

# ILUMEN PID SOLUTION

ILUMEN PIDbox

INSTALLATION MANUAL



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# 1 INFORMATION ON THIS MANUAL

This manual contains instructions on how to install the Ilumen PIDbox.

## 1.1 VALIDITY

This manual applies to the Ilumen PIDbox v2

## 1.2 TARGET GROUP




This manual is intended for skilled persons. Only qualified persons with the appropriate skills are allowed to perform the tasks set forth in this manual.

## 1.3 ADDITIONAL INFORMATION

Links to additional information can be found at [www.ilumen.be](http://www.ilumen.be)

- ✓ Ilumen PIDbox datasheet
- ✓ What is PID?
- ✓ PID checker

## 1.4 SYMBOLS

Symbol	Explanation
	Indicates a hazardous situation which, if not avoided, will result in property damage
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury
	Information that is important for a specific topic or objective, but is not safety-relevant

# 2 SAFETY

## 2.1 APPROPRIATE USAGE

The Ilumen PIDbox applies a voltage to PV modules in reference to earth. The device may only be switched on when the installation is executed as described in this manual.

Before installing the Ilumen PIDbox, ensure that the permitted operating range of each component is maintained at all times. So set correct AC-voltages and never apply more DC-current through the PIDbox than allowed. All the operating ranges are indicated on the type plate on the side of the PIDbox.

Before using the Ilumen PIDbox you have to obtain the appropriate approval from the manufacturer of the PV modules.

Any applications other than those described here shall be considered contrary to the appropriate usage. Alternative use or modification of the Ilumen PIDbox will void warranty claims and operation permit.

## 2.2 QUALIFICATIONS OF SKILLED PERSONS

The work described in this document must be performed by skilled personnel only. Skilled personnel must have the following qualifications:

- ✓ Knowledge of how an inverter works and how it is operated
- ✓ Training in how to deal with the dangers and risks involved in installing and operating electrical devices and plants
- ✓ Training in the installation and commissioning of electrical devices and plants
- ✓ Knowledge of all applicable standards and directives
- ✓ Knowledge and observance of this document and all safety precautions

## 2.3 SAFETY PRECAUTIONS

### 2.3.1 *ELECTRIC SHOCK*



**When the Ilumen PIDbox is in operation, voltage will be present. Prior to maintenance work on the PV plant switch off the inverter and then the PIDbox.**



**When you want to change the arrangement of the Ilumen PIDbox you must switch off the Ilumen PIDbox 20 minutes prior to making any changes.**

### 2.3.2 *ELECTROSTATIC DISCHARGE*



**Never operate the Ilumen PIDbox when not properly installed or when the components are not closed properly. Always make sure the grounding of the Ilumen PIDbox is done correctly.**

## 3 SCOPE OF DELIVERY

1x Ilumen PIDbox

Containing the following components

- a. 1x iLumen PID controller
- b. 1x front access panel
- c. 1x bottom access panel
- d. 1x AC-connector
- e. 1x LED indicator
- f. Installation manual

## 4 PRODUCT DESCRIPTION

The Ilumen PIDbox is placed between the inverter and the solar array strings. The power of the strings goes through the PIDbox, entering on one side “PV in” and leaving on the other “Inv. out”. This means the Ilumen PIDbox is placed in series between the PV panels and the inverter. You can use one Ilumen PIDbox per 1 MPP tracker.

## 5 MOUNTING

### 5.1 MOUNTING LOCATION REQUIREMENTS

- ✓ The installation site must be freely and safely accessible at all times without the necessity for any auxiliary equipment.
- ✓ The mounting location should be placed in a well ventilated location.
- ✓ Do not place the Ilumen PIDbox in a dusty environment.
- ✓ The ambient temperature must be between -10 and 40°C.
- ✓ Normally the PIDbox is installed right next the inverter or close to the DC-combiner box.
- ✓ Always mount the PIDbox in an upright position.



**Install the PIDbox on a flat surface to avoid stress on the mounting brackets.**



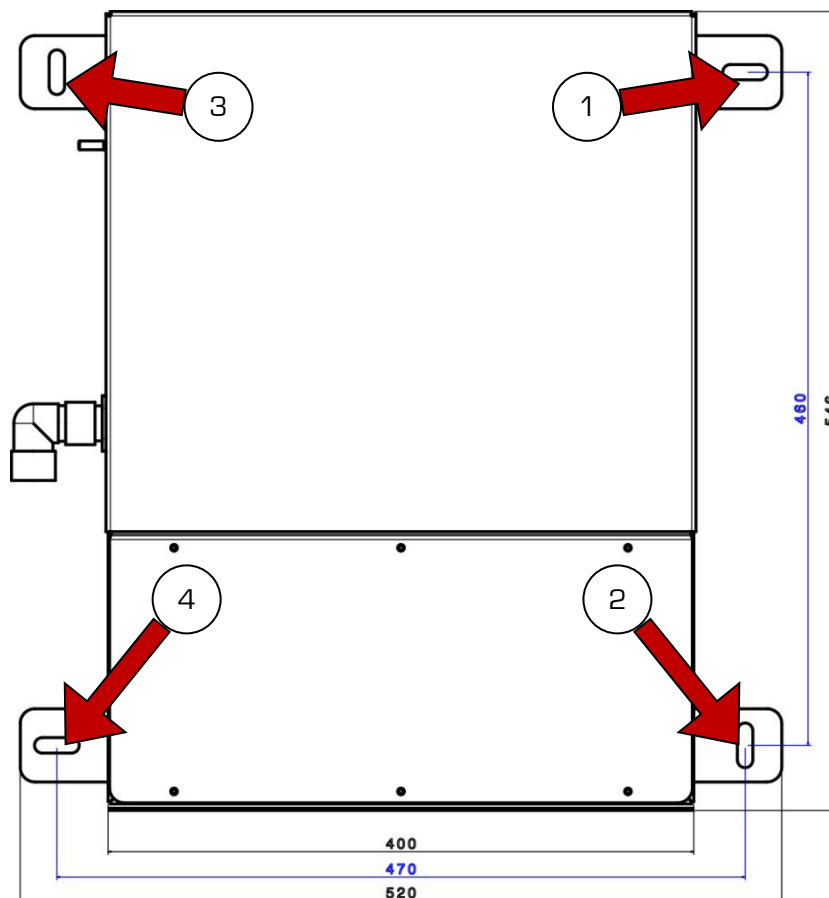
**Install the PIDbox always in a shaded area. Prevent from installation in a dusty environment.**



**The device must be mounted on a vertical wall. Never install the device flat on the floor.**

### 5.2 MOUNTING THE ILUMEN PIDBOX USING THE MOUNTING HOLES

1. Mark the 4 positions of the drill holes on the mounting surface



2. Drill the holes
3. Insert the wall plugs (if necessary)
4. Screw the Ilumen PID to the mounting surface and make sure adequate washers are installed.
5. Check if mounted securely

## 6 ELECTRICAL CONNECTIONS

When installing the Ilumen PIDbox, the DC side of the PV plant must be switched off. After the installation is done, you can switch on the PIDbox by inserting the AC-plug. The green LED should burn immediately. After this you can switch on the DC-circuit breaker again inside the inverter or DC-combiner box.

### 6.1 AC-CONNECTION

A standard 1 phase AC connection (230VAC (standard) or 110VAC (on request)) must be available on installation. This supply should be on at all times.

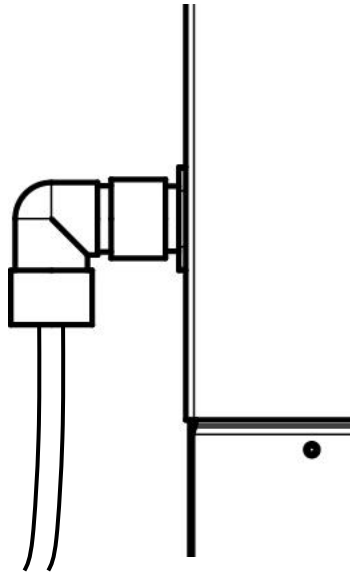
Make sure that a residual-current device of maximum 300mA is also present in this circuit.



Connect the L, N and earth cable to the clamps in the AC-connector using a max of 1,5mm<sup>2</sup>.

- **PE:** earth connection
- **1:** Neutral
- **2:** Line 230VAC

Connect the AC-connector on the left side of the PIDbox. Make sure it is tightened and facing down.



**Use an automatic circuit breaker of 16A and residual-current device of maximum 300mA.**



**Make sure you apply the correct AC-voltage to the PIDbox. Any other voltage than the ones indicated in this manual will cause a defect in the PIDbox.**

## 6.2 INSTALLATION OF TIMER/CLOCK (NOT INCLUDED)

We also strongly advise to place a timer/clock on the AC-connection. This timer will insure that the normal function of the PV-plant is guaranteed during the day. The timer must switch on the PIDbox around 2 hours before sundown and must disconnect the AC 1 hour before sunrise.

We advise to use some kind of din-rail clock/timer to do this. Possible examples:



Stel de klok op de juiste datum (lokale tijd) in.

Schakel de AC **aan**: 2 uur voor zonsondergang van de kortste dag van het jaar

Schakel de AC **uit**: 1 uur voor zonsopgang van de kortste nacht van het jaar

Meer info over zonsopgang en zonsondergang vindt u hier:

<http://www.timeanddate.com/worldclock/sunrise.html>

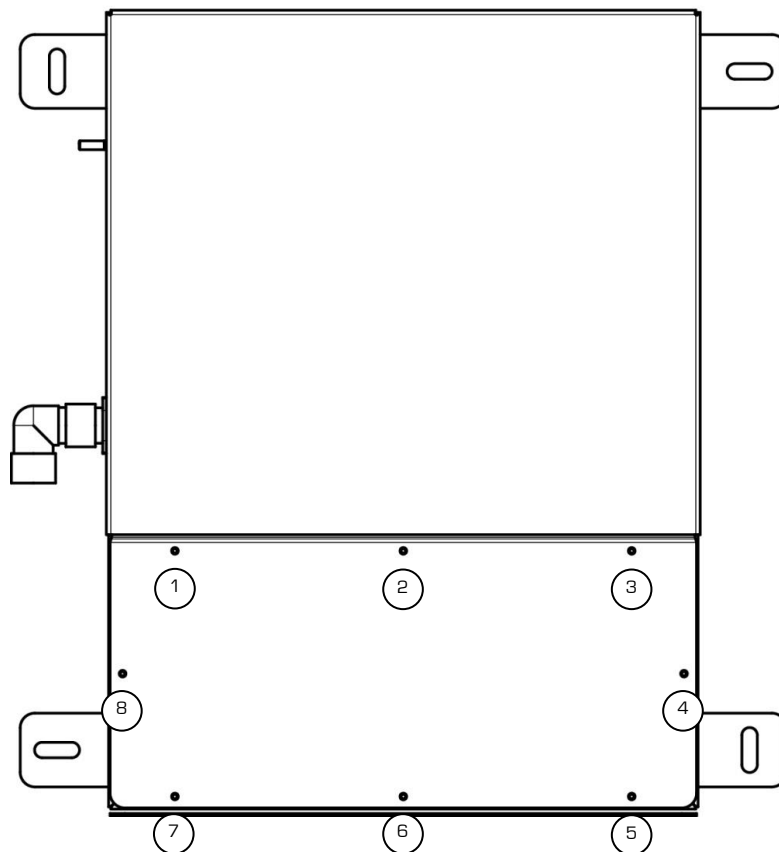
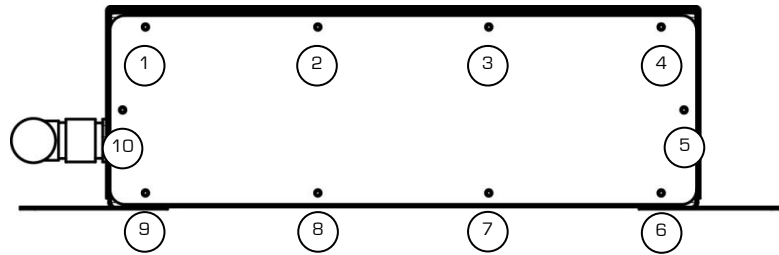


### 6.3 OPENING AND CLOSING THE PIDBOX

There are 2 lids that can be opened up for hooking up the PIDbox.

To open the bottom lid unscrew the 10 screws located on the front side of the PIDbox. To close place the lid back on the PIDbox. Screw in all the screws. Do not over tighten the screws otherwise the screws and lid can be damaged.

To open the front lid unscrew the 8 screws located on the front side of the PIDbox. To close place the lid back on the PIDbox. Screw in all the screws. Do not over tighten the screws otherwise the screws and lid can get damaged.

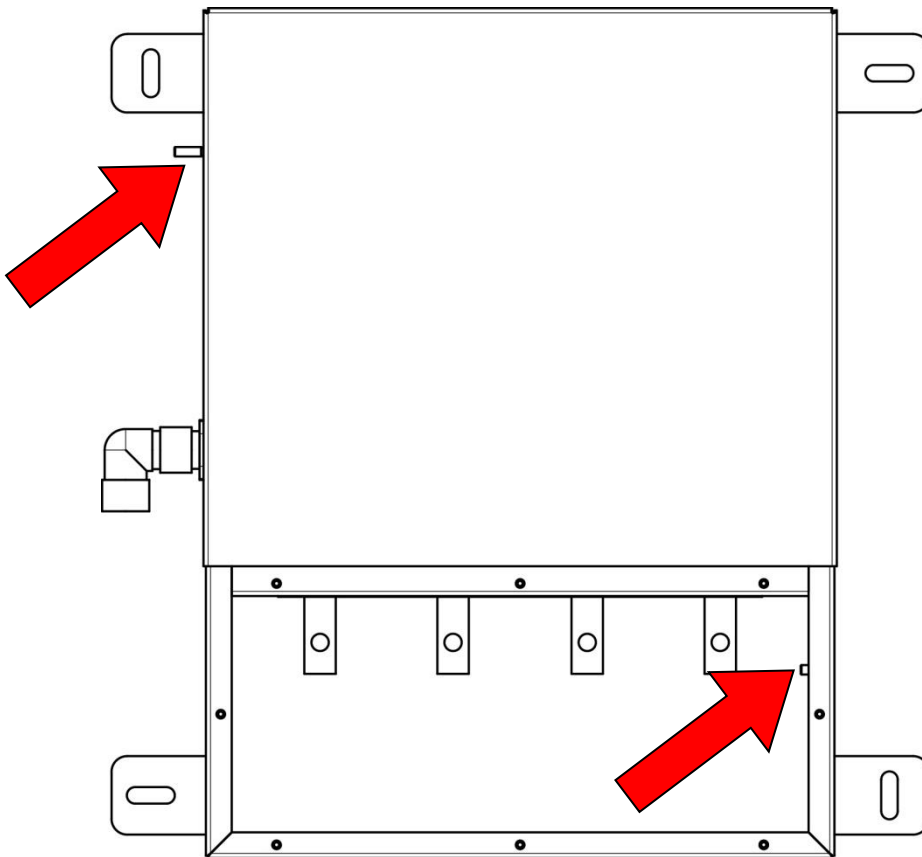


**Do not try to open the top cover yourself. Trying to do so will void the warranty.**

## 6.4 EARTH CONNECTION

To achieve the best result, the frames of the solar modules must be connected to the earth connector of the Ilumen PIDbox. For optimal result you must install a cable (6 or more mm<sup>2</sup>) to the mounting structure of the solar modules (make sure mounting structures and frames of the solar modules are electrically conducting). It is important that all frames of all solar modules are at the earth potential, if necessary you have to interconnect the mounting structures with additional cables. If you are sure that all metal frames of the solar modules are connected to earth, you can also install a earth cable to the central earth connection of the PV-plant if this is easier.

Connect the earth cable to the earth screw inside or outside the PIDbox. Please use appropriate cable lugs to connect the earth. The earth pin is M6x25. No nuts and washers are included.



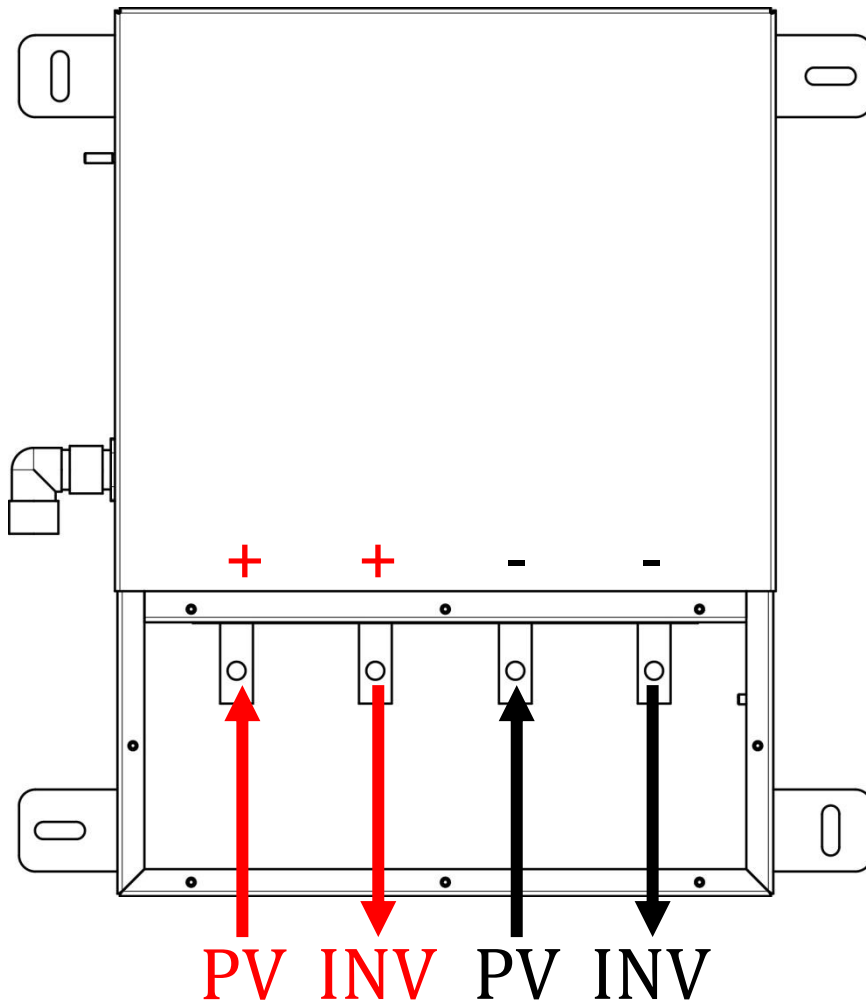
## 6.5 SOLAR ARRAY AND INVERTER CONNECTIONS



**When installing the PIDbox between the PV array and inverter always switch off the DC switch of the inverter and in the DC-combiner boxes.**

1. Connect the positive DC cable coming from the PV array. Connect it to the “PV +” position.
2. Connect the negative DC cable coming from the PV array. Connect it to the “PV -” position.
3. Connect the “INV +” position to the positive side of the inverter of the PV array
4. Connect the “INV -” position to the negative side of the inverter of the PV array

To connect the cables use appropriate cable lugs, nuts and bolt to attach the cables to the copper busbars. The holes in the copper busbars are 11mm in diameter. Use M10 bolts to properly connect the cables to the PIDbox.



**Do not connect more than 1 MPPT to 1 PIDbox. You cannot mix multiple MPPT's and connect it to 1 PIDbox. General rule is 1 PIDbox per 1 MPPT.**



**The maximum current that can pass through the Ilumen PIDbox is indicated on the type plate on the side of the PIDbox . Make sure this is never exceeded.**



**Make sure the positive PV cable is connected to the "PV+", the negative PV cable is connected to the "PV-", and the positive inverter cable is connected to the "INV+", the negative inverter cable is connected to the "INV-".**



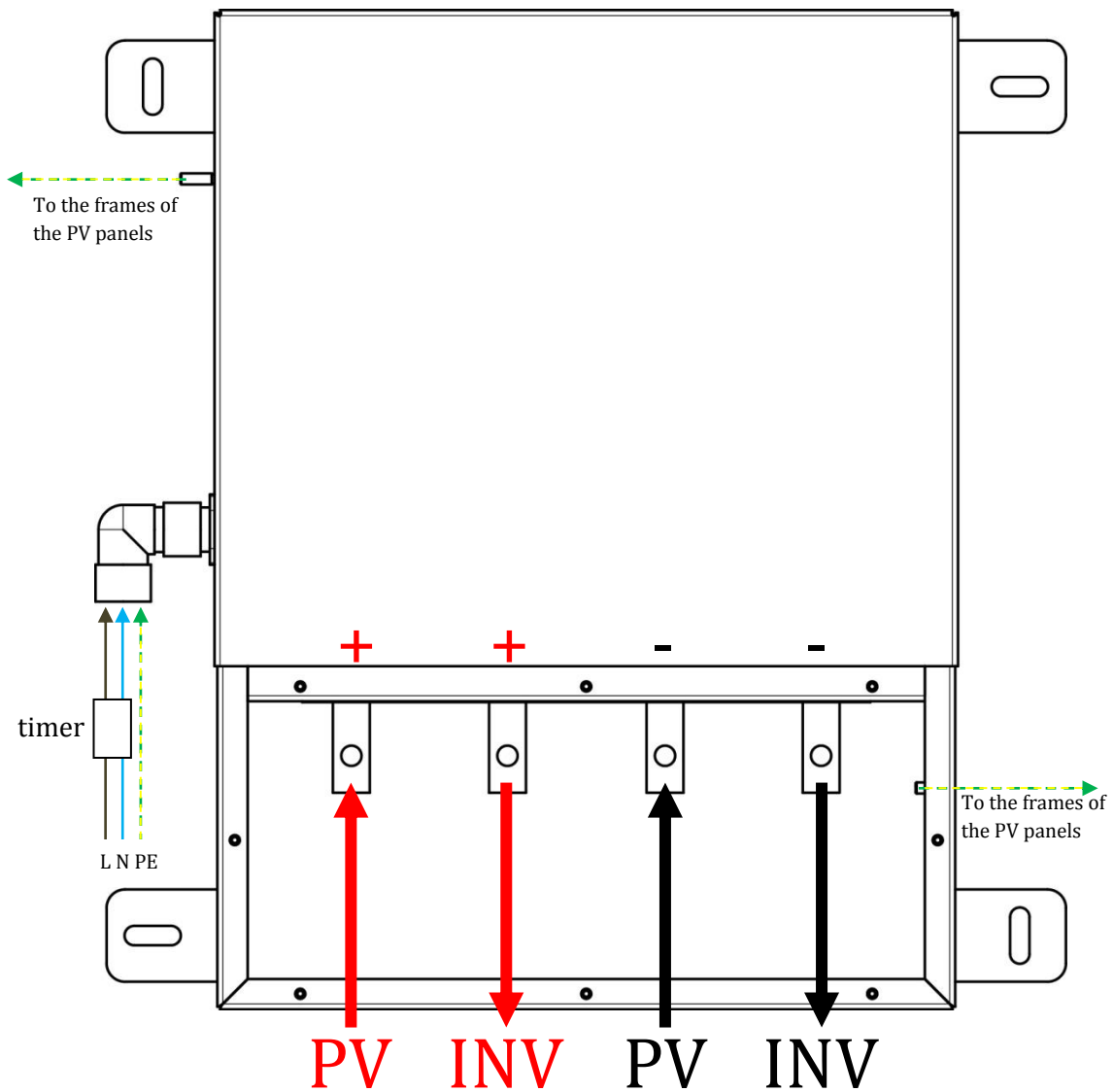
**During installation of the PIDbox, the DC cables from the PV plant to the PIDbox need to be fixed with brackets to avoid stress on the internal components.**

## 6.6 CONNECTION DIAGRAMS

Several solutions are possible. Here you find the most common possible connection.



## 6.7 SCHEMATICS



## 6.8 PASSING CABLES THROUGH THE BOTTOM LID

To make sure the complete device is waterproof, all lids must be placed back on the device. So cable glands have to be placed in the bottom lid. This lid is made of metal so make sure to use appropriate tooling to make the holes for the cable glands. We recommend a good hydraulic punch driver set.



**To make sure that the PIDbox is rated IP 65, all the lids have to be placed on the PIDbox and attached with all the screws.**



**The cable glands need to be assembled in the lower lid of the PIDbox to insure a watertight end result.**

## 7 COMMISSIONING

### 7.1 CHECK

Do a final check whether everything is properly mounted and connected (see chapter 5 and 6 for details):

- ✓ The PV frames are all connected to the same earth as the earth pin of the Ilumen PIDbox
- ✓ The PV and inverter DC cables are correctly connected
- ✓ The AC connection is made properly

If all these points are installed correctly you can start up the Ilumen PIDbox .

### 7.2 STARTING UP THE ILUMEN PID

The Ilumen PIDbox can only work in an automatic mode. To start up the Ilumen PIDbox , plug in the AC connector. Next see if the green light on the left side of the Ilumen PIDbox starts burning. After checking the system it will be switched on automatically. Now you can switch on the inverter again.

When the Ilumen PIDbox is hooked up correctly to the inverter you will see the following status light readouts.

- ✓ **GREEN**:. DC circuit breakers are on. This light should burn during the day
- ✓ **RED**: DC circuit breakers are off. This light should burn after it detects that it is night.
- ✓ **ORANGE**: PID controller is switched on and cures the PV system. It can take a minute or so that the orange light will come on after the red light starts to light up.

So there are 2 scenarios:

- Daytime: green light on
- Nighttime: red light will be on, when curing starts, orange will be on.



**The PIDbox will go in safety mode in case of detection of over-current. Maintenance of the PIDbox by authorised person is required before automatic start up happens again. Please contact iLumen for this matter.**

## 8 INSTALLATION SUMMARY

- 1) Take the necessary safety precautions (DC switch of the inverter off).
- 2) Mount the Ilumen PIDbox correctly to a wall using the mounting holes.
- 3) Connect the Ilumen PIDbox earth connector to the frames of the PV modules and check the interconnections between the PV casings.
- 4) Disconnect the PV array cables from the inverter.
- 5) Mind the maximum allowed current through the DC circuit breakers of the PIDbox
- 6) Connect the PV array cables to the Ilumen PIDbox inputs (see 6.4 for details).
- 7) Connect the Ilumen PIDbox to the inverter (see 6.3 for details).
- 8) Plug in the AC connector in the PIDbox
- 9) Switch on the AC power with the dedicated circuitbreaker
- 10) Turn on the DC switch inside the inverter and in the DC combiner boxes

## 9 DECOMMISSIONING THE ILUMEN PIDBOX

### 9.1 DISASSEMBLING THE PIDBOX

Switch off the DC to the Ilumen PIDbox by switching off the inverter or the DC combiner box. Then switch off the AC power to the PIDbox. Disconnect the Ilumen PIDbox from the AC grid. Wait a minimum of 20 minutes. Disconnect the DC cables from the PIDbox . Disconnect all earth connections.

When all electrical connections are disconnected you can dismount the Ilumen PIDbox .



**When doing any kind of work on the PIDbox , always switch off the DC power to the device inside the inverter or the DC combiner boxes.**

### 9.2 PACKING THE PIDBOX

To pack the PIDbox use the original packaging or packaging suitable for the weight and dimensions of the PIDbox (see Section 12 "Technical Data").

### 9.3 DISPOSING OF THE PIDBOX

Dispose of the PIDbox at the end of its service life in accordance with the disposal regulations for electronic waste currently applicable at the installation site.

## 10 TROUBLESHOOTING

### 10.1 FAULTS

Lights readout	Fault	Corrective action
No lights visible	Product does not work	Make sure the AC-power is connected and AC voltage is present. Also make sure that all the AC connector is connected correctly on the PIDbox.
No lights visible	Product does work. The front panel lights can be defective	Please contact iLumen technical service.
Orange light does not burn during the night while the red light is burning.	Product does not cure the panels	This can have 2 reasons: <ul style="list-style-type: none"> <li>• It takes about 1 minute to activate the orange light after the red light has turned on.</li> <li>• Earth connection between PIDbox and the frame of the modules is interrupted.</li> </ul>
Red light during the day when in automatic mode.	The PIDbox has encountered an internal fault	Please contact iLumen technical service.
Orange – Green blinking light	The PIDbox has encountered an internal fault	Please contact iLumen technical service.

### 10.2 NO GOOD PID REGENERATION

If the modules are not regenerating or not regenerating fast enough you should check following things:

- ✓ Check the grounding of the system. If necessary you should place additional interconnections between the frames of the modules.
- ✓ Is the Ilumen PIDbox properly connected to the grid?
- ✓ Is the AC power properly connected (is its indication light burning)?
- ✓ Let an expert check if the problem you're having with the yield is caused by PID

### 10.3 RESETTING THE PIDBOX

Always power off the DC-power first in the inverter and the DC-combiner boxes. Then the PIDbox can simply be reset by switching off the AC-power. Wait 20 seconds and switch the AC-power back on.

If resetting does not help fixing your problem, please consult chapter 10.1 of this manual.

### 10.4 REPAIRING THE PIDBOX

Do not try to repair the PIDbox by yourself without contacting iLumen. This will void the warranty.

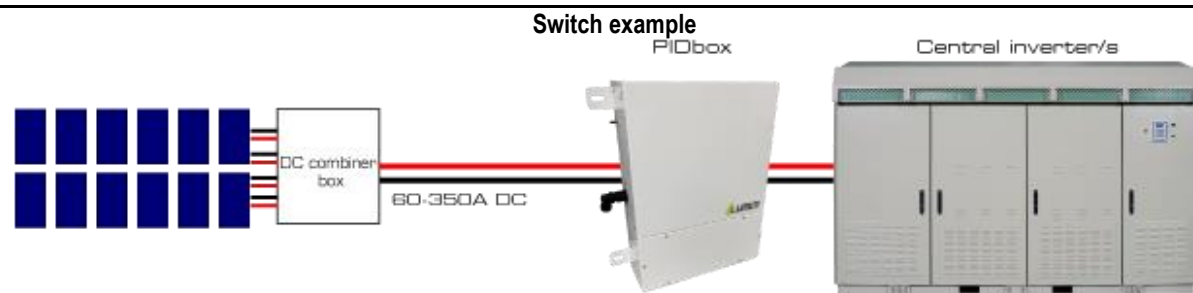
Always contact iLumen technical service if your PIDbox is broken.

# 11 CONTACT

## Ilumen bvba

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Belgium  
Tel: +32 13 30 61 77  
[info@ilumen.be](mailto:info@ilumen.be)  
[www.ilumen.be](http://www.ilumen.be)

# 12 TECHNICAL DATA



### PV array / inverter input

Input PV voltage range	80 - 1000 V
Output voltage to ground	Up to 1250 V
Maximum PV current / input	
V75	75 A
V100	100 A
V125	125 A
V150	150 A
V200	200 A
V250	250A
V300	300 A
V350	350 A
Number of independent DC inputs	1
Maximum output current in operation	16 mA

### GRID (AC)

Nominal AC voltage	110 to 130 V or 220 to 250 V (specify when ordering)
Nominal AC grid frequency	50 to 60 Hz
Power consumption in standby operation	20 W
Typical power consumption in operation	20 W (typically 0,4kWh/day)
Maximum power consumption	25 W
Inrush power	350W

### General data

Dimensions (W x D x H)	520x 140 x 550 mm
Weight	16 kg
Operating temperature range	-10 to 40 °C
Environmental conditions	IP65 – indoor and outdoor use

### Configuration

1 input

None of the connected solar module poles may become grounded on the panel side, grounding is allowed on the inverter side.

### Various

Warranty	Up to 20 years
Certificates	<a href="http://www.ilumen.be">www.ilumen.be</a>



