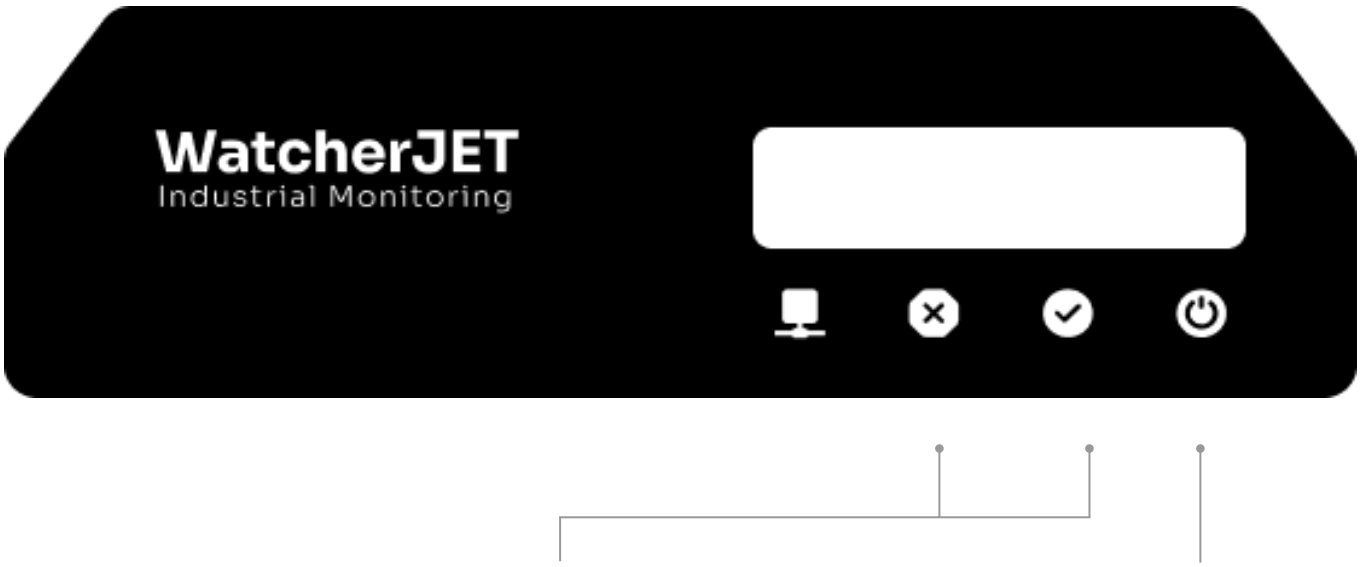
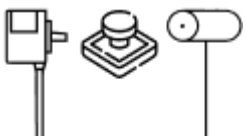
STEP-BY-STEP USER GUIDE

CHAPTER 1: Hardware & WatcherJET 3.0



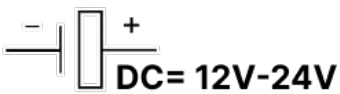


Step 1:

Connect the sensors

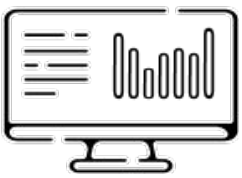
Step 2:

Connect the power supply



Step 3:

Provide an access point (AP)



Step 4:

Go to console.monitait.com/factory/watchers to add your watcher and get real-time feedback

Setup: Collecting data

Setup: Taking action

Controls and Signals

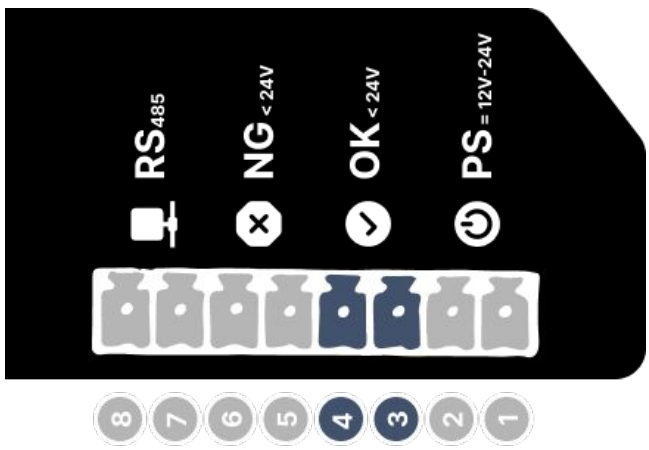
QC Machines

External machine signal

- **Production Count**

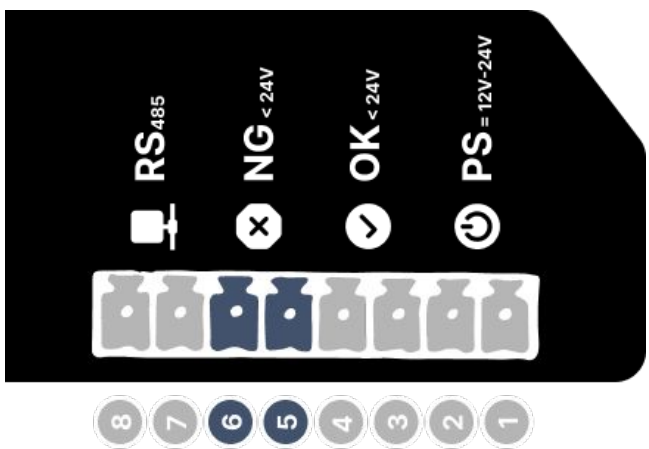
  Any 12-24 signal from the machine can be used as a one piece counter. Connect 2 wires from your machine to the OK inputs (3 and 4) to start counting automatically with WatcherJET.

  *Bidirectional signal and isolated by internal optocoupler



- **Counting Defects**

  Connect the ejector signal or the machine output to the NG inputs (5 and 6).



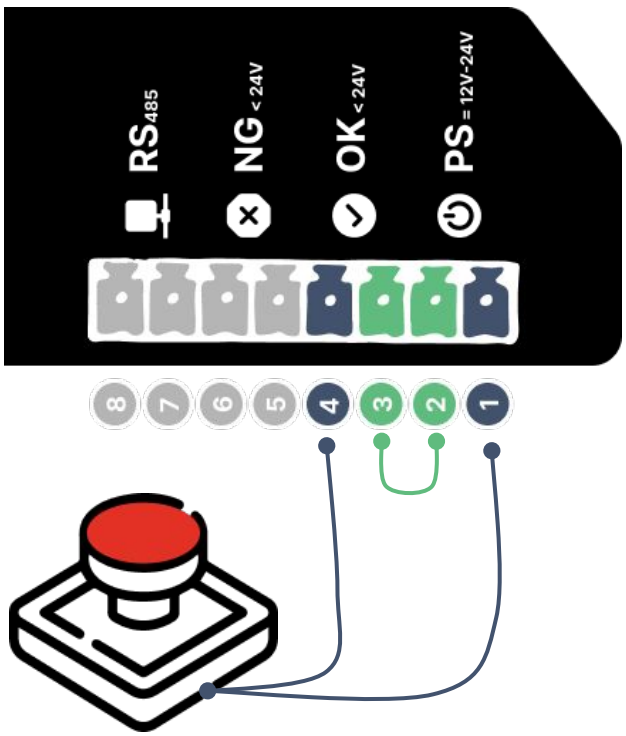
Step 1: Connect the sensors

Push button

- **Production Count**

  Take one wire from the push button and connect it to the **OK input (4).** Connect the other wire from the same button to the **negative power input (1).**

  Now, take a wire and connect the **other OK input (3) to the positive power input (2).**

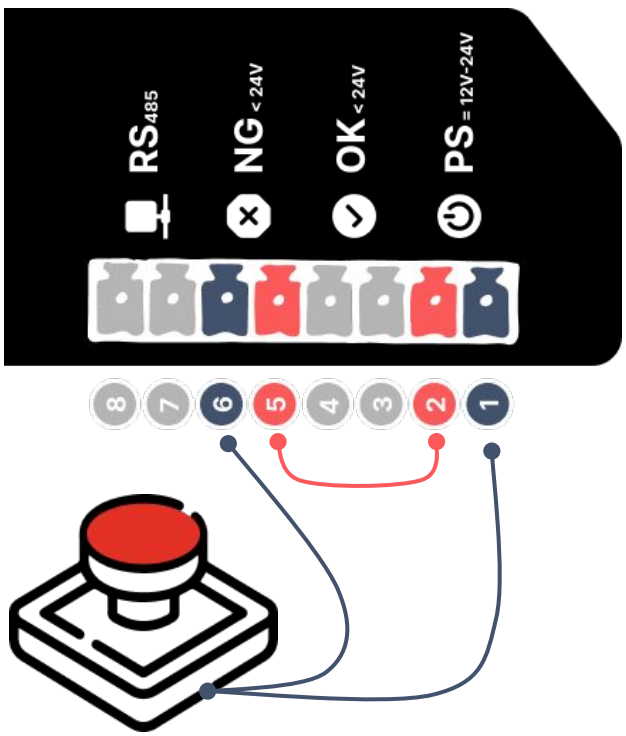


- **Counting Defects**

  To count defects with a push button repeat the same steps with another push button and the NG inputs.

  Take one wire from the push button and connect it to the **NG input (6).** Connect the other wire from the same button to the **negative power input (1).**

  Now, take a wire and connect the **other NG input (5) to the positive power input (2).**

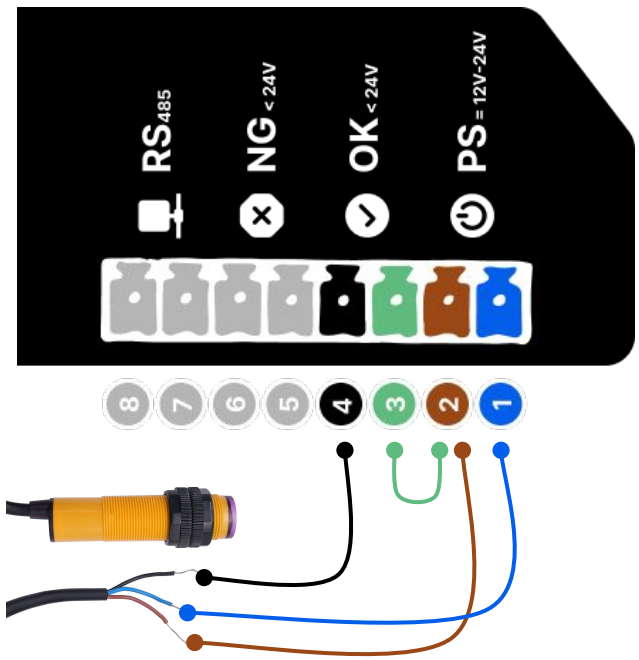


Obstacle sensor

- **Production Count**

  Take the sensor **black wire** and connect it to the **OK input (4).** Then connect the **brown wire** to the **positive power input (2)** and the **blue wire** to the **negative power input (1).**

  Now, take a wire and connect the **other OK input (3) to the positive power input (2).**

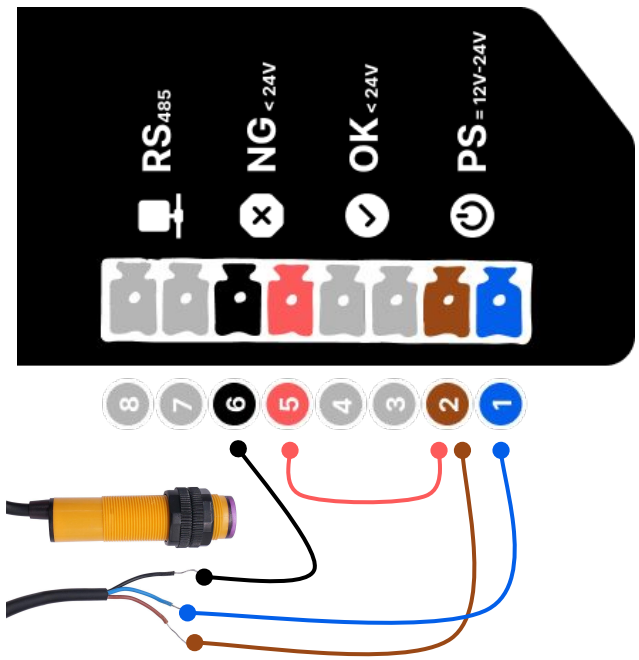


- **Counting Defects**

  To count defects with a obstacle sensor repeat the same steps with another sensor and the NG inputs.

  Take the sensor **black wire** and connect it to the **NG input (6).** Then connect the **brown wire** to the **positive power input (2)** and the **blue wire** to the **negative power input (1).**

  Now, take a wire and connect the **other NG input (5) to the positive power input (2).**

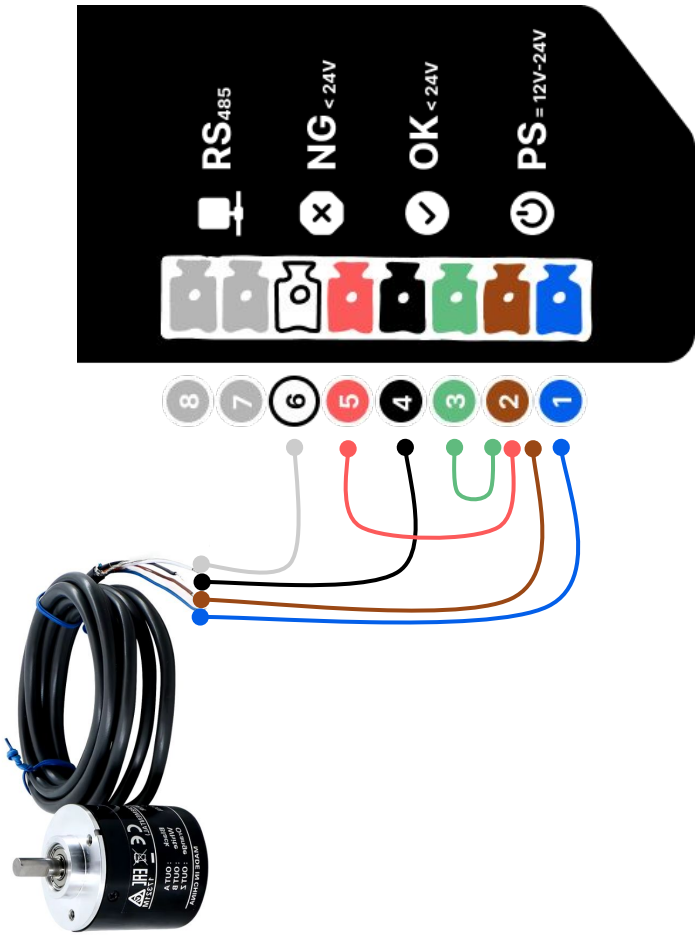


Step 1: Connect the sensors

Encoder

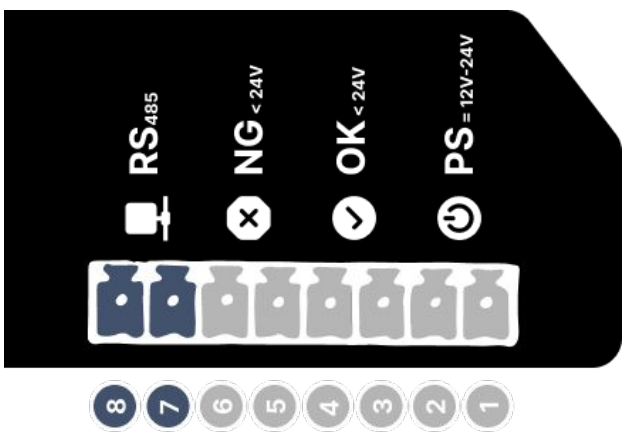
Take the encoder **white** wire and connect it to one of the **NG inputs (6).** Then take the **black wire** and connect it to the **OK input (4).** Now, connect the **brown wire** to the **positive power input (2)** and the **blue wire** to the **negative power input (1).**

Finally take two wires and connect the **other OK input (3) and the other NG input (5) to the positive power input (2).**



RS485 protocol

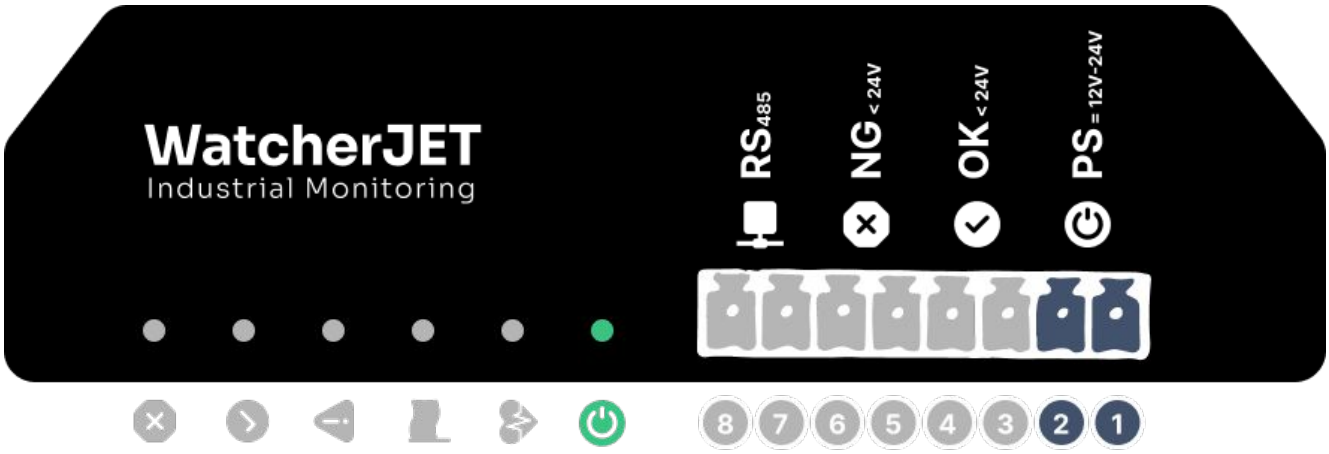
If you want to connect more than one sensor to your device and collect other types of data you need to use RS485 protocol. Take the A lead from your RS485 BUS and connect it to the RS485-A inputs (8) then take the B lead of the RS485 BUS and connect it to the RS485-B inputs (7).



Step 2: Connect the power supply

Plug the device into power

Connect the power supply unit to the power inputs (1,2) then plug into power and check if the green light for the power turns on.



Power supply specifications

Power Supply Unit (Recommended)	
Input Voltage	12-24v DC
Output Voltage	12-24v DC
Input Current	100mA
Maximum output current	2A
Frequency	50Hz
Operating Temperature	-10 to 50 °C

Temporary setup using mobile hotspot

*Use this to test your watchers

1. Turn on the hotspot
2. Change hotspot name & password
   *Name: **Monitait**
   *Password: **p@ssword**
   The watchers will connect to the hotspot automatically (this might take a few seconds)
3. Go to connected devices on your phone to find watcher register ID

Permanent setup using router

You can use any type of router you have for this step but if you are considering acquiring new ones there are three models that have been tested and completely compatible with WatcherJET system:

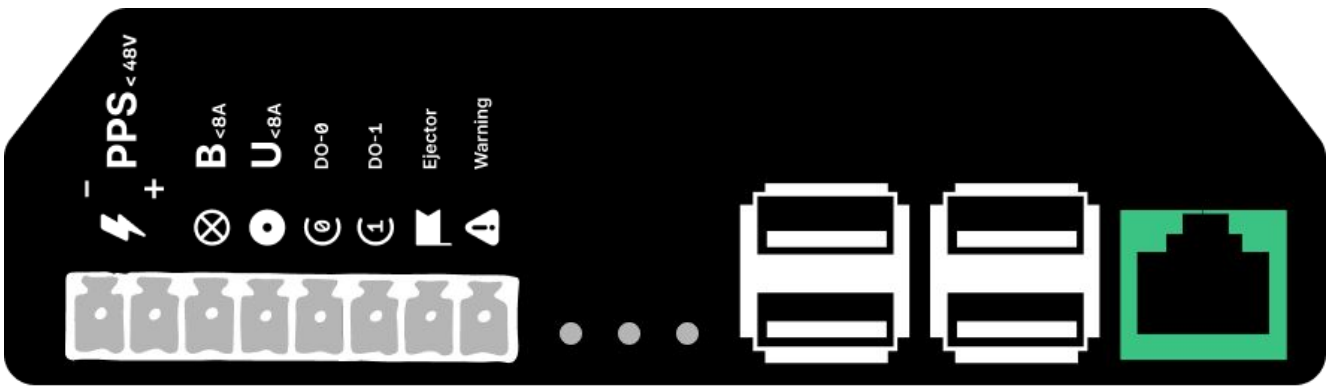
Tenda N301 - setup
D-Link DIR-612 - setup
UniFi AP-AC-LR - setup

LAN network connection (Best practice)

Use Ethernet cables to connect your device to the router or switch. Ensure the cables are securely plugged in.

We strongly recommend that you use this option to have a longer uptime and a more reliable connection.

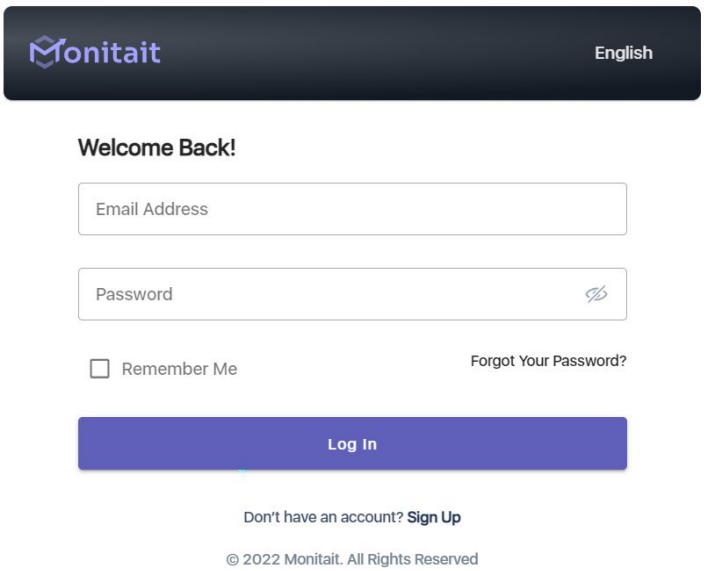
If you are using a firewall add a rule and give access to this address:
***.monitait.com**

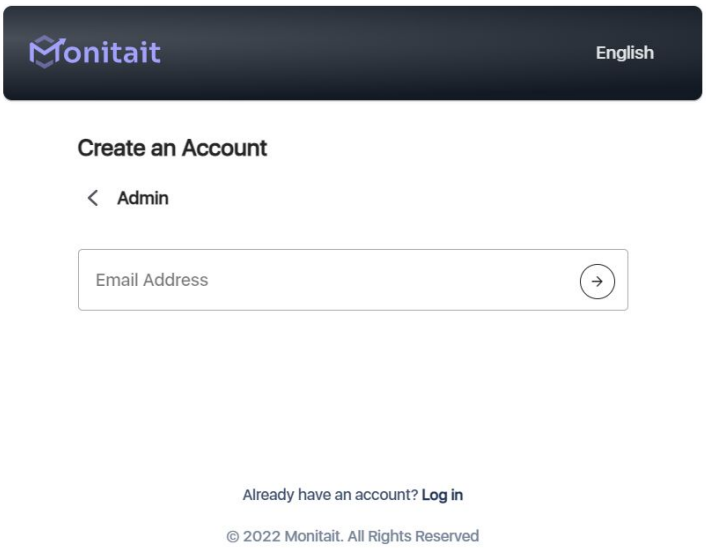


LAN Port

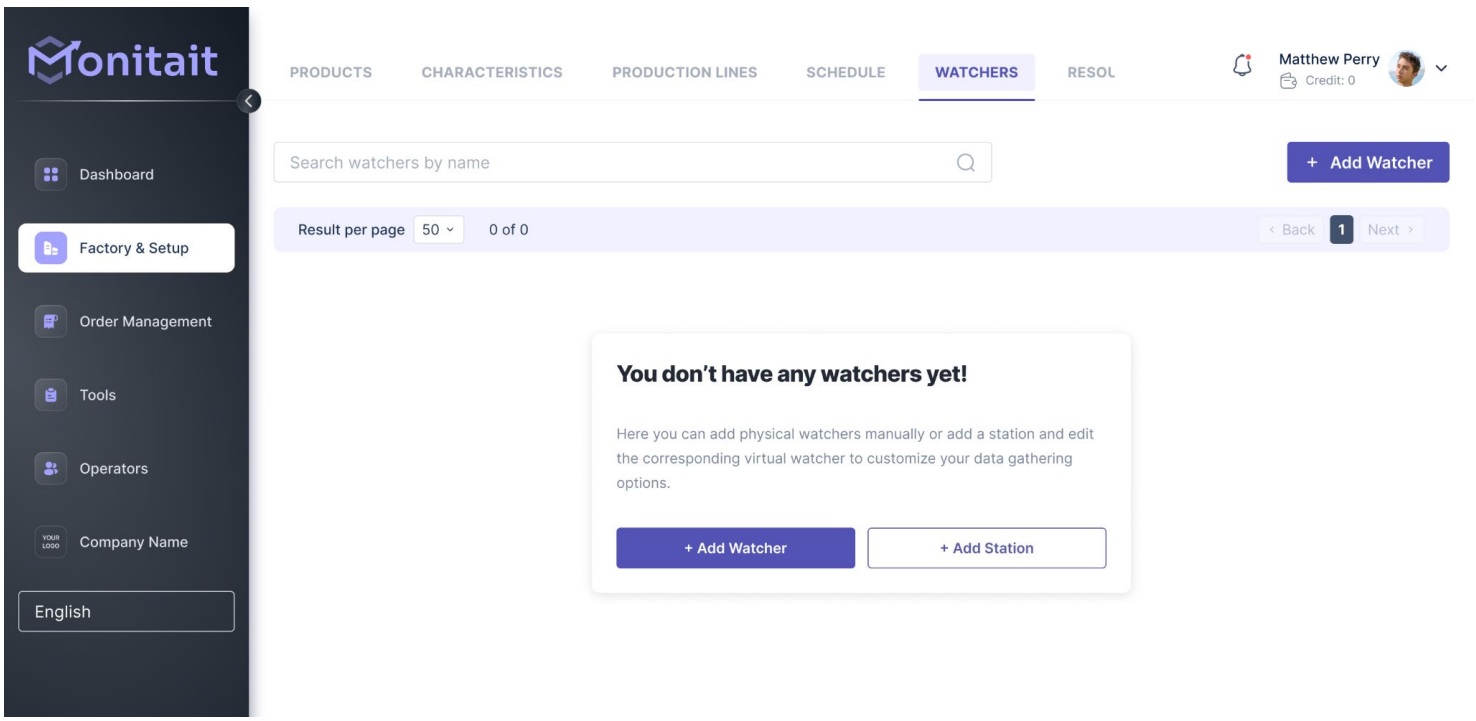
Step 4: Go to console.monitait.com

1. Sign up or log into your monitait account from console.monitait.com



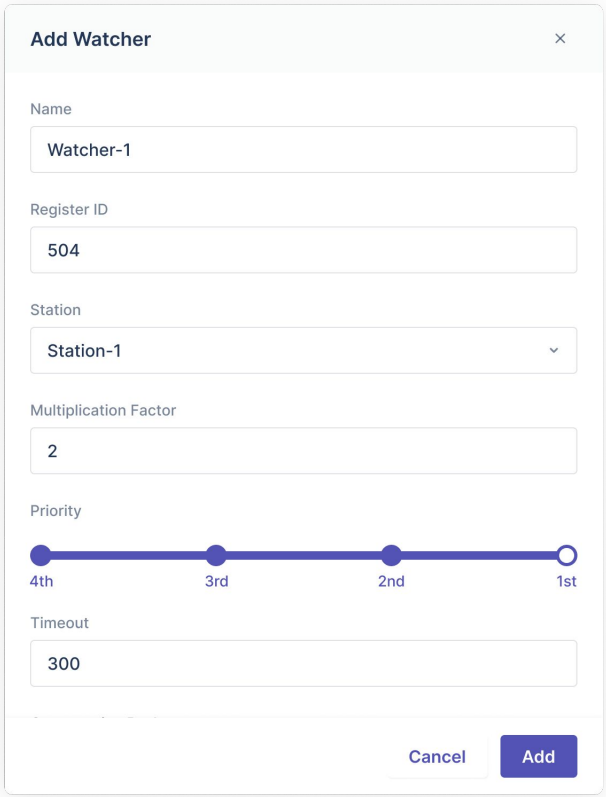


2. Go to the **watchers tab** from the factory & setup section On the Monitait panel and click on the +Add Watcher button



Step 4: Go to console.monitait.com

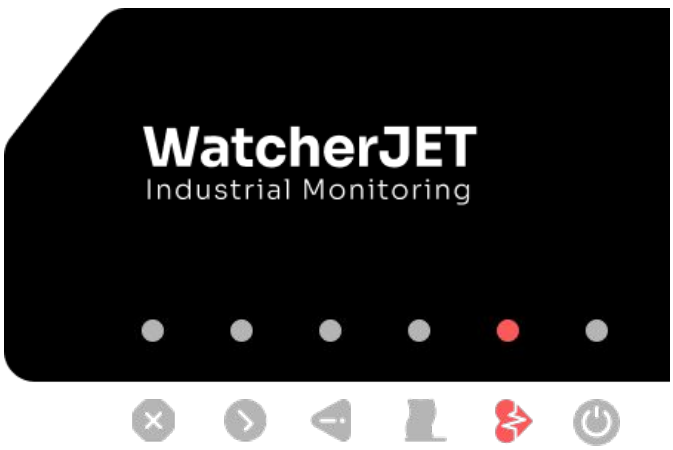
3. On the add watcher modal pick a name for your watcher then enter the watcher's **registration ID** on your device and select the station where this watcher is going to be installed.



Advanced settings:

- **Multiplication Factor:** Sets the quantity for each received signal
- **Priority:** Specifies which data to prioritize when receiving data from multiple watchers.
- **Timeout:** Defines the minimum duration that will be considered downtime when the watcher isn't sending signals.

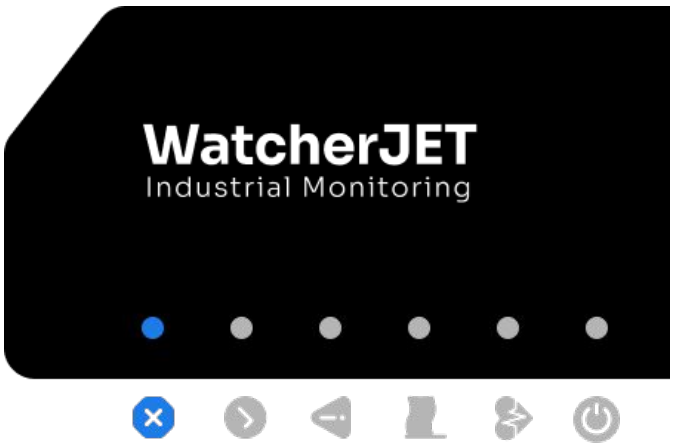
4. To confirm connectivity and healthy data capturing, initiate counting with the sensors and check if the red LED with the heart icon (💓) blinks.



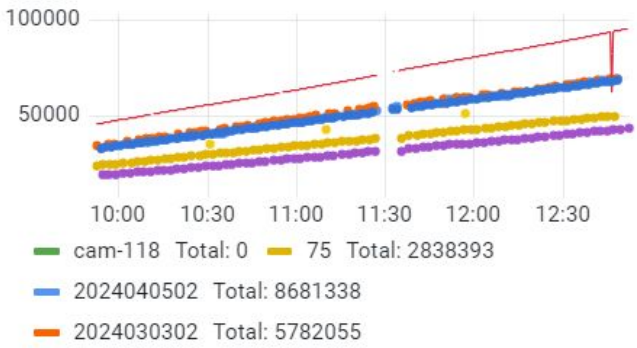
Step 4: Go to console.monitait.com

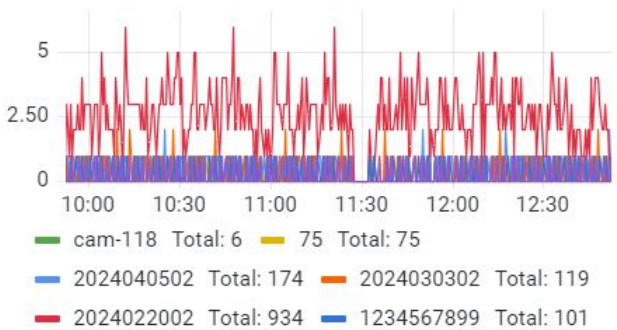
If only one sensor is connected for counting (inputs 3 and 4), the LED with the checkmark icon (✓) will light up during the counting of acceptable products.

If a sensor is connected for counting defects (inputs 5 and 6), the LED with the rejection icon (✗) will turn on during the counting of defective products.



5. Go to your Monitait **dashboard** to view your production data

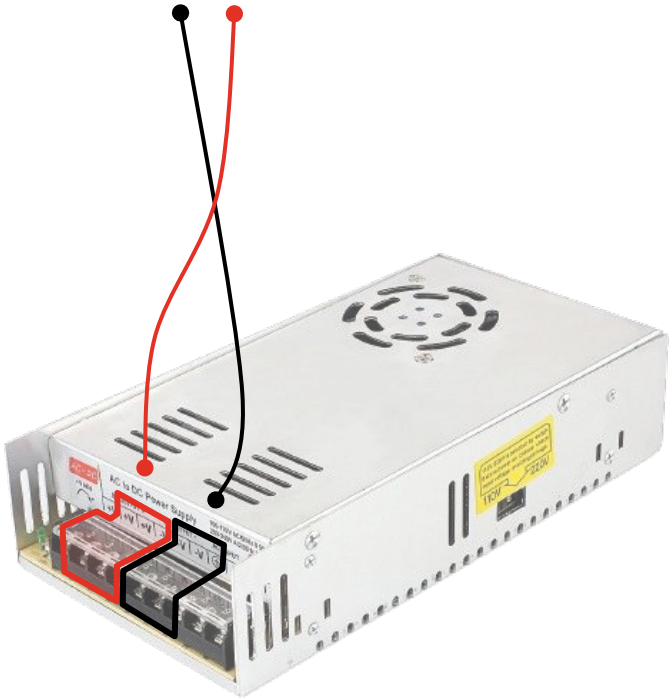




Step 1: Connect the high current power supply

⚠ Caution!

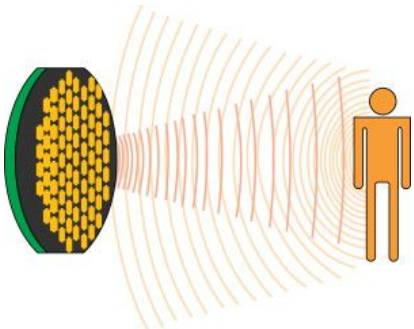
Before using a high-current power supply, make sure you fully understand how it works and follow all the safety instructions in its manual and **ENSURE THAT YOUR POWER SUPPLY IS NOT EXCEEDING 48V.**



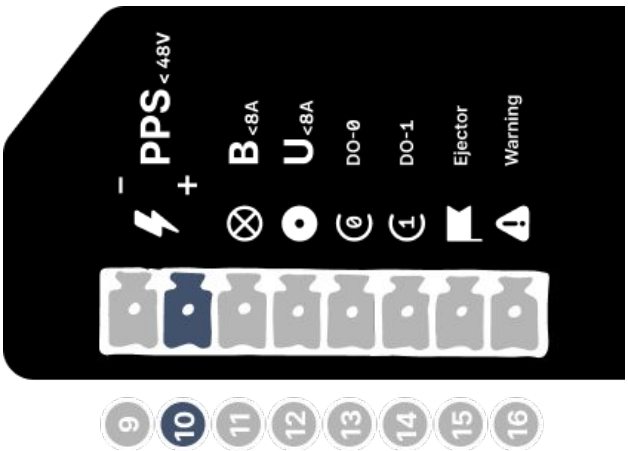
- Take a wire and connect one of the negative power supply outputs to the negative PPS input on the watcher (10).
- Take another wire and connect one of the positive power supply outputs to the positive PPS input on the watcher (9).
- After connecting the wires, confirm proper wiring by checking that the green light with thunder icon (⚡) is on.

Connecting the emitters

Any device or component that generates and releases a specific type of signal, such as light, sound, or electromagnetic waves, projecting it in an unidirectional flow, can be considered an emitter.



Take the positive contact from the emitter and connect it to the positive PPS input on the watcher (10).



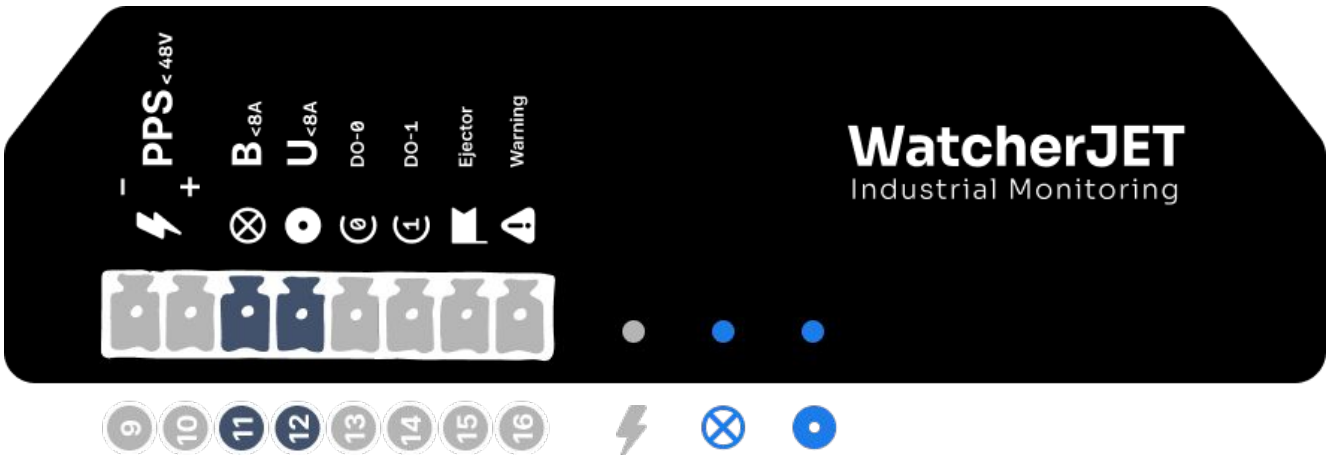
Hint!

For optimal protection of the WatcherJET system from potential high-current damage, it is strongly recommended that you connect the positive terminal of the emitters directly to the positive output of the power supply.

Step 2: Set up the emitters

The rest of this process depends on the emitter intended placement:

- **Adverse Emitters:** If the emitters are placed far from the detector and their signal comes from the other side they are considered to be ‘adverse’. In this case take the **negative contact from the emitter** and connect it to the **B output (11)** on the watcher.
- **Aligned Emitters:** If the emitters are positioned side by side and in close proximity to the detector, they are considered to be ‘aligned’. In this case take the **negative contact from the emitter** and connect it to the **U output (12)** on the watcher.



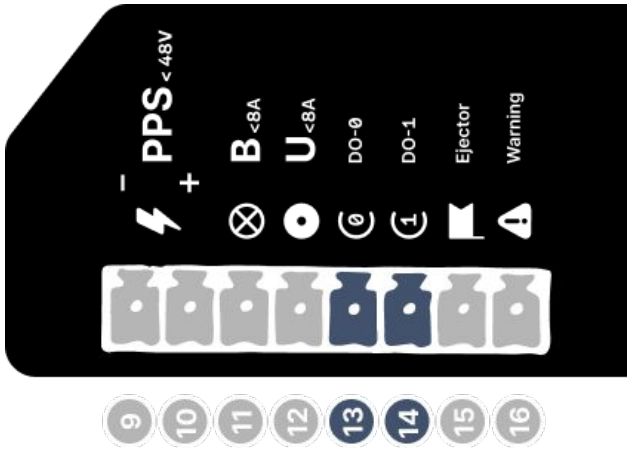
- Check the blue LED associated with each emitter to determine whether the emitter is active.

Hint!

You can use a SSR relay if the emitter demands more than 8A.

Digital Outputs

DO-0 and DO-1 (13 and 14) are digital outputs and they need advanced settings.
Contact our technical team to learn more about these outputs.



Ejector

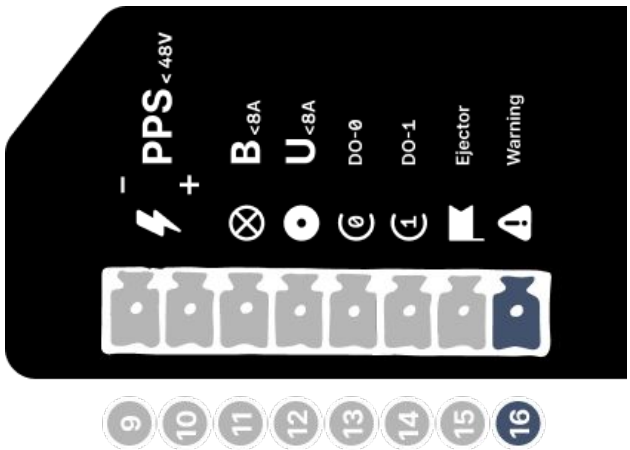
To take action based on the collected data you can connect the ejector output (15) to your PLC digital input.

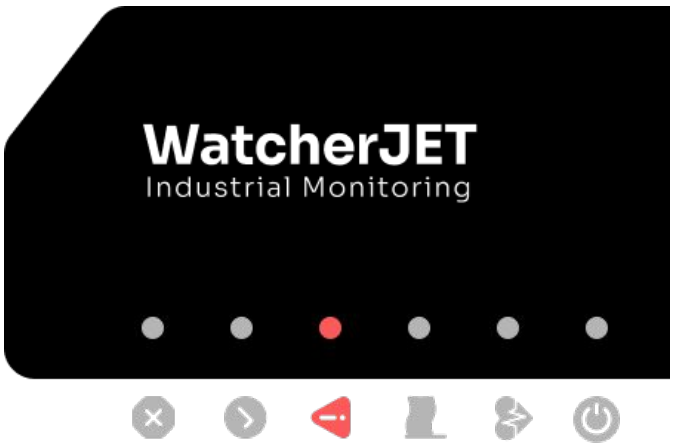
The LED indicator for the ejector is located on the other side and will blink whenever an item is ejected.

Warning

You can also connect warning output (16) to your PLC digital input to get notified about the mechanical risks.

The LED indicator for warnings, located on the other side, will activate whenever there is a mechanical risk.





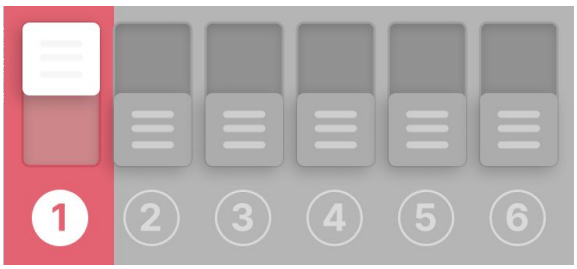
*For your safety, please reach out to us to consult with our experts regarding the warning.

Caution!

These outputs are just OPTO isolated NPN outputs. PLEASE DO NOT USE THESE FOR ANY HIGH CURRENT LOAD.

Key-1: Buzzer

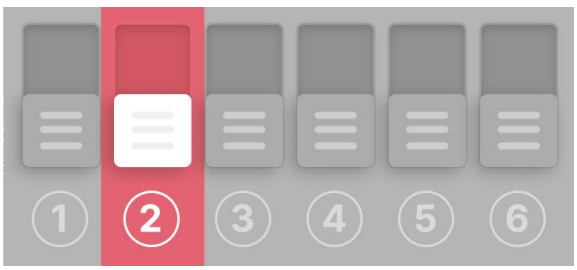
This button controls the buzzer, which is enabled by default. You can turn it off by switching down the button if the sound is not needed.



Key-2: Battery

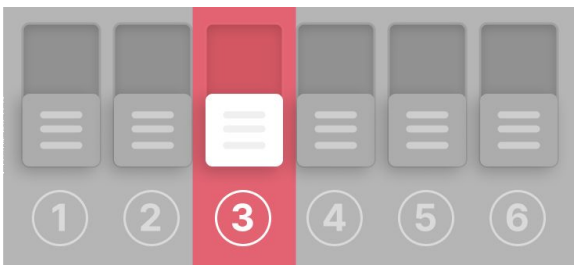
If you need to use batteries, you must provide two 18650 batteries and turn on this key.

*Please note that this involves opening the device, which is done at your own responsibility.



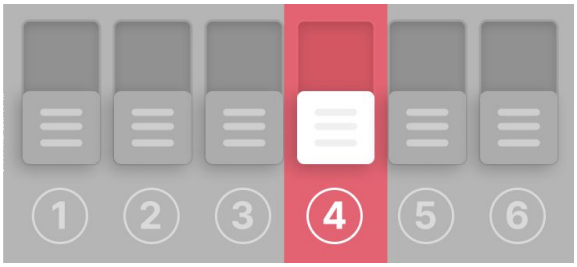
Key-3: Camera

After connecting the camera to your device, you must turn on this switch to begin data collection via the camera. Until the switch is activated, WatcherJET will disregard the connected camera.



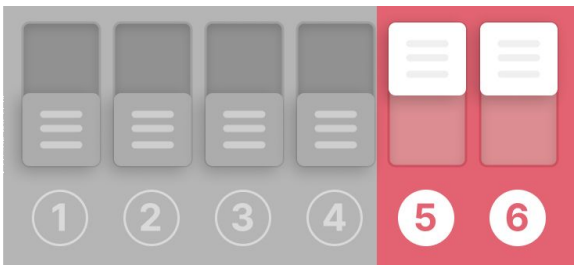
Key-4: Scanner

If you are using the scanner for module training or other functions, please activate Key 4 to allow WatcherJET to identify the scanner.



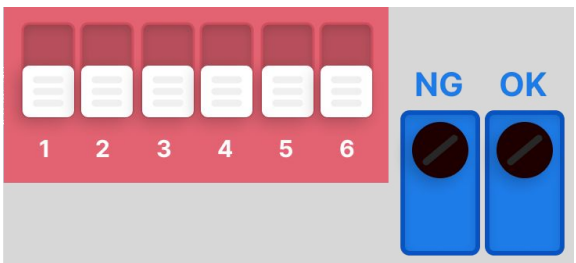
Key-5: TX and Key-6: RX

Keys 5 and 6 establish the RS232 connection between the Arduino and the Raspberry Pi. If you intend to use the external connectors, you must turn off these two keys. For example, when you want to use FabriQC/PartQC.



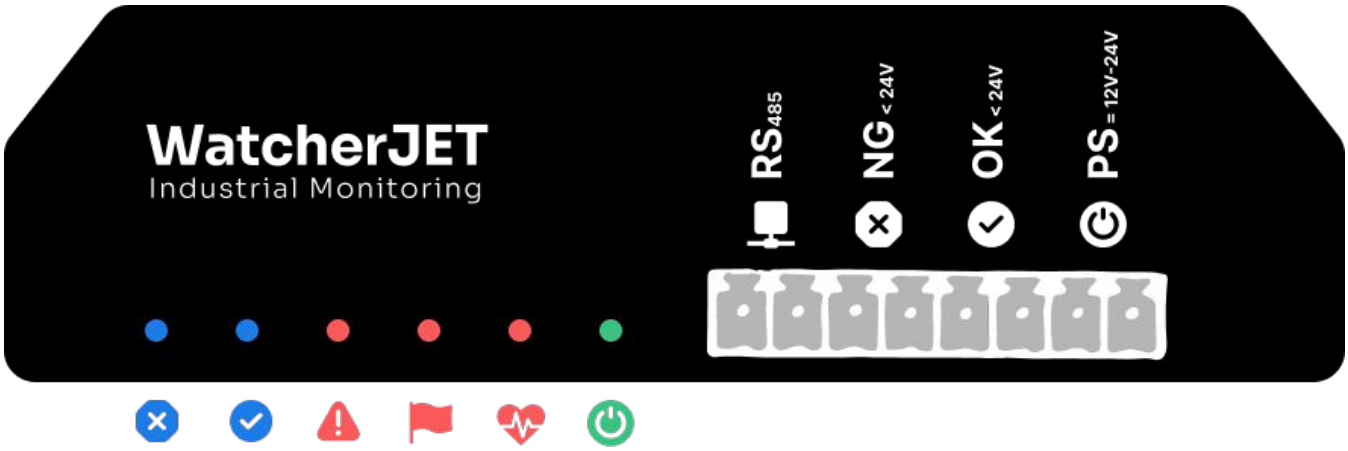
Adjustment screws

The function of the two screws next to the keys is to adjust the counting frequency. The default frequency for counting ranges from zero to 1700 Hz, which should be sufficient for most applications. However, there may be production lines with higher speeds that experience signal loss. In such cases, they can turn the screws clockwise to increase the frequency until no signals are lost.



The Indicators

There are indicators on both side of the device. Understanding these indicators will help you monitor the device's performance, troubleshoot issues, and ensure proper operation.



Once the power supply unit is connected to the power inputs (1, 2) and plugged into a power source, check if the green power light turns on, confirming the device is powered.

To verify connectivity and data capture, initiate counting with the sensors. The red LED with a heart icon will blink, confirming healthy data collection.

To enabling the ejector output, corresponding LED indicator will blink, signaling the ejection of an item. (Buzzer sound)

The LED with danger icon will light up when a mechanical risk is detected.

The LED with the checkmark icon will illuminate during imposing a signal to the OK input

The LED with the rejection icon will illuminate during imposing a signal to the NG input

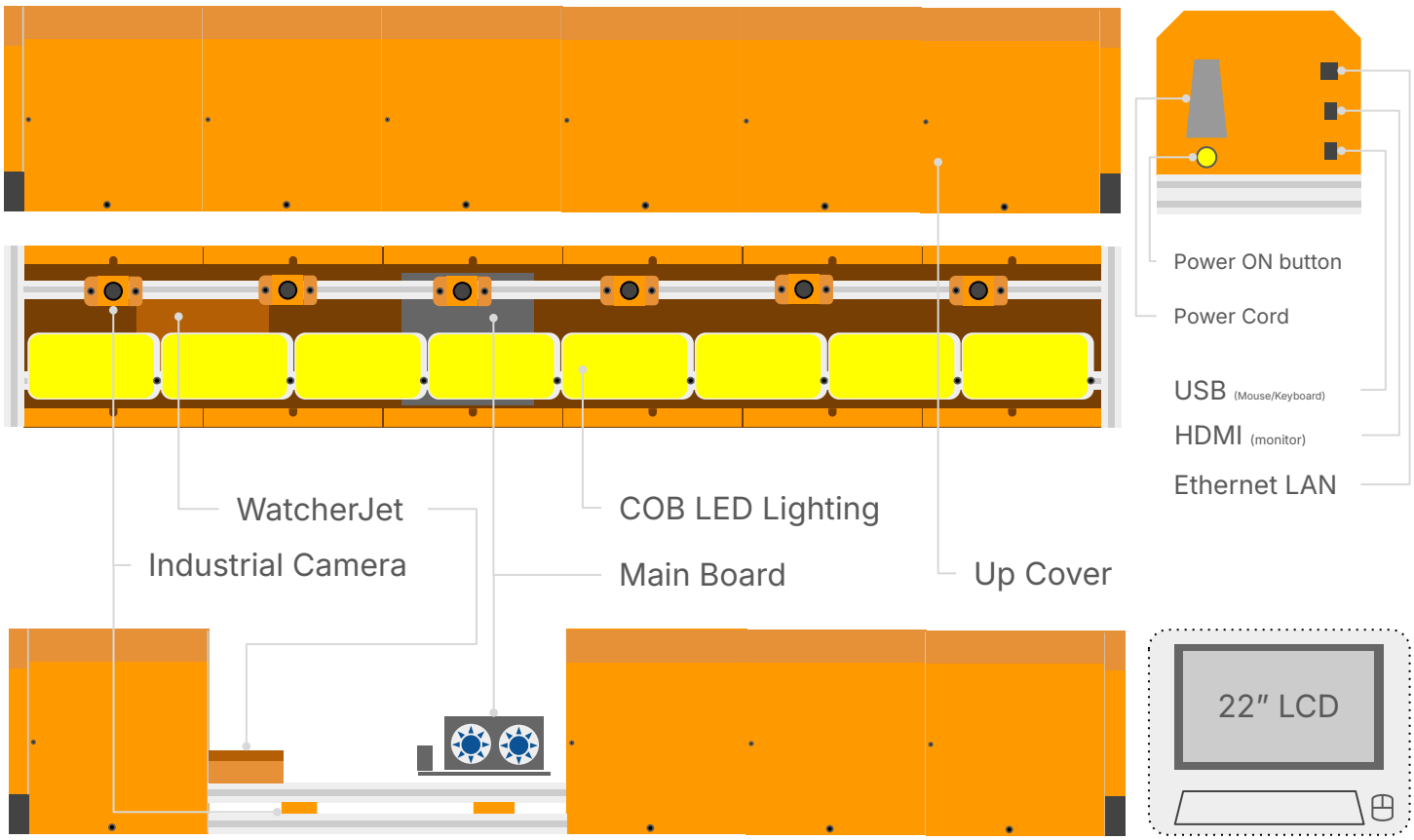
The Indicators

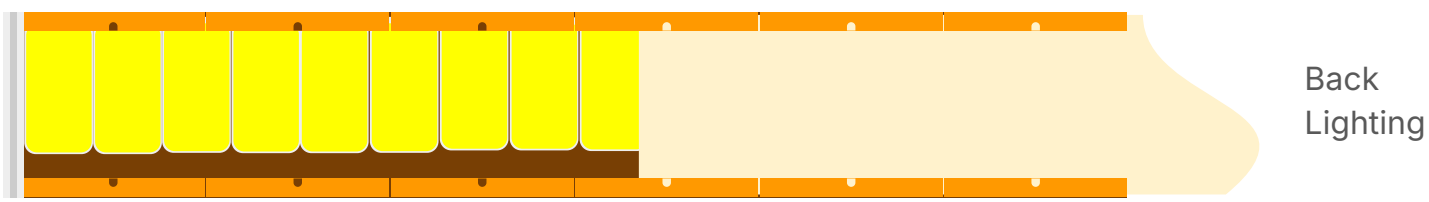
The thunder icon confirms proper wiring and connection for the PPS. (Power PS)

This Blue LED lights up to verify proper enabling of the adverse emitter (B).

This Blue LED lights up to verify proper enabling of the align emitter (U).

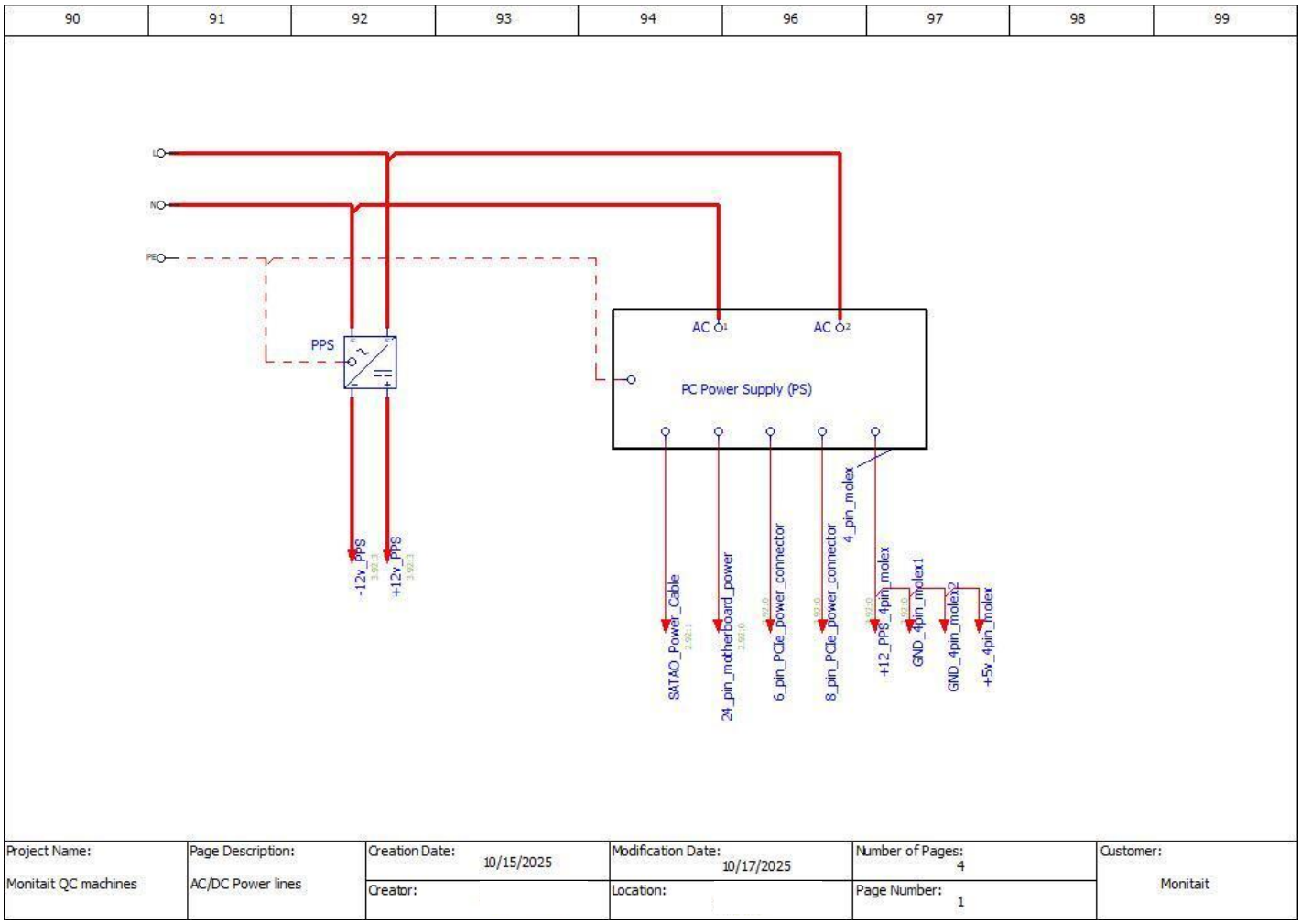
The Platform (FabriQC/PartQC/MonitaQC)





- Number of Cameras or Units may vary based on the application
- Be sure that you've set the power switch to 110v in case
- You can use any Monitor/LCD with HDMI input, and Install the LCD somewhere visible and easy to use, use Wireless Mouse and Keyboard
- Some applications have the Backlight structure

Wiring Schematics

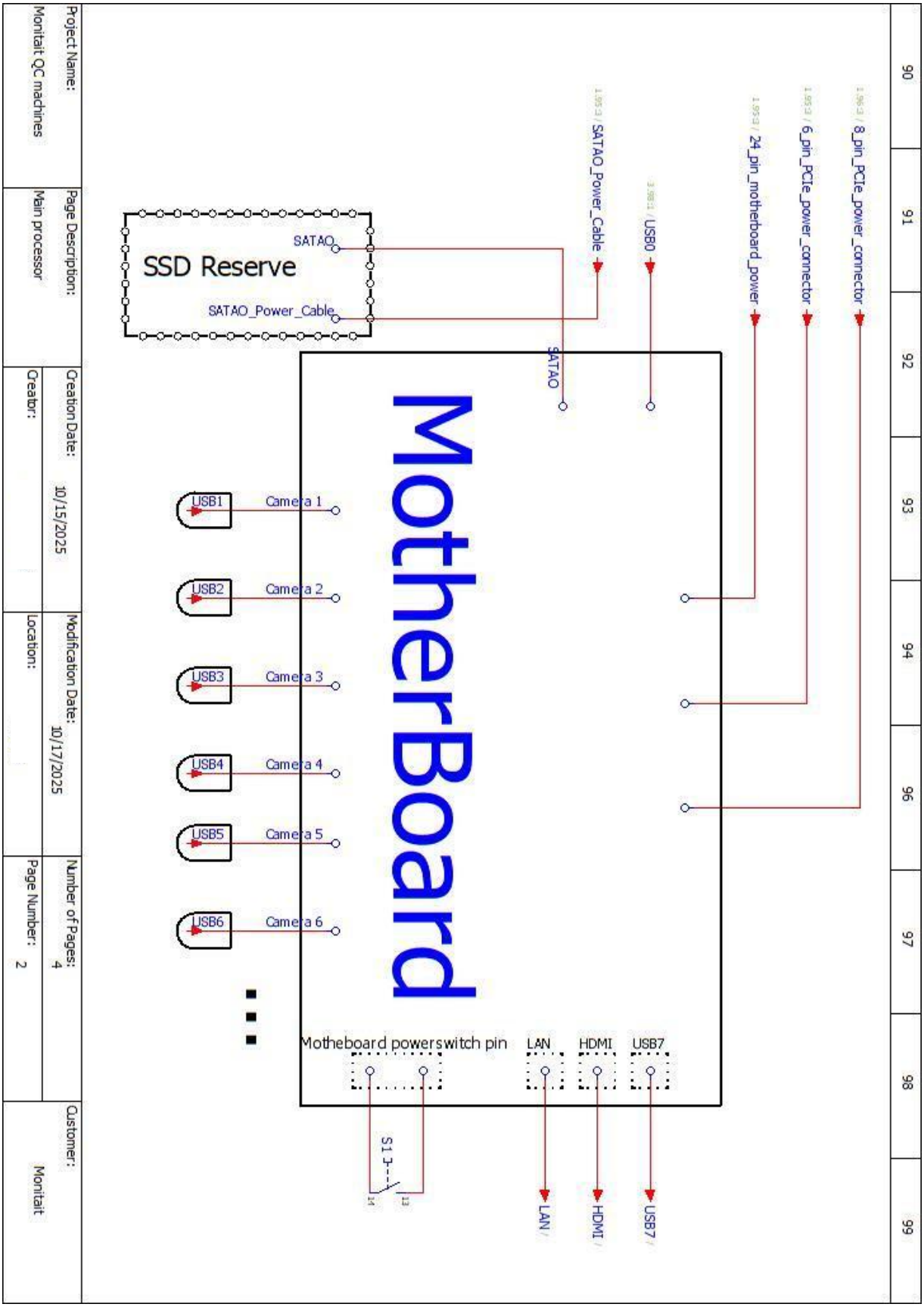


QC machine requires a 1×220V AC or a 1×110V AC supply. Estimated power budget:

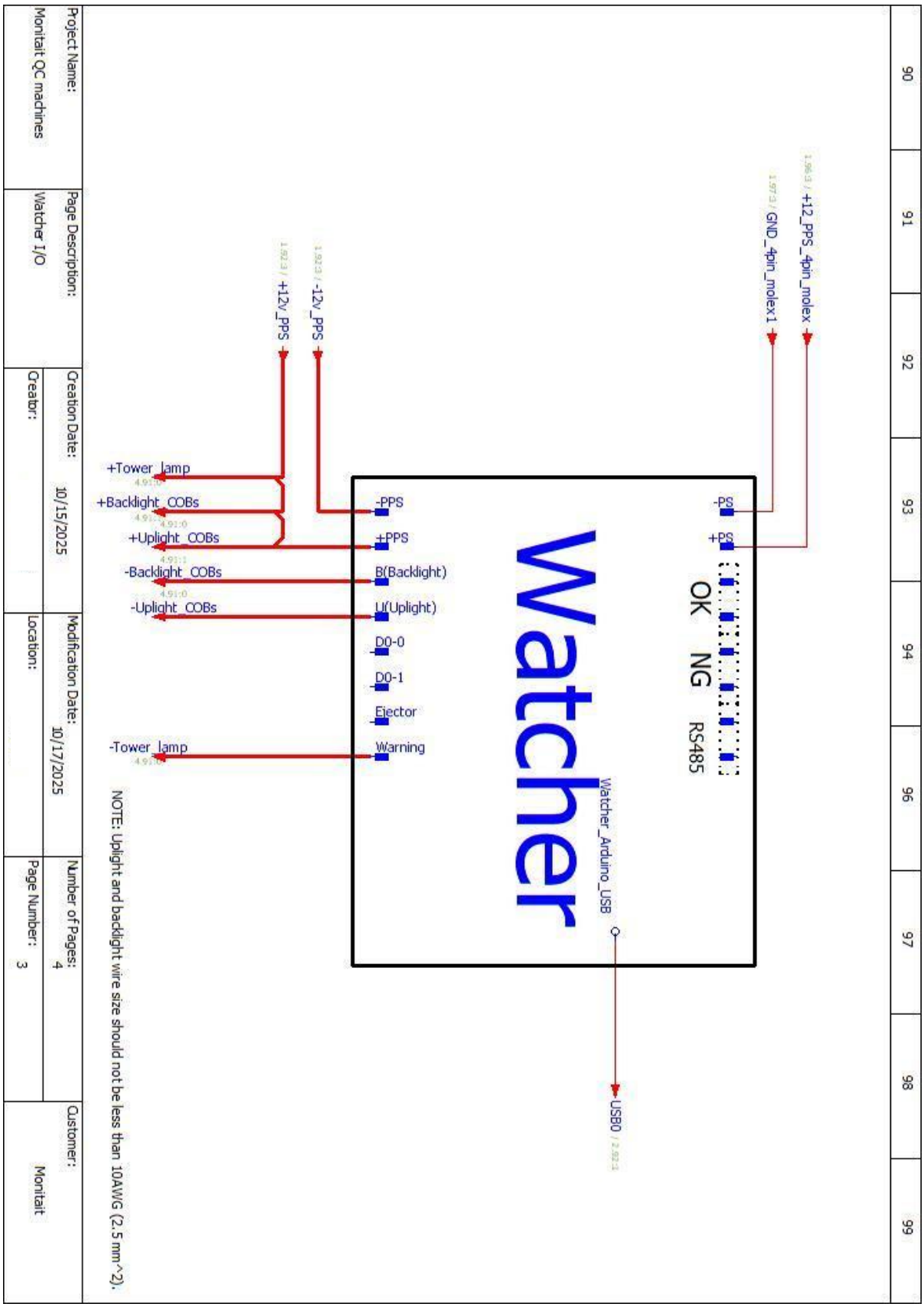
1. Computer / processing / sensors: ~600 W (for mainboard, cameras, communications with Watcher, SSD reserve, etc.)
2. PPS switching supply: ~360 W (i.e.: 12 V 30 A) — for lighting LEDs, peripheral sensors such as rotary encoder, obstacle sensors, and ejector pneumatic valves.

- Do not directly interconnect the DC outputs of the two power supplies. Keep wiring for each supply separate and clearly labelled.
- Industrial environments have high electromagnetic noise, harmonics, inrush currents, over- and under-voltage events. Use at least a **2 kVA stabilizer/line conditioner** or an equivalent industrial voltage regulator to protect the equipment.
- Consider a circuit breaker before connecting the line 10A (220V AC) / 16A (110V AC)
- Ensure protective earth (PE / chassis earth) is connected correctly per local electrical code. Final decisions about grounding topology and bonding must be made by a qualified electrician.

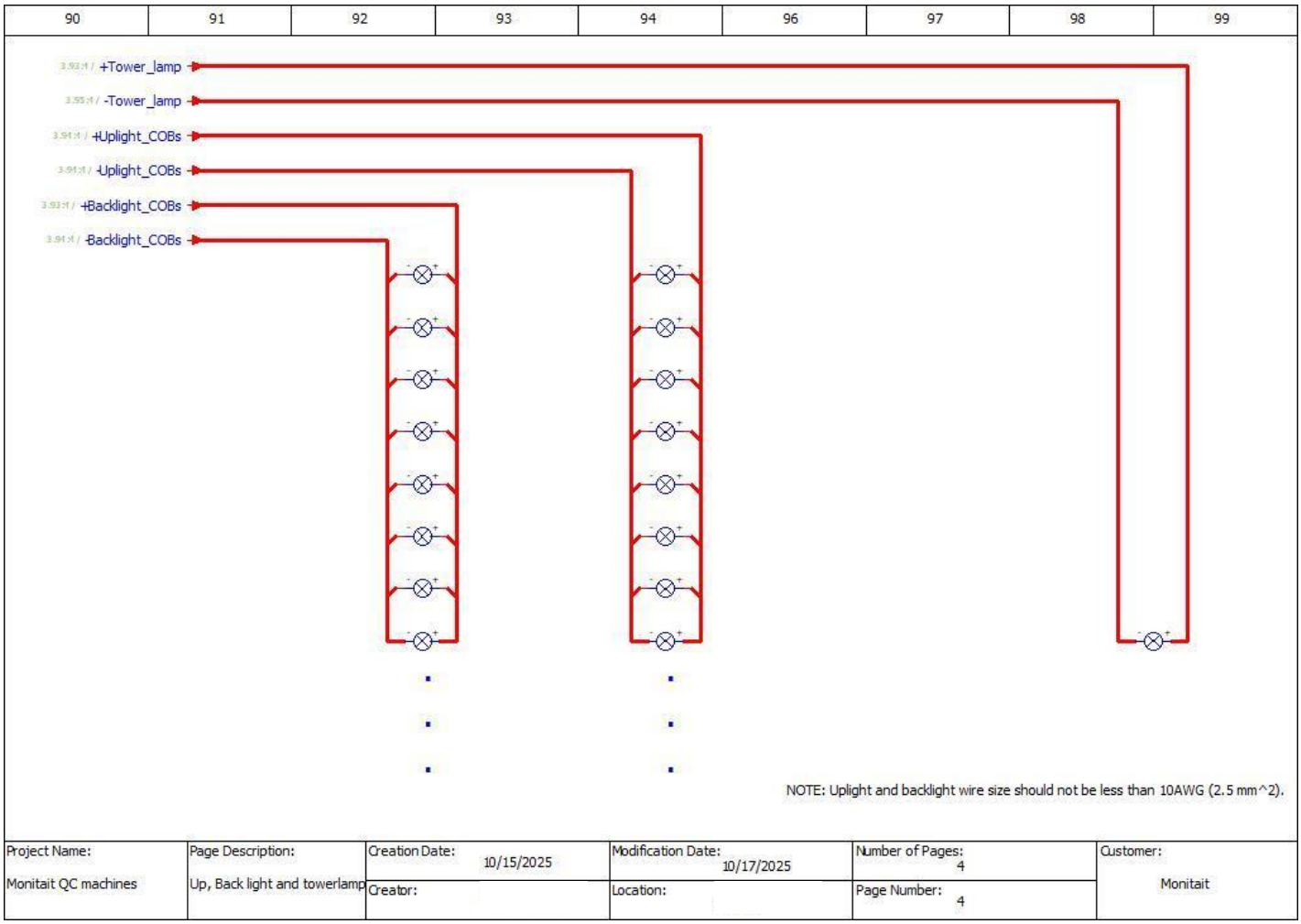
Wiring Schematics



Wiring Schematics



Wiring Schematics



- QC machine requires **U**plight and **B**acklight (optional) illumination.
- Use PPS voltage compatible LED or COB modules (recommended: 100 W 12 V 200×113 mm LED Matrix).
- Ensure easy access for future COB replacement and proper heat dissipation.
- Use only LED-compatible PWM dimming