

Operation manual

UV-Monitor UVT 16



UV - Monitor UVT 16 software version V1.4

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Use

The UVT 16 Monitor is used to monitor signals from UV probes or sensors applied to sources of radiation, providing a control system for small items of UV equipment.

Description

The monitor is designed for installation on a control panel. At the rear of the device are placed pluggable terminals for all connections. The front plate contains the five keypads, three status LEDs and a two-line alphanumeric display showing the metered values and other information. The readings to be shown can be pre-selected from the menu and/or called up by pressing the keypads. These pads are also used to make the settings and to program the functions of the monitor. The functionality of the software V1.4 is slightly enlarged in details but apart from that identical with the previous version.

Technical data



Supply voltage	230 V AC 50 to 60 Hz; power taken up 2,5 W (110 V on request)
Size W x H x D	Casing for installation into control panel 96 x 96 x 64
Measurements for installation	Installed depth incl. clips 75 mm Area of cut-out $92^{+0.8} \times 92^{+0.8}$ acc. to DIN 43700 Installation method: screw-down clips
Connections	Two 14-pole push-on connections with screws to fix Suitable wiring: 0.25 to 1.5 mm ² cross-section
Display	Three status LED and alphanumeric two-line LCD display, with press-button illumination LED thresholds: green > 70 %, yellow 70 % to 50 %, red < 50 %. Figures possible to display on LCD: UV level, alarm, rate of flow, lamp life (in hours), overall operating hours, no. of switch-on cycles, software version (All factory settings can be reset)
Operation	By means of 5 keypads on front of device
Temperature	Ambient temperature 0 to 40° C
Weight	Approx. 400 g
Inputs	<ul style="list-style-type: none"> - UV input via diode (can be set in two stages internally) - Input for current loop sensors 4 to 20 mA, internal apparent ohmic resistance 100 Ω - Input for UV sensor with voltage output options: max. 10 V; Ri = 50 KΩ max. 5 V; Ri = 25 KΩ max. 2 V; Ri = 10 KΩ - Input for switch-on cycles: without potential, for (mains) 230 V AC signal - Input, lamp failure (e.g. electronic ballast relay contact) Ie = 5 mA - Input, alarm off – switch or button; alarm blocked during servicing or maintenance
Outputs	<ul style="list-style-type: none"> - Output, 4 to 20 mA, can be set or calibrated using menu, apparent ohmic resistance 100 Ω - Supply voltage for voltage and current sensors: (output voltage 24 V DC, will take max. 60 mA) - Early warning, relay contact - closer - Main alarm, changeover relay contact, contact will take I_{min} = 50 mA at 5 V DC, I_{max} = 5 A at 250 V AC, resistive load - RS 232 output on request
Additional functions	Integral meters for: <ul style="list-style-type: none"> Overall operating hours (no reset possible) No. of operating hours left for lamp (reset by operator possible) No. of switch-on cycles (reset by operator possible) “Change lamp” display “Lamp failure” display “Alarm” or “Early Warning” display.

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Connections

1/2: Input mains electricity 230 V AC

3/4/5: Output alarm 1 (changeover contact):
main alarm will take (current) at (resistance)
 $I_{min} = 50 \text{ mA at } 5 \text{ V DC,}$
 $I_{max} = 5 \text{ A at } 250 \text{ V AC}$

6/7: Output alarm 2 (closer): pre alarm
Threshold can be set from menu
Contact resistance levels as for main alarm

8/9: Input “alarm off”
When the switch/contact is closed, all
alarm signals are blocked

8/10: Input “lamp failure”: provided for connection of the electronic ballast contacts with no potential – the lamp failure alarm is triggered on closure ($I_e = 5 \text{ mA}$)

11/12: Input “switch-on cycles” input with no potential for a 230 V AC signal (i.e. lamp supply voltage): the internal cycle meter goes up by 1 each time this voltage is switched on. The hours of operation are metered continuously while the 230 V AC signal is being received. If the monitor is switched on simultaneously with the lamps, and there is no separate electricity supply for lamps and monitor, this input must be provided with mains voltage from contact nos. 1/2.

13/14: Output, supply voltage for voltage and current sensors: for hardware 2.1 and higher, 13 (-) already connected internally to ground 21/26

15/16/17: RS 232 interface: this is for factory programming and can be programmed on request as an optional extra

18/21: Output, 0/4 to 20 mA: for transmission of a standardised value over a considerable distance to an external, higher-level control system (PLC)

19/20: Inputs, 0/4 to 20 mA: available for additional sensors, e.g. sensors to measure flow rate or temperature (as optional extra)

21/26: Input Ground, equal to 26, internally connected to 13

22/23/24: Input for UV sensors with voltage output (DVGW/ÖNORM standard).
Supply voltage for these sensors is at output 13/14

25: Input for UV sensors with 0/4 to 20 mA current output (DVGW/ÖNORM)

26: Input Ground, equal to 26, internally connected to 13

27/28: Input for as many UV diodes as required; 2 sensitivity levels can be set by means of an internal jumper – the factory setting is the high level, suitable for UV sensors based on silicon carbide, and if the sensor is based on gallium phosphate or silicon the jumper setting must be changed; there is a menu for calibration to match the lamp

15	Tx	RS232	24VDC +	14	
16	Rx		60mA -	13	
17	Gnd		Schaltzyklus 230VAC	12	
18	+IOUT 0/4-20mA				11
19	+IIN2 0/4-20mA		Strahlerausfall Alarm aus	10	
20	+IIN1 0/4-20mA				9
21	Gnd			8	
22	+UIN 10V		pre-alarm	7	
23	+UIN 5V UV-				6
24	+UIN 2V Sensor		main-alarm	5	
25	+IIN 0/4-20mA				4
26	Gnd			3	
27	K UV-Sensor	(Diode)	Netz 230VAC	N	2
28	A			L	1

Assembly and commissioning

The monitor is designed to fit in an opening of $92^{+0.8} \times 92^{+0.8}$ mm (W x H) on a control panel. The depth to be provided for installation is approx. 75 mm including that for the cable connections. Screw-down clips are supplied with the monitor to fix it. Please attach the clips top and bottom on the housing. To make the connections sure against mix up they have different colours (right-orange, left-black). The electricity supply, relay outputs and sensor are all connected up by plugs secured with screws and marked as appropriate. Care is necessary with the polarity for the connection of the sensor. Care should be taken to avoid short circuits, especially of the sensor supply voltage.

Input and output details

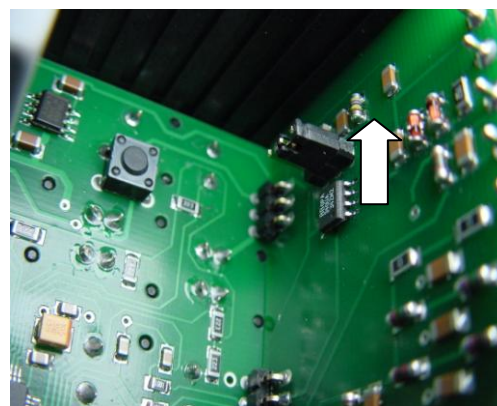
UV diodes and measured values given in %

UV diodes are connected to the terminals 27 (cathode) and 28 (anode). The factory setting is for use of silicon carbide-based sensors (SUV 13A1C). If sensors based on silicon or gallium phosphate are to be used, the jumper should be adjusted by the manufacturer. If the customer does this, the method is as follows.

Disconnect the device from the mains! Remove both the 14-pole push-in terminals. Unscrew the four screws on the rear plate. Change the setting of the jumper indicated from centre/top to centre/bottom. Then be sure to close the casing before reconnecting to the main.

Sensor with voltage output, for W/m^2 metering, or dosing (optional extra)

Sensors with voltage output (SUV 20.x x Y1C) are connected as follows. The wires for the mains electricity are connected to terminals 13 (-) and 14 (+). The sensor output must be connected to terminal 24 (2V) and 26 (GND). If other sensors are used or the sensor at this input is overloaded, terminals 23 (5V) or 22 (10V) can be employed.



Sensor with current output, metering in W/m^2

Sensors with current loops (SUV 20.x x Y1C) are connected as follows. $+U_B$ from the sensor have to be connected to terminal 14 (+), sensor output I_{OUT} to terminal 25 (20 or 19 also possible). Connection 13 (-) with 26 (GND) to close the current loop is already done internally.

sensor contacts	diode	Y1 – voltage output	Y2 – current output	cable Z1	cable Z3
pin 1	cathode (27)	signal output (23 resp. 24)	+ UB (14)	brown	yellow
pin 2	cathode (27)	GND (26 resp. 21)	+ UB (14)	white	brown
pin 3	anode (28)	- UB (13)	I out (25)	blue	green
pin 4	anode (28)	+ UB (14)	I out (25)	black	white

You can see in brackets the terminal numbers of the UVT16.

Including other sensors

The present software version supports only an additional sensor for rate of flow. The rate can be shown additionally at the display. There is a choice of which input to use for it. Inputs are the ones 19/21 (I_{in2}) and 20/21 (I_{in1}) specifically intended for it. If U_{in} (or I_{in}) is not being used for a UV sensor, it can be used as an alternative.

In case more functionality (e.g. dose calculation) is needed we refer to the UVT 18. This new developed monitor comes with a more powerful hardware and allows on request also customer specified programming.

Displays, Operation, Programming

Using the keypads, navigating through the menus

Before monitoring starts, the apparatus must be adjusted to the particular external switching circumstances. All values are easy to set using the five keypads provided of the front of the device. Each time the keys are touched, the display will be illuminated for about one minute. This makes no difference to the functioning of the keys.

Basic functions

▶ Arrow to right

- EITHER moves cursor one place to the right OR diverts into sub-menu

◀ Arrow to left

- EITHER moves cursor one place to the left
- OR diverts back to the higher-level menu without saving the value (effectively cancelling last entry) if there is no option (or cursor for options) on extreme left

■ Central keypad (Enter)

- Confirms, or accepts option, or accepts diversion into sub-menu

▲ Arrow up

- EITHER select option OR raise number at cursor position by one respectively shift comma one position right

▼ Arrow down

- EITHER select option OR reduce number at cursor position by one respectively shift comma one position right

- ┆→ before an entry indicates that it is possible to divert into a sub-menu
- before an entry indicates that the next function is a choice of options

(Only in the Info Details menu, when the items in the basic display are selected)

– before an entry indicates that this item has been selected for the basic display.

+ before an entry indicates that this item has not been selected for the basic display.

To change these round, press the ■ or ▶ keypads.

Brief guide to navigating

From the basic display, pressing ▶ brings up the first level of menus. If a password check has been activated, the password will be requested.

By pressing ▲/ ▼, the user can browse through the menus, up / down, or can change the figure at the cursor position respectively shift of the comma right / left.

The ■ (Enter) key is pressed to confirm the current entry, or to execute the current menu item, or to divert into the submenu. The ▶ key can also be used to divert into a sub-menu. Diverting will start always from the marked line1. Line 2 shows a forecast or the value, which has to be changed. Within the value the cursor can be moved right ▶ or left ◀ to reach the position to be changed. If the cursor is already at the extreme left, pressing the ◀ keypad calls up the previous menu level (effectively cancelling the current one). With pressing Enter ■ the new entry will be stored.

If no keypad has been pressed for more than one minute, the display goes back to the basic display automatically, and the light goes off. After this, if a password check has been activated, it will be necessary to re-enter the password.

Entering the password

A password will only be requested if the password checks in the program have been activated. The password level is selected by means of the number before the "-" when the password is being entered.

















1. is the level for authorised staff – limited authorisation
2. is the level for the plant engineer (unlimited access rights)

The device is supplied with both levels are switched off. To activate the password system, the entry "off" in the Password menu must be replaced with a number between 001 and 255. The relevant users should note the passwords well. If a password is forgotten after all, and typed in wrong, the display will show "Password wrong; code: XX". XX stands for two capital letters, which can be used to look up in a table a once-only password. The manufacturer has the table to enable passwords 1 and 2 to be by-passed.

password 1	password 2	authorisation for staff with	level	description
No	No	no password	3	all have full access
No	Yes	no password password 2	0 3	basic display only full access
Yes	No	no password password 1	0 3	basic display only full access
Yes	Yes	no password password 1 password 2	0 2 3	basic display only access to basic functions* full access

* password 1 can be changed but not deactivated

LED-display / operating status

priority	status	LED	active relay	priority	status	LED	active relay
13	start test		-	6	sensor fault		main alarm
12	alarm off (m.)		-	5	lamp fault (8/10)		main alarm
11	main alarm (m.)	 	main alarm	4	main alarm		main alarm
10	pre alarm (m.)	 	pre alarm	3	pre alarm		pre alarm
9	internal fault ###		main alarm	2	life time alarm		-
8	delay ###, #		-	1	overload		-
7	alarm off (8/9)		-	0	normal operation		-

 LED on

 LED flashing

Menu structure (Menu tree)

level	name menu item	kind of display	
	basic display	menu	monitor display
▼	+ info-state	display operation status	operation ok
▼	+ info-UV	display UV-value in % or W/m ²	UV 083%
▼	+ info rate of flow	display rate of flow in m ³ /h	flow. 5,54m ³ /h
▼	+ info lamp hours	display remaining lamp hours	lamp 7.580h
▼	+ info overall hours	display operation hours of the monitor	all. 690h
▼	+ info switching cycle	display ON/OFF cycles	swcy 20
▼	+ info version	display software version	version 1.3-DE
0	1 2	main menu	solicited input
▶	▼	+ information	navigation: change with ■
	▶	▼ + info state	+ not yet / - already chosen for basic display ■
		▼ + info-UV	+ not yet / - already chosen for basic display ■
		▼ + info rate of flow	+ not yet / - already chosen for basic display ■
		▼ + info lamp hours	+ not yet / - already chosen for basic display ■
		▼ + info-overall hours	+ not yet / - already chosen for basic display ■
		▼ + info switching cycles	+ not yet / - already chosen for basic display ■
		▼ + info version	+ not yet / - already chosen for basic display ■
▶	▼	+ lamp	navigation: with ▲▼, ◀▶, back without change ◀, confirm with ■
	▶	▼ + change lamp	decision yes / no ▲▼+■
		▼ + switching cycle	overwriting no. of switching cycles possible value ▶▲▼+■
		▼ + lamp hours	overwriting no. of remaining lamp hours possible value ▶▲▼+■
		▼ + life time lamp	Input/ overwriting of lamp lifetime hours possible value ▶▲▼+■
▶	▼	+ alarm mode	navigation: selection with ■
	▶	▼ + automatic	choose automatic function for alarm with ■
		▼ + manual alarm off	all alarm will be blocked with ■
		▼ + manual main alarm	tripping main alarm with (e. g. check higher level monitoring / buzzer) ■
		▼ + manual pre alarm	tripping pre alarm with (e. g. check indicator light / buzzer) ■
▶	▼	+ alarm	navigation: selection resp. justify number ▲▼, positioning ◀▶, Esc ◀, confirm ■
	▶	▼ + manual duration	input duration of manual blocked alarm (0=endless) value ▶▲▼+■
		▼ + delay	input duration of alarm blocking after lamp ignition (run-up time) value ▶▲▼+■
		▼ + pre alarm	input threshold value pre alarm (%-value > main alarm value) value ▶▲▼+■
		▼ + main alarm	input threshold value main alarm (%-value < pre alarm) value ▶▲▼+■
		▼ + relay modus	relay closed/open while alarm ▲▼+■
		▼ + relay pre alarm	inactive/active while main alarm ▲▼+■
		▼ + relay lamp fault	relay closed/open in case of lamp fault ▲▼+■
▶	▼	+ sensor-UV	navigation: selection resp. justify number ▲▼, positioning ◀▶, Esc ◀, confirm ■
	▶	▼ + input	choose sensor input (diode, U _{in} , I _{in} , I _{in1} , I _{in2}) ▲▼+■
		▼ + calibration value	input value in % (diode) or W/m ² (for sensors with option Y1/Y2) ▶▲▼+■
		▼ + unit	choose unit %, W/m ² , J (for sensors with option Y1/Y2) ▲▼+■
		▼ + calibration	decision yes / no (for sensor diode e. g. type SUV13C) ▲▼+■
▶	▼	+ sensor rate of flow	navigation: selection resp. justify number ▲▼, positioning ◀▶, Esc ◀, confirm ■
	▶	▼ + input	choose sensor input (I _{in} , I _{in1} , I _{in2}) ▲▼+■
		▼ + calibration value	input value in m ³ /h (=20 mA) value ▶▲▼+■
▶	▼	+ output (I _{out})	navigation: selection resp. justify number ▲▼, positioning ◀▶, Esc ◀, confirm ■
	▶	▼ + I _{out} -mode	choose mode 0 / 4 - 20 mA ▲▼+■
		▼ + maximum	input %-value for 20 mA value ▶▲▼+■
		▼ + minimum	input %-value for 0/4 mA value ▶▲▼+■
		▼ + calibration	DO NOT CHANGE ! (internal 20 mA calibration = St I _{out} on side sticker)
▶	▼	+ change password	Input password 1 / 2 - 001 ... 255 (000 password function inactive) value ▶▲▼+■
▶	▼	+ store	save the adjusted cyclic order of the display information issues (the rest automatically) ■

Access authorisation level: 0=black (no restriction) 1=brown 2=green (partial access) 3=red (full access)

Notes:

My standard values:

My standard circuitry:

15	Tx	RS232	24VDC +	14
16	Rx		60mA -	13
17	Gnd		Schaltzyklus	12
18	+IOUT 0/4-20mA		230VAC	11
19	+IIN2 0/4-20mA		Strahlerausfall	10
20	+IIN1 0/4-20mA		Alarm aus	9
21	Gnd			8
22	+UIN 10V		pre-alarm	7
23	+UIN 5V UV-			6
24	+UIN 2V Sensor		main-alarm	5
25	+IIN 0/4-20mA			4
26	Gnd			3
27	K UV-Sensor		Netz N	2
28	A (Diode)		230VAC L	1

Password 1 (plant user):

<input type="text"/>	<input type="text"/>	<input type="text"/>
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Password 2 (plant manufacturer):

<input type="text"/>	<input type="text"/>	<input type="text"/>
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Miscellaneous: