



It's Under Control®

RTI-ICP-2

User Manual



RTI-ICP-2

Compact intelligent control processor with three IR ports, one two-way RS-232 port, two relay/trigger outputs, two sense inputs, built-in Wi-Fi and dual Gigabit Ethernet with PoE.

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Introduction

The ICP-2 is a compact control processor for single-room and small office installations. It runs the same drivers and the same Integration Designer® (ID12.0 or higher) programs as the rest of the range from a chassis small enough to sit behind a display or on a shelf, and adds built-in Wi-Fi alongside its two Gigabit Ethernet ports.

Control programs are authored in RTI's Integration Designer® software (version 12.0 or higher) on a Windows PC and downloaded over USB or Ethernet. Drivers run on a JavaScript-based platform, and the processor runs Yocto with embedded Linux operating system with a real-time clock for time-based events and sleep timers.

Features

- Three (3) IR output ports, 5V mono 3.5mm, individually adjustable by potentiometer
- One (1) two-way RS-232 port on an RJ-45 connector
- Two (2) programmable relay outputs rated 3A @ 30VDC
- Two (2) assignable voltage sense inputs, 3-24VDC
- Dual Gigabit Ethernet (10/100/1000) operating as a two-port switch
- Power over Ethernet or DC powered
- Built-in Wi-Fi (5GHz and 2.4GHz)
- One (1) USB-A host port for supported accessories and dongles
- USB-C programming port
- RTI COM port for the ZM-24 Zigbee® transceiver module
- Real-time clock with Network Time Protocol synchronisation
- Non-volatile flash storage retains the system configuration without power
- Field-upgradeable firmware with failsafe storage during download
- Front panel status indicators and multifunction reset buttons
- Compact plastic enclosure; flat mountable with optional feet, or VESA, Wirepath ONE and DIN rail options

What's in the box

- One (1) ICP-2 Intelligent Control Processor
- One (1) 12VDC power supply with international interchangeable blades
- One (1) RJS-232 connector
- One (1) Wall Mount Plate
- Four (4) Self-tapping screws with Drywall Anchors
- Terminal blocks (phoenix connectors, shipped plugged into the unit)
- One (1) Quick reference card with QR code to this online reference guide

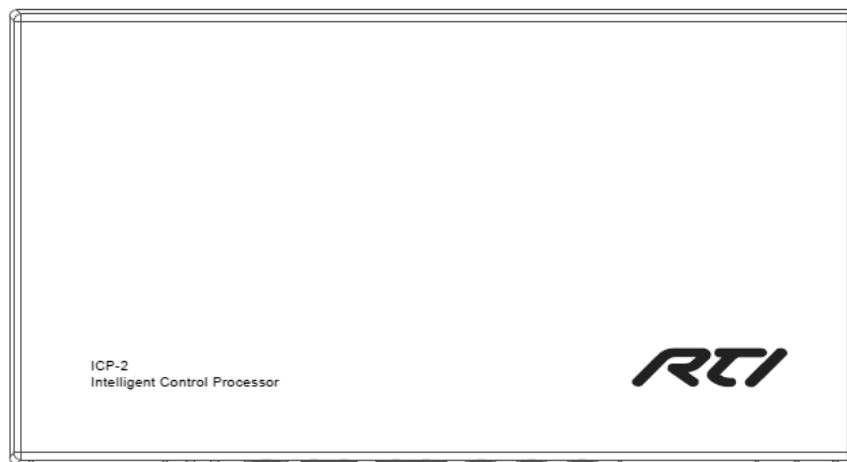
Specifications

PROCESSING & MEMORY:	
PROCESSOR	NXP i.MX8MM
OPERATING SYSTEM	Yocto with embedded Linux
RAM	3GB
FLASH STORAGE	16GB
REAL-TIME CLOCK	Yes, Time-Based Events and Sleep Timers, NTP Synchronization
DRIVER PLATFORM	Javascript Based, Node.js Capable
IR:	
IR OUTPUT PORTS	Three (3), Output Only
IR OUTPUT CONNECTOR	5v Mono 3.5mm
IR OUTPUT LEVEL	Variable By Potentiometer, Adjustable Per Port (Accessible On Top Of The Unit)
IR OUTPUT CURRENT	100mA Maximum Per Port
IR FREQUENCY RANGE	15khz - 460khz
Serial:	
RS-232 PORTS	One (1), Two-Way
RS-232 CONNECTOR	RJ-45
RS-232 BAUD RATE	Up To 19,200 bps
Sense Inputs & Relay Outputs:	
SENSE INPUTS	Two (2), Assignable Digital / Closure
SENSE INPUT VOLTAGE	3 – 24VDC; Off / Low Must Not Exceed 1VDC
RELAY OUTPUTS	Two (2), Programmable
RELAY RATING	3A@30VDC Max Each Relay
RELAY DEFAULT STATE	Normally Open; Programmable as Normally Closed While Powered
CONNECTOR	Phoenix Terminal Blocks, A / B Per Channel
Network & Expansion:	
ETHERNET PORTS	Two (2) Ethernet 1 (PoE) and Ethernet 2
ETHERNET SPEED	Gigabit, 10/100/1000 Mb/S
NETWORK INTERFACES	Two-Port Ethernet Switch
USB-A HOST (REAR)	One (1) USB 2.0, For Supported Third-Party Dongles
USB-C (PROGRAMMING)	One (1) USB 2.0 Device, For Integration Designer (ID12.0 or higher)
RTI COM	One (1) Supports The ZM-24 Zigbee® Transceiver Module
WI-FI	Built In — 5GHz and 2.4GHz
Control & Programming:	
PROGRAMMING SOFTWARE	RTI Integration Designer® (Must be ID12.0 or higher)
DOWNLOAD METHODS	USB-C Programming Port or Ethernet
FIRMWARE	Field Upgradeable Existing Firmware Retained Until A New Download Completes Successfully
BUTTONS	Multifunction By Hold Time — DHCP, Reset, and Factory Reset
Power:	
DC INPUT	12VDC, 2A
DC CONNECTOR	5.5mm Barrel, Negative Case
POWER SUPPLY	International 110-240v AC to DC, Interchangeable Blades
POWER OVER ETHERNET	IEEE 802.3af Type 1, Up To 15.4W, on Ethernet 1
Enclosure & Mounting:	
MATERIAL	Plastic
COLOR	Black
WIDTH	7.7" (195mm)
DEPTH	4.1" (104mm)
HEIGHT	1.2" (30mm)
WEIGHT	10.5oz (298g)
MOUNTING	Flat Surface; VESA, Wirepath ONE and Screw-On DIN Rail
Compliance:	
REQUIRED MARKS	CE, FCC, RCM, UKCA

Panel Overview



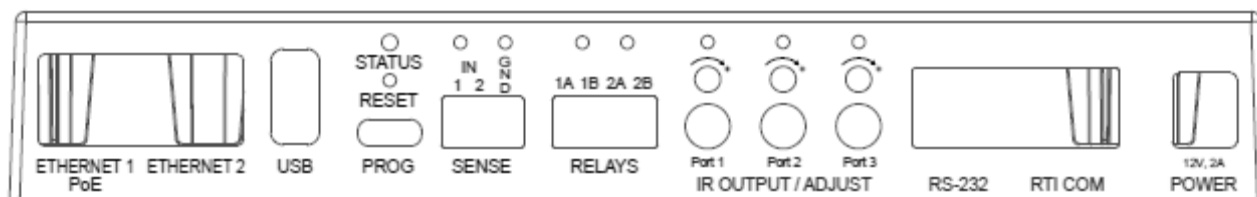
ICP-2 OVERVIEW



ICP-2 TOP PANEL

The ICP-2 has been designed to be simple and streamlined so the connectors and indicators are only on one edge.

Panel Overview



ICP-2 REAR PANEL CONNECTIONS

Connectors are grouped from left to right as follows.

ETHERNET 1 / POE	Gigabit Ethernet; Also, Powers the Processor Over PoE
ETHERNET 2	Gigabit Ethernet; Second Port of the Built-In Switch
USB-A HOST	USB-A Host Port for Supported Accessories and Dongles
USB-C (PROGRAMMING)	Connection to Integration Designer for Program and Firmware Download
SENSE INPUTS 1-2	Voltage sense inputs
RELAY OUTPUTS 1-2	Each Relay is Separate with Two Connections per Contact
IR PORTS 1-3	5v Mono 3.5mm IR Outputs (Does Not Accept MPIO Accessories)
RS-232	RJ-45 Two-Way Serial Port
RTI COM	Connection for ZM-24 Zigbee® Transceiver
POWER	+12vdc, 2A (Not Required if Using PoE)

Mounting

The ICP-2 is a compact unit designed to sit on a flat surface, tuck behind a display, or mount to a bracket. It ships with a wall mount plate to make mounting setup easier and allow the ICP-2 to be clipped into position.

For fixed installations the ICP-2 is compatible with VESA mounting and with Wirepath ONE brackets. Leave clearance around the unit for airflow and for cable strain relief at the rear.

Initial Setup

Work through these steps in order to get the ICP-2 installed, powered, connected and ready to receive its first system file. The sections that follow cover each connector group in detail.

1. Install the ICP-2 on its surface, bracket or DIN rail. See Mounting above.
2. Connect IR emitters to the IR PORTS. Each port is a 5V mono 3.5mm output.
3. Connect the two-way serial device to the RS-232 port using Cat-5/6 cable terminated to the pinout given in this guide.
4. Wire contact-closure and voltage sources into the SENSE INPUTS terminal blocks, and wire the devices you intend to switch into the RELAY / TRIGGER OUTPUTS terminal blocks.
5. If the system uses RTI Zigbee® handheld controllers, connect a ZM-24 transceiver module to the RTI COM port.
6. Connect the network. Use ETHERNET 1 / PoE if the switch supplies Power over Ethernet; the processor will draw its power from that port. ETHERNET 2 is the second port of the built-in switch and can feed another device at the same location.
7. If the network does not supply PoE, connect the supplied 12VDC power supply to the POWER jack and then to a suitable power source.
8. Power on the connected source and destination equipment.
9. Watch the front panel Status indicator. Solid red means the operating system is starting. Solid green means the system file and drivers have loaded. The indicator goes off when the processor is ready for use.
10. Update the firmware before programming. See Updating Firmware.
11. Create the control program in Integration Designer® (ID12.0 or higher) and download it to the processor over the USB-C programming port or over Ethernet.
12. With the system file loaded, verify control of each connected device. If a device is not responding over IR, adjust that port's output level using the IR adjustment potentiometer on the top of the unit.

NOTE: The ICP-2 must be programmed to operate. It will not control anything until a system file has been downloaded.

Programming the ICP-2

All programming is done using RTI's Integration Designer® software (ID12.0 or higher) on a Windows PC. The software creates the control program, referred to as an ID file, and identifies each processor by a unique identifier.

Programs are downloaded over the USB-C programming port or over Ethernet. Network settings, sense input modes, and relay and trigger output modes are all configured within Integration Designer® (ID12.0 or higher) and downloaded as part of the system file.

Updating Firmware

It is highly recommended that this and all RTI products have the latest firmware installed. Firmware is available by selecting the Firmware button in the AVPro Connect section of the AVPro Global website at <https://www.avproglobal.com>

NOTE: The ICP-2 retains the currently installed firmware while a new file downloads and only transfers over once the download has completed successfully. A failed or interrupted download will not leave the processor without working firmware.

IR Ports

The ICP-2 provides three IR output ports on 5V mono 3.5mm connectors. The ports are output only. Infrared transmission covers a frequency range of 15kHz to 460kHz, and each port supplies up to 100mA.

IR Output Gain Adjustment

IR output level is adjustable per port by potentiometer.

1. The IR output adjustment potentiometers are located on the top of the unit.
2. Locate the potentiometer for the affected port.
3. Rotate it clockwise for higher output power, or counter-clockwise for lower output power.
4. Test the device again and repeat until control is reliable.

NOTE: The IR output indicator illuminates in response to an output signal on any port.

RS-232 Ports

The ICP-2 provides one two-way RS-232 port on an RJ-45 connector for bi-directional communication with a supported device. The connector carries no LEDs. Serial communication is supported at baud rates up to 19,200 bps through the applicable RTI driver.

IMPORTANT NOTE

RS-232 communication cabling should be kept short and well away from mains wiring. Confirm the baud rate set in Integration Designer® (ID12.0 or higher) matches the connected device.

RS-232 Port Pinout

RJ-45 (ICP-2 RS-232 PORT)		
1	DSR	Data Set Ready
2	DCD	Carrier Detect
3	DTR	Data Terminal Ready
4	GND	Signal Ground / Common
5	RXD	Receive Data
6	TXD	Transmit Data
7	CTS	Clear To Send
8	RTS	Request To Send

NOTE: Pins 1, 2 and 3 are wired for compatibility but are not required for communication with supported devices. Pins 4 through 8 carry the signals used by RTI drivers.

Sense Inputs

The ICP-2 provides two digital sense inputs on phoenix terminal blocks, with A and B terminals per input. On sensing voltage, events such as a macro or command can be triggered automatically.

Sense voltage input: Connect the positive lead from the voltage source to Side A of the sense input and the ground lead to Side B.

NOTE: Sense inputs accept 3-24VDC. The off or low state must not exceed 1VDC.

Relay Outputs

Two programmable relay outputs are provided on phoenix terminal blocks, with A and B terminals per output. Relay modes are configured within Integration Designer® (ID12.0 or higher). Connect the A and B contact terminals of a relay to the device.

NOTE: All relays are Normally Open when not energized and may be programmed to behave Normally Closed while power is applied to the processor. Each relay is rated 3A@30VDC.

Ethernet and Power over Ethernet

Two Gigabit Ethernet ports are provided. ETHERNET 1 / PoE and ETHERNET 2 operate as a two-port switch, so a second device at the same location can be fed from ETHERNET 2 without a separate switch. Both ports support 10/100/1000 Mb/s.

ETHERNET 1 / PoE will power the processor from a switch or injector supplying IEEE 802.3af Type 1 power, up to 15.4W. When PoE is used, the 12VDC power supply is not required.

Network settings such as the IP address, and the mode of operation, are configured within Integration Designer® (ID12.0 or higher). Ethernet may also be used to download system files to the processor.

NOTE: The MAC address is programmed during manufacture, stored in non-volatile memory, and drawn from a range assigned to RTI. The MAC address label is applied near the Ethernet ports.

Wi-Fi

The ICP-2 has Wi-Fi built in, supporting both 5GHz and 2.4GHz bands. Wireless settings are configured within Integration Designer® (ID12.0 or higher) and downloaded as part of the system file. Wi-Fi may be used in place of a wired network connection to connect to the local network. There is no bridge between Wi-Fi and wired Ethernet.

NOTE: A wired connection to ETHERNET 1 / PoE is recommended for the initial system file download and for installations that depend on Power over Ethernet.

USB Ports

USB-A HOST PORT

One USB-A host port, USB 2.0. This is provided for connection of a supported third-party dongle, such as an audio output adaptor, and for future accessories and features.

USB-C PROGRAMMING PORT

USB 2.0 device port on the rear panel, used for connection to Integration Designer® (ID12.0 or higher) on a Windows PC, for download of program files and firmware updates. The port presents an RTI-specific USB identifier so the software can recognize the processor.

RTI COM Port

The RTI COM port supports a ZM-24 Zigbee® transceiver module, providing 2.4GHz communication with compatible RTI handheld controllers. Refer to the ZM-24 operation guide for installation instructions.

Status Indicators

Indicators are red unless otherwise specified, diffused and flush mounted.

INDICATOR BEHAVIOUR:	
POWER	SOLID — POWER APPLIED
STATUS — SOLID RED	PROCESSOR IS PLUGGED IN AND BOOTING; THE OPERATING SYSTEM IS STARTING UP
STATUS — SOLID GREEN	SYSTEM FILE AND DRIVERS HAVE BEEN LOADED
STATUS — OFF	PROCESSOR HAS FINISHED STARTING UP AND IS READY FOR USE
STATUS — BLINK GREEN	EXECUTING COMMANDS OR MACROS DURING OPERATION
RELAY	SOLID RED — ACTUATED
SENSE	SOLID RED — RESPONSE TO INPUT SIGNAL
IR OUTPUT	SOLID RED — RESPONSE TO OUTPUT SIGNAL
NET LINK	SOLID RED — SUCCESSFULLY CONNECTED TO ETHERNET

Reset Buttons

The front panel button is multifunction, with the action determined by how long the button is held.

- **Reboot.**
 - Press and hold for between 2 to 5 seconds.
 - Reboots the processor.
- **DHCP reset.**
 - Press and hold for between 10 to 30 seconds.
 - Returns the processor to DHCP addressing.
- **Factory reset.**
 - Press and hold for longer than 30 seconds.
 - Returns the processor to its factory configuration.
 - The system file must be downloaded again afterwards.

RTI Accessories Supported

SUPPORTED CONNECTIONS:	
TOUCHPANELS	ETHERNET
REMOTE CONTROLS	WI-FI VIA ROUTER FROM ETHERNET; ZIGBEE® 2.4GHZ VIA COM PORT TO ZM-24
EXPANSION PROCESSORS	ETHERNET
THIRD-PARTY DEVICES	ETHERNET or RS-232 CONTROL — AUDIO, VIDEO, CABLE BOXES, TV, PROJECTORS, LIGHTING, HVAC, SECURITY

Troubleshooting

Work through the checks below before contacting Technical Support.

THE ICP-2 DOES NOT RESPOND TO ANY COMMANDS

The processor must be programmed to operate. Confirm that a system file has been created in Integration Designer® (ID12.0 or higher) and downloaded over the USB-C programming port or over Ethernet. Check the Status indicator: if it is off, the processor has started up and is ready.

THE PROCESSOR WILL NOT POWER UP

If powering over PoE, confirm the network cable is in ETHERNET 1 / PoE and that the switch or injector supplies IEEE 802.3af Type 1 power. Otherwise confirm the 12VDC 2A supply is connected to the POWER jack and to a live outlet.

A DEVICE IS NOT RESPONDING TO INFRARED COMMANDS

Confirm the IR output indicator illuminates when a command is sent. If it does, the port is delivering the code, and the issue is at the emitter. Check emitter placement over the device's IR window, then adjust that port's potentiometer on the top of the unit clockwise for higher output power.

A SERIAL DEVICE IS NOT RESPONDING

Confirm the Cat-5/6 run is terminated to the pinout given in this guide and check the baud rate set in Integration Designer® (ID12.0 or higher) against the device's own setting. Supported rates run up to 19,200 bps.

A SENSE INPUT IS NOT TRIGGERING EVENTS

Confirm the sense input mode in Integration Designer® (ID12.0 or higher) matches the wiring. For contact closure, conductors go to both sides (A and B) of the input. For a voltage trigger, the positive lead goes to Side A and the ground lead to Side B, with 3-24VDC present. Confirm the off state does not exceed 1VDC.

THE NETWORK CONNECTION IS UNRELIABLE

ETHERNET 1 and ETHERNET 2 form a two-port switch. Confirm the cable is in the intended port and that the Net Link indicator is lit. If the unit is on Wi-Fi, confirm the wireless settings downloaded with the system file. Check the IP configuration in Integration Designer® (ID12.0 or higher).

Maintenance

To clean the ICP-2, lightly dampen a lint-free cloth with plain water or a mild detergent and wipe the outer surfaces.

NOTE: Do not use harsh chemicals as damage to the unit may occur.

Damage Requiring Service

The unit should be serviced by qualified service personnel when:

- The power supply cord or the plug has been damaged.
- Objects have fallen or liquid has been spilled into the unit.
- The unit has been exposed to rain.
- The unit does not appear to operate normally or exhibits a marked change in performance.
- The unit has been dropped, or the enclosure has been damaged.

Do not attempt any service beyond that described in these operating instructions. Refer all other service needs to qualified service personnel.

Safety Suggestions

Read and Follow Instructions. Read all safety and operating instructions before operating the unit.

Retain Instructions. Keep the safety and operating instructions for future reference.

Heed Warnings. Adhere to all warnings on the unit and in the operating instructions.

Heat. Keep the unit away from heat sources such as radiators, heat registers, stoves, etc., including amplifiers that produce heat.

Power Sources. Connect the unit only to a power supply of the type described in the operating instructions, or as marked on the unit.

Power Cord Protection. Route power supply cords so that they are not likely to be walked on or pinched by items placed on or against them, paying particular attention to the cord plugs at power receptacles and at the point at which they exit from the unit.

Water and Moisture. Do not use the unit near water—for example, near a sink, in a wet basement, near a swimming pool, near an open window, etc.

Object and Liquid Entry. Do not allow objects to fall or liquids to be spilled into the enclosure through openings.

Ventilation. Do not obstruct the enclosure vents. Allow clearance around the unit for airflow.

Servicing. Do not attempt any service beyond that described in the operating instructions. Refer all other service needs to qualified service personnel.

Regulatory Compliance

The ICP-2 carries CE, FCC, RCM and UKCA marks.

DECLARATION OF CONFORMITY (DOC)

The Declaration of Conformity for this product can be found on the AVPro Global website <https://www.avproglobal.com>

FEDERAL COMMUNICATIONS COMMISSION NOTICE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the device.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received including interference that may cause undesired operation.

INDUSTRY CANADA COMPLIANCE STATEMENT

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received including interference that may cause undesired operation.

Cet appareil est conforme avec Industrie Canada exempts de licence standard RSS (s). Son fonctionnement est soumis aux deux conditions suivantes:

1. Ce dispositif ne peut causer des interférences nuisibles.
2. Cet appareil doit accepter toute interférence reçue y compris des interférences qui peuvent provoquer un fonctionnement indésirable.

Support

If you are encountering any problems or have a question about your RTI product, first refer to the Troubleshooting section of this guide, then contact RTI Technical Support for assistance.

RTI provides technical support by telephone or e-mail. For the highest quality service, please have the following information ready:

- Your name
- Company name
- Telephone number
- E-mail address
- Product model and serial number (if applicable)

If you are having a problem with hardware, please note the equipment in your system, a description of the problem, and any troubleshooting you have already tried.

RETURN AUTHORIZATION

Please do not return products to RTI without return authorization.

Contacting RTI

For news about the latest updates, new product information, and new accessories, please visit our web site at: www.rticontrol.com

For general information, you can contact RTI at:

AVPro Global Holdings
2222 E 52nd Street North
Sioux Falls SD 57104
Tel: 877-886-5112
Tech Support: info@avproglobal.com

Warranty

THE BASICS

RTI warrants new products for a period of three (3) years (excluding consumables such as rechargeable batteries which are warranted for one (1) year) from the date of purchase by the original purchaser (end user) directly from RTI / Pro Control (herein referred to as "RTI"), or an authorized RTI dealer.

Warranty claims may be initiated by an authorized RTI dealer using the original dated sales receipt or other proof of warranty coverage. In the absence of the receipt of purchase from the original dealer, RTI will provide warranty coverage extension of six (6) months from the date code of the product.

Note: RTI warranty is limited to the provisions set forth in this policy and does not preclude any other warranties offered by third parties who are solely responsible for those other warranties.

COVERAGE DETAILS

Except as specified below, this warranty covers defects in product material and workmanship. The following are not covered by the warranty:

- Product purchased via unauthorized sellers or internet sites will not be serviced — regardless of purchase date.

- Damages caused by accident, misuse, abuse, neglect or acts of God.
- Cosmetic damage, including, but not limited to, scratches, dents and normal wear and tear.
- Failure to follow instructions contained in the Product Installation Guide.
- Damages due to products used in an application or environment other than that for which it was intended, improper installation procedures or adverse environmental factors such as incorrect line voltages, improper wiring, or insufficient ventilation.
- Repair or attempted repair by anyone other than RTI and Pro Control or authorized service partners.
- Failure to perform recommended periodic maintenance.
- Causes other than product defects, including lack of skill, competence or experience of user.
- Damage due to shipment of this product (claims must be made to the carrier).
- Altered unit or altered serial number: defaced, modified or removed.

LIMITATIONS OF LIABILITY

RTI Control is also not liable for:

- Damages caused by its products or for failure of its products to perform, including any labor costs, lost profits, lost savings, incidental damages, or consequential damages.
- Damages based upon inconvenience, loss of use of the product, loss of time, interrupted operation, commercial loss, any claim made by a third party or made on behalf of a third party.
- Loss of, or damage to, data, computer systems or computer programs.

RTI's liability for any defective product is limited to repair or replacement of the product, at the sole discretion of RTI.

In cases where the warranty policy conflicts with local laws, the local laws will be adopted.



AVPro Global Holdings, LLC
2222 E 52nd Street N
Sioux Falls, SD 57104
www.avproglobal.com



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