

INSTALLATION AND MAINTENANCE MANUAL FOR
ADVANCE UV SYSTEMS PTY LTD
MON-PRO11-A, UV INTENSITY MONITOR
WITH DIGITAL CERTIFIED DVGW/ONORM SENSOR



UV Intensity Monitor MON-PRO11-A

UV-Monitor PRO11DPI-I 230V AC - Documentation Technical Specification



Features

- UV-intensity alternatively measured:
 - ~ via (up to 2) digital sensors (relative values in %, absolute values in W/m^2)
 - ~ via photodiode sensor (relative values in %),
 - ~ via sensor with current interface (relative values in %, absolute values in W/m^2)
- UV value forwarding (e.g. to PLC):
 - ~ 4...20mA output signal assigned to the present UV intensity value (4mA = 0%; 20mA = 100% UV)
- status indication - internal:
 - ~ LCD with simultaneous report of UV value (1st row) and operating hours (2nd row) (if 2 digital sensors connected: simultaneous report of both sensors; operating hours via button up/down),
 - ~ LCD backlighting in different colours for additional status indication: green (normal operation), yellow (note/pre-alarm) and red (warning/main alarm)
- status indication - external:
 - ~ two potential free relay contacts assigned to certain uv-values for indicating pre- and main alarm condition, thresholds adjustable via menu
- remote inputs:
 - ~ "UV-off"-input to stop UV monitoring, alarming and hour counting; used to prevent alarm during starting/ warming up and other functions such as auto-wiping
 - ~ "lamp fault" - input; shorting this contact shows "lamp error" and activates alarm relays; e.g. to be used with ballasts error relays
- internal real time clock for counting purposes:
 - ~ hour counter to determine the total operation time of the system
 - ~ programmable hour counter for counting operation hours of lamps
 - ~ programmable lamp life time warning, after exceeding this value the display shows "max. lifetime - replace lamp"
 - ~ programmable delay time (0...600s) for system start up (to prevent alarms during lamps power/warming up)
- internal operating cycle counters (shows ons and offs)
- special menu features:
 - ~ languages: English, German
 - ~ menu lock to prevent unauthorized access to system settings
 - ~ freeze mode: the present state of the system is frozen until next keystroke

Technical Specification

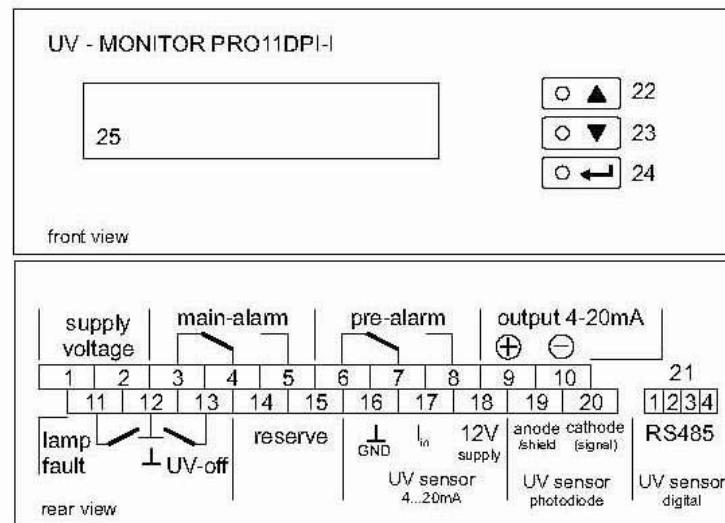
mains voltage:	230V AC $\pm$ 10% 50/60Hz 3W	CE-conform:	yes
mains frequency:	45...65Hz	operating temperature:	0...45°C
inputs:	2x digital sensor with RS485 interface(measurement value given via special protocol) - absolute measurement in [W/m²]display range: 0...9999,99W/m² - relative measurement in [%]display range: 0...999,9% - base value for percental presentation, alarm thresholds and the monitors 4...20mA output: => absolute value assigned as "100% value" 1x photodiode sensor (the photodiode signal is adjusted internally) - relative measurement in [%]display range: 0...650% - base value for percental presentation, alarm thresholds and the monitors 4...20mA output: => present UV intensity assigned as "endvalue" during sensor adjustment operation 1x sensor with current interface (adjusted sensor with signal output 4...20mA) - absolute measurement in [W/m²] display range: 0...9999,99W/m² - base value for absolute value presentation, alarm thresholds and the monitors 4...20mA output: => sensors calibration value assigned to the 20mA signal input and set as 90...120% - relative measurement in [%] display range: 0...150% - base value for percental presentation, alarm thresholds and the monitors 4...20mA output: => 20mA signal input set as 90...120% 1x remote contact "UV-off" for remote operation - stops UV monitoring and alarming; 1x remote contact "lamp fault" for remote operation - activates alarm relays and display warnings	outputs:	1x sensor power supply 12V DC, max. 25mA 1x current output 4...20mA, potential free (max. load resistance Rmax=200Ω) - signal output is assigned to the measured UV value;20mA = 100% UV 1x main alarm relay load: 50-500mA at 24V-230V AC, 100-500mA at 24V-60V DC - threshold selection range: 0...100% reference for percental value is 100% UV 1x pre alarm relayload: 50-500mA at 24V-230V AC, 100-500mA at 24V-60V DC - threshold selection range: [main alarm threshold]...100% reference for percental value is 100% UV
status indication:	LCD: 2*12 digits, 14,5mm height backlight colour: green: function o.k., yellow: note/pre-alarm, red: warning/main alarm (96/48/114)mm / 300g	handling:	menu-based, 3 keys: "enter", "up", "down" languages: English, German
dimensions / weight:		mounting hole:	cut-out according DIN43700 (92+0,8 x 45+0,6)
running time of the clock:	approx. 8 years	protection level:	IP20 (IP65 at front with optional monitor cover)

Warning Notices

The potential free contacts of the error relay do not provide protection against electric shock. All wires connected to the device shall be installed with appropriate protection against contact. For use in dry environment only!

The device may only be installed by authorised personnel to make sure all applicable safety rules are fulfilled.

Wiring diagram



- | | |
|---|---|
| 1. mains 230V AC $\pm$ 10% 50/60Hz | 15. reserve |
| 2. mains 230V AC $\pm$ 10% 50/60Hz | 16. UV sensor 4...20mA GND (ZED sensor cable: black) |
| 3. main alarm relay: rest contact (closed to PIN4 in case of alarm) | 17. UV sensor 4...20mA signal (ZED sensor cable: blue) |
| 4. main alarm relay: change over contact | 18. UV sensor power supply (ZED sensor cable: brown/red) |
| 5. main alarm relay: active contact (closed to PIN4 on correct working) | 19. photodiode input: anode/shield (ZED sensor cable: black) |
| 6. pre alarm relay: rest contact (closed to PIN7 in case of alarm) | 20. photodiode input: cathode (ZED sensor cable: blue) |
| 7. pre alarm relay: change over contact | 21. digital sensor input: RS485 (connect up to 2 sensors in parallel) |
| 8. pre alarm relay: active contact (closed to PIN7 on correct working) | 1. supply voltage |
| 9. UV value output 4...20mA (+) | 2. Signal B |
| 10. UV value output 4...20mA (-) | 3. Signal A |
| 11. lamp fault contact (if closed to PIN12 display shows 'lamp error' and flashes red/yellow) | 4. supply voltage GND |
| 12. remote input GND | 22. "up": increment |
| 13. UV-off – contact (if closed to PIN12 display shows 'UV off' and flashes green/yellow) | 23. "down": decrement/change mode |
| 14. reserve | 24. "enter": menu/select |
| | 25. display |

Monitor configuration - Calibration

Key functions

enter:	⇒ <i>enter config menu,</i> ⇒ <i>skip menu item,</i> ⇒ <i>confirm parameter</i>	• to enter config menu: ⇒ press enter > 2 seconds • to go to next menu item: ⇒ press enter
up:	⇒ <i>increment value,</i> ⇒ <i>change option</i>	• to allow changes on menu item: ⇒ press down
down:	⇒ <i>decrement value,</i> ⇒ <i>change option,</i> ⇒ <i>enter change mode</i>	• to increment value or change option: ⇒ press up • to decrement value or change option: ⇒ press down

At value changes keep key pressed for faster changes.

Note:

Not all changes and setups are stored until all menu items are confirmed and "config OK" was shown on the display.

The menu will be left after approx. 20 seconds without keystroke.

Monitor start up

- if connected to mains the monitor will start up with the following messages:
 - ~ PRO11 type and software version (approx. 3s)
 - ~ start-up countdown (according to the defined start-up time);
 - ~ display of uv-value and user hours
- special cases:
 - ~ if the **UV-off contact** (PIN 12/13) is closed: LCD shows "UV off" and present time, the display is blinking green/ yellow, no start-up countdown is performed
 - ~ if the **lamp fault contact** (PIN 11/12) is closed: the LCD shows "lamp error" and present time, the display is blinking red/yellow **after** start-up countdown

Menu access

- to enter config menu: press **enter** > 2 sec.
- 1. 'lock code 0000'
 - (the lock code can be used for access limitations; '0000' is the standard setting, please change if necessary)
 - ~ press **enter** to skip
 - ~ if a lock code is assigned already
⇒ enter the code by pressing **up/down**,
 - ~ press **enter** to confirm

Measurement break

- 2. 'freeze'
 - (to pause uv monitoring until next keystroke; e.g. for calibration check)
 - ~ press **enter** to skip
 - ~ to activate freeze mode press '**down**' for 'yes' and **enter** to confirm

Monitor base settings

- 3. 'language' (select English or German)

- ~ press **enter** to skip
- ~ change language with **up/down**,
- ~ press **enter** to confirm
- 4. 'date/time' (set time and date)
 - ~ press **enter** to skip
 - ~ to set time/date press **down** for entering change mode,
 - ~ change value by pressing **up/down**,
 - ~ press **enter** for choosing the next digit,
 - ~ press **enter** to confirm
- 5. 'lock code change'
(set a lock code or change an existing lock code to prevent unauthorized menu access)
 - ~ press **enter** to skip
 - ~ press **down** for entering change mode,
 - ~ change value by pressing **up/down**,
 - ~ press **enter** to confirm
- 6. 'reset cycles'
(counting the reset cycles of the monitors microprocessor)
 - ~ press **enter** to skip
 - ~ to clear switch cycle counter press **down**,
 - ~ press **enter** to confirm
- 7. 'switchcycles'
(counting the on-/off cycles of the monitor)
 - ~ press **enter** to skip
 - ~ to clear switch cycle counter press **down**,
 - ~ press **enter** to confirm

System specific settings

- 8. 'startup time'
(delay time to prevent alarm during systems warming up; count down will start with monitor connected to mains or reopened UV-off contact (PIN12 to PIN13), can be skipped by keystroke; range: 0...600s)
 - ~ press **enter** to skip
 - ~ press **down** for entering change mode,
 - ~ change value by pressing **up/down**,
 - ~ press **enter** to confirm

Display settings

- 9. 'contrast'
 - ~ change value by pressing **up/down**,
 - ~ press **enter** to confirm

Operation hour counters

- 10. 'user counter'
(for counting lamp hours; should be reset after lamp exchange)
 - ~ press **enter** to skip
 - ~ to reset user counter press **down**,
 - ~ press **enter** to confirm
- 11. 'abscounter'
(total operating hours of the monitor; not to be reset by user)

12. 'lamp lifetime'

(set the upper limit for the user hour counter; if exceeded by user hours, the display shows "max. lifetime - replace lamp" and is blinking green/yellow; factory setting 150 000 hours means approx. 18 years = function disabled)

- ~ press **enter** to skip
- ~ to change lamp lifetime press **down** for entering change mode,
- ~ change value by pressing **up/down**,
- ~ press **enter** to confirm

UV measurement configuration

13. 'input' (choose between digital, current and photodiode sensor)

- ~ press **enter** to skip
- ~ choose the desired sensor input signal by pressing **up/down**,
- ~ press **enter** to confirm

- if 'digital' is selected => see 14. for further information
- if 'current' is selected => see 15. for further information
- if 'photodiode' is selected => see 16. for further information

14. => if 'input digital' is selected:

• 'sensor number: '

(enter number of connected sensors; (up to 2))

- ~ press **enter** to skip
- ~ choose number by pressing **up/down**,
- ~ press **enter** to confirm

• 'sensor 1 ID: 00000A'

(enter sensor identifier - see sensor housing)

- ~ press **enter** to skip
- ~ change hexadecimal number by pressing **up/down**,
- ~ press **enter** to confirm

• (same procedure for 2nd digital sensor if selected)

• '100% value ***W/m²'

(set the base value for percental presentation, alarm thresholds and the monitors 4...20mA output; value is used for all connected digital sensors)

- ~ press **enter** to skip
- ~ change value by pressing **up/down**,
- ~ press **enter** to confirm

• 'scale unit'

(choose between relative [%] and absolute [W/m²] measurement)

- ~ press **enter** to skip
- ~ choose the scale unit by pressing **up/down**,
- ~ press **enter** to confirm

15. => if 'input current' is selected:

• 'scale unit'

(choose between relative [%] and absolute [W/m²] measurement)

- ~ press **enter** to skip
- ~ choose the scale unit by pressing **up/down**,
- ~ press **enter** to confirm =>
- ~ if 'scale unit' = [%] is selected

• 'endvalue'

(defines the base value for percental presentation; default: sensors 20mA=100%; assignment can be changed from 90 to 120% - see example below)

- ~ press **enter** to skip
- ~ change reference value by pressing **up/down**,
- ~ press **enter** to confirm
- ~ if 'scale unit' = [W/m²] is selected
- 'calibr.value'
(enter the sensors calibration value as reference for value report)
 - ~ press **enter** to skip
 - ~ change value by pressing **up/down**,
 - ~ press **enter** to confirm
- '***W/m² = 100%'
(defines the reference for the "UV 4...20mA output" and the alarm thresholds; default: sensors 20mA=100%; this assignment can be changed from 90 to 120% - see *example below*)
 - ~ press **enter** to skip
 - ~ change value by pressing **up/down**,
 - ~ press **enter** to confirm

• to allow the adaptation to the specific needs of different systems the base value assignment for the input signal can be changed from 90 to 120%

example:

- calibration value ok: base value = 100%:
20mA sensor signal = 20mA monitor UV out
- calibration value too low - base value set to 90%:
22mA sensor signal = 20mA monitor UV out
- calibration value too high - base value set to 120%:
16,7mA sensor signal = 20mA monitor UV out

16. => if 'input photodiode' is selected:

- 'endvalue'
(defines the reference for percental value calculation; default value: 110% assumed for a brand new lamp in the first operation hours)
 - ~ change the %-value by pressing **up/down**
 - ~ press **enter** to confirm
- 'adjust'
(determines the best amplification stage for the sensor signal and sets the present UV value as the reference measurement value for the endvalue)
 - ~ press **enter** to skip
 - ~ to start adjustment press **down** for "yes" and **enter** to confirm

Note: The adjustment of sensitivity has to be performed on initial operation and after every lamp-exchange.

(The system has to be in steady state! = operation temperature of lamps and media is reached)

The adjustment defines the reference for value calculation resp. the shown values.

Due to this, the adjustment makes only sense with a new lamp or with a known lamp state.

Alarm settings

17. 'main alarm'

(set the alarm threshold for main alarm relay)

- ~ press **enter** to skip
- ~ press **down** for entering change mode,

- ~ change value by pressing **up/down**,
 - ~ press **enter** to confirm
18. 'pre alarm'
(set the alarm threshold for pre alarm relay)
- ~ press **enter** to skip
 - ~ press **down** for entering change mode,
 - ~ change value by pressing **up/down**,
 - ~ press **enter** to confirm
19. 'config - write - OK - end'
(configuration is written to memory)

Not until this moment are all changes are stored.

UV Sensor: PN: MON-SENS-003

The sensor is used for measuring / monitoring of UV irradiation.

Sensitive element: SiC-diode

Sensor body material: 1.4305

Dimensions/weight: see drawing

Adjustment wavelength: 254nm

interface/protocol: RS485 ZCon

Operating temperature: 0 - 40°C

Signal resolution: 0,01W/m²

Supply voltage: 12-24V (stabilized)

operation current: max. 50mA

temperature drift: <0,1%/K

max. pressure/protection class: 10bar (on using measurement window MF001)

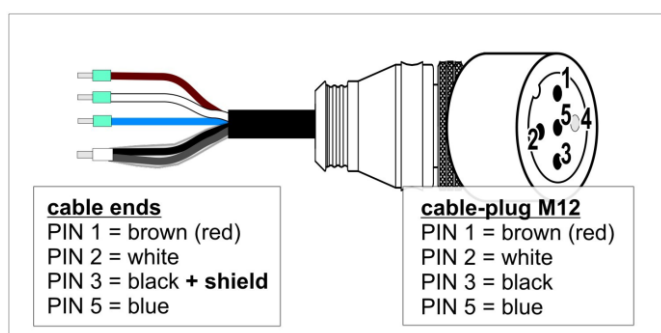
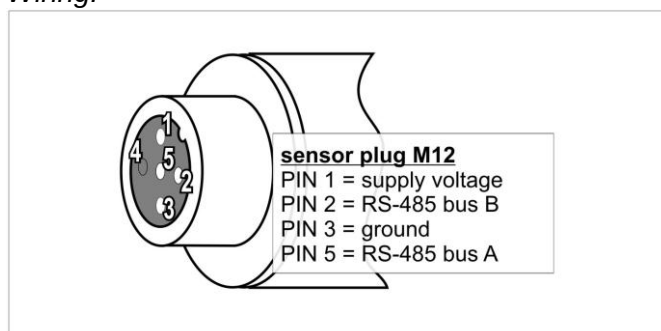
Protection class: IP64 on terminal ends if connected to appropriate sensor cable

Sensor cable: 2.9 m enclosed



Measurement range: 2.00 W/m²...500 W/m²

Wiring:



Cable Terminations:

The sensor cable is terminated in the RS485 terminals (21) at the back of the PRO11 monitor. (See wiring diagram on page 4)

Brown wire is terminated in terminal 1 of the RS485 terminals (21)

White wire is terminated in terminal 2 of the RS485 terminals (21)

Blue wire is terminated in terminal 3 of the RS485 terminals (21)

Black and shield wire is terminated in terminal 4 of the RS485 terminals (21)

UV Sensor Holder: PN: MON-SENS-HOL-01

The measurement window MON-SENS-HOL-01 is to be used for holding the UV sensor in place according DVGW W294 and ÖNORM M5873.



Technical Specification:

UV window: quartz-glass, diameter: 24,5mm, path width: 5mm

Body: stainless steel 1.4404

Dimensions: Diameter: 38mm, length: 65mm
Weight: 365g
Thread: BSP1", length 20mm
Wrench size: 32mm
Inner dimensions: according DVGW/ÖNORM
Sensor fixation cap. nut M30x2
Max. pressure: 16bar
Operating temp.: 0...40°C

Attention:

Cover thread with anti-seize paste before turning in. Please also use an O ring seal behind thread.

For drinking water applications we recommend annual checks of watertightness, e.g. during lamp exchange or sensor recalibration intervals. The duration of watertightness may be reduced by high UV intensities, thermal cycling, alternating shock loading or strong vibrations, ultrapure water, biological or chemically active water.

Handle the MON-SENS-HOL-01, especially the quartz glass surface, with care. Be careful not to touch the surface with any sharp object; if the window is scratched or damaged, accurate measurement cannot be warranted.

Keep the quartz glass window clean, as foreign materials on the window can seriously affect transmittance in the ultra violet range. Use ethyl alcohol and a cleaning tissue, an iron-free sponge or a soft brush for cleaning the window.