MaNima Pollux Industrial Nova

User Manual

Installation, commissioning, configuration and maintenance

Read this manual in full before you install the driver.

Document	Detail
Document number	MA243501
Revision	1.0
Date	August 2026
Product	Pollux Industrial Nova
Datasheet	DS243501 — Pollux Industrial Nova, rev 1.0

Contents

1 Revision history

Revision	Change	Author	Reviewer	Date
1.0	New manual, restructured for the Pollux Industrial Nova	NOo	MvdH	August 2026

2 About this manual

Thank you for using the MaNima Pollux Industrial Nova. This manual describes how to install, commission, configure and maintain the driver. Anyone who works with the driver must have read it.

2.1 Who this manual is for

Installation and commissioning must be carried out by certified personnel: technicians familiar with low-voltage DC installation, the applicable local wiring regulations, and the machine or installation the driver is built into. Hand these instructions to the technicians and end users responsible for installing or operating the product.

2.2 Scope

This manual covers the Pollux Industrial Nova, hardware revision 3.0, running firmware version 1.3.23. Where a figure comes from the datasheet it is marked as reproduced, so a reviewer knows to check both documents when it changes.

Check the running firmware version on the Scanner tab of the MaNima Configurator, in the Software Version column. Where the driver runs a different firmware version, some screens in this manual may not match exactly.

2.3 Conventions

Safety notices appear in four levels, explained in the Safety chapter. A notice always stands before the step it guards. Numbered lists are procedures: perform one step at a time, in order. Names printed on the hardware or shown in the software are written exactly as labelled, for example DIG_IN_1-1 or Enable pulsemode.

2.4 Related documents

This manual does not repeat the full specifications. For ratings, electrical characteristics and efficiency figures, see the Pollux Industrial Nova datasheet (DS243501). Only the values you need while working at the terminal block are reproduced here.

Wiring diagrams and the MaNima Configurator are available from the MaNima support pages.

Downloads: https://www.manima-technologies.com/support/downloads/

3 Safety

This chapter states the notice hierarchy used throughout the manual and the general safety requirements that apply to every procedure. Hazards belonging to one specific procedure are stated at that procedure.

3.1 Notice hierarchy

Level	Meaning
WARNING	Could cause death or serious injury.
CAUTION	Could cause minor or moderate injury.
NOTICE	No personal injury; equipment damage, data loss or a voided warranty.

3.2 General requirements

WARNING — LIVE DC TERMINALS

The supply terminals and channel outputs carry up to 48 V DC and remain live for as long as either supply input is connected.

Isolate both supply inputs and verify zero voltage at the terminals before you work on any connection.

- Read this manual in full before you install the driver.
- Installation and service may only be carried out by certified personnel.
- Do not open, modify or repair the driver. Any modification or repair by anyone other than MaNima Technologies BV voids the warranty and the protection built into the product.
- Do not put the driver into service if it is damaged, shows visible damage, does not operate correctly, or behaves in any way that is out of the ordinary for an electrical device.
- Wire the driver only as described in this manual.
- Verify that the power source is free of short circuits before you connect it.
- Keep the supply input within 12–48 V DC. The absolute maximum is 50 V; above roughly 51 V the driver shuts down. Higher voltages may damage the product.
- Do not exceed 10 A per channel, 20 A per supply side, or 40 A in total.
- The driver is rated IP52 and must be protected against moisture. Moisture will damage the product.
- Operate the driver between 0 °C and 80 °C, at 20–80 % relative humidity.
- To de-energise the driver, disconnect it from both supply inputs. There is no on/off switch.

Reproduced from DS243501.

4 Product overview

The MaNima Pollux Industrial Nova is a high-power PWM LED driver for demanding industrial lighting processes in harsh environments. It drives eight independent channels up to 48 V and 40 A, at a PWM frequency configurable per bank from 100 to 2000 Hz, with an efficiency of up to 91 percent and an extended operating temperature range up to 80 °C. Its low channel resistance of around 20 milliohm keeps losses — and therefore heat — to a minimum, even at full load.

4.1 Redundant fail-safe design

The eight channels are arranged as two banks of four, each bank fed by its own supply input, with a shared ground. Each channel has its own hardware short-circuit and overcurrent protection that limits the current within 10 microseconds, independent of the firmware — so the behaviour is predictable even during a software fault. If one supply fails, the other bank keeps running while a potential-free output signals the fault, and an action handler switches the load to the surviving bank.

4.2 Monitoring and cooling

The driver measures each output current individually and up to eight NTC temperatures in real time. Using configurable thresholds it intervenes — dimming, alarming or shutting down — before a fixture is damaged. A dedicated PWM output steplessly regulates a fan or pump in a closed loop based on the measured temperature, with the RPM read back so a failing fan is caught early.

4.3 Hardware-based integration

Integration is hardware-based and deterministic. Eight configurable PADIO pins — each an analog input, a digital input, or an output — four PNP high-side outputs that switch a user-supplied voltage, and two potential-free outputs plus two digital inputs connect directly to PLC signals. Configuration and read-out run over an extensive API, locally or through the MaNima Cloud.

Eight high-speed trigger inputs, one per channel, generate overdrive pulses directly from a hardware signal, without software in the critical timing loop, so the lighting tracks the process or the camera exposure deterministically.

4.4 Key features

- High-power PWM driver: up to 48 V and 40 A across eight channels.
- Redundant fail-safe design: two banks of four channels on separate supplies, with automatic switch-over and fault signalling.
- Per-channel hardware short-circuit and overcurrent protection, limiting the current within 10 microseconds.
- Voltage, current and temperature monitoring with configurable error levels.
- Up to eight PADIO channels: each pin as an analog input (NTC), a digital input, or an output.
- A dedicated PWM output for temperature-controlled fan or pump cooling.

- Two digital inputs and two potential-free outputs for scene control, alarms and redundancy.
- Four PNP high-side outputs to switch a user-supplied voltage — relays, indicators or PLC inputs.

4.5 Protection

Protection is layered and hardware-based, so it stays effective even during a software fault:

- Reverse-polarity protection on both supply inputs.
- Input overvoltage protection that shuts the driver down above roughly 51 V, withstanding up to 80 V.
- Individual fast short-circuit protection that limits each output to 10 A within 10 microseconds. The channel recovers on its own once the short is removed.
- Board-temperature monitoring that reduces the output duty cycle above 80 °C.

Reproduced from DS243501.

4.6 Connector overview

All connections are on the two long sides of the housing. The top side carries the first supply input and the outputs of channels 1 to 4, the Reset and ID buttons, the pump/fan header and both Ethernet ports. The bottom side carries the second supply input and the outputs of channels 5 to 8, the Digital I/O and NTC block, and the Pulse and Outputs block.

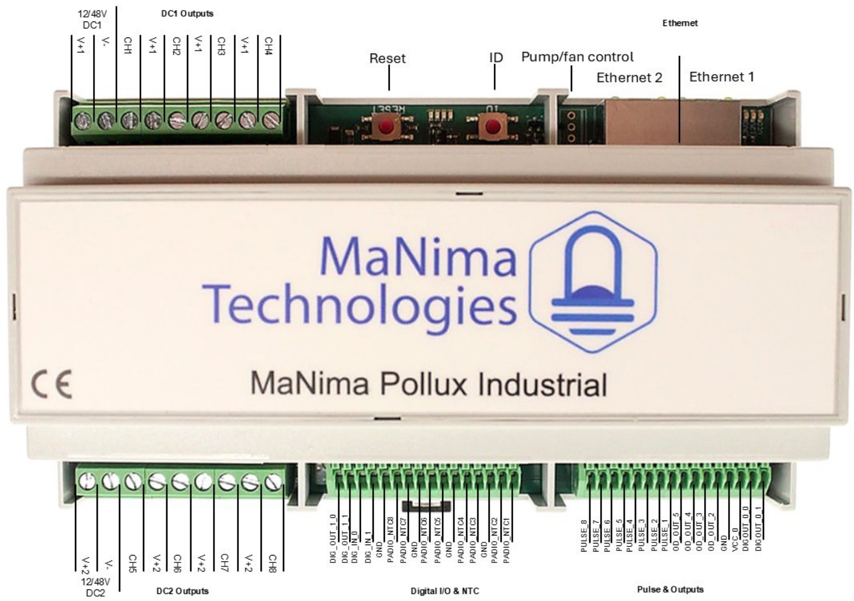

Figure 1 — Connector and pin layout, top and bottom side.

Both 16-pin connectors are Phoenix Contact PTSA 1,5/16-3,5-F push-in spring terminal blocks: 16 positions in a single row at a 3.5 mm pitch, 57.5 mm wide overall, rated 8 A at a nominal conductor cross section of 1.5 mm². Pin 1 is the leftmost pin. Press the actuator above a position to open the spring, insert the conductor into the opening below it, then release. The full signal list for each pin is in the Technical reference chapter.

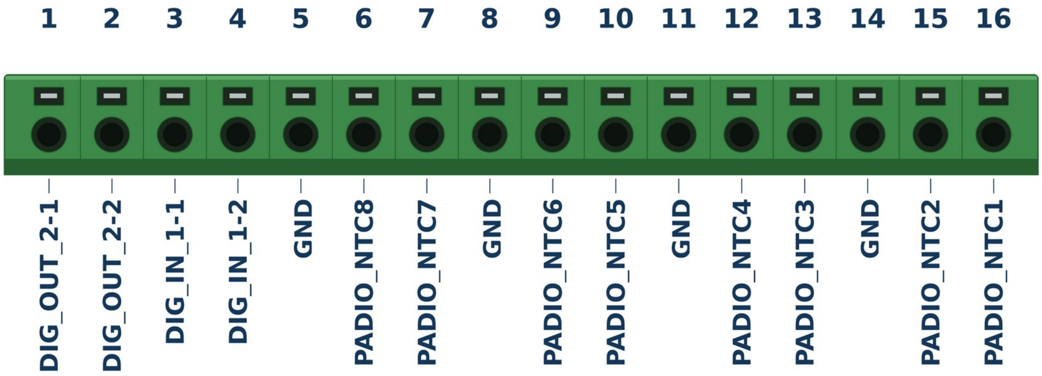

Figure 2 — Digital I/O and NTC connector, pins 1 to 16.

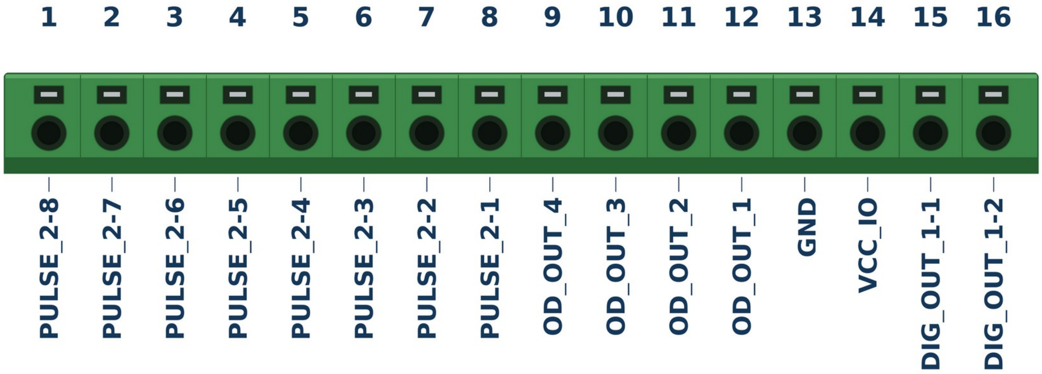

Figure 3 — Pulse and Outputs connector, pins 1 to 16.

5 Unpacking and scope of delivery

This chapter covers what arrives and what to check before you mount anything.

All products are handled and packaged using ESD-safe methods. Keep the driver in its packaging until you are ready to mount it.

5.1 Scope of delivery

The box contains the Pollux Industrial Nova in its DIN-rail enclosure, and nothing else. NTC sensors, mating connectors, cabling, a power supply and printed documentation are not included and are ordered separately — see the Ordering information section of the product datasheet.

5.2 Checks on arrival

Inspect the driver before you mount it. Damage found now is a delivery matter; damage found after installation is not.

- Check the enclosure for cracks, a distorted DIN-rail clip and bent or damaged terminal blocks.
- Confirm the label reads Pollux Industrial Nova and that the order number matches what you ordered.
- Keep the driver in its ESD-safe packaging until you are ready to mount it, and handle it by the enclosure rather than the terminals.

If anything is damaged or missing, contact MaNima before you power the driver.

6 Mechanical installation

This chapter mounts the driver. The driver must be unpowered and unwired throughout.

6.1 Enclosure

Property	Value
Standard	Meets the requirements of DIN 43880
Mounting	35 mm DIN rail, or screwed to a flat surface
Material	Light grey UL94-V0 flame-retardant PC
Dimensions	159.2 mm wide (3 units) × 90 mm long × 58 mm high
Weight	360 g
IP rating	IP52

Reproduced from DS243501.

6.2 Mounting the driver

The driver clips onto a 35 mm DIN rail, or can be screwed to a flat surface. What matters for either method is the orientation and the space around it.

6.2.1 Clearances

The housing vents at the top and the bottom only; the sides are closed. Two requirements therefore land on the top and bottom faces:

- **Airflow.** Warm air leaves through the top and is drawn in at the bottom. Anything that blocks either face raises the board temperature and brings the driver closer to the point where it limits its own output.
- **Access.** Both terminal blocks are on those same faces. You need room for the conductors and for a screwdriver on the supply and channel terminals.

Clearance	Minimum
Above	50 mm
Below	50 mm
Left and right	None — drivers may sit side by side

50 mm above and below covers both requirements at once. It leaves the convection path open, and it is enough to bend a 3.31 mm² conductor into the terminal and still get a screwdriver squarely onto the screw. The sides need no clearance at all, so drivers may be mounted directly against one another on the rail.

Mount the driver on a horizontal DIN rail, so that the two terminal faces point up and down. This is the orientation the venting assumes: cool air is drawn in at the bottom face and warm air leaves through the top. A driver mounted on a vertical rail, or laid flat, loses that convection path even where the clearances are respected.

> **NOTICE — CLEARANCES ARE A MINIMUM, NOT A TARGET**
> At a high ambient temperature, or with all eight channels near their maximum current, the minimum clearance alone may not keep the board below 60 °C.
> **Verify the board temperature at full load during commissioning, and add cooling or more space if it runs high.**

6.3 Thermal requirements

Board temperature is measured in real time and can be read in the MaNima Configurator. Two temperatures matter, and they are not the same thing:

- 60 °C is the advised working maximum. Design the installation so the board stays below it.
- 80 °C is the protection threshold. Above it the driver reduces the output duty cycle to protect itself, and the fixtures dim.

An installation that runs at 80 °C is already at the point where the driver starts limiting its own output. Treat 60 °C as the design target and leave the 20 °C between them as margin.

> **NOTICE — BOARD TEMPERATURE GOVERNS THE CURRENT LIMIT**
> Running the driver at high current in a warm cabinet without cooling raises the board temperature until the driver starts limiting its own output. The fixtures dim without a fault being reported.
> **Provide active or passive cooling where the ambient temperature or the load is high, and verify the board temperature under full load during commissioning.**

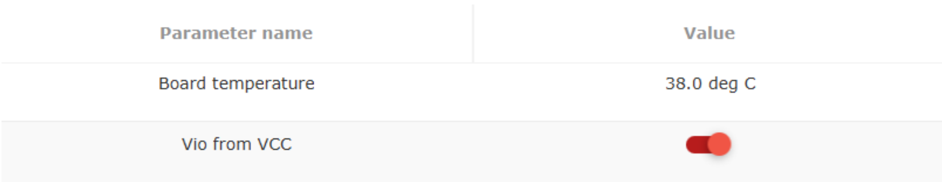

Figure 4 — The board temperature is read on the Board tab of the NTC / LDR page.

6.3.1 How much current you can draw

The limit that applies is the board temperature, not a fixed current figure. Two cases:

- At an ambient temperature of 40 °C without active cooling, do not exceed the maximum currents in the Pollux Industrial Nova datasheet (DS243501): 10 A per channel, 20 A per supply side, 40 A in total.
- Above 40 °C ambient, or when you want to run closer to those maxima, add active or passive cooling and verify that the board stays below 60 °C under full load.

The datasheet maxima may be exceeded only where cooling keeps the board below 60 °C. Verify this by measurement during commissioning, not by calculation.

7 Electrical installation

This chapter connects the supply inputs and the LED channels. The driver must be mounted and both supply inputs isolated before you start.

WARNING — LIVE DC TERMINALS

Wiring a terminal block while a supply input is connected exposes you to up to 48 V DC.

Isolate both supply inputs and verify zero voltage at the terminals before you begin wiring.

7.1 Terminal data

The driver has two different kinds of terminal, and they are wired differently. The supply inputs and the LED outputs use screw terminals. The Digital I/O & NTC and Pulse & Outputs blocks use push-in spring terminals, which need no tool and no torque.

7.1.1 Screw terminals — supply inputs and LED outputs

Specification	Min	Max	Unit
Wire size, solid	0.05	3.31	mm²
	30	12	AWG
Wire size, stranded	0.05	3.31	mm²
	30	12	AWG
Torque		0.5	Nm
		4	lb·in
Wire strip length		6	mm

Reproduced from DS243501. Observe the torque — an under-torqued terminal heats up under load.

7.1.2 Push-in terminals — Digital I/O & NTC and Pulse & Outputs

Specification	Value
Type	Phoenix Contact PTSA 1,5/16-3,5-F
Connection method	Push-in spring, no tool required
Wire size, solid	0.2 to 1.5 mm²
Wire size, stranded	0.2 to 1.5 mm²
Wire size, AWG	24 to 16
With ferrule, no plastic collar	0.25 to 1 mm²
With ferrule and plastic collar	0.25 to 0.5 mm²
Wire strip length	9 mm
Nominal current	8 A
Rated voltage (III/2)	250 V
Pitch	3.5 mm
Torque	Not applicable

Terminal data from the Phoenix Contact product datasheet.

NOTICE — DO NOT FORCE A PUSH-IN TERMINAL

A push-in spring terminal is not a screw terminal. Turning or levering the actuator with a screwdriver deforms the spring and the contact is lost.

Press the actuator straight down, insert the conductor, and release. Apply no torque.

7.2 Cable lengths

Connection	Maximum length
Power supply	3 m
LED outputs	30 m
NTC sensors	30 m, extendable with the MaNima Extensa

Reproduced from DS243501.

7.3 Port descriptions

The connectors, from top left to bottom right:

12/48V DC1 — power input for supply 1. Corresponds with the DC1 outputs.

12/48V DC2 — power input for supply 2. Corresponds with the DC2 outputs.

DC1 outputs — four PWM channels, CH1 to CH4, with V+1. Corresponds with the 12/48V DC1 input.

DC2 outputs — four PWM channels, CH5 to CH8, with V+2. Corresponds with the 12/48V DC2 input.

Digital I/O & NTC — the eight PADIO pins and the two digital inputs and outputs. See Technical reference for the pinout.

Pulse & Outputs — the eight pulse trigger inputs, the four PNP high-side outputs, VCC_IO, the digital outputs and the pump/fan header.

Ethernet 1 and 2 — RJ45 connectors on an onboard switch, for connecting the driver to the network.

Reset — manual reset of the driver when a reset through the software is not possible.

ID — identifies this driver in the software.

For additional wiring diagrams, download them from the MaNima support pages.

Downloads: https://www.manima-technologies.com/support/downloads/

7.4 Connecting the supply inputs

The driver has two independent supply inputs, 12/48V DC1 and 12/48V DC2. Each feeds one bank of four channels: DC1 feeds CH1 to CH4, DC2 feeds CH5 to CH8. The grounds of both inputs are shared. Each side supports up to 20 A. Using two supplies, one per input, is recommended.

The driver keeps its monitoring capability when only one of the two inputs is supplied, but only the four channels belonging to that input can drive a load.

> **NOTICE — SINGLE SUPPLY DISABLES HALF THE OUTPUTS**
> With only one supply input connected, four of the eight channels cannot drive a load.
> **Connect both supply inputs unless the installation deliberately uses one bank only.**

WARNING — LIVE DC TERMINALS

The supply terminals carry up to 48 V DC and remain live for as long as either supply is connected.

Isolate both supply inputs and verify zero voltage at the terminals before you touch a conductor.

1. Isolate both power supplies and verify zero voltage at their terminals.
2. Strip the supply conductors to 6 mm.
3. Connect the positive conductor of supply 1 to V+1 on the 12/48V DC1 terminal.
4. Connect the negative conductor of supply 1 to V− on the same terminal.
5. Tighten both screws to 0.5 Nm.
6. Repeat for supply 2 on the 12/48V DC2 terminal.
7. Verify that no strands protrude from any terminal and that each conductor is held by the clamp, not by its insulation.

Result: both supply inputs are wired and the driver is ready for the channel wiring. Do not switch on yet.

7.5 Connecting the LED channels

CH1 to CH8 are PWM-controlled grounds. V+1 and V+2 are the positive rails and correspond to supply input 1 and supply input 2 respectively. A fixture is therefore wired between a V+ terminal and a channel terminal of the same bank.

NOTICE — DO NOT CROSS THE BANKS

Wiring a fixture between V+1 and a channel on the DC2 bank places the load across two separate supplies.

Wire every fixture between a V+ and a channel of the same bank: V+1 with CH1 to CH4, V+2 with CH5 to CH8.

WARNING — LIVE DC TERMINALS

The channel terminals carry up to 48 V DC and remain live for as long as either supply is connected.

Isolate both supply inputs and verify zero voltage at the terminals before you touch a conductor.

1. Confirm that both supply inputs are isolated.
2. Strip the fixture conductors to 6 mm.
3. Connect the positive conductor of the fixture to a V+1 terminal.
4. Connect the negative conductor to the channel terminal that will drive it, for example CH1.
5. Tighten both screws to 0.5 Nm.
6. Repeat for each fixture, keeping fixtures on the DC2 bank between V+2 and CH5 to CH8.

Result: every fixture is wired to a channel of its own bank. Record which fixture is on which channel — you need this when you configure the outputs and the NTC pairing.

7.6 Redundant power supply

Because each bank has its own supply, the driver can be wired as a redundant pair: a fixture is connected to a primary channel on one bank and to a secondary channel on the other. If the primary supply fails or the primary channel faults, the LEDs on that side turn off while the driver and the other bank keep running, and an action handler switches the load to the secondary channel.

The same fault can raise an alarm: a digital output can drive an alarm lamp or notify a PLC, and with the MaNima Cloud an email can be sent. The driver can also switch to another scene. See the action handler example in Configuration and operation.

7.6.1 What a redundant fixture needs

Redundancy is wired, not configured. The fixture must contain two electrically independent LED strings — one fed from the DC1 bank, one from the DC2 bank. A fixture with a single string cannot be made redundant on this driver, because feeding one string from two banks would tie the two supplies together.

- Two independent strings in the fixture, with four conductors to the driver.
- Two separate power supplies, one per supply input. Two inputs fed from one supply protects against a channel fault but not against a supply failure.
- Each string rated for the full light output, because it carries the load alone whenever the other bank is down.

> **NOTICE — BOTH STRINGS ON ONE BANK IS NOT REDUNDANCY**
> If both strings of a fixture are wired to channels of the same bank, a failure of that supply takes out both of them.
> **Wire the primary string to a DC1 channel and the secondary string to a DC2 channel.**

> **WARNING — LIVE DC TERMINALS**
> The channel terminals carry up to 48 V DC and remain live for as long as either supply is connected.
> **Isolate both supply inputs and verify zero voltage at the terminals before you touch a conductor.**

1. Confirm that both supply inputs are isolated.
2. Connect a separate power supply to each of the two supply inputs, as described in Connecting the supply inputs.
3. Wire the primary string of the fixture between V+1 and a DC1 channel, for example CH1.
4. Wire the secondary string of the same fixture between V+2 and a DC2 channel, for example CH5.
5. Tighten every screw to 0.5 Nm.
6. Repeat for each redundant fixture. Any DC1 channel may be paired with any DC2 channel; the driver imposes no fixed pairing.

Result: each fixture is fed from both banks over two independent strings. The wiring is now redundant, but the switch-over is not yet active — set up the action handler that turns on the secondary channel when the primary one faults, as described in Configuration and operation.

Pairing CH1 with CH5, CH2 with CH6 and so on keeps the wiring easy to follow, but it is a convention rather than a requirement. Whichever pairing you use, record it — the action handler is configured per channel.

7.7 Shielding and grounding

The driver has no protective earth connection: the housing is plastic and the supply inputs carry only V+ and V−. Shielding is therefore a signal-integrity measure, not a safety measure, and it applies to one thing — the NTC wiring.

An NTC returns a small analog voltage over a cable that often runs alongside PWM channels switching at up to 2000 Hz. Over a short run this is harmless. Over a long run the cable picks up enough interference to make the temperature reading unstable, which in turn makes the driver dim or alarm on a temperature that is not real.

- Use shielded cable for NTC sensors, and always where the run is long.
- Connect the shield to GND at one end, and leave it unconnected at the other.

Connecting the shield at both ends creates a ground loop, which injects more interference than the shield removes. One end only. Which end is not prescribed; in practice this is the driver end, because the Digital I/O & NTC connector has GND pins available for it.

No particular cable type is required, and no maximum length applies to unshielded runs — shield where the run is long enough for the reading to become unstable, and see Troubleshooting if it already is.

> **NOTICE — AN UNSTABLE NTC READING IS NOT ALWAYS A SENSOR FAULT**
> Interference picked up by unshielded or double-earthed NTC wiring shows up as a fluctuating temperature, and the driver acts on it by dimming or alarming.
> **Check the shielding before you replace a sensor that appears to be faulty.**

8 I/O and signal connections

This chapter connects the signal interfaces. The driver must be mounted and both supply inputs isolated before you start.

8.1 PADIO interface

Eight PADIO pins (Programmable Analog/Digital I/O) are individually configurable. Each pin has five modes:

- **Off** — the pin is not used.
- **NTC** — analog input for temperature sensing.
- **LDR** — analog input for a light-dependent resistor.
- **DIN** — digital input.
- **DOUT** — digital output, PNP high-side.

24 V is the maximum in either direction: a PADIO pin accepts up to 24 V as an input and switches up to 24 V as an output. In DOUT mode it works like the OD_OUT outputs — it is a high-side switch that feeds the load from the pin, so the load goes between the pin and GND. A pin set to an analog mode is automatically disabled as an output, so measurement and switching stay separated.

The mode is set per pin in the MaNima Configurator, on the NTC / LDR tab. Wire the pin for the mode you intend to use, then set that mode before you power the fixture — see the NTC inputs section of Configuration and operation.

PADIO characteristic	Min	Typ	Max	Unit
Input high level (Vih)	2.0			V
Input low level (Vil)			1.22	V
Input current at 24 V			1.4	mA
Maximum voltage, input or output			24	V
Default NTC resistance (R25)		5000		Ω
Default NTC Beta value		3950		
Measurable temperature range, default NTC	0		120	°C
Source current in DOUT mode			50	mA

Reproduced from DS243501. NTC resistance and Beta are configurable; the usable range depends on the NTC used.

8.1.1 Wiring a PADIO pin

Every PADIO connection is made between the PADIO pin and a GND pin of the Digital I/O & NTC connector. The connector has four GND pins — 5, 8, 11 and 14 — each sitting next to a pair of PADIO pins, so a sensor never needs a ground from another part of the installation.

> **WARNING — LIVE DC TERMINALS**
> The channel terminals nearby carry up to 48 V DC and remain live for as long as either supply is connected.
> **Isolate both supply inputs and verify zero voltage at the terminals before you touch a conductor.**

1. Confirm that both supply inputs are isolated.

2. Decide which PADIO pin the device will use, and note the pin number from the Technical reference chapter.
3. Strip the conductors to 9 mm.
4. Connect one conductor to the PADIO pin and the other to the nearest GND pin. For NTC and LDR this is the whole connection — the sensor is a two-wire resistive device and has no polarity. For DIN, the signal goes to the PADIO pin and the signal ground to GND, at no more than 24 V. For DOUT, the load goes between the PADIO pin and GND; the pin supplies up to 24 V and sources up to 50 mA.
5. Press each conductor straight into the push-in terminal and confirm it is held by the clamp, not by its insulation.
6. Set the pin to the matching mode in the MaNima Configurator before you power the installation.

Result: the PADIO pin is wired. It does nothing until its mode is set — a pin left on Off ignores whatever is connected to it.

8.2 PNP high-side outputs and VCC_IO

Four PNP high-side outputs, OD_OUT_1 to OD_OUT_4, switch a voltage you supply the VCC_IO rail. Because that voltage comes from your installation, the outputs drive relays, indicator lamps or PLC inputs directly at the level the rest of the installation already uses.

High-side means the output feeds the load rather than switching it to ground. When the output is on it connects VCC_IO through to its pin; when it is off the pin floats. The load therefore goes between the output pin and GND. Note that the connector label reads OD_OUT — the outputs are high-side switches regardless of that label.

PNP outputs & VCC_IO	Max	Unit
VCC_IO input voltage	24	V
Output voltage when on	VCC_IO	V
Source current per output	50	mA

Reproduced from DS243501.

NOTICE — VCC_IO MUST ALSO BE ENABLED IN SOFTWARE

Wiring a supply to the VCC_IO pin does not by itself power the PNP outputs. Until the rail is enabled, the outputs stay low and appear to be faulty.

Switch on Vio from VCC on the Board tab of the NTC / LDR page in the MaNima Configurator, as described in Configuration and operation.

8.2.1 Wiring VCC_IO and the PNP outputs

VCC_IO is pin 14 of the Pulse & Outputs connector, with GND on pin 13. The four outputs OD_OUT_4 to OD_OUT_1 are pins 9 to 12. The load sits between the output pin and GND, and the output feeds it the VCC_IO voltage when it switches on.

WARNING — LIVE DC TERMINALS

The channel terminals nearby carry up to 48 V DC and remain live for as long as either supply is connected.

Isolate both supply inputs and verify zero voltage at the terminals before you touch a conductor.

1. Confirm that both supply inputs are isolated.
2. Strip the conductors to 9 mm.
3. Connect the positive of your own supply, at no more than 24 V, to VCC_IO on pin 14.
4. Connect the negative of that supply to GND on pin 13.
5. Connect the load between an OD_OUT pin and GND. Each output sources up to 50 mA at the VCC_IO voltage.
6. Switch on Vio from VCC on the Board tab of the NTC / LDR page in the MaNima Configurator.

Result: the PNP outputs switch your own voltage. If an output stays low, check Vio from VCC before you check the wiring.

8.3 Digital inputs and outputs

Two digital inputs accept local control or commands straight from PLC outputs. Two potential-free digital outputs report faults and errors, or drive an external redundancy circuit. Both are used as triggers and as actions in the action handlers.

Specification	Min	Max	Unit	Condition
Digital input high level (Vih)	2.0		V	
Digital input low level (Vil)		1.22	V	
Digital input current		1.4	mA	48 V input
Digital output voltage level		400	VDC	
Digital output current		50	mA	

Reproduced from DS243501. The digital inputs are protected against voltages up to the supply voltage.

8.3.1 Choosing a digital output

The driver has three kinds of digital output, and they are not interchangeable. Pick the one that matches the load:

Output	Where	Switches	Max current	Type
PADIO in DOUT mode	Digital I/O & NTC, any PADIO pin	Up to 24 V	50 mA	PNP high-side; load between the pin and GND
OD_OUT_1 to OD_OUT_4	Pulse & Outputs, pins 9 to 12	The VCC_IO voltage you supply, up to 24 V	50 mA	PNP high-side; load between the pin and GND
Digital output 0 and 1	Pulse & Outputs pins 15 and 16; Digital I/O & NTC pins 1 and 2	Up to 400 V	50 mA	Potential-free, no shared reference

Use a potential-free output where the circuit you switch has its own supply or its own ground — a PLC on a different reference, or an alarm loop. Note that the other two are wired the same way: the load goes between the output pin and

GND, and the output feeds it. They differ only in where the voltage comes from — a PADIO output from your own supply, an OD_OUT output from the VCC_IO rail.

8.3.2 Finding an output on the connector

The four PNP outputs are numbered the same way in the MaNima Configurator and on the connector. The two potential-free outputs each have two terminals, split across two connectors: output 1 (DIG_OUT_1-1 and DIG_OUT_1-2) on the Pulse & Outputs connector, and output 2 (DIG_OUT_2-1 and DIG_OUT_2-2) on the Digital I/O & NTC connector.

In the Configurator	On the connector	Pins
Output 1	DIG_OUT_1-1 and DIG_OUT_1-2	Pulse & Outputs, 15 and 16
Output 2	DIG_OUT_2-1 and DIG_OUT_2-2	Digital I/O & NTC, 1 and 2
OD output 1	OD_OUT_1	Pulse & Outputs, 12
OD output 2	OD_OUT_2	Pulse & Outputs, 11
OD output 3	OD_OUT_3	Pulse & Outputs, 10
OD output 4	OD_OUT_4	Pulse & Outputs, 9

8.3.3 Wiring the digital inputs and outputs

The two digital inputs are pins 3 and 4 of the Digital I/O & NTC connector, with GND on pin 5. They accept up to the supply voltage without damage.

Each potential-free output has two terminals, and they are not interchangeable with the inputs: output 0 is on pins 15 and 16 of the Pulse & Outputs connector, output 1 on pins 1 and 2 of the Digital I/O & NTC connector. There is no polarity and no shared ground — the two terminals are simply a contact that opens and closes.

WARNING — POTENTIAL-FREE DOES NOT MEAN DE-ENERGISED
A potential-free output switches up to 400 V from a circuit that is not supplied by this driver, so it can be live while the driver itself is isolated.
Isolate the external circuit as well before you wire these terminals.

1. Isolate both supply inputs and any external circuit that the outputs will switch.
2. Strip the conductors to 9 mm.
3. For a digital input, connect the signal to pin 3 or 4 and the signal ground to GND on pin 5.
4. For a potential-free output, connect the external circuit across the two terminals of that output.
5. Press each conductor straight into the push-in terminal and confirm it is held by the clamp.

Result: the inputs and outputs are wired. Both become useful only once they are used as a trigger or an action — see Action handlers in Configuration and operation.

8.4 Pulse trigger inputs

Eight high-speed pulse inputs, PULSE_2-1 to PULSE_2-8, correspond one-to-one with the eight output channels: PULSE_2-1 fires CH1, PULSE_2-2 fires CH2, and so on. A hardware signal on a pulse input fires an overdrive pulse on its channel without software in the timing loop, so the lighting follows a moving line or a camera exposure deterministically.

NOTICE — PULSE MODE OVERRIDES THE ACTION HANDLERS
When pulse mode is enabled, every action handler is overridden and the pulse inputs take control of the outputs.
Enable pulse mode only where hardware triggering is intended, and re-verify the handlers after you disable it again.

8.4.1 Wiring a pulse input

The pulse inputs are internally pulled up, so a channel fires when its pin is pulled down to ground. Nothing needs to be supplied to the pin: an open-collector or NPN output, a transistor, or a dry contact all work, and the trigger device only has to sink the pin low.

The inputs respond within 10 microseconds. The offset between the trigger and the light is set in pulse mode itself — a pulse can be fired at a configurable delay after the trigger — so the timing is matched to the process there rather than in the wiring.

PULSE_2-1 to PULSE_2-8 are pins 8 down to 1 of the Pulse & Outputs connector, with GND on pin 13. Note the order — PULSE_2-1 is pin 8 and PULSE_2-8 is pin 1.

NOTICE — DO NOT DRIVE A PULSE INPUT HIGH
The input already sits high through its internal pull-up. Feeding it a voltage from outside adds nothing and risks exceeding the input rating.
Switch the pin to ground, and leave it open for the idle state.

WARNING — LIVE DC TERMINALS
The channel terminals nearby carry up to 48 V DC and remain live for as long as either supply is connected.
Isolate both supply inputs and verify zero voltage at the terminals before you touch a conductor.

1. Confirm that both supply inputs are isolated.
2. Strip the conductors to 9 mm.
3. Connect the switching side of the trigger device to the PULSE pin of the channel it should fire.
4. Connect the return of the trigger device to GND on pin 13, so it shares a ground with the driver.

5. Where the run is long or passes close to the channel wiring, use shielded cable and connect the shield at one end only, as described in Shielding and grounding.
6. Enable pulse mode in the MaNima Configurator and set the pulse parameters for each channel.

Result: the channel fires from the hardware trigger. Until pulse mode is enabled, the inputs do nothing.

A channel can also pulse without any trigger at all: Auto pulse mode runs the port at its configured pulse length on its own, so no wiring to the pulse input is needed. See Pulse mode in Configuration and operation.

Each pulse input is held high by an internal pull-up and is triggered by pulling it to ground. A potential-free contact, an open-collector output or an NPN sensor can drive it directly; no external supply or pull-up resistor is needed.

Property	Value
Internal pull-up	10 kΩ to VCC
Input impedance	approx. 30 kΩ
Trigger	Pull the input to ground
Maximum input voltage	VCC, the supply voltage of the driver (12–48 V)
Input current at 24 V	approx. 1 mA
Sink current when pulled to ground at 24 V	approx. 2.4 mA
Response time	10 µs

The pull-up sits on VCC, so the voltage at the input follows the supply voltage of the driver. Rate the switching contact or sensor for the supply voltage you actually use, and make sure it can sink the current listed above.

8.5 Pump/fan control

A dedicated four-wire header drives a fan or pump. The PWM signal scales the cooling steplessly with the measured fixture temperature, and the tachometer input reads the actual RPM back, so a stalled or failing fan is detected before it causes overheating. A standard four-wire fan uses the same pin order and connects without extra components.

Pin	Signal	Note
1	GND	Square pad
2	12 V	Supply, up to 500 mA (6 W)
3	TACH	Open-drain, internal 4.7 kΩ pull-up to 3.3 V
4	PWM	25 kHz control signal at 3.3 V logic level

Reproduced from DS243501.

> **CAUTION — FAN SUPPLY LIMIT**
> A fan or pump drawing more than 500 mA overloads the header.
> **Select a fan rated at 12 V and no more than 500 mA (6 W).**

8.5.1 Whether your driver has the header

The header is fitted by MaNima when the ordered configuration includes a fan or a chiller. Drivers supplied without active cooling have the four plated holes but no header, so check the board before you plan the cooling wiring. Pin 1 is the square pad.

If a driver was supplied without the header and cooling is added later, the header has to be soldered in. Contact MaNima rather than fitting it in the installation — soldering on a mounted, wired driver risks damage to the board and to the wiring around it.

8.5.2 Connecting a fan or pump

1. Confirm that both supply inputs are isolated.
2. Connect GND to pin 1, 12 V to pin 2, TACH to pin 3 and PWM to pin 4.
3. Set the fan or pump curve against the NTC that measures the fixture it cools, as described in Configuration and operation.
4. During commissioning, check that the RPM read-back reports a plausible speed, and that it changes when the PWM level changes.

Result: the fan or pump is driven and monitored. A tachometer reading of zero while the PWM output is active means a stalled fan or a missing TACH connection, not a driver fault.

8.6 Ethernet

Two Ethernet ports share an onboard switch, so drivers can be daisy-chained along one network run instead of home-running every unit to a central switch. A controller or the MaNima Cloud still reaches every driver on the chain.

> **NOTICE — EACH DRIVER NEEDS A UNIQUE ADDRESS**
> Two drivers with the same IP address will not both appear in the scanner.
> **Give every driver a unique IP address, either through DHCP or manually.**

8.6.1 Planning the chain

The limit on a chain is not bandwidth or latency. Configuration and status traffic is small, and each switch hop adds only a few microseconds — irrelevant for configuration, and irrelevant for triggering because that runs over the pulse inputs rather than the network.

The onboard switch keeps relaying as long as the driver has power on either supply input, so losing one input does not break the chain behind it. A driver only stops relaying when it loses power on both inputs at once — and then every driver further down the chain, whose traffic passes through it, goes unreachable with it.

- Keep a chain to roughly twenty drivers.
- Split a long line into two chains from the switch rather than running one long one. Two chains of fifteen recover better than one of thirty.
- Use Cat5e or better, up to 100 m per hop — the length limit applies to each cable between two drivers, not to the chain as a whole.
- Put the drivers you most need to reach during a fault closest to the switch.

NOTICE — A FULLY UNPOWERED DRIVER BREAKS THE CHAIN BEHIND IT

Every driver relays the traffic for the ones after it. Losing one supply input does not interrupt this, but a driver that loses power on both inputs takes the rest of that chain off the scanner with it.

Feed daisy-chained drivers so that a single supply failure never leaves one unpowered, and keep a critical driver off the far end of a long chain.

1. Connect the first driver to the network switch with Cat5e or better.
2. Connect Ethernet 2 of that driver to Ethernet 1 of the next, and continue down the line.
3. Give every driver a unique IP address, either through DHCP or manually.
4. Confirm in the Scanner that every driver on the chain appears.

Result: all drivers on the chain are reachable from the Configurator and, where used, from the MaNima Cloud.

9 Commissioning

This chapter powers the driver for the first time and verifies the installation. All wiring must be complete and checked before you start.

9.1 Before you switch on

WARNING — FIXTURES LIGHT UP WITHOUT WARNING

From this point the fixtures can be energised at full output, and a fixture that emits UV is a hazard to eyes and skin at any distance where it is in view.

Clear the area and confirm that no person is in the line of sight of any fixture before you switch on.

1. Verify that every terminal screw is tightened to 0.5 Nm.
2. Verify that every push-in conductor is held by the clamp and not by its insulation.
3. Verify that no fixture is wired across two banks.
4. Verify that both supplies deliver 12–48 V DC and are free of short circuits.
5. Verify that each redundant fixture has its two strings on different banks.
6. Verify that NTC shields are connected at one end only.
7. Verify that the driver is mounted on a horizontal rail with at least 50 mm free above and below it.

9.2 First power-up

1. Switch on supply 1 and confirm the driver powers up.
2. Switch on supply 2.
3. Connect the driver to the network and start the MaNima Configurator.
4. Find the driver in the Scanner tab and connect to it.
5. Set the network settings as required, see Network settings.
6. Check the board temperature and the measured supply voltages.
7. Set the PWM frequency for each side, and enable the outputs.
8. Where the installation uses the PNP outputs, switch on Vio from VCC on the Board tab. They stay low until you do.
9. Use Output identify to confirm which fixture each channel drives, and record it.
10. Configure the NTC inputs, the PADIO modes and the action handlers as required.
11. Where a fan or pump is fitted, confirm that the RPM read-back reports a plausible speed and follows the PWM level.
12. Run the installation at full load and confirm the board temperature stays below 60 °C. Add cooling if it does not.

Result: the installation is powered, configured and verified under load. Record the channel-to-fixture map, the NTC pairing and the configured thresholds before you hand it over — they are what the next person needs in order to change anything safely.

9.3 Reset and indications

Four LEDs on the board show which supply rails are present. Each LED is lit whenever its rail is up, so a dark LED points straight at where the power stops.

LED	Lit when
VIO	The internal I/O rail derived from VCC_IO is present and enabled.
12V	The 12 V rail is present. This is also what feeds the pump/fan header.
3V3	The 3.3 V logic rail is present.
VCC_IO	The VCC_IO rail is present.

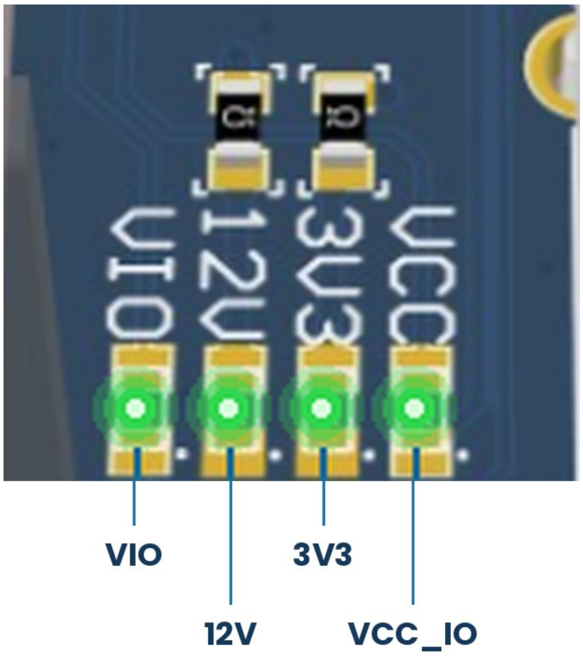

Figure 5 — The four rail LEDs, left to right as printed on the board: VIO, 12V, 3V3 and VCC_IO. Each LED is lit whenever its rail is present.

The VIO LED is the quickest check on the PNP outputs. If it is dark, either no voltage is wired to VCC_IO or Vio from VCC has not been switched on in the Configurator — and until it is lit, the PNP outputs cannot switch anything.

If all four are dark, the driver has no supply at all. If VCC is lit and 3V3 is not, the fault is on the board rather than in your wiring.

These four are on their own row. A second row of status LEDs sits beside the buttons — see below.

9.3.1 Status LEDs

A second row of four LEDs sits beside the ID and Reset buttons. These report the state of the firmware rather than the power rails.

LED	Meaning
Left	Heartbeat. It blinks while the firmware is running. A heartbeat that has stopped means the driver is not running, even when the rail LEDs are lit.
Middle two	Not assigned.
Right (red)	Fault. It lights on overvoltage, overcurrent, a board temperature that is too high, or a short circuit, and whenever an action handler fires.

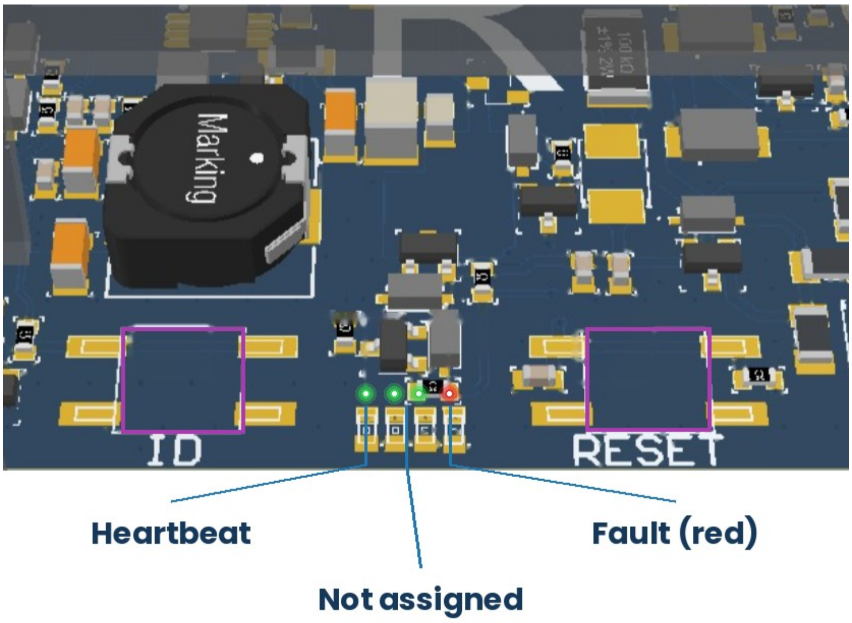

Figure 6 — The status LEDs between the ID and Reset buttons, which are outlined in magenta. From left to right: the green heartbeat LED, two unassigned green LEDs, and the red fault LED.

Read the two rows together. The rail LEDs tell you whether the driver has power; the heartbeat tells you whether it is running on that power; the red LED tells you whether it has found a fault while running.

9.3.2 Reset and ID buttons

Both buttons are on the top face of the driver, next to the Ethernet ports, and are reachable without opening the housing.

Reset — restarts the interface. Press it once, briefly — a short press is all it takes, and holding it makes no difference. It restarts the driver only; it does not clear the configuration or return the driver to factory settings. Use it when a restart through the MaNima Configurator is not possible.

ID — reserved for a future firmware version. It has no function in the firmware this manual covers.

10 Configuration and operation

The driver is configured through the MaNima Cloud, or locally with the MaNima Configurator where no internet connection is available. An extensive API exposes control and read-out to third-party systems.

10.1 The MaNima Configurator

The MaNima Configurator (MC) is the program the operator uses to configure the driver. It must run on a computer on the same network as the driver. Install and connect the driver first: most options are unavailable without a connection between the computer and the driver.

Downloads: https://www.manima-technologies.com/support/downloads/

Install the latest version of Java on that computer. No particular version is required beyond the current one.

Java: https://www.java.com/en/

10.1.1 Installing the Configurator

1. Run the installer, manimaConfigurator_latest, that you downloaded from the MaNima downloads page.
2. On Select Additional Tasks, leave Create a desktop shortcut ticked. This is the shortcut you use to open the program later. Click Next.
3. On Ready to Install, click Install and wait for the installation to finish.
4. On the final screen, leave Launch MaNima Configurator ticked and click Finish. The program starts, and the desktop shortcut opens it from then on.

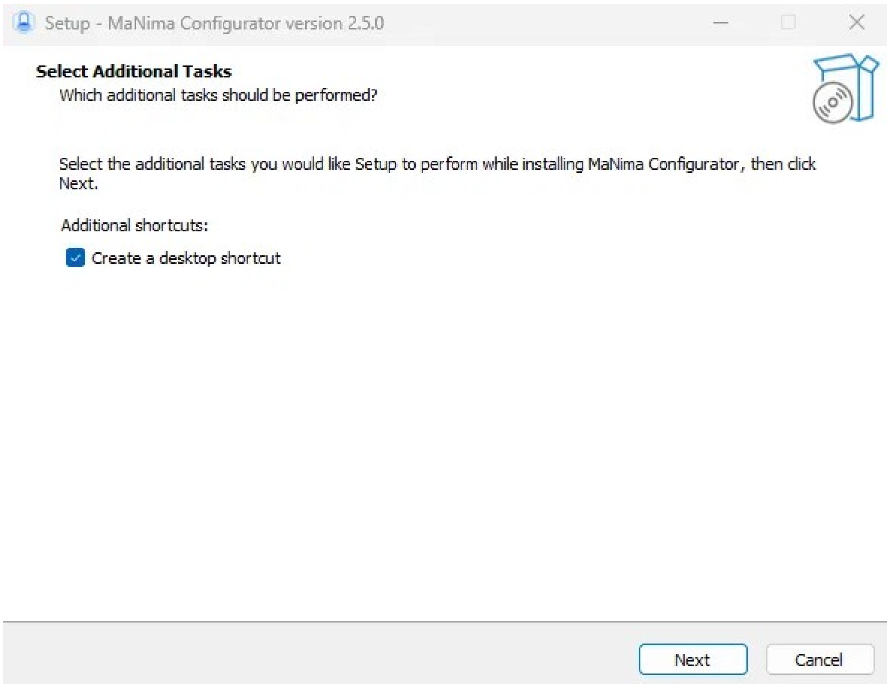

Figure 7 — Select Additional Tasks: keep Create a desktop shortcut ticked.

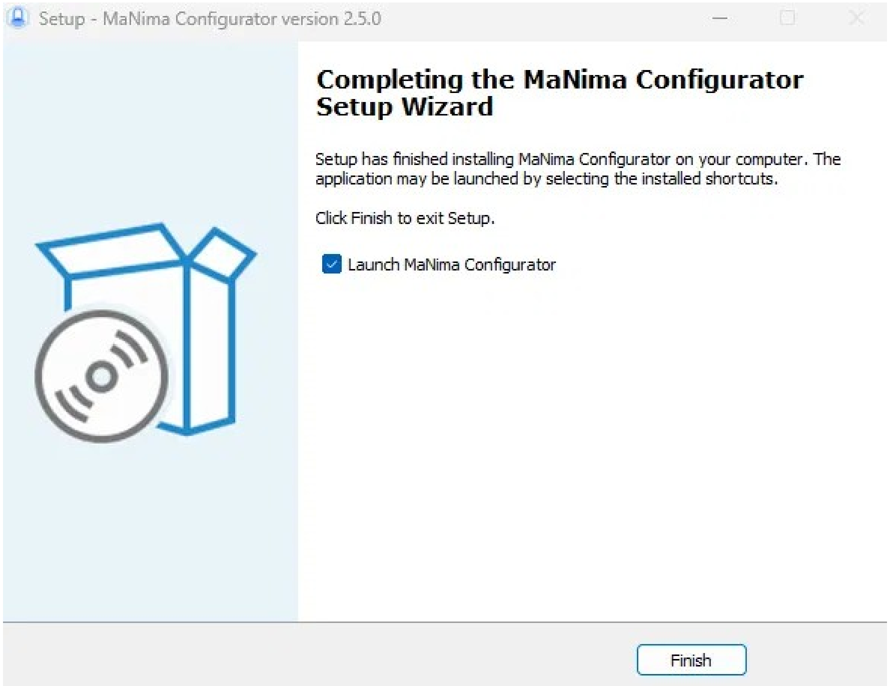

Figure 8 — The final screen. Leave Launch MaNima Configurator ticked and click Finish.

10.2 Scanner

The Scanner tab searches the network for MaNima products. A driver appears in the scanner regardless of the IP address it currently has, as long as it is on the same network as the computer.

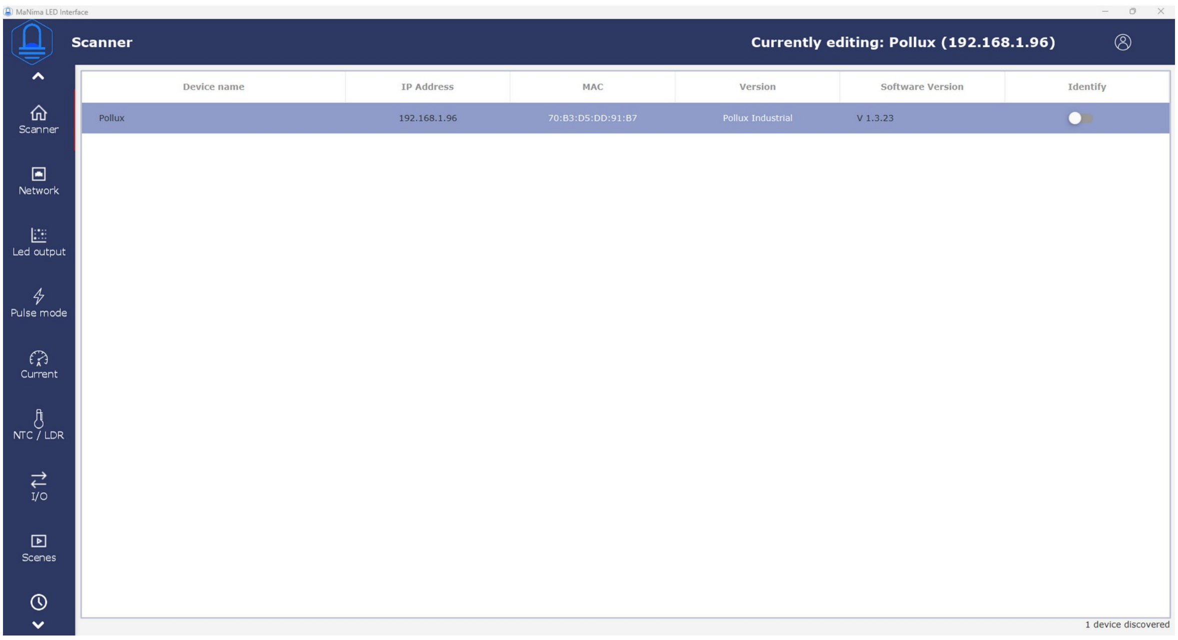

Figure 9 — The Scanner tab, listing every MaNima device found on the network. The navigation column on the left gives access to every other tab.

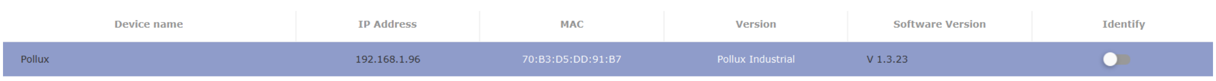

Figure 10 — The columns of the device list, close up.

Currently editing — the device that is currently being edited, by name and IP address.

Device name — the name given to a device, so the operator can tell devices apart. Change it in the settings tab.

IP Address — the address of the device. Every device must have a unique address; a duplicate address will not be visible.

MAC — the hardware address assigned by the manufacturer. Unlike IP addresses, MAC addresses are never identical.

Version — the licence in use on the device.

Software Version — the software version running on the device.

Identify — runs a test cycle on the device so you can see which fixtures it controls.

To connect, left-click the device in the list. On success the header changes from Currently editing: None to the address of the device. The bottom right of the window reports how many devices the scan found.

10.2.1 Failure to connect

If the Configurator does not find the driver, check the following in order:

1. The driver is on the same network as the computer.
2. The network has a DHCP server.
3. The IP address is within the address range of the Configurator.
4. The driver is powered and the supply is within 12–48 V DC.

10.2.2 Error warnings

An error warning appears when the driver has encountered a problem. Follow the instructions in the message.

10.3 Network settings

The Network tab sets the address of the driver. With DHCP on, the network assigns the address and the three fields are greyed out. Switch DHCP off to enter the address, subnet mask and gateway yourself.

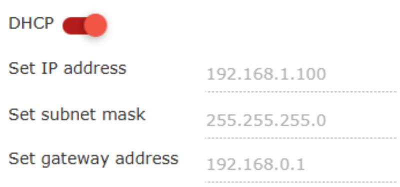

Figure 11 — The Network tab with DHCP on. The address fields are greyed out until DHCP is switched off.

A driver appears in the Scanner whatever address it has, so an address that does not match your subnet is not a reason to reset the driver — connect to it from the Scanner and correct the address here.

10.4 LED output

The LED output tab configures the eight PWM channels.

Output enabled — switches the output on and off. Changes on this tab take effect immediately; you do not have to enable an output before adjusting it.

Output universe — the Art-Net or sACN universe bound to the output.

Output channel — the channel within that universe. Each PWM output takes one channel.

PortNTC — selects which PADIO inputs regulate this output — NTC inputs measuring temperature, or LDR inputs measuring radiation. Where more than one is selected, the driver acts on the highest reading, never on their average: a sensor that is over its limit must not be averaged away by ones that are not.

Powersupply voltage — the measured input voltage.

OutputDutyPort — the output value, 0 to 255, which can be set in the boot scene.

Output identify (30s) — flashes the output for 30 seconds so you can see which fixture it drives.

PWM frequency side A and side B — the PWM frequency, configurable from 100 to 2000 Hz. Set per side, not per channel: side A applies to CH1 to CH4 on the DC1 bank, side B to CH5 to CH8 on the DC2 bank.

Because the frequency is shared within a bank, fixtures that need different PWM frequencies have to be split across the two banks. Plan this before you wire the channels — a camera-synchronised fixture and a general-lighting fixture on the same bank cannot run at different frequencies.

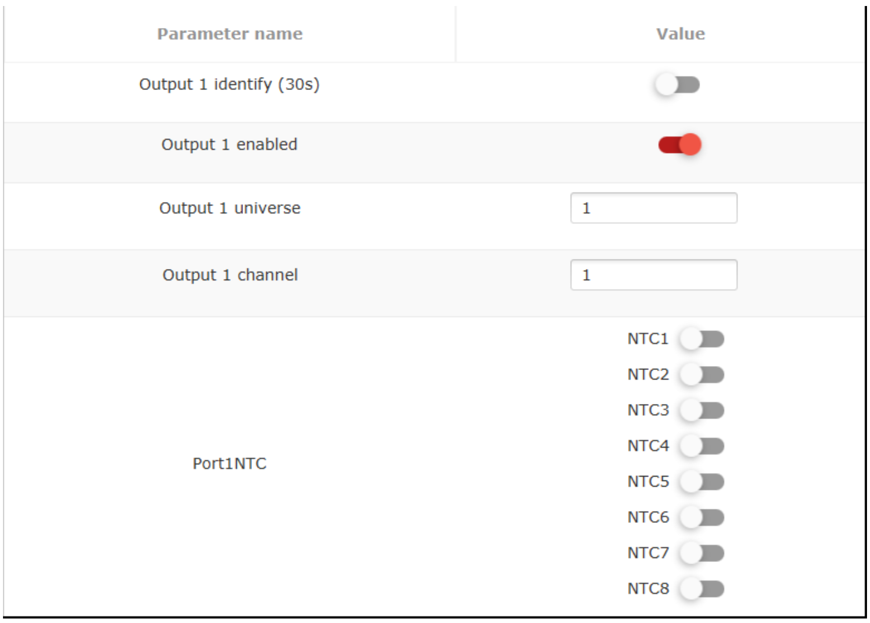

Figure 12 — The LED output tab, showing the settings of one channel.

10.4.1 Art-Net and sACN addressing

The universe and channel fields bind each PWM output to an Art-Net or sACN address, so an external lighting controller can drive the outputs over the network. Set the universe and channel to match the controller, and give each output its own channel.

This is an alternative to driving the outputs from scenes, action handlers or the API. An installation that runs standalone does not need it.

10.5 Pulse mode

Pulse mode gives the pulse inputs direct control of the PWM outputs, one input per output.

Enable pulsemode — when enabled, every action handler is overridden and the pulse inputs control the outputs.

Delaytime port — the delay between the trigger and the pulse, per port.

Pulse length port — the length of the pulse on the output when triggered.

Auto pulse mode — pulses the port periodically on its own, with no trigger on the pulse input. Set per port.

Delay and pulse length are set per port, so eight channels can follow the same trigger at different offsets — useful where fixtures are spaced along a moving line and each one should fire as the product reaches it. Delay is in microseconds, pulse length in milliseconds.

Auto pulse mode is the alternative to hardware triggering: the port pulses by itself at the configured length. Use it to run a strobe at a fixed rate, or to test a fixture and its wiring before the triggering system exists.

Figure 13 — The Pulse mode tab, with the delay and pulse length of each port.

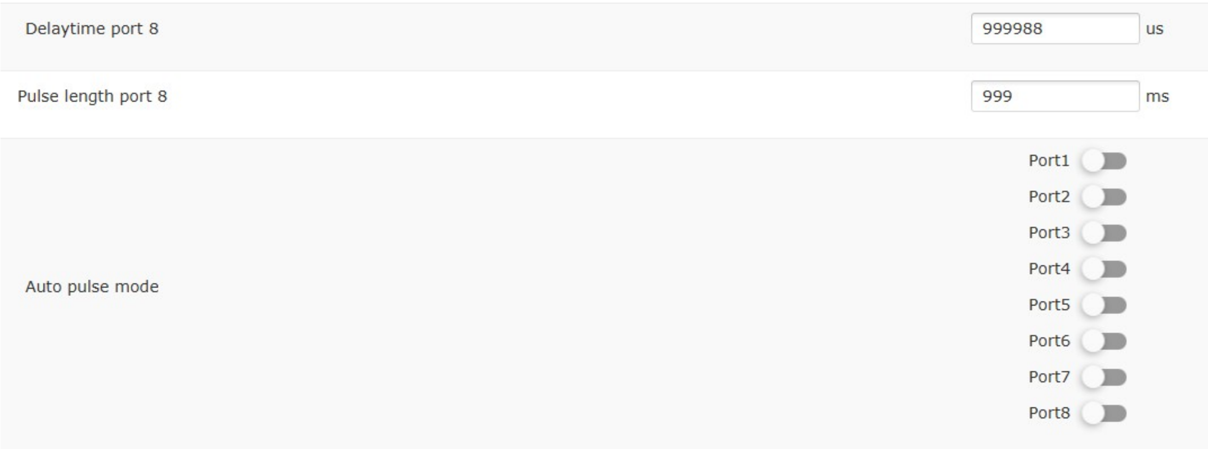

Figure 14 — The lower part of the same tab, with the Auto pulse mode switch per port.

10.6 Current

The Current tab reads the current on each output and sets the thresholds that the action handlers watch. Every parameter is per port and every value is in amperes.

Peak Current — the measured peak current on the output.

Average Current — the measured average current on the output.

Peak current low and high setpoint — the thresholds on the peak current that an action handler can act on.

Average current low and high setpoint — the same, for the average current.

Short circuit — on while a short circuit is detected on the output. The channel recovers by itself once the short is gone; no reset is needed.

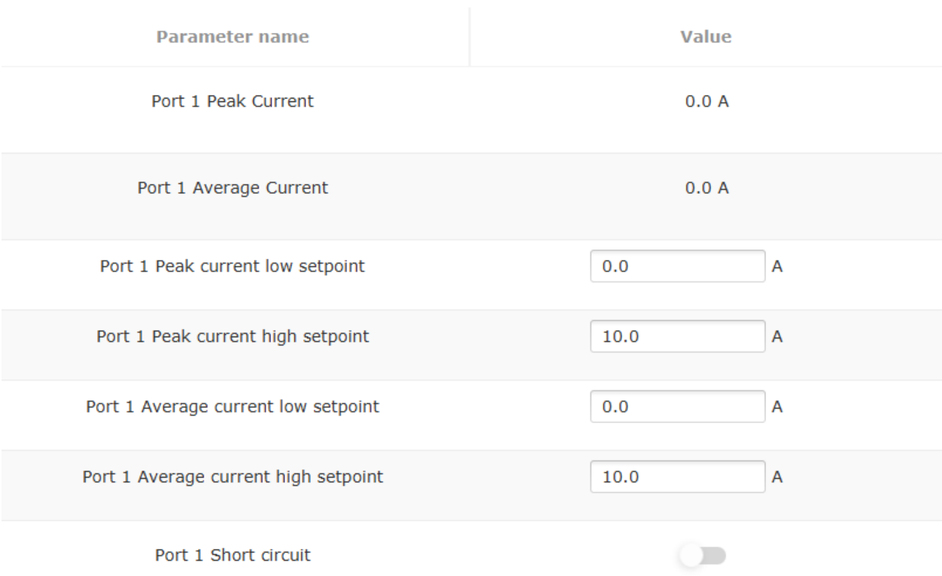

Figure 15 — The Current tab. Each port has its own readings and its own four setpoints.

Peak and average behave differently under PWM. A channel at a low duty cycle can draw its full peak current while its average stays low, so a threshold set on the average will not catch a fault that the peak would. Use the peak setpoints to protect the fixture and the average setpoints to watch its duty over time.

The setpoints on this tab are the thresholds the current triggers act on. Create those handlers from this tab: the Set-up new handler menu offers the triggers belonging to the tab you started it from.

Set a handler on the short-circuit trigger even though the channel recovers by itself. An intermittent short — a conductor that touches now and then — clears and returns without ever becoming a permanent fault, so it shows up as a fixture that flickers rather than as something visibly broken. A handler logs it, notifies through the cloud, or switches the channel off so the fault is found rather than lived with.

10.7 NTC and LDR inputs

This tab configures the eight PADIO pins. Despite its name it covers every PADIO mode, not only the analog ones: the mode selector at the top of each tab is where a pin becomes an input or an output.

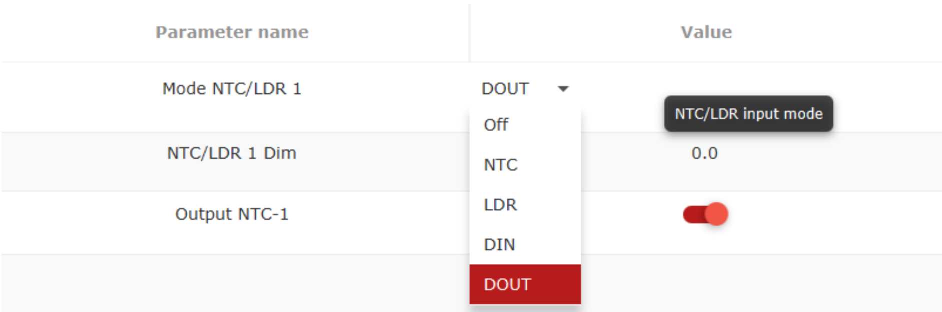

Figure 16 — The mode selector on the NTC / LDR tab, with all five modes. Each of the eight PADIO pins has its own tab.

> **Mode NTC/LDR** — sets what the pin does. Off, NTC, LDR, DIN (digital input) or DOUT (digital output). The remaining parameters on the tab apply to the analog modes.

Every parameter on this tab belongs to one PADIO pin, and the eight pins are independent. Each has its own mode, its own curve and its own sensor specification, so one driver can run an NTC on one pin, an LDR on the next, and a digital input on a third — with a different sensor type and a different curve on each.

NTC and LDR use the same mechanism and the same curve, but the fields change with the mode — both their names and their units. Set the mode first, then fill in the curve.

10.7.1 Fields common to both modes

> **NTC/LDR Dim** — the current output level this pin is asking for, from 0.0 (off) to 1.0 (full).

> **Disconnected dimming** — turns off the paired outputs when the sensor is disconnected or its wiring is unreliable.

Outmax, Outmed, Outmin — the output levels of the curve, in percent.

10.7.2 In NTC mode

The pin reads a temperature. The driver converts the sensor resistance to a temperature, so it needs to know the sensor.

NTC1Temp — the temperature currently measured, in °C.

NTC1Inmax, Inmed, Inmin — the temperatures at which the output levels apply, in °C.

NTC1Beta, NTC1KOhm — the Beta value and the nominal resistance of the connected NTC. Password protected. Set these to match the sensor, or every temperature the driver reports will be wrong.

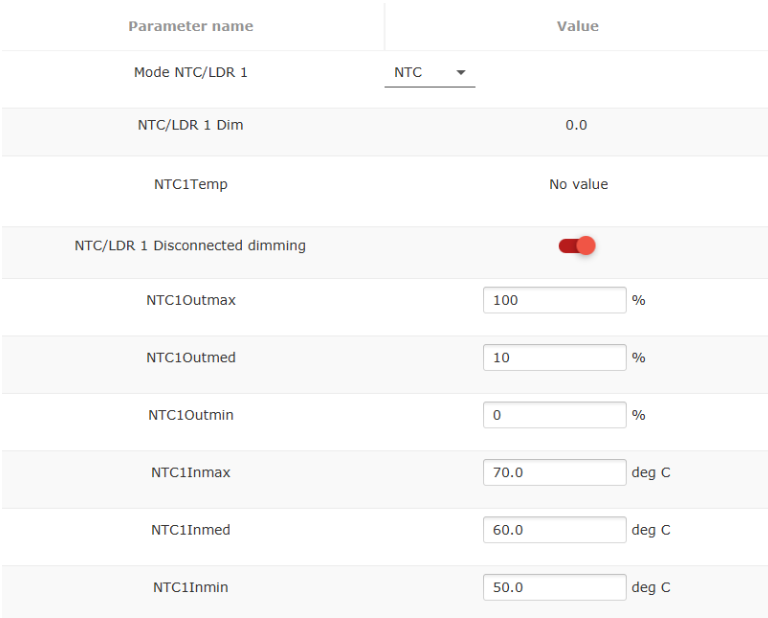

Figure 17 — A PADIO pin in NTC mode. The curve is set in degrees Celsius; Beta and KOhm follow below these fields.

10.7.3 In LDR mode

The pin reads a resistance directly. An LDR has no Beta or nominal resistance to configure, so those two fields are not shown, and the curve is set in ohms rather than in a light unit.

LDR1Resistance — the resistance currently measured, in ohms.

LDR1Inmax, Inmed, Inmin — the resistances at which the output levels apply, in ohms.

Parameter name	Value
Mode NTC/LDR 1	LDR
NTC/LDR 1 Dim	0.0
LDR1Resistance	No value
LDR1Outmax	100 %
LDR1Outmed	10 %
LDR1Outmin	0 %
LDR1Inmax	70.0 Ohm
LDR1Inmed	60.0 Ohm
LDR1Inmin	50.0 Ohm

Figure 18 — The same pin in LDR mode. NTC1Temp has become LDR1Resistance, the curve is in ohms, and Beta and KOhm are gone.

10.7.4 In DIN mode

The curve fields disappear and the pin becomes a plain digital input. One field is left, Input NTC-n, showing the state of the pin.

Parameter name	Value
Mode NTC/LDR 1	DIN
NTC/LDR 1 Dim	0.0
Input NTC-1	

Figure 19 — A PADIO pin set to DIN. Only the input state remains.

The input has its own action handler, with its own pair of triggers — NTC DIN high and NTC DIN low. These are separate from the triggers of the two dedicated digital inputs, so a handler built here acts on this PADIO pin only.

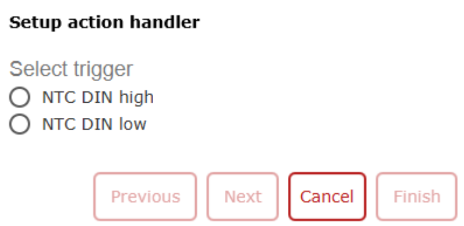

Figure 20 — Creating a handler on a PADIO pin in DIN mode. The triggers are NTC DIN high and low, separate from those of the dedicated digital inputs.

10.7.5 In DOUT mode

The pin becomes an output and the field changes to Output NTC-n, a switch you can operate directly. The same output can be driven by an action handler through the Switch on NTC digital output and Switch off NTC digital output actions.

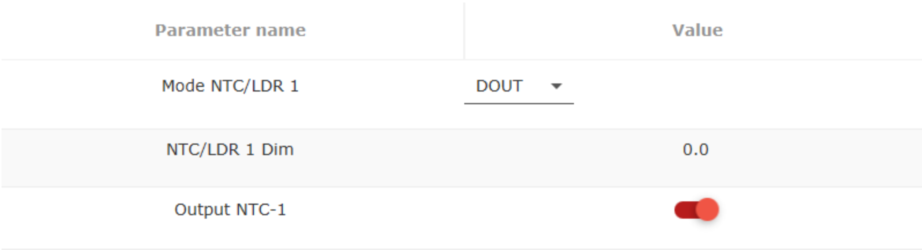

Figure 21 — The same pin set to DOUT. The field is now a switch you operate.

> **NOTICE — AN LDR RESISTANCE FALLS AS THE LIGHT RISES**
> A brighter fixture gives a lower resistance, so the curve runs the opposite way round to a temperature curve.
> **Measure the sensor at the light levels you want to act on, and set Inmin, Inmed and Inmax to the resistances you measured.**

The Inmax value on this tab is also the limit used by the sensor triggers. Create those handlers from this tab.

The screenshots in this section may show other Beta and KOhm values than the default sensor: a pin can be set up for any NTC. The MaNima default sensor is 5000 Ω at 25 °C with a Beta of 3950; set NTC1Beta and NTC1KOhm to match whichever sensor you actually connect.

10.7.6 Three scales for one output level

The Configurator expresses an output level in three different ways, and they all mean the same thing:

Where	Scale	Full output
LED output tab, OutputDutyPort	0 to 255	255
NTC / LDR tab, Outmax / Outmed / Outmin	0 to 100 %	100
NTC / LDR tab, NTC/LDR Dim	0.0 to 1.0	1.0

Check which scale a field uses before you type a number into it. A value of 100 means full output on the curve and just under 40 percent in the duty field.

10.7.7 The Board tab

The last tab of the NTC / LDR page is not a PADIO pin. It holds two settings that apply to the driver as a whole.

Board temperature — the temperature measured on the board itself, in real time. See Thermal requirements for the limits that apply to it.

Vio from VCC — enables the VCC_IO rail that feeds the four PNP high-side outputs. The outputs stay low until this is switched on, even when a supply is wired to the VCC_IO pin.

Parameter name	Value
Board temperature	38.0 deg C
Vio from VCC	

Figure 22 — The Board tab, with the board temperature and the Vio from VCC switch.

Set the curve with the ambient temperature and the heat generated by the fixtures in mind. The lower end of the curve has a hysteresis, so the fixture does not start blinking at the switching point.

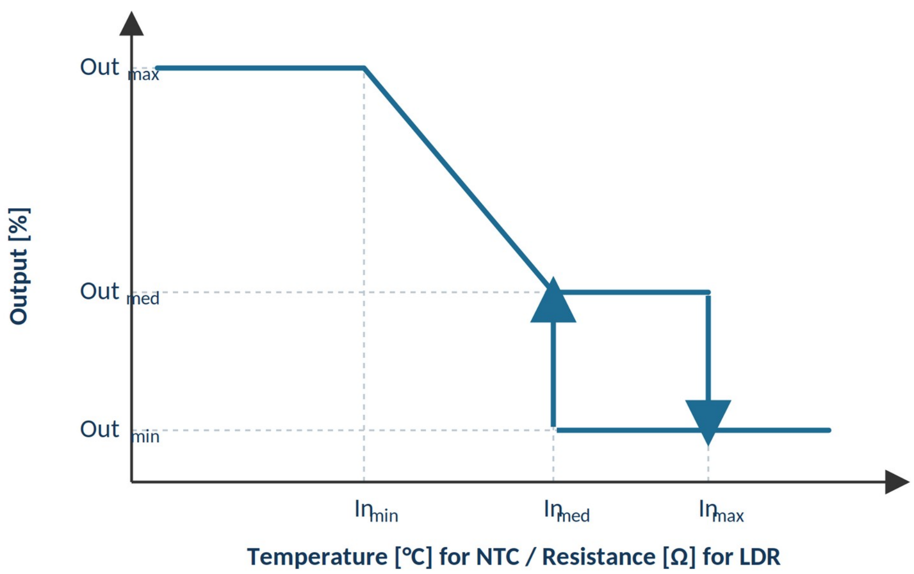

Figure 23 — The curve. Inmin, Inmed and Inmax are input values; Outmin, Outmed and Outmax are the matching output levels. The two arrows show the hysteresis at the low end.

With the default NTC — 5000 Ω at 25 °C, Beta 3950 — the driver measures from 0 to 120 °C. That range belongs to the sensor, not to the driver: Beta and KOhm are configurable, so a different NTC or an LDR gives a different usable range. Check the range against the sensor's own specification before you set Inmin, Inmed and Inmax, and keep the curve inside it. Points outside the measurable range cannot be reached, so the output stays at whichever level the curve last defined.

10.8 Digital inputs and outputs

The Digital Inputs tabs show which inputs are being triggered by external systems. The Digital Outputs tab enables and disables the outputs manually. Both are used to build action handlers, and both are the place to create them: start Set-up new handler from the row of the input or output the handler concerns.

10.8.1 Two tabs of digital inputs

The inputs are split across two tabs because they come from two different places on the hardware:

- Input 1-1 and 1-2 on DigitalInputs-1 are the two dedicated digital inputs on the Digital I/O & NTC connector.
- Input 2-1 to 2-8 on DigitalInputs-2 are the eight pulse trigger inputs on the Pulse & Outputs connector, read as ordinary digital inputs.

The software names on these tabs do not read the same as the pin labels on the connectors. Use this table to map a software input to the physical pin:

Software name	Physical pin	Connector	Connector pin
Input 1-1	DIG_IN_1-1	Digital I/O & NTC	3
Input 1-2	DIG_IN_1-2	Digital I/O & NTC	4
Input 2-1	PULSE_2-1	Pulse & Outputs	8
Input 2-2	PULSE_2-2	Pulse & Outputs	7
Input 2-3	PULSE_2-3	Pulse & Outputs	6
Input 2-4	PULSE_2-4	Pulse & Outputs	5
Input 2-5	PULSE_2-5	Pulse & Outputs	4
Input 2-6	PULSE_2-6	Pulse & Outputs	3
Input 2-7	PULSE_2-7	Pulse & Outputs	2
Input 2-8	PULSE_2-8	Pulse & Outputs	1

The software name and the pin label now read the same — Input 2-1 is PULSE_2-1 — but the pulse inputs still run in the opposite order to the connector pins: PULSE_2-1 sits on pin 8 and PULSE_2-8 on pin 1. That pin order is fixed by the board layout, so read the pin label, not the position on the connector. This is expected, not a fault.

The pulse inputs are internally pulled up, so an input with nothing wired to it reads high. A row of eight inputs all showing high usually means they are simply unconnected, not that eight signals are active.

Reading a pulse input here is not the same as using it in pulse mode. On this tab it is a slow digital input that can trigger an action handler; in pulse mode it fires an overdrive pulse in hardware without software in the timing loop. See Pulse mode for that.

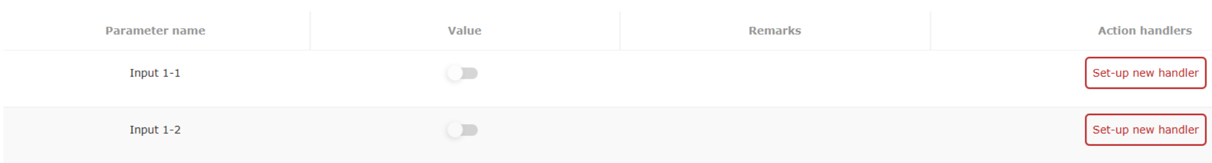

Figure 24 — DigitalInputs-1: the two dedicated inputs, each with its own Set-up new handler button.

Parameter name	Value	Remarks	Action handlers
Input 2-1			Set-up new handler
Input 2-2			Set-up new handler
Input 2-3			Set-up new handler
Input 2-4			Set-up new handler
Input 2-5			Set-up new handler
Input 2-6			Set-up new handler
Input 2-7			Set-up new handler
Input 2-8			Set-up new handler

Figure 25 — DigitalInputs-2: the eight pulse inputs read as digital inputs. All eight read high here because nothing is wired to them.

Parameter name	Value	Remarks	Action handlers
Output 1			Set-up new handler
Output 2			
OD output 1			
OD output 2			
OD output 3			
OD output 4			

Figure 26 — The Digital Outputs tab. Output 1 and 2 are the potential-free outputs; OD output 1 to 4 are the PNP high-side outputs.

The names here do not match the connector labels. See the output name table in I/O and signal connections before you switch an output.

10.8.2 The Ethernet tab

The fourth tab of the I/O page reports whether each Ethernet port has a link, and lets you build a handler on it. This is where the network triggers in the handler menu come from.

Parameter name	Value	Remarks	Action handlers
Ethernet 1 connected			Set-up new handler
Ethernet 2 connected			Set-up new handler

Figure 27 — The Ethernet tab. Ethernet 1 has a link here and Ethernet 2 does not.

On a daisy-chained line this is worth a handler. A driver in the middle of a chain that loses the link on Ethernet 2 still works itself, but everything behind it has just disappeared from the network — and nothing else reports that. A handler on the lost link turns it into an alarm.

Trigger behaviour per action, for a handler triggered on a high input:

Action	Input high	Input low
Toggle output	Toggle	No toggle
Turn on output	Output on	Output off
Turn off output	Output off	Output on
Redundant output	Switched	Not switched
Activate scene	Activate	Deactivate
Deactivate scene	Deactivate	Nothing
Switch on digital output	Switched	Not switched
Switch off digital output	Switched	Not switched

NOTICE — OUTPUTS NEED A BOOT SCENE TO BE TRIGGERABLE

A digital input that triggers an output has nothing to set the output to if no boot scene value is defined.

Fill in the boot scene for every output you intend to trigger from a digital input.

10.9 Scenes and standalone operation

The boot scene creates standalone static scenes. Use the sliders to set the level of each channel, and the drop-down menu to record which colour each channel drives — R, G, B or W — useful as a reminder later. Press Add Scene to add a further scene that an action handler can activate; new scenes appear as tabs.

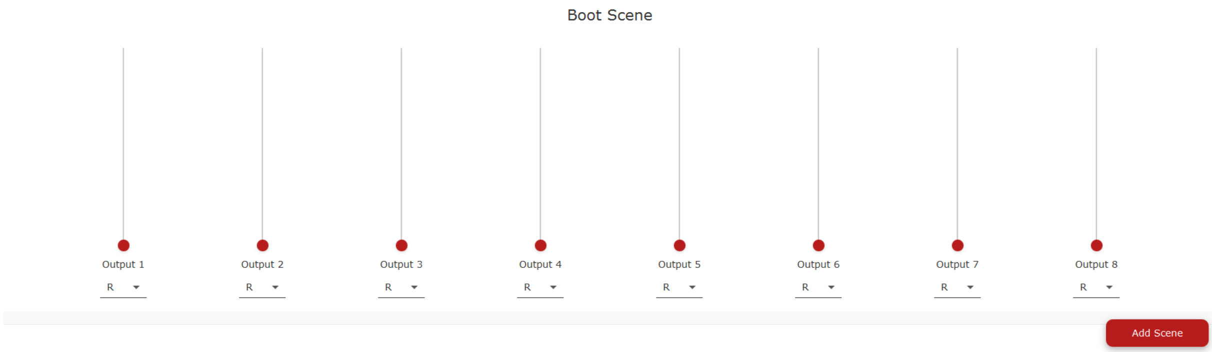

Figure 28 — The Boot Scene tab: a slider per channel, and the Add Scene button that creates a further scene.

Beyond live control, the driver runs stored scenes autonomously, with time scheduling and scene switching triggered from the digital inputs — for example jumping to a safe scene on a fault. This keeps a machine running without a supervising PC or network connection.

10.10 Time schedule

The time schedule attaches action handlers to a time of day, a weekday or an individual date. Typical uses are activating the outputs daily from sunset to sunrise, on selected weekdays between fixed times, or on one specific date.

The page has two tabs. Set the time settings first: latitude and longitude are entered in decimal degrees and determine sunrise and sunset for each day, so a schedule built on sunset means nothing until they are correct.

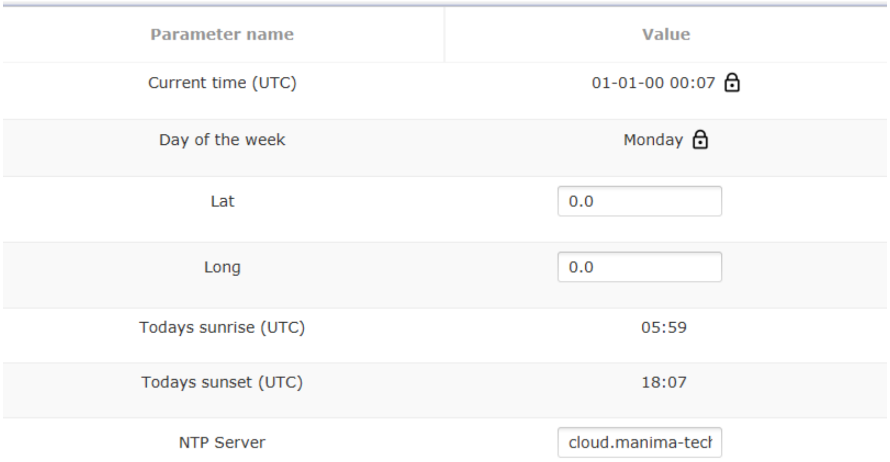

Figure 29 — The time settings. Latitude and longitude determine sunrise and sunset.

Current time (UTC) — the clock the driver is running on, read-only. It is set from the NTP server and is not the local time.

Day of the week — the weekday the driver believes it is, read-only. Use it to confirm the clock is synchronised before relying on a weekday schedule.

Lat / Long — the position of the installation in decimal degrees. Both start at 0.0, which puts sunrise and sunset off the coast of West Africa.

Todays sunrise (UTC) / Todays sunset (UTC) — the times the driver has calculated for the entered position. Read them back after entering the coordinates — they are the quickest check that the position is right.

NTP Server — the time server the driver synchronises its clock with. It points to a MaNima server by default.

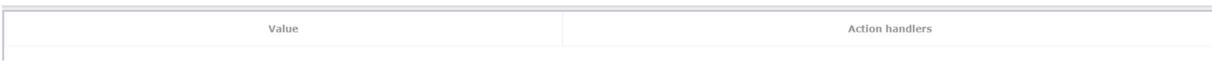

Figure 30 — The Time schedule tab. Add timeslot is at the bottom right.

10.10.1 Creating a timeslot

A timeslot is a window in time. It carries no action of its own — you create the slot first and attach a handler to it afterwards. Press Add timeslot and work through the wizard.

1. Choose the days the slot is active on: Everyday, a single Date, or Selected Weekdays.
2. Choose when the slot becomes active: Sunrise, Sunset, or a Fixed time.
3. Choose when it deactivates, from the same three options.
4. Where you chose sunrise or sunset, set an offset in minutes, from −100 to +100. Use it to start before dusk or to run on past first light. The start and the end each carry their own offset.

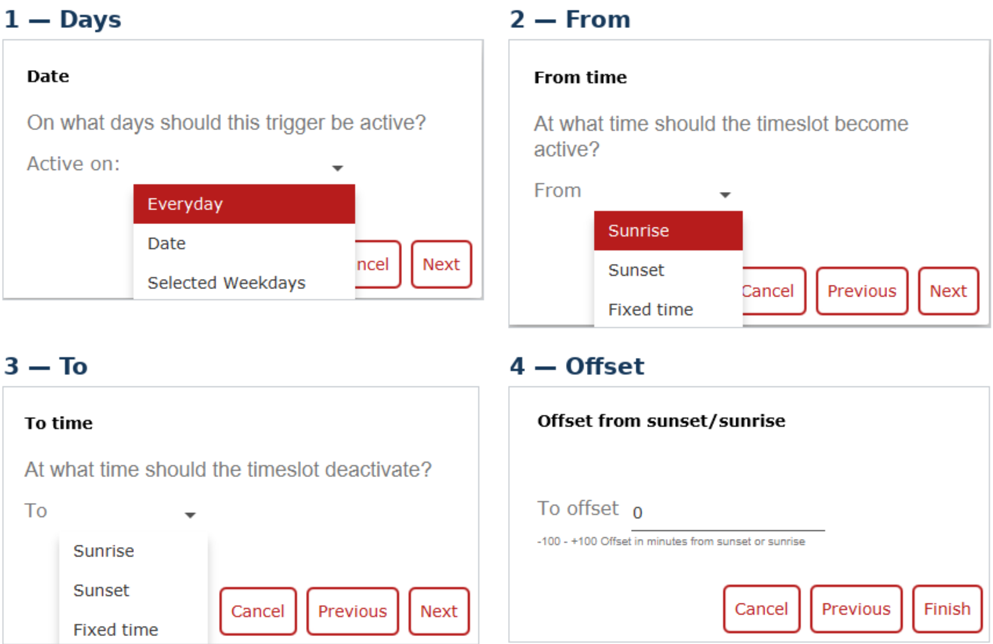

Figure 31 — The main path of Add timeslot: days, start, end, offset.

The wizard is not a fixed sequence — each choice decides which screen comes next, so the number of steps varies. Three of the options open a screen of their own before the wizard continues.

1. Selected Weekdays opens Select days: a toggle per weekday, Mon through Sun. Switch on every day the slot must run.
2. Date opens Select date: Day 1 to 31, Month 1 to 12, and a two-digit Year.
3. Fixed time opens Select Time: the hour and the minute at which the slot switches. The end of the slot is set on its own screen in the same way.

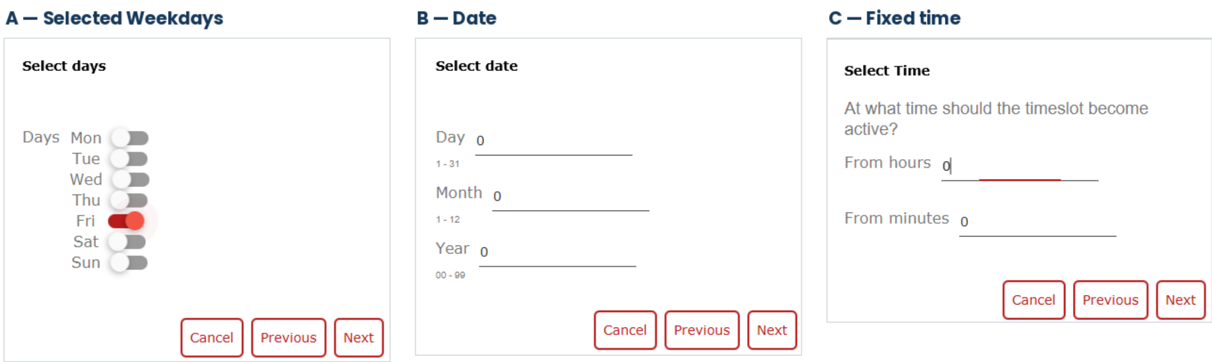

Figure 32 — The three screens that only appear for a particular choice.

Previous steps back through the wizard without losing what you have already entered; Cancel discards the slot. Finish appears on the last screen.

> **NOTICE — THE SCHEDULE RUNS ON UTC, NOT ON LOCAL TIME**
>
> Every time in the schedule is UTC, including a Fixed time you enter here and the sunrise and sunset times shown in the time settings. The driver does not convert to local time and does not shift with summer time, so a fixed time entered as local time fires one or two hours off in most of Europe.
>
> **Convert local time to UTC before entering it, and check the offset again when the clocks change.**

The finished slot appears as one row per slot, described in plain words — for example Every day from sunset until sunrise, or Every day from 6 minutes after sunrise until 2 minutes after sunset. Delete removes it.

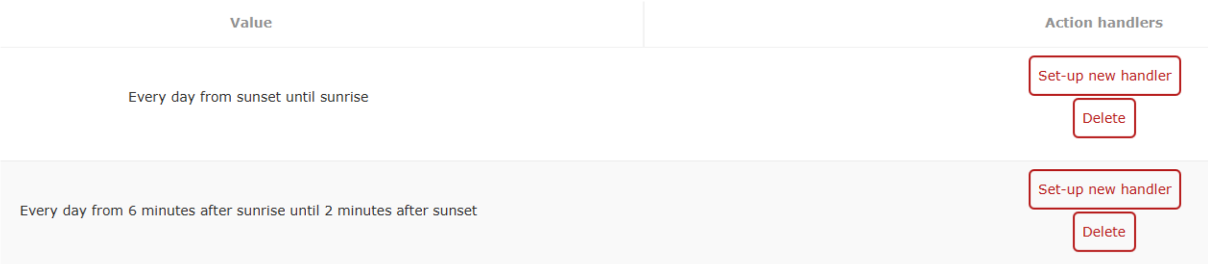

Figure 33 — A finished timeslot, with its own Set-up new handler and Delete buttons.

10.10.2 Attaching an action to a timeslot

Press Set-up new handler on the row of the slot. There is only one trigger — Time slot active — so the choice you make is what happens while the slot runs.

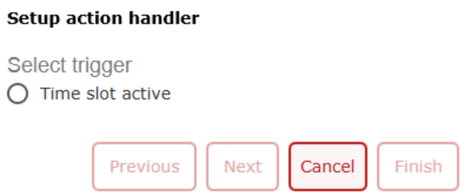

Figure 34 — The only trigger a timeslot offers.

The action list here is shorter than the one offered from an I/O input. A timeslot can drive the LED channels, the scenes and the two potential-free digital outputs, but not Art-Net, the OD outputs or a PADIO pin in DOUT mode. Where you need one of those on a schedule, drive a scene from the timeslot and put the rest in that scene.

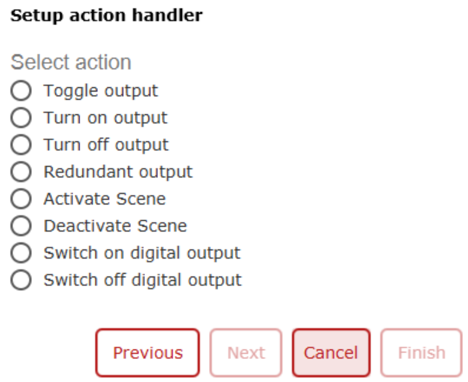

Figure 35 — The eight actions a timeslot can perform.

> **NOTICE — TIME SCHEDULES NEED AN INTERNET CONNECTION**
> Without a network connection the driver cannot reach the NTP server, so its clock is not synchronised and the schedule will not run as intended.
> **Verify the network settings before you rely on a time schedule.**

10.11 Action handlers

Action handlers turn a measured value — a current, a temperature, a digital input — into an action. Press Set-up new handler to create one. The menu that appears depends on the tab you were in when you pressed it, and has three steps: select the trigger, select the action, then set the action parameters.

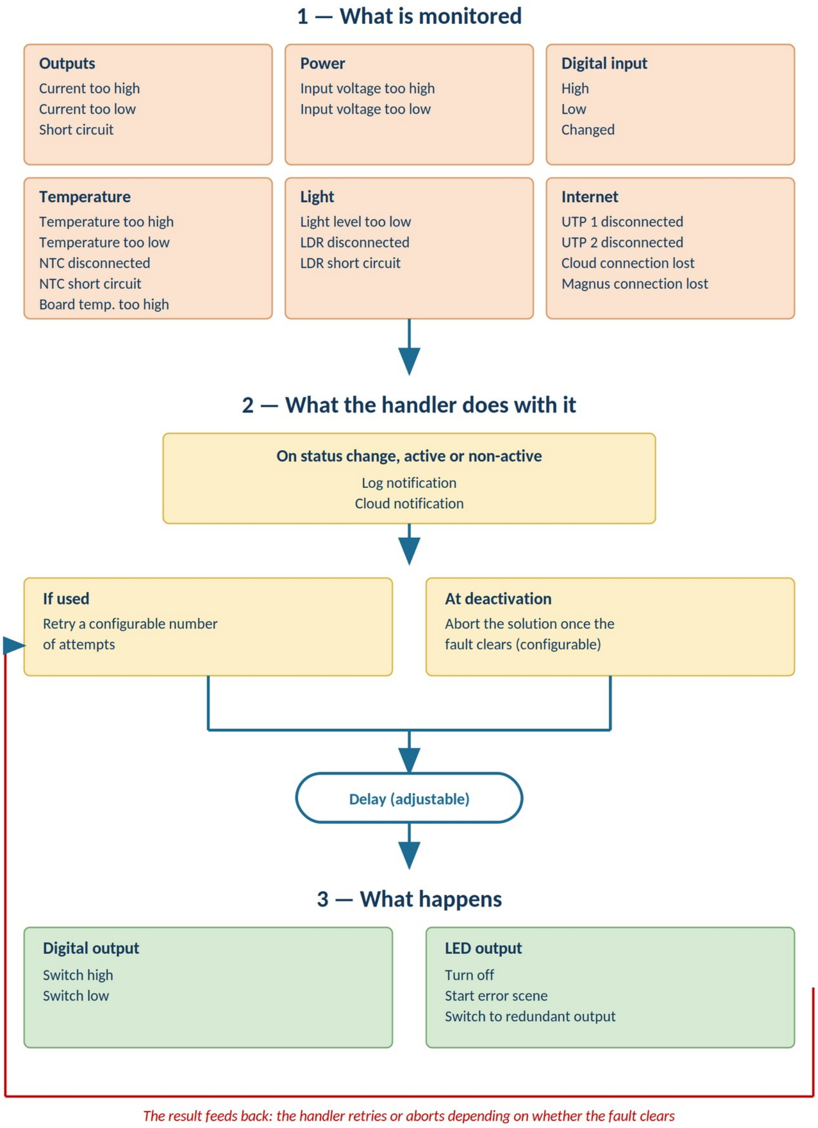

Figure 36 — How a monitored condition becomes an action. Every handler follows these three steps.

10.11.1 Triggers

The Setup action handler wizard asks for the trigger first. It lists only the triggers that apply to the tab the handler was started from, so the options below appear in groups rather than as one long list. Select a trigger and press Next.

I/O triggers:

- **Digital input high** — the digital input is on.
- **Digital input low** — the digital input is off.
- **Digital input changed** — the digital input has changed state.

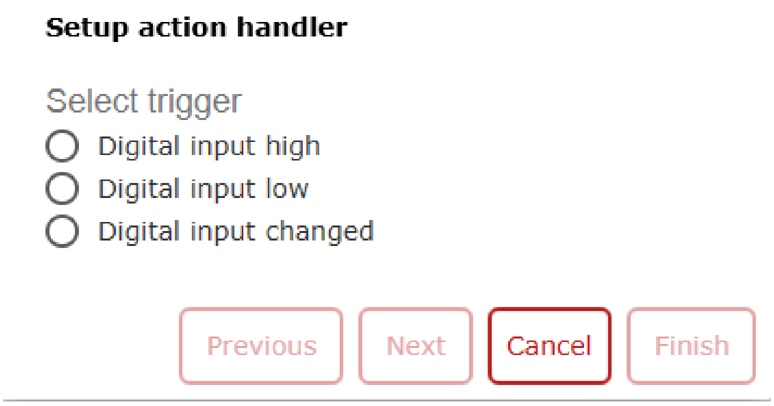

Figure 37 — Selecting an I/O trigger.

Current triggers:

Peak current too high — uses the peak current high setpoint of the port.

Peak current too low — uses the peak current low setpoint of the port.

Average current too high — uses the average current high setpoint of the port.

Average current too low — uses the average current low setpoint of the port.

Output shortcircuit — triggers on a detected short circuit on the output.

Sensor triggers. These apply to a PADIO pin in NTC mode and to one in LDR mode; the limit is the Inmax value configured for that pin, whether it is a temperature or a radiation level:

NTC temperature too high — uses the Inmax value of the pin as the limit.

NTC disconnected — triggers when the sensor is disconnected.

NTC shortcircuit — triggers when the sensor is short-circuited.

Temperature too high, disconnected OR shortcircuit — a combined trigger that fires on any of the three faults above. Use it where the handler should react to a sensor problem without distinguishing which one it is.

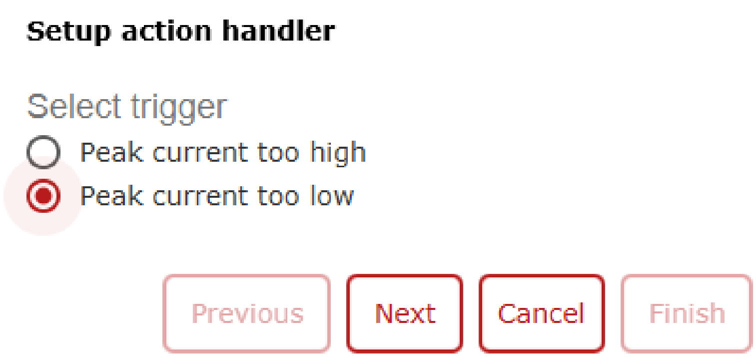

Figure 38 — Selecting a trigger. The wizard lists only the triggers that apply to the tab the handler was started from.

10.11.2 Actions

Actions on the LED channels:

Toggle output — turns an output on or off with the same action.

Turn on output — enables the output.

Turn off output — disables the output.

Redundant output — switches over to the second output for redundancy.

Actions on scenes:

Activate Scene — activates a stored scene.

Deactivate Scene — deactivates a stored scene.

Actions on the digital outputs. Note that there are three separate pairs, one per kind of output — check which one you need against the output table in I/O and signal connections:

Switch on / off digital output — the two potential-free outputs.

Switch on / off digital OD output — the four OD_OUT outputs.

Switch on / off NTC digital output — a PADIO pin set to DOUT.

Actions on the network:

Enable ArtNet — starts accepting Art-Net control.

Disable ArtNet — stops accepting Art-Net control, so the driver keeps running on its own scenes and handlers.

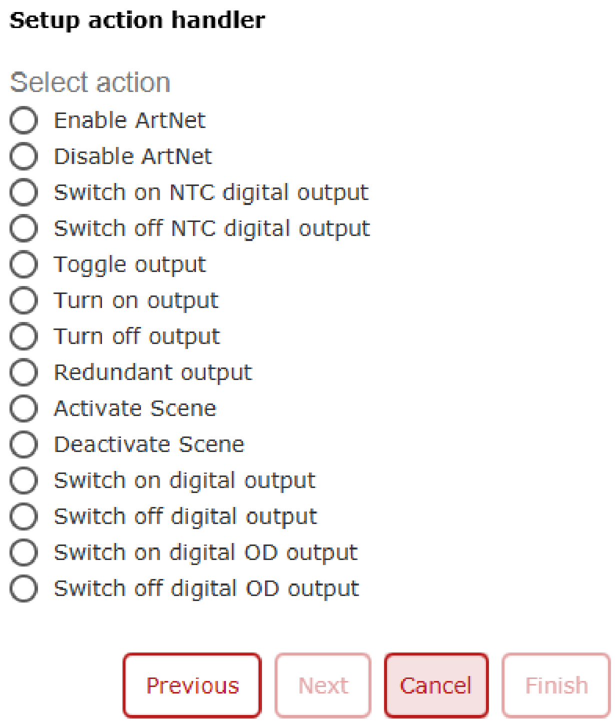

Figure 39 — Selecting the action the handler performs. The wizard lists every action in one step.

10.11.3 Action parameters

Delay (ms) — the delay before the action is performed. Use it to let a condition settle before acting on it, so a brief spike does not shut a channel down.

Cancel if trigger resolved — cancels the action once the trigger clears, returning the driver to its previous state. Leave it off where the fault should stay latched until someone looks at it.

Outputs 1 to 8 — the channels the action applies to. These are check boxes, not a single number: one handler can act on several channels at once.

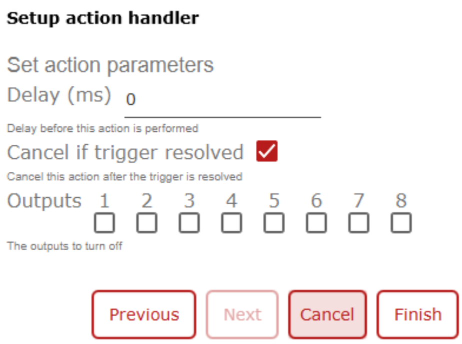

Figure 40 — Setting the action parameters. The eight check boxes select which channels the action applies to.

10.11.4 Example: a redundant pair

This example makes CH3 the redundant partner of CH1. If CH1 short-circuits or draws too much current, the driver disables CH1 and activates CH3.

1. Open the Current tab and select port 1.
2. Press Set-up new handler and choose Output shortcircuit as the trigger.
3. Choose Turn off output as the action and enter 1 as the output number.
4. Add a second handler on port 1 with the same trigger, choose Redundant output as the action, and enter 3 as the output number.
5. Add a third handler on port 1 with Average current too high as the trigger, using the high setpoint of the port, and repeat the two actions above.
6. Add handlers for high current and short circuit on port 3 as well, with Turn off output as the action, so the secondary output is protected too.

When the fault occurs, the current on CH1 falls to zero, the Port 1 short circuit checkbox turns red, the handlers turn red to show they have fired, and the average current on CH3 rises as it takes over the load.

10.12 Firmware update

The update tab updates the software on the driver over the network, without physical access to the driver. An Ethernet connection to the driver is required.

1. Download the required update from the MaNima support pages.
2. Press Select file and choose the downloaded file.
3. Verify that the correct file is selected.
4. Press Start update.

To update several drivers at once, press Batch update at the top right and select the drivers. On a daisy-chained line this saves visiting each one, but it also reboots several drivers at the same time — do it when the installation can be dark, not during production.

Figure 41 — The Update tab, showing the current firmware version and licence, and the Batch update button at the top right.

Downloads: https://www.manima-technologies.com/support/downloads/

> **NOTICE — UPDATE FILES ARE LICENCE-SPECIFIC**
> An update file intended for a different product or licence is not compatible and may leave the driver unusable.
> **Verify that the update file matches the product and licence before you start the update.**

When you run into problems, first make sure both the driver software and the MaNima Configurator are on their latest version.

11 MaNima Cloud

The MaNima Cloud is the hosted service for monitoring, configuring and maintaining the driver over the internet, without local access. This chapter covers connecting a driver, the monitoring dashboard, and the configuration sections. It is used alongside the local Configurator, not instead of it.

11.1 Connecting to the cloud

Connectivity is automatic. As soon as the driver has an internet connection through a router, it registers itself with the MaNima Cloud — there is nothing to configure on the driver.

To see the driver in the cloud:

1. Ask the customer to create a MaNima Cloud user account.
2. Provide MaNima with the MAC address of the driver.
3. MaNima links the device to the account so it appears on the dashboard.

11.2 The monitoring dashboard

The dashboard shows the live state of the driver at a glance: whether it is online, the running firmware and network details, the board temperature, the voltage on each supply side, the average and peak currents, and the actual output levels over time. Alarms are shown at the top.

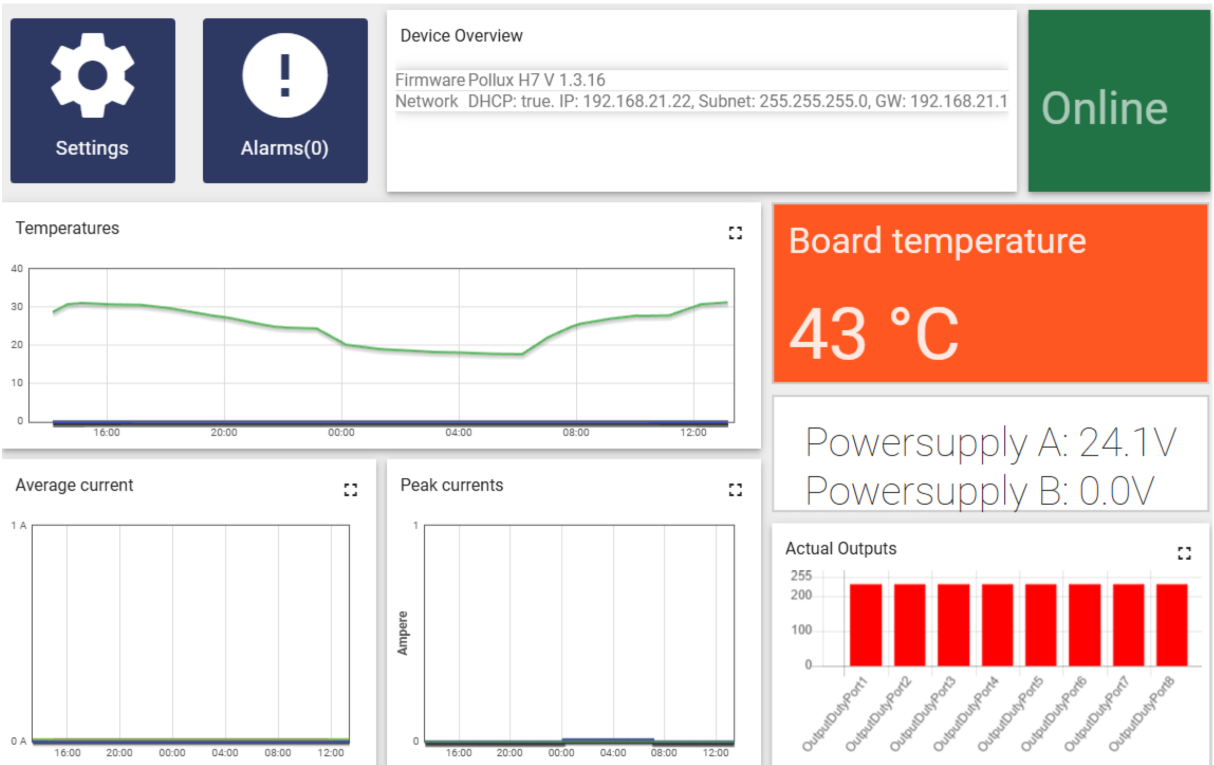

Figure 42 — The cloud dashboard: online status, board temperature, supply voltages, current graphs and the actual outputs.

11.3 Alarms

The Alarms button at the top of the dashboard shows the number of active alarms. Press it to open the Device Alarms window.

Each alarm is one row in the table:

Column	Shows
Created time	The date and time the alarm was raised.
Originator	The device that raised it, by MAC address.
Type	What happened, for example Ethernet 2 disconnected.
Severity	How serious the event is, for example Major.
Status	Whether the alarm is still active, and whether it has been acknowledged.
Assignee	The user the alarm is assigned to, if any.

The list shows the alarms raised within a time window. Widen the window to look further back than the current day.

On each row you can add a comment, assign the alarm to a user, acknowledge it, or clear it. Acknowledging records that someone has seen the alarm; it does not fix the underlying condition. Work through the Troubleshooting chapter for that.

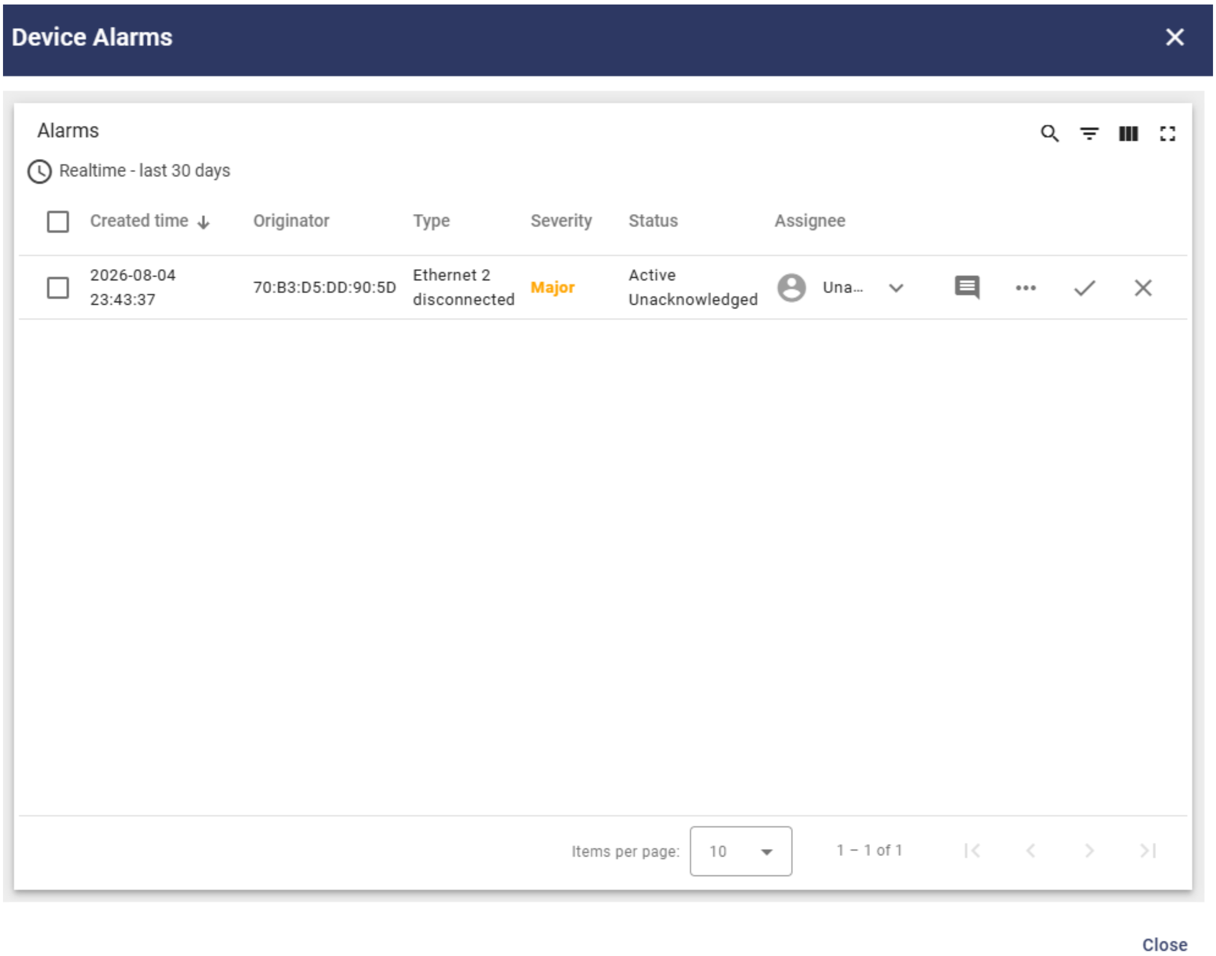

Figure 43 — The Device Alarms window with one active, unacknowledged alarm.

The Type names the condition the driver detected. Examples seen in service are Port short circuit on a named output, for example Port 8 Short circuit; an Ethernet link dropping, for example Ethernet 2 disconnected; and the driver dropping off the cloud, shown as Offline Alarm.

The Severity ranks how serious that condition is. A hardware fault that stops an output, such as a short circuit, is raised as Major. Losing contact with the driver, an Offline Alarm, is raised as Critical, because from the cloud the driver can no longer be seen or controlled at all.

Figure 44 — A Major alarm: Port 8 Short circuit, active and unacknowledged.

Figure 45 — A Critical alarm: Offline Alarm, the driver no longer reachable from the cloud.

11.4 Configuration sections

The configuration sections run down the left of the cloud device page. Each opens a set of tabs on the right. The same column also holds the Backup settings, Restore settings and Reboot device controls.

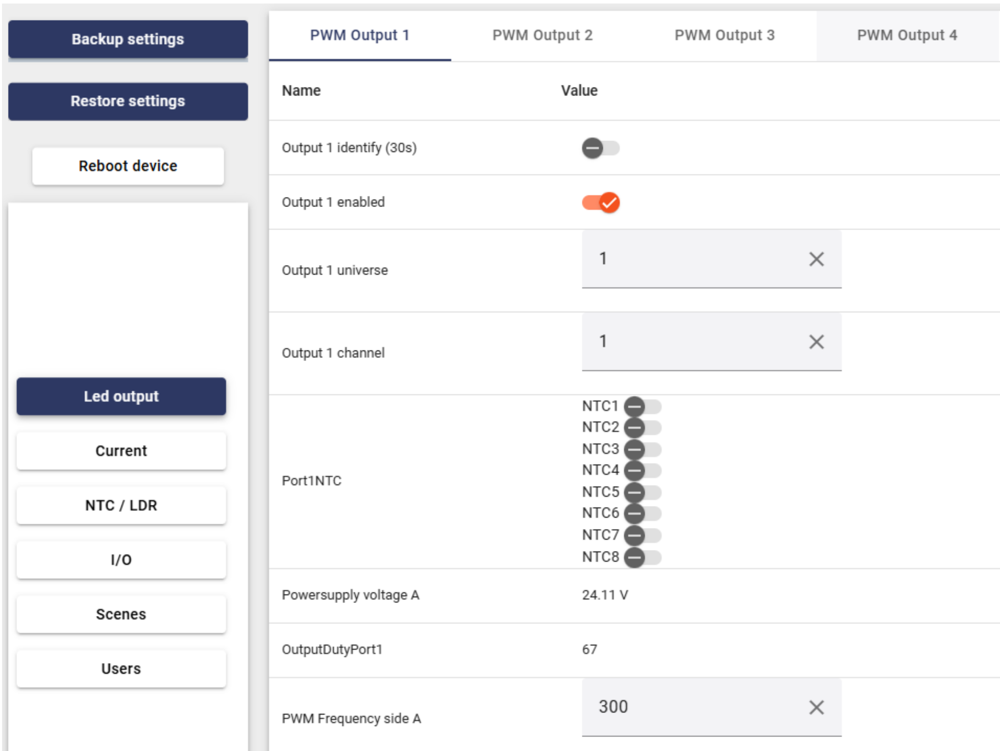

Figure 46 — The cloud device page, with the configuration sections in the left column.

11.4.1 Led output

The Led output section holds one block per output, named PWM Output 1 through PWM Output 8. Each block sets how that output is driven and where it takes its value from:

Field	Sets
Output identify (30s)	Flashes this output for 30 seconds so you can confirm which fixture it drives.
Output enabled	Switches the output on or off.
Output universe	The Art-Net or sACN universe the output listens to.
Output channel	The channel within that universe.
Port NTC	The NTC input, NTC1 through NTC8, that protects this output.
Powersupply voltage	The supply side, A or B, that feeds the output.
Output duty	The current drive level of the output, read back live.
PWM Frequency side	The PWM frequency for that supply side, in hertz. The default is 330 Hz.

Changing the universe or channel here has the same effect as changing it in the local Configurator; the cloud and the Configurator act on the same settings.

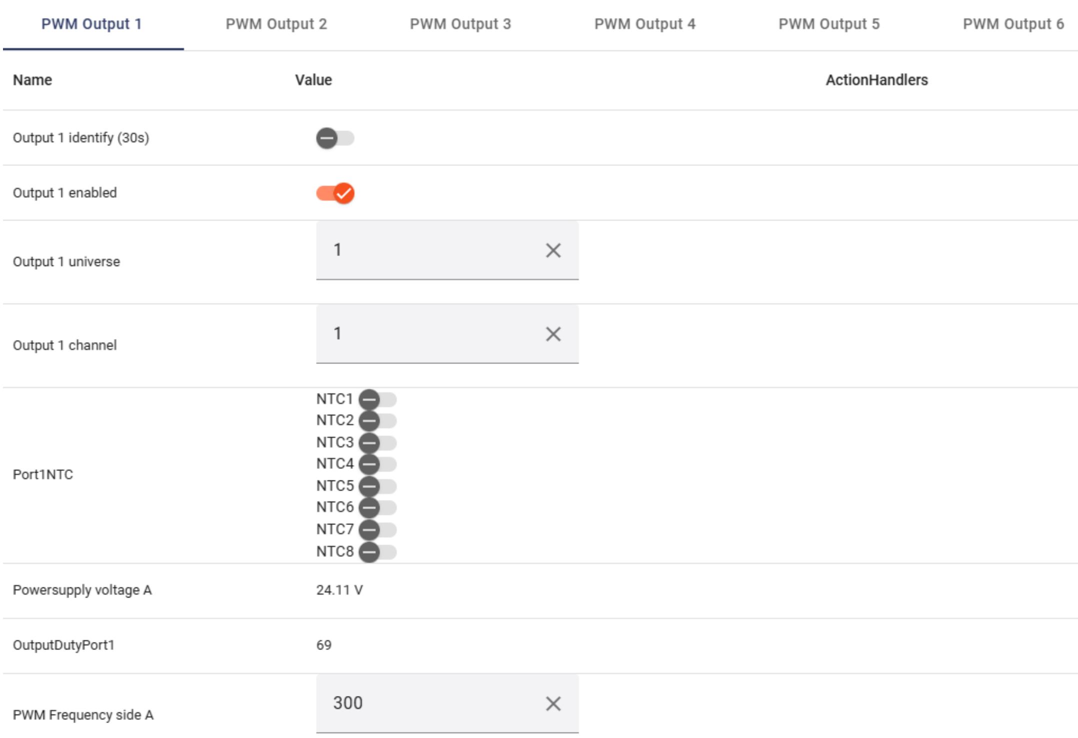

Figure 47 — The Led output section, with one block per PWM output.

11.4.2 Current

The Current section reads back the current on each output and lets you raise an alarm when it drifts outside a set band. It has one block per output, with the same fields for each:

Field	Meaning
Peak Current	The highest current measured on the output, read live.
Average Current	The average current on the output, read live.
Peak current low setpoint	The lowest peak current allowed before an alarm is raised.
Peak current high setpoint	The highest peak current allowed before an alarm is raised.
Average current low setpoint	The lowest average current allowed before an alarm is raised.
Average current high setpoint	The highest average current allowed before an alarm is raised.
Short circuit	Indicates a detected short circuit on the output.

A current that falls below its low setpoint usually means a fixture has failed open; a current above its high setpoint points to a wiring fault. Use the Create Handler button on a field to link the setpoint to an action, for example raising an alarm in the cloud.

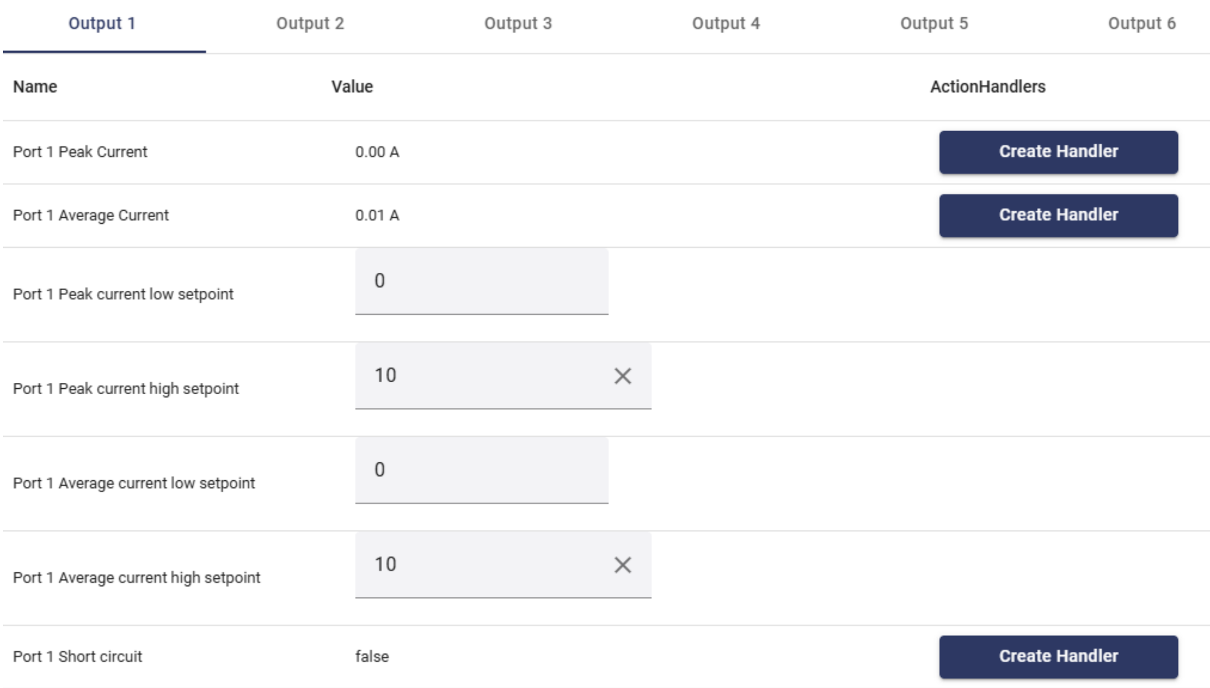

Figure 48 — The Current section, with peak and average setpoints per output.

11.4.3 NTC / LDR

The NTC / LDR section configures the eight sensor inputs. Each input is a block named NTC / LDR 1 through NTC / LDR 8. An input can act as a temperature sensor or as a light sensor, and it can dim the outputs it is tied to:

Field	Sets
Mode NTC / LDR	Whether the input reads a temperature sensor (NTC) or a light sensor (LDR).
Dim	The dimming factor the input currently applies, read live.
NTC Temp	The measured temperature at the input, read live, in degrees Celsius.
Disconnected dimming	What the output does if the sensor is lost. Switch it on to dim to a safe level rather than run unprotected.
NTC Out max / med / min	The three output dimming levels the input maps to.
NTC In max / med / min	The three input readings that those output levels map from.

The three in and out pairs let you shape the dimming curve: as the reading rises from the In min value to the In max value, the output moves between the matching Out levels. For a temperature sensor this dims the fixture down as the board heats up, protecting it before the hardware derating takes over.

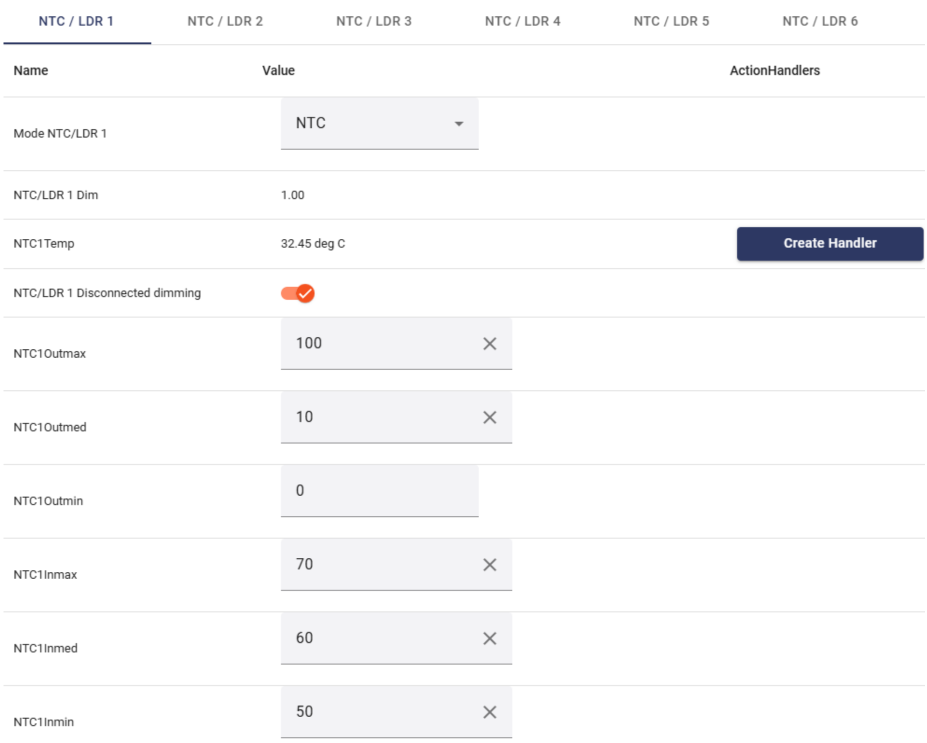

Figure 49 — The NTC / LDR section, with the in-to-out dimming map per input.

11.4.4 I/O

The I/O section shows the state of the digital inputs and outputs and the Ethernet ports, and lets you attach actions to them. It is split into tabs:

Tab	Contains
DigitalInputs-1	The two inputs Input 1-1 and Input 1-2, each read live as true or false.
DigitalInputs-2	The eight inputs Input 2-1 through Input 2-8, read the same way. These are the pulse inputs on the Pulse and Outputs connector.
DigitalOutputs	The two potential-free outputs, Output 1 and Output 2, each with a switch for its current state.
Ethernet	Ethernet 1 connected and Ethernet 2 connected, read live as true or false.

Use the Create Handler button on an input to tie a change of state to an action, for example switching a scene when an input goes true. This is the same action-handler mechanism the current and sensor sections use.

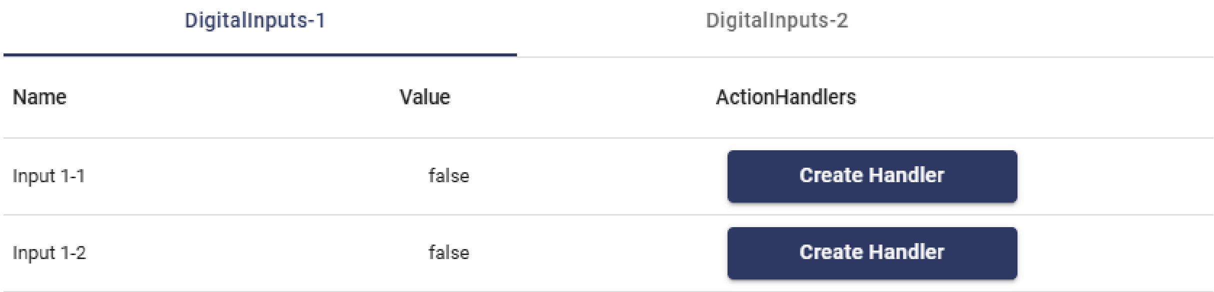

Figure 50 — The I/O section, DigitalInputs-1 tab.

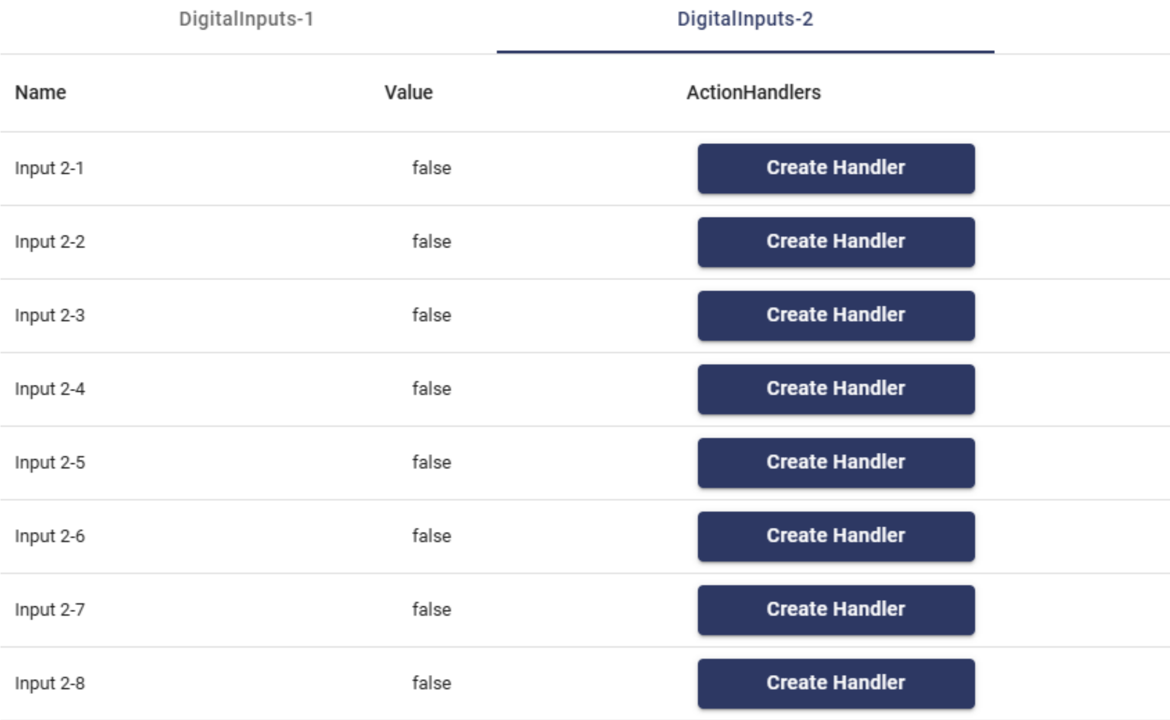

Figure 51 — The I/O section, DigitalInputs-2 tab, with the eight pulse inputs.

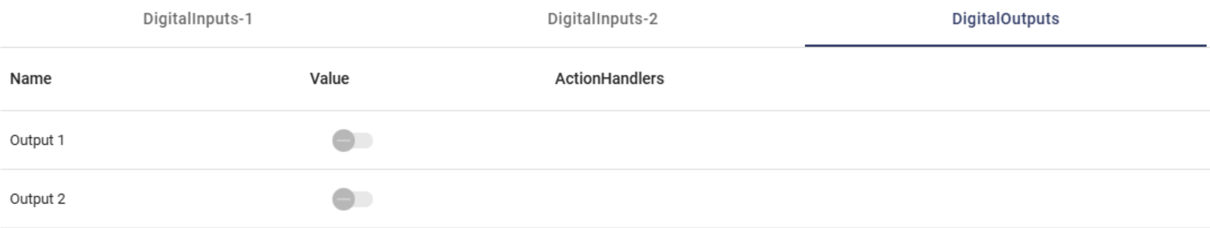

Figure 52 — The I/O section, DigitalOutputs tab.

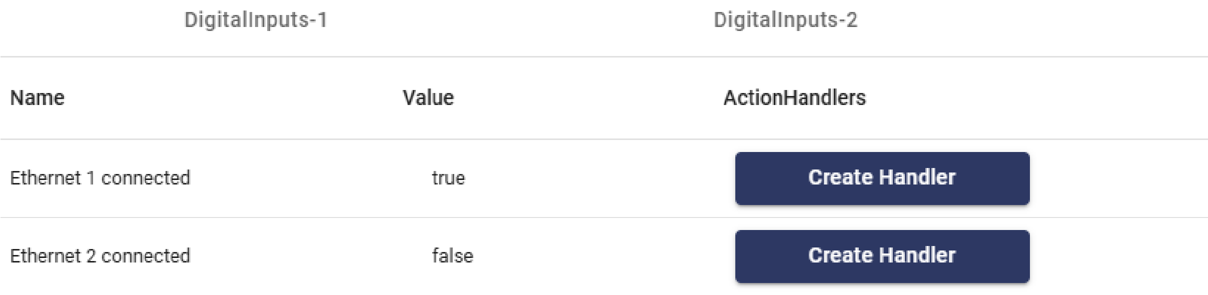

Figure 53 — The I/O section, Ethernet tab.

11.4.5 Scenes

The Scenes section stores fixed output levels the driver can recall on its own, without a lighting controller on the network. The first entry is the Boot Scene, the state the driver takes at power-up; the entries below it are the numbered scenes.

Each scene has a slider per output, output 1 through output 8, that sets that output's level in the scene. The list beside each slider assigns a colour code to that output — R, G, B or W — so a scene shows which colour each output drives rather than a bare output number.

Set the levels you want, then save the scene. The Boot Scene is what makes the driver useful standalone: it comes up in a known, safe state even with no network present.

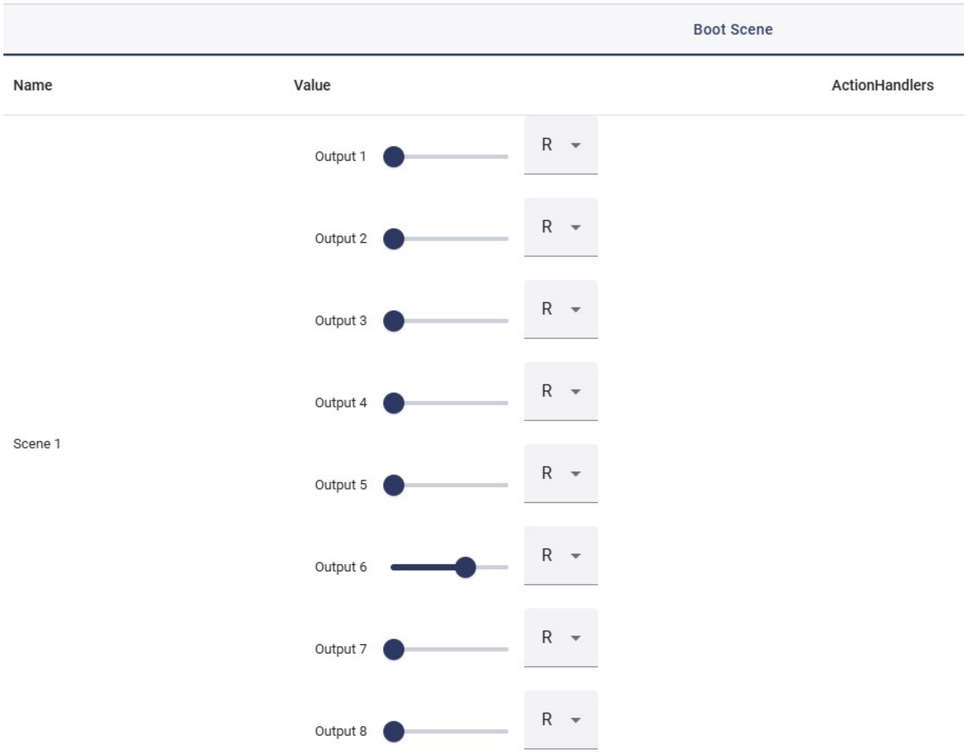

Figure 54 — The Scenes section, with a level slider per output.

11.4.6 Users

The Users section controls who can see and change the device in the cloud. The Default user field sets the role a new user is given, for example Dealer, which decides what that user is allowed to do.

Set the default role to match how the device is handed over: a customer who should only monitor gets a viewing role, while an installer who commissions the device needs a role that can change the configuration.

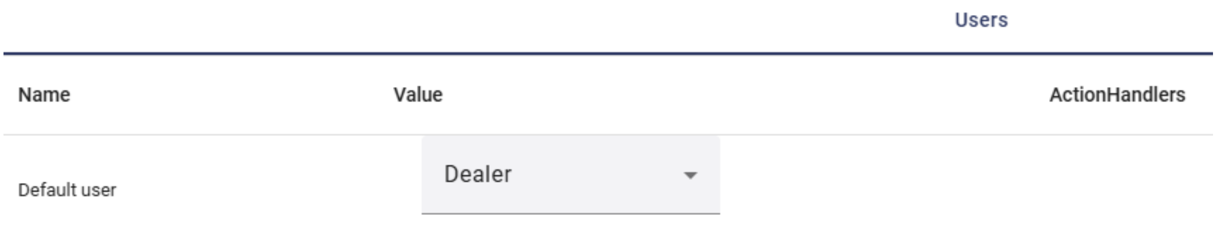

Figure 55 — The Users section, with the default user role.

11.4.7 Backup, restore and reboot

The driver's configuration is backed up to and restored from the cloud. The controls sit at the top left of the cloud device page, above the configuration sections.

To back up the configuration, press Backup settings. The cloud stores a backup automatically and stamps it with the date and time, so the backups build up as a revision history. You do not manage any files yourself.

To restore a configuration:

1. Press Restore settings.
2. In the Restore backup window, open Select backup and choose the backup by its date and time.
3. Press Upload configuration to apply it.

Press Close to leave the window without restoring.

Press Reboot device to restart the driver remotely. The driver keeps its configuration; a reboot has the same effect as a short press of the reset button on the housing and clears nothing you have set.

12 Maintenance

This chapter keeps the installation within specification over its life.

12.1 Inspection intervals

Inspect the installation once a year under normal conditions. Inspect every six months in demanding environments — heavy dust, vibration, high ambient temperature or continuous operation.

Carry out every inspection with the driver switched off and isolated. See the Safety chapter before you start.

At each inspection, check the following:

- All screw terminals are still tight. See Re-torquing the terminals below.
- The enclosure, and the ventilation openings in particular, are free of dust.
- Any external fan or pump driven from the pump/fan output still turns freely without abnormal noise, and the reported RPM is plausible.
- There are no visible signs of overheating — discolouration, deformation or scorch marks on the enclosure or the wiring.
- The connectors and cables are undamaged and still firmly seated.

12.2 Cleaning

Clean the driver only when it is switched off and isolated.

- Remove dust with low-pressure dry compressed air or a soft, dry brush.
- Do not use solvents, aggressive cleaning agents, or wet cloths directly on the electronics or the connectors.
- For a heavily soiled enclosure, wipe the outside with a lightly dampened cloth, then let it dry completely before you switch the driver back on.

12.3 Re-torquing the terminals

Screw terminals can settle after the first thermal cycles, so their torque is re-checked on a schedule.

Re-torque all screw terminals to 0.5 Nm:

- Once after the first few weeks of operation, and
- At every annual inspection thereafter.

Re-torque with the driver switched off and isolated. See the Safety chapter before you start.

12.4 Verification after service

Whenever a terminal has been loosened, a cable replaced, or the driver removed and refitted, verify the following before you return it to service:

- All loosened screw terminals are re-torqued to 0.5 Nm.
- The wiring matches the pinout. See the Technical reference chapter.
- The power source is free of short circuits before you reconnect it.
- On power-up, the status LEDs, and the measured voltage, current and temperature, are all as expected. See the Commissioning chapter.

13 Troubleshooting

Find the symptom in the table, work through the actions in order, and stop when the symptom clears.

WARNING — LIVE DC TERMINALS DURING FAULT-FINDING

Fault-finding often requires the driver to be powered, and the terminals carry up to 48 V DC while it is.

Do not touch any terminal while a supply input is connected. Isolate both inputs before you change any wiring.

Symptom	Likely cause	Action
The driver does not appear in the scanner	Driver and computer are on different networks	Connect both to the same network segment and scan again.
	No DHCP server on the network	Enable DHCP, or set a fixed address manually.
	Address outside the range of the Configurator	Set an address within the range of the Configurator.
	Duplicate IP address	Give each driver a unique address; duplicates are not shown.
	Driver unpowered or supply out of range	Verify 12–48 V DC at the supply inputs.
Half the channels do not drive a load	Only one supply input is connected	Connect the second input; DC1 feeds CH1–CH4 and DC2 feeds CH5–CH8.
A channel reads a short circuit	Short between the channel terminal and its V+	Isolate both supplies and check the fixture wiring on that channel.
Outputs dim by themselves under load	Board temperature above 80 °C	Improve cooling; confirm the fan runs and its RPM is read back.
An output stays off after a fault cleared	The handler is not set to cancel after the fault resolves	Enable Cancel the solution after the failure is resolved on that handler.
Outputs ignore the action handlers	Pulse mode is enabled and overrides them	Disable Enable pulsemode, then re-verify the handlers.
A triggered output does nothing	No boot scene value set for that output	Fill in the boot scene for the output.
The driver shuts down at power-up	Supply voltage above roughly 51 V	Verify the supply is within 12–48 V DC.
The time schedule does not run	No internet connection, so the clock is not synchronised	Check the network settings and the time settings.
The update fails	Wrong update file, or outdated Configurator	Verify the file matches the product and licence, and update the Configurator.
A PADIO pin does not respond	The pin is set to the wrong function in the Configurator	Check the PADIO function of that pin; an input configured where an output is expected will not switch.
A PNP output (OD_OUT) does not switch	The VCC_IO rail is missing, or Vio is not enabled	Verify voltage on VCC_IO and that the VIO LED is lit; enable Vio from VCC in the Configurator if it is dark.
A pulse input does not trigger	Pulse mode is off, or the wrong pin is wired	Enable pulse mode, and wire to the pin by its label, not its position — PULSE_2-1 drives CH1 and sits at the far pin.
The external fan reports no RPM	No four-wire fan connected, or the TACH wire is missing	Connect a four-wire fan and wire the TACH line to the pump/fan header.
The driver loses its cloud connection	No internet, or the required port is blocked	Check the network connection and confirm the firewall allows the MaNima Cloud port.

14 Decommissioning and disposal

This chapter removes the driver from service safely and disposes of it correctly. The driver must be taken out of operation before you start.

14.1 Safe removal

WARNING — LIVE DC TERMINALS DURING REMOVAL

The supply and LED terminals carry up to 48 V DC while a supply input is connected.

Isolate both supply inputs and verify zero voltage at the terminals before you disconnect any wiring.

1. Switch off and isolate both supply inputs.
2. Verify zero voltage at the supply and LED terminals.
3. Disconnect the wiring from the terminals.
4. Release the driver from the DIN rail and remove it.

14.2 Disposal and WEEE

Do not dispose of the driver with household or general waste. As electronic equipment it falls under the WEEE Directive and must be collected separately.

- Hand the driver in at a designated collection point for waste electrical and electronic equipment, or return it to MaNima Technologies BV.
- Observe the local regulations that apply at the place of disposal.
- Recover packaging materials for recycling where facilities exist.

15 Technical reference

The pinouts below are reproduced in full so they can be used at the terminal block. Pin 1 is the leftmost pin of each connector as seen in the connector and pin layout figure in the Product overview chapter. For the complete specifications, see the Pollux Industrial Nova datasheet (DS243501).

15.1 Digital I/O and NTC connector

Pin	Signal	Function
1	DIG_OUT_2-1	Digital output
2	DIG_OUT_2-2	Digital output
3	DIG_IN_1-1	Digital input
4	DIG_IN_1-2	Digital input
5	GND	Ground
6	PADIO_NTC8	Analog, digital IN and OUT
7	PADIO_NTC7	Analog, digital IN and OUT
8	GND	Ground
9	PADIO_NTC6	Analog, digital IN and OUT
10	PADIO_NTC5	Analog, digital IN and OUT
11	GND	Ground
12	PADIO_NTC4	Analog, digital IN and OUT
13	PADIO_NTC3	Analog, digital IN and OUT
14	GND	Ground
15	PADIO_NTC2	Analog, digital IN and OUT
16	PADIO_NTC1	Analog, digital IN and OUT

15.2 Pulse and outputs connector

Pin	Signal	Function
1	PULSE_2-8	Pulse mode
2	PULSE_2-7	Pulse mode
3	PULSE_2-6	Pulse mode
4	PULSE_2-5	Pulse mode
5	PULSE_2-4	Pulse mode
6	PULSE_2-3	Pulse mode
7	PULSE_2-2	Pulse mode
8	PULSE_2-1	Pulse mode
9	OD_OUT_4	PNP high-side output
10	OD_OUT_3	PNP high-side output
11	OD_OUT_2	PNP high-side output
12	OD_OUT_1	PNP high-side output
13	GND	Ground
14	VCC_IO	Voltage input
15	DIG_OUT_1-1	Digital output
16	DIG_OUT_1-2	Digital output

15.3 Pump/fan header

A separate 4-pin header, not part of the 16-pin Pulse and Outputs connector.

Pin	Signal	Function
1	GND	Ground
2	12V	Supply, up to 500 mA (6 W)
3	TACH	RPM read-back, open drain with internal pull-up
4	PWM	Speed control

15.4 Key values reproduced from the datasheet

Value	Figure
Supply input	12–48 V DC (absolute maximum 9–50 V)
Maximum output current, single channel	10 A
Maximum output current per side, combined	20 A
Screw terminal wire size	0.05–3.31 mm² (30–12 AWG)
Screw terminal torque	0.5 Nm (4 lb·in)
Wire strip length	6 mm
Operating temperature	0–80 °C
Default PWM frequency	330 Hz (configurable 100–2000 Hz)

Reproduced from DS243501. If any of these change, correct both documents.

16 Glossary

Term	Meaning
Action handler	A rule that turns a measured value or an input into an action on an output, a scene or a digital output.
Boot scene	The stored static output levels the driver applies on start-up and uses as the basis for triggered outputs.
Duty cycle	The fraction of each PWM period during which the output is switched on, and therefore the perceived brightness.
DIN 43880	The standard for the built-in enclosure dimensions the driver conforms to.
LDR	Light Dependent Resistor — a sensor whose resistance varies with the incident light level.
MaNima Cloud	The hosted service for remote configuration, monitoring and email alerting.
MaNima Configurator	The local application used to configure the driver where no internet connection is available.
NTC	Negative Temperature Coefficient thermistor — a sensor whose resistance falls as temperature rises.
OD_OUT	The connector label of a PNP high-side output. The label reads OD; the outputs are high-side switches.
PADIO	Programmable Analog/Digital I/O — a pin configurable as an analog input (NTC or LDR), a digital input, or a PNP high-side output.
PNP high-side output	An output that feeds the load from a supplied rail rather than switching it to ground. The load is wired between the pin and GND.
Potential-free output	An output whose contact is galvanically isolated from the driver's own supply.
Pulse mode	A mode in which the hardware pulse inputs drive the outputs directly, overriding the action handlers.
PWM	Pulse Width Modulation — switching the output on and off rapidly and varying the on-time to set the output level.
Redundant output	A second channel that takes over the load when the primary channel faults.
TACH	The tachometer signal from a four-wire fan, read back as RPM.
VCC_IO	The user-supplied rail that the PNP high-side outputs switch. Not the driver's own supply.

17 Support and tutorials

MaNima publishes video tutorials covering the Configurator and the installation on its YouTube channel. The tutorial below walks through connecting the interface:

- **Connecting the Interface:** https://www.youtube.com/watch?v=dm48WyPdrrA

17.1 Contact

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18 Disclaimer

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