



MX-U81 Hardware Guide

for Processor and Cameras

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Datalogic S.r.l.
Via S. Vitalino 13
40012 Calderara di Reno - Italy
www.datalogic.com

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Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

EAC Compliance

Customs Union

The CU Conformity certification has been achieved; this allows the Product to bear the Eurasian mark of conformity.

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Datalogic provides several services as well as technical support through its website. Log on to www.datalogic.com and click on the **SUPPORT** link which gives you access to:

- **Downloads** by selecting your product model from the dropdown list in the Search by Product field for specific Data Sheets, Manuals, Software & Utilities, and Drawings;

- **Repair Program** for On-Line Return Material Authorizations (RMAs) plus Repair Center contact information;
- **Customer Service** containing details about Maintenance Agreements;
- **Technical Support** through email or phone.

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When Your System Arrives

Thank you for purchasing a MX-U81 embedded machine vision system (MX-U81 Processor). *Please read the instructions in this document before starting your system setup.*

This manual explains the various parts of the MX-U81 system hardware, including the system inputs and outputs available to integrate your system into a production line.

When your system arrives, check the shipping cartons for wrinkled or damaged corners, holes through the cardboard, or other signs of rough handling or abuse. If you find any signs of damage, ask the delivery service to make a note on the delivery receipt describing the damage.

Carefully remove the system unit, cameras, cabling, and accessories from the shipping package. Place all equipment you unpack on a table and inspect each item. Report any damage to the carrier immediately. Save all packing materials so you can repack the shipment in case you need to move or ship it.

Temperature precautions: If your system arrives in very cold or hot weather, allow all the equipment to reach room temperature before plugging it in. Exposing a cold device to a warm room causes condensation that could damage the system if power is applied too soon. If condensation forms, wait for it to dry completely.

System Factory Setup

Before we shipped your MX-U81 vision system, we ran the installation and setup program and specified a default software and hardware configuration. See page 4 for more information about setting up the hardware. Refer to the Impact Reference Guide for software configuration information.

IMPORTANT NOTE:

A USB Hardware key is ordered and shipped separately from the processor. It must be present in the USB port labeled USB5 on the processor front before the processor is powered on. (See “Front Panel Connections” on page 7.)



Processor Front View

A USB Hardware key is ordered and shipped separately from the processor. It must be present in the USB port labeled USB5 on the processor front before the processor is powered on.

Hardware Components

The major hardware components of the system are the MX-U81 Processor, camera, and cables.

- MX-U81-4-P-1 4-camera capable, PNP outputs: 959918109
- MX-U81-4-N-1 4-camera capable, NPN outputs: 959918110
- For details about MX-U81 cables, see “Processor Cables” on page 57.
- For details about MX-U81 cameras, see “Camera Specifications” on page 34.

Safety Precautions



Warning: There are no user-serviceable parts inside the hardware. To avoid electrical shock, never open the case. Modifying or tampering with internal components will void the product warranty.



Attention: Il n'y a aucune pièce réparable par l'utilisateur à l'intérieur du dispositif. Pour éviter un choc électrique, n'ouvrez jamais le cas. Modification ou manipulation des composants internes annulera la garantie du produit.

1. Read all of the following instructions before setting up your system. **Save this document for later use.**
2. Follow all warnings and instructions in this manual and in other user guides shipped with your hardware components.
3. To avoid damage to the vision system and its components, **never** plug in or unplug a cable when the power is on. Always shut down the processor and turn off the power supply before you make cable changes (see “Turning Off the System” on page 3).
4. Never use the system if a power cable has been damaged. Do not allow anything to rest on a power cable and keep them away from traffic.
5. The air inlets and exhausts on the unit are for ventilation. Do not block or cover these openings or insert anything into these openings.
6. Do not expose the vision system to moisture, rain, or snow, and do not use it near water. If a component gets wet unplug it immediately.
7. To avoid injury, never open the case. Modifying or tampering with internal components will void the product warranty.



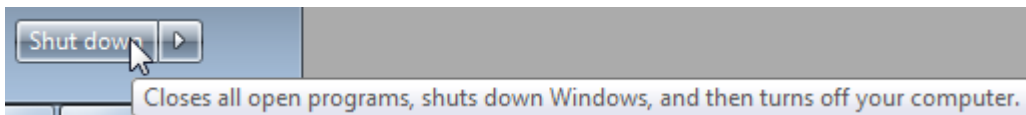
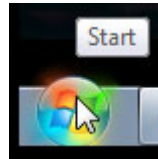
Service Personnel Only - Caution: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to battery maker’s instructions.

Turning Off the System

Warning: Turning off the processor power before stopping VPM and the Windows operating system can damage the processor and corrupt vision programs and other system files.

Processor Turn Off Procedure

1. If any cameras are online, turn them offline.
2. Close all open vision programs.
3. Disconnect VPM from any connected cameras.
4. Close VPM.
5. Click the Windows Start menu.
6. Click Shut down.



7. Wait approximately 30 seconds for the disk access and other processor functions to stop.
8. If the processor does not power off automatically, press and release the power button on the front of the processor (see “Front Panel Connections” on page 7).

Processor Specifications

This section lists the general operating specifications for the MX-U81. Only Datalogic USB cameras will operate with MX-U81 Processor. GigE cameras cannot be used. Each of the MX-U81 cameras has different operating specifications. See “MX-U81 Cameras” on page 21 for details.

Technical Data	
Supply voltage (Vs)	24 VDC ± 10%
Nominal Current Draw	5.5 A at 24 VDC
Digital Inputs	16 opto-isolated
Input Current	ON: 2.0 mA or more Off: 0.16 mA or less
Digital Outputs	16 opto-isolated current sinking (NPN) or sourcing (PNP)
Output Voltage	35 VDC (max)
Output Current	100 mA max per output
Output saturation voltage	< 1V
Dimensions	5.12 w x 10.63 h x 10.03 d (in) 130 w x 270 h x 255 d (mm)
Temperature	Operating: 0° to +55° C (+32° to +131° F) Storage: -20° to +60° C (-4° to +140° F)

Technical Data	
Relative Humidity (30 °C)	Operating: 10% to 90% (non-condensing) Storage: 5% to 95% (non-condensing)
Vibrations (EN60068-2-6)	2 to 8 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Shock resistance (EN60068-2-27)	11 MS (15 G)
Housing material	Galvanized plate, plastic
Mechanical protection (EN 60529)	IP20
Weight	4.52 lb. (2.05 kg)
Minimum Impact Software Version Required	11.5.0
CPU	MX-U81: Intel® Core i7 2.3 GHz – quad core
System Memory	16 GB DDR3 RAM
Storage	128 GB SATA SSD (MLC)
Graphics	Intel® HD 3000 (1920x1200 resolution) - DVI
PCIe	1 x PCIe x8
Camera Interface	4 x Dedicated USB 3.0 ports; 1,500 mA Max per connection
Serial Communication	1 x RS-232 Serial port
Keyboard/Mouse	4 x USB 3.0 ports
Communication Connectivity	Supports Ethernet/IP, Modbus, TCP, PROFINET, and OPC
Network interface	2 x LAN ports 10/100/1000 Mbps Base-T

Setting Up the System

WARNING: To avoid damage to your unit, *never* plug in or unplug any cables when the unit power is on. Always shut down the processor and turn off the power supply first before making any cable changes (see “Turning Off the System” on page 3).

NOTE: When a new processor is powered on the first time, a monitor, keyboard, and mouse must be connected to the processor to approve the license agreement.

1. Familiarize yourself with the major system components as shown in this manual.
2. Unpack and check all the equipment.
3. Mount the MX-U81 Processor and power supply in their desired positions as indicated in the mounting instructions (see “Processor Installation” on page 13). Make sure all vents have at least 1.5 inches (38.1 mm) of clearance for sufficient ventilation. Be aware of USB camera connector cable length limits.

4. Connect the I/O cable, optional monitor, and optional keyboard to the MX-U81 Processor. Connect the I/O cable to the terminal block. When a new processor is powered on the first time, a monitor, keyboard, and mouse must be connected to the processor to approve the license agreement.
5. Attach the appropriate lens for the application to the camera. Mount the MX-U81 camera, lighting, and optional power supply. See “Mounting the Camera” on page 23.
NOTE: Do not leave the camera imager uncovered. When you remove the lens cap, you must replace it with a lens.
6. Connect the camera to a Processor USB 3.0 camera port using a Datalogic USB 3.0 cable. See “Top Panel Connections” on page 6.
7. You are ready to wire the hardware. See “Processor I/O” on page 49 for details about input/output schematics for your MX-U81 system. Wiring specifications for all cables are described in “Cable Reference” on page 57.
8. Wire the MX-U81 camera’s strobe and trigger connections to the camera’s terminal blocks. See “Connecting the Camera” on page 25.
9. Wire the MX-U81 Processor power connector to the optional power supply. Wire AC power to the power supply. Connect the power supply plug to the processor connector. See “Power Supply Connection” on page 15.
10. Connect the cables from the MX-U81 terminal blocks to their cameras.
11. IMPORTANT: A USB Hardware key is ordered and shipped separately from the processor. It must be present in the USB port labeled USB5 on the processor front before the processor is powered on. (See “System Factory Setup” on page 1 and “USB Hardware Key” on page 17.)
12. Plug the power supplies into an appropriate *grounded* power source. To protect your system, we recommend using a surge protector.
13. Turn on the MX-U81 Processor power switch. Turn on the camera power supply.

NOTE: Default network IP addresses were assigned to the MX-U81 Processor and Cameras at the factory. You will probably not need to change them unless there is a conflict with other devices on your network.

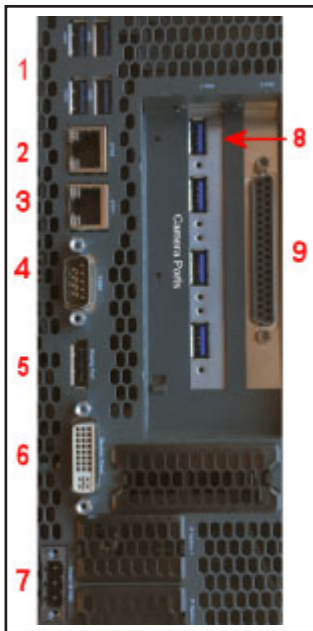
14. Start the Impact Software program Vision Program Manager and click on the Settings tab, then the Camera system object. Select the Assign tab and assign the desired camera.
15. Check your camera and lighting setup, calibrate the camera, configure your inspection parameters, then put the camera online. For more information about using Impact software, refer to the Impact Reference Guide.

If your system does not work when you are finished with the setup, review the instructions and diagrams to make sure you made all connections properly.

Please note that Datalogic cannot guarantee the performance of MX-U81 systems which have additional software installed on them, including, but not limited to, anti-virus and firewall software. Datalogic recommends that MX-U81 systems remain disconnected from networks that access the Internet in order to minimize security risks. Datalogic will attempt to support systems with antivirus software installed, but we cannot guarantee system performance.

Top Panel Connections

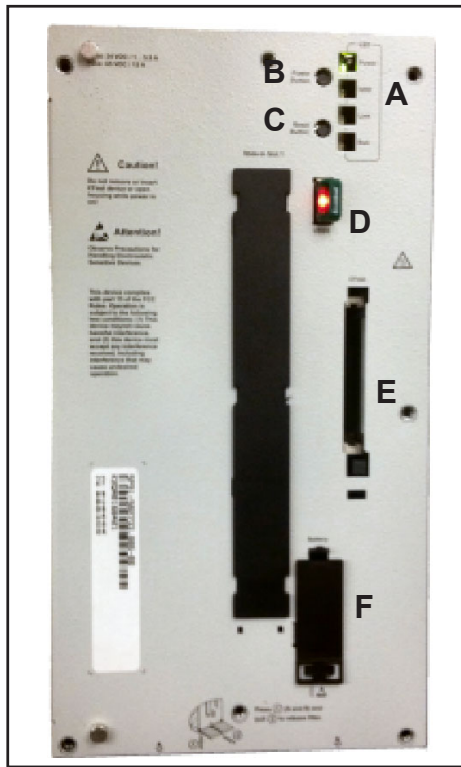
This illustration shows the connections on the Processor's top panel.




Symbol	Function
1	USB 3.0 (x 4)
2	ETH2 - Ethernet 2 (See "Status Lights" on page 9)
3	ETH1 - Ethernet 1 (See "Status Lights" on page 9)
4	RS232 Serial Port (COM 1) - See "Serial Port" on page 58
5	Display Port connection
6	Monitor/Panel connection for smart monitor
7	Supply Voltage
8	USB 3.0 Dedicated Camera Ports (x 4)
9	37-pin D-Sub Digital I/O (See "Processor I/O Connection" on page 49)
	An open PCIe x8 slot is available (behind the PCI slot cover next to the Digital I/O connector)

Front Panel Connections

This illustration shows the connections on the Processor’s front panel.



Symbol	Function
A	Status Lights (see “Status Lights” on page 9)
B	Power Button: Press and release to turn on the unit. If the unit is on, press and release to shut down the OS and switch off the unit (see “Turning Off the System” on page 3). Press and hold to switch off without OS shut down. (Warning: Data could be lost.)
C	Reset Button: Resets the processor which triggers a hardware and PCI reset. The unit is restarted. (Warning: Data could be lost.)
D	USB 2.0 Port for USB Hardware key only. See “USB Hardware Key” on page 17.
E	CFast Slot. A CFast card can be used for extended storage. Note: Do NOT insert or remove the card while the unit is powered on. (See “CFast Card” on page 18)
F	Battery Compartment (See “Battery” on page 19)

 **Service Personnel Only - Caution:** Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to battery maker’s instructions.

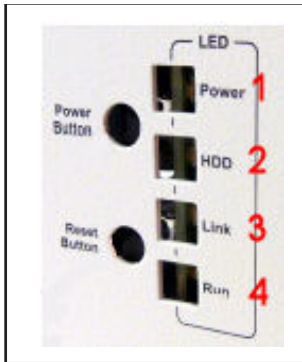
Rear View

This illustration shows the Processor's rear panel.



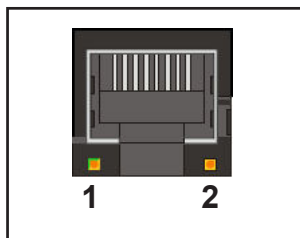
Status Lights

This illustration shows the status lights on the front of the Processor.



Symbol	Name	When lit indicates:
1	Power	Power is On
2	HDD	Solid-state hard drive or Cfast access is active
3	Link	On: An active Smart Display Link connection is established Blinking: Connection is interrupted due to power loss to display unit
4	Run	An application is running

This illustration shows the status lights for the two Ethernet connections on the top of the Processor.



Symbol	Name	When lit indicates:
1	ETH1 and ETH2 Speed	Off: 10 Mbps Green: 100 Mbps Orange: 1000 Mbps (Gigabit)
2	ETH1 and ETH2 Activity/Link	On: Link is established Blinking: Data is being transferred

Preventive Maintenance



Warning: There are no user-serviceable parts inside the device. To avoid electrical shock, never open the case. Modifying or tampering with internal components will void the product warranty.



Attention: Il n'y a aucune pièce réparable par l'utilisateur à l'intérieur du dispositif. Pour éviter un choc électrique, n'ouvrez jamais le cas. Modification ou manipulation des composants internes annulera la garantie du produit.

This section contains tips to keep your system trouble-free and operating smoothly.

- Insure at least 1.5 inches (38.1 mm) of clearance on the sides and top of the MX-U81 Processor.
- Periodically check mounting bolts for tightness and wear. The MX-U81 Processor should be mounted securely in a vibration-free location.
- Keep the outside of the unit clean and free of oil and dust. You can clean the unit with a mild cleanser. *Do not* use an abrasive cleaner and *never* immerse the unit in water.
- Periodic cleaning of the air inlets, filters, and exhausts is highly recommended.
- Verify that all cable connections are correct and tight. Secure the cables to prevent accidents or damage to the device connectors.
- When you move the system, be careful that the movement does not loosen connections. After the system is moved, verify cable and power cord connections.
- Repair or replace frayed or damaged cables immediately.
- Do NOT attempt to clean the camera imager or imager cover. Do NOT spray the imager or imager cover with compressed air as this may leave spots.

Before You Call

If you have a problem with your system, contact your distributor or call Datalogic S.r.l. Before calling, however, review the installation to ensure you are not overlooking an obvious reason for the problem.

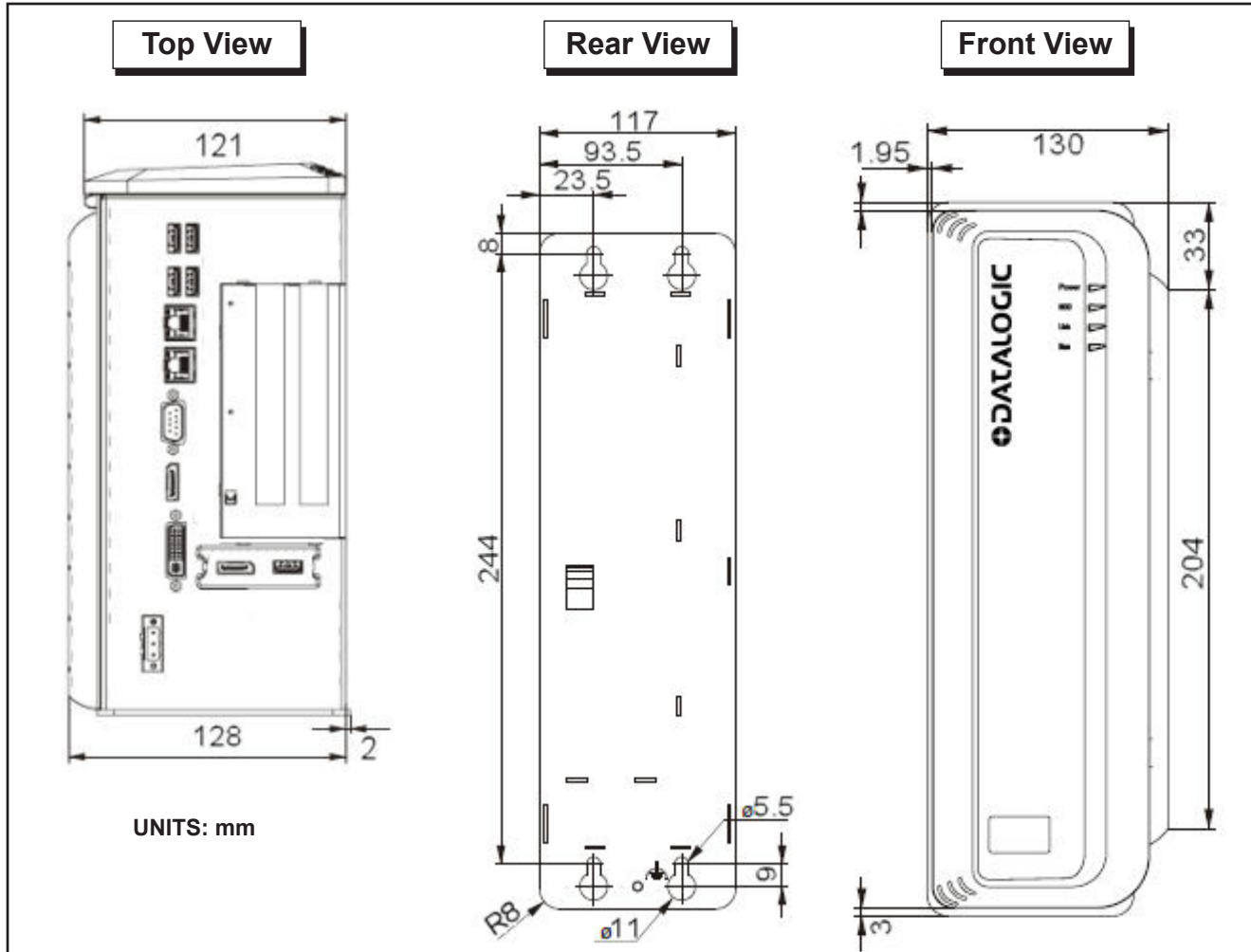
When you call for support, be prepared to answer to the following questions:

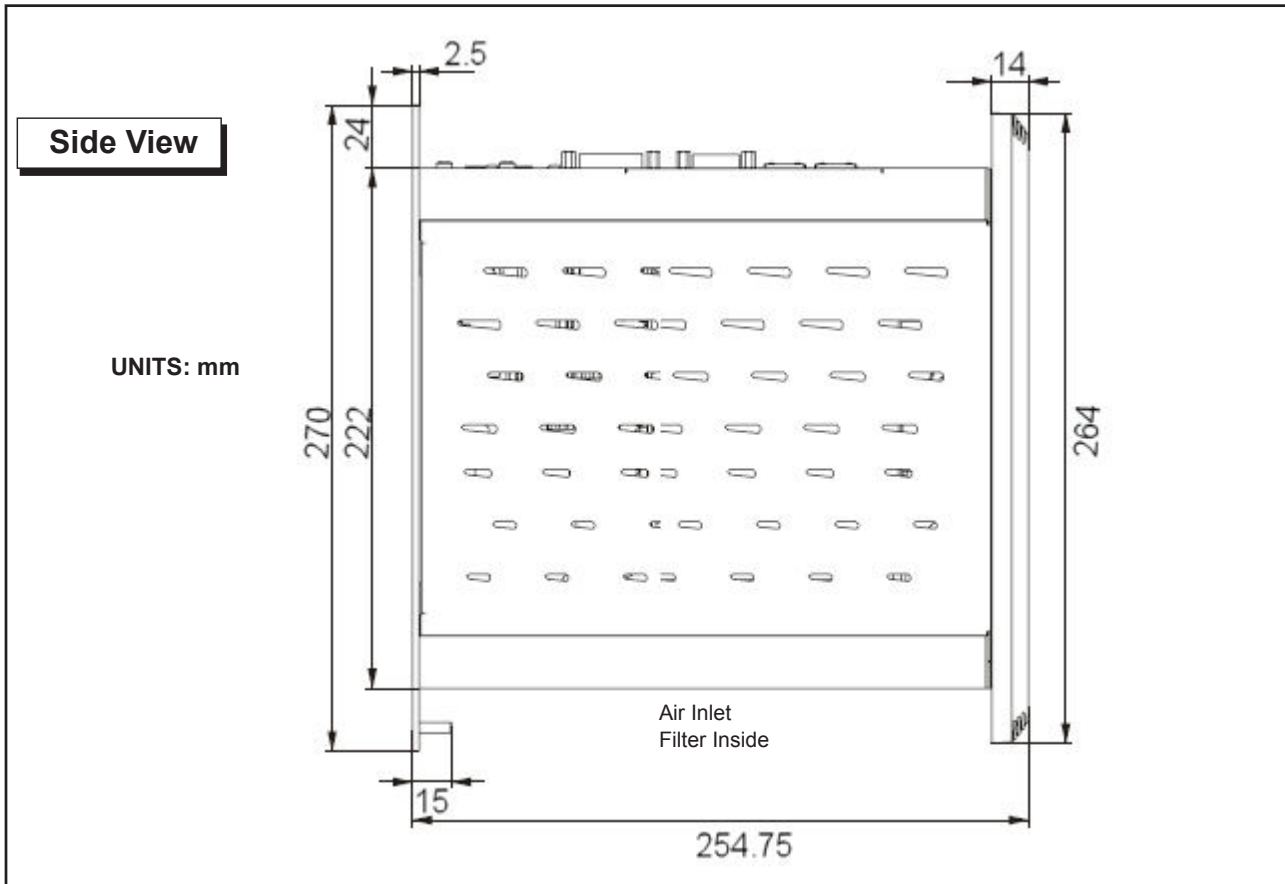
- What are the model and serial numbers of the device you are using? The model, serial, and part numbers are located on the rear panel of the processor.
- Have you added, replaced, or reconfigured your hardware recently? This includes any changes to the camera or other components.
 - What version of Impact Software you are running? Look on the title bar of one of the Impact Software components.
 - Have you updated or replaced any software on your client computer lately?

Basic Hardware Components

Processor Views and Dimensions

This section shows specifications for the Processor, including various views and dimensions.





Processor Installation

Safety Instructions



Warning: There are no user-serviceable parts inside the device. To avoid electrical shock, never open the case. Modifying or tampering with internal components will void the product warranty.



Attention: Il n'ya pas de pièces réparables par l'utilisateur à l'intérieur du matériel. Pour éviter un choc électrique, n'ouvrez jamais le boîtier. L'ouverture du boîtier ou de retirer l'étiquette inviolable annulera la garantie du produit.

- Make sure heavy equipment is loaded evenly in the rack to avoid a hazardous condition. The rack should safely support the combined weight of all the equipment it supports.
- Before the system is connected to the supply circuit, be sure to check equipment nameplate ratings to avoid overloading circuits. Overloading may damage over-current protection devices and supply wiring.
- Slots and openings in the cabinet are provided for ventilation. To ensure sufficient air circulation for reliable system operation, and to prevent overheating, maintain a minimum of 1.5 inches (38.1 mm) of clearance on the top and sides of the cabinet and between MX-U81 Processors.

An optional power supply is available for MX-U81 Processors. If you provide your own, it must supply 24VDC at 5.5 A (nominal) with a safe operating ambient temperature range of 0° to +55° C (+32° to +131° F).

This equipment is to be powered by a Listed power supply for the U.S. and Canada, or a power supply that meets the requirements for use where either IEC 60950 or EN60950 is applicable.

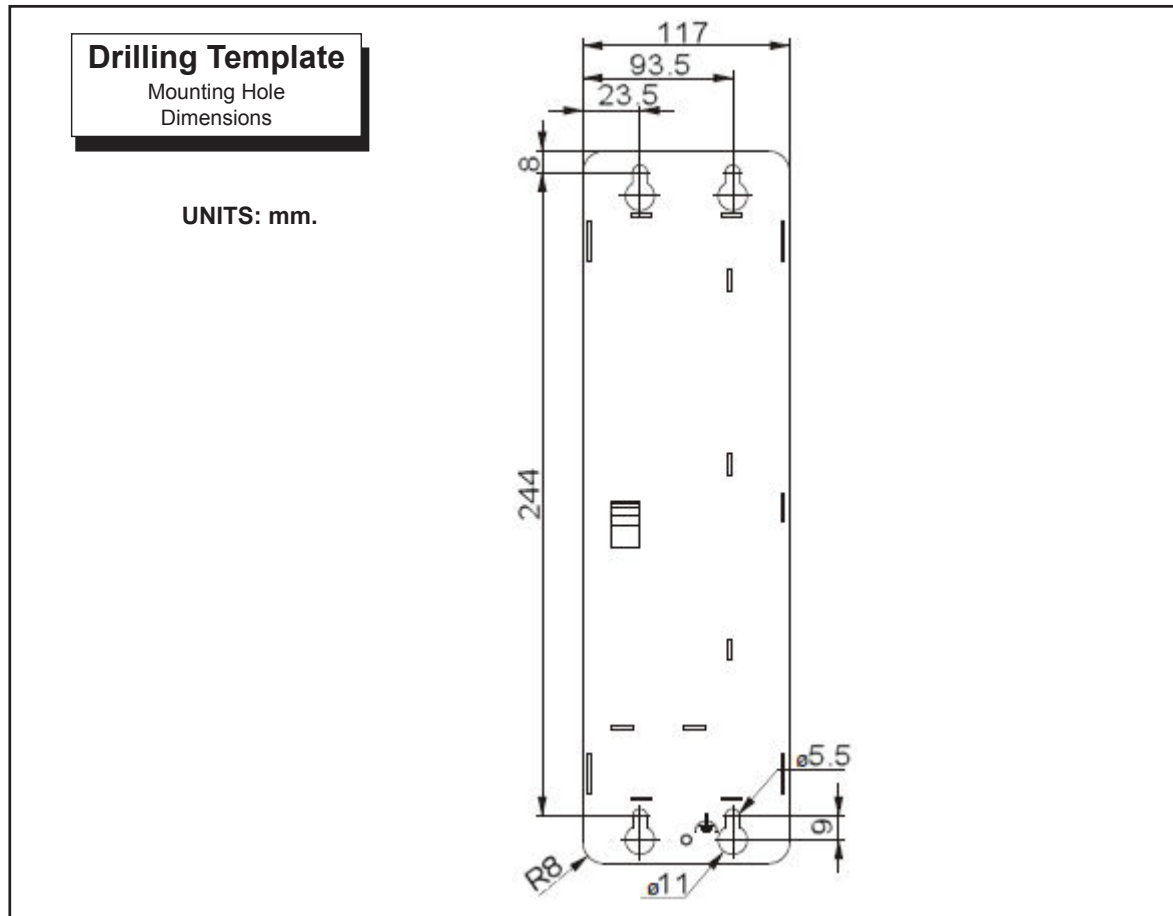
- To ensure safe operation, the system power must be properly grounded. If the unit is mounted within a rack, verify that it is reliably connected to electrical ground. The ground terminal on the power input must be connected to the grounded chassis/enclosure of the power supply. This insures electromagnetic compliance and proper operation. See “Grounding Concepts” on page 16.
- The Processor is to be connected only to networks that do not route outside the plant.

Flat Surface Mounting

When mounting the MX-U81 Processor:

- Take environmental conditions into consideration.
- Mount the processor to a flat, stable, vibration-free surface.
- This processor is only certified for operation in closed rooms.
- Do not subject the processor to direct sunlight.
- Do not cover the ventilation holes.
- Mount the processor only in an upright position as shown in “Processor Views and Dimensions” on page 11.
- The wall or control cabinet must be able to withstand four times the total weight of the processor.

- Do not exceed the flex radius of any connected cables.



NOTE: If the Processor uses a Compact Flash card, mount with the Processor top facing upward so the CF card does not fall out due to vibration.

To mount the Processor:

1. Mark the surface mounting holes in the desired location using the drilling template dimensions.
2. Drill four surface mounting holes in the mounting surface. Use suitable anchors if necessary.
3. Insert four M5 mounting screws in the mounting holes and tighten them until approximately 0.2 inches (5 mm) is left exposed. The mounting screws must be long enough to provide sufficient support.
4. Maneuver the Processor so mounting bracket slots align with the mounting screws.
5. Place the slots over the screws and slide the Processor down until the screws fit snugly into the mounting bracket slots.
6. If necessary, tighten the mounting screws until snug.

Power Supply Connection



Warning: To avoid electrical shock, disconnect all power to the power supply before working on it.



Avertissement: Pour éviter le choc électrique, débranchez toute la puissance à l'alimentation d'énergie avant de travailler à lui.

This equipment is to be powered by a Listed power supply for the U.S. and Canada, or a power supply that meets the requirements for use where either IEC 60950 or EN60950 is applicable.

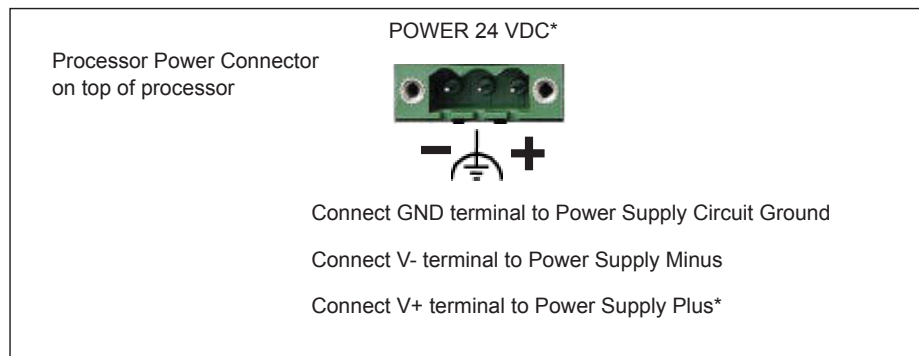
Wire the supplied power plug according to the chart shown below, then plug it into the power connector on the top of the processor. The ground terminal (pin 2) on the +24V power input must be connected to the power supply's grounded chassis/enclosure. This connection is needed to insure electromagnetic compliance and proper operation. See "Grounding Concepts" on page 16.

Slot Number	Signal Name
1	24 VDC Supply Minus
2	Chassis Ground
3	24 VDC Supply Plus

SUPPLIED POWER PLUG

Insert stripped wire into this hole →

To open, insert a small screwdriver into this slot and push down gently on the screwdriver handle →



*Note: The processor requires approximately 5.5 A @ 24VDC. We recommend using a 24 VDC power supply capable of providing 5.5 A current. This voltage is commonly used in many manufacturing environments.

Grounding Concepts

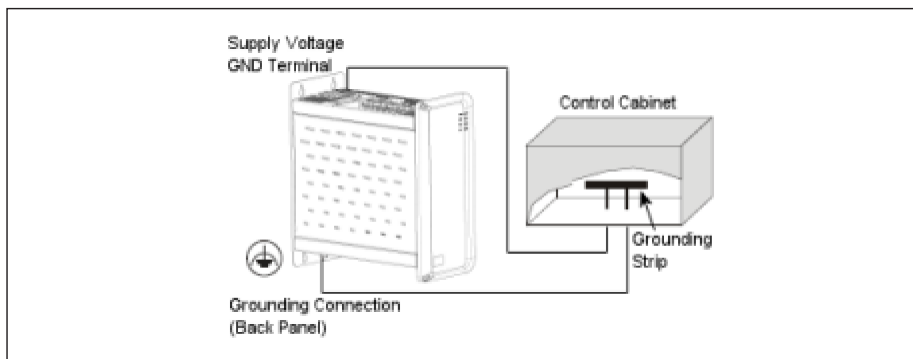
Functional ground is a low impedance current path between electrical circuits and ground. It is used, for example, to improve immunity to disturbances, but is not a protective measure. Grounding deflects disturbances, but does not necessarily provide protection against electric shock.

The functional ground on the processor has two connections:

- Supply voltage GND terminal
- Grounding connection on the processor back panel

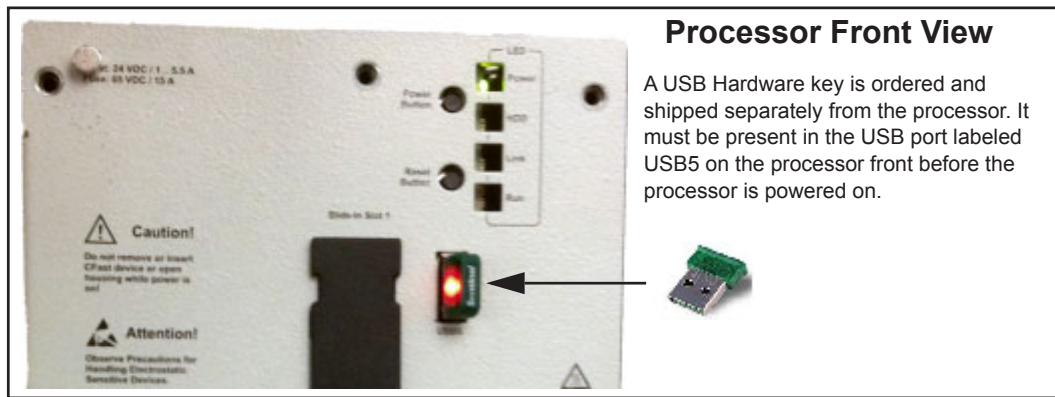
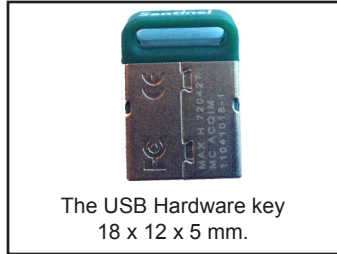
To guarantee a good functional ground:

- Connect the processor to the central grounding point in the control cabinet using the shortest route possible.
- Use a cable with a minimum cross section of 2.5 mm² per connection. If a cable with wire tip sleeves is connected to the supplied power plug, then a cable with maximum 1.5 mm² per connection is possible.
- Use shielded cable for all data connections.



USB Hardware Key

A USB Hardware key, which contains license and processor configuration information, is ordered and shipped separately from the processor. It must be present in the USB port labeled USB5 on the processor front before the processor is powered on.

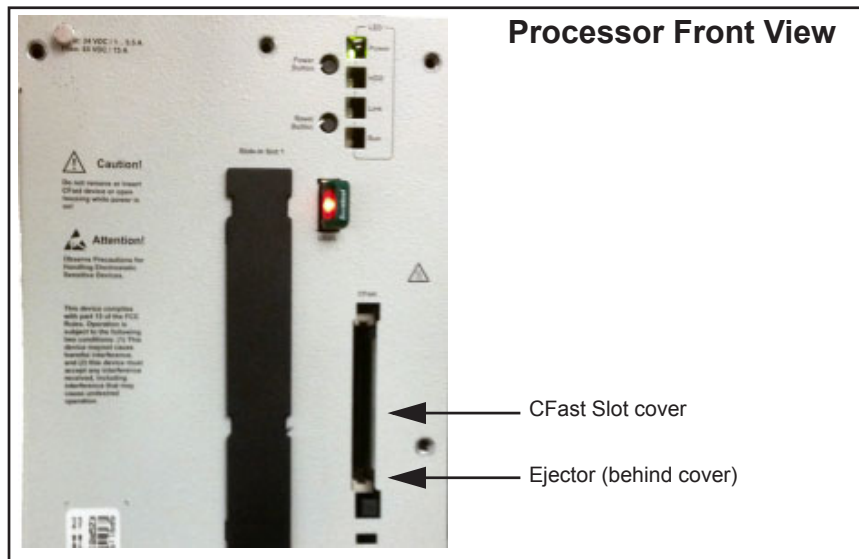


CFast Card

A CFast slot is located in the Processor front. A CFast card can be used as removable media for transferring data, performing upgrades, or for extended storage.

This CFast slot is connected to the chip set internally via SATA 1 with SATA III design (SATA 6 Gbit/s).

WARNING: Power must be disconnected before inserting or removing the CFast card.



To exchange the CFast card

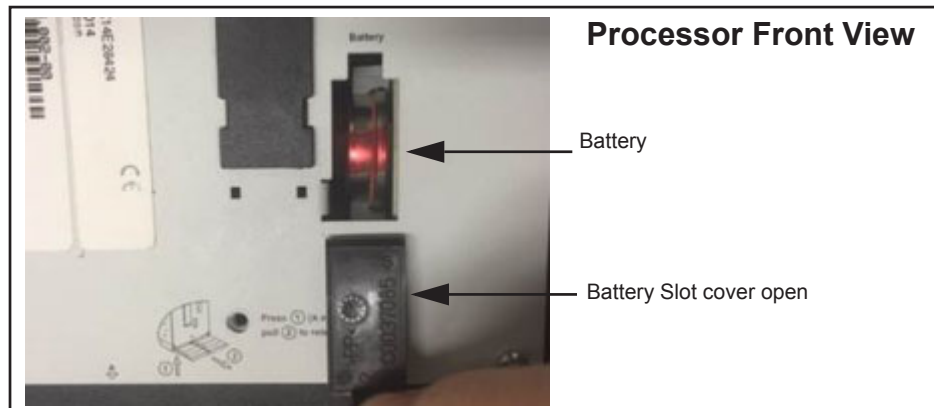
1. Press down on the slot cover's top clip to open the slot.
2. Press the ejector at the bottom of the slot with a pointed object, such as a pen.
3. Pull the card straight out.
4. Insert the new card straight into the slot.
5. Close the slot cover.

Battery

⚠ WARNING: Risk of explosion if battery is handled improperly or replaced by an incorrect type. Do not recharge, disassemble, or dispose of in fire. Lithium batteries are considered hazardous waste. Dispose of used batteries according to battery maker's instructions or in accordance with applicable local regulations.

The lithium battery (CR2477N, 3 V, 950 mAh) powers the internal real-time clock (RTC). It is located behind the processor's front cover. The battery has a limited service life and should be replaced at least every four years.

⚠ WARNING: Power must be disconnected before replacing the battery.



To replace the battery

1. Disconnect the power supply to the processor.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Press down on the slot cover's top clip to open the battery slot.
4. Do not hold the battery by its edges. Using the removal strip, carefully pull the battery out of its slot.
5. Insulated tweezers may be used to insert the new battery in the slot. Be sure the removal strip is in place to make the next battery replacement easier.
6. Reconnect the power supply to the processor.
7. Reset the date and time in the BIOS.

MX-U81 Cameras

Introduction

This section describes digital cameras provided by Datalogic S.r.l. Our USB cameras can be used only with our MX-U81 Processors. GigE cameras will not operate on a MX-U81 Processor.

Datalogic S.r.l. does not support the use of these cameras in any manner other than described herein.

MX-U81 cameras acquire an image when a signal is present on the trigger input of the camera trigger cable, then digitize images at the camera source and transmit them directly to the processor over the USB cable. These cameras provide 8-bit resolution using internal 12-bit A/D converters and some have progressive scan shutter exposure (allowing individual pixel readings).

MX-U81 cameras have a hard-coat finish case that helps eliminate ground loops. All camera settings (shutter, strobe, partial scan, etc.) are configured using Impact software and are maintained in the MX-U81 processors' memory so there are no physical switches on the cameras.

All camera settings must be configured using the Settings tab in the Vision Program Manager (VPM) or in the Settings program. For more detailed information, refer to the Impact Reference Guide (843-0093).

Safety Precautions

Read all of the following instructions before setting up your camera. Save this document for later use.

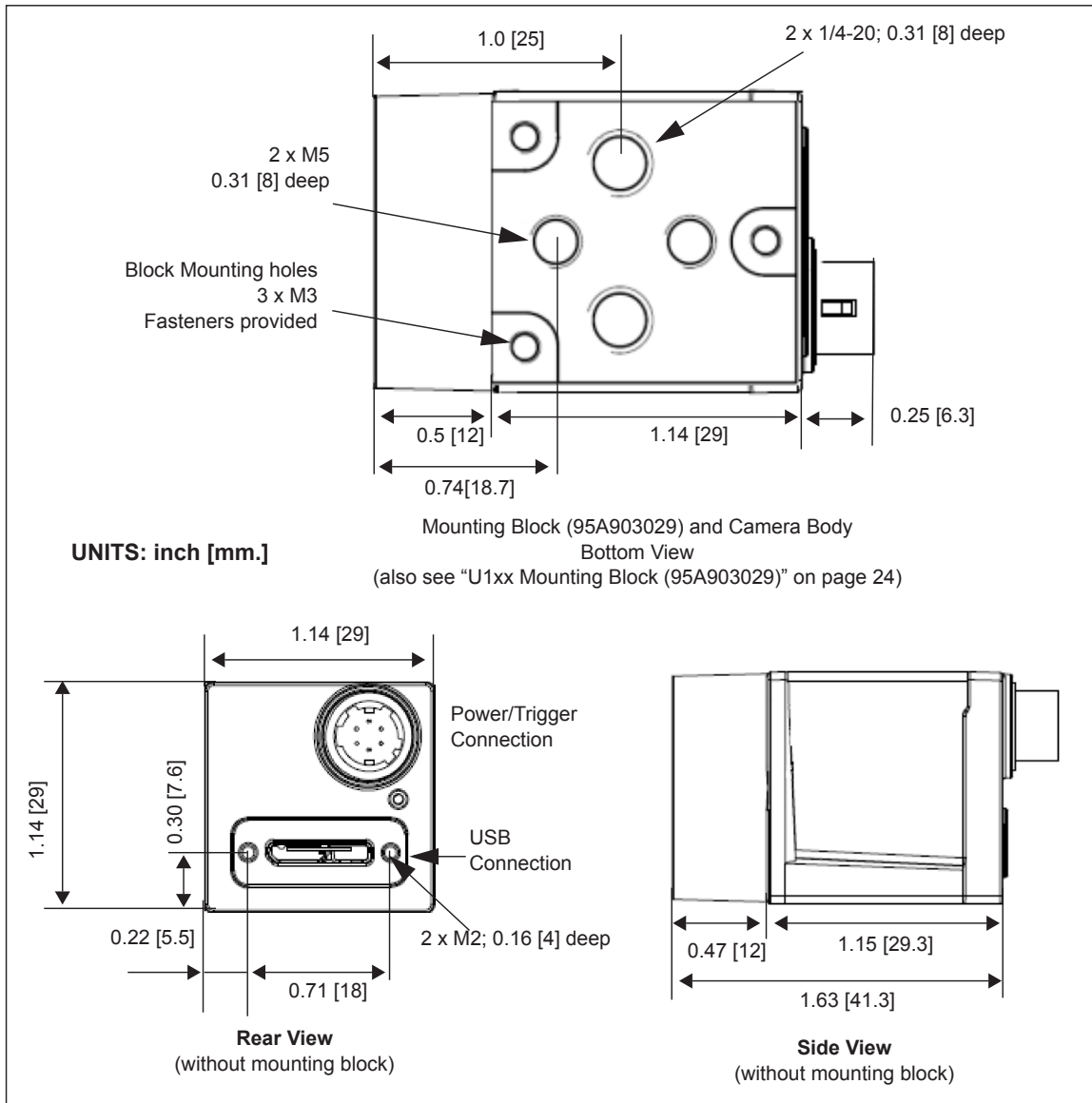
- Follow all warnings and instructions in this manual and in other user guides shipped with your hardware components.
- Do not attempt to disassemble the camera. Do not remove screws or attachments. There are no user-serviceable parts inside. Refer servicing to Datalogic S.r.l.
- All MX-U81 cameras connect power and image transmission to the MX-U81 Processors using a USB cable from Datalogic. Using any other cable may cause intermittent data transmission. Cameras connect to triggering signals and strobe output using a cable and terminal block. See “Connecting the Camera” on page 25 for more details.
- This camera is designed for indoor use. Do not expose it to moisture, including rain or snow, and avoid operating it in wet areas. Should the camera become wet, turn off the power immediately. Moisture can damage the camera and create danger of electric shock. Avoid using the camera when the humidity is above 80%.
- Make sure your camera has enough airflow around it for proper ventilation. The safe case temperature during operation is from 0° to 50° C (32° to 122° F).
- Mount the camera body in a fixed position where it will not be subject to excessive vibration.
- To reduce stress on the camera connectors and cable, loop the cables and fasten them to the camera's mounting block. Do not crimp or tie the cables tightly with wire ties as this may damage them internally. The minimum cable bend

radius is fifteen times the cable diameter. It is not intended for continuous flexing or movement. Be sure that cables are safely routed away from vehicle and pedestrian traffic.

- Check the intended installation area to be sure there is enough room for the camera and any lighting that may be needed.
- Avoid areas with excessive heat, vibration, and environmental contaminants.
- Mount the camera away from devices that emit large amounts of electromagnetic energy.
- Do NOT attempt to clean the camera imager or imager cover. Do NOT spray the imager or imager cover with compressed air as this may leave spots.
- Do not leave the camera imager uncovered. When you remove the lens cap, you must replace it with a lens.

U1xx Camera Dimensions

This section provides dimensions for the U1xx series of cameras.



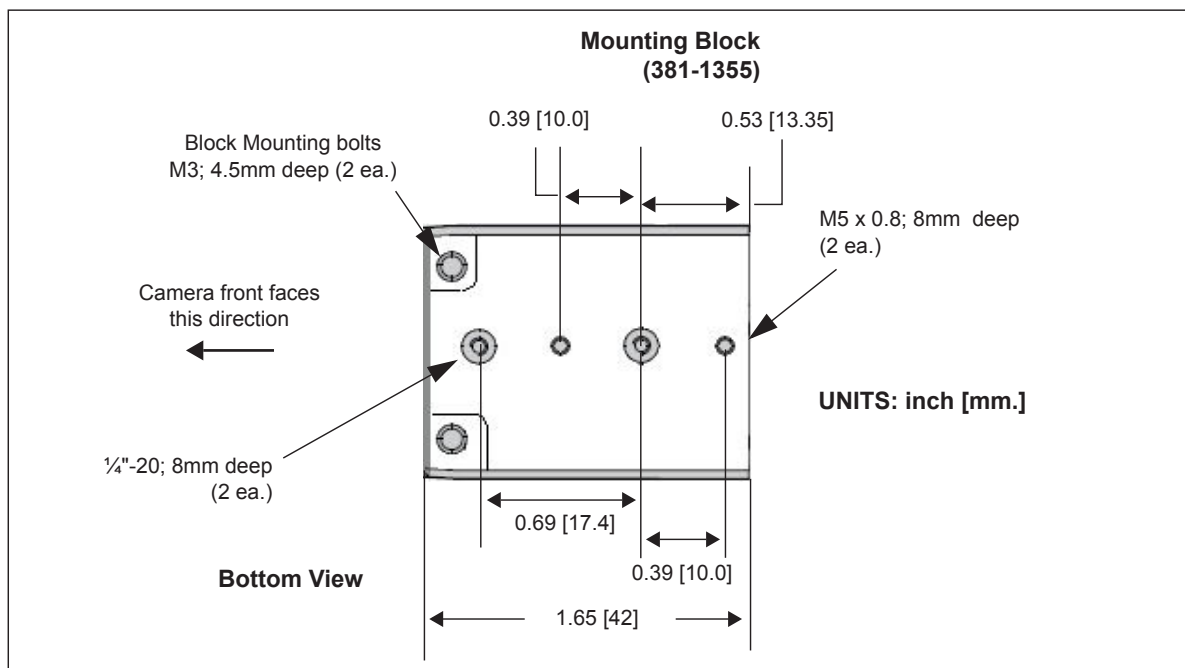
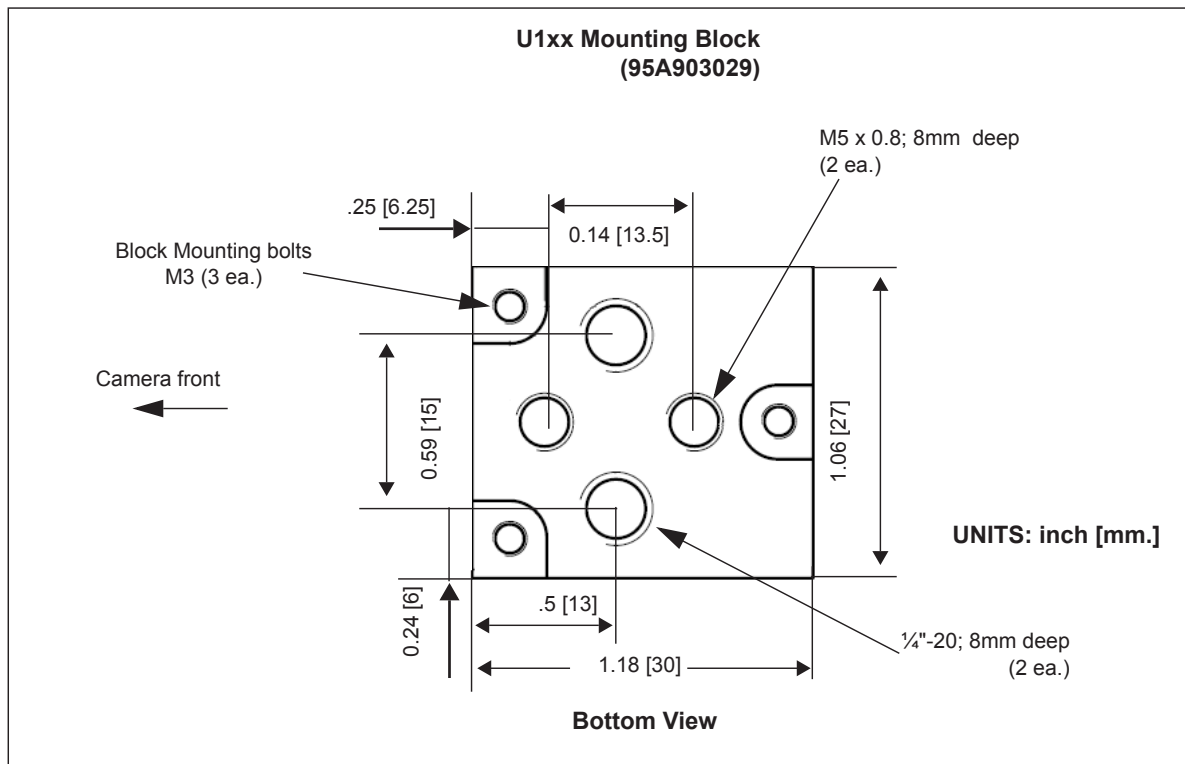
Mounting the Camera

This section provides instructions for mounting the U1xx camera and dimensions for the camera mounting block.

To mount a U1xx camera

1. With the mounting block held tightly against the camera body, insert the mounting bolts through the block mounting bolt holes (see diagram).

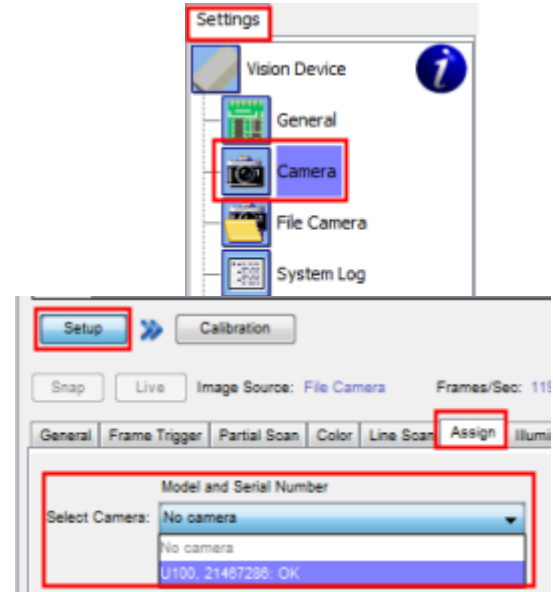
2. Turn the mounting bolts clockwise to tighten them and secure the block to the camera.
3. Use appropriately sized fasteners in the pre-threaded holes in the bottom of the mounting block to secure it to a rigid surface for proper stability and heat transfer. (See "U1xx Camera Dimensions" on page 23.)



Connecting the Camera

After you make the electrical connections to the camera as shown below, you must connect the camera to the processor and assign it.

1. Plug the camera into any of the USB 3.0 ports labeled USB1 through USB4 on the MX-U Series processor.
2. Start Vision Program Manager (VPM) and click the Connect button in the VPM tool bar.
3. Select one of the IMPACT Devices from the dialog then click Connect to Vision Device.
4. Click the Settings tab.
5. Click the Camera icon.
6. On the Setup tab, click the Assign tab.
7. From the Select Camera drop down, select the camera you want to use. The list includes camera serial and model numbers. If a camera selection is disabled, the camera is already assigned.
8. Click OK to close the Camera Connected dialog.

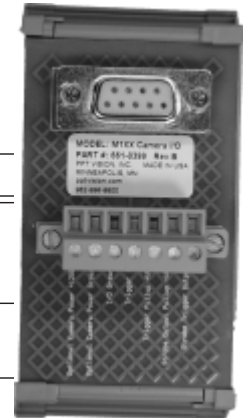


WARNING: Never wire U1xx Camera Strobe Outputs in parallel with other U1xx Camera Strobe Outputs. This will damage the cameras.

U1xx Camera Connection

To connect U1xx camera trigger signals and strobe outputs, use cable 606-0674-xx (6 pin Hirose Male to DB9) with terminal block 661-0399. For an alternate connection see “U1xx Camera Connection (Alternate)” on page 29.

Terminal Name	Signal	Notes
Optional Camera Power	DO NOT USE	Do NOT apply power to this terminal. Power is supplied by the USB connection. (See “Top Panel Connections” on page 6.)
Optional Camera Power Ground	DO NOT USE	Not required. Ground is supplied by the USB connector.
I/O Ground	I/O Ground	
Trigger In**	Camera Trigger In	0 to +24 VDC recommended Maximum +30 VDC As sinking input Off: 0 to +1.4 VDC On: +2.2 to +24 VDC; 5 to 15 ma As sourcing input (see Trigger Pullup +VCC) Off: +2.2 to +24 VDC; 5 to 15 ma On: 0 to +1.4 VDC
Trigger Pullup +VCC**	Trigger In Pullup - use if Trigger In needs sourcing (see Note 1 below)	+24 VDC recommended Maximum +30 VDC (**Block contains 1.6k Ohm 1W resistor between Trigger In and Trigger Pullup +VCC)



Terminal Name	Signal	Notes
Strobe Output Pullup +VCC*	Strobe Supply Voltage - use if Strobe Trigger Output needs sourcing (see Note 2 below)	Based on Strobe requirement (optional) Max: +30 VDC; 50 ma (*Block contains 1.6k Ohm 1W resistor between Strobe Trigger Output and Strobe Output Pullup +VCC)
Strobe Trigger Output*	Trigger Out to Strobe (see Note 3 below)	DO NOT APPLY ANY VOLTAGE DIRECTLY TO THIS OUTPUT. DO NOT WIRE OUTPUTS IN PARALLEL.

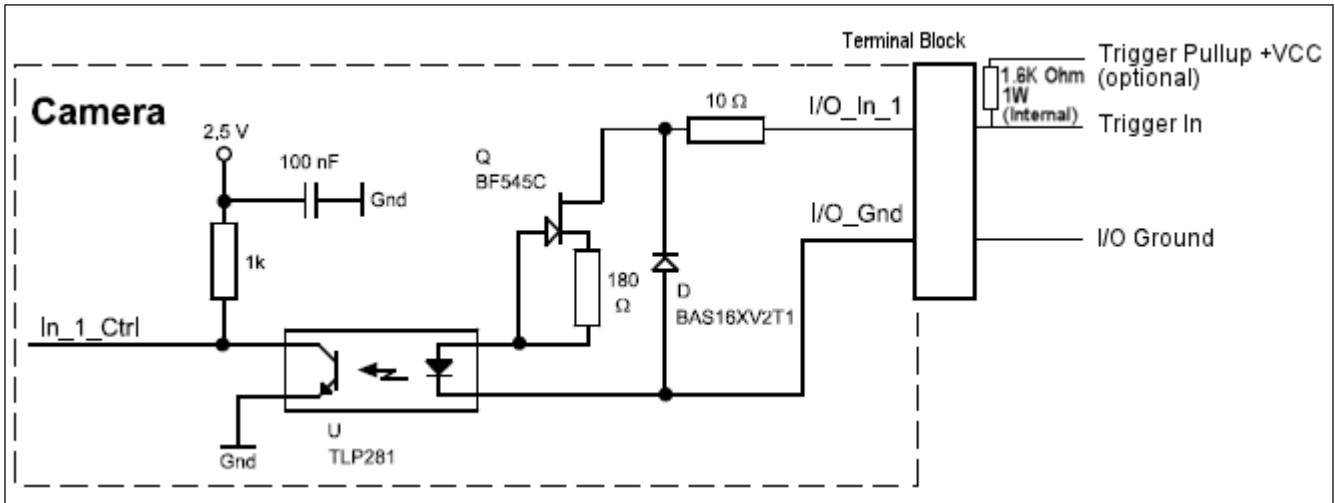
NOTE 1: If Camera Trigger In requires a sinking signal, set the Software Trigger Event to Rising Edge. If it requires a sourcing signal, set the Software Trigger Event to Falling Edge.

NOTE 2: If Strobe Trigger Output requires a sinking signal, set the Strobe Trigger Output to Falling Edge. If it requires a sourcing signal, set the Strobe Trigger Output to Rising Edge.

NOTE 3: Disconnecting the camera will turn on some strobe lights.

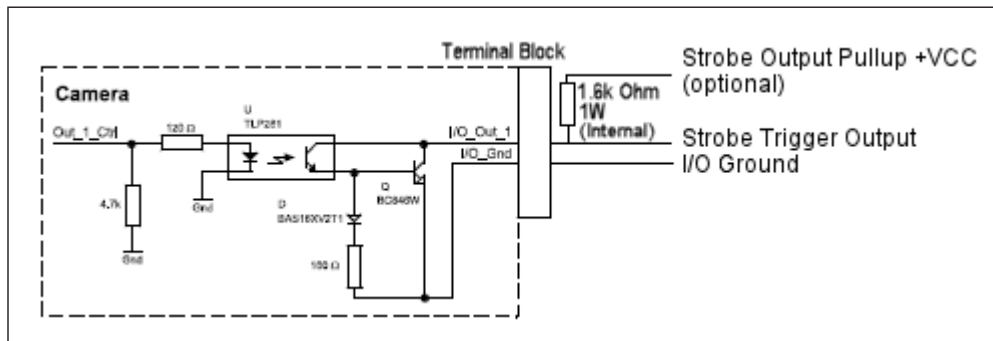
U1xx Circuit Diagrams

U1xx Trigger In Circuit

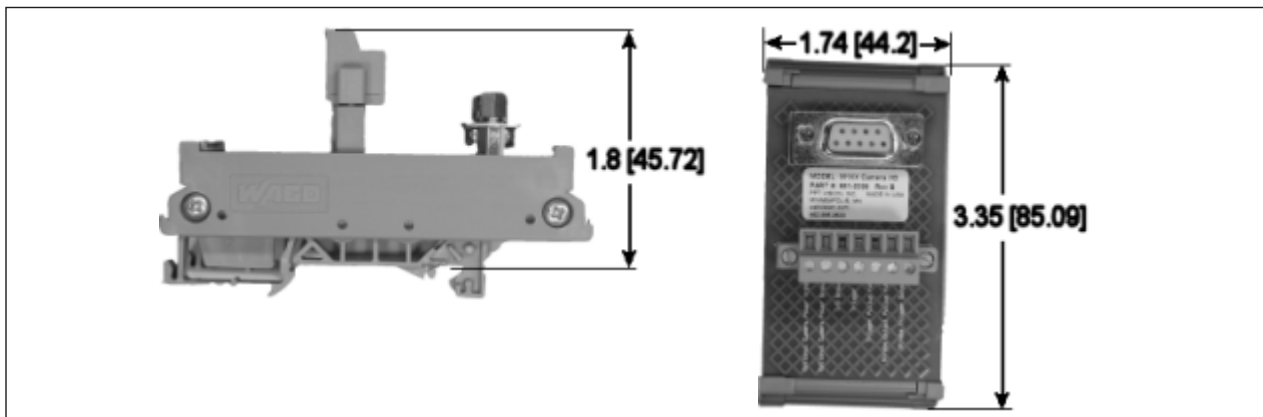


WARNING: Never wire U1xx Camera Strobe Outputs in parallel with other U1xx Camera Strobe Outputs. This will damage the cameras.

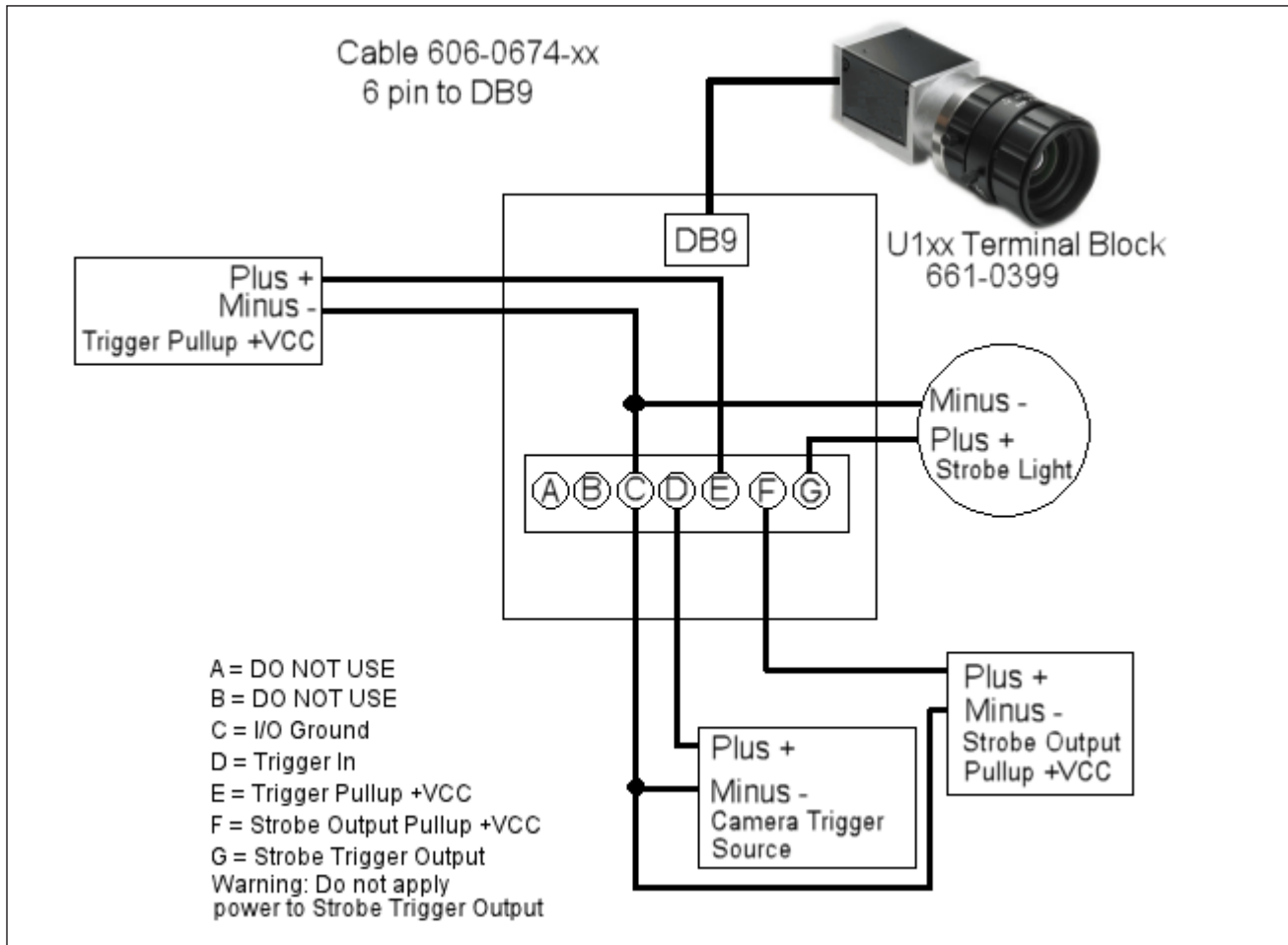
U1xx Strobe Trigger Output Circuit



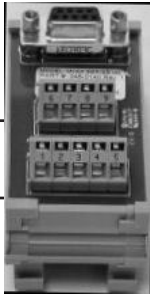
661-0399 Terminal Block Dimensions



U1xx Terminal Connections



U1xx Camera Connection (Alternate)



IMPORTANT: This section describes how to connect MX-U81 cameras using the older, discrete style of terminal block. To use the newer, integrated style of terminal block, see “Connecting the Camera” on page 25.

WARNING: Never wire U1xx Camera Strobe Outputs in parallel with other U1xx Camera Strobe Outputs. This will damage the cameras.

To connect U1xx camera trigger signals and strobe outputs, use a terminal block (248-0140) and optional Hirose 6-pin to DB9 camera cable (606-0674-xx).

To connect the camera without a terminal block, use the optional Hirose 6-pin to unterminated cable (part number 606-0672-xx).

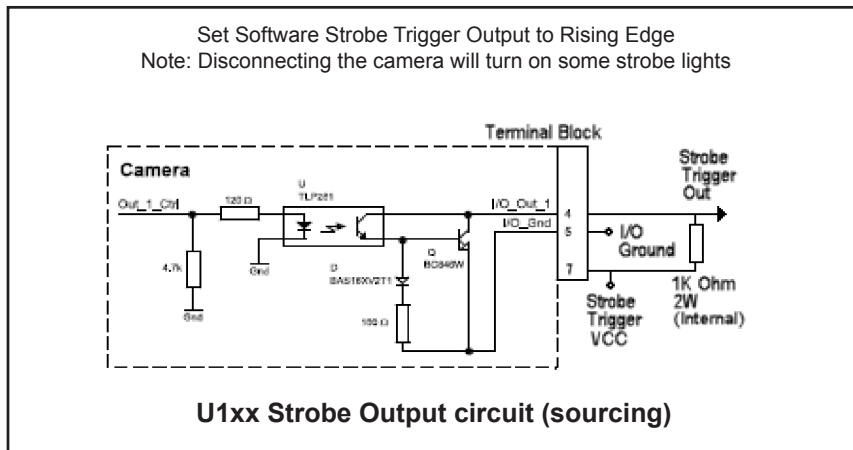
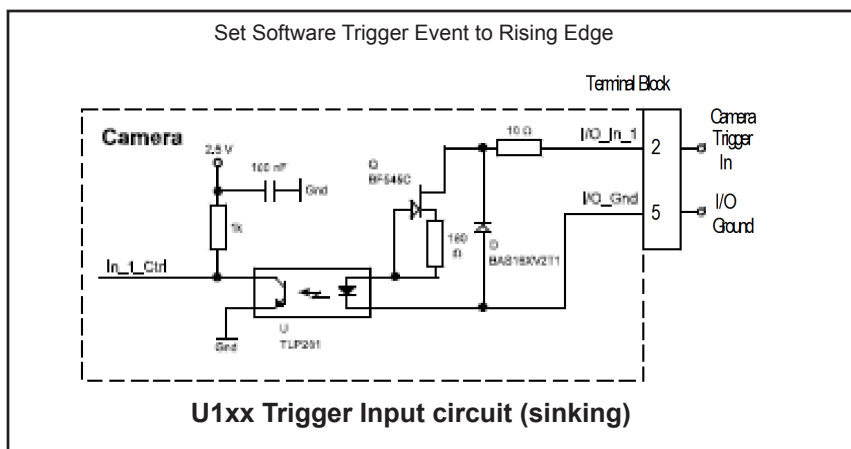
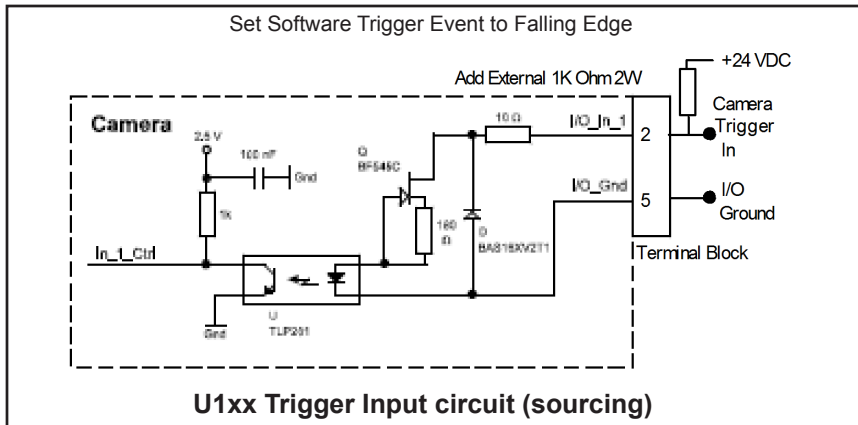
Terminal	Color	Signal Name	Notes
1	Blue	DO NOT USE	Do NOT apply power to this terminal. Power is supplied by the USB connector. See “Top Panel Connections” on page 6.
2	Orange	Camera Trigger In	0 to +24 VDC recommended Off: 0 to +1.4 VDC On: +2.2 to +24 VDC; 5 to 15 ma Maximum +30 VDC
3	Green	No Connection	
4*	Wht/ Grn	Strobe Trigger Out	DO NOT APPLY ANY VOLTAGE DIRECTLY TO THIS OUTPUT. DO NOT WIRE OUTPUTS IN PARALLEL.
5	Wht/ Org	I/O Ground	
6	Wht/ Blu	DO NOT USE	Not required. Ground is supplied by the USB connection.
7*	None	Strobe VCC	Based on Strobe requirement Max: +30 VDC; 50 ma (*Block contains 1k Ohm 2W resistor between terminals 4 and 7)

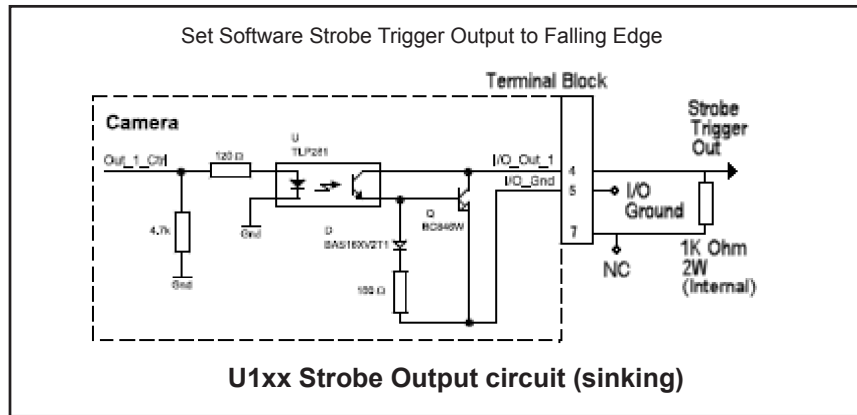
NOTE: The U1xx camera's Strobe Trigger Out is normally closed (it opens to trigger the strobe). Do not wire multiple cameras' strobe outputs in parallel to trigger a single strobe.

To connect the power cable to the camera, align the cable connector with the connector on the rear of the camera, push gently until the cable connector seats securely, then tighten the connector collar. To disconnect it, loosen the collar completely, then grasp the connector and gently pull.

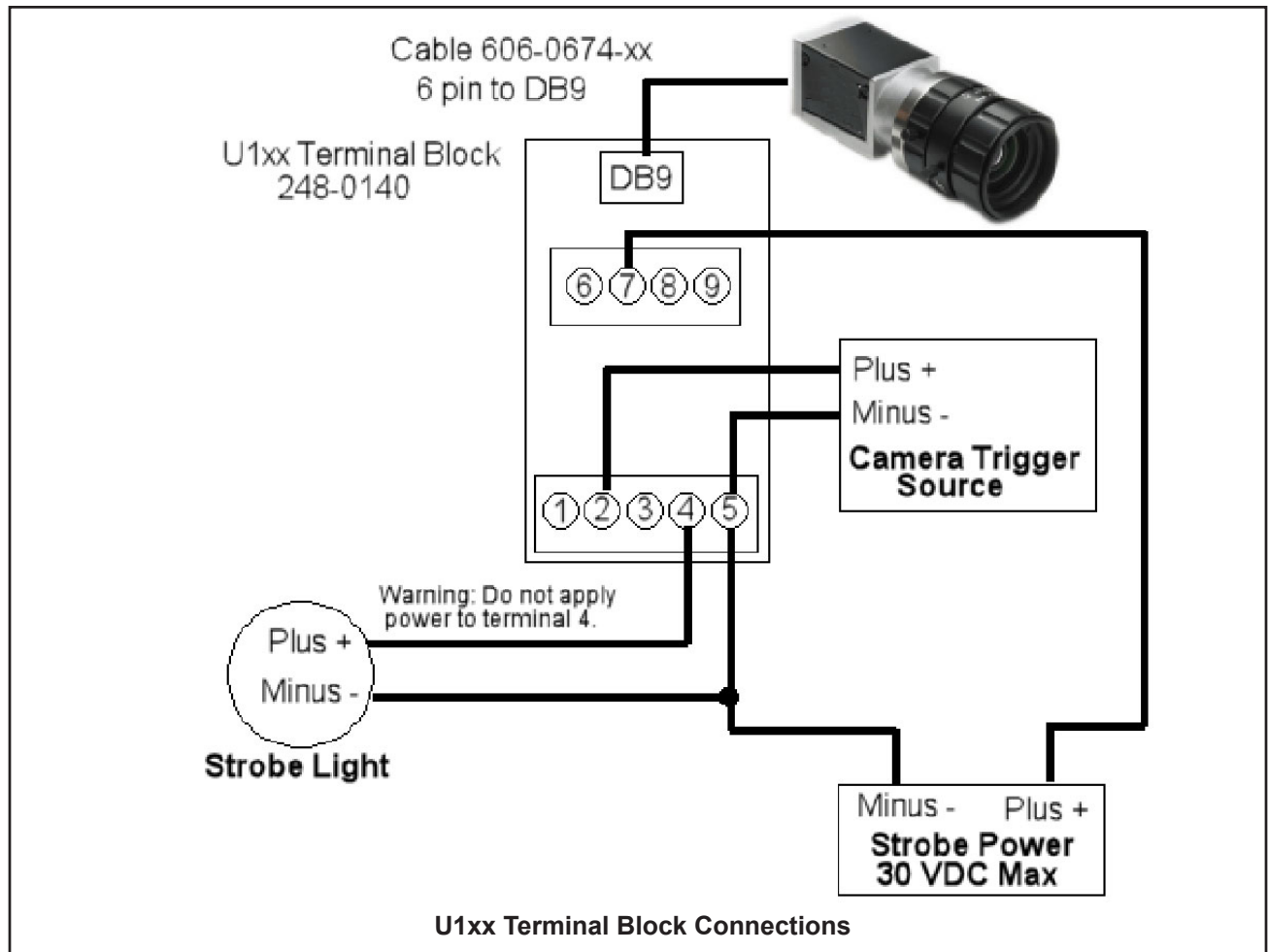
NOTE: To reduce stress on the cable and connectors, loop the cable and fasten it to the camera's mounting block. Do not crimp or tie the cable tightly with wire ties as this may damage it internally. The cable is not intended for continuous flexing or movement. The cable's maximum bend radius is fifteen times the cable diameter.

U1xx Circuit Diagrams (Alternate)

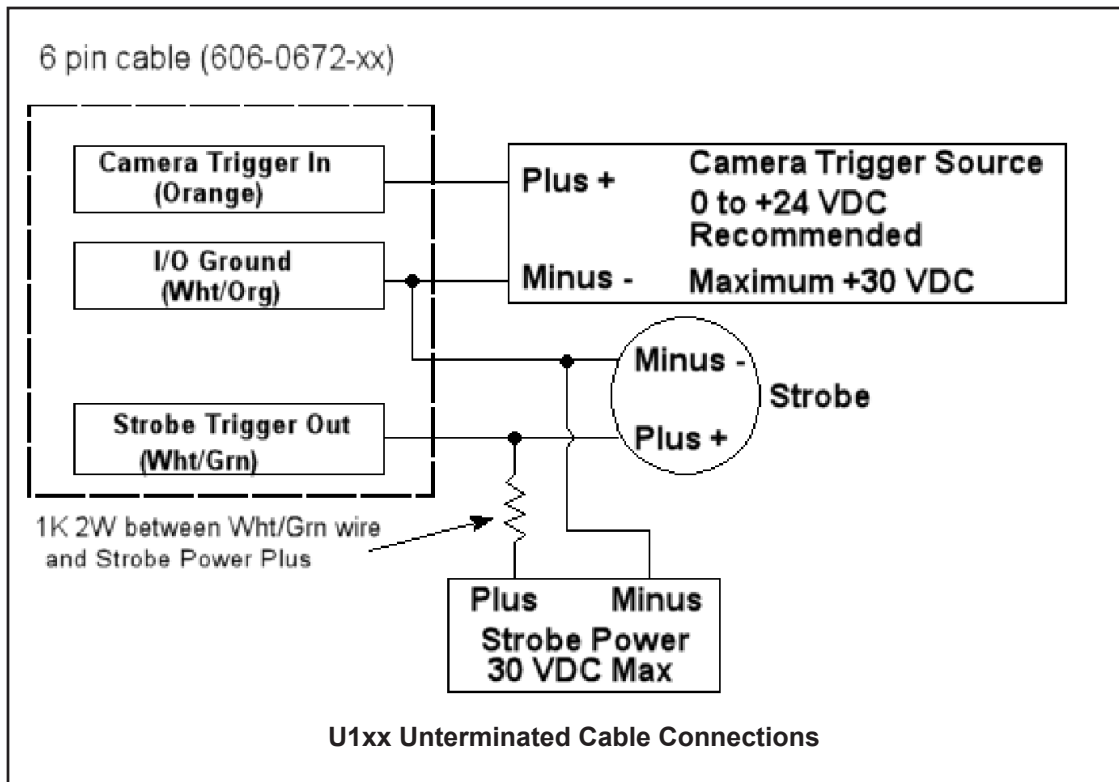




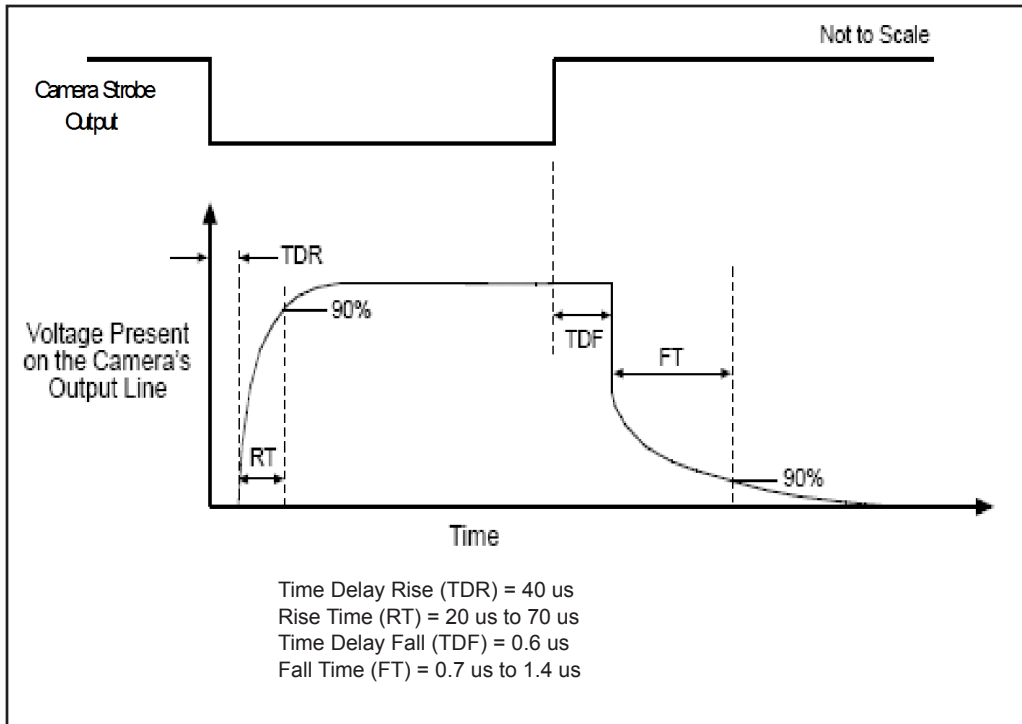
U1xx Terminal Connections (Alternate)



U1xx Unterminated Cable Connections (Alternate)



The response times for the strobe output on the U1xx camera will typically fall into the ranges specified below. The exact response time for your application will depend on the external resistor and the applied voltage you use. The shutter begins opening simultaneously with the “Camera Strobe Output” in the diagram.



Camera Setup and Calibration

Use the Impact programs to setup and calibrate cameras with a MX-U81 processor. (Refer to the Camera Setup Tab section of the Impact Software Reference Guide.)

Calibration insures that measurements shown in Impact software tools accurately indicate the inspected object's measurements. A camera requires calibration when it is first connected to the MX-U81 Processor, when the camera-to-subject distance changes, and when the lens is changed. Calibration targets with 0.5, 1.0, and 2.0 mm dot pitches are available from us (Part number 381-1177). Contact us for printed versions of targets with larger pitches.

Camera Specifications

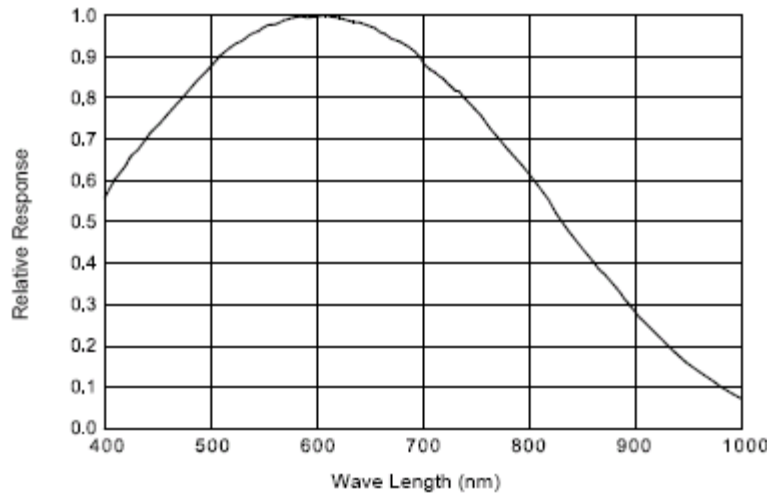
U1xx, U1xxC

All U1xx cameras have the following specifications. Model numbers that end in “C” are color cameras.

U1xx Common Specifications	
Lens Mount	C mount
Cabling	Camera cable provides trigger and strobe. USB cable provides power and transmits video
Operating Environment	Temperature: 0 to +50 C (+32 to 122 F) Humidity: 0 to 80% (non-condensed)
Weight	<2.9 ounces (<80 g)
Software Version	Impact Software V11.5.0 or greater
Protection Class	IP30

U100, U100C

This camera captures a 659 x 494 pixel size image with square pixels. It can partially scan the image horizontally and vertically.



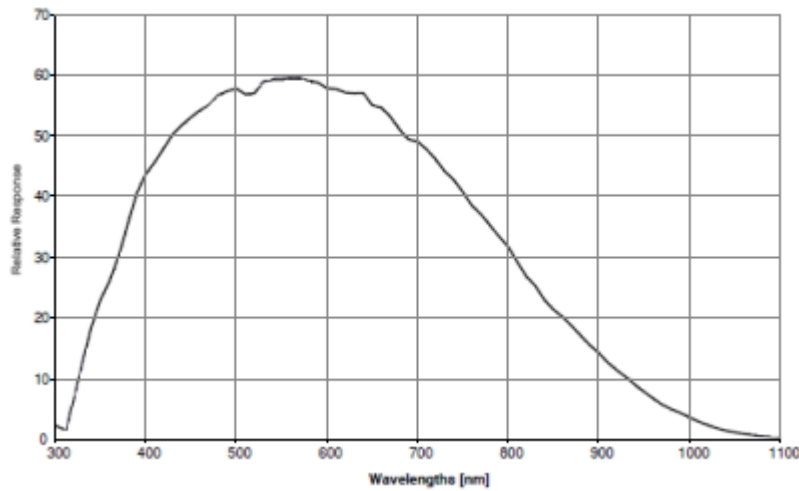
U100 Spectral Response (excludes lens and light source characteristics)

U100 Specifications	
Part Number	959933003; 959933004
Pick-up Device	Progressive Scan CCD - 659 (H) x 494 (V) pixels
Sensor Size	1/4" 3.69 mm x 2.77 mm
Capture Rate	120 full-resolution frames per second (fps); higher with partial scan
Pixel Size	5.6 x 5.6 micrometers

U100 Specifications	
Power	5 VDC (2.4 W)
Gain	100% to 1023%
Shutter Open	16 to 1,000,000 microseconds
Exposure Start Delay	17.62 μ sec
Software Version	Impact Software V11.5.0 or greater

U101, U101C

This camera captures a 640 by 480 pixel size image with square pixels. It can partially scan the image horizontally and vertically.

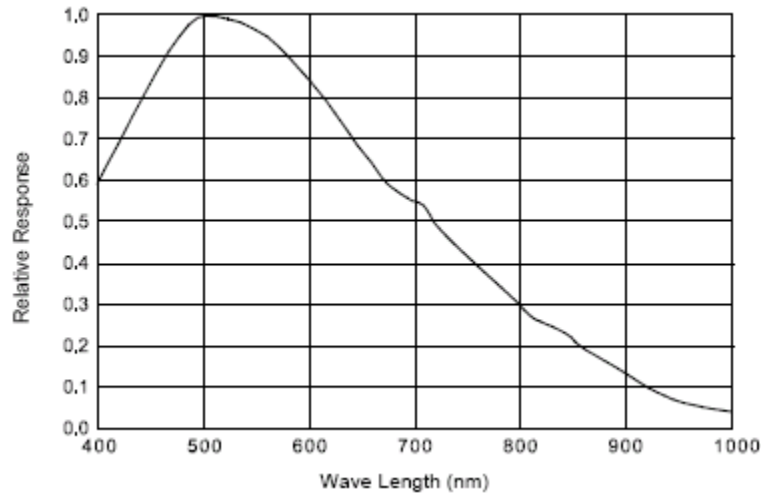


U101 Spectral Response (excludes lens and light source characteristics)

U101 Specifications	
Part Number	959933030; 959933031
Pick-up Device	Global Shutter CMOS - 640 (H) x 480 (V) pixels
Sensor Size	1/4" (3.8 mm) diag - 3.07mm (H) x 2.3mm (V)
Capture Rate	750 full-resolution fps; higher with partial scan
Pixel Size	4.8 x 4.8 micrometers
Power	5 VDC (2.4 W)
Gain	350% to 1023%
Shutter Open	24 to 1,000,000 microseconds
Software Version	Impact Software V11.8.0.97 or greater

U110, U110C

This camera captures a 659 by 494 pixel size image with square pixels. It can partially scan the image horizontally and vertically.

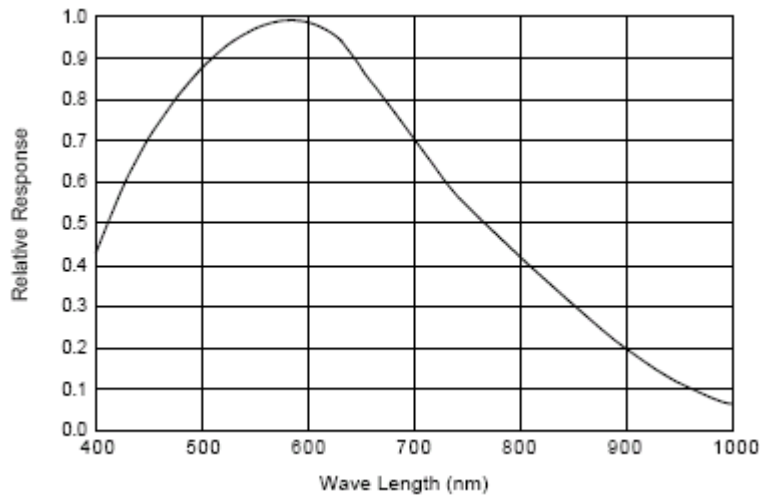


U110 Spectral Response (excludes lens and light source characteristics)

U110 Specifications	
Part Number	959933001; 959933002
Pick-up Device	Progressive Scan CCD - 659 (H) x 494 (V) pixels
Sensor Size	1/3" 4.88mm (H) x 3.66mm (V)
Capture Rate	90 full-resolution fps; higher with partial scan
Pixel Size	7.4 x 7.4 micrometers
Power	5 VDC (2.4 W)
Gain	350% to 1023%
Shutter Open	24 to 1,000,000 microseconds
Exposure Start Delay	31.72 μ sec
Software Version	Impact Software V11.5.0 or greater

U150, U150C

This camera captures a 1296 by 966 pixel size image with square pixels. It can partially scan the image horizontally and vertically.

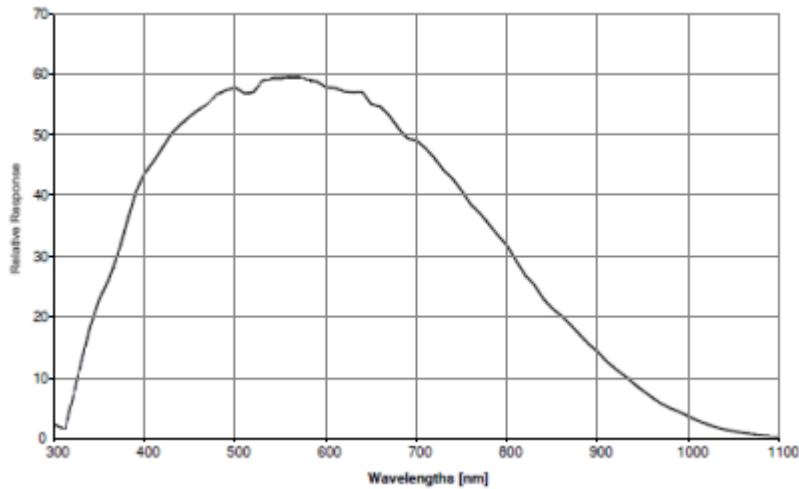


U150 Spectral Response (excludes lens and light source characteristics)

U150 Specifications	
Part Number	959933005, 959933006
Pick-up Device	Progressive Scan CCD - 1296 (H) x 966 (V) pixels
Sensor Size	1/3" 4.86mm (H) x 3.62mm (V)
Capture Rate	30 full-resolution fps; higher with partial scan
Pixel Size	3.75 x 3.75 micrometers
Power	5 VDC (2.5 W)
Gain	100% to 1023%
Shutter Open	22 to 1,000,000 microseconds
Exposure Start Delay	34.50 μsec
Software Version	Impact Software V11.5.0 or greater

U151, U151C

This camera captures a 1280 x 1024 pixel size image with square pixels. It can partially scan the image horizontally and vertically.

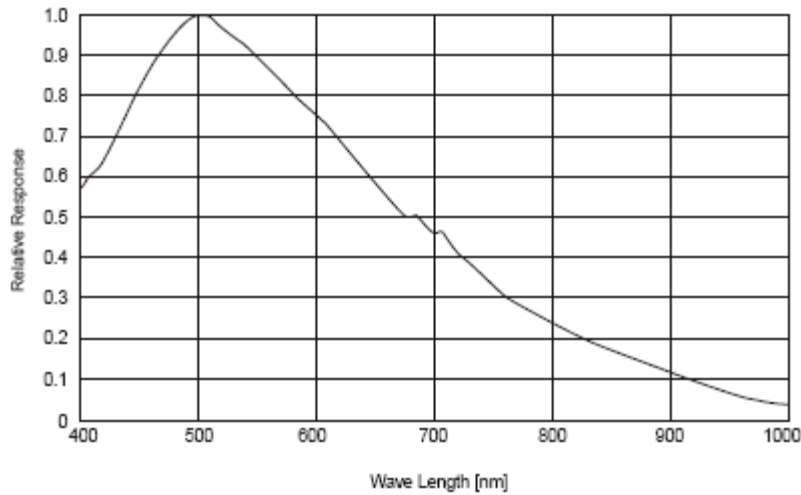


U151 Spectral Response (excludes lens and light source characteristics)

E151 Specifications	
Part Number	959933032; 959933033
Pick-up Device	Global Shutter CMOS - 1280 (H) x 1024 (V) pixels
Sensor Size	1/2" (8 mm) diag - 6.14mm (H) × 4.92mm (V)
Capture Rate	200 full-resolution fps; higher with partial scan
Pixel Size	4.8 x 4.8 micrometers
Gain	100% to 1023%
Shutter Open	16 to 1,000,000 microseconds
Software Version	Impact Software Release 11.8.0.97 or greater

U180, U180C

This camera captures a 1624 by 1234 pixel size image with square pixels. It can partially scan the image horizontally and vertically.

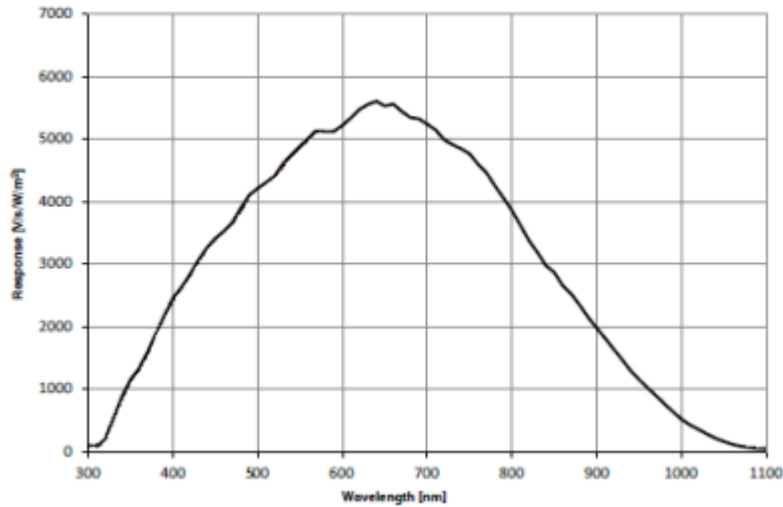


U180 Spectral Response (excludes lens and light source characteristics)

U180 Specifications	
Part Number	959933007, 959933008
Pick-up Device	Progressive Scan CCD - 1628 (H) x 1236 (V) pixels
Sensor Size	1/1.8" 7.16mm (H) x 5.44mm (V)
Capture Rate	20 full-resolution fps; higher with partial scan
Pixel Size	4.4 x 4.4 micrometers
Power	5 VDC (3.5 W)
Gain	100% to 1023%
Shutter Open	31 to 1,000,000 microseconds
Exposure Start Delay	34.50 μ sec
Software Version	Impact Software V11.5.0 or greater

U181, U181C

This camera captures a 1920 by 1200 pixel size image with square pixels. It can partially scan the image horizontally and vertically.

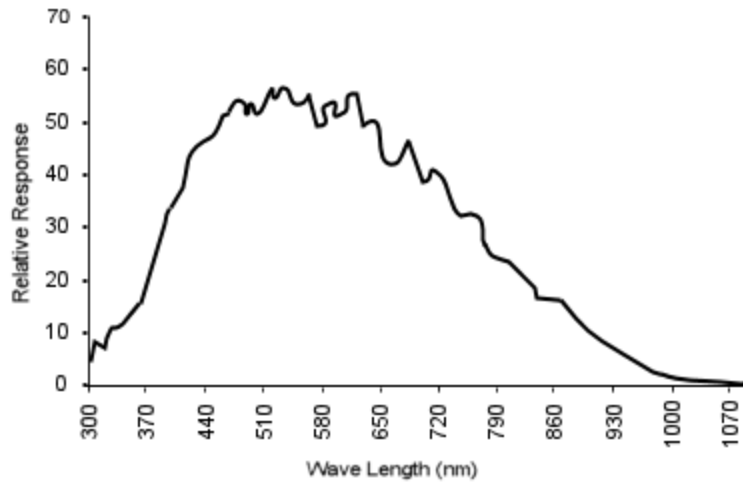


U181 Spectral Response (excludes lens and light source characteristics)

U181 Specifications	
Part Number	959933034, 959933035
Pick-up Device	Global Shutter CMOS - 1920 (H) x 1200 (V) pixels
Sensor Size	2/3" 9.5mm (H) x 6.08mm (V)
Capture Rate	150 full-resolution fps; higher with partial scan
Pixel Size	4.8 x 4.8 micrometers
Power	5 VDC (3.5 W)
Gain	100% to 1023%
Shutter Open	31 to 1,000,000 microseconds
Software Version	Impact Software V11.8.0.97 or greater

U190, U190C

This camera captures a 2048 by 1088 pixel size image with square pixels. It can partially scan the image horizontally and vertically.

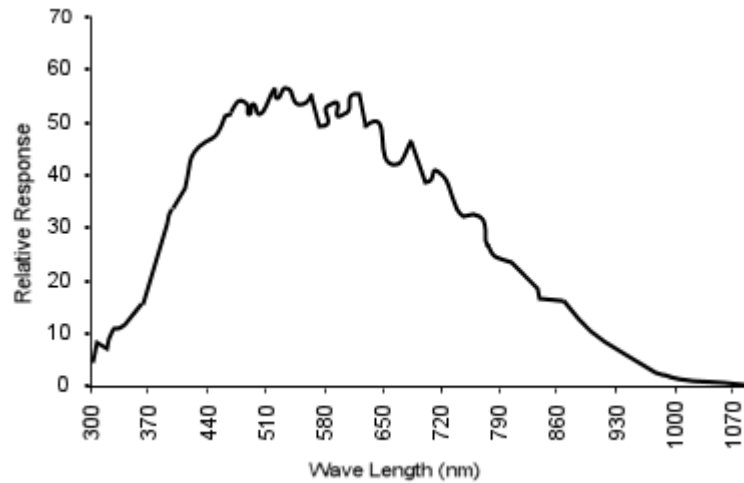


U190 Spectral Response (excludes lens and light source characteristics)

U190 Specifications	
Part Number	959933011, 959933012
Pick-up Device	CMOS - 2048 (H) x 1088 (V) pixels
Sensor Size	2/3" 11.26mm (H) x 5.98mm (V)
Capture Rate	165 full-resolution fps; higher with partial scan
Pixel Size	5.5 x 5.5 micrometers
Power	5 VDC (2.5 W)
Gain	100% to 1023%
Shutter Open	31 to 1,000,000 microseconds
Exposure Start Delay	34.50 μ sec
Software Version	Impact Software V11.5.0 or greater

U195, U195C

This camera captures a 2048 by 2048 pixel size image with square pixels. It can partially scan the image horizontally and vertically.

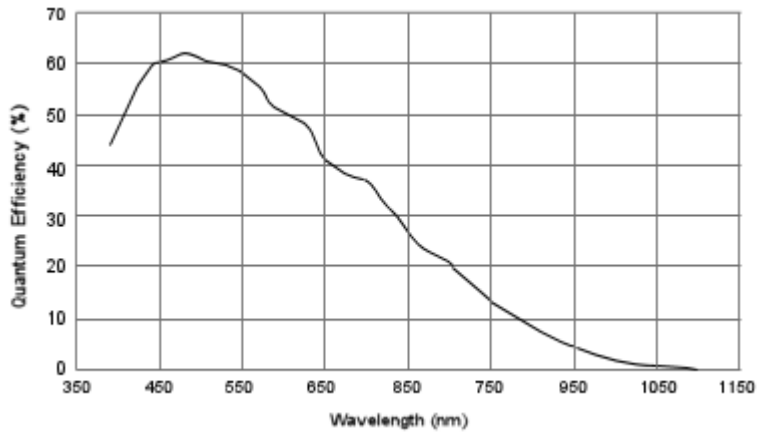


U195 Spectral Response (excludes lens and light source characteristics)

U195 Specifications	
Part Number	959933013, 959933014
Pick-up Device	CMOS - 2048 (H) x 2048 (V) pixels
Sensor Size	1" (14.8 mm) diag - 11.26 mm (H) x 11.26 mm (V)
Capture Rate	90 full-resolution fps; higher with partial scan
Pixel Size	5.5 x 5.5 micrometers
Power	5 VDC (2.6 W)
Gain	100% to 1023%
Shutter Open	31 to 1,000,000 microseconds
Exposure Start Delay	34.50 μ sec
Software Version	Impact Software V11.5.0 or greater

U197, U197C

This camera captures a 2592 by 1944 pixel size image with square pixels.

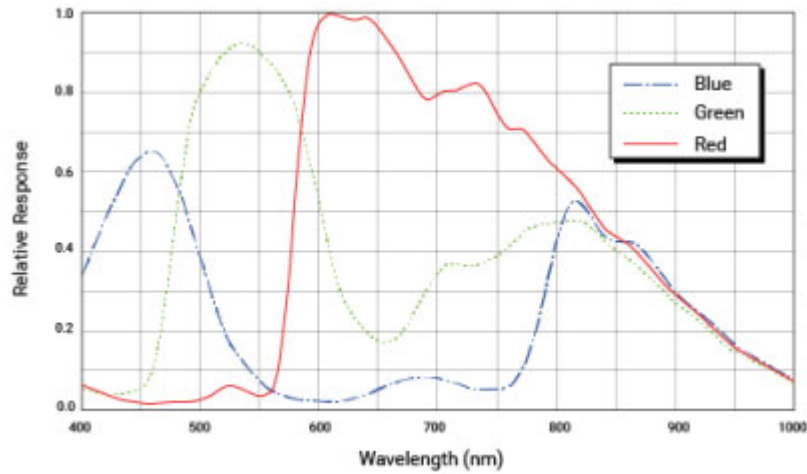


U197 Spectral Response (excludes lens and light source characteristics)

U197 Specifications	
Part Number	959933009, 959933010
Pick-up Device	Progressive Scan CMOS, Rolling Shutter - 2592 (H) x 1944 (V) pixels
Sensor Size	1/2.5" 5.70 mm (H) x 4.28mm(V)
Capture Rate	14 full-resolution fps
Pixel Size	2.2 x 2.2 micrometers
Power	5 VDC (2.2 W)
Software Version	Impact Software V11.5.0 or greater

U198, U198C

This camera captures a 2448 x 2048 pixel size image with square pixels. It can partially scan the image horizontally and vertically.



U198C Spectral Response (excludes lens and light source characteristics)

U198 Specifications	
Part Number	
Pick-up Device	Global Shutter CMOS - 2448 (H) x 2048 (V) pixels
Sensor Size	2/3" (11.1 mm) diag - 8.4 mm (H) x 7.1 mm (V)
Capture Rate	20 full-resolution fps; higher with partial scan
Pixel Size	3.45 x 3.45 micrometers
Gain	100% to 1023%
Shutter Open	112 to 1,000,000 microseconds
Software Version	Impact Software Release 11.10 or greater

Third-party Cameras

Basler Cameras

The MX-U81 Processor and Impact Software can support Basler Ace and Scout USB model cameras. Ace model numbers begin with “acA” and Scout model numbers begin with “scA.” For complete details and the most accurate specifications for these cameras, consult the manufacturer’s documentation.

The only other third-party cameras the MX-U81 Processor and Impact Software will support are listed in this section. This information, including power and trigger signal connections, are provided by Datalogic as a convenience.

Datalogic assumes no responsibility for the accuracy or timeliness of this third-party camera information.

For complete details and the most accurate specifications for these cameras, consult the manufacturer’s documentation.

You must purchase a license from Datalogic to connect a third-party camera to the MX-U81 processor.

JAI Camera

Model (USB 3.0)	Resolution (Megapixels)	Color	Image Horizontal	Image Vertical	Minimum Software Version Required
SP-20000M	20	No	5120	3840	11.8.0.97

This camera requires an MX-U40 or MX-U80 processor. See “Note on Device Driver Install” on page 46.

JAI Camera Connection

To connect JAI camera power, trigger signals, and strobe outputs, use cable 606-0671-xx (12-pin Hirose connector on one end, with the other end unterminated).

Pin	Color	Signal Name	Notes
1	Wht/Blu	Camera Power Ground	See Note 1 below
2	Wht/Org	Camera Power VCC	+12VDC to +24VDC $\pm 10\%$, 450mA, 5.4W (at normal, Full resolution, DC+12V) See Notes 1 and 2 below
3	Wht/Brn	DO NOT USE	
4	Brn/Wht	DO NOT USE	
5	Wht/Grn	Camera Trigger -	
6	Wht/Gry	Camera Trigger +	+0 to +24 VDC Off: 0 to + 1.4 VDC On: +3.3 to + 24 VDC Maximum: +24 VDC
7	Gry/Wht	Strobe Trigger -	

Pin	Color	Signal Name	Notes
8	Blu/Wht	Strobe Trigger +	+5 to +24 VDC Maximum: +24 VDC
9	Org/Wht	DO NOT USE	
10	Grn/Wht	DO NOT USE	
11	Red/Blu	Camera Power VCC	See Note 1 below
12	Blu/Red	Camera Power Ground	See Note 1 below

NOTE 1: Pins 2 and 11 are tied together inside of the camera. Pins 1 and 12 are tied together inside of the camera. To avoid a voltage drop when there are long wires between your power supply and the camera, we recommend that you provide camera power VCC through separate wires between your power supply and pins 2 and 11 on the camera, and that you provide camera power ground through separate wires between your power supply and pins 1 and 12 on the camera.

NOTE 2: Although the USB 3.0 interface is capable of supporting both data and power, the power supplied through the interface is not sufficient to operate the camera. A separate power supply unit must be connected to the 12-pin connector.

Note on Device Driver Install

The first time you connect a JAI camera to the MX-U81 processor, you must install a device driver for the camera.

To install the device driver:

1. Use a USB cable to connect the camera to one of the USB camera ports on the processor.
2. On the processor Windows interface, click Start - Control Panel.
3. Select Device Manager from the list of options.
4. In the list of devices, you should see a listing for "Other Devices/USB3 Vision Device" with a yellow warning icon.
5. Double-click the item, then click Update Driver.
6. Click "Browse My Computer for driver software."
7. Click "Let me pick from a list of device drivers on my computer."
8. Select "Basler USB3 Vision Cameras" from the list, then click Next
9. Select "Basler Ace USB3 Vision Camera" from the list, then click Next.
10. When the "Update Driver Warning" message is displayed, click Yes.
11. The message "Windows has successfully updated your driver software" should be displayed.
12. From Windows, select Start - Shut down - Restart.
13. When the computer restart is finished, you can use VPM to connect to the camera.

Note on Processor Fails to Start

The first time a JAI camera is connected to an MX-U81 processor, the processor may fail to start correctly and stop with the Windows screen displayed. To correct this issue, you must change a BIOS setting on the processor.

To change the XHCI Legacy BIOS Setting

1. Restart Windows. While the processor is restarting, repeatedly press the DEL key.

2. When the BIOS configuration menu is displayed, select Advanced.
3. Select USB Configuration.
4. Select XHCI Legacy Support and disable it.
5. Select Save and Exit.

Processor I/O

There are two versions of the MX-U processor, one with sourcing outputs - MX-U81-4-P-1, and one with sinking outputs - MX-U81-4-N-1.

This section discusses the MX-U81 Processor I/O scheme. Refer to this section for all specifications when wiring your inputs and outputs into the Processor.

Note: Your MX-U81 Processor does not provide a voltage source for inputs and outputs – it must be provided by an external source. Refer to the module tables below for more voltage requirement information.

Note: The Trigger Signal and Strobe Output for MX-U81 cameras are separate and not part of the MX-U81 Processor inputs and outputs. See MX-U81 Cameras on page 21 for details.



Processor I/O Connection

To connect MX-U81 processor input and output signals use either cable 606-0675-xx (37 pin D-sub Male to Male Cable) with terminal block 248-0110, or use cable 606-0675-xx and remove one end (to create a pigtail) with no terminal block.


IMPORTANT: Do not connect or disconnect the cable while power is on

Current Sinking (NPN) I/O

Connector and terminal numbers for model numbers containing the letter “N” are listed in the following table.

Connector or terminal number	Color Code	Signal Name
1	Black	Output Minus (Note 1)
2	Brown	Input 1- and Event 1-
3	Red	Input 2- and Event 2-
4	Orange	Input 3-
5	Yellow	Input 4-
6	Green	Input 5-
7	Blue	Input 6-
8	Purple	Input 7-
9	Gray	Input 8-
10	White	Input 9-
11	Pink	Input 10-
12	Light Green	Input 11-
13	Black/White	Input 12-
14	Brown/White	Input 13-

Connector or terminal number	Color Code	Signal Name
15 16	Red/White Orange/White	Input 14- Input 15-
17 18	Green/White Blue/White	Input 16- Input Plus (Note 2)
19	Purple/White	No Connection
20 21	Red/Black Orange/Black	Output Minus (Note 1) Output 1
22 23	Yellow/Black Green/Black	Output 2 Output 3
24 25	Gray/Black Pink/Black	Output 4 Output 5
26 27	Pink/Red Pink/Blue	Output 6 Output 7
28 29	Pink/Green Light Blue	Output 8 Output 9
30 31	Light Blue/Black Light Blue/Red	Output 10 Output 11
32 33	Light Blue/Blue Light Blue/Green	Output 12 Output 13
34 35	Gray/Red Gray/Green	Output 14 Output 15
36 37	Purple/Black Blue/Black	Output 16 Output Plus (Note 3)



J1 (37 Pin "D" Sub Female)
AMP Part 747916-4
Part 244-0287
(Solder Side)

NPN NOTES:

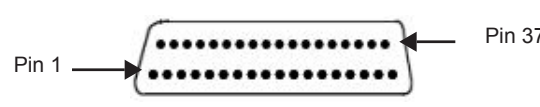
1. Common Minus for output ports (External 12 to 24VDC Minus)
2. Common Plus for input ports (External 12 to 24VDC Plus)
3. Common Plus for output ports (Not an output voltage source. External 12 to 24VDC Plus is required)

Current Sourcing (PNP) I/O

Connector and terminal numbers for model numbers containing the letter "P" are listed in the following table.

Connector or terminal number	Color Code	Signal Name
1 2	Black Brown	Input Minus (Note 4) Input 1- and Event 1-
3 4	Red Orange	Input 2- and Event 2- Input 3-

Connector or terminal number	Color Code	Signal Name
5 6	Yellow Green	Input 4- Input 5-
7 8	Blue Purple	Input 6- Input 7-
9 10	Gray White	Input 8- Input 9-
11 12	Pink Light Green	Input 10- Input 11-
13 14	Black/White Brown/White	Input 12- Input 13-
15 16	Red/White Orange/White	Input 14- Input 15-
17 18	Green/White Blue/White	Input 16- Output Plus (Note 5)
19 20	Purple/White Red/Black	No Connection No Connection
21	Orange/Black	Output 1
22 23	Yellow/Black Green/Black	Output 2 Output 3
24 25	Gray/Black Pink/Black	Output 4 Output 5
26 27	Pink/Red Pink/Blue	Output 6 Output 7
28 29	Pink/Green Light Blue	Output 8 Output 9
30 31	Light Blue/Black Light Blue/Red	Output 10 Output 11
32 33	Light Blue/Blue Light Blue/Green	Output 12 Output 13
34 35	Gray/Red Gray/Green	Output 14 Output 15
36 37	Purple/Black Blue/Black	Output 16 Output Plus (Note 5)



Pin 1 → ← Pin 37

J1 (37 Pin "D" Sub Female)
 AMP Part 747916-4
 Part 244-0287
 (Solder Side)

PNP NOTES:

- 4. Common Minus for input ports (External 12 to 24VDC Minus)
- 5. Common Plus for output ports (Not an output voltage source. External 12 to 24VDC Plus is required)

Processor Inputs

The MX-U81 Processors contain sixteen general-purpose input connections.

Two inputs serve as both event and polled inputs (Inputs 1 and 2). The remaining inputs are polled. The event inputs are interrupt-driven which means that a change of state on the input will immediately cause an action and any inspection task that uses that input will run. Polled input means that the input's status is checked based on conditions defined in the inspection task.

Interrupt-driven inputs are edge-triggered and the duration of the input pulse must be longer than the debounce time. The active trigger edge (rising, falling, or both), input pulse duration, and debounce, are all configured in the Vision Program Manager Settings tab.

This table describes the input characteristics.

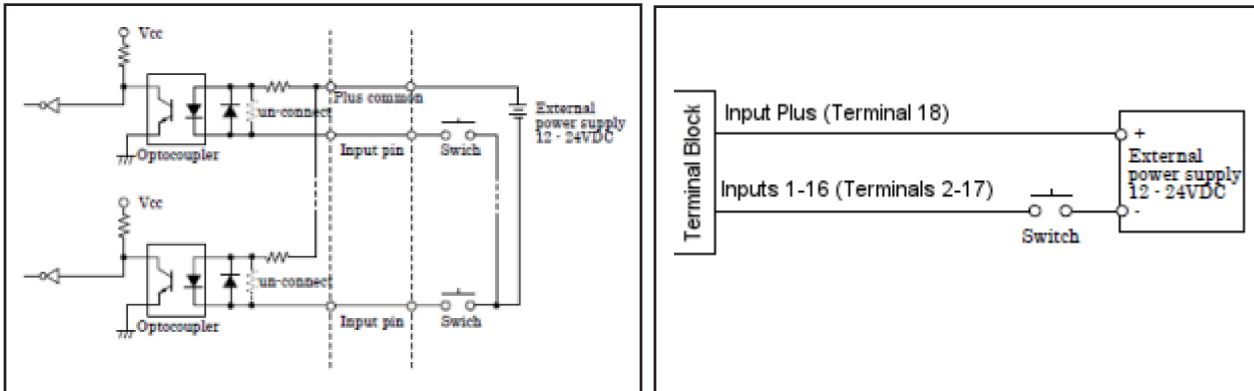
Input Resistance (nominal)	Input Voltage	Turn On Current	Turn Off Current	Maximum Current	Isolated Voltage
4.7k @	5-24 Vdc	>2 mA	< 0.16Ma	5.1 mA @ 24Vdc	1000 Vrms

Input Wiring

Note: All connections to inputs must be made using properly grounded shielded cable.

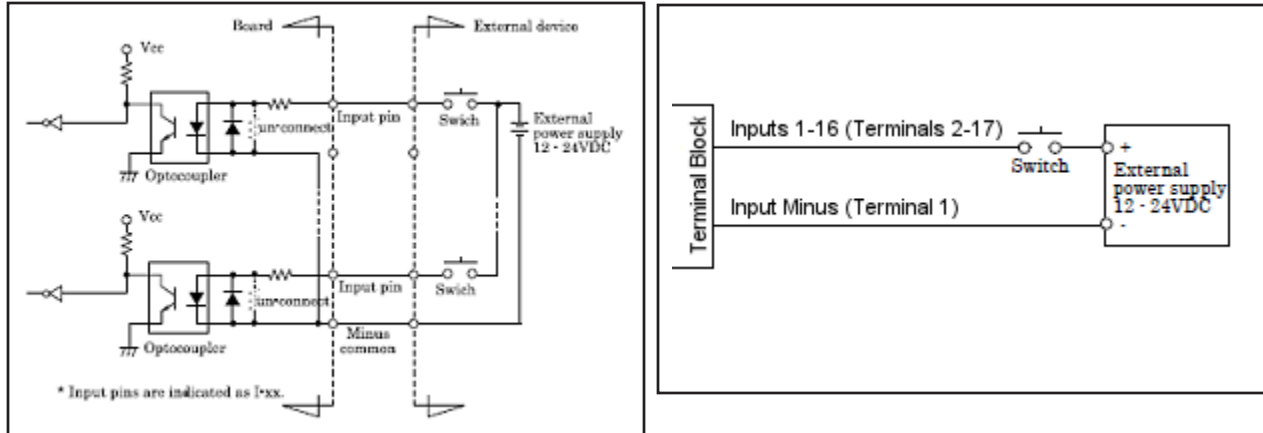
Current Sinking (NPN) Input Circuit

The diagram below shows how to wire a sensor to a general purpose or event input for model numbers containing the letter "N." All inputs are compatible with current sinking output signals. Pin 18 is the "Input Plus Common" connection for all the inputs.



Current Sourcing (PNP) Input Circuit

The diagram below shows how to wire a sensor to a general purpose or event input for model numbers containing the letter “P.” All inputs are compatible with current sourcing output signals. Pin 1 is the “Input Minus Common” connection for all the inputs.



Processor Outputs

The MX-U81 Processors contain sixteen general-purpose current-sink type output connections.

The table below describes the output's electrical characteristics.

Supply Voltage	+5 VDC (minimum) to +35 VDC (maximum)
Source Current (maximum)	100 Milliampères per output

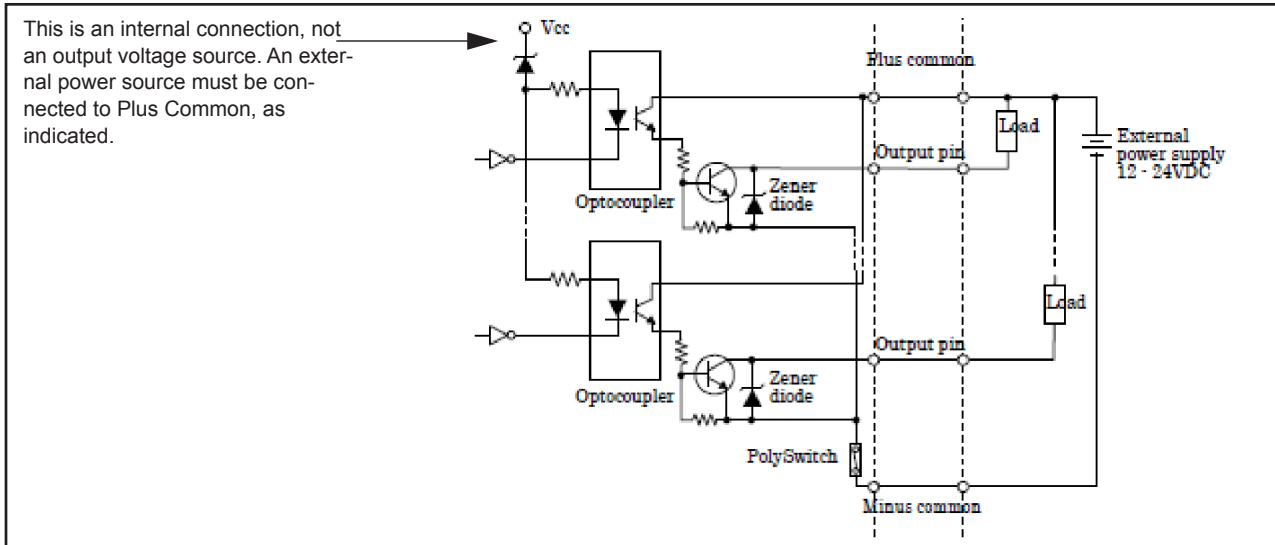
Note: An external power source is required to power an output load. The outputs are merely switches that are open or closed. All output connections must use properly grounded and shielded cable.

Note: The Trigger Signal and Strobe Output for MX-U81 cameras are separate and not part of the MX-U81 Processor inputs and outputs. See MX-U81 Cameras on page 21 for details.

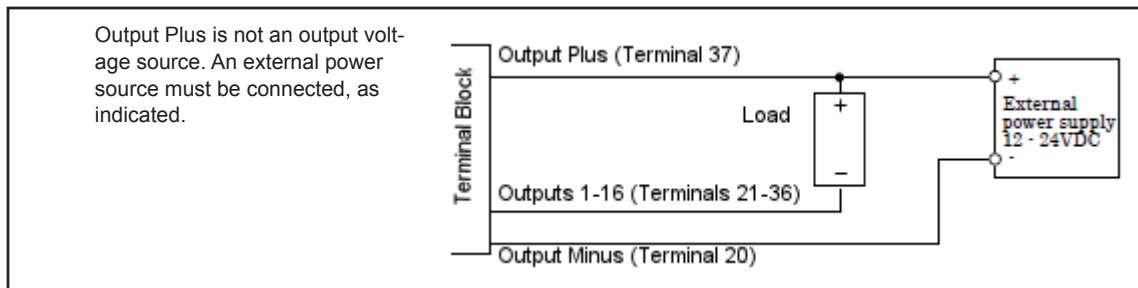
Output Wiring

Current Sinking (NPN) Output Circuit

The diagrams below show internal circuit diagrams and how to wire processor outputs for model numbers containing the letter "N."

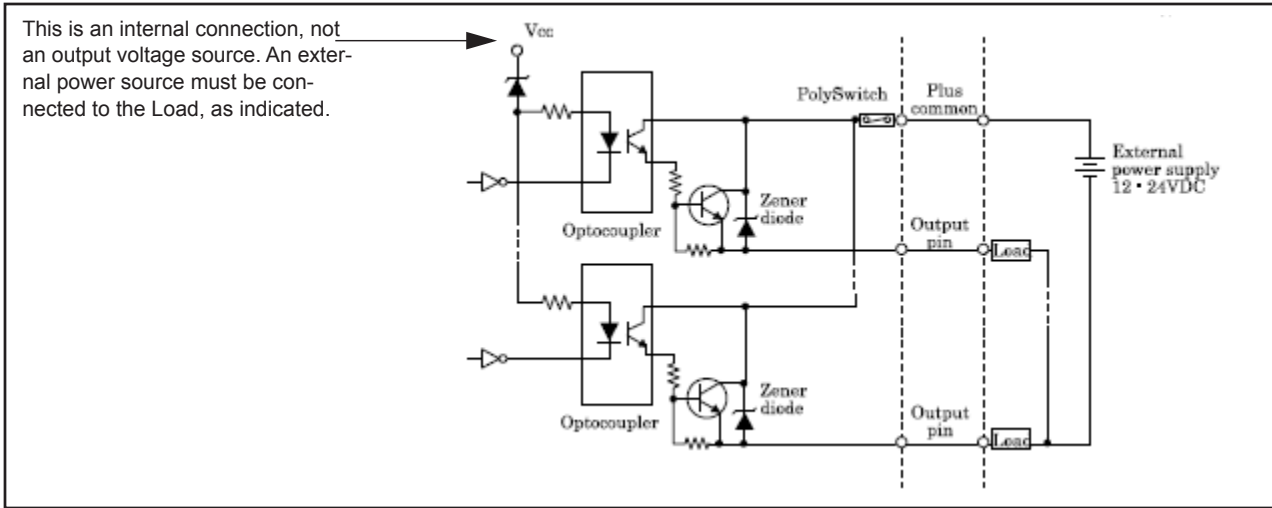


NOTES: To prevent output damage, all inductive loads must have noise suppressors connected directly across the load, as close to the load as possible.

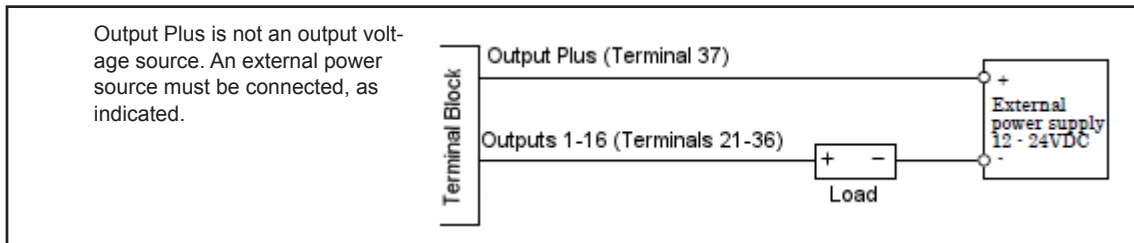


Current Sourcing (PNP) Output Circuit

The diagrams below show internal circuit diagrams and how to wire processor outputs for model numbers containing the letter "P."



NOTES: To prevent output damage, all inductive loads must have noise suppressors connected directly across the load, as close to the load as possible.



Cable Reference

This chapter documents MX-U81 Processor and Camera cable assemblies.

Processor Cables

The following cables connect different hardware devices to the Processor.

Ethernet

An Ethernet cable (Part number 606-0457-xx) is used to connect the MX-U81 Processor to any external network. The last two digits of the part number indicate the cable length in feet. We recommend you use shielded Cat5e Ethernet cable or better to connect the Processor.

A crossover cable is not required because the Ethernet ports are auto-negotiating; that is they can tell the difference between a peer-to-peer connection and a router/switch connection and they configure themselves and the communications to suit the environment.

Input/Output

The terminal block and cable for connecting MX-U81 processor are listed in the table below. For connection diagrams, see “Processor I/O Connection” on page 49. The last two digits of the part number indicate the cable length in meters.

Connector Type	Part Number
Terminal Block - 37 pin D-sub to Screw Terminal	248-0110
I/O Cable - 37 pin D-sub Male to Male Cable (for use with above terminal block)	606-0675-xx
37 pin D-sub Male to pigtail (remove one end)	606-0675-xx

Power Supply


This equipment is to be powered by a Listed power supply for the U.S. and Canada, or a power supply that meets the requirements for use where either IEC 60950 or EN60950 is applicable.

See “Power Supply Connection” on page 15 for more details on wiring the power supply cable.

Serial Port

A standard serial cable is used to connect the Processor to the serial port on an external device (e.g. terminal, PLC, motion controller, data recorder). This may require using a null modem cable or adapter. The serial port does not support hardware (CTS/RTS) or software (Xon/Xoff) data flow control. Impact software supports RS-232 communication protocol only. RS-485 is not supported.

Pin Number	Signal Name
1	No Connection
2	Received Data (RXD)
3	Transmitted Data (TXD)
4	No Connection
5	Signal Ground (GND)
6	No Connection
7	Request To Send (RTS)
8	Clear To Send (CTS)
9	No Connection



9 Pin Male
(Pin Side)

Monitor/Panel

The monitor/panel port provides RGB, DVI, and SDL video signals. The processor requires a monitor and keyboard when it first starts, and to configure the system. A VGA cable (5 meters maximum) with the appropriate adapter can be used on this connector.

Display Port

The display port provides DVI and HDMI video signals.

USB Processor to Camera

A USB 3.0 cable is used to connect the MX-U81 Processor to the U-Series camera. (USB 3.0, Micro B screw lock/A, 3 m)

Camera Cable

U1xx

The terminal block and cable for connecting U1xx cameras are listed in the table below. For cable wire color codes and connection diagrams, see “U1xx Camera Connection” on page 25. The last two digits of the part number indicate the cable length in meters.

Connector Type	Part Number
Terminal Block	661-0399
Camera Cable - DB9 to 6-pin Hirose Male (for use with above terminal block)	606-0674-xx
Hirose 6-pin Male to pigtail (for use with no terminal block)	606-0672-xx

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