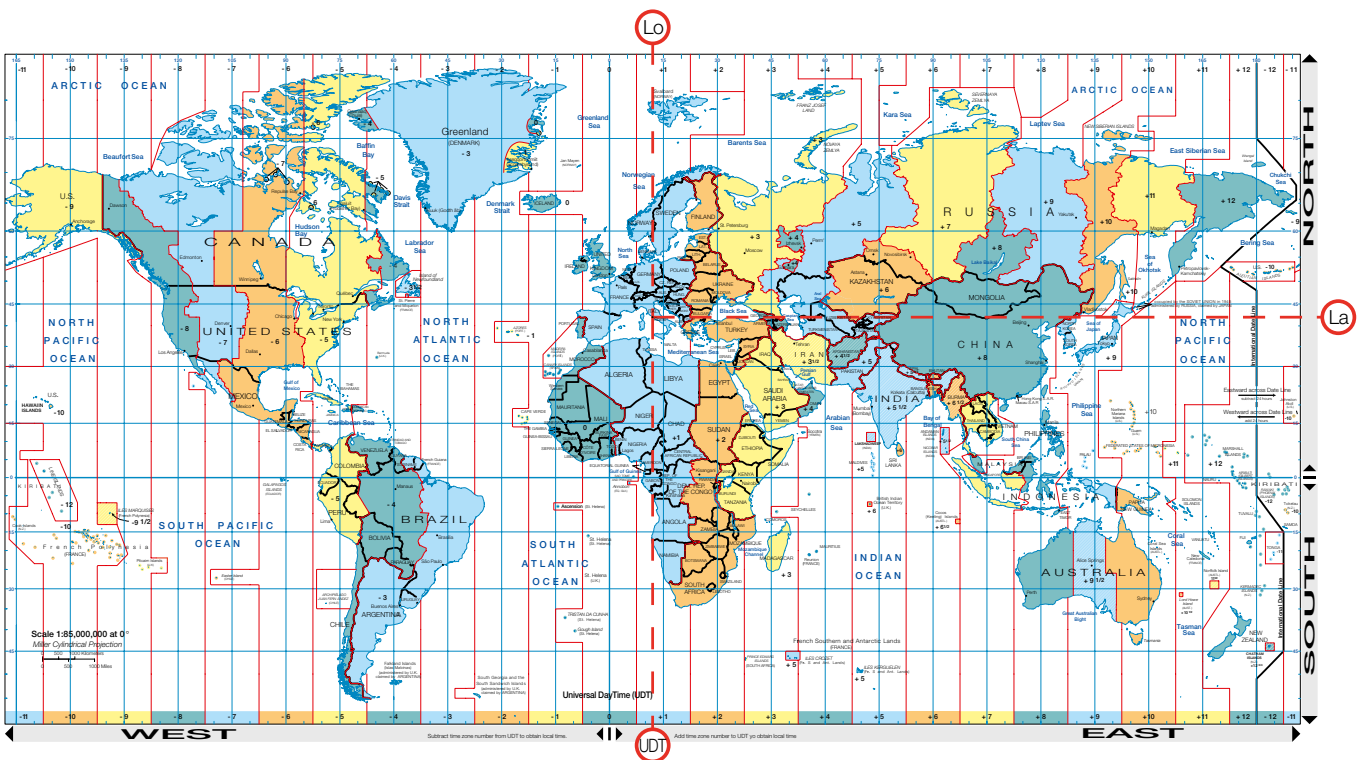
Keys

- ① **menu** selection of operating mode
- auto** mode of running according to the program selected
- prog** new for programming mode
- prog** **modif** to modify an existing program
- ☺ checking of the program modification of time, date and selection of the winter/summer time-change mode
- astro** astronomical mode
- ☆ indicates that the channel is in astronomical mode
- ② **+ and -** navigation or setting of values (TWA-1)
- C1** **C2** (TWA-2) in auto mode, selection of overrides, or waivers
- ③ **enter** to validate flashing information on display
- ④ ← to return to the previous step



Programming

- Lo Longitude 12° EAST
- La Latitude 41° NORTH
- +1 Universal Date Time = +1 hour



T Line twilight switches

— 01 Operating principle of T Line twilight switches

— 02 Installation example of T Line twilight switches

Operating principle

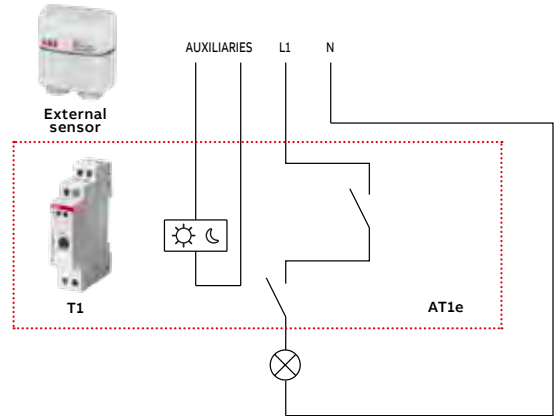
The diagram shows an example of installation for the T1 twilight switch in the lighting system of a commercial building. When the external light falls below a certain level (e.g. during the evening when the shop is closed), the device switches on the window lights and the shop sign. The lights can be switched off later in the evening to reduce power consumption thanks to the AT1 time switch.

Application environments

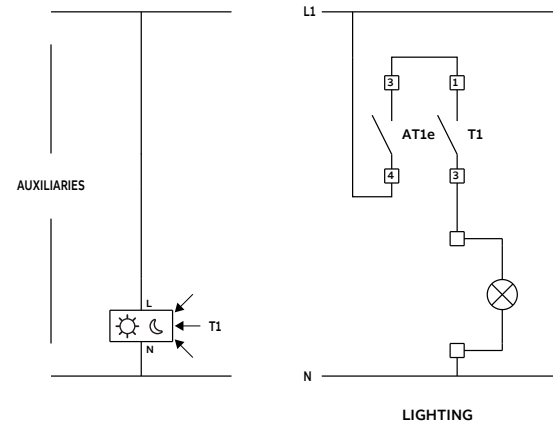
The installation of the T1 twilight switch in combination with an AT electromechanical timer is particularly useful in applications where energy saving is of primary importance (shops, office corridors and public passageways, car parks, parks, etc.).

Installation example

As shown in the diagrams, one of the possible applications for the T1 twilight switch is controlling the lighting system of a commercial building. When the external light falls below a certain level (e.g. when the shop is closed), the device switches on the window lights and the shop sign. The lights can be switched off later in the evening to reduce power consumption thanks to the AT1 time switch which keeps the circuit open until the next morning. When the external light returns to above the threshold value, the twilight switch relay returns to the open position.



— 01



— 02



T1 POLE twilight switches

- 01 Operating principle of T1 POLE twilight switches
- 02 Installation example of T1 POLE twilight switches

Operating principle

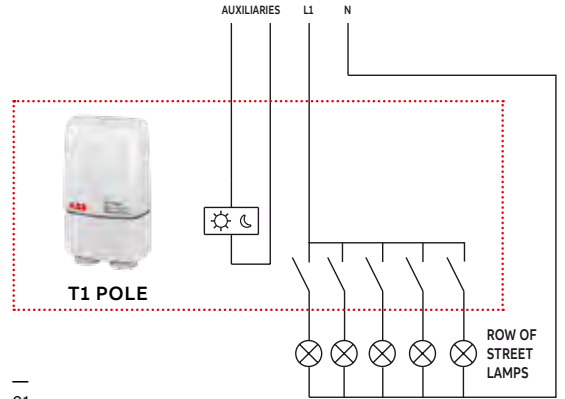
The diagram shows an installation example of T1 POLE twilight switch to control motorway lighting systems. When the external light falls below a certain level, 10 lux for example, the device switches on the lights present in tunnels, rest areas, near to junctions, etc. The lights are then switched off by the T1 POLE in the morning when the 10 lux value is exceeded.

Application environments

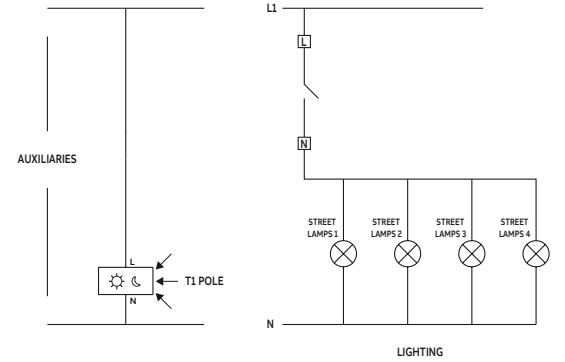
The installation of the T1 POLE twilight switch is particularly suitable for controlling external street lighting, thanks to the fact that they can be installed on poles or street lamps.

Installation example

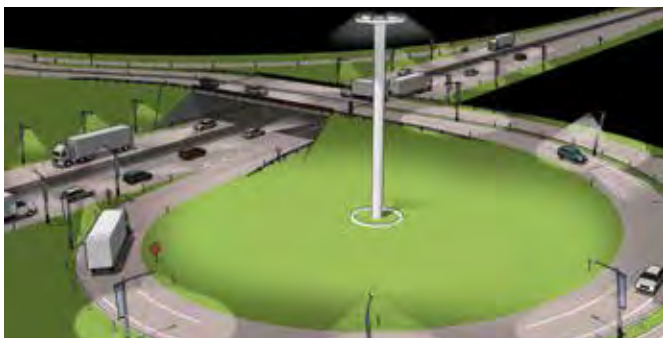
As shown in the diagrams, one of the possible applications is the installation of a T1 POLE twilight switch to control the motorway lighting system. When the external light falls below a certain level (for example at sunset), the pole-mounted twilight switch, switches on the lights to provide the correct lighting value. At sunrise, the external brightness exceeds the threshold value and the twilight relay returns to the open position, switching off the lights.



01



02



TWA astronomical twilight switches

— 01 Operating principle of TWA astronomical twilight switches

— 02 Installation example of TWA astronomical twilight switches

Operating principle

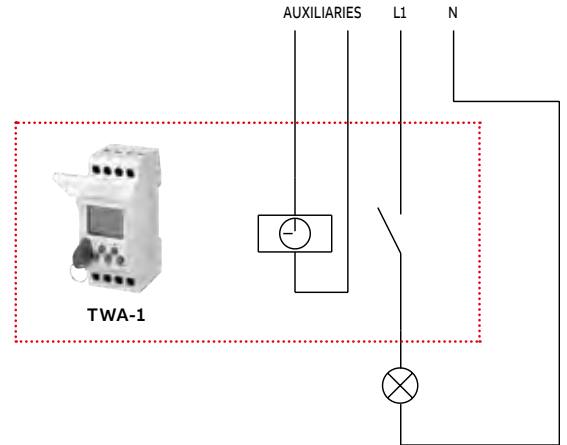
The installation of an astronomical twilight switch in a system is particularly useful in situations in which light sources, or other environmental conditions, can cause changes in the brightness level and falsify the Lux value. In these cases, the TWA-1 and TWA-2 astronomical switches can control the lighting system according to the sunrise and sunset times of the geographic zone in which the system is installed.

Application environments

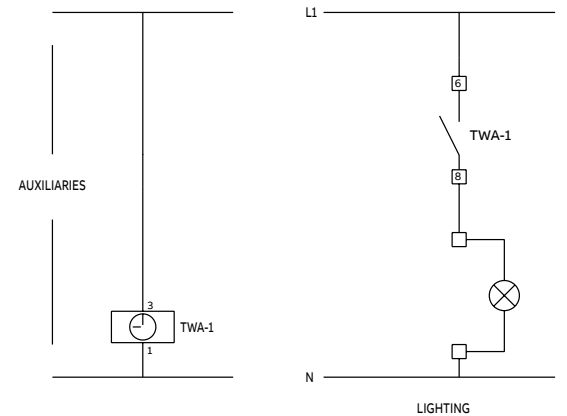
The TWA-1 and TWA-2 astronomical twilight switches are particularly suitable for use in applications where the operation of a twilight switch with external sensor is potentially subject to alteration or damage from external agents (e.g. smog, overexposure to light, vandalism etc.).

Installation example

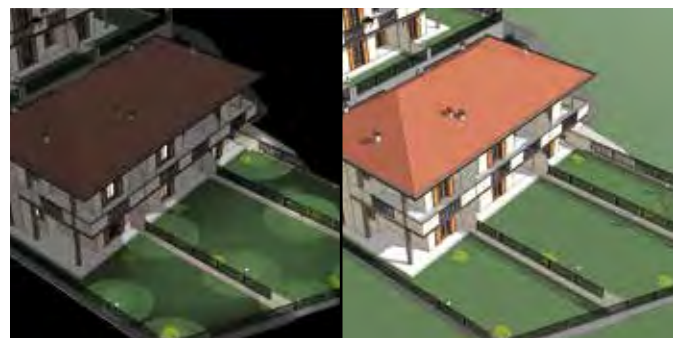
Atmospheric pollution is one of the causes of reductions of the level of environmental light. Dust deposits on the external probe of a traditional twilight switch can compromise the operation of the device, preventing it from automatically switching off the controlled lighting system in the presence of external light. As shown in the example, this problem can be resolved by installing a TWA-1 astronomical twilight switch that controls the lighting system according to sunrise and sunset times.



— 01



— 02



THS modular thermostats

THS series thermostats are able to control a wide range of refrigeration and heating applications.

The THS-C and THS-W models, both equipped with a potential-free switching contact, represent the optimum solution for regulating the temperature in heating systems and industrial applications and for controlling the temperature in refrigerated counters, greenhouses, dryers or tilting isothermal portals.

THS-1 and THS-4 sensors, which can be used in conjunction with the THS-C and THS-W thermostats, function within a $-30\text{ }^{\circ}\text{C}$ and $+130\text{ }^{\circ}\text{C}$ temperature range.

The THS-S model, with two potential-free independent contacts and equipped with a remote sensor included in the package, is indicated for controlling the temperature of switchboards, providing a cooling adjustment in the range $+20\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$ and anticondensation function in the range $0\text{ }^{\circ}\text{C}$ to $+10\text{ }^{\circ}\text{C}$.

Did you know that controlling the temperature in switchboards with the new THS-S thermostat is now simpler?

Unlike conventional models designed for installation on walls or panels, the THS-S modular thermostat is better able to control the temperature in switchboards since it is mounted on a DIN-rail, which needs no fastening accessories, and thanks to the capacity of the relay that allows it to control over 3 kW of heating elements without the use of external contactors.



Ease of use

The possibility of setting one or two temperature setpoints on the front of the device and adjusting them without having to use any tools simplifies the configuration procedure. The instructions and diagrams are shown on the side of the product to ensure that the necessary information is always readily available when needed.

Visibility

Two indicator LEDs enable you to check the operation of the device at a glance: the yellow LED signals a sensor shortcircuit and the green LED indicates the state of the contact.

Accuracy

The tiny temperature difference ensures the temperature set is maintained with great accuracy.

Safety

The lead-sealable and undetachable glass cover ensures maximum protection against tampering by unauthorized staff.

Compact size

Since it is so small in size, just two DIN modules, the THS thermostat can be used in a number of applications, even where space is a critical factor.

		THS-C	THS-W	THS-S
Rated voltage	V	230 AC	230 AC	230 AC
Contact type		1NO/NC	1NO/NC	2NO
Contact capacity				
- resistive loads	A	16	16	16
- inductive loads	A	3	3	3
Frequency	Hz	50-60	50-60	50-60
Number of temperature setpoints		1 continuously adjustable	1 continuously adjustable	2 continuously adjustable
Adjustment range	°C	-20...+40	0...+60	0...+10/+20...+60
Max switching power	W	3500	3500	3500
Differential	°C	1	1	2
Thermal gradient		1 °K/15 minutes	1 °K/15 minutes	1 °K/15 minutes
Type of operation		ON/OFF fixed differential	ON/OFF fixed differential	ON/OFF fixed differential
Max section of cables at terminals	mm ²	2.5	2.5	2.5
Protection degree	IP	20	20	20
Relay ON/OFF indication		LED indicator	LED indicator	LED indicator
Temperature tolerance	°C	±1	±1	±1
Operatin temperature	°C	0...+50	0...+50	0...+ 70
Storage temperature	°C	-10...+65	-10...+65	-10...+70
Type of installation		DIN rail	DIN rail	DIN rail
Tightening torque	Nm	0.5	0.5	0.5
Case / colour		thermoplastic/ grey RAL 7035	thermoplastic/ grey RAL 7035	thermoplastic/ grey RAL 7035
Power consumption	VA	3	3	3
Type of application		services-providing/ industrial sector	services-providing/ industrial sector	services-providing/ industrial sector
Programming		graduated scales with mechanical pointer	graduated scales with mechanical pointer	graduated scales with mechanical pointer

—
01 THS-C
operating example

The THS-C and THS-W modular thermostats regulate the temperature differentially, as indicated in the figure below.

When the THS-C thermostat detects a temperature below the setpoint, it closes contact 1 until the temperature returns above the setpoint. It then reopens the contact and, when the temperature drops below the differential again, the cycle is repeated.

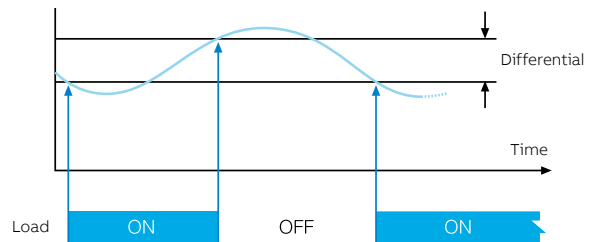
The THS-W thermostat works in the same way but the relay closes contact 5 when the temperature exceeds the maximum setpoint.



Yellow LED:
sensor short-circuit indication
on = sensor short-circuited

Green LED:
load state indication

Temperature regulation knob



—
01

Sensor installation

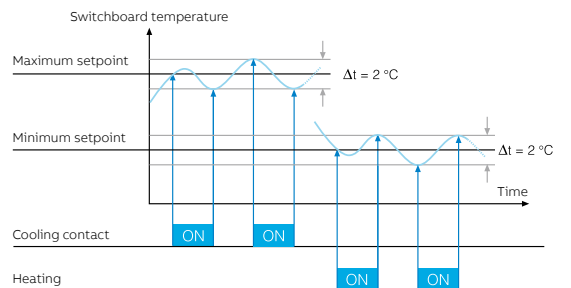
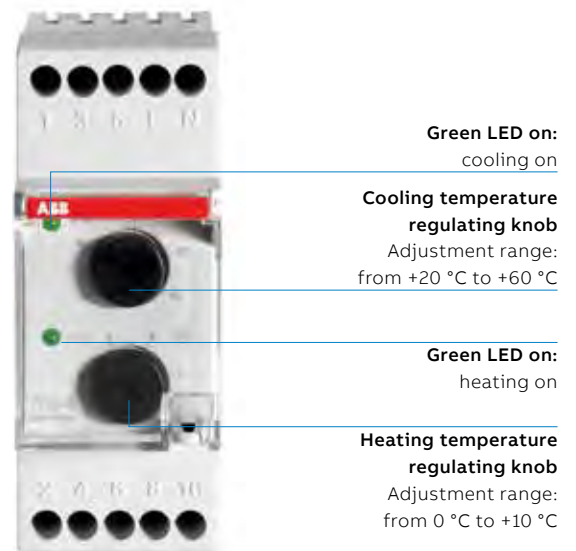
The temperature sensor (supplied separately) is made of brass, encapsulated in silicone rubber, impermeable and resistant to high temperatures (130 °C). It is 1.5 or 4 metres long and may be positioned at a distance of up to 100 metres.



—
01 THS-S
operating example

As shown in the figure, the THS-S modular thermostat activates

- the fan or the conditioner, when the temperature in the switchboard exceeds maximum setpoint set using the knob at the top;
- the heating device connected, when the temperature in the switchboard drops below the minimum setpoint set using the knob at the bottom.



—
01

Sensor installation

The temperature measuring sensor, which is included in the package, has an operating range of -30 °C to +85 °C and can be set at a distance of up to 100 m.



—
 01 Operating principle of THS modular thermostats
 —
 02 Installation example of THS modular thermostats

Operating principle

Modular thermometers let you control and keep a heating or cooling element at a set temperature, comparing the value read by the sensor with the one set by the user.

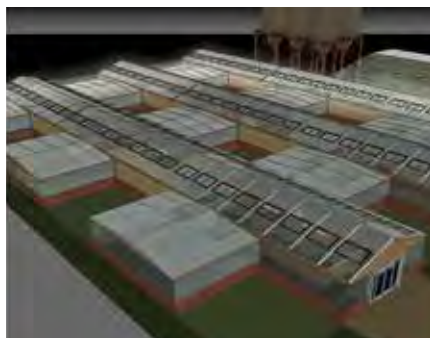
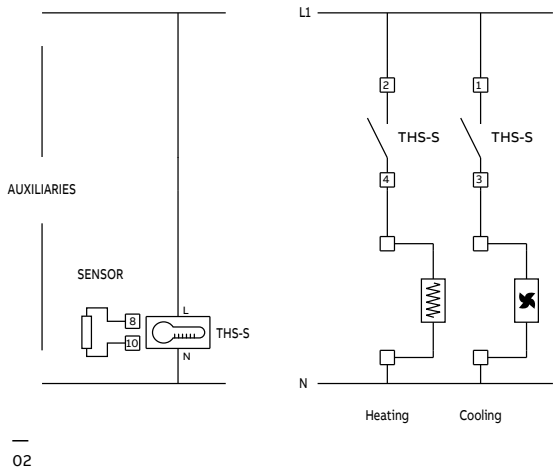
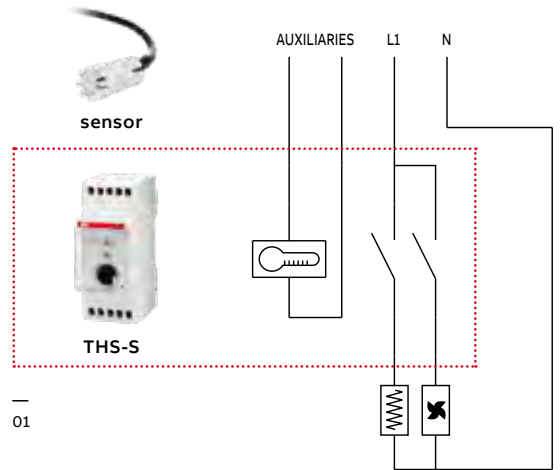
The THS range can thus guarantee switchboard operating reliability, perfect product conservation in refrigerated counters or cells, promote greenhouse production, optimise drying cycles, etc.

Application environments

THS thermostat installation is thus the best way to regulate temperature in automation and distribution switchboards, in heating systems, in industrial applications or to control refrigerator systems, greenhouses, dryers or isothermal folding portals.

Installation example

As shown in the diagrams, one of the possible applications consists in the installation of a THS-S modular thermostat inside an automation or distribution switchboard where the temperature must be kept at a set value. Thanks to the THS-S thermostat, you can thus control the temperature, permitting cooling regulations between +20 ÷ +60 °C and anti-condensation between 0 ÷ +10 °C. Furthermore, you can manage up to 3 kW of point heaters without having to use any external contactors to manage the load.

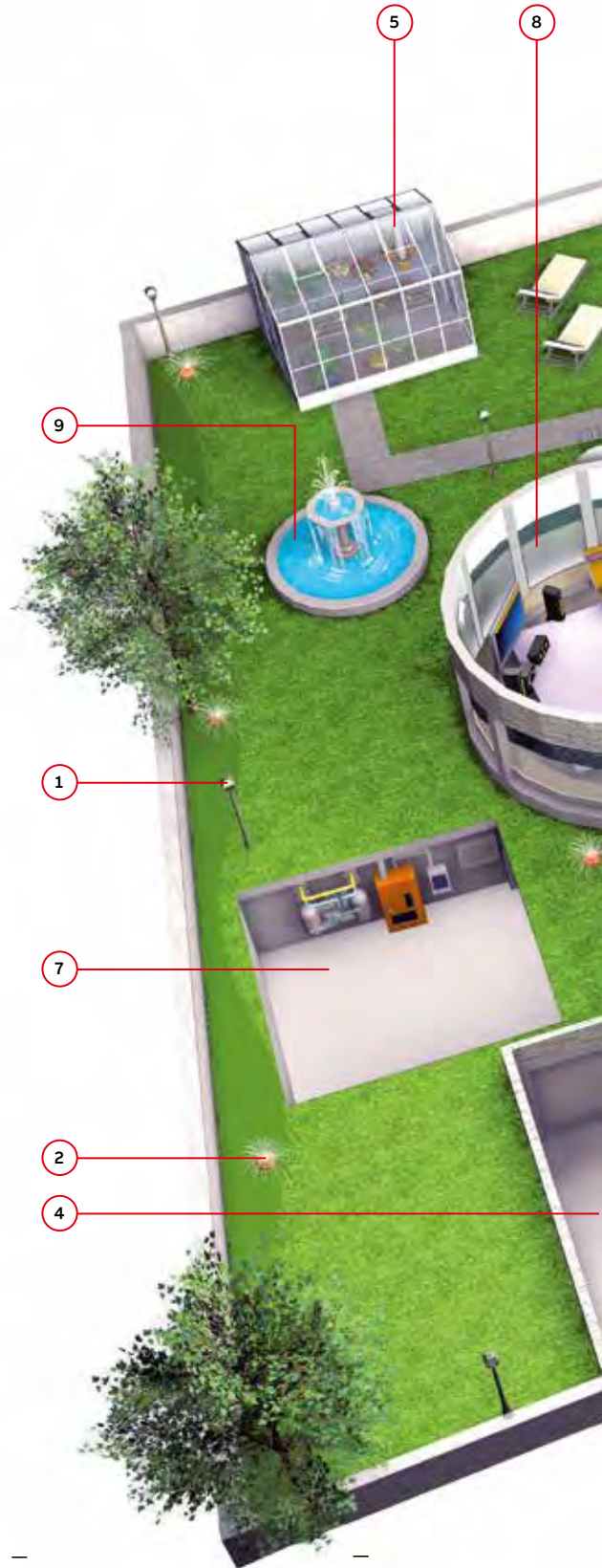




Guide to installation in residential buildings

Advanced technologies and performance: ABB's solutions integrate perfectly and provide a complete, functional and elegant system able to meet the requirements of every domestic and working environment.

- 1 Outdoor lights in the garden
- 2 Irrigation pumps for the garden
- 3 Circulation pumps for swimming pools
- 4 Staircase and garage lights
- 5 Temperature and lighting control in greenhouses
- 6 Skylights
- 7 Temperature and lighting control in cellars
- 8 Rolling shutter opening/closing
- 9 Pumps for fountains and canals
- 10 Temperature and lighting control in reptile vivariums and/or aquariums
- 11 Turning convectors on/off
- 12 Heating elements in the roof



T1



T1 PLUS



AT1e-R



AT2e-R



AT72e



D1





E 232-230



E 232-E230Multi 10



THS-C



THS-S



THS-W





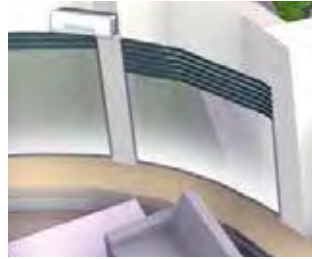
1 The outdoor garden lights are controlled by the **T1** twilight switch, which turns them on and off according to the preset level of luminosity.



7 **E 232-230Multi 10** turns on the cellar lights when the button is pressed. The lights then remain on until the button is pressed again. However, the lights will still be turned off after a preset time if the user forgets to press the button.



2 An **AT72** electro-mechanical time switch controls the irrigation pumps in the garden by means of programmed time settings.



8 Thanks to twilight switch **T1**, the shutters at the windows of a house are controlled depending on the luminosity level outdoors.



3 The swimming pool water pump is regulated by digital time switch **D1**, which allows the various jets to be controlled separately.



9 The pump that circulates the water is controlled by the **AT2e-R** electro-mechanical time switch according to the programmed setting.



4 **E 232-230Multi 10** turns on the staircase lights for the preset time and warns the user with a double flash before they go out.



10 The temperature in the reptile vivarium or aquarium is regulated by the heating elements or fans controlled by the **THS** thermostat.



5 The heating function in greenhouses is regulated by model **THS-W**, installed in the switchboard along with an **AT1e** time switch, which controls the irrigation time and a **T line** twilight switch that automatically turns on the lights.



11 The convectors are automatically regulated by the **D1** time switch according to the program selected.



6 The skylight can be opened and closed to suit requirements by digital time switch **D1**, or by the **T1 PLUS** twilight switch for daytime applications.



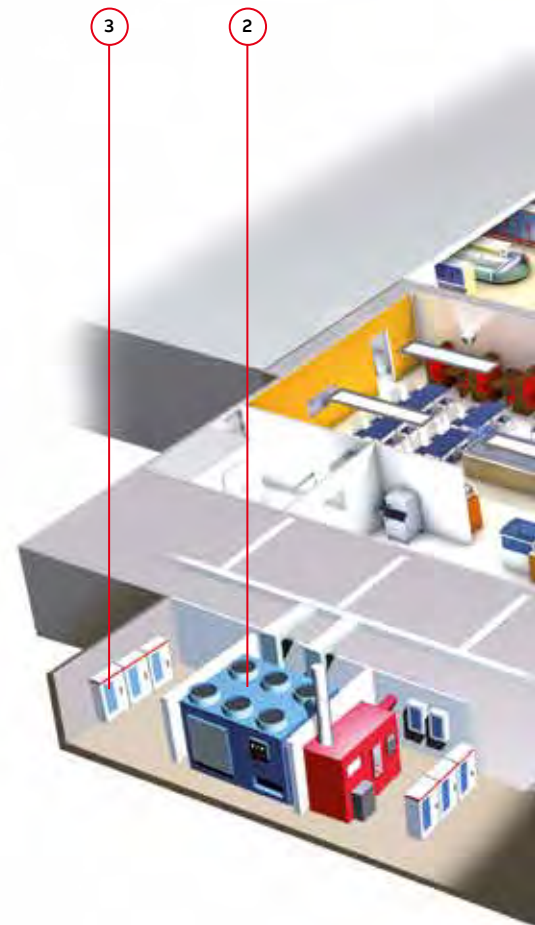
12 The roof temperature can be monitored instant by instant by means of the **THS**, so as to turn on the heating elements and prevent ice from forming.



Guide to installation in commercial buildings

Use of time switches, twilight switches, thermostats and staircase light switches achieves considerable energy savings in commercial applications. Lights and comfort functions will only be available when required in places open to the public and those reserved to personnel, thus avoiding waste and helping to protect the environment.

- 1 Shop window lights
- 2 Conditioning and lighting systems
- 3 Main switchboard
- 4 Lights in corridors, rooms
- 5 Street lighting
- 6 Lighting of monuments
- 7 Church bells
- 8 Lighting in amusement parks
- 9 Lighting in parking lots
- 10 Circulation pump of public fountains
- 11 Advertising sign control
- 12 Christmas lights





THS-S





1 The lighting in shop windows is controlled by the **T1** twilight switch which, in conjunction with one of the **ATe** or **D Line** series of time switches, turns off the lights overnight to avoid wasting energy.



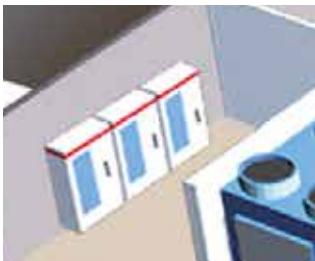
7 Thanks to the **D1** digital time switch, the bells of a church are controlled with one of the various different advanced functions allowing the user to regulate the intervals of time between one stroke and the next as required.



2 The lighting and heating systems are controlled separately by means of a **D2** two-channel digital time switch.



8 The lights in an amusement park are controlled by the **TWA-1** astronomical twilight switch which, without an external sensor, allows them to function regularly without being affected by interference that could cause faults.



3 Distribution switchboard with cooling fan and heating elements controlled by model **THS-S**.



9 The lights in a parking lot can be controlled according to the time of day or the level of luminosity outdoors, functions which are achieved with an **ATe** electro-mechanical or **D Line** digital time switch, or by means of a **T Line** twilight switch, respectively.



4 The sensor in the corridor activates **E 232-230**, which keeps the lights in the rooms and corridors on until the selected time terminates.



10 The systems that pump the water in the fountains are controlled by the **D1** digital time switch which, thanks to its advanced functions, creates plays of water like a sparkling waterfall or an elegant spray in a very simple way.



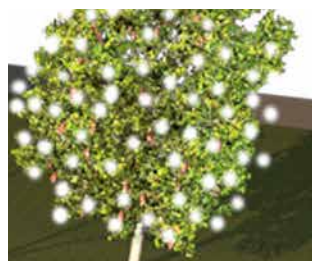
5 Twilight switch **T1 POLE**, which can be installed on a pole or wall, has a 10 lux presetting and allows the public street lighting to be controlled in a very simple way.



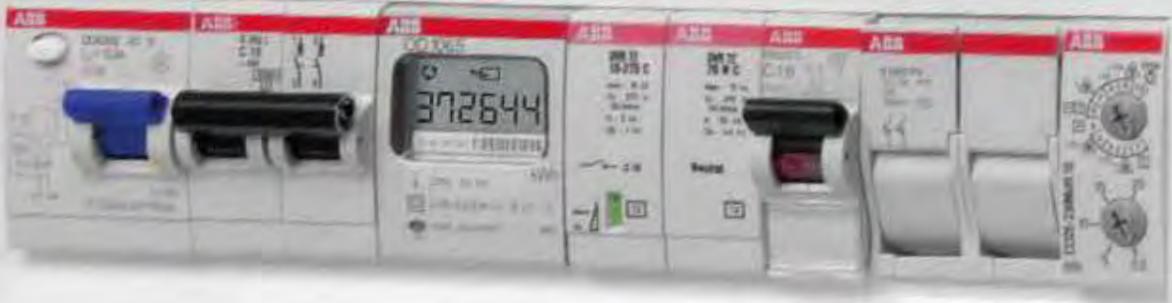
11 Advertising signs run at preset times thanks to a weekly or annual program defined by a **D Line** or **D 365** series of digital time switches.



6 The artistically arranged lighting for the buildings and monuments in cities is controlled by the **D1** digital time switch, which provides a vast range of functions to suit the type of effect required.



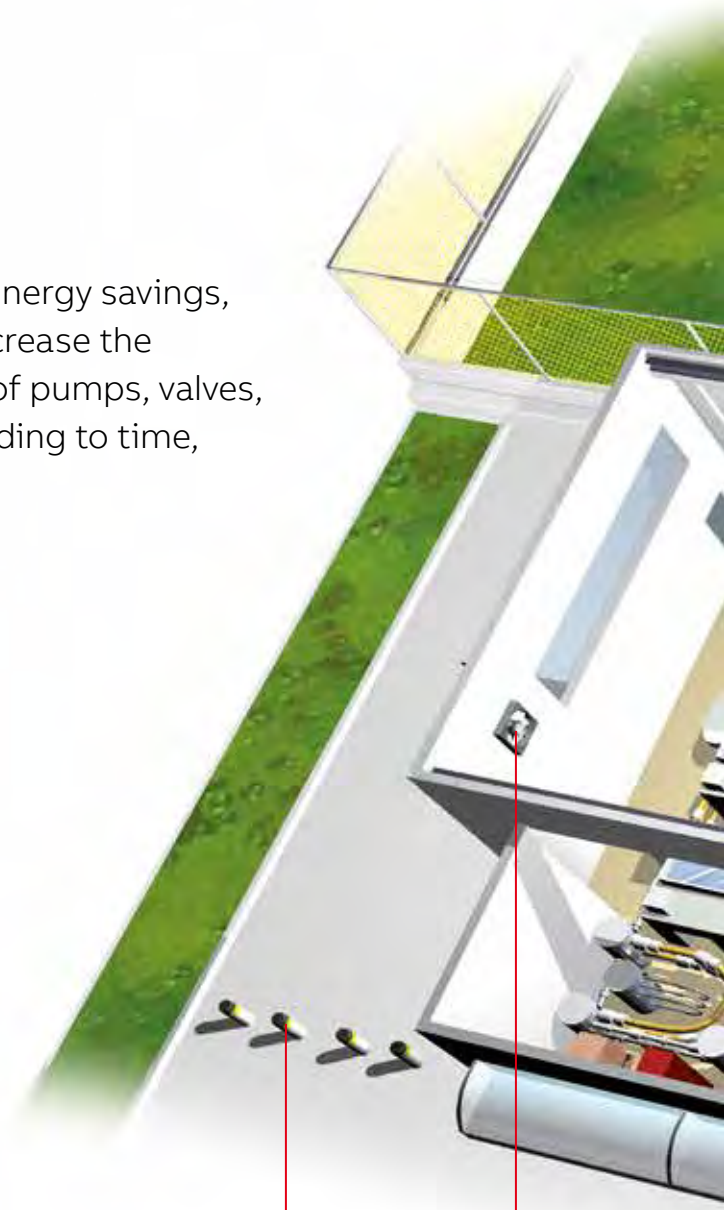
12 In conjunction with the **D1** digital time switch, the **T1** twilight switch is able to control skylights automatically according to the level of outdoor luminosity, creating lighting effects thanks to the different functions provided by the **D Line** digital time switch itself.



Guide to installation in industrial buildings

Designed for ease of use, safety, comfort and energy savings, ABB's products optimize consumptions and increase the efficiency in industries by automating the use of pumps, valves, fans and motors with programs defined according to time, temperature or light intensity settings.

- 1 Temperature control in switchboards
- 2 Temperature control in floor heating coils
- 3 Control of monitoring equipment
- 4 Re-circulating and mixing pumps
- 5 Food bins, galvanic tanks, etc.
- 6 Motorized valve control
- 7 Control of generic motors
- 8 Air circulation fans for special areas
- 9 Control of cold rooms
- 10 Road safety barriers
- 11 Control of electric fences
- 12 Control of the lighting systems in tunnels



10

8

T1 PLUS



THS-C



THS-W



THS-S

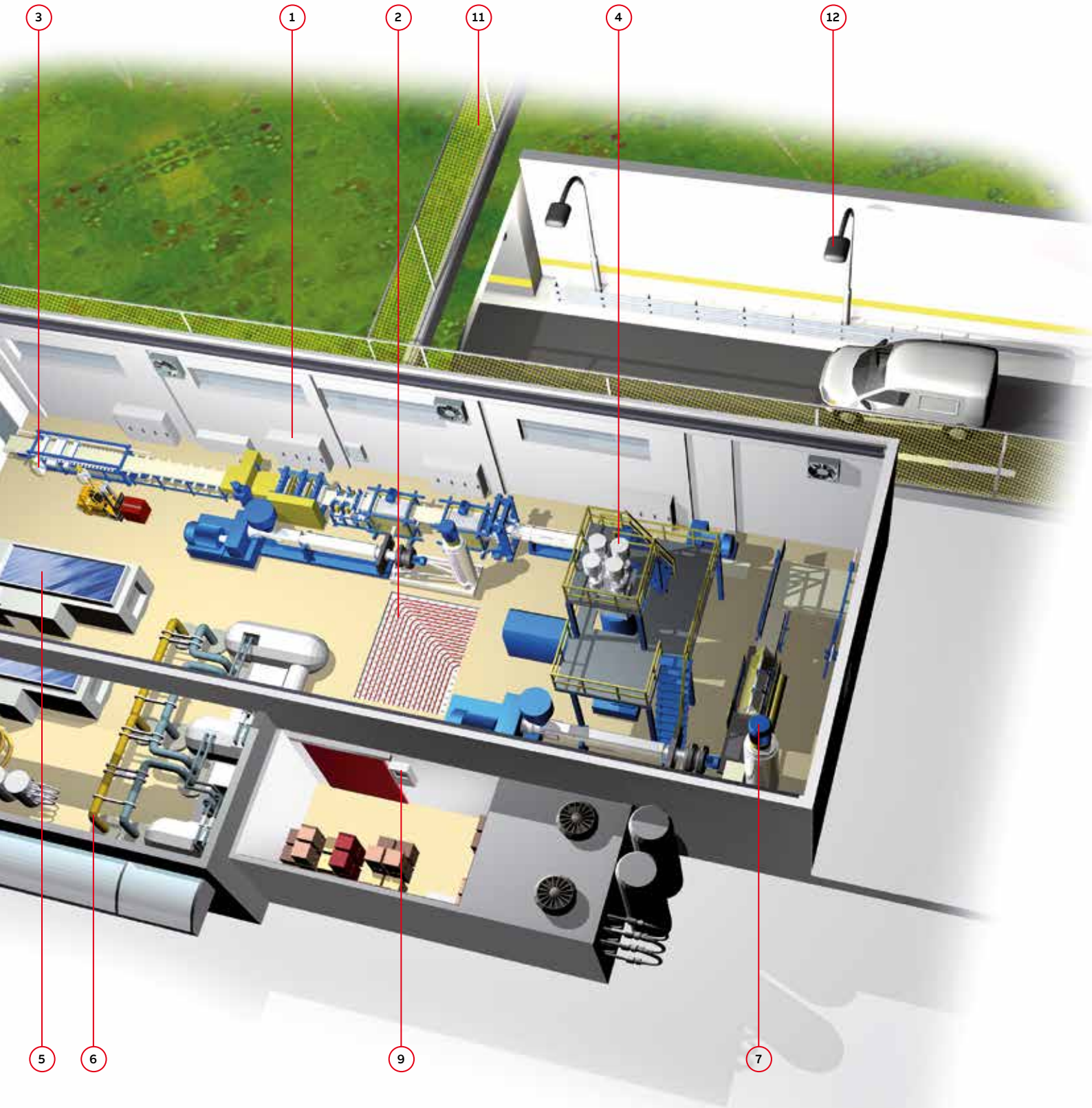


AT1e-R



AT2e-R





D1

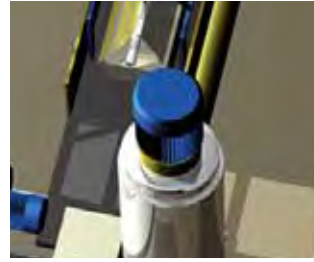


D2

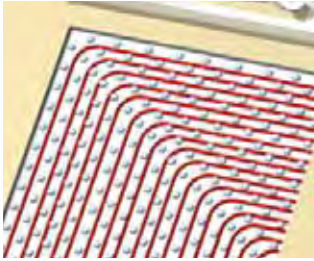




1 The temperature in the switchboards is controlled by the **THS-S**, which maintains it at the selected setpoint.



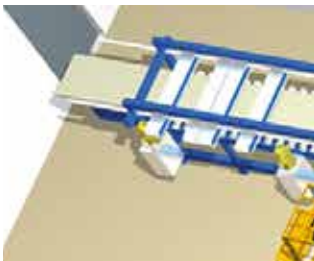
7 Various different types of motors can be controlled by the **D1** digital time switch, which cuts down on the energy wasted thanks to its advanced timing functions.



2 The temperature of the coils is detected by the external sensor of the **THS** thermostat, which controls the temperature according to the preset value.



8 Air circulation fans for special areas are automated by the **ATe** weekly time switch as established by the program settings.



3 The **ATe** electro-mechanical or **D Line** digital time switch can control various different devices in simple operating systems that do not use a PLC.



9 The **THS-C** model controls the cooling function in the cold room.



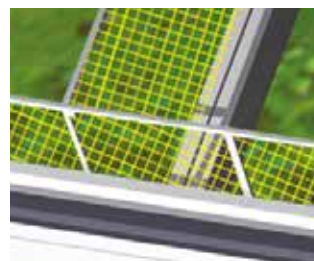
4 Various pump models for re-circulation or mixing functions can be controlled by the **ATe** series electro-mechanical time switches.



10 Road safety barriers for access to unauthorized areas on certain days of the year for example, can be conveniently controlled by an hourly program in the **D1** digital time switch.



5 The temperature in tanks, like the ones used for foodstuffs, is kept accurately at a setpoint by means of **THS** thermostats, thus ensuring high quality processing results.



11 To prevent unauthorized persons or animals from accessing areas during the night, the electric fence is controlled by the **D1** digital time switch, which keeps it activated at preset times of the day.



6 Motor-operated valves are controlled according to the temperature detected by the **THS** thermostat, which achieves higher thermal precision thanks to the low differential.



12 The lighting systems in tunnels are controlled by the **T1 PLUS** so as to guarantee the correct degree of visual perception inside and of the indications in the lighting systems in the external areas just outside the tunnels.



Guide to installation in the agrifood sector

This application example highlights the versatile features of the THS range, which is able to create the ideal environment in every situation by adjusting the temperature in the switchboards and ensuring reliable operation: in cold rooms and refrigerated counters so as to perfectly preserve the foodstuffs, in greenhouses to encourage plant growth and in dryers to optimize the processing cycles.

- 1 Temperature control in distribution switchboards
- 2 Refrigeration control in cold rooms
- 3 Temperature control in greenhouses
- 4 Temperature control of dryers

1 Distribution switchboard with cooling fan and heating elements controlled by model **THS-S**.

2 The **THS-C** model controls the cooling function in the cold room.

3 The heating function in greenhouses is regulated by model **THS-W**, installed in the switchboard along with an **ATe** time switch, which controls the irrigation time and a **T Line** twilight switch that automatically turns on the lights.

4 The correct temperature in the dryer is guaranteed by model **THS-W**.

T1 PLUS



THS-C



THS-W

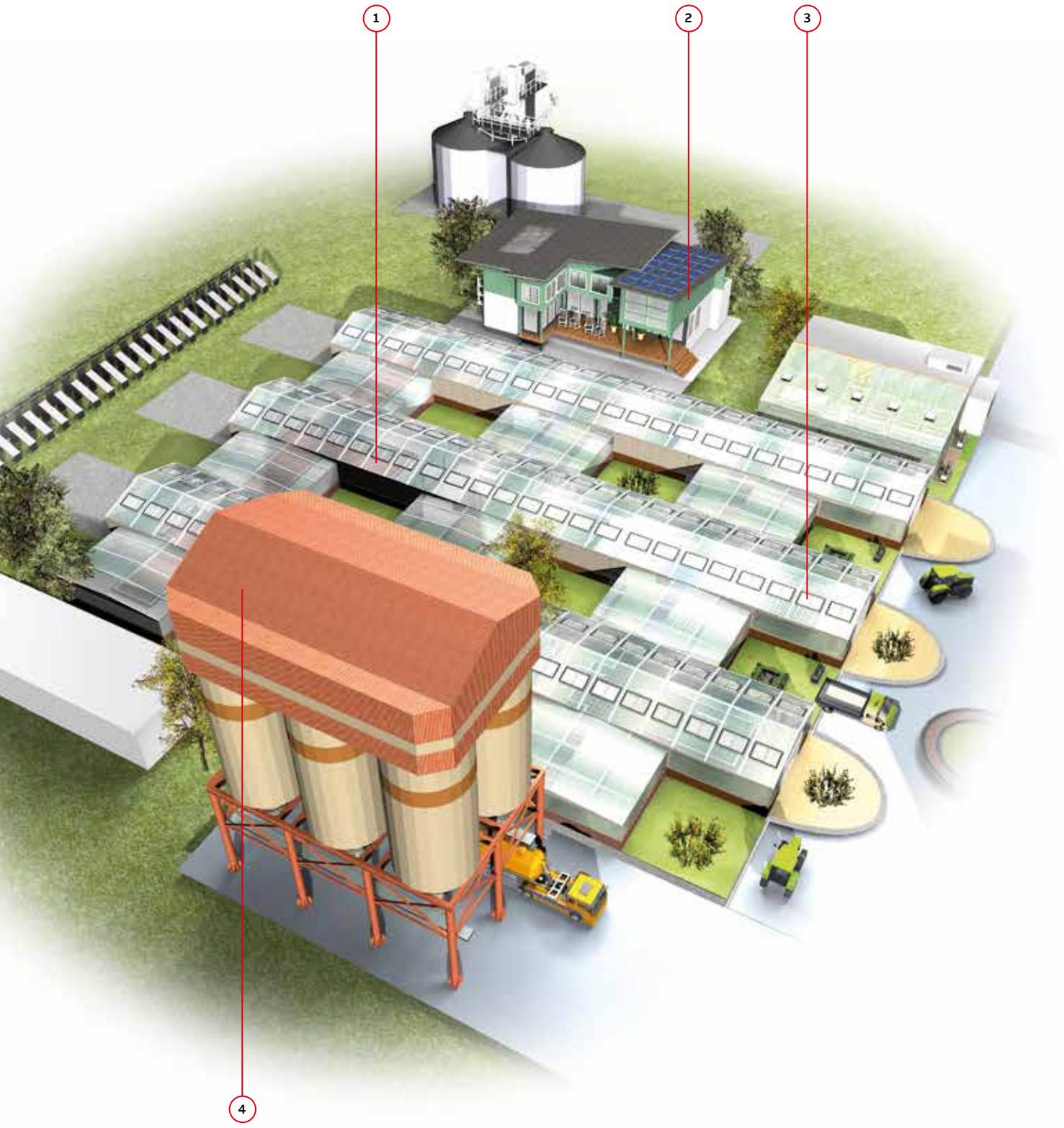


THS-S



AT1e-R





D1



D2



Order codes

AT electro-mechanical time switches

Contact	Version	Description type	ABB code	Bbn 8012542 EAN	Piece weight kg	Nr of modules	Pack.
1NO	Daily time switch without reserve	AT1e	2CSM231205R0601	312055	0.095	1	1
1NO	Daily time switch, running reserve	AT1e-R	2CSM231215R0601	312154	0.095	1	1
1NO/1NC	Daily time switch without reserve	AT2	2CSM204105R0601	041054	0.118	2	1
1NO/1NC	Daily time switch, running reserve	AT2-R	2CSM204115R0601	041153	0.118	2	1
1NO/1NC	Weekly time switch, running reserve	AT2-7R	2CSM204125R0601	041252	0.118	2	1
1NO/1NC	Daily time switch without reserve	AT2e	2CSM231225R0601	312253	0.118	2	1
1NO/1NC	Daily time switch, running reserve	AT2e-R	2CSM231235R0601	312352	0.118	2	1
1NO/1NC	Weekly time switch, running reserve	AT2e-7R	2CSM231245R0601	312451	0.118	2	1
1NO/1NC	Daily time switch without reserve	AT72e	2CSM231255R0601	312550	0.142	-	1
1NO/1NC	Daily time switch, running reserve	AT72e-R	2CSM231265R0601	312659	0.142	-	1
1NO/1NC	Weekly time switch, running reserve	AT72e-7R	2CSM231275R0601	312758	0.142	-	1

D Line digital time switches

Contact	Version	Description type	ABB code	Bbn 8012542 EAN	Piece weight kg	Nr of modules	Pack.
1NO/NC	1 channel	D1	2CSM258763R0621	587637	0.140	2	1
1NO/NC	1 channel with key	D1 PLUS	2CSM257583R0621	575832	0.140	2	1
1NO/NC	1 channel with key synchronizable	D1 SYNCHRO	2CSM257493R0621	574934	0.140	2	1
2NO/NC	2 channels	D2	2CSM256313R0621	563136	0.140	2	1
2NO/NC	2 channels with key	D2 PLUS	2CSM277583R0621	775836	0.140	2	1
2NO/NC	2 channels with key synchronizable	D2 SYNCHRO	2CSM277363R0621	773634	0.140	2	1
-	Programming key	D KEY	2CSM277143R0621	771432	0.002	-	1
-	Programming software for D Line	D SW	2CSM299973R0621	999737	0.005	-	1
-	DCF77 antenna for D Line	D DCF77	2CSM299983R0621	999836	0.150	-	1
-	GPS antenna for D Line	D GPS	2CSM299993R0621	999935	0.150	-	1

—
E 232 staircase lighting switches

Contact	Version	Description type	ABB code	Bbn 8012542 EAN	Piece weight kg	Nr of modules	Pack.
1...7 min		Electro-mechanical staircase light switch	E 232-230V	2CDE110000R0501	548243	0.081	1 10
0.5...20 min		Electronic staircase light switch	E 232E-230N	2CDE110003R0511	654166	0.083	1 10
0.5...20 min		Multivoltage electr. staircase light switch	E 232E-8/230N	2CDE010003R0511	654173	0.092	1 10
0.5...20 min		Multifunction electr. staircase light switch	E 232E-230Multi 10	2CDE110013R0511	654180	0.082	1 10
0.5...20 min		Multifunction multivoltage electr. staircase light switch	E 232E-8/230Multi 10	2CDE010013R0511	654197	0.093	1 10

—
T Line twilight switches and TWA astronomical twilight switches

Contact	Version	Description type	ABB code	Bbn 8012542 EAN	Piece weight kg	Nr of modules	Pack.
1NO		Twilight switch, 1 CH	T1	2CSM295563R1341	955634	0.076	1 1
1NO		Twilight switch advanced, 1 CH	T1 PLUS	2CSM295793R1341	957935	0.078	1 1
1NO		Twilight switch pole mounted, 1 CH	T1 POLE	2CSM295753R1341	957539	0.140	- 1
-		External sensor	LS-D	2CSM295723R1341	957232	0.069	- 1
1NO/NC		Astronomical twilight switch, 1 CH	TWA-1	2CSM204365R1341	043652	0.160	2 1
2NO/NC		Astronomical twilight switch, 2 CH	TWA-2	2CSM204375R1341	043751	0.160	2 1

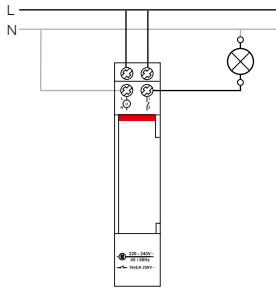
—
THS modular thermostats

Contact	Version	Description type	ABB code	Bbn 8012542 EAN	Piece weight kg	Nr of modules	Pack.
1NO/NC		Modular thermostat 0...+60 °C	THS-W	2CSM207083R1380	070832	0.180	2 1
1NO/NC		Modular thermostat -20...+40 °C	THS-C	2CSM251163R1380	511632	0.180	2 1
2NO		Modular thermostat for switchboards	THS-S	2CSM236803R1380	368038	0.200	2 1
-		Temperature detecting sensor, 1.5 m	THS-1	2CSM202033R1380	020332	0.0035	- 1
-		Temperature detecting sensor, 4 m	THS-4	2CSM277603R1380	776031	0.0035	- 1

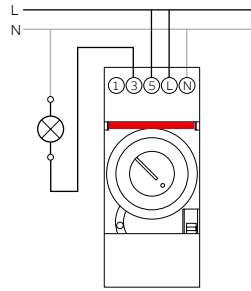
Wiring diagrams

AT electro-mechanical time switches

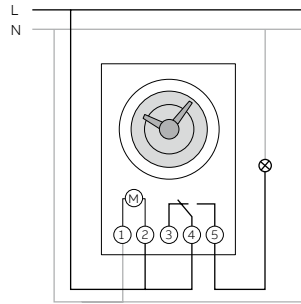
AT1e, AT1e-R



AT2, AT2-R, AT2-7R

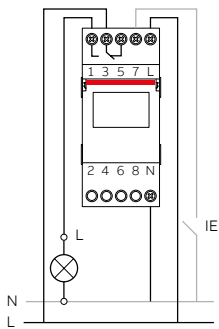


AT72e, AT72e-R, AT72e-7R

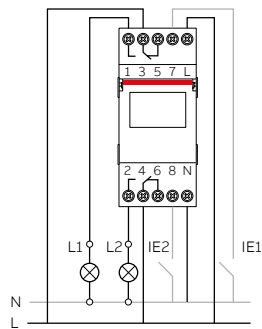


D Line digital time switches

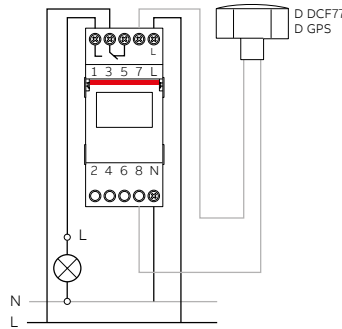
D1, D1 PLUS



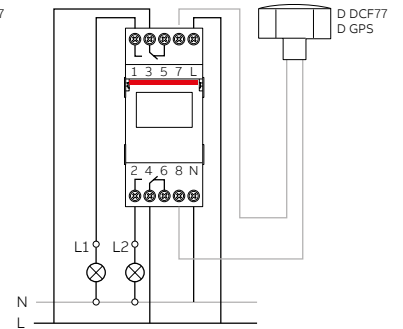
D2, D2 PLUS



D1 SYNCHRO

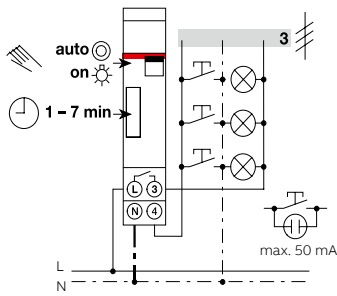


D2 SYNCHRO

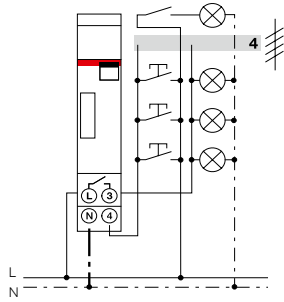


E 232 staircase lighting switches

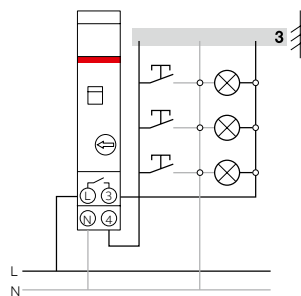
**3-wire configuration
E 232-230**



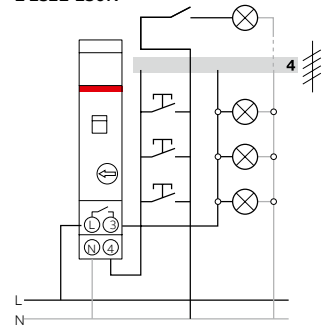
**4-wire configuration
E 232-230**



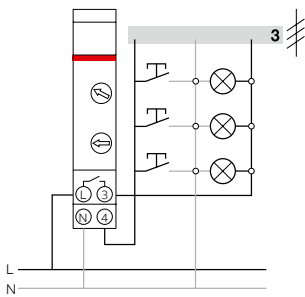
**3-wire configuration
E 232E-230N**



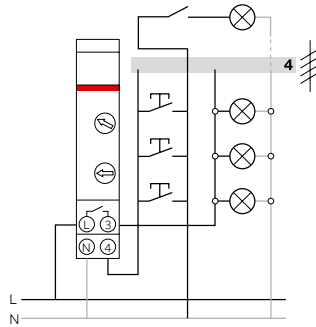
**4-wire configuration
E 232E-230N**



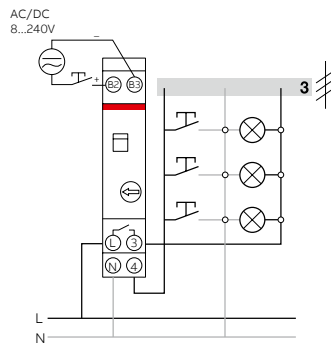
**3-wire configuration
E 232E-230Multi 10**



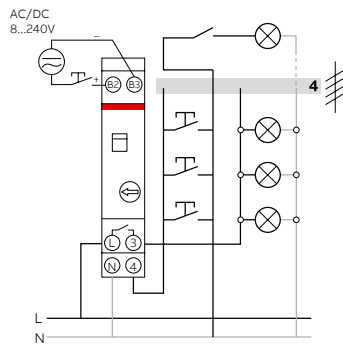
**4-wire configuration
E 232E-230Multi 10**



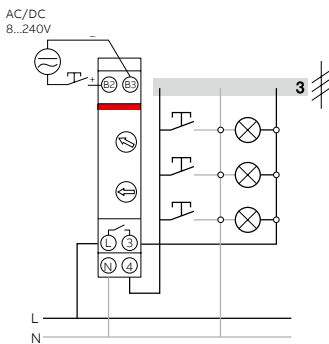
**3-wire configuration
E 232E-8/230N**



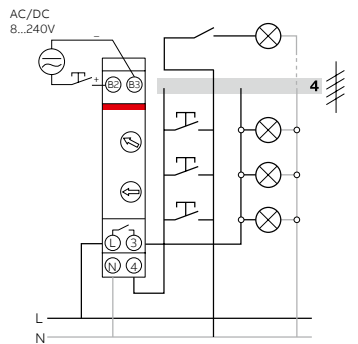
**4-wire configuration
E 232E-8/230N**



**3-wire configuration
E 232E-8/230Multi 10**

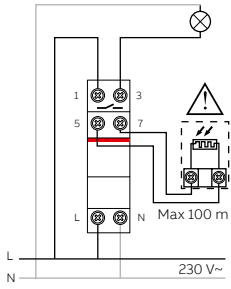


**4-wire configuration
E 232E-8/230Multi 10**



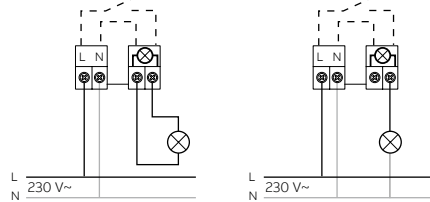
T Line twilight switches and TWA astronomical twilight switches

T1, T1 PLUS

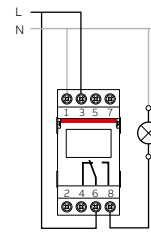


T1 POLE

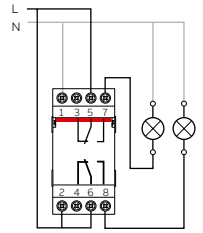
230 V~ -30T60
~16 (3)A / 250 V~



TWA-1

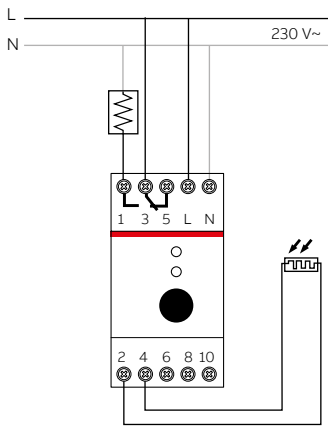


TWA-2

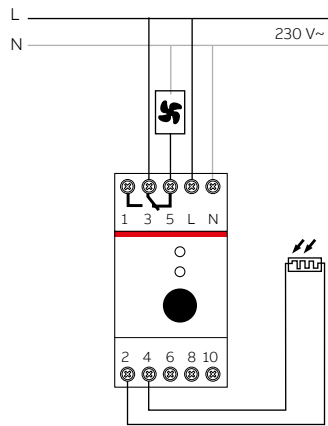


THS modular thermostats

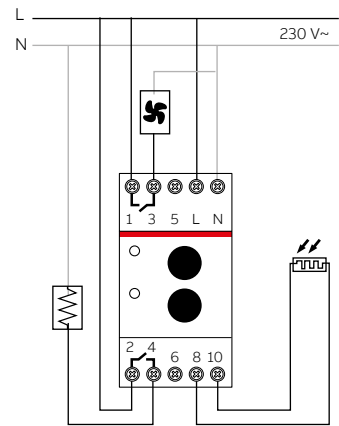
THS-C Heating



THS-W Cooling



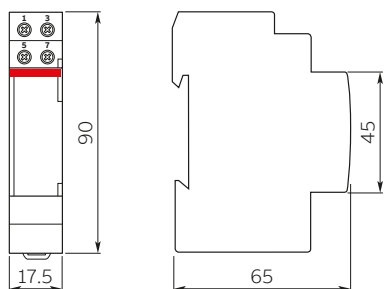
THS-S



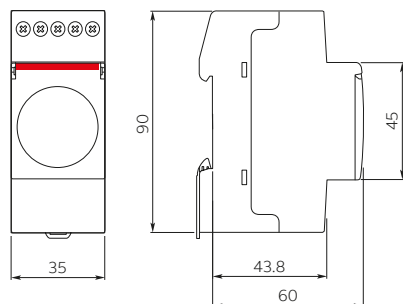
Overall dimensions

AT electro-mechanical time switches

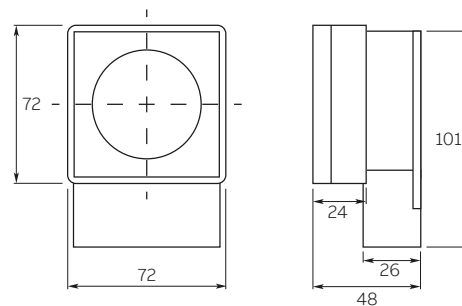
AT1e, AT1e-R



AT2, AT2-R, AT2-7R, AT2e, AT2e-R, AT2e-7R

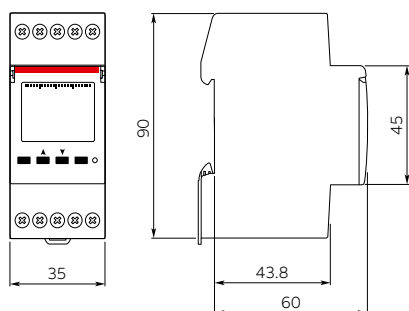


AT72e, AT72e-R, AT72e-7R



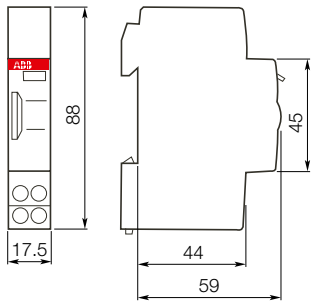
D Line digital time switches

D1, D1 PLUS, D2, D2 PLUS D1 SYNCHRO, D2 SYNCHRO

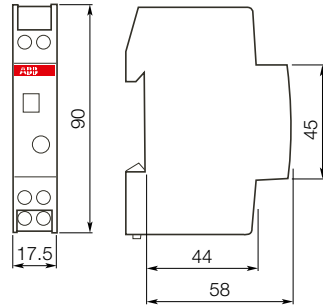


E 232 staircase lighting switches

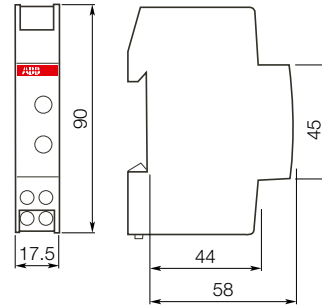
E 232-230



**E 232E-230N
E 232E-8/230N**

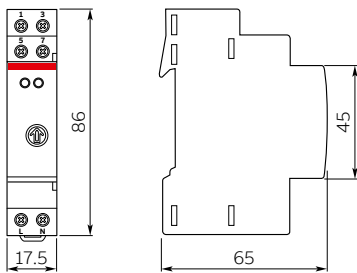


**E 232E-230Multi 10
E 232E-8/230Multi 10**

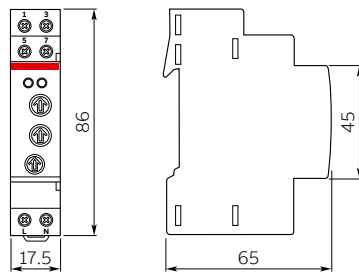


T Line twilight switches and TWA astronomical twilight switches

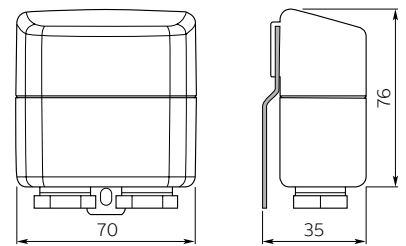
T1



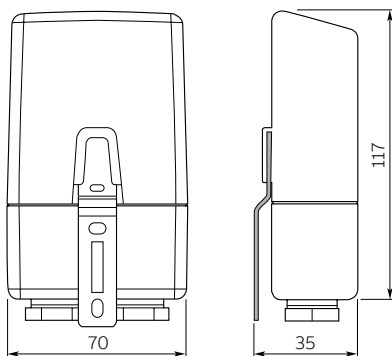
T1 PLUS



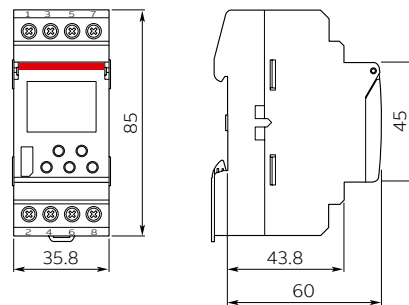
LS-D



T1 POLE



TWA-1, TWA-2



Frequently asked questions

When is it better to use a digital time switch rather than an electro-mechanical one?

Digital time switches are more accurate, take less time to switch and have many more programming functions (impulsive, cyclic, random, vacation modes, etc.) than electro-mechanical time switches. Moreover, they have a longer-lasting running reserve (years instead of hours) since they have no moving mechanical parts. Whatever the application, when there are numerous, frequent and different operations (daily, weekly or annual), the D or D365 Line series time switches provide a better performance with only a little difference in price.

The permanent OFF position in an electro-mechanical time switch is not available for the 1-channel model. How can it be obtained?

The permanent OFF position is used for servicing work or holiday periods. In both cases, the load can be disconnected permanently by merely disconnecting the protection on the supply side.

Can more than one sensor be connected with models T1 and T1 PLUS?

No, one sensor must always be used for each device.

Can different types of sensors be connected with models T1 and T1 PLUS?

No, the only sensor allowed is the LS-D type.

When must an astronomical time switch be used?

When the length of the connection between the device and sensor exceeds 100 m, or when the connection is too complicated (e.g., switchboard installed in a cellar).

When the sensor cannot be installed away from light sources (amusement parks, camp sites, etc.).

When external agents prevent the sensor from functioning correctly, e.g. pollution or vandalism.

Glossary

Electro-mechanical: time switch programmed by moving the positions of the tappets and synchronized with a quartz battery or via the network frequency.

Digital: electronic time switch equipped with an LCD display and sometimes with a programming key so that programs can be exchanged.

Daily time setting: 24-hour periodic programming.

Hourly time setting: 1-hour periodic programming.

Weekly time setting: 7-day periodic programming.

Yearly time setting: 1-year periodic programming.

Running reserve: interval of time during which a switch may function normally without network supply voltage thanks to an internal backup battery.

Minimum switching time: the shortest time between an ON-OFF cycle.

Tappets: small sliding segments, generally arranged in a circle on the frontal dial of an electro-mechanical time switch. Their width represents the minimum switching time.

Impulsive programming: programming function with an extremely short load switching time.

Cyclic program: programming function for periodically switching the load.

Lux: this is the International System's unit of measurement for illumination (lx symbol).

DCF77: the official German time signal permanently transmitted from Mainflingen, Germany (50° 01' N, 09° 00' E) with 50 kW power. The emitter's reception range is around 2,500 km with a precision of 1 second every 300,000 years.

GPS: the Global Positioning System (GPS) is a satellite positioning system with continuous, worldwide coverage. It is controlled by the US Department of Defense. The GPS system combines the time supplied by various atomic clocks installed on board its satellites, while a network of terrestrial stations determines and corrects the errors. Since the time is obtained from several different sources at the same time, the clock can automatically compensate for propagation delays and other problems, thus achieving a precision of less than one second.

Astronomical time switch: twilight or digital time switch able to forecast the exact time the sun rises and sets according to the date and latitude in which it is installed, without requiring an external light sensor.

Switching delay: switching delay of a twilight switch. It prevents untimely switching due to rapid changes in the degree of light caused by external factors (e.g. the headlights of a vehicle or the shadow cast by a cloud).

Hysteresis: interval between light intensity values that cause the ON-OFF switch to function: it prevents switching oscillations at dawn and dusk.

EEPROM memory: programmable, non-volatile electronic memory device that keeps store and safe the time and date settings even during a power failure.

Network frequency synchronizing: synchronizing system of an electro-mechanical time switch by means of the network frequency, usually ensured by a contract with a Public Utility Company.

Additional information

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