

MaNima Pollux / Pollux Industrial

Highlights

- PWM driver for high power (up to 48V 40A)
- 8 output channels, or 4x2 when redundancy is used
- Two on-board ethernet ports for daisy chaining
- Voltage and output current monitoring and configurable error levels
- Temperature monitoring of the connected LED fixtures
- Controllable through network API and custom API available
- Fully redundant fail-safe design and automatically switch between power supplies and inform on error
- Control LED outputs through Art-Net / sACN with a live PC, stand-alone using the MaNima Magnus or scenes and time scheduling
- 2 digital inputs for local control to switch scenes or control scenes directly from PLC outputs
- 2 digital potential free outputs to communicate faults or errors, or to enable redundancy circuits
- Per channel hardware overcurrent protection
- Industrial only: 8 high speed digital inputs enable remote control for industrial use
- Remote system monitoring using MaNima Cloud solutions

Applications

- High power LED systems
- Durable replacement in UV for mercury lamps used for curing or disinfection
- Remote locations where devices are hard to reach
- New buildings which should meet the newest durability regulations

Description

The MaNima Pollux is a high-performance PWM LED driver built for demanding (industrial) applications. With the ability to drive up to 48V and 40A, it supports even the most power-intensive LED setups. The device features eight independent channels, which can be reconfigured into two sets of four for redundancy, ensuring uninterrupted operation.

To protect your installation, the Pollux includes robust hardware overcurrent protection. This feature automatically detects and responds to excessive current levels, preventing potential damage to the LEDs and associated circuitry. This safeguard is crucial for maintaining the long-term reliability and safety of the system, especially in environments where power fluctuations or load changes are common.

The Pollux integrates easily into existing networks with its dual Ethernet ports and onboard switch. Advanced monitoring capabilities allow for real-time tracking of voltage, current, and temperature. It can generate alarms if thresholds are exceeded, safeguarding your system.

Temperature control is built with support for up to eight external sensors, preventing overheating and extending LED lifespan. The device also includes a custom API for seamless third-party integration, two digital inputs for scene switching, and two potential-free digital outputs for alarms or redundancy control.

For fast-paced environments, the industrial version offers eight high-speed inputs that can autonomously pulse outputs with microsecond precision. Remote management is made easy via the MaNima Cloud platform, which also provides email alerts for any issues. The MaNima Pollux combines precise control, comprehensive monitoring, and reliable operation, making it an ideal solution for professional LED lighting in industrial settings.

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Revision history

Revision	Change	Author	Reviewer	Date
1.0	Initial release	MvdM		
2.0	Update to new lay-out	MvdH	NOo	August 2024

Electrical specifications

Absolute maximum ratings

Applying ratings above the following figures might lead to permanent damage which is not covered by warranty.

Absolute maximum rating @ 25°C	Min	Max	Unit
Power supply input	9	50	V
Maximum output current per side (single channel)		10	A
Maximum output current per side (channels combined)		20	A
Digital input voltage levels ¹		VDD	
Digital output voltage level		400	VDC
Digital output current		50	mA
Cable length NTC sensors ²		30	m
Cable length power supply		3	m
Cable length LED outputs		30	m

¹VDD is the power supply voltage

²NTC sensors cable length can be extended using MaNima Extensa device

Specification	Min	Typ	Max	Unit	Condition
Power supply	12		48	V	
Idle supply input current ¹		0.12		A	24V
		0.07		A	48V
Idle power consumption ¹		2.9		W	24V
		3.3		W	48V
Efficiency at full load ²		89		%	24V
		91		%	48V
Operating temperature	10		50	°C	
	0		80	°C	Industrial
Humidity	20		80	%	
IP rating	IP52				
Weight		360		grams	
Default output PWM frequency ³	100	330	2000	Hz	
Output short circuit protection response time			10	µs	
Channel resistance (on board) ⁴		20	30	mΩ	

¹Idle means no outputs or inputs are driven, only power being supplied, with 1 ethernet port connected and all other connectors are open

²Full load meaning all 8 outputs driven at maximum capacity

³The frequency can be changed from 100-2000Hz using the configurator, however to comply with regulations, these cases should be measured and verified separately by the user

⁴Channel resistance is measured from GND connection to channel output on terminal block

The digital inputs are protected against voltages up to the power supply voltage

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	48V input

Specification	Min	Max	Unit	Condition
Screw terminal wire sizes	0.05	3.31	mm ²	Solid wire
	30	12	AWG	Solid wire
	0.05	3.31	mm ²	Stranded wire
	30	12	AWG	Stranded wire
Screw terminal torque		0,5	Nm	
		4	Lb.In	
Wire strip length		6	mm	

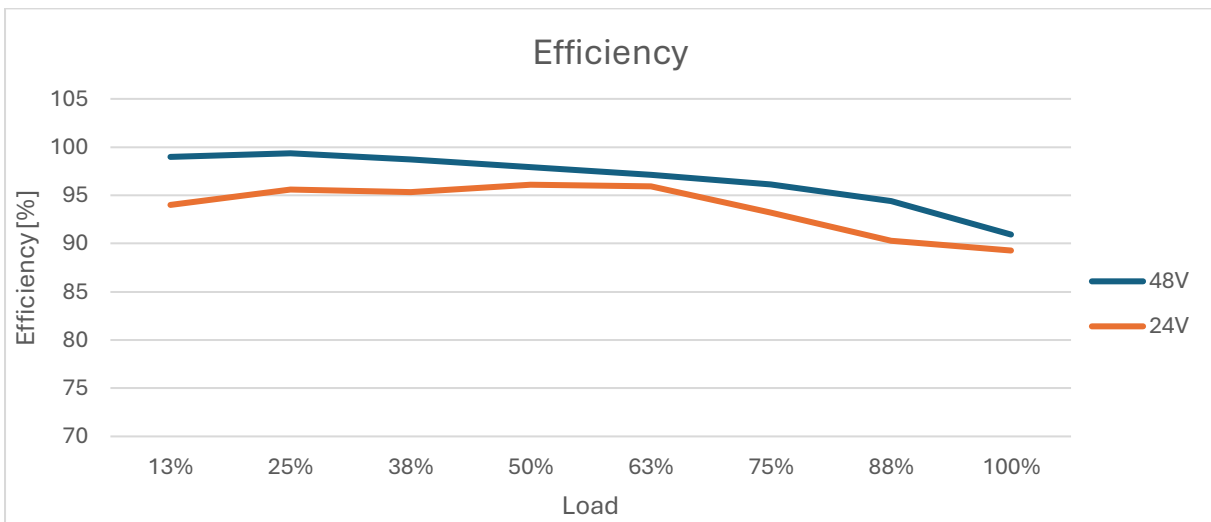
Efficiency

The MaNima Pollux efficiency is calculated by dividing the output power by the input power. Because output power differs per application, the maximum output power is used for efficiency calculation.

$$Eff = \frac{P_{out}}{P_{in}}$$

The graph below visualizes the efficiency of the Pollux, with load from 0 to maximum on the horizontal scale and the efficiency on the vertical scale.

This is based on using all 8 output channels 100% on, 1 ethernet port connected and all other ports disconnected.



100% load means 2000W of output power driven with 100% duty cycle.

Redundancy

The MaNima Pollux can be used as a redundancy device. In this case, the outputs will be setup as 2x4. Each side of the Pollux will be fed with a separate power supply. When one of these fails, the LEDs on that side will turn off but the Pollux itself and the other working side will keep functioning.

In such a failure, an output can be triggered to turn on an alarm light, notify a PLC or when the MaNima cloud is used, an email can be send.

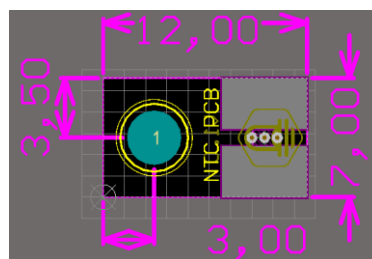
The Pollux can also be setup to switch to another scene. Refer to chapter Typical applications for examples.

Selection of NTC

The Beta and resistance of an NTC can be changed using the MaNima configurator. However, to be sure the Pollux can measure full range temperature, use the MaNima NTC PCB. It contains the default NTC and features large solder pads to attach a cable. To mount it to a fixture, a screw hole can be used. Note that for all NTC's, only one beta and resistance value can be stored, so it's not possible to reliably use different NTC's on one Pollux.

NTC PCB

For increased compatibility and ease, MaNima can deliver an NTC mounted on a PCB. This PCB contains the default NTC to function in combination with the MaNima Pollux. It can be mounted on a fixture using thermal conducting glue or an M3 screw. A cable can be connected to the large soldering pads. On the back side (the side that sits against the fixture), there is a copper plane for thermal conductivity. Using thermal guides, the heat is transferred right to the NTC.



The hole is 3.2mm in diameter. Dimensions are in mm.

Pollux versus Pollux Industrial

The Pollux Industrial targets different applications because of the extended temperature range. It targets harsh environments. For example, use cases are in factories running high power machines, or UV curing applications in combination with the Pollux Industrial pulse mode. The Pollux focuses more on applications for architectural or creative lightning, for instance on buildings or as art lightning.

Features

Output

The output consists of 2x4 channels, powered by their own power supply input. The GND's of these power supply inputs are shared.

Protection

The Pollux is protected on different levels;

- Power supply input polarity protection, if + and – are swapped, the Pollux won't be damaged
- Power supply input overvoltage protection. If voltage levels over ~51V are measured, the Pollux turns off. This protection works up to 80V
- Output short circuit protection. Each output has an individual, automatically fast hardware short circuit protection that limits the output current to 10A.
- Board temperature monitoring, the Pollux ensures the board temperature stays within safe levels by limiting the output duty when the temperature gets too high (> 80°C)

Functions

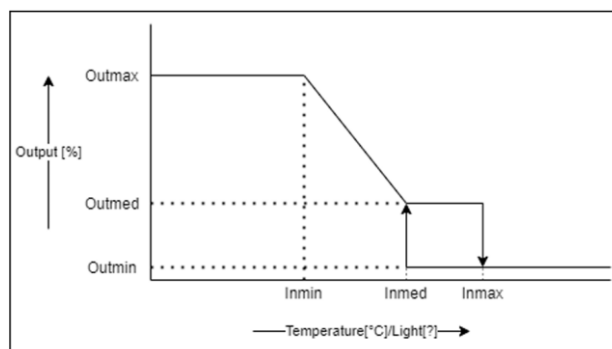
The MaNima Pollux is configured using the MaNima Cloud through an online environment. If the Pollux can't be connected to the internet, the MaNima Configurator software can be used to locally setup the Pollux. The software is downloadable through the [MaNima technology website](#).

The Pollux does real-time monitoring of the LED fixture using the connected NTC temperature sensors. Moreover, it measures each individual output current and when anomalies are detected, triggers can be setup to enable the output, turn off the scene or other actions are taken.

When an overtemperature situation occurs, the Pollux will dim the output to make sure the LED fixture won't overheat.

The Pollux Industrial contains a Pulse mode module, which can be used to generate overdrive pulses to the output, with high control over timing. These pulses can be sent periodically without input signal, or at a fixed time after the digital input is pulled low.

The dimming curve for the NTC measurement looks like this:



The values are configured in the MaNima Configurator. The lower end features an hysteresis, to make sure the LED fixture won't start blinking on this edge case.

Pinout



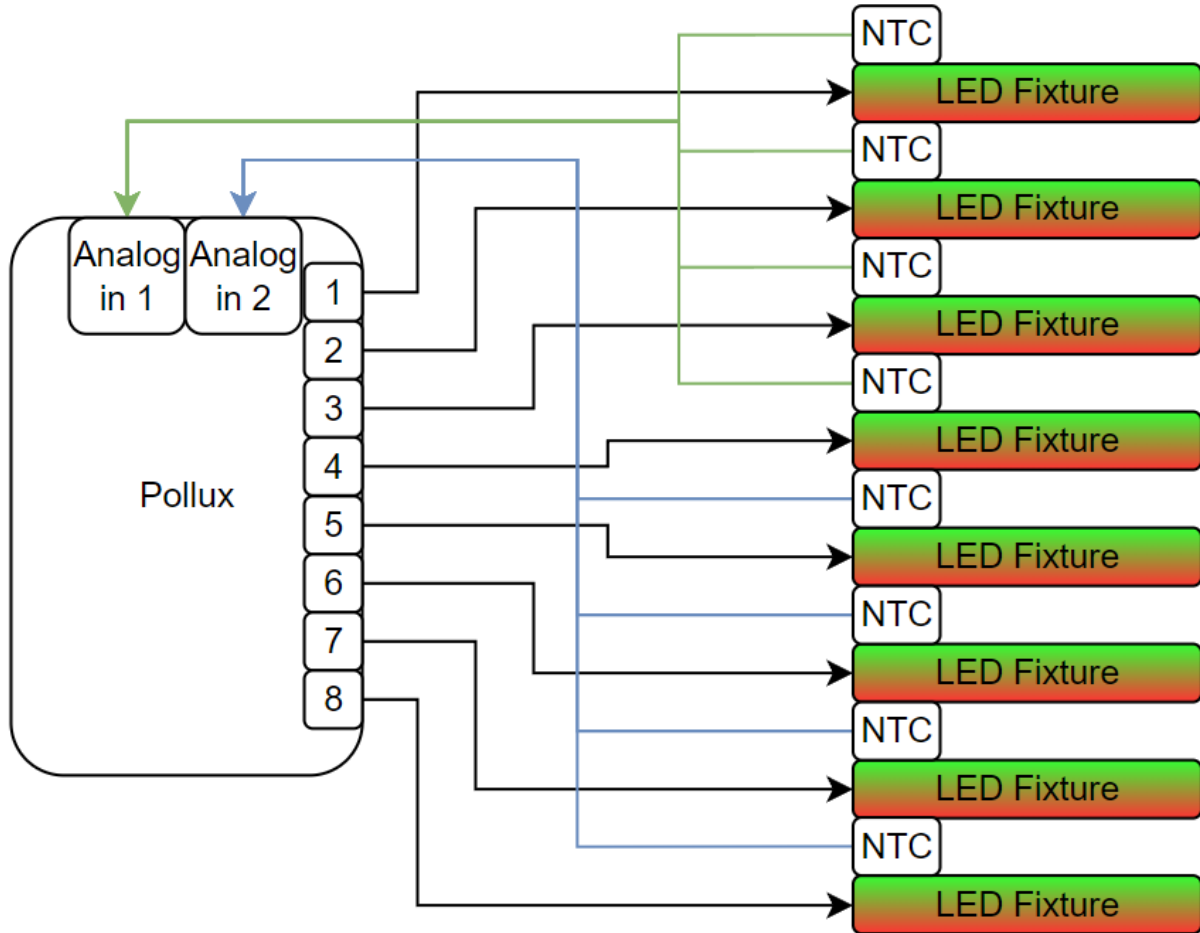
Connector	Pin	Signal
PWM Output DC1	1	VDD (+) side A
	2	GND
	3	Output channel 1
	4	VDD (+) side A
	5	Output channel 2
	6	VDD (+) side A
	7	Output channel 3
	8	VDD (+) side A
	9	Output channel 4
PWM Output DC2	1	VDD (+) side B
	2	GND
	3	Output channel 5
	4	VDD (+) side B
	5	Output channel 6
	6	VDD (+) side B
	7	Output channel 7
	8	VDD (+) side B
	9	Output channel 8

Connector	Pin	Signal
Digital input 2 / Pulse mode	1	Digital in 2.1
	2	Digital in 2.2
	3	Digital in 2.3
	4	Digital in 2.4
	5	Digital in 2.5
	6	Digital in 2.6
	7	Digital in 2.7
	8	Digital in 2.8
Analog input 1	1	GND
	2	GND
	3	NTC / LDR 4
	4	NTC / LDR 3
	5	NTC / LDR 2
	6	NTC / LDR 1
Analog input 2	1	GND
	2	GND
	3	NTC / LDR 8
	4	NTC / LDR 7
	5	NTC / LDR 6
	6	NTC / LDR 5
Digital input 1	1	Digital out 1.1
	2	Digital out 1.2
	3	Digital out 2.1
	4	Digital out 2.2
	5	Digital input 1.1
	6	Digital input 1.2

Typical applications

Architectural lighting on buildings with temperature control

In this application the Pollux is driving LEDs mounted on the outside of a building. Because of the heat generated by the LED fixtures and the sun shining, the temperature of the LEDs will fast become too high.



In this case, each fixture contains its own NTC. In practice, this is often not required, as the measured temperature will be about the same if equal type of fixtures are used.

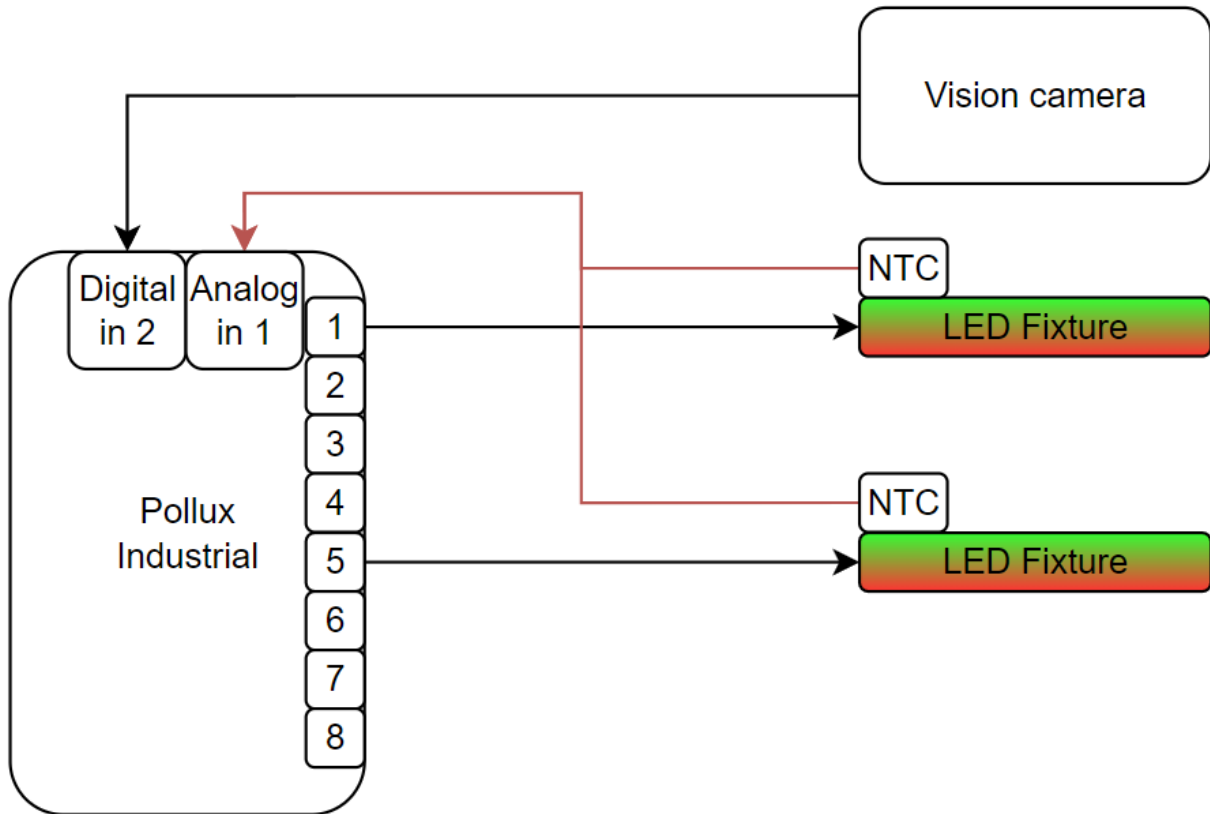
Typical values for the NTC limits are:

Outmax: 100%, outmed: 10%, outmin: 0%

Inmin: 50°C, inmed: 60°C, inmax: 70°C

Pulse mode for vision systems

The Pollux Industrial can be connected to a vision camera. When vision systems are used inside machines, often LED's are not bright enough. When using pulse mode with a slightly higher power supply voltage, the LEDs can be overdriven. The vision camera's trigger output can directly be connected to one of the Pollux Industrial's digital input 2. When pulled to ground, the Pollux Industrial generates a pulse of a pre-set time, after a pre-set delay.



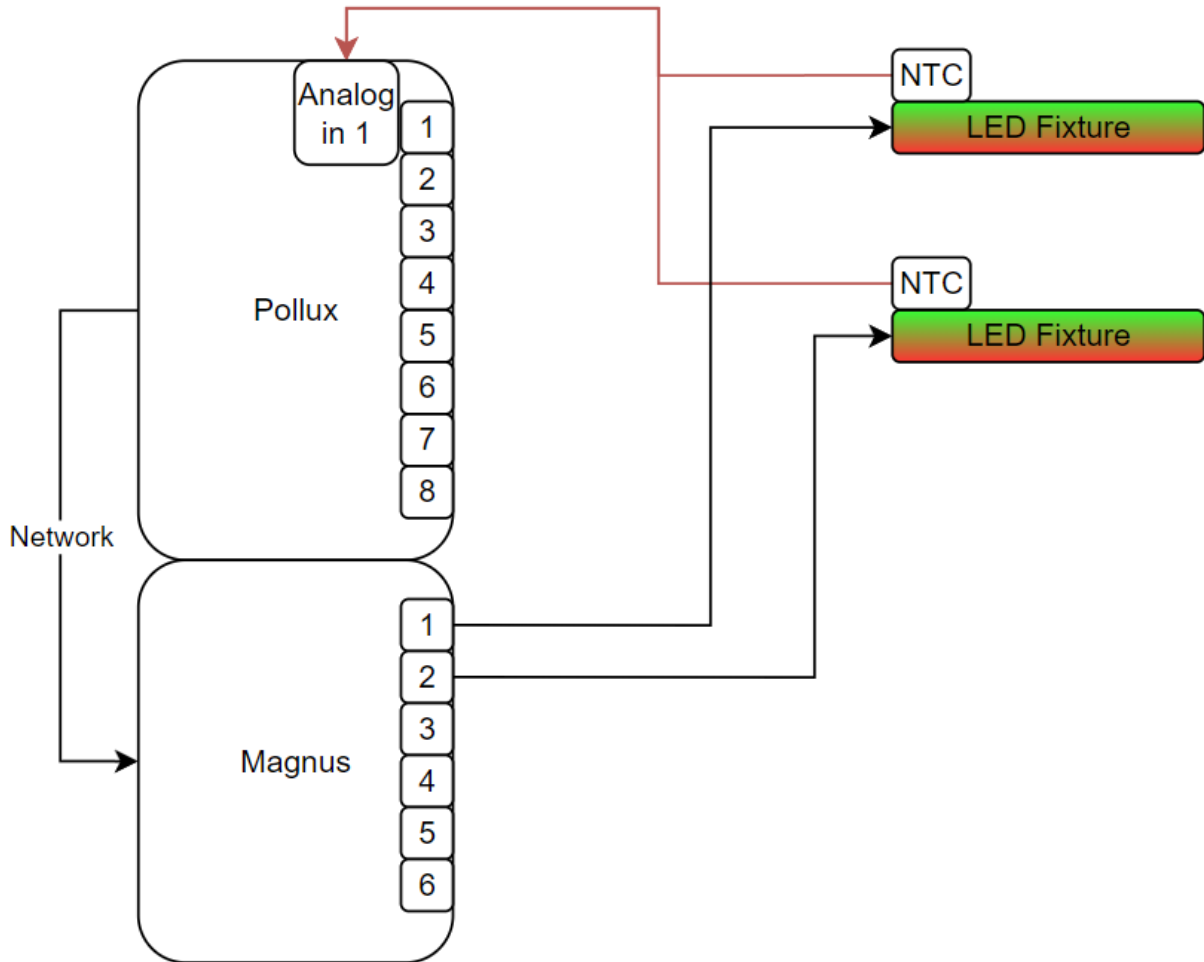
Make sure the LEDs are capable of this overdrive before increasing the power supply voltage!

The Pollux Industrial still measures temperature, but stop pulsing when inmax temperature is reached. It will automatically continue when the temperature drops below the inmed value.

Digital LED temperature monitor

Sometimes digital LEDs are required to create specific effects. However, these LEDs can also be temperature protected using the Pollux. Since the MaNima Pollux cannot directly control digital LEDs, it can cooperate with the MaNima Magnus.

In this application, the Magnus is used to drive digital LED fixtures.



The Magnus and Pollux are connected through the network. In the MaNima configurator, the Pollux will be added to the Magnus as an extension.

After registering the extension inside the Magnus, triggers can be added to different channels. In this case, NTC 1 temperature and NTC 2 temperature are both added and will be set up to change the global dimming of the Magnus.

The Pollux will transmit the dimming value according to the NTC dimming values, and the Magnus will respond by dimming the output accordingly.

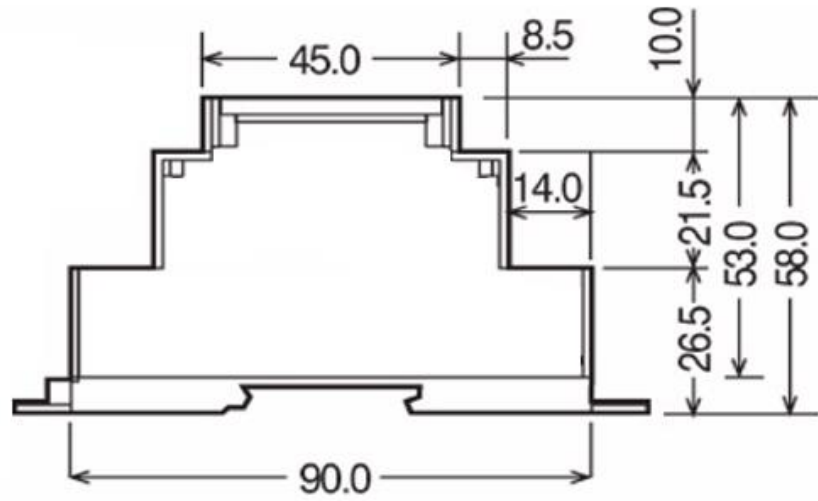
Note that the extension connection is based on a MAC connection. So when by any reason the IP address of one or both devices change, the connection will not fail.

Mechanical specifications

The Pollux and Pollux Industrial are fitted inside an DIN rail enclosure.

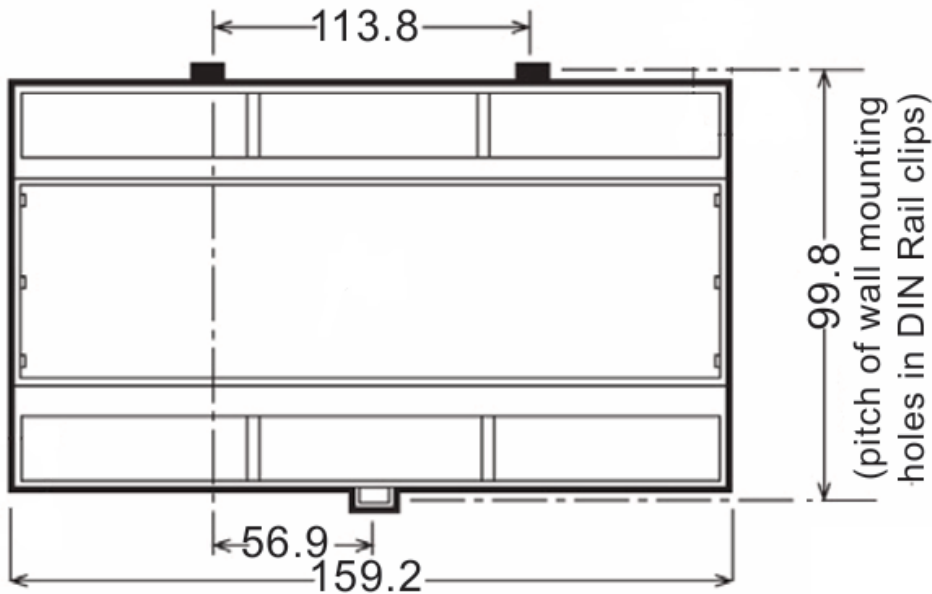
Dimensions are found in the image on the right. The width of the enclosure is found below.

- Design meet requirements of DIN 43880
- Fits 35mm DIN rail or screwed to flat surface
- Durable Light gray UL94-VO Flame retardant PC material
- 90mm long and 58mm high



Pollux

The enclosure of the Pollux is 3 units wide, or 159.2mm.



Ordering information

Order number	Type	Remark
POLLUX	Pollux	In DIN rail enclosure
POLIND	Pollux Industrial	In DIN rail enclosure
NTCPCB	MaNima NTC sensor	Default NTC sensor

All products are carefully handled and packaged in ESD safe methods.

Disclaimer

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