BETA Switching

Timers

■ **Overview**

Devices	Page	Field of application	Standards	Used in		
				Non-residential buildings	Residential buildings	Industry
Digital time switches	9/3	Minute-precise switching of devices and system components in daily, weekly and yearly programs. Unique due to the wide variety of functions offered by the Mini and Top versions; for PC programming Astro, Profi and Expert	IEC 60730-1 and IEC 60730-2-7 EN 60730-1 and EN 60730-2-7 VDE 0631 Part 1 and Part 2-7 UL 60730	✓	✓	✓
Mechanical time switches	9/10	Accurate and 15-minute switching accuracy. With automatic time setting during commissioning and automatic switching to daylight savings.	IEC 60730-1 and IEC 60730-2-7 EN 60730-1 and EN 60730-2-7 VDE 0631 Part 1 and Part 2-7 UL 60730	✓	✓	✓
Timers for buildings	9/15	Stairwell lighting timers ensure the safe use of stairwells and save energy. Expanded applications for common rooms and garages, as well as the time switching of ventilators and fluorescent lamps.	IEC 60699 EN 60669, DIN 18015	✓	✓	
Timers for industrial applications	9/20	Multifunctional, delay, wiper, flashing and OFF-delay timers in control circuits expand the use of distribution boards in both small and large plants.	IEC 60255 EN 60255			✓

9

Overview

These days, time switching is taken for granted.

In fact, it is now hard to imagine many process sequences and energy saving processes without time switching. It could also be claimed that time switching satisfies a basic need.

The new generation of digital time switches have a much more diverse range of functions than earlier devices and, thanks to better solutions, are simpler to operate.

They can be used for switching systems or system components, or for functions, such as: irrigation systems, greenhouses, public gardens, swimming pools, filtering installations, canopy controls, school bells, church bells, shop window lighting, advertising lighting, gym lighting, traffic signal controls, street lighting, illuminated signs, office lighting, lighting of stairwells and entrances, object illumination, preheating of industrial furnaces, spraying machines, ovens, heating systems, air-conditioning systems, fans and ventilation systems, heating and circulation pumps and sauna systems.

All devices have the VDE mark and are approved acc. to UL.

Benefits

- The menu-assisted operation with background lighting, contrast setting of the display and illuminated keys offer a clear overview for any application.
- The text-assisted programming of the time switches with their logical 4 pushbutton system and extremely intuitive menu-driven handling enables time saving during installation and spares users the time-consuming chore of reading long-winded operating instructions.
- Simple programming on the PC enables the fast creation and copying of complicated switching programs, thus saving time and eliminating errors.
- A data key simplifies programming and saves enormous amounts of time during commissioning, maintenance and data transmission.

9

BETA Switching
Timers

Digital time switches

■ **Technical specifications**

		Mini 7LF4 401	Top 7LF4 411 7LF4 412	Profi 7LF4 421 7LF4 422	Astro 7LF4 431 7LF4 432	Expert 7LF4 444
Standards		EN 60730-1, -2-7; VDE 0631-1, -2-7; UL 60730				
Approved acc. to		VDE, UL 60730/UL 917 CSA C22.2 No. 14 and 177				
Supply						
• Rated control supply voltage U_c	V AC	230	120, 230	120, 230	230	120/230
	V AC/DC	--	--	24	--	24
- operating range	x U_c	0.85 ... 1.1	0.85 ... 1.1	0.85 ... 1.1 [1]	0.85 ... 1.1	80 .. 253 V [1]
• Rated frequency	Hz	50	50	50	50	50
- frequency range	Hz	50 ... 60	50 ... 60	50 ... 60 [2]	50 ... 60	50 ... 60 [2]
• Rated power dissipation P_v	VA	1.5	2	2	2	2.5/4 [3]
Channels/contacts						
• Switching channels		1	1 or 2			4
- rated operational voltage U_e	V AC	250				
- rated operational current I_e at p.f. = 1	A	16				
at p.f. = 0.6	A	10				
• Contacts		1 CO	1 or 2 CO			4 CO
- mechanical switching cycles (in millions)		30	10			
- electrical switching cycles at p.f. = 1		80000	100000			
• Maximum contact load	V; mA	12; 100				
- incandescent lamp load	A	5	8			
- fluorescent lamp loads at 7 µF	VA	--	60			
uncorrected	VA	1400				
Safety						
• Different phases permissible between drive/contact		Yes				
• Rated impulse withstand voltage U_{imp} Drive/contact	kV	4				
- EMC: burst acc. to IEC 61000-4-4	kV	> 4.4				
- EMC: surge acc. to IEC 61000-4-5	kV	> 2.0				
- electrostatic discharge acc. to IEC 61000-4-2	kV	> 8.0				
• Power reserve storage	a	> 100 h	6		5	
- minimum loading time	h	48	--			
- battery type		NiMH cell	Li primary cell			
- service life at 20 °C	a	10				
at 40 °C	a	5				
• Program memory non-volatile		--	Yes			
• Overvoltage category acc. to EN 61010-1		III				
Function						
• Minimum switching sequences	min	1				1 s
• Make and break cycles	min	1				1 s
• Clock errors per day typical	s/day	± 2.5	± 0.86	± 0.2		
• Control input terminal S		--			Yes	
• Memory spaces						
- programs [4]		8	56 (2 × 28)		28 (2 × 14)	4 × 3 × 28
- pulse (alternatively)		--		84	--	
- pulse cycle		--		1 s ... < 60 min	--	
Connections						
• Terminals ± screw (Pozidriv)		PZ 1				
• Conductor cross-sections of main current paths						
- rigid, max.	mm²	4				
- rigid, min.	mm²	1.5				
- flexible, with end sleeve	mm²	2.5				
- flexible, without end sleeve	mm²	4				
Environmental conditions						
• Permissible ambient temperature	°C	-10 ... +55	-20 ... +55			
• Storage temperature	°C	-20 ... +60				
• Resistance to climate acc. to EN 60068-1		20/055/21				
• Degree of protection acc. to EN 60529		IP20, with connected conductors				
• Safety class acc. to EN 60730-1		II				

[1] For 24 V devices (7LF4 421-2, 7LF4 422-2 and 7LF4 444-2):
Tolerance 10/+ 10%; operating range 0.9 ... 1.1 x U_c.

[2] For 24 V devices (7LF4 421-2, 7LF4 422-2 and 7LF4 444-2):
Frequency range 0 ... 60 Hz.

[3] For 24 V device (7LF4 444-2): P_v = 4 VA.

[4] A program consists of an ON time, an OFF time and assigned
ON and OFF days or day blocks.

9

Selection and ordering data

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per P. unit approx
		V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	Mini digital time switches											
	• Week program											
	1 channel											
	1 CO	250	16	230	1	►	**7LF4 401-0**		027	1	1	0.185
	Top digital time switches											
	• Week program • With text-assisted programming concept Languages: German, English, French, Italian, Spanish, Dutch, Spanish											
	1 channel • 56 programs											
	1 CO	250	16	230	2	►	**7LF4 411-0**		027	1	1	0.230
	1 CO	250	16	120	2	B	**7LF4 411-1**		027	1	1	0.230
	2 channels • 56 programs (28 per channel)											
	2 CO	250	16	230	2	A	**7LF4 412-0**		027	1	1	0.230
	2 CO	250	16	120	2	B	**7LF4 412-1**		027	1	1	0.230
	Profi digital time switches											
	• Week program • With text-assisted programming concept Languages: German, English, French, Italian, Spanish, Dutch, Spanish • Simple program creation by means of PC using the software included with the 7LF4 940-0 USB adapter • Vacation program • Random program • Operating hours meter, counting range: 65535 h											
	1 channel • 56 programs • Pulse function, 84 start times											
	1 CO	250	16	230	2	A	**7LF4 421-0**		027	1	1	0.235
	1 CO	250	16	120	2	B	**7LF4 421-1**		027	1	1	0.235
	1 CO	250	16	24 AC/DC	2	A	**7LF4 421-2**		027	1	1	0.235
	2 channels • 56 programs (28 per channel)											
	2 CO	250	16	230	2	A	**7LF4 422-0**		027	1	1	0.270
	2 CO	250	16	120	2	B	**7LF4 422-1**		027	1	1	0.270
	2 CO	250	16	24 AC/DC	2	B	**7LF4 422-2**		027	1	1	0.270
	Astro digital time switches											
	• Week program • Astro function • With text-assisted programming concept Languages: German, English, French, Italian, Spanish, Dutch, Spanish • Simple program creation by means of PC using the software included with the 7LF4 940-0 USB adapter • Vacation program • 1 h-test • Input disable over PIN code • Operating hours meter, counting range: 65535 h											
	1 channel • 28 programs • With control input, delay time 0 min ... 23 h 59 min											
	1 CO	250	16	230	2	►	**7LF4 431-0**		027	1	1	0.235
	2 channels • 28 programs (14 per channel)											
	2 CO	250	16	230	2	►	**7LF4 432-0**		027	1	1	0.270

9

BETA Switching
Timers

<div style="background:#b00">

Digital time switches

</div>

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per P. unit approx
		V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	Expert digital time switches											
	• Week program • Year program • Exception program (priority program) • Astro function • With text-assisted programming concept Languages: German, English, French, Italian, Spanish, Dutch, Spanish • Simple program creation by means of PC using the software included with the 7LF4 940-0 USB adapter • Cycle function for channel 1 • Vacation function • 1h-Test • Input disable over PIN code • Operating hours meter, counting range: 65535 h • 84 programs per channel • With control input, delay time 0 min ... 23 h 59 min. • with Expert data key, Order No. 7LF4 940-2											
	• 4 channels											
	4 CO	250	16	120/230	6	▶	**7LF4 444-0**		027	1	1	0.455
	4 CO	250	16	24 AC/DC	6	B	**7LF4 444-2**		027	1	1	0.451
	Data keys for digital time switches Profi and Astro											
	• Programming at the PC (7LF4 940-0 USB adapter and software required) • Read-in of programs to the time switch • Writing of programs from the time switch • Transfer of programs - from PC to time switch and vice versa - from time switch to time switch					B	**7LF4 940-1**		027	1	1	0.003
	Data keys for Expert digital time switch											
	• Programming at the PC (7LF4 940-0 USB adapter and software required) • Read-in of programs to the time switch • Writing programs from the time switch • Transfer of programs - from PC to time switch and vice versa - from time switch to time switch					B	**7LF4 940-2**		027	1	1	0.003
	USB adapters and software for digital time switches Profi, Astro and Expert											
	• For the reading and writing of data keys at the PC • with programming software • with one data key for Profi, Astro Order No. 7FL4 940-1 • Can be connected over USB interface • System requirements: - Windows 2000, Windows ME, Windows XP or Windows 98 Second Edition - USB connection - 40 MB free disk space					B	**7LF4 940-0**		027	1	1	0.125

9

* You can order this quantity or a multiple thereof.
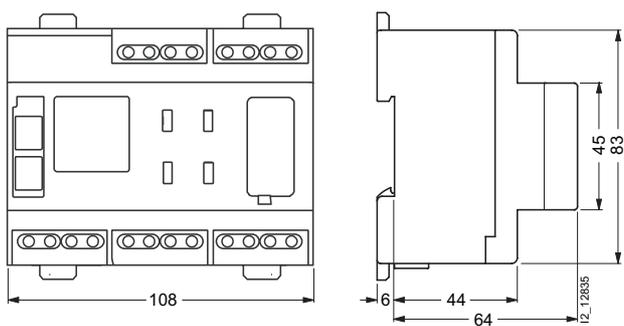
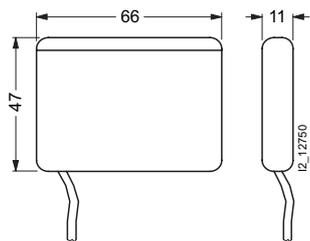## ■ Dimensional drawings

7LF4 401
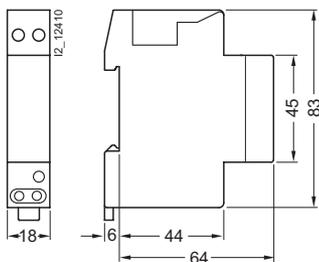
7LF4 41.
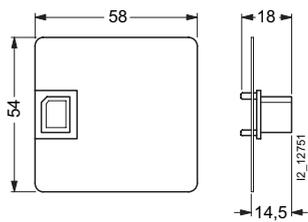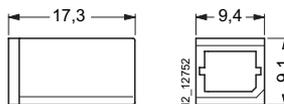7LF4 42.
7LF4 43.
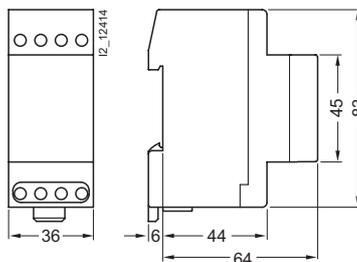
7LF4 444

7LF4 940-0
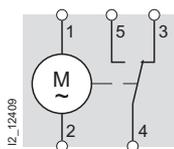Card reader for USB connection

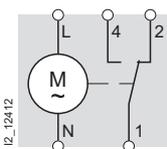Plug-in card for data key

7LF4 940-1
7LF4 940-2

■ Schematics

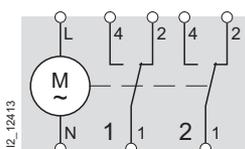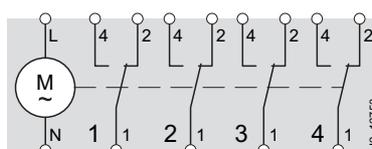7LF4 401

7LF4 411
7LF4 421
7LF4 431

7LF4 412
7LF4 422
7LF4 432

7LF4 444

BETA Switching
Timers

Digital time switches

■ **More information**

Digital time switches Mini

The Mini digital time switch with a width of only 1 MW and its hour, day and week program is particularly ideal for replacing 1 MW time switches in distribution boards with limited space.

Digital time switches: Top, Profi, Astro and Expert

Whether you are programming locally using the text-assisted programming, or sitting comfortably in front of your PC, the task is quicker and easier with the digital time switches; Top, Profi, Astro and Expert.

Simple operation:

Four programming pushbuttons offer user-friendly assistance with a text menu.

Easy-to-read display:

And if you need to change the settings of the digital time switch at the back of a dark control cabinet, the integral background lighting of the display and the lighting of the control elements offer a clear overview.

Easy commissioning:

You can get started with the programming straight away. Profi, Astro and Expert are supplied with the time, date and automatic daylight savings for Central Europe already set.

Clear contrast:

In order to maintain an overview even in bad light conditions and extreme temperatures, the contrast of the display can be adjusted - practical down to the very last detail.

Convenient programming:

It has never been so easy and uncomplicated to operate and program a digital time switch.

1-channel time switches allow input of up to 56 switching programs, 2-channel time switches allow up to 28 programs per channel and 4-channel time switches up to 84 programs per channel. This means that the time switches Profi, Astro and Expert are ideally equipped for even the most complex of tasks.

Each entry required is clearly indicated so that you don't even need the operating instructions.
Particularly practical: you can even program the digital time switches without the supply voltage being applied.

The digital time switches Profi, Astro and Expert offer more than reliable switching. Numerous integrated convenience functions make them versatile and simple problem solvers.

A data key enables easy programming of the digital time switches Profi, Astro and Expert at a PC, simplifies the setting of time switch programs and saves enormous amounts of time. It also minimizes errors and supports the copying of time switch programs to different switches.

Astro function:

The Astro and Expert time switches have one key strength, the Astro function. The exact time of sunrise and sunset is available for every location and every day in the year. This means, for example, that the connected outer lighting is only switched on when it is dark - whether it is winter when the days are shorter or in summer when the days are much longer. The benefits are obvious:

● Cost-savings, because electricity is only used when the lighting is really needed, and because this prolongs the service life of the lighting itself. Particularly in the case of dusk-dependent lighting controls.
● Safety and convenience, because the light is always switched on when it's dark.
● Easy to use, because the digital time switch doesn't have to be reprogrammed throughout the year.
● Installation couldn't be easier, because Astro digital time switches work in the distribution board. No further need for laborious cable laying to the light sensors. The compact 2-MW series is also ideally suited for retrofitting or replacement.

It goes without saying that the digital time switches Astro and Expert don't just switch at dawn and dusk, complex, combined programs are also possible. You always have the choice between astronomically calculated and individually set switching times, or a combination of both.

PC programming

The digital time switches Profi, Astro and Expert support plug-in data keys. This provides even greater safety and convenience.

For example, the data key lets you read out a program from a digital time switch, copy it to a PC, where it can be saved and edited - or simply transfer it to another time switch. It goes without saying that you can work with several data keys and it will only take seconds to change programs.

A safety copy ensures fast service. So if a time switch has been interfered with, you can simply use the data key to transfer the stored program back to the time switch.

Thanks to the standard operator interface, based on MS-Office, there is no need for laborious program training.

Pulse function for 1-channel devices

With the pulse function, up to 84 start times and a pulse time can be programmed onto the time switch. The pulse duration can be selected between 1 s and 59 min 59 s.

Random function:

If the random function is activated, the set switching times are shifted within a range of +/- 30 min.

Operating hours meter:

For commercial fields of application in particular, it is often necessary to establish the running time of the switched load, e.g. lighting. The operating hours meter shows the total ON time per channel and the date of the last reset.

Vacation period function:

In the vacation program, the vacation period are set with start and end date. If the vacation program is activated, the digital time switch does not carry out any programmed switching commands during the relative period but, depending on the respective input, is set to "CONTINUOUSLY OFF" or "CONTINUOUSLY ON" during the vacation period. At the end of the specified vacation period, the digital time switch automatically resumes execution of the switching commands according to the programmed switching times.

Control input:

The delay time that can be set in the control input enables an additional switching of the relay, parallel to the switching program.

Adjustable delay time 0 min ... 23 h 59 min, the delay time starts as soon as the voltage drops out at the control input.

1h test:

The "1H TEST" function can be used for simulating switching. If "1H TEST" is activated, the switching outputs are switched for one hour. At the end of the specified time, the digital time switch automatically resumes execution of the switching commands according to the programmed switching times.

PIN code:

Input and programming can be disabled using a four-digit PIN code.

Week programs:

Programs that are designed to be repeated regularly every week, e.g. light control, heating control. A week program comprises an ON/OFF time and assigned ON/OFF days.

Year programs:

Programs that are only to be executed within a defined period of validity. They overlap with the week programs of the same channel according to an OR operation. The period of validity is specified by entering the start/end date. Validity from start date 00:00:00 to end date 24:00:00. The start date must be prior to the end date. Within their period of validity, these programs act as week programs. Outside their period of validity, these programs have no influence on the switching behavior.

Exception programs:

have a higher priority as week and year programs. Week programs and year programs of the same channel will not be executed within the period of validity of an exception program, However, within the period of validity other exception programs will be executed. The different exception programs overlap according to an OR operation.

Cycle function:

On the year time switch, channel 1 has an additional option for "cyclic switching". The term "cyclic switching" means that within a specific period, the time switch is switched on for a specific duration (ON time).
The cycle time can be set between 2 seconds and 2 hours.
The ON time can be set between one second and one hour.

USB adapters

The Profi, Astro and Expert time switches are easy to program at the PC using the data key with the USB adapter and software. This enables the simple and fast creation of complicated time switch programs. Storing and copying time switch programs are also very easy and convenient.
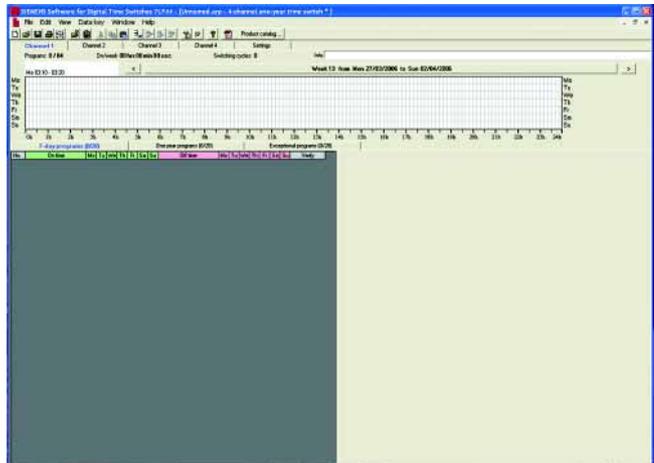
• You can create switching programs for digital time switches easily and conveniently at the PC in the comfort of your own home, store it on the data key and transfer it to the time switch on site.

• Not only do you save time when creating and transferring programs, but also during maintenance.

9