

Zeto Controller



The Zeto Controller Family User Guide

Next Generation Universal LED Control - ZETO Family

- Modular design allows for user to add only what they need
 - Up to 16 Add-On modules with one control box (Core)!
- TCP/IP Connection to access via browser-based application
- Custom Software Friendly
- Higher rated output than previous gen controller
- Singular backplane design for shared compatibility of CX drivers and VX digital dimmer modules.



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1 Zeto controllers family overview

Zeto controllers family is composed of five different units: Core, CX, CX Plus, VX-4, and VX-16. Core is the brain of the whole system; it serves as an interface between the user and other parts of the system. As such, it must always be present. As for other units, any combination of them can be connected to the Core. The number of connected units to the core can range from 1 to 16; it can be any mix of CX, CX Plus, VX-4, and VX-16. At any time, the system can be expanded with new units. Each unit (CX, CX Plus, VX-4, and VX-16) has a rotary switch at the back that enables setting a unique number between 1 to 16 (more about it can be found in chapter 2). All units, including the core, are designed to be attached to a standard DIN rail (see 4); they connect to each other and communicate with bus connectors at the back, which sit within the DIN rail. The Core will automatically recognize how many and what kind of units are connected to it. Units will be recognized by unique address numbers selected by the aforementioned rotary switches. We briefly described the role of the Core; let's now introduce other family members.

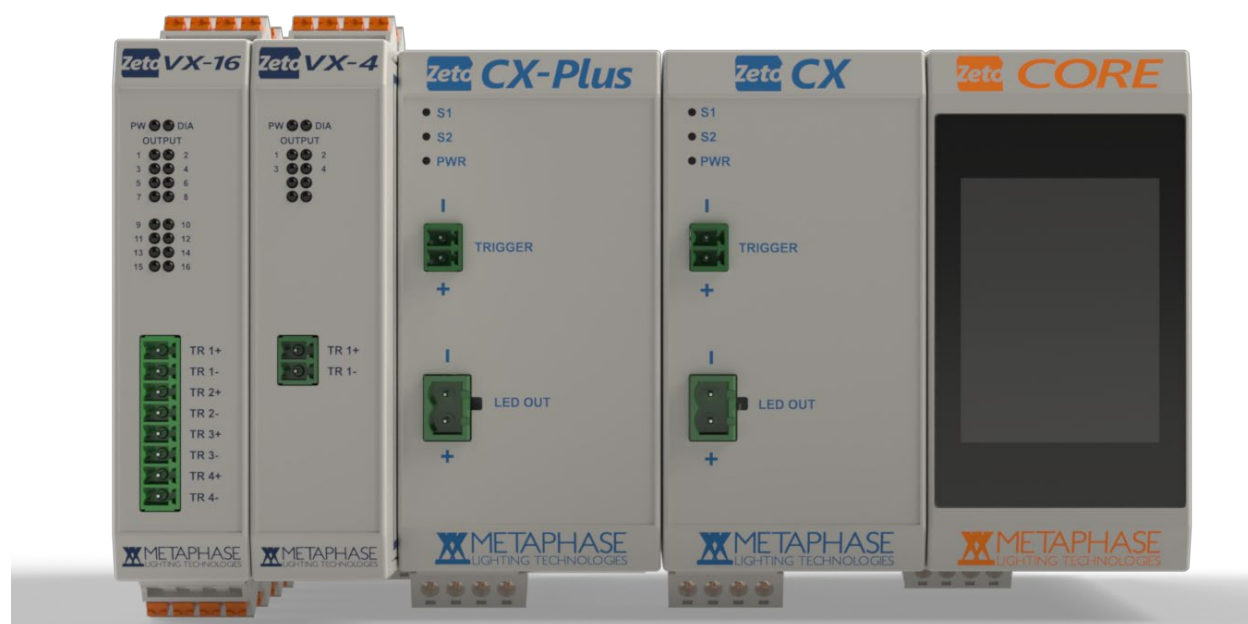


Figure 1.1. 3D Rendering of the Zeto controllers family - Core, CX and VX

CX and CX Plus are two models of Universal Light Controllers. These are precise, high-power, current-controlled LED drivers. They can operate in DC or Strobe mode, with the latter using either internal or external trigger. It is important to note that CX can only be used with the light that is designed to use an external LED controller. It won't work or can cause damage to the light or controller if used with the light equipped with a built-in driver. CX is NOT a voltage-

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regulated power supply and it cannot be used as such. In Metaphase lights family portfolio, products compatible with CX controllers are easily designated in finished good part numbers. These will include ‘-U’ suffix and A-type drive designation for newer products; examples would be: TXISO1A-06-W-M12-U or UB-LL-610-R-NC00-U.

VX-4 and VX-16 are sophisticated, multi-channel, programmable digital dimmers. They allow precise control of light output of lights equipped with internal drivers and 0-10V dimming control lines. In Metaphase (<https://www.metaphase-tech.com>) portfolio, these will be products that have ‘-24Z’ suffix or B/C type drive designation in their finished good part numbers; examples will be: UB-LL-1210-W-CC00-24Z, TXISO1B-12-RGB-3.0M, TXBR3C-24-B-L30-M12.

Both CX and VX units can be connected to the same Core and be used simultaneously. They are intended to be used with different lights, though. It is envisioned that this can be useful in a lab setup or an application that involves multiple illuminators, some of them with built-in drivers and some of them without built-in drivers.

1.1 Core

In this chapter we will describe functions, connections and proper use of the Core unit. 3D model is presented in Figure 1.2.

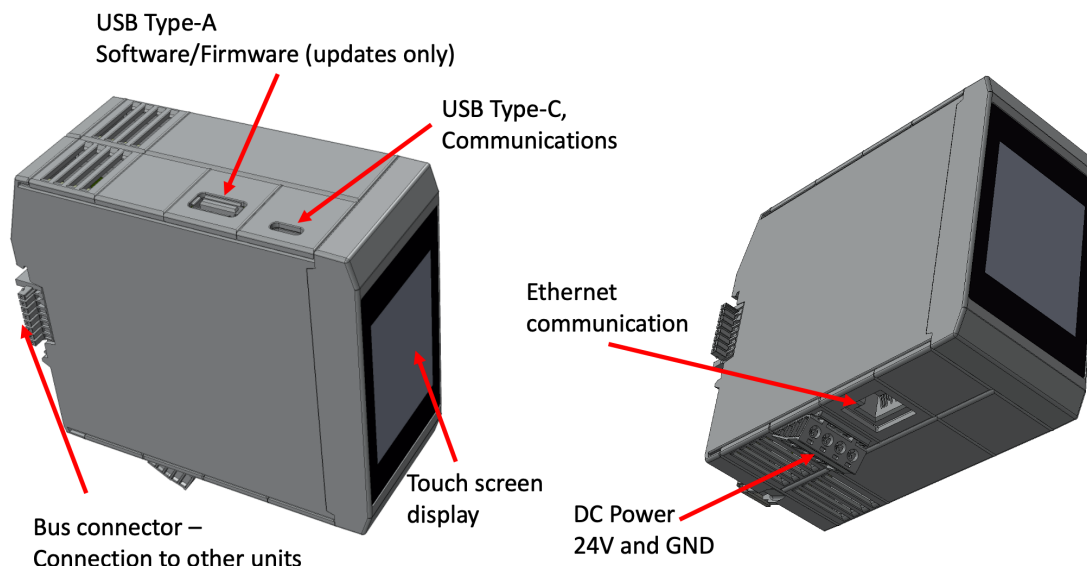


Figure 1.2. 3D model of the Core - shown various connections available

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As mentioned in the introduction, Core is necessary for any ZETO system to function. Regardless how many other units are used (CXs and VXs). Therefore, the customer will have to make sure that at least one Core is being purchased with the new system. Core will act as a gateway to the entire system, providing communication and controls. There are 3 different ways to interact with the system:

- Touch screen display on the front face of the Core
- USB-C, through serial COM port emulation
 - This mode is designed to control the system by sending and receiving binary commands (see 5)
- Ethernet
 - This mode can be used to control the system by sending and receiving binary commands (see 5), similarly to the USB-C port
- WEB
 - Core is equipped with a WEB server that enables the whole system control just with the use of the browser

Ethernet supports both UDP and TCP. Core can utilize the DHCP protocol to obtain an IP address, or it is possible to set a static IP address. The MAC address assigned to the unit is displayed on the sticker at the back.

Each mode of communication is discussed in a separate chapter below.

Additionally to the USB-C port, there is also a USB Type-A port present on the top of the Core (see Figure 1.2). This port is only intended for software/firmware updates – this procedure is described in paragraph 6.

DC power is delivered to the unit with the use of screw-in terminals – they are located at the bottom of the unit (see Figure 1.2 for reference). There are two terminals for 24V and two for GND. Only one pair can be used; another one can be used to daisy-chain 24V to the next unit (CX, VX).

1.1.1 Core – using touchscreen display

After powering up the unit, by delivering 24V DC, and after approximately 9 seconds, this image will greet the user on the touch screen display - Figure 1.. At the bottom right corner, there will be displayed the current version of the software running currently on the Core. If no other unit is connected (and powered) to the core, the screen won't change, and there will be no way to interact with the core. If, on the other hand, CX or VX are being connected, this will be displayed - Figure 1.. The screenshot on the left corresponds to a CX, and the one

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on the right to a VX. As it was mentioned before, both can be connected at the same time, as well as multiple CXs and VXs. In order to toggle between them, use the left and right arrows at the bottom of the screen. In the middle of the screen unit id (configured with the rotary switch at the back) and type of unit will be displayed. Always present on the screen is an IP address box – the top left corner of the screen. It is either the IP address assigned by the DHCP server if such is present or a static IP address. To switch from DHCP to a static address, please press the box, and this screen will appear – see Figure 1..



Figure 1.3. Greeting screen after powering up Core

There are two states that the core can be in. Locked and unlocked. To prevent unauthorized changes to the settings/limits on the Core, the device needs to be “unlocked” with a PIN. This PIN is configured during the initial setup of the CORE device. The core can be unlocked by simply tapping on the red lock icon and inputting the correct PIN. You can reach out to xxxxx@metaphase-tech.com for support in the case of a forgotten PIN.

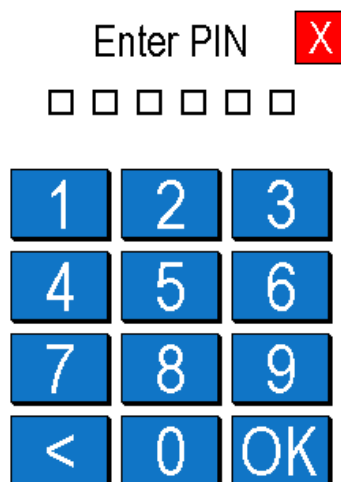


Figure 1.4. Inputting PIN on Core

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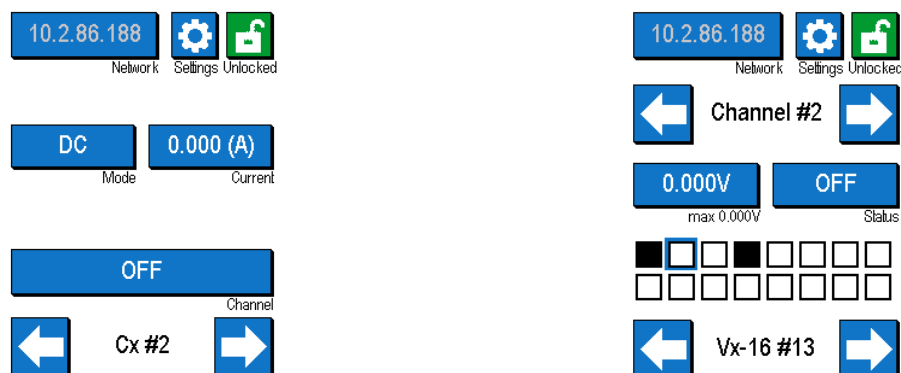


Figure 1.5. Screen display when CX or VX is connected

If the DHCP box is selected, Core will seek an IP address assignment from the server. If needed, the assigned in factory MAC address is on a sticker at the back of the Core. If DHCP is disabled, one can enter its own IP address. In case DHCP is selected and server fails to assign an IP address, the main screen will display ‘---.---.---.---’ in the IP address field, on the main page. Users can scan the QR code to access the web interface from a mobile device.

While using CX, there are two basic modes of operation – DC and Strobe modes. The screen for DC is shown in Figure 1., whereas the one for Strobe is in Figure 1.. All settings are quite self-explanatory. To toggle the channel output on and off, press the long button labeled channel. One important thing to understand is that while the channel is on, this setting will be stored in non-volatile memory. Even if CX is power cycled, the channel will come back on. This is intentional, in case of a power failure in the facility, the system will come back live without any intervention.

By tapping the button Settings, we enter additional options for CX – see Figure 1.. There are three screens to access. They allow us to check the firmware version, set the limits, and tap to more options for the trigger. The latter includes switching between internal and external triggers.

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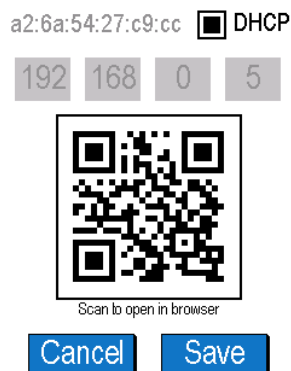


Figure 1.6. Settings to set IP address or enable DHCP

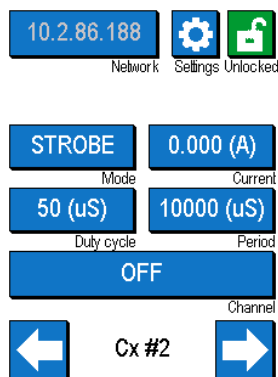


Figure 1.7. Screen displayed when CX is in Strobe mode

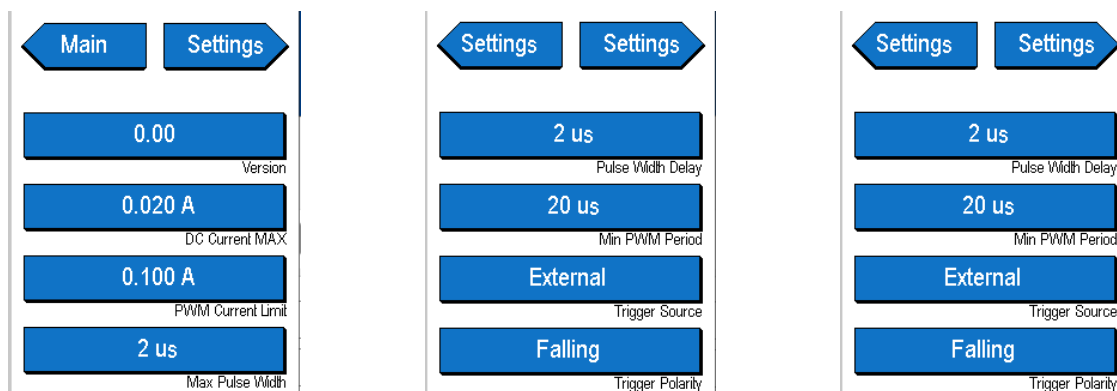


Figure 1.8. Screenshot of Setting screens for CX

When VX has been connected to the Core, this screen will be displayed - Figure 1.. It allows setting voltage in the range between 0 and 10V for each channel separately. Toggling between channels can be achieved with the use of the left and right arrows at the top of the screen. 16 boxes in the bottom part of the screen are quick indicators of which channels are enabled. Additional options can be found after pressing the Setting button, see - Figure 1.. It allows

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checking the firmware version, setting voltage limits for each channel, and assigning trigger inputs to channel outputs; more on that in the chapter designated to VX (see 1.3).

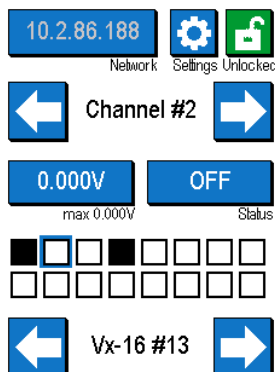


Figure 1.9. Screen shot of the main screen for VX

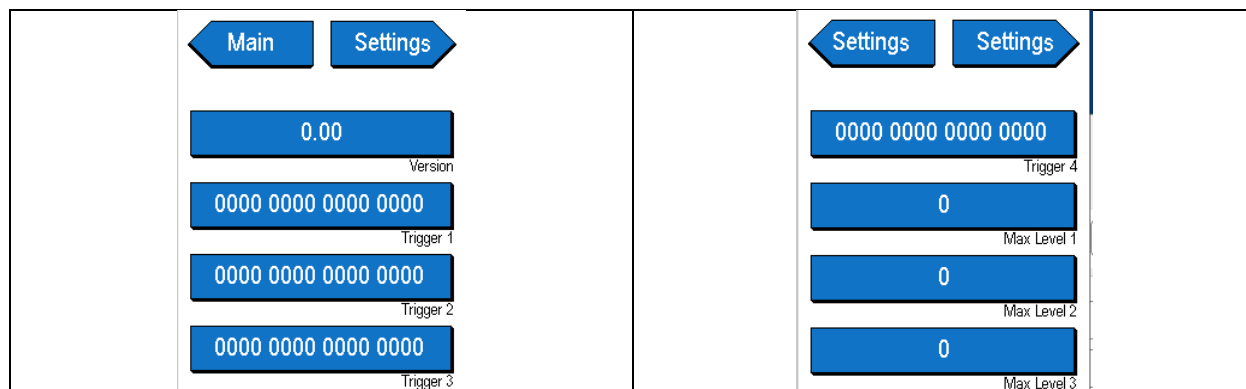


Figure 1.10. Screen shot of VX's Setting screens

1.1.2 Core – WEB interface

Every Core runs a web server, serving the Metaphase Vision control application. Point the browser at the Core's IP address and you get full control of every CX and VX module on that Core's bus.

Metaphase Vision is designed to work on a laptop, a tablet or a phone. The layout adapts to the screen. On a mobile device, the page tabs move to a bar along the bottom of the screen.

Accessing the Web Interface

Before you start, confirm that:

- The Core is powered (24 V DC) and finished booting.

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- An Ethernet cable is connected and the orange and green LEDs beside the Core's Ethernet port are lit.
- Your computer, tablet or phone is on the same network as the Core.
- An IP address is displayed in the top-left box of the Core's touchscreen (see 1.1.1). If it reads ---.---.---.---, the Core did not receive a DHCP address — assign a static address as described in 1.1.1 before continuing.

There are two ways in:

Option 1 — Type the IP address

Open any modern browser (Chrome, Edge, Safari or Firefox) and type the IP address shown on the Core's touchscreen into the address bar, for example 10.2.86.188. No port number and no https:// prefix are required.

Option 2 — Scan the QR code

Press the IP address box on the Core's touchscreen to open the network screen (Figure 1.6). A QR code is displayed under the address field. Scan it with a phone or tablet camera and open the link that appears.

System page

The Systems page is where you set up and manage your hardware. This is the first screen you see when you open the app.

At the top, a summary header reports the number of Cores configured, the total number of modules and how many Cores are currently connected, together with connection uptime.

Below it, each Core is shown as a card containing:

- The Core's name (click the pencil icon to rename it) and its address and port.
- Connection status and how long the link has been up.
- A 16-slot module grid representing bus addresses 1–16. Occupied slots show the module type (VX-4, VX-16, CX or CX Plus), its address, and the name you have given it. Empty slots are shown greyed out.
- A rescan control that re-runs the bus census, for use after you add, remove or re-address a module.

Clicking a module in the grid jumps straight to that module's controls on the Channels page. Module names entered here are stored on the Core itself, so they follow the hardware. The same names appear on any other phone, tablet or PC that connects to that Core.

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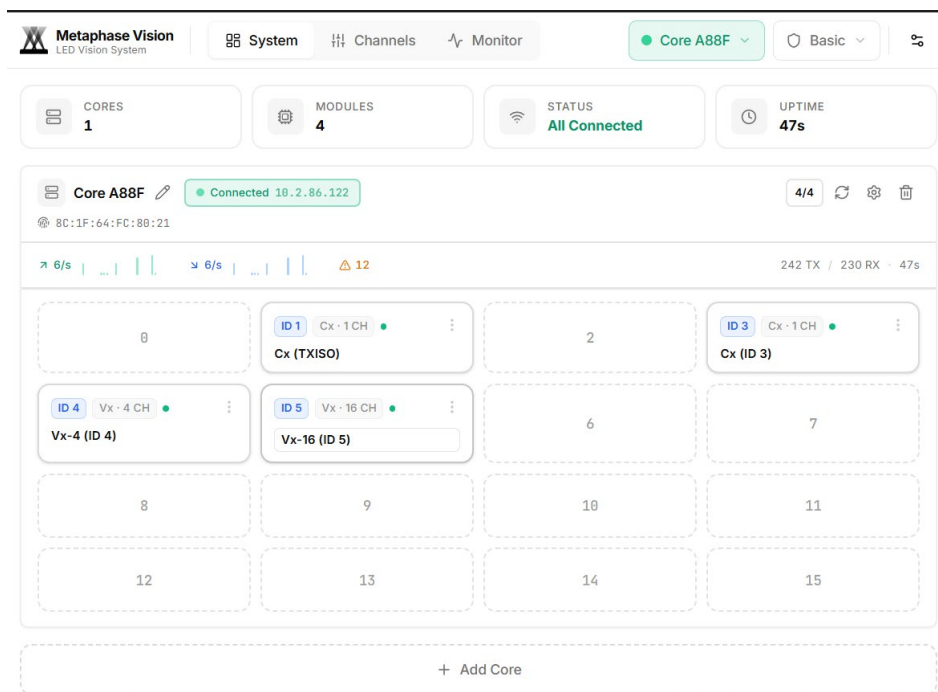


Figure 1.11. Core status and the 16-slot module bus grid.

Channels Page

The Channels page opens a grid showing every CX and VX module as a card, with a power toggle and the essential live values on each. Click a card to expand that module into its full control view.

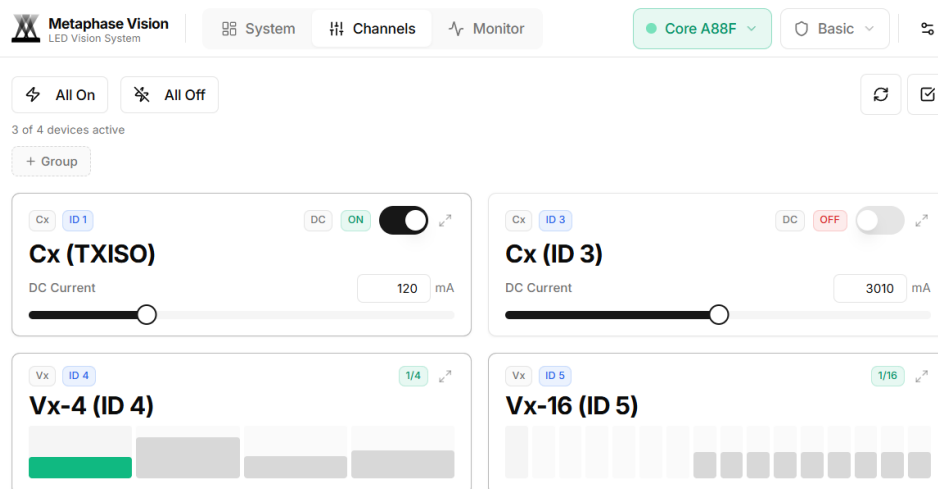


Figure 1.12. Channels status page grid view.

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VX modules (VX-4 / VX-16)

The header shows the module name, its device ID, and how many channels are currently active (e.g. 1 of 16 ch active), followed by the All On, All Off, Read All and Select buttons and + Group.

Output Level — the 0–10 V drive level, as a percentage, adjustable by slider or by typing a value;

Output Limit (padlock icon) — the maximum level that channel is allowed to reach, shown as a percentage and the equivalent voltage. This is a safety ceiling, not a drive level, and it requires Admin access to change;

Trigger Input — assigns the channel to a trigger input (Off, T1–T4), which is how one trigger is made to gate a group of channels as shown in Figure 1.11.

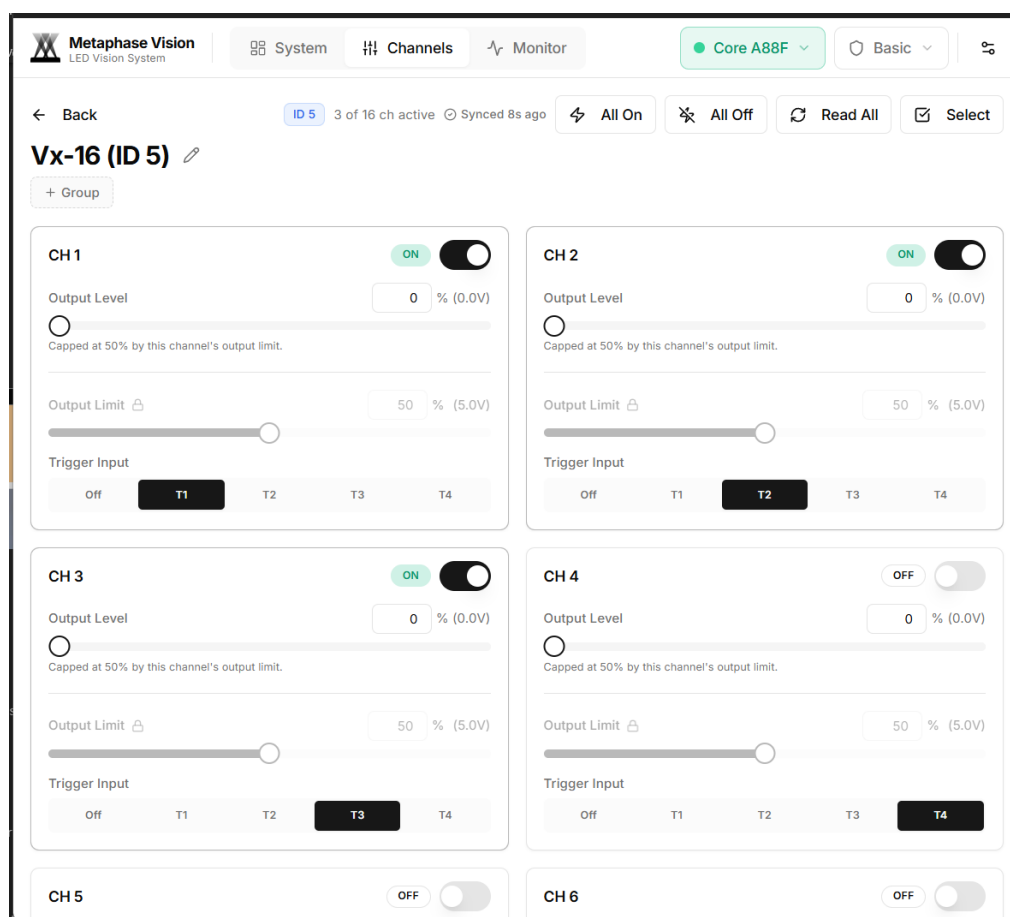


Figure 1.13. Expanded VX-16 module, one panel per output channel.

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CX modules (CX / CX Plus)

DC tab: DC Current in mA, with its Current Limit ceiling.

Strobe tab: Pulse Current with its Current Limit; Strobe Pulsewidth with its Pulsewidth Limit; Trigger Delay; and Strobe Period with its Min Period.

Trigger Source (internal or external): Select sources T1 – T4.

The limit fields (current, pulsewidth, minimum period) are the guard rails that stop an operator driving a light past its rating. They are marked with a padlock and require Admin access; the day-to-day values above them do not. Remember that the strobe combinations must respect the limits tabulated in 7.3, and that the channel ON state is stored in the CX's non-volatile memory and will return after a power cycle.

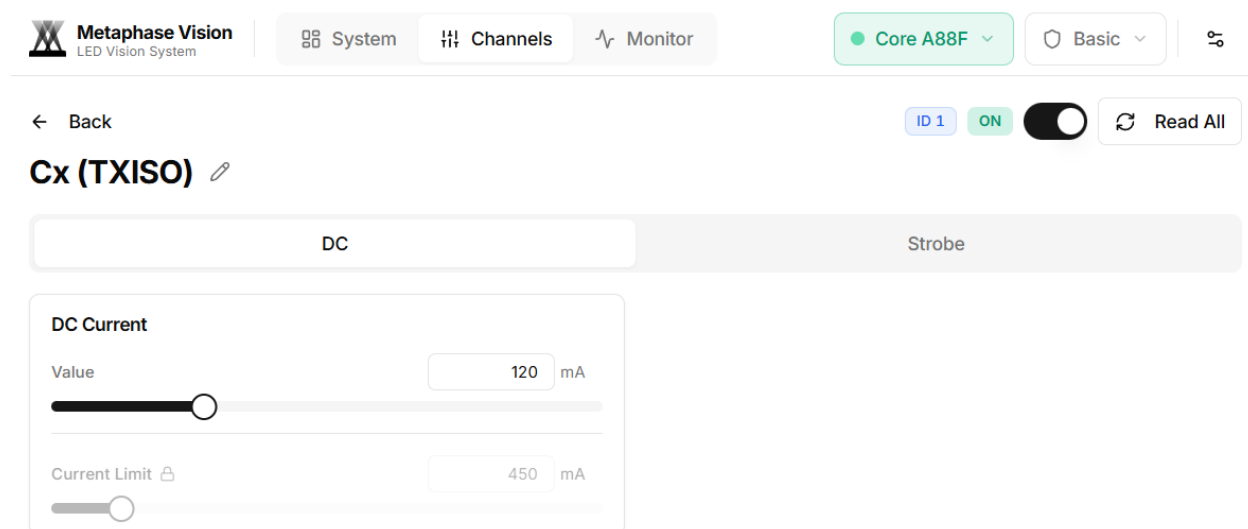


Figure 1.14 Expanded CX module, DC and Strobe control tab.

Monitor page

The Monitor page exposes the binary protocol described in the METAPHASE ZETO – Developer Integration Guide (see 5). It is the first place to look when something is not responding as expected, and it is also a convenient bench tool when writing software against the Core.

Communication Log

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A live, decoded trace of every packet. Each row shows direction (TX / RX / SYS), the raw eight bytes, the decoded command name, channel, device ID and data value, and the round-trip time in milliseconds. Errors and timeouts are called out in the log. Export saves the log as a CSV file; Clear empties it.

Command Builder

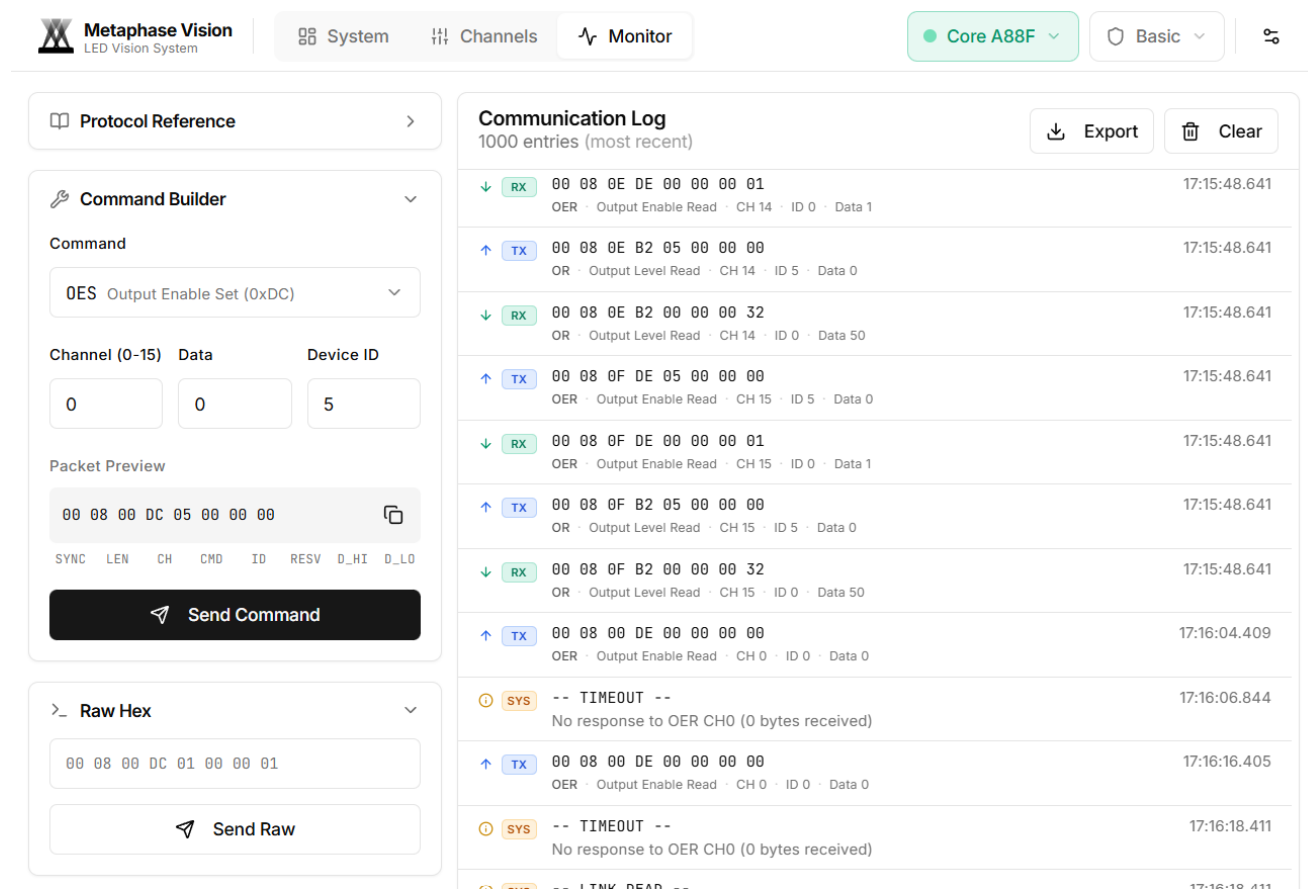
Build a valid packet without memorizing the byte layout: choose the command from the drop-down, enter Channel (0–15), Data and Device ID, check the Packet Preview, then press Send Command.

Raw Hex

For sending an arbitrary eight-byte packet, e.g. 00 08 00 DC 01 00 00 01.

Protocol Reference

The command table, available inline for quick lookups for software development.



The screenshot displays the 'Monitor' page of the Zeto Controller interface. At the top, there are navigation tabs for 'System', 'Channels', and 'Monitor', with 'Monitor' being the active tab. A dropdown menu shows 'Core A88F' and 'Basic' settings. The main content area is divided into two columns. The left column contains the 'Command Builder' and 'Raw Hex' sections. The 'Command Builder' section has a 'Command' dropdown set to 'OES Output Enable Set (0xDC)', input fields for 'Channel (0-15)' (0), 'Data' (0), and 'Device ID' (5), a 'Packet Preview' showing the resulting hex packet '00 08 00 DC 05 00 00 00', and a 'Send Command' button. The 'Raw Hex' section has an input field with '00 08 00 DC 01 00 00 01' and a 'Send Raw' button. The right column features the 'Communication Log' with 1000 entries (most recent). The log shows a series of RX (green) and TX (blue) packets, including 'OER Output Enable Read' and 'OR Output Level Read' commands, along with two 'SYS' (yellow) entries indicating 'TIMEOUT' and 'No response to OER CH0 (0 bytes received)'. Each log entry includes the raw hex data, decoded command details, and a timestamp.

Figure 1.15 Monitor page — Command builder and live communication log.

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Access levels: Basic and Admin

Metaphase Vision has two access levels, shown and changed from the dropdown in the top bar.

Basic is the default and covers all normal operation: turning channels on and off, setting VX output levels, setting CX current, pulsewidth and period, assigning trigger inputs, creating groups, renaming modules and channels, and reading everything back.

Admin additionally unlocks the settings that protect the hardware and the installation such as VX output limits per channel; CX current limit, Pulsewidth limit/Min Period, and Data Management (configuration backup and restore)

Anything that needs Admin is displayed with a padlock and will not accept changes until you unlock.

How to unlock

Click the Basic dropdown, choose Admin, and enter the six-digit PIN. The dropdown turns blue and reads Admin. The unlock applies to that browser session only — other devices, and a later session on the same device, start at Basic again. To step back down, click the dropdown and choose Basic.

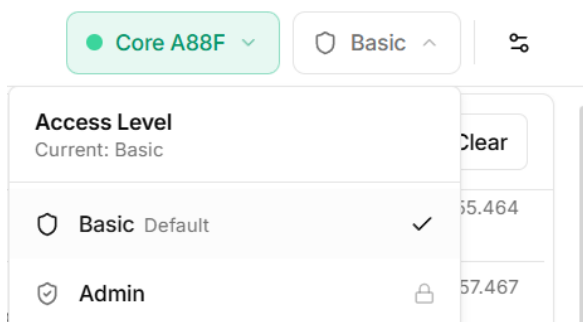


Figure 1.16. Selecting an access level.

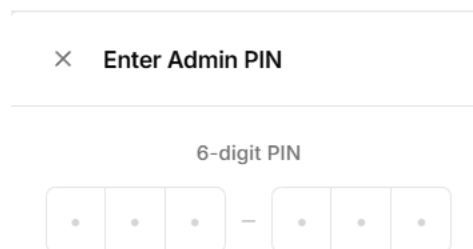


Figure 1.17. Entering the Admin PIN.

The PIN belongs to the Core, not to the browser. It is the same PIN that unlocks that Core's touchscreen (see 1.1.1), and it is stored on the Core, so every device that connects uses the same credential. A new unit ships with the default Admin PIN 000000; set your own during commissioning.

To set or change the PIN

1. Elevate to Admin.

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2. Click the chip again and choose Manage PINs.
3. Press Set Custom PIN (or Change if one is already set).
4. Enter the new six-digit PIN, enter it a second time to confirm, and press Save PIN.

The new PIN is written to the connected Core(s); a confirmation message reports the result, and warns you if any Core could not be reached. The trash icon beside Change removes the custom PIN and returns the Core to the default 000000.

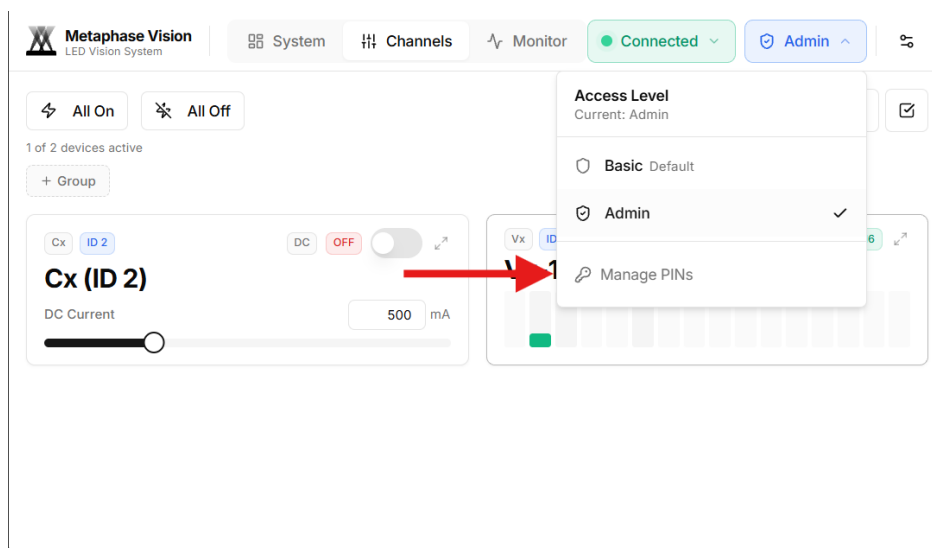


Figure 1.18. Managing PINs from the Metaphase Vision Web App

Forgotten PIN

There is no universal override code. Contact sales@metaphase-tech.com if you need assistance.

1.2 Universal Light Controllers – CX and CX Plus

CX controllers are precise Current Controlled LED drivers. They can operate in DC or Strobe mode, both with the use of internal or external trigger. Functionality-wise, CX and CX Plus are identical. The difference is in maximum rating (for detailed spec, see 7.3):

- CX
 - DC Current: 4A max
 - Strobe current: 40A max
 - Max output power: 60W
- CX Plus

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- DC Current: 10A max
- Strobe current: 40A max
- Max output power: 150W

3D models of CX/CX Plus, with labeled connections, are presented in Figure 1.. On the top of the CX, there is a USB-C connector; this is a service port. It is used for software updates and service functions. It cannot be used for controlling the unit. For that function, you have to be connected to the USB-C port on the Core unit – see also 5. On the bottom of the unit, there are screw terminals for DC Power connection. Two of those are labeled +24V, and another two are Grounds (GND). It is important to use an appropriate power supply that is able to deliver sufficient power. See the power supply guide here 3.

The front plate of the CX controller is shown in Figure 1.. On the front of the controllers, there are two connectors; the top one is a Trigger input. This one is used when an optional external trigger is used. This input has to be enabled, either in the GUI with the use of a touch screen display, through the WEB interface, or by sending appropriate instructions via Ethernet or USB to the controller. It is also important to understand that this trigger input is not required for the controllers' operation. The controller can generate an internal trigger signal where the pulse duration and frequency can be set. The bottom input on the front of the controller is an LED output, and this is where the light should be connected. Attention has to be paid to the polarity; connecting a device with reverse polarity can damage the connected light. A particular light may require more than one channel; in this situation, the customer needs to procure additional CX (or a plurality of them). All CXs can be controlled by one Core unit; it is also possible to mix CX and CX Puls units on the same bus (connected to the same Core unit). It is also important to understand that the controller will recognize faulty conditions, such as: no load, short, excessive power consumption (above the design values of the controller); however, this is the user's responsibility not to overcurrent the light connected to the controller. Setting the current above the design values allowed by a particular light can damage the light. Metaphase-designed lights compatible with external controllers will always have a sticker stating the maximal allowable current both in DC and Strobe operation.

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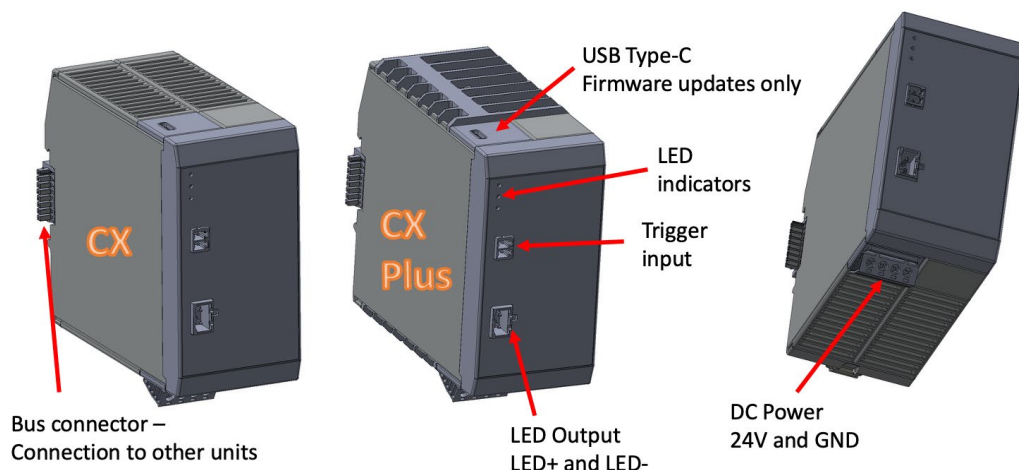


Figure 1.19. 3D model of CX family controllers



Figure 1.20. Front plate of the CX controller

On the top of the front plate, there is a column of indicator LEDs. The one on the bottom is labeled PWR and it indicates that 24V DC was supplied to the controller. Two other LEDs, labeled S1 and S2, are status indicators. S1 is a heartbeat indicator; in normal operation, it is pulsating all the time – this shows firmware running correctly. S2 is also pulsating, however, only when the unit is idling (output is off). In a situation when output is enabled, S2 will stay constantly on in DC mode and will pulsate quickly in Strobe mode. If either or both S indicators are constantly off, it means that the unit is malfunctioning. Try power cycling the unit; if the problem persists, contact Metaphase for assistance.

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1.2.1 CX startup process

Startup process is an important step in CX operation. Light should be connected to CX always with the power being disconnected from CX. After that, when power is turned on, CX will perform a load testing procedure. If everything is correct, it will be ready to use. If you power CX without light connected, it will return an error message – no load (see next paragraph). It will stay in this mode until it is power cycled. It means you need to connect the light and power cycle the unit for it to recognize the load correctly. If you plan for changing the type of light connected to the unit, this process needs to be repeated. Power down the unit, replace the light, and power it up again. Do not attempt to swap the light during CX being powered.

1.2.2 Errors in CX operation

As mentioned before CX will report a variety of errors. This can be viewed in three ways:

- On the Monitor page of the WEB interface – see **Error! Reference source not found.**
- On touch screen display; if error occurs CX label between toggle arrows becomes yellow, when press it will display error type.
- You can also read error messages by sending appropriate binary command to the Core, for more see paragraph 5.

1.2.3 Connecting external trigger source

Trigger input in both CX models is optically isolated. It can support both PNP or NPN drives, moreover it is possible in setting to change trigger polarity if the reversed operation is desired. Since CX's trigger input is optically isolated, there may be a need to supply external voltage to the input if the trigger source is not able to provide one itself. Please carefully study diagram in Figure 1.4 to understand available options for connectivity.

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Triggering Options

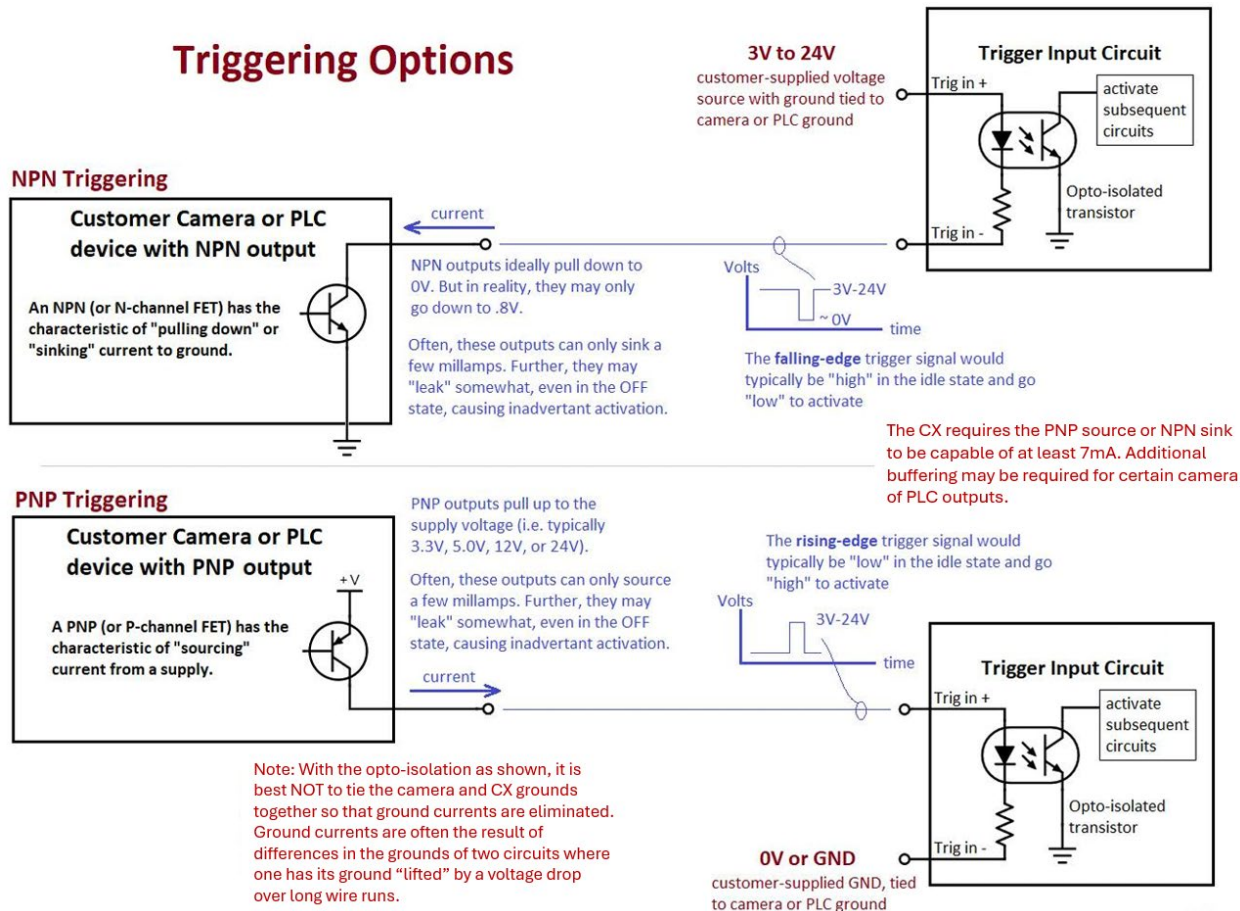


Figure 1.4. Diagram explaining options of connecting external trigger signal to CX

1.3 Digital Programmable Dimmers – VX-4 and VX-16

VX controllers are programable digital multichannel dimmers with software-programmable trigger inputs. VX-4 has four individually programmable 0-10V outputs and one trigger input. VX-16 has sixteen 0-10V outputs and 4 trigger inputs. Trigger inputs can be assigned to any output channels; this can be achieved with the use of a touchscreen display on the Core, WEB interface, or writing software. One trigger input can control from 1 to 16 channels; this enables toggling a particular number of channels simultaneously. This concept is shown on the diagram Figure 1.6.

In Figure 1.5, we can see 3D models of VX controllers with available connections. On the top of the controllers close to the front, there is a USB-C port. Similarly to CX, this port is for service and firmware updates only. Communication can only be achieved by connecting to the Ethernet or USB-C port located on the Core. Behind the Ethernet port, there are channel outputs from no. 1 to 8. Each channel has a pair of connections: V+ (0-10V) and GND. All

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GNDs are connected internally together and are common ground. On the bottom of the unit, there are channels 9-16, accordingly. All connectors are spring-loaded terminals. At the very far end on the bottom, there is a DC 24V supply input. To distinguish it additionally from outputs, it is equipped with screw terminals. There is a pair of 24V inputs and two GND (grounds) inputs.

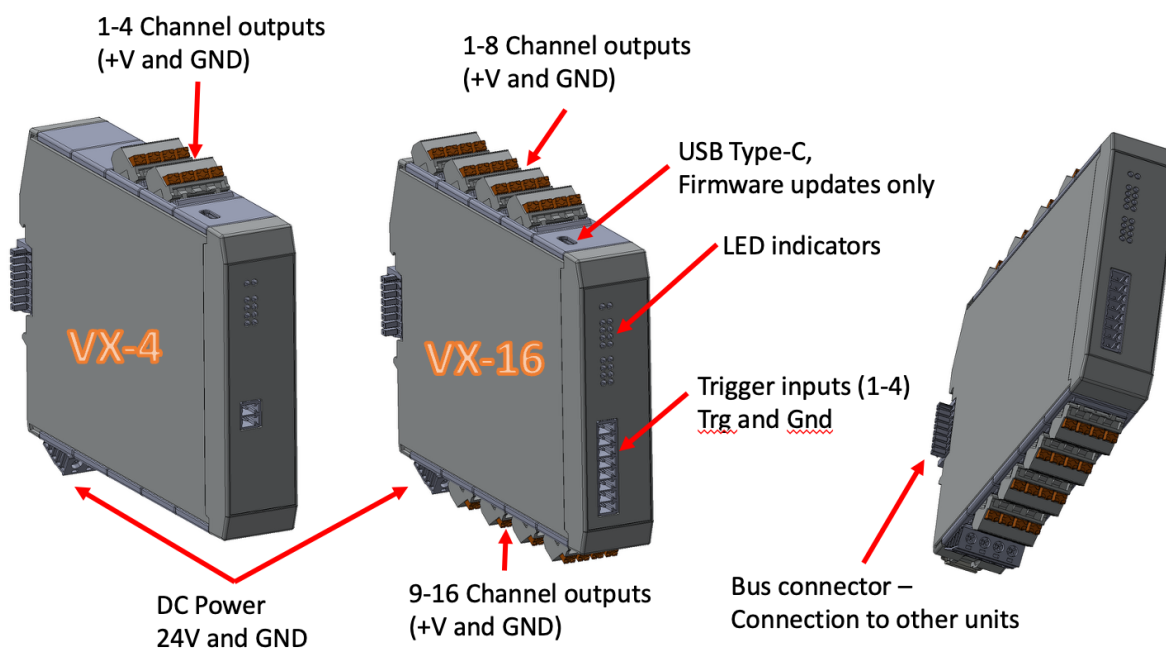


Figure 1.5. 3D models of VX-4 and VX-16 controllers, connectivity

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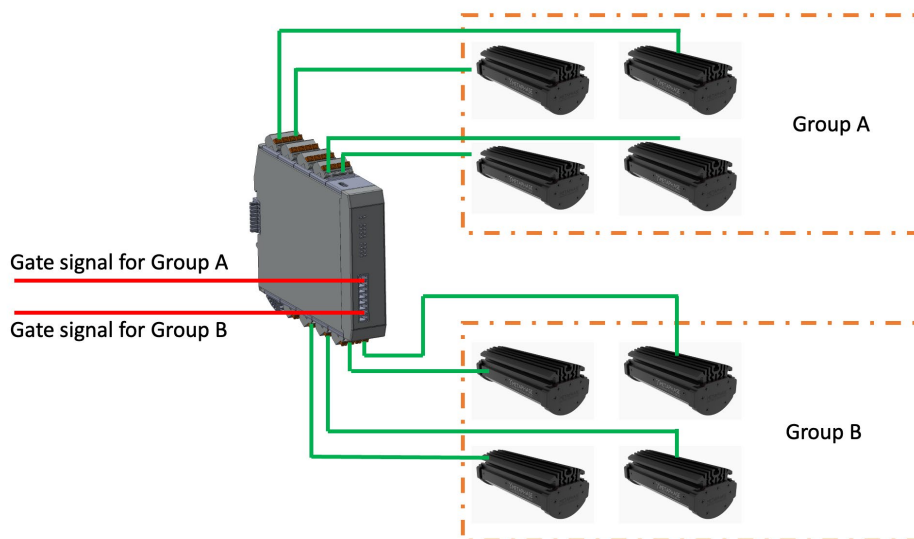


Figure 1.6. Diagram showing how VX can control different group of light simultaneously

In Figure 1.7 there are shown VX's face plates. Starting from the top, there are two LEDs labeled PWR and DIA. The first one is indicating 24V DC power connected to the device, and the second one is a heartbeat indicator. The latter one should pulsate all the time, indicating proper operation of the firmware running on the unit. In case of this indicator going permanently off, try power cycling the unit. If that does not help, this can indicate malfunctioning of the unit, and you should contact Metaphase for assistance.

Next to the two indicator LEDs, there are two columns of channel indicator LEDs. These are showing if the particular channel is being enabled. And finally, at the bottom of the face plate, there are Trigger channel inputs.



Figure 1.7. Face plates of VX controllers

Zeto Controller

2 Selecting unit's address

As mentioned before, the Core can support up to 16 units connected to it. It is up to user to manually select unique address 1-16 on each unit. At the back of both CXs and VX there is a rotary switch – see Figure 2.. Please use the screwdriver and rotate the switch to a desired number. There cannot be two devices having the same address selected on one bus; there is no requirement though that numbers have to be consecutive or units need to be connected on the bus in a particular order.

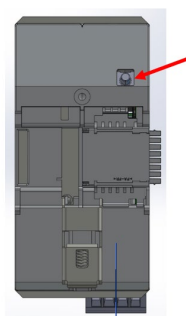


Figure 2.2. Rotary switch at the back of the unit - setting unique address number

3 Selecting correct power supply

Power ratings of each Zeto unit are provided in section 7. Some more considerations are needed though for selecting power supply based on loads connected to CX modules. It is not always required to select power supply based on max rating of CX and CX Plus -60W and 150W, respectively. If the light to be used with CX will consume for example 10W max, power supply used can be lower wattage one. Please use a rule of thumb to always have at least +15% overhead when choosing power supply. When buying light from us, you will be provided with the max power consumption value of this particular light. In any cases of any problems or doubts when calculating power budget and selecting appropriate power supply please contact Metaphase and you will be supported.

4 Mounting units on a DIN rail

DIN rail 35mm wide and 15mm deep must be used (NS 35/15)! DIN rail of 7.5mm depth is NOT compatible.

Zeto Controller

5 Programming guide

We refer you to the separate document titled: METAPHASE ZETO - Developer Integration Guide.

6 Firmware/Software upgrades

To be added in next revision of this document.

Zeto Controller

7 Specification

7.1 Core

Parameter - CORE	Value (description)
Supply Voltage	24V +/- 10%
Module	Connects up to 16 mixed modules CX-x / VX-xx
Supply Voltage	24V ±10%
Cooling	Passive
Connectivity	USB C (Emulating COM port) or Ethernet
Communication	BUS interface to communicate with CX-x / VX-xx
GUI	Touchscreen Display
ROHS Compliance	Yes

Zeto Controller

7.2 VX-4 and VX-16

Parameter - VX-xx	Value (description)
Supply Voltage	24V +/- 10%
Channels (LED out)	4 or 16 Channel
Supply Voltage	24V ±10%
Trigger Input	1 or 4 - Optically isolated inputs, Configurable
Outputs	0-10V
Max Current Sink	50mA per channel
Cooling	Passive
Communication	BUS interface to communicate with Core
ROHS Compliance	Yes

Zeto Controller

7.3 CX and CX Plus

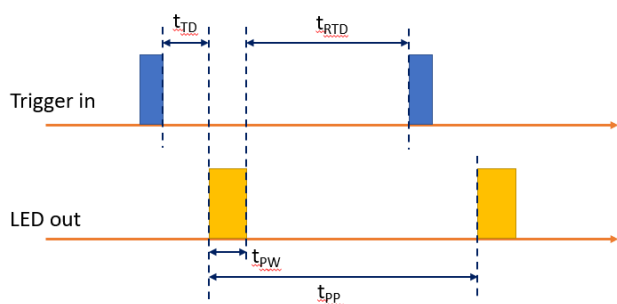
General spec

Parameter	Value (description)
Channels (LED out)	1 Channel
Supply Voltage	24V $\pm$ 10%
Trigger Input	
- Protection	Optically isolated (3.75kV), reverse and overvoltage protected up to 60V
- Voltage	2 to 30V with internal current limit and miswire protection
- Current	3mA max internally limited
- Rate	50kHz max
- Pulsewidth	1 μ s min
- Edge/Polarity	Rising or Falling Edge
Operating Modes	Strobe (Pulse), DC (CC, Constant Current)
ROHS Compliance	Yes
Expected Lifetime	75,000 hours
Mounting	Vertical, DIN Rail
Operating Ambient Temp	40C
Operating Humidity	0% to 90% RH non-condensing

Zeto Controller

Strobe Mode Output

Parameter	Value (description)
Voltage	0.5 to 55V (can effectively achieve V_f LED up to 24V)
Current	10mA to 40A
Pulse width	1 μ s to 60ms
Frequency	0 to 50kHz (infinite to 20 μ s period).
Trigger modes	Internal or External
Trigger Delay (delay between trigger event and start of output pulse)	6 μ s (typical) to 60ms
Combined Current, Pulsewidth, and Period Limitations	Strobe limits: $pw \leq 0.03 / i$ $T \geq 75 * pw * i * (pw * (i - 10) + 0.0048)$ (max FET power) $T \geq pw + 15\mu s$ (re-trigger delay or min off time) $T \geq 20\mu s$ (max trigger frequency) $P_{out} \leq 30W$ where: pw = pulsewidth in seconds; i = pulse current in Amps; T = pulse (or trigger) period in seconds; f = pulse (or trigger) frequency in Hz



t_{TD} – Trigger delay $\geq 6\mu s$

t_{RTD} – Re-trigger delay $> 15\mu s$

t_{PW} – Pulse width 1ms – 60ms

t_{PP} – Pulse period (Frequency) $\geq 20ms$ ($\leq 50kHz$)*

*20ms is possible with internal trigger, with external trigger the minimum Period = 1ms + 15ms + 6ms = 22ms

Zeto Controller

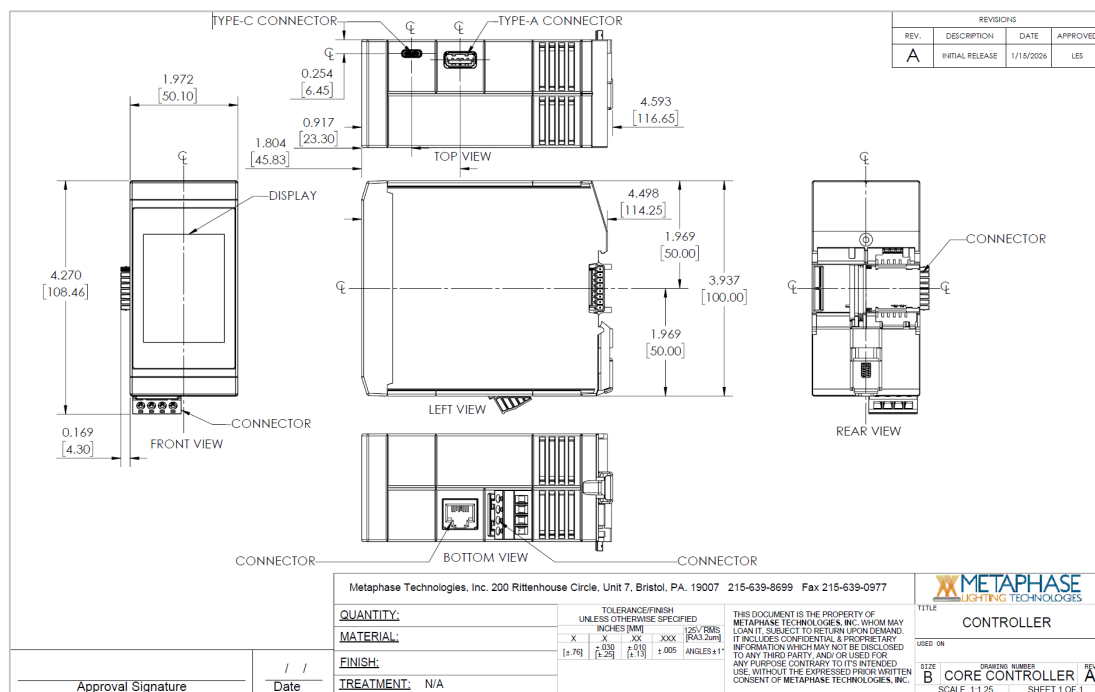
DC Current Mode Output

Parameter	Value (description)
Current	10mA to 4A (CX) or 10A (CX Plus)
Voltage	0.5V to 55V
Continuous Power	60W (CX) or 150 W (CX Plus)

Zeto Controller

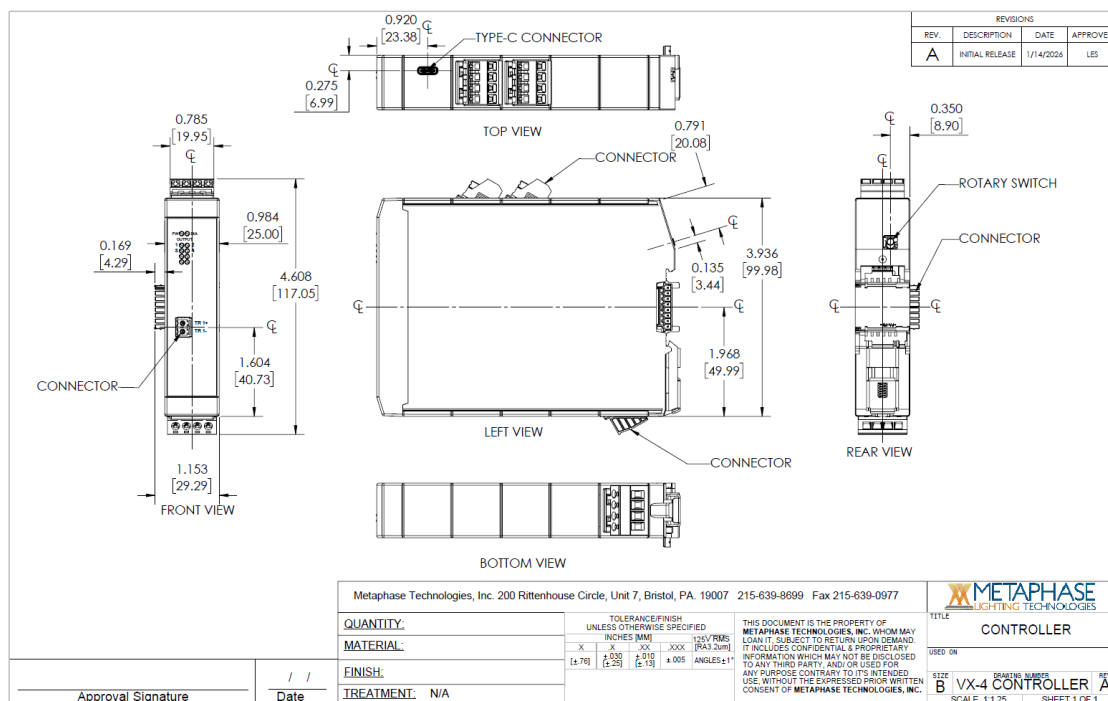
8 Mechanical drawings

8.1 Core



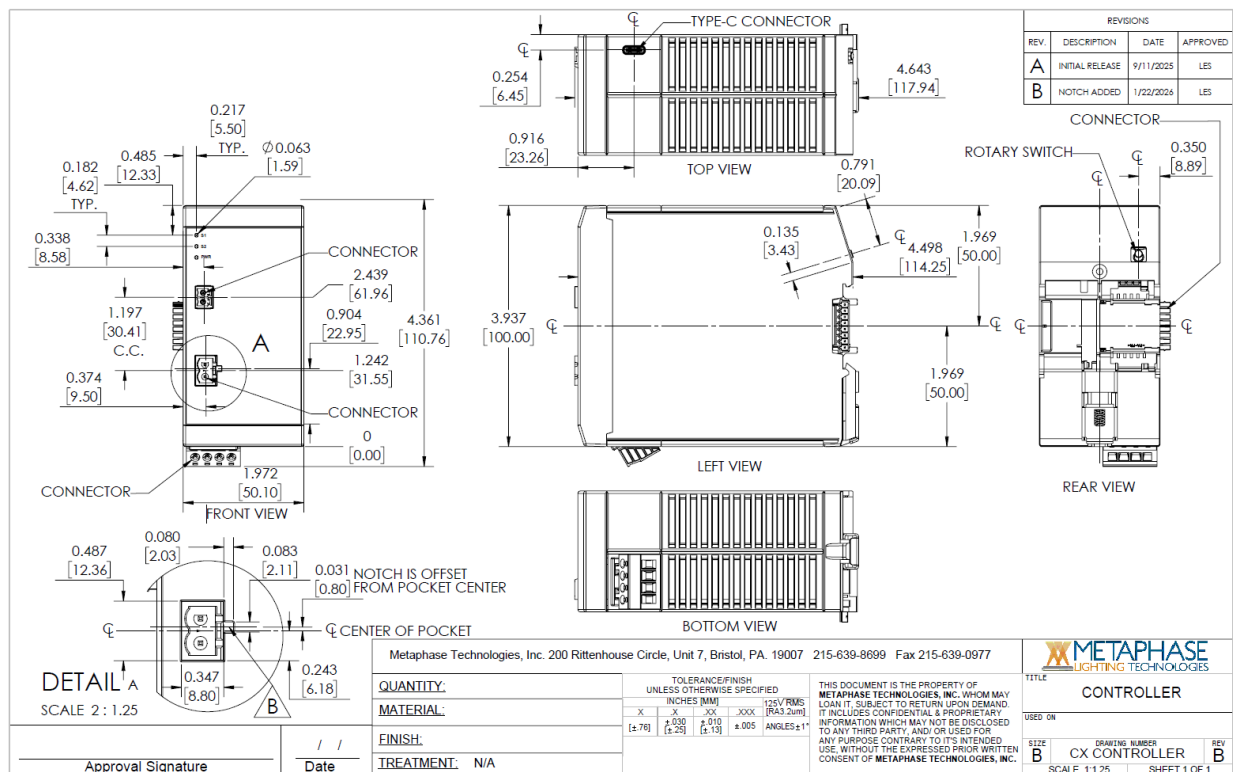
Zeto Controller

8.2 VX-4



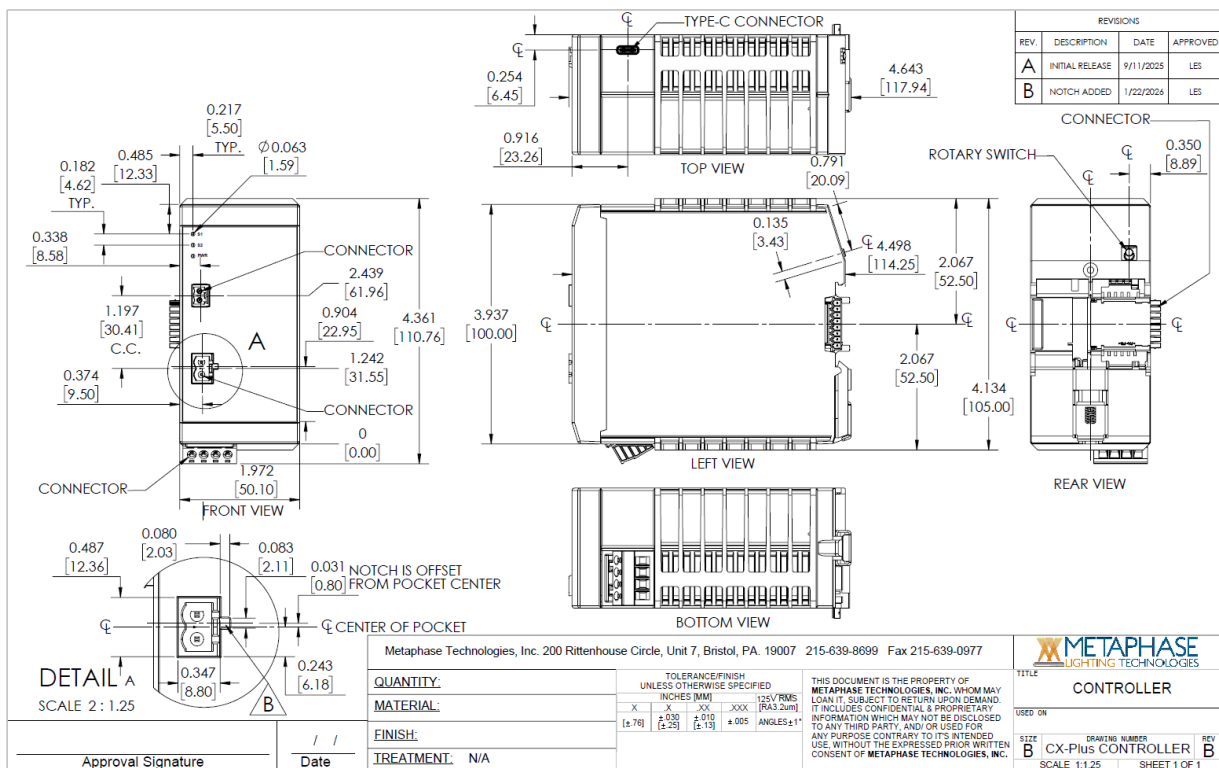
Zeto Controller

8.4 CX



Zeto Controller

8.5 CX Plus





For over three decades, Metaphase Technologies has been striving

“To bring innovation and inspiration to the global automated vision inspection industry, that improves the health, safety and security of our communities.”

We're proud of our demonstrated expertise in engineering
flexible lighting solutions
that have facilitated integration
into thousands of vision systems designs.

Throughout the world, Metaphase clients enjoy the enhanced automation and image capture benefits of our patent-pending breakthroughs in uniform diffuse high brightness and ultra-brightness LED illumination.

First to implement built-in constant current drivers across multiple product lines, Metaphase continues to synergize cutting-edge LED lighting & control technologies that streamline innovation and increase return on investment.

Made in the USA for over 30 years, our versatile designs are continuously updated to incorporate the latest advances in LEDs, thermal management, optics, and electronic technologies to meet the challenging needs of today's global automation and scientific marketplace.

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200 Rittenhouse Circle, West Unit 7, Bristol, PA 19007 USA

+1-215-639-8699 www.metaphase-tech.com

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