

Technical Note

MetCam Cable Wiring Instructions

Apr 2024

MetCam can be wired using a rigid conduit or a multi-core Instrument Tray Cable. Since 2023 CI offers an optional pigtail. If purchased, this option includes a 3.2 meters longs Zone 1/Class 1 Div 1 certified Instrumental tray cable factory installed with a certified gland.

MetCam uses a 14-pin terminal block to realize power/4-20/Ethernet connections and additional two pins for a factory configurable 4-20/RS485 connection.

1 Ethernet connection

The connection with MetCam needs to be realized by a straight through cable. Ethernet cables can be wired as straight through or crossover. A straight through cable is a type of twisted pair cable that is used in local area networks to connect a computer to a network hub such as a router. This type of cable is also sometimes called a patch cable.

On a straight through cable, the wired pins match. Straight through cable use one wiring standard: both ends use T568A wiring standard or both ends use T568B wiring standard. The following figure shows the wiring schemes of both standards.



The cable supporting this type of connection will follow the specifications of CAT5E; it needs to include (at least) 4 twisted pairs with 100 Ohm differential impedance per pair and an additional pair for power.

In sites where 4-20 infrastructure is implemented, an additional pair for this interface should be available as well in the cable (total 6 pairs at least).

The pitch of the twisted pairs, on a CAT5E cable, is shown in the table on the right.

If the cable used will not be a CAT5E cable, it is probable that the twist pitch will be identical for all cable pairs. For best performance, look for a cable with some intermediate value in the range 50 – 70 turns per meter.

If the cable used is not a standard CAT5E, the color code of the pairs is of less significance.

The following table shows which pin of the RJ45 connector, at the PC side, is connected to which terminal block socket on the MetCam side.

It is important to maintain this connection scheme. Failing to do so will reduce, or altogether eliminate, the communication bandwidth.

Pair No	RJ45 Pin number	Color coding of Ethernet pairs	Terminal Block socket number
1	5	Blue / White	9
	4	Blue	10
2	1	Orange / White	14
	2	Orange	13
3	3	Green / White	12
	6	Green	11
4	7	Brown / White	8
	8	Brown	7

RJ45 connector pin assignment

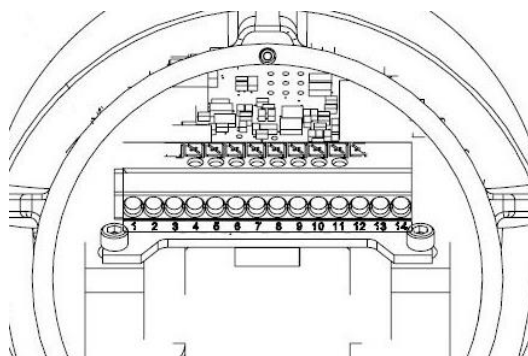


RJ-45 Plug

Pin 1



Clip is pointed away from you.

Terminal block, as seen after opening MetCam back cover¹

Note:

Once connected properly, the bit rate of the connection should be 1Gb/s.

If you encounter lower values, it is an indication that MetCam Ethernet may not be wired properly.

Go back and re-check it.

MetCam terminal block socket assignment (all functions)

Pin Marking on Terminal Block	Description
1	Voltage input + Max 32 V
2	Voltage input -
3	(4-20 mA & HART™) Negative
4	(4-20 mA & HART™) Positive
5	RS485 – Y
6	RS485 – Z
7	Gigabit Ethernet Bi-Directional Data 2 -
8	Gigabit Ethernet Bi-Directional Data 2 +
9	Gigabit Ethernet Bi-Directional Data 1 -
10	Gigabit Ethernet Bi-Directional Data 1 +
11	Gigabit Ethernet Receive Data -
12	Gigabit Ethernet Receive Data +
13	Gigabit Ethernet Transmit Data -
14	Gigabit Ethernet Transmit Data +

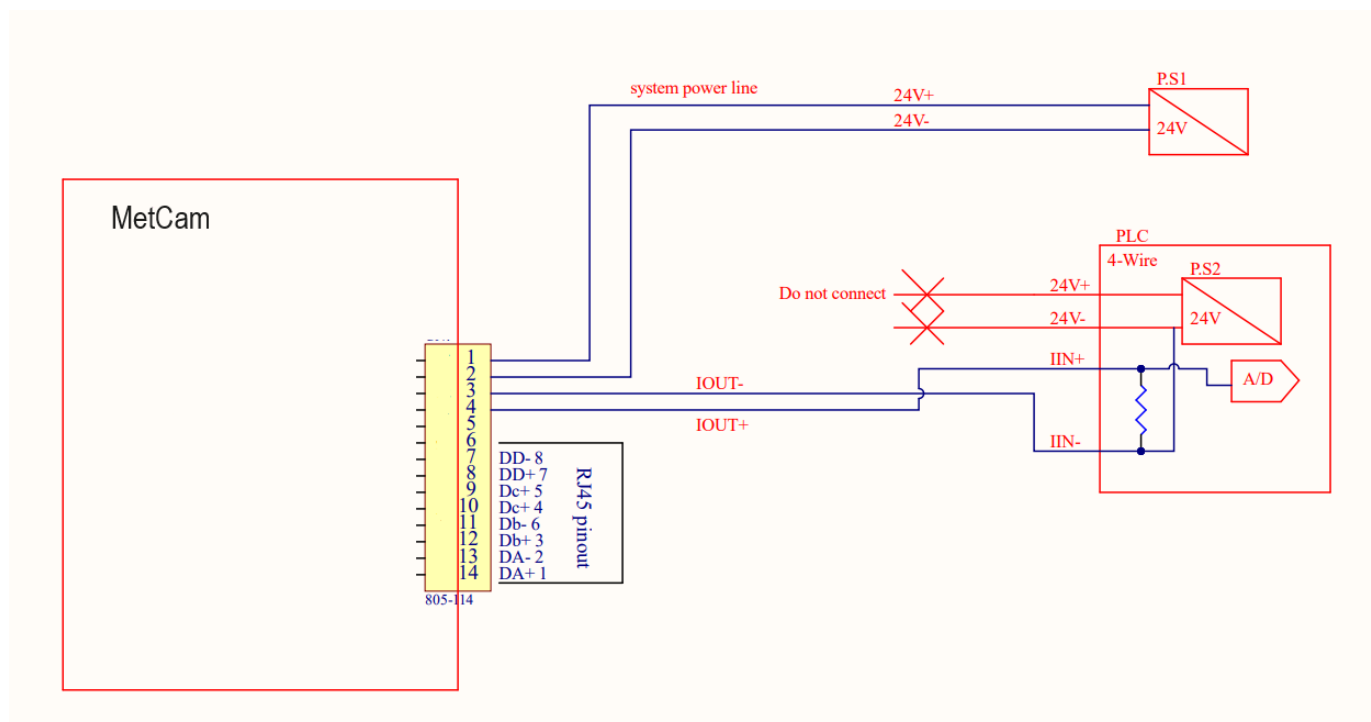
2 4-20 Current Loop Wiring

MetCam is designed as a 4-wire 4-20 mA Transmitter. There is a way to connect it as a 3-wire device. Both of these are described in the following.

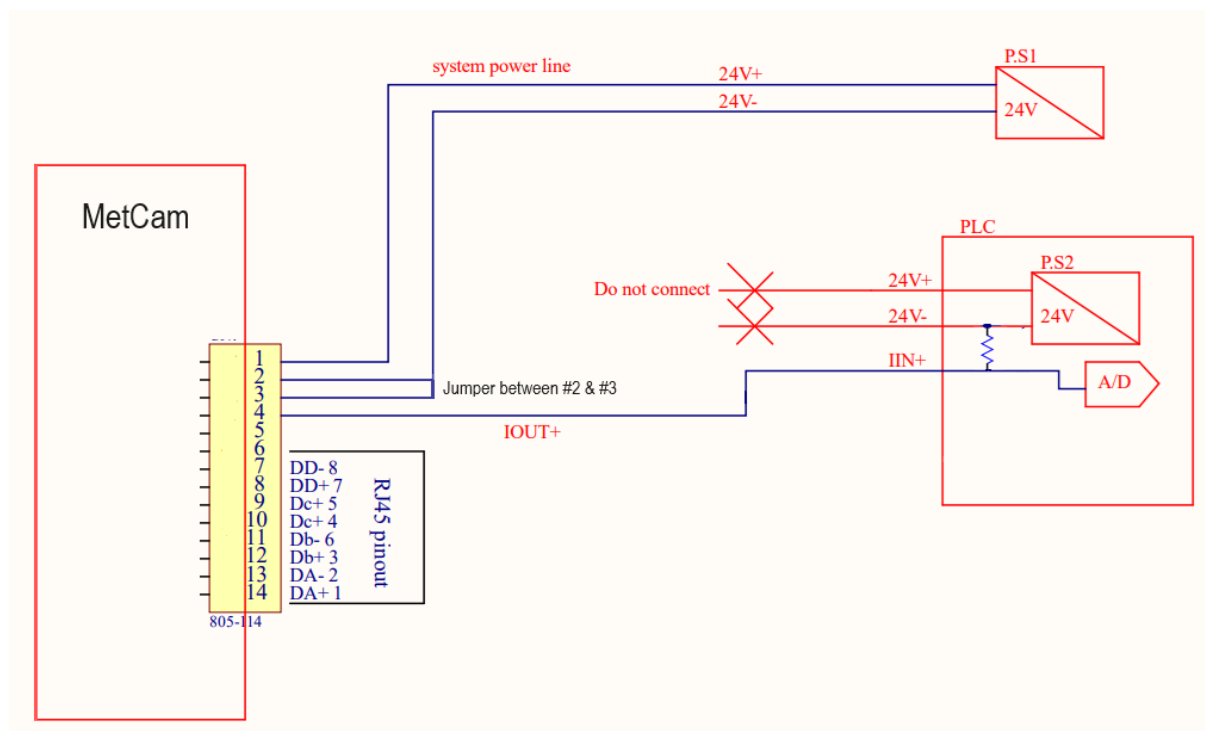
Warning

Do not connect the + VDC power line into pin #4 of the terminal block! Only connect it to pin #1

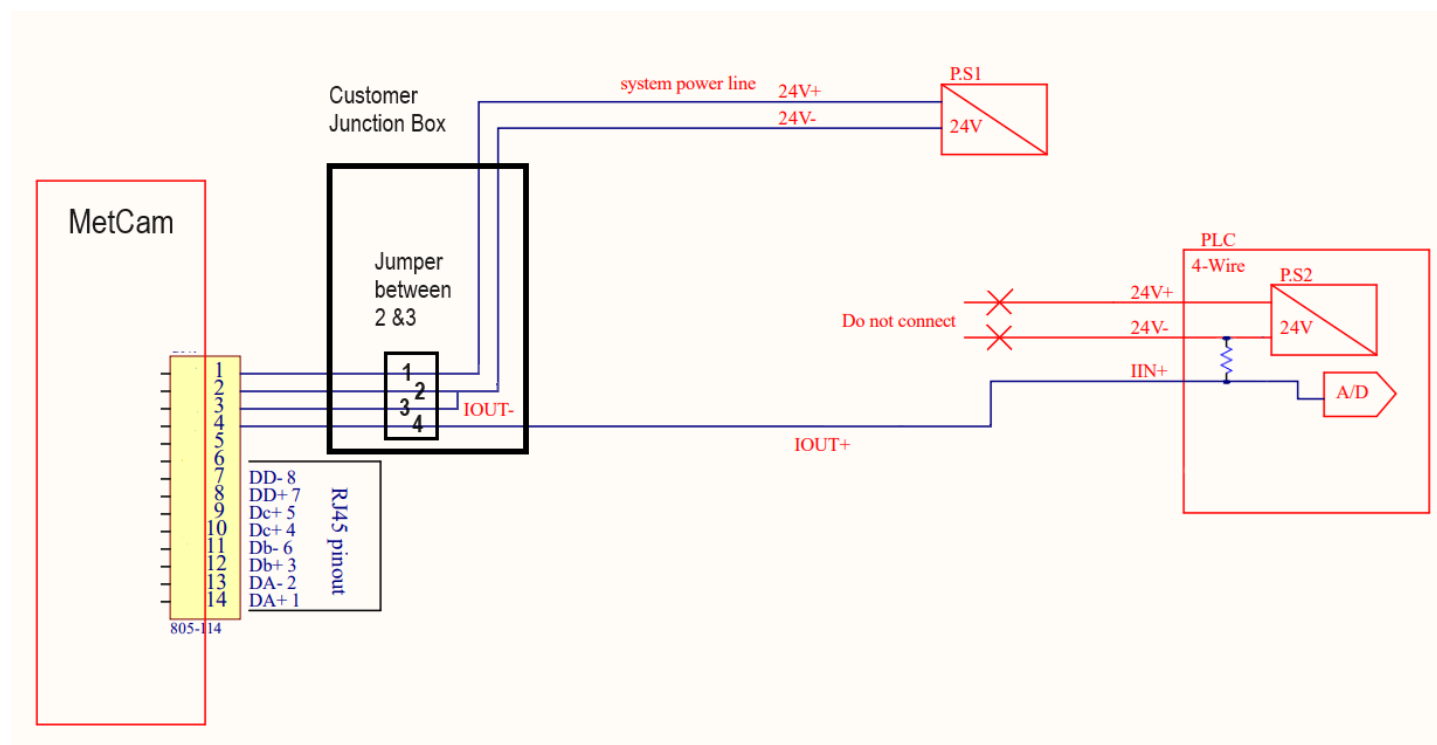
The following diagram is the recommended connection scheme of the 4-20 mA analog channel of MetCam into a controller.



There are two options for this. If the MetCam was ordered without the pigtail cable option, the user needs to wire the terminal block and put a jumper between pins #2 & #3 as in the following:



If the MetCam was delivered with the factory Pigtail option, then it comes with 2 wires for power and 2 for the 4-20 analog channel. In that case, connection as a 3-wire device means that the IOUT – wire, coming from pin #3, needs to be connected to the 24V- inside the junction box where the signals are separated as in the following:



HART communication is added to this 4-20 output in March 2024.

3 Second 4-20 mA/RS485 output

This output uses pins #5 & #6.

The default of this output is as a second 4-20 output.

It can be factory configured to operate as an RS-485 output.

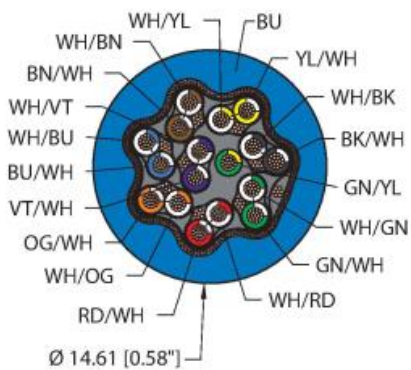
This output is reserved for future use.

4 Multi-Core ITC cable

There are cables available that support multi-signals and are rated for C1D1/Zone 1 locations.

One such example is a TURK BLU, EX60, 8STPDX22+1X18, S-FDB, ITCERDB Extremelife™ Cable.

A cross section of this cable is shown in the following:

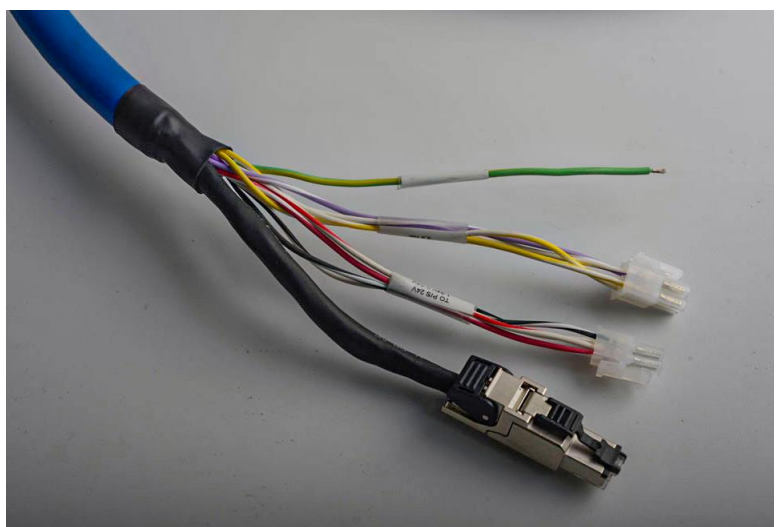


From September 2023, MetCam may be ordered with an attached cable. This option includes the above cable, with a length just over 3 meters, cemented into a certified gland added to the MetCam. This option may be added to an existing MetCam unit but will require the unit to arrive at the factory.

Images of factory installed cable option.

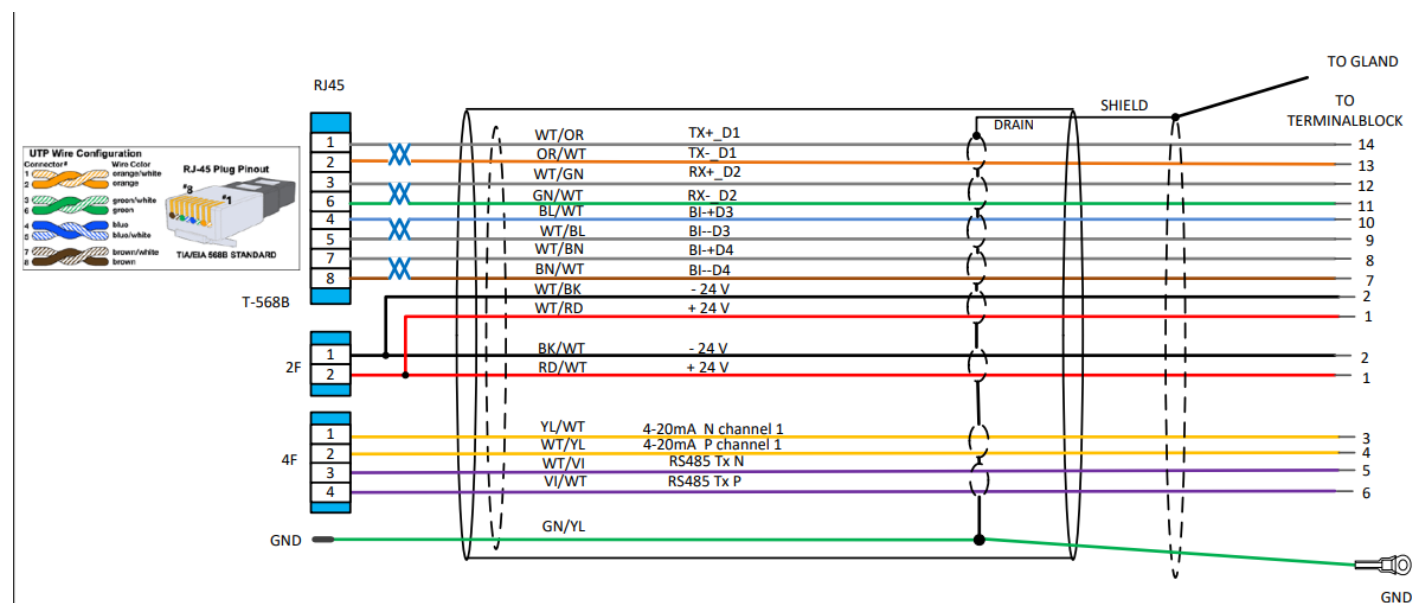


MetCam with factory installed cable



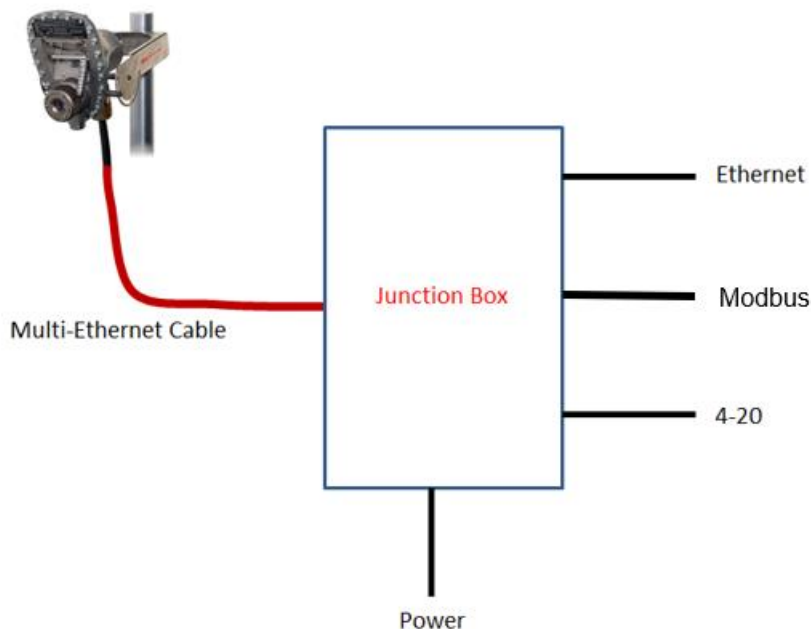
Cable end connectors, RJ45, Power, 2X4-20 mA and ground

Multi-core cable wiring scheme



5 Installation

The recommended installation of a MetCam unit is into a junction box, where the signals and power are separated. A general layout of this is shown in the following illustration:



Notes

¹ Instructions for opening the back cover are given in the "MetCam Instructions for use manual".

- First release the locking screw with a 0.05" hex wrench.
- Then unscrew (turn CCW) the back cover using a metal flat to bridge the opposing cuts in the cover plate.
- Reverse this process to close the back cover after making the terminal block connections.
- Verify that the cover has made contact with the body and that it is tight against it before locking the 0.05" hex set screw.