IntelliPack Series 811T Transmitters and Combination Transmitter/Alarms Process Current/Voltage Input

USER'S MANUAL

ACROMAG INCORPORATED
30765 South Wixom Road
Wixom, MI 48393-2417 U.S.A.
Tel: (248) 295-0880
Fax: (248) 624-9234

8500567L

Safety Summary - Symbols on equipment:

Means “Caution, refer to this manual for additional information”.

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IMPORTANT SAFETY CONSIDERATIONS

It is very important for the user to consider the possible adverse effects of power, wiring, component, sensor, or software failures in designing any type of control or monitoring system. This is especially important where economic property loss or human life is involved. It is important that the user employ satisfactory overall system design. It is agreed between the Buyer and Acromag, that this is the Buyer's responsibility.

1.0 INTRODUCTION

These instructions cover hardware functionality of the transmitter models listed in Table 1. Supplementary sheets are attached for units with special options or features.

Table 1: Models Covered in This Manual

Series/ Input/Type	-Options/Output/ Enclosure/Approvals[1]	-Factory Configuration[2]
811T	-0500[3]	-C
811T	-1500[3]	-C

Notes (Table 1):
1. Agency approvals include cULus Listed.
2. Include the “-C” suffix to specify factory configuration option. Otherwise, no suffix is required for standard configuration.
3. Model 811T-0500 units have transmitter functionality only, while 811T-1500 transmitters include an alarm relay.

Module programming, transmitter operation, and the IntelliPack Configuration Software is covered in the IntelliPack Transmitter Configuration Manual (8500-570).

DESCRIPTION

Series 811T Transmitters and combination Transmitter/ Alarms are members of the popular Acromag IntelliPack Transmitter & Alarm family. These models will accept DC current input, DC voltage input, and AC current input (using an external sensor). The transmitter output is an isolated process current or voltage, plus an optional Single-Pole Double-Throw (SPDT) electro-mechanical alarm relay (“-1500” units). All IntelliPacks contain an advanced technology microcontroller with integrated downloadable flash memory and EEPROM for non-volatile program, configuration, calibration, and parameter data storage. Units are fully reconfigurable via our user-friendly Windows 95® or NT® IntelliPack Configuration Program. Field reconfigurability is also possible with module push-buttons and status LED’s. Once configured, these modules may operate independent of the host computer for true embedded monitoring and control.

Modules may be field connected for either process current or DC voltage input or output signals. The 811T has a single current or voltage input, an isolated process current or voltage output, and an isolated SPDT alarm relay (“-1500” units). On-board excitation is provided at the input to facilitate a two-wire, 4 to 20mA process current transmitter hookup. Wide range bipolar DC voltage inputs to ±100VDC are possible. The relay has a yellow LED on the front of the module that provides a visual indication of the high or low alarm condition. Additionally, “Run”, “Status”, and “Zero/Full-Scale” LED’s provide local feedback of operating mode, system diagnostics, and field configuration status. Front panel push buttons are available to reset a latched alarm and to facilitate field configuration without connecting to a host computer.

The module uses a high resolution, low noise, Sigma-Delta, Analog to Digital Converter (Σ-Δ ADC) to accurately convert the input signal into a digitized value. An optically isolated Digital-to-Analog Converter (DAC) provides the corresponding process current or voltage output. A separate alarm circuit controls the relay contacts.

Flexible transmitter functionality and an optional alarm combined in a single device, plus convenient reprogrammability, makes this instrument extremely powerful and useful over a broad range of applications. This transmitter may be configured for several input computation functions, such as, proportional, square root, and 24-segment linearization. Input averaging may also be combined with any computation function. The output may produce a normal (ascending), or reverse (descending) response. The relay of 811T-1500 models may be configured as a limit alarm with deadband, latching or non-latching contacts, and failsafe or non-failsafe modes. A programmed relay time delay may be implemented to filter transients & minimize nuisance alarms.

An optional AC current sensor (Acromag Model 5020-350) may be used in conjunction with the DC current input circuit of this device to implement an AC current transmitter for inputs up to 20A rms. The optional AC current sensor is itself an isolated, accurate, toroidal instrument transformer, that outputs a safe, low-level DC milliamp signal to the input of the transmitter. As an isolated device, it adds an extra level of input isolation and protection. See “AC Current Sensor” section for more information.

All IntelliPack modules are designed to withstand harsh industrial environments. They feature RFI, EMI, ESD, EFT, and surge protection, plus low temperature drift, wide ambient temperature operation, and isolation between input, output, power, and relay contacts. They also have low radiated emissions per CE requirements. As a wide-range DC-powered device, the unit may be powered from DC power networks incorporating battery back-up. Additionally, the input power terminal is diode-coupled, providing reverse polarity protection. This allows the unit to be connected to redundant power supplies, or several units to safely share a single DC supply.

Units are DIN-rail mounted and removable terminal blocks facilitate ease of installation and replacement, without having to remove wiring. Transmitter power, output, and relay wiring are inserted at one side of the unit, while input wiring is inserted at the other side. Connectors are an industry standard screw clamp type and accept a wide range of wire sizes.

The safe, compact, rugged, reconfigurable, and reliable design of this transmitter makes it an ideal choice for control room and field applications. Custom IntelliPack module configurations are also possible (please consult the factory).

Key IntelliPack 811T Features

- **Agency Approvals** - cULus Listed.
- **Easy Windows® Configuration** - Fully reconfigurable via our user friendly Windows 95® or NT® IntelliPack Configuration Program.
- **Nonvolatile Reprogrammable Memory** - This module has an advanced technology microcontroller with integrated, non-volatile, downloadable flash memory and EEPROM. This allows the functionality of this device to be reprogrammed thousands of times.
- **Convenient Field Reprogrammability** - This unit allows transmitter zero and span calibration, plus alarm setpoint and deadband adjustments, to be made via module push-buttons and LED’s, thus facilitating in-field changes without having to connect a host computer.
- **Fully Isolated** - Input, power, output, and optional relay contacts are all isolated from each other for safety and increased noise immunity.
- **Wide Input Transfer Function Variability** - This transmitter may utilize a proportional, 24-segment linearizer, or square-root input transfer function. Averaging may be combined with any other input function. Other functions are possible—please consult the factory.
- **Universal Analog Outputs** - Supports process current output ranges of 0-20mA, 4-20mA, and 0-1mA, or 0-5V and 0-10V outputs. Current outputs may drive up to 550Ω, typical. Voltage outputs include short circuit protection.
- **Normal Or Reverse Acting Output Direction** - The output of this transmitter may be configured for a normal (ascending), or reverse (descending) response.
- **Flexible DC Current or Voltage Inputs** - Accepts process current (0-22mA), or wide range voltage inputs to ± 100V DC, with eight different gain ranges.
- **Optional AC Current Input** - An optional AC current sensor can be purchased separately to support AC current inputs.
- **Convenient Input Excitation Supply** - The input includes an excitation supply for operation with two-wire transmitters.
- **Automatic Self-Calibration** - Self-calibration is built-in to correct for temperature drift of the input circuit.
- **Self-Diagnostics** - Built-in routines operate upon power-up for reliable service, easy maintenance, and troubleshooting.
- **Wide-Range DC-Powered** - This device operates from a wide DC supply range and the power terminal is diode-coupled. This makes this transmitter useful for systems with redundant supplies, and/or battery back-up.
- **Wide Ambient Operation** - The unit is designed for reliable operation over a wide ambient temperature range.
- **Hardened For Harsh Environments** - The unit will operate reliably in harsh industrial environments and includes protection from RFI, EMI, ESD, EFT, and surges, plus low radiated emissions per CE requirements.
- **Convenient Mounting, Removal, & Replacement** - The DIN-rail mount and plug-in type terminal bocks make module removal and replacement easy.
- **High-Resolution Precise A/D & D/A Conversion** - Includes a high-resolution, low noise, Sigma-Delta, Analog-to-Digital Converter (Σ-Δ ADC) and Digital-to-Analog Converter (Σ-Δ DAC), for high accuracy and reliability.
- **LED Indicators** - Used to indicate operating, alarm, and field configuration status.

Alarm Relay Model Only (811T-1500)

- **Powerful Alarm Functionality** - May be programmed for limit alarms with deadband, latching/non-latching contacts, and failsafe/non-failsafe operation.
- **High-Power SPDT Relay Contacts -** Includes a Single-Pole-Double-Throw (SPDT) electro-mechanical alarm relay for switching up to 230VAC and 5A.
- **Failsafe or Non-Failsafe Relay Operation** - May be configured for failsafe or non-failsafe relay operation. Upon power up, relay may cycle states during diagnostic operation.
- **Configurable Setpoint With Deadband** - Deadband helps to eliminate relay "chatter" and prolong contact life.
- **Programmable Latching or Momentary Alarms** - May be configured for automatic alarm reset, or a latching alarm with manual push-button or software reset.
- **Programmable Relay Time Delay Filters Transients** - Useful for increased noise immunity and to filter transients.

ACCESSORY ITEMS

The following IntelliPack accessories are available from Acromag. Acromag also offers other standard and custom transmitter and alarm types to serve a wide range of applications (please consult the factory).

IntelliPack Configuration Software (Model 5030-881)

IntelliPack alarms and transmitters are configured with this user-friendly Windows 95® or NT® Configuration Program. This software package includes the IntelliPack Alarm Configuration Manual (8500-563) and IntelliPack Transmitter Configuration Manual (8500-570). These manuals describe software operation and various alarm and transmitter functions in detail. The Configuration Software also includes an on-line help function. All transmitter and alarm functions are programmable and downloadable to the modules via this software. Non-volatile memory provides program, configuration, and data storage within the IntelliPack.

IntelliPack Serial Port Adapter (Model 5030-913)

This adapter serves as an isolated interface converter between the EIA232 serial port of the host computer and the Serial Peripheral Interface (SPI) port of the IntelliPack module. It is used in conjunction with the Acromag IntelliPack Configuration Software to program and configure the modules. This adapter requires no user adjustment, no external power, and operates transparent to the user. It receives its power from the IntelliPack module. The adapter has a DB9S connector that mates to the common DB9P serial port connector of a host computer. The adapter also has a 6-wire RJ11 phone jack to connect to the IntelliPack alarm module via a separate interconnecting cable (described below). Refer to Drawing 4501-635 for computer to IntelliPack connection details.

IntelliPack Cable (Model 5030-902)

This 6-wire cable is used to connect the SPI port of the IntelliPack Serial Port Adapter to the IntelliPack. This cable carries the SPI data and clock signals, reset signal, and +5V power and ground signals. The cable is 7 feet long and has a 6-wire RJ11 plug at both ends which snap into jacks on the Serial Port Adapter and the IntelliPack module.

IntelliPack Software Interface Package (Model 800C-SIP)

The IntelliPack Software Interface Package combines the Configuration Software (5030-881), Alarm Configuration Manual (8500-563), Transmitter Configuration Manual (8500-570), Serial Port Adapter (5030-913), and Cable (5030-902), into a complete kit for interfacing with IntelliPack Alarms and Transmitters.

AC Current Sensor (Model 5020-350)

This optional sensor is an accurate toroidal instrument transformer used to convert a sinusoidal 50-60Hz AC current signal into a low level DC milliampere signal of 0 to 11.17mA. The input AC current range is a simple function of the number of turns placed through the toroid as shown in Table 2. This sensor is isolated and requires no calibration or adjustment. A sensor used with the IntelliPack provides redundant input isolation.

Table 2: AC Current Sensor Turns & Range

AC Current Input Range	Primary Turns	Sensor Output (Red/Black Wires)
0 to 20A AC	1	0 to 11.17mA DC
0 to 10A AC	2	"
0 to 5A AC	4	"
0 to 2A AC	10	"
0 to 1A AC	20	"

The output wires of this sensor are polarized: Red is (+) plus and Black is (-) minus. Normally these output wires are attached to one end of a user supplied cable, and the other end of the cable connects to the IntelliPack Transmitter's process current input terminals.

Input Burden: Is a function of the wire gauge resistance used for the primary turns (the current carrying wire being monitored).
Input Overload: The AC current sensor will withstand overload conditions as follows:

- 20 times full scale for 0.01 seconds.
- 10 times full scale for 0.1 seconds.
- 5 times full scale for 1.0 second.

AC Current Sensor to Transmitter Wiring Distance: 400 feet maximum for 18 gauge wire. Other wire gauges can be used as long as the resistance of both wires is less than 5Ω.

2.0 PREPARATION FOR USE

UNPACKING AND INSPECTION

Upon receipt of this product, inspect the shipping carton for evidence of mishandling during transit. If the shipping carton is badly damaged or water stained, request that the carrier's agent be present when the carton is opened. If the carrier's agent is absent when the carton is opened and the contents of the carton are damaged, keep the carton and packing material for the agent's inspection. For repairs to a product damaged in shipment, refer to the Acromag Service Policy to obtain return instructions. It is suggested that salvageable shipping cartons and packing material be saved for future use in the event the product must be shipped.

This module is physically protected with packing material and electrically protected with an anti-static bag during shipment. However, it is recommended that the module be visually inspected for evidence of mishandling prior to applying power.

This circuit utilizes static sensitive components and should only be handled at a static-safe workstation.

INSTALLATION

The transmitter module is packaged in a general purpose plastic enclosure. Use an auxiliary enclosure to protect the unit in unfavorable environments or vulnerable locations, or to maintain conformance to applicable safety standards. Stay within the specified operating temperature range. As shipped from the factory, the unit is factory calibrated for all valid input ranges and has the default configuration shown in Table 3 below.

WARNING: Applicable IEC Safety Standards may require that this device be mounted within an approved metal enclosure or sub-system, particularly for applications with voltages greater than or equal to 75VDC or 50VAC.

Table 2: 811T Default Factory Configuration

PARAMETER	CONFIGURATION/CALIBRATION
Input Range	0 to 22mA DC
Samples	N=1 (No Input Averaging)
Output Range	0 to 10V DC (Jumper Installed)
Output Mode	Normal Acting (Ascending Signal)
Transmitter Scaling	Input for 0% Output = 4mA, Input for 100% Output = 20mA.
Computation	None (Directly Proportional)
Alarm Mode	High Limit
Setpoint	20mA DC
Deadband	0.16mA (1% of 16mA span)
Operating Mode	Failsafe
Time Delay	100ms
Reset Type	Automatic (momentary)

Shaded entries apply to Model 811T-1500 units which also include alarm relay functionality.

Your application may differ from the default configuration and will require that the transmitter be reconfigured to suit your needs. This is accomplished with Acromag's user-friendly Windows 95® or NT® Configuration Program and Serial Port Adapter. Configuration is normally done prior to field installation since field configurability via the module's push-buttons is generally limited to zero, full-scale, setpoint, and dropout adjustments. See the Transmitter Configuration Manual (8500-570) for instructions.

Jumper Installation (Voltage Output)

For voltage output, a short jumper must be installed between the output "I+" and "JMP" terminals. A jumper wire is included with the unit and has already been installed between the output "I+" and "JMP" terminals. Verify the position of this jumper if your application requires output voltage. Remove this jumper for current output applications. Refer to the Electrical Connections Drawing 4501-640.

Mounting: Refer to Enclosure Dimensions Drawing 4501-642 for mounting and clearance dimensions.

DIN Rail Mounting: This module can be mounted on "T" type DIN rails. Use suitable fastening hardware to secure the DIN rail to the mounting surface. Units may be mounted side-by-side on 1-inch centers for limited space applications. **"T" Rail (35mm), Type EN50022:** To attach a module to this style of DIN rail, angle the top of the unit towards the rail and locate the top groove of the adapter over the upper lip of the rail. Firmly push the unit towards the rail until it snaps solidly into place. To remove a module, first separate the input terminal block(s) from the bottom side of the module to create a clearance to the DIN mounting area. Next, insert a screwdriver into the lower arm of the DIN rail connector and use it as a lever to force the connector down until the unit disengages from the rail.

Electrical Connections

Terminals can accommodate wire from 14-24 AWG (stranded or solid copper). Strip back wire insulation 1/4-inch on each lead before installing into the terminal block. Input wiring should be shielded twisted-pair. Since common mode voltages can exist on signal wiring, adequate wire insulation should be used and proper wiring practices followed. It is recommended that transmitter output and power wiring be separated from the input signal wiring for safety, as well as for low noise pickup. Note that input, power, output, and relay terminal blocks are a plug-in type and can be easily removed to facilitate module removal or replacement without removing individual wires. If your application requires voltage output, you must install a jumper between the output "I+" and "JMP" terminals (pre-installed from the factory). Remove this jumper for current output applications. Be sure to remove power and/or disable the load before unplugging the terminals to uninstall the module, installing or removing jumpers, or before attempting service. All connections must be made with power removed.

CAUTION: Risk of Electric Shock - More than one disconnect switch may be required to de-energize the equipment before servicing.

1. **Power:** Refer to Electrical Connections Drawing 4501-640. Variations in power supply voltage within rated limits has negligible effect on module accuracy. For supply connections, use No. 14 AWG wires rated for at least 75°C. The power terminal is diode-coupled for reverse polarity protection.

2. **DC Voltage/Current Inputs (Without AC Current Sensor):** Connect input(s) per Drawing 4501-640. Observe proper polarity (see label for input type). An excitation supply is provided at the input for powering two-wire transmitters.

3. **AC Current Input (Optional):** Refer to Drawing 4501-633 to connect the optional AC current sensor. The sensor is typically mounted near the AC current being measured and will transmit a low level DC milliampere signal to the module. This allows the module to be mounted remote from the AC signal and sensor and connected using small gauge wire. The sensor output (Red/Black) wires can be shorted, open-circuited, or removed from the transmitter input terminals, without hazard to personnel or to the sensor.

   AC Current Sensor: Per Table 2 on Page 4, loop the required number of turns through the toroid for the full-scale current range required by your application. Use the cable tie provided with the sensor to mechanically secure it.

   DANGER: If the AC current sensor is used with an AC Current Transformer (C.T.), disconnect power from the C.T., or short the output of the C.T., before removing the wire going through the AC current sensor. If this is not done, an open circuited C.T. will generate hazardous high voltages and possible C.T. damage.

4. **Analog Output Connections**: Wire outputs as shown in Electrical Connections Drawing 4501-640. For voltage output, you must also install a jumper between the output "I+" and "JMP" terminals (pre-installed from the factory). Remove this jumper for current output.

5. **Output Relay Contacts (811T-1500)**: Wire relay contacts as shown in Electrical Connections Drawing 4501-640. See the "Alarm Relay Specifications" for power capacity. If necessary, an interposing relay can be used to switch higher currents as shown in Interposing Relay Connection Drawing 4501-646.

   Electromechanical Relay Contact Protection: To maximize relay life with inductive loads, external protection is required. For DC inductive loads, place a diode across the load (1N4006 or equivalent) with cathode to (+) and anode to (-). For AC inductive loads, place a Metal Oxide Varistor (MOV) across the load. See Relay Contact Protection Drawing 4501-646 for details.

   IMPORTANT: Noise and/or jitter on the input signal has the effect of reducing (narrowing) the instrument's deadband and may produce contact chatter. The long term effect of this will reduce the life of mechanical relays. To reduce this undesired effect, you should increase the effective deadband. Note that the input averaging function of this transmitter may also be used to reduce contact chatter. The configurable relay time delay may also help eliminate relay chatter.

6. **Grounding:** See Electrical Connections Drawing 4501-640. The module housing is plastic and does not require an earth ground connection. However, there are mounting positions on the input and output terminals to connect cable shields, plus earth ground. These connections are isolated from the internal circuit and are recommended to minimize noise and help protect the unit from damaging I/O transients.

   WARNING: For compliance to applicable safety and performance standards, the use of shielded cable is recommended as shown in Drawing 4501-640. Further, the application of earth ground must be in place as shown in Drawing 4501-640. Failure to adhere to sound wiring and grounding practices may compromise safety & performance.

3.0 MODULE CONFIGURATION

This transmitter/alarm module needs to be configured for your application. Configuration is done using Acromag's Windows 95/98/ME/NT/XP/2000 IntelliPack Configuration Program and Serial Port Adapter. Transmitter configuration details are included in the IntelliPack Transmitter Configuration Manual (8500-570). Field configuration of transmitter zero & full-scale, plus setpoint & dropout (811T-1500 units), via the module's push-buttons and LED's is covered below.

FIELD CONFIGURATION

This program mode allows adjustment to key transmitter configuration and alarm parameters in the field, without having to connect a host computer. Field reprogrammability of zero & full-scale (scaling parameters), plus alarm setpoint & deadband (Model 811T-1500) is accomplished via the transmitter/alarm module's "SET", "MODE", "UP", and "DOWN" push buttons, and the zero/full-scale and relay LED's (see Drawing 4501-642).

Equipment Required

- An accurate input source (voltage or current) adjustable over the configured input range. This source must be accurate beyond the module specifications for best results. For voltage inputs, use a voltage source with an output impedance of 100Ω or less.
- An accurate current or voltage meter is also required to monitor the output level. This meter must be accurate beyond the module specifications for best results.

  Note: The module's input range must already be set via the IntelliPack Configuration Software. Input levels outside of the configured input range will not be accepted for zero, full-scale, setpoint, or dropout calibration. Since input levels cannot be validated during field programming, entering incorrect signals can produce an undesired output response. Install a jumper between the output "I+" and "JMP" terminals for voltage output. Remove this jumper for current output.

Transmitter/Alarm General Field Programming Procedure

The following procedure uses the corresponding zero/full-scale (labeled "Z/FS") and relay (labeled "RLY") LED's to indicate which parameter is being programmed. A constant ON zero/full-scale LED refers to zero configuration (scaling input for 0% output), a flashing ON/OFF zero/full-scale LED refers to full-scale/span configuration (scaling input for 100% output). A constant ON relay LED indicates setpoint adjustment, a flashing ON/OFF relay LED indicates dropout/deadband adjustment. Refer to Table 4.

CAUTION: Do not insert sharp or oversized objects into the switch openings as this may damage the unit. When depressing the push-buttons, use a blunt tipped object and apply pressure gradually until you feel or hear the tactile response.

1. Connect a voltage or current source to the input, as required (refer to Electrical Connections Drawing 4501-640).
2. Apply power and the module's green "Run" LED will light.
3. Press and hold the **"MODE"** push button until the green "Run" LED turns OFF and the yellow "Zero/Full-Scale" LED turns ON. In this mode, the unit is ready to accept a zero input for the transmitter (scaling input for 0% output). If you do not wish to change the zero parameter, skip to step 7.
4. Adjust the input source to the zero level according to your input range (value must be within input range selected).
5. Press the **"UP"** or **"DOWN"** push-button one time to cause the module to auto-adjust its output level to the corresponding output zero according to the output range selected. If the output is not exactly at the zero level, then each successive depression of the "UP" or "DOWN" switch will increment or decrement the output signal by a small amount. Holding the switch depressed will increase the amount of increment or decrement.
6. Press the **"SET"** push-button to accept the zero value. Note that every time the "SET" button is pressed, the yellow "Status" LED will flash once and the zero output will be captured.
7. Press the **"MODE"** push button one time. The "Zero/Full-Scale" LED will flash on/off, indicating that the unit is ready to accept the full-scale value for setting the span (scaling input for 100% output). If you do not wish to change the full-scale parameter, skip to step 11.
8. Adjust the input source to the full-scale level according to your input range (the value must be within the input range selected). The module uses the zero and full-scale levels to set the span (span = full-scale - zero).
9. Press the **"UP"** or **"DOWN"** push-button one time to cause the module to auto-adjust its output level to the corresponding full-scale output for the output range selected. If the output is not exactly at the full-scale level, then each successive depression of the "UP" or "DOWN" switch will increment or decrement the output signal by a small amount. Holding the switch depressed will increase the amount of increment or decrement.
10. Press the **"SET"** push-button to accept the full-scale value. Note that every time the "SET" button is pressed, the yellow "Status" LED will flash once and the full-scale output will be captured.
11. If you are configuring a model 811T-0500 which has no alarm, then skip steps 12-17 and jump ahead to step 18.

Transmitter/Alarm Field Programming Procedure…continued

12. Press the **"MODE"** push button one time until the yellow zero/full-scale LED goes out and the yellow relay LED turns ON (see Table 4). In this mode, the unit is ready to accept an input setpoint level for the alarm. If you do not wish to change the setpoint, skip to step 15.
13. Adjust the input source to the High or Low alarm setpoint level.
14. Press the **"SET"** push button to accept the setpoint. Note that every time the "SET" button is pressed, the yellow status LED will flash once and the value at the input will be captured.
15. Press the **"MODE"** push button one time and the yellow relay LED should start flashing (see Table 4). This means that the unit is ready to accept the dropout level for the alarm relay. If you do not wish to change the dropout, skip to step 18.
16. Adjust the input source to the desired dropout level.
17. Press the **"SET"** push button to accept the input dropout level. Note that every time the "SET" button is pressed, the yellow status LED will flash once and the value at the input will be captured. The module will use the difference between the setpoint and dropout values to calculate relative deadband.
18. Press the **"MODE"** push button one time to complete the program sequence and return to run mode. The green "RUN" LED will turn ON, the yellow "Zero/Full-Scale" LED will be OFF, and the yellow alarm LED will be ON or OFF according to the alarm status. The module will now assume a transfer function based on the zero and full-scale values just set. The setpoint and dropout of 811T-1500 units is used to determine the alarm deadband. Note that until "SET" is pressed, pushing "MODE" will only toggle between the zero & full-scale, plus setpoint & dropout adjustment modes (811T-1500 units), without affecting their values. Further, if no push-buttons are depressed for a period greater than 2 minutes, then the module will automatically revert to run mode (green "Run" LED will light) and no changes will be made to the original zero or full-scale, and optional setpoint or dropout settings.

Notes (Field Program Procedure):

1. In field configuration mode, the yellow zero/full-scale LED (Z/FS) and relay LED (RLY) are used to indicate which program parameter is being adjusted as illustrated in Table 4:

Table 4: Field Configuration LED Program Indication

LED INDICATOR	Constant ON	FLASHING
Yellow Zero/ Full-Scale (labeled "Z/FS")	Zero	Full-Scale
811T-1500: Yellow Relay (labeled "RLY"),	High or Low Setpoint	High or Low Dropout

2. To summarize, the green "Run" LED is turned off in field configuration mode. The yellow zero/full-scale LED is ON or FLASHING when the corresponding zero or full-scale value is being set in field configuration mode and turned OFF in run mode. The yellow alarm LED is ON or FLASHING when the corresponding setpoint or dropout/deadband level is being set in field configuration mode.

Notes (Field Program Procedure)…continued:

3. If the transmitter/alarm is in field configuration mode and no push buttons are pressed after 2 minutes, then the module will return to the run mode, the green "Run" LED will light, and no changes to any program parameters will be made.
4. Latching alarms require a push button reset to exit the alarm state (this may also be accomplished under software control). Use the up or down push-button on the front of the module to reset a latched alarm relay.

4.0 THEORY OF OPERATION

Refer to Simplified Schematic 4501-629 and Functional Block Diagram 4501-691 to gain a better understanding of the circuit. Note that these transmitters will pre-filter a signal and convert the signal to a scaled voltage--either through a voltage divider circuit (voltage inputs), or a current sink resistor (current inputs). An A/D converter stage then applies appropriate gain to the signal, performs analog-to-digital conversion, and digitally filters the signal. The digitized signal is then transmitted serially to a microcontroller. The microcontroller completes the transfer function according to the transmitter type and its embedded function, and sends a corresponding output signal to an optically isolated Digital-to-Analog Converter (DAC). The DAC then updates its current or voltage output in response. The microcontroller also compares the signal value to the limit value according to the alarm type and completes all necessary alarm functions per its embedded program (811T-1500 units only). The embedded configuration and calibration parameters are stored in non-volatile memory integrated within the microcontroller. Only the functions required by an application are actually stored in memory—new functionality can be downloaded via the IntelliPack Configuration Program and Serial Port Adapter. A wide input switching regulator (isolated flyback mode) provides isolated +5V and +16V power to the circuit, plus an isolated +15V output circuit supply.

5.0 SERVICE AND REPAIR

CAUTION: Risk of Electric Shock - More than one disconnect switch may be required to de-energize the equipment before servicing.

SERVICE AND REPAIR ASSISTANCE

This module contains solid-state components and requires no maintenance, except for periodic cleaning and transmitter configuration parameter (zero, full-scale, setpoint, deadband, etc) verification. Since Surface Mounted Technology (SMT) boards are generally difficult to repair, it is highly recommended that a non-functioning module be returned to Acromag for repair. The board can be damaged unless special SMT repair and service tools are used. Further, Acromag has automated test equipment that thoroughly checks and calibrates the performance of each module. Please refer to Acromag's Service Policy Bulletin or contact Acromag for complete details on how to obtain service parts and repair.

PRELIMINARY SERVICE PROCEDURE

Before beginning repair, be sure that all installation and configuration procedures have been followed. The unit routinely performs internal diagnostics following power-up or reset. During this period, all LED's will turn ON momentarily, and the green "Run" LED flashes. If the diagnostics complete successfully, the "Run" LED will stop flashing after approximately one second and remain ON. This indicates that the unit is operating normally. If the "Run" LED continues to flash, then this is indicative of a problem. In this case, use the Acromag IntelliPack Configuration Software to reconfigure the module or download its firmware and this will usually cure the problem. If the diagnostics continue to indicate a problem (a continuously flashing green LED), or if other evidence points to a problem with the unit, an effective and convenient fault diagnosis method is to exchange the questionable module with a known good unit.

The IntelliPack Serial Port Adapter also contains a red LED visible at the small opening in the enclosure to the right of the RJ11 receptacle. If this LED is OFF or Flashing and power is ON, then a communication interface problem exists. Note that the adapter receives its power from the IntelliPack module. A constant ON LED indicates a properly working and powered serial interface adapter.

Acromag's Application Engineers can provide further technical assistance if required. When needed, complete repair services are available from Acromag.

6.0 SPECIFICATIONS

811T-1500-C, Single I/V Input, Process I/V Output, SPDT Relay
811T-0500-C, Single I/V Input, Process I/V Output

General: The IntelliPack Model 811T-0500 is a DC-powered transmitter which conditions either a single process current or voltage input, and provides an isolated current or voltage output. Isolation is supplied between the sensor input, the output, and power. The 811T-1500 also includes a SPDT, Form C, electro-mechanical relay, which provides a local limit alarm function with isolated relay contacts. This transmitter/ alarm is DIN-rail mounted.

The unit is configured and calibrated with our user-friendly Window 95® or NT® IntelliPack Configuration Program. Push-buttons on the module allow adjustment to the zero and full-scale points for the transmitter, plus setpoint and deadband adjustment for modules with the alarm option. All calibration and configuration information is stored in non-volatile reprogrammable memory in the module.

MODEL NUMBER DEFINITION

Transmitters are color coded with a white label. The prefix "8" denotes the IntelliPack Series 800, while the "T" suffix specifies that this device is primarily a process transmitter.

811T: Transmits and isolates a single DC voltage or current input, or AC current input (using external sensor).

-X500: The four digits of this model suffix represent the following options, respectively:

X = 1 with Alarm Relay, X = 0 without Alarm Relay;
5 = Output: Transmitter Voltage or Current;
0 = Enclosure: DIN rail mount;
0 = Approvals: cULus Listed.

INPUT SPECIFICATIONS

Unit must be wired and configured for the intended input type and range (see Installation Section for details). The following paragraphs summarize this model's input types, ranges, and applicable specifications.

DC (Process) Current: 0-22mA DC and 0-5mA. A precision 24.9Ω current sinking resistor converts the input current to a voltage that is processed by the A/D converter. An optional external AC current sensor is required to monitor AC current signals (Acromag Model 5020-350). This sensor generates a low level DC milliampere signal of 0 to 11.17mA for the module (see Table 2 for scaling to AC current). This module also provides an excitation supply (15VDC @24mA) for use with 2-wire transmitters.

Current Input Reference Test Conditions: 4 to 20mA input using the on-board excitation supply; Ambient Temperature = 25°C; Power Supply = 24VDC; Alarm Delay = 100ms; Output = 4-20mA, proportional.

Input Overvoltage Protection: Bipolar Transient Voltage Suppressers (TVS), 7.6V clamp level typical.

DC Voltage (100:1 Input Divider): ±50 to ±100V DC; ±25 to ±50V DC; ±12 to ±25V DC; ±6 to ±12V DC; ±3 to ±6V DC; ±1 to ±3V DC.

Voltage Input Reference Test Conditions: -10 to 10V DC input; Ambient Temperature = 25°C; Power Supply = 24V DC; Alarm Delay = 100ms; Output = 4-20mA, proportional.

Input Overvoltage Protection: Bipolar Transient Voltage Suppressers (TVS), 135V clamp level typical.

General Input Specifications

Input/Alarm Accuracy: Better than ±0.05% of input span. This includes the effects of repeatability, but not sensor error. This refers to input and alarm accuracy, but does not include analog output accuracy (see Table 7).

Accuracy Versus Temperature: Better than ±0.005% of input span per °C, or ±1uV/°C, whichever is greater.

Resolution: See Table 6.

Input Response Time: 100ms typical, to 98% of final value for a step change in the input. This applies to the analog output. See Relay Response Time for alarm output response. Note that a software programmable delay can be implemented for filtering transients and this will increase the response time.

Input bias current: ±25nA maximum, excluding excitation current of process current inputs.

Input Filter: Normal mode filtering, plus digital filtering, optimized and fixed per input range within the Σ-Δ ADC.

Noise Rejection (Normal Mode): 40dB @ 60Hz, typical with 100Ω input unbalance (24.9Ω for process currents).

Noise Rejection (Common Mode): 100dB @ 60Hz, typical with 100Ω input unbalance (24.9Ω for process currents).

Analog to Digital Converter (A/D): A 16-bit Σ-Δ converter, Analog Devices AD7714AR-5.

Input Conversion Rate: 20 conversions per second.

Input Excitation Supply: +15V DC typical, current limited to approximately 24mA. For use with two-wire process current transmitters.

Input Zero/Span Range Turn-Down (See Table 5): The configuration software may be used to calibrate an output response to input zero & full-scale values that are subsets of their nominal input ranges. Select input spans from 10% to 100% of nominal full-scale input range. For best results, select the smallest input range that contains the desired zero & full-scale input signal. See Table 5.

Table 5: Input Zero/Full-Scale Span Selection

Nominal Input Range Selected (Av Gain)	Recommended Input Span Calibration Range
0-22mA DC (Av=2)	Any Span 2.2mA to 22mA
0-5mA DC (Av=2)	Any Span 0.5mA to 5mA
±50 to ±100V (Av=1)	Any Span 20V to 200V
±25 to ± 50V (Av=2)	Any Span 10V to 100V
±12 to ± 25V (Av=4)	Any Span 5V to 50V
± 6 to ± 12V (Av=8)	Any Span 2.4V to 24V
± 3 to ± 6V (Av=16)	Any Span 1.2V to 12V
± 1 to ± 3V (Av=32)	Any Span 0.6V to 6V

Table 6: A/D Resolution Per Nominal Input Range

Gain A_V	Input Range	A/D Resolution
2	0-22mA, 0-24mA Typical	757nA/LSB
2	0-5mA, 0-6mA Typical	757nA/LSB
1	±50 to ±100V	3770uV/LSB
2	±25 to ±50V	1880uV/LSB
4	±12 to ±25V	942uV/LSB
8	± 6 to ±12V	471uV/LSB
16	± 3 to ± 6V	236uV/LSB
32	± 1 to ± 3V	118uV/LSB

ANALOG OUTPUT SPECIFICATIONS

These units contain an optically isolated DAC (Digital-to-Analog Converter) that provides a process current or voltage output. Note that calibration can only occur with respect to one of the outputs, voltage or current, and only one of the outputs may operate at a time. A jumper is required between the output "I+" and "JMP" terminals for voltage output. Remove this jumper for current output.

Voltage Output Specifications:

Output Range: 0-10V DC, 0-5V DC.
Output Accuracy: See Table 7.
Output Current: 0-10mA DC maximum.
Output Impedance: 1Ω.
Output Resolution: See Table 7.
Output Short Circuit Protection: Included

Current Output Specifications:

Output Ranges: 0-20mA DC, 4-20mA DC, or 0-1mA DC.
Output Maximum Current: 21.6mA typical.
Output Accuracy: See Table 7.
Output Compliance: 10V Minimum, 12V Typical.
Output Resolution: See Table 7.
Output Load Resistance Range: 0 to 550Ω, typical.

Table 7: Analog Output Range Resolution & Accuracy

Output Range	Resolution	Accuracy[1,2] Percent-of-Span	
		Output	Overall
0 to 20mA DC	0.0025%	0.025%	0.075%
4 to 20mA DC	0.0025%	0.025%	0.075%
0 to 1mA DC	0.0370%	0.100%	0.150%
0 to 10V DC	0.0025%	0.025%	0.075%
0 to 5V DC	0.0030%	0.050%	0.100%

Notes (Table 7):
1. Voltage outputs unloaded. Loading will add "I*R" error.
2. Software calibration produces high accuracy.
3. All output current and voltage ranges are subsets of the 0-20mA range.

General Output Specifications

Digital-to-Analog Converter: Analog Devices AD420AR-32, 16-bit Σ-Δ. Monotonic to 16 bits.

Integral Non-Linearity: ±0.002% (±1.4LSB) of span typical, 0.012% (±7.9LSB) of span maximum, for ranges utilizing full output span (0-24mA, 0-10V DC).

Output Temperature Drift: Better than ±20ppm/°C Typical, ±50ppm/°C Maximum.

Output Settling Time: 3ms to 0.1% of full-scale.

RELAY OUTPUT SPECIFICATIONS

Model 811T-1500 units include a SPDT electro-mechanical alarm relay which provides one independent Single Pole Double Throw (SPDT), Form C, electromagnetic, dry-contact sealed relay. The relay operates as a limit alarm with control of deadband/ hysteresis, latching/non-latching contacts, failsafe/non-failsafe modes, plus relay time delay.

Note: In order to control a higher amperage device, such as a pump, an interposing relay may be used (see Drawing 4501-646).

SPDT Alarm Relay Specifications (811T-1500 Units Only):

Electrical Life - CSA Ratings:

25VDC, 5A, 10^5 operations, resistive.
48VDC, 0.8A, 10^5 operations, resistive.
240VDC, 0.1A, 10^5 operations, resistive.
120VAC, 5A, $3x10^4$ operations, resistive.
240VAC, 5A, $3x10^4$ operations, resistive.

Contact Material: Silver-cadmium oxide (AgCdO).

Initial Dielectric Strength: Between open contacts: 1000VAC rms.

Expected Mechanical Life: 20 million operations. External relay contact protection is required for use with inductive loads (see Contact Protection Drawing 4501-646).

Relay Response (No Relay Time Delay): Relay contacts will switch within 150ms typical, for an input step change from 10% of span on one side of an alarm point to 5% of span on the other side of the alarm point.

ENCLOSURE/PHYSICAL SPECIFICATIONS

Unit is packaged in a general purpose plastic enclosure that is DIN rail mountable for flexible, high density (approximately 1" wide per unit) mounting. See Enclosure Dimensions Drawing 4501-642 for details.

Dimensions: Width = 1.05 inches, Height = 4.68 inches, Depth = 4.35 inches (see Drawing 4501-642).

DIN Rail Mounting (-xx0x): DIN rail mount, Type EN50022; "T" rail (35mm).

Connectors: Removable plug-in type terminal blocks; Current/Voltage Ratings: 15A/300V; Wire Range: AWG #14-24 (stranded or solid copper); separate terminal blocks are provided for power/output, input, and relay contacts. For supply connections, use No. 14 AWG copper wires rated for at least 75°C.

Case Material: Self-extinguishing NYLON type 6.6 polyamide thermoplastic, UL94 V-2, color beige; general purpose NEMA Type 1 enclosure.

Printed Circuit Boards: Military grade FR-4 epoxy glass.

Shipping Weight: 1 pound (0.45 Kg) packed.

APPROVALS (-xxx0)

0: Agency Approvals - cULus Listed, UL File E199702

Product approval is limited to general safety requirements of the above standards.

Warning: This product is not approved for hazardous location applications.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature: -25°C to +70°C (-13°F to +158°F).

Storage Temperature: -40°C to +85°C (-40°F to +185°F).

Relative Humidity: 5 to 95%, non-condensing.

Power Requirements: +10V Minimum to +36V DC Maximum. Current draw is a function of supply voltage (see Table 8). Current shown in Table 8 assumes that the input excitation supply is delivering 20mA, the output circuit is at 20mA, and the IntelliPack Serial Interface Adapter is connected. An internal diode provides reverse polarity protection.

CAUTION: Do not exceed 36VDC peak, to avoid damage to the module.

Table 8: 811T Supply Current

Supply Voltage	Supply Current (Relay Energized)	Supply Current (Relay De-energized)
10V	275mA	240mA
12V	220mA	195mA
15V	170mA	150mA
24V	110mA	100mA
36V	80mA	75mA

Note: Disconnecting the Serial Port Adapter will reduce current consumption 8% on average. Unloading the input excitation supply will reduce current consumption about 22%.

IMPORTANT – External Fuse: If unit is powered from a supply capable of delivering more than 1A to the unit, it is recommended that this current be limited via a high surge tolerant fuse rated for a maximum current of 1A or less
(for example, see Bel Fuse MJS1).

Power Supply Effect:

DC Volts: Less than ±0.001% of output span change per volt DC for rated power supply variations.

60/120 Hz Ripple: Less than 0.01% of output span per volt peak-to-peak of power supply ripple.

Isolation: Input, output, power, and optional relay output circuits are isolated from each other for common-mode voltages up

to 250VAC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC dielectric strength test for one minute without breakdown). This complies with test requirements outlined in ANSI/ISA-82.01-1988 for the voltage rating specified.

Installation Category: Suitable for installation in a Pollution Degree 2 environment with installation category (over-voltage category) II rating.

Radiated Field Immunity (RFI): Complies with IEC1000-4-3 Level 3 (10V/M, 80 to 1000MHz & 900MHz keyed) and European Norm EN50082-1.

Electromagnetic Interference Immunity (EMI): No relay trips will occur beyond ±0.25% of input span from setpoint, and no output shifts will occur beyond ±0.25% of span, under the influence of EMI from switching solenoids, commutator motors, and drill motors.

Electrical Fast Transient Immunity (EFT): Complies with IEC1000-4-4 Level 3 (2KV power; 1KV signal lines) and European Norm EN50082-1.

Electrostatic Discharge (ESD) Immunity: Complies with IEC1000-4-2 Level 3 (8KV/4KV air/direct discharge) to the enclosure port and European Norm EN50082-1.

Surge Immunity: Complies with IEC1000-4-5 Level 3 (2.0KV) and European Norm EN50082-1.

Radiated Emissions: Meets or exceeds European Norm EN50081-1 for class B equipment.

FIELD CONFIGURATION AND CONTROLS

Field program of transmitter zero and full-scale (all models), plus alarm setpoint and dropout levels (811T-1500 only), is accomplished with module push-buttons and LED indicators. This is useful for making adjustments in the absence of a host computer. **Note:** The unit must first be configured using the Configuration Software before its configuration can be modified in the field.

Module Push Buttons (See Dwg 4501-642 for Location):

Mode - Used to change mode of field configuration.
Set - Used to accept input data during field calibration.
Up - Used to increment output level during field calibration. Used to reset a latched alarm relay in operating mode.
Down - Used to decrement output level during field calibration. Used to reset a latched alarm relay in operating mode.

LED Indicators (See Dwg 4501-642 for Location):

Operating (Run) Mode

Run (Green) - Constant ON indicates power is applied and unit is operating normally. Upon power up, the module may take up to 20 seconds to perform internal diagnostics, during diagnostics, the relay may cycle states before the module becomes operational. Flashing ON/OFF indicates that unit is performing diagnostics (first second following power-up), or has failed diagnostics (after a few seconds).
Status (Yellow) - The ST LED will flash ON/OFF when an over/under range limit of the A/D converter is reached.
Zero/Full-Scale (Yellow) - Turned OFF in Run mode.
Relay (Yellow) - Constant ON indicates alarm condition for relay. During field configuration, this LED has a different function (see below).

Field Configuration Mode

Run (Green) - Turned OFF in this mode.
Status (Yellow) - Blinks each time the "SET" button is pressed to capture an I/O signal in this mode.
Zero/Full-Scale (Yellow) - ON or FLASHING if zero or full-scale is being adjusted in this mode (See Table 4).
Relay (Yellow) - ON or FLASHING if alarm setpoint or dropout is being adjusted in this mode (See Table 4).

HOST COMPUTER COMMUNICATION

Host Communication Port (SPI): IntelliPack SPI port (standard RJ11 6-wire phone jack). See Drawing 4501-643 for location. Configuration information is downloaded from the host computer through one of its EIA232 serial ports. This port must be connected to the module through an Acromag IntelliPack Serial Port Adapter. This Serial Port Adapter serves as an isolated interface converter between EIA232 and the IntelliPack's SPI port.

Baud Rate (EIA232): 19.2K baud.

SOFTWARE CONFIGURATION

Units are fully reprogrammable via our user-friendly Windows 95® or NT® IntelliPack Configuration Program (Model 5030-881). A cable (5030-902) and converter (5030-913) are required to complete the interface (Software Interface Package 800C-SIP). See Drawing 4501-643. The following transmitter and alarm attributes are selectable via the IntelliPack Configuration Software. Refer to the IntelliPack Transmitter Configuration Manual (8500-570) for a more detailed explanation of these attributes and their application.

Input Configuration

Input - Range: The transmitter can be configured to accept any one of the fourteen input range types described in the Input Specifications using the IntelliPack Configuration Software. Units are engineering units appropriate to the input range selected (V DC, mA DC, A AC, %).

Input - Samples/Averaging: Indicates the number of input signal A/D conversions to be used to compute an average value. Samples can be set to 1 (default), 2, 4, 8, or 16. This is useful to help filter out transients. Note the response time will be increased by the factor selected.

Input Calibration: The IntelliPack Configuration Software is used to calibrate the input range of this module.

Output Configuration

Output - Range: Analog output can be configured for one of five ranges of current or voltage. For voltage output, a jumper must also be installed between the output "I+" and "JMP" terminals (remove this jumper for current output).
Voltage (Jumper Required): 0 to 10V DC, 0 to 5V DC.
Current: 0 to 20mA DC, 4 to 20mA DC, or 0 to 1mA DC.

Output - Mode: Select a Normal Acting (ascending), or Reverse Acting (descending) output response.

Output Calibration: The configuration software can be used to calibrate the output conditioning circuit of this module.

Transmitter Configuration

Transmitter - Scaling: Scaling is performed after averaging and converts the engineering units of the input range (or a portion of the input range) to 0 to 100% at the output. That is, scaling allows virtually any part of the selected input range to

be scaled to 0% and 100% at the transmitter analog output. The scaling may also be adjusted in-field via front panel push-buttons and status LED's.

Transmitter - Computation: The following gives a brief description of current available transmitter computation functions:

- **None (Default):** Each input sample is converted into a directly proportional output update.
- **Square Root:** Each input sample is converted into a corresponding output update that is the square root of the input signal. The output in percent is computed as the square root of the product of the input in percent multiplied by 100%.
- **Linearizer:** Permits the entry of up to 25 user-defined input-to-output break points to facilitate up to 24 segment linearization of a non-linear sensor signal.

Alarm Configuration (Model 811T-1500) Model 811T-1500 units may also be configured for simple limit alarms. You may also refer to the IntelliPack 800A alarm family for dedicated alarm modules that support other operating functions.

Alarm - Input: The input signal range to the alarm is the full range for the configured input type. Example: if 4-20mA input was selected using the configuration program, the alarm can be programmed to any setpoint from 0 to 20mA. If input averaging is used, an averaged input value will be used by the alarm.

Alarm - Mode: Select a High or Low limit for the limit alarm function of this model. The relay will trip on an increasing input signal for a high limit, and on a decreasing input signal for a low limit.

Alarm - Setpoint: A high or low setpoint (plus deadband) may be assigned to the relay and is programmable over the entire input range. The relay will enter the alarm state when either the user-defined high or low setpoint is exceeded for the specified amount of time (this allows input transients to be filtered). Relay remains in the alarm state until the input signal has retreated past the defined setpoint, plus any deadband, for the specified amount of time. Please refer to the IntelliPack alarm family for dedicated alarm modules that support other operating functions.

Alarm - Deadband: Deadband is associated with the setpoin t. Deadband settings for bipolar input ranges should be limited to 50% or less of the range selected. Unipolar input ranges support deadband settings up to 100% of the range selected. Deadband determines the amount the input signal has to return into the "normal" operating range before the relay contacts will transfer out of the "alarm" state. Deadband is normally used to eliminate false trips or alarm "chatter" caused by fluctuations in the input near the alarm point. Note that deadband may also apply to latched alarms. If the alarm is latching, it is recommended that the deadband be set to a minimum.

IMPORTANT: Noise and/or jitter on the input signal has the effect of reducing (narrowing) the instrument's deadband and may produce contact chatter. Another long term effect of contact chatter is a reduction in the life of the mechanical relay contacts. To reduce this undesired effect, increase the deadband setting.

Relay - Time Delay: Programmable from 0 milliseconds to 25.5 seconds in 100ms increments for this model (used to help filter input transients and avoid nuisance alarming). A minimum delay of 100ms is recommended for increased noise immunity & conformance to applicable safety standards. This delay does not apply to control of the transmitter's analog output.

Relay - Operating Mode: User configurable for "failsafe" operation (relay deenergized in alarm state), or non-failsafe operation (relay energized in alarm state). Failsafe mode provides the same contact closure for alarm states as for power loss, while non-failsafe mode uses alarm contact closure opposite to power loss conditions. Upon power up, relay may cycle states during diagnostic operation.

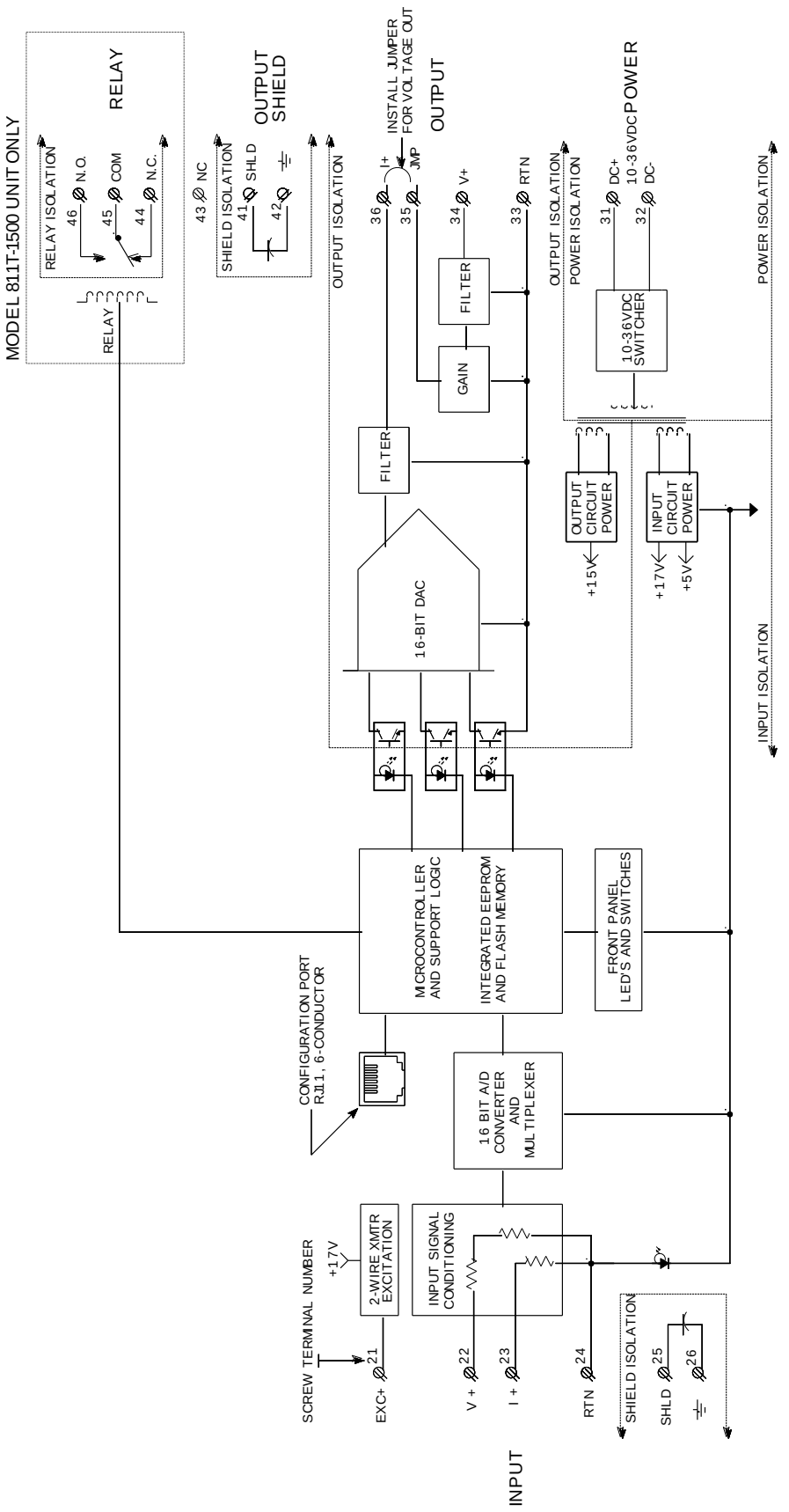
Relay - Reset: The relay may be configured to automatically reset when the input retreats past its setpoint and deadband, or the relay may latch into its alarm state. Use the up or down push-buttons on the front of the module to reset a latched relay and exit the latched state (this may also be accomplished under software control).

Visual Alarm Indicator: A yellow LED (labeled "RLY") for the relay provides visual status indication of when the relay is in alarm (LED is ON in alarm). This LED is also used in field configuration mode to indicate whether setpoint or deadband is being adjusted.

Other IntelliPack Configuration Software Capabilities

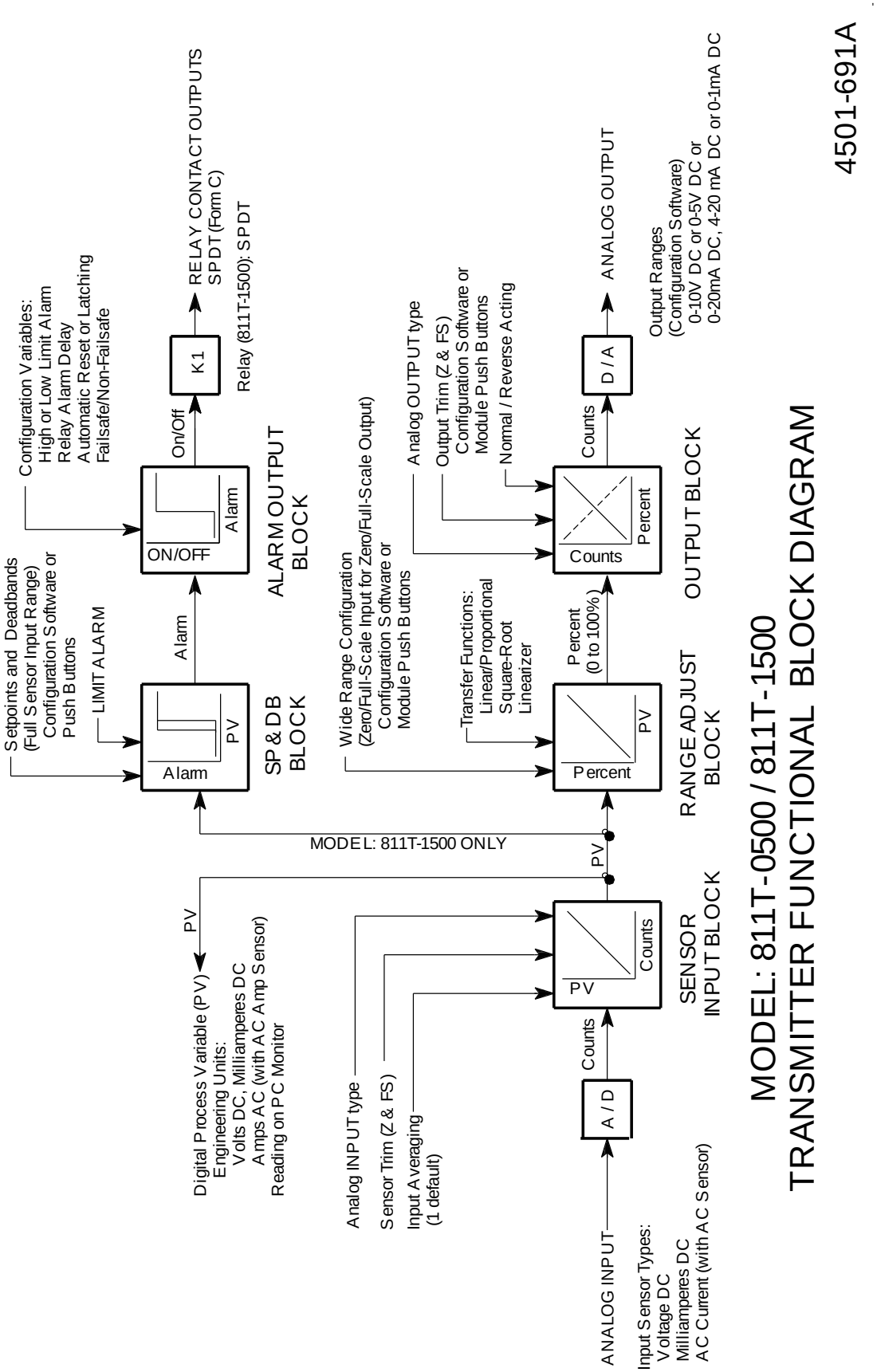
In addition to configuring all features of the module described above, the IntelliPack Configuration Software includes additional capabilities for testing and control of the module (see below). For complete information on the IntelliPack Configuration Software, refer to Transmitter Configuration Manual 8500-570.:

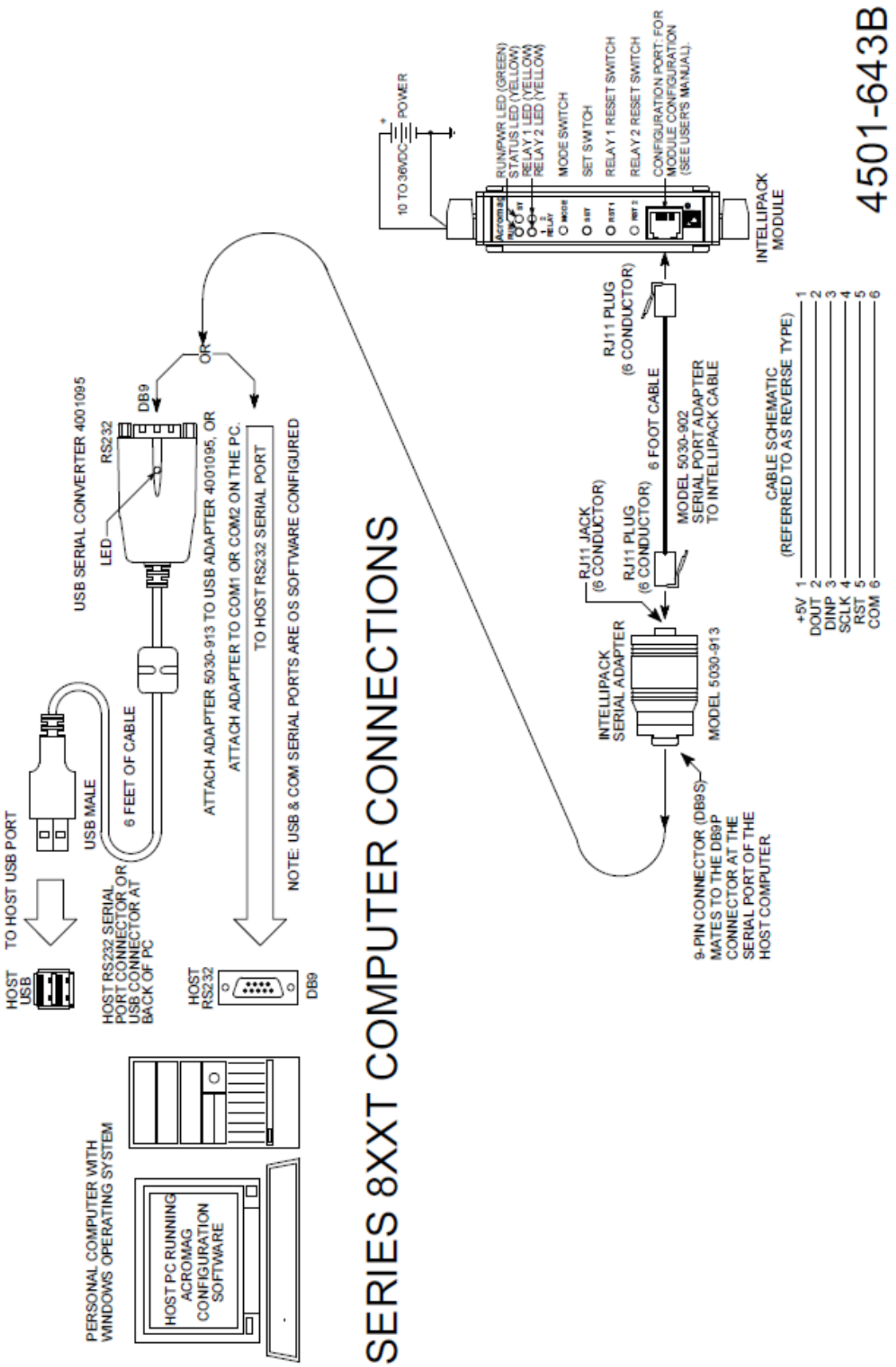
- Monitors the input and output signal values and allows polling to be turned on or off.
- Provides a "Show Graph" function to view a graphical representation of input signal (x) versus output signal (y).
- Allows a configuration to be uploaded or downloaded to/from the module. Also provides a means to rewrite a module's firmware if the microcontroller is replaced or a module's functionality is updated.
- Provides controls to separately calibrate the input and output stages and restore the original factory input or output calibration in case of error.
- Provides separate controls to reset a module and reset a latched alarm relay.
- Provides a control to adjust a transmitter's output signal independent of the input signal (timed override).
- Allows optional user documentation information to be written to the module. Documentation fields are provided for tag number, comment, configured by, location, and identification information. This information can also be uploaded from the module and printed via this software.
- Allows a module's complete configuration to be printed in an easy to read, two-page form, including user documentation.
- Includes on-line help and context (field) sensitive help functions.

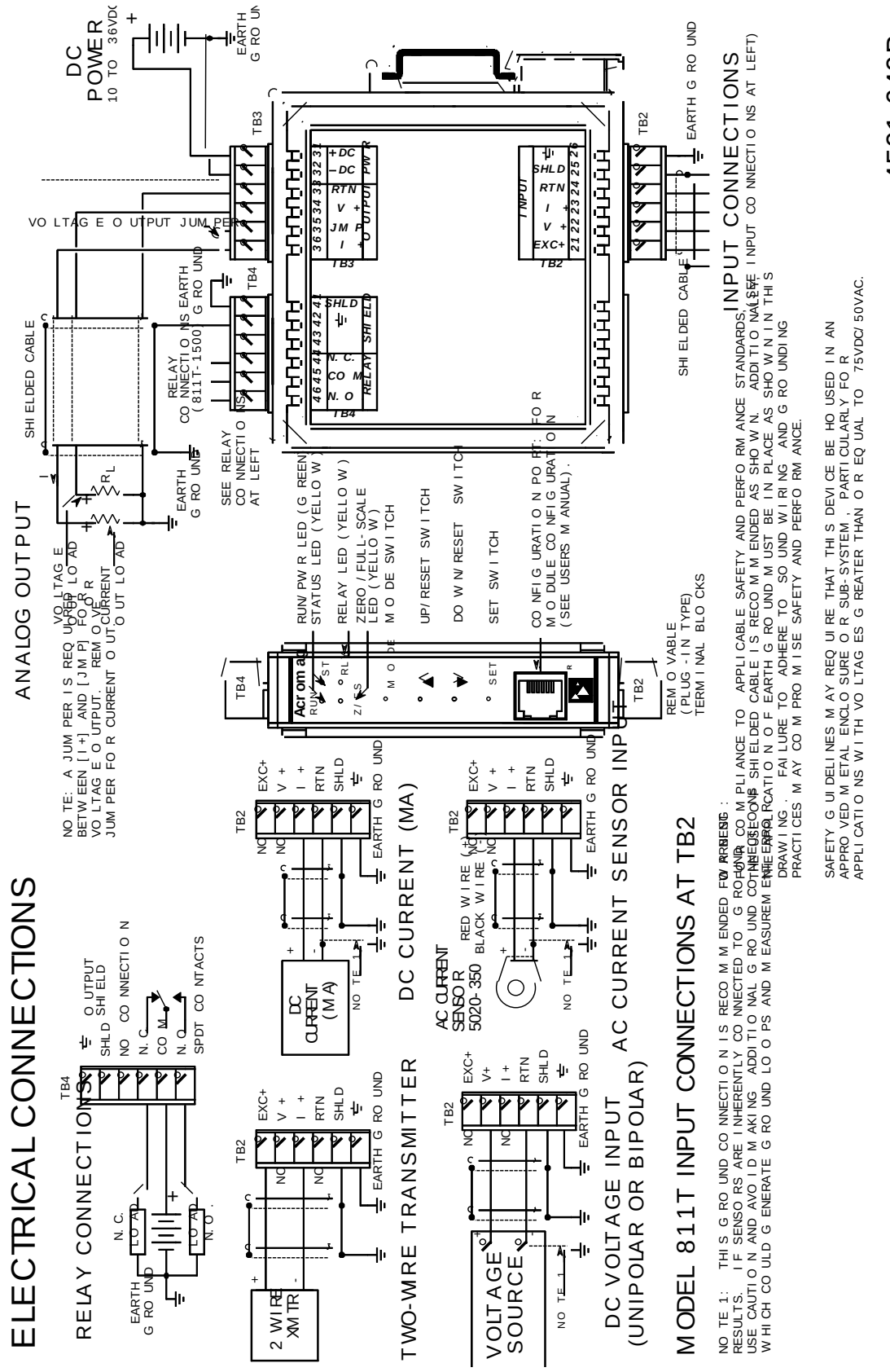


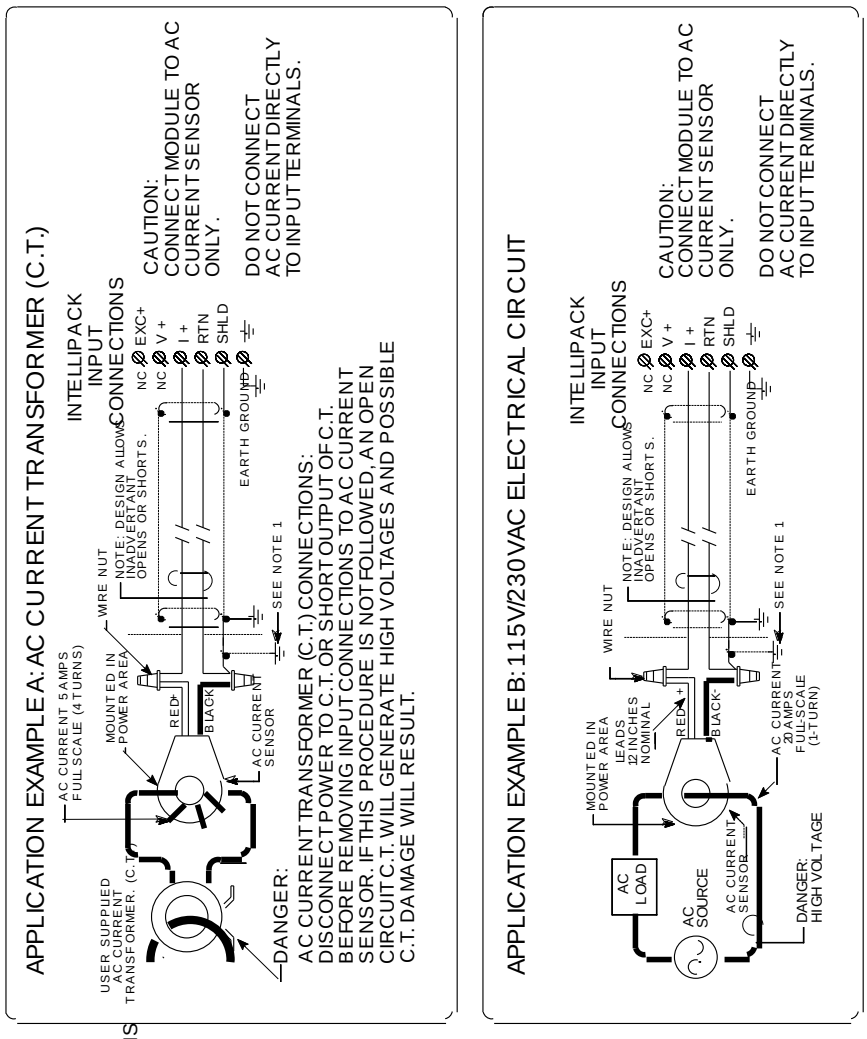
SERIES 811T SIMPLIFIED SCHEMATIC

4501-629A


MODEL: 811T-0500 / 811T-1500
TRANSMITTER FUNCTIONAL BLOCK DIAGRAM
4501-691A
ANALOG INPUT
Input Sensor Types:
Voltage DC
Milliamperes DC
AC Current (with AC Sensor)
A / D
Counts
SENSOR
INPUT BLOCK
PV
Counts
Analog INPUT type
Sensor Trim (Z & FS)
Input Averaging
(1 default)
PV
Digital Process Variable (PV)
Engineering Units:
Volts DC, Milliamperes DC
Amps AC (with AC Amp Sensor)
Reading on PC Monitor
MODEL: 811T-1500 ONLY
Percent
PV
RANGE ADJUST
BLOCK
OUTPUT BLOCK
Percent
(0 to 100%)
Transfer Functions:
Linear/Proportional
Square-Root
Linearizer
Wide Range Configuration
(Zero/Full-Scale Input for Zero/Full-Scale Output)
Configuration Software or
Module Push Buttons
Counts
Percent
Analog OUTPUT type
Output Trim (Z & FS)
Configuration Software or
Module Push Buttons
Normal / Reverse Acting
Counts
D / A
ANALOG OUTPUT
Output Ranges
(Configuration Software)
0-10V DC or 0-5V DC or
0-20mA DC, 4-20 mA DC or 0-1mA DC
Alarm
PV
SP & DB
BLOCK
Setpoints and Deadbands
(Full Sensor Input Range)
Configuration Software or
Push Buttons
LIMIT ALARM
Alarm
ON/OFF
Alarm
ALARM OUTPUT
BLOCK
Configuration Variables:
High or Low Limit Alarm
Relay Alarm Delay
Automatic Reset or Latching
Failsafe/Non-Failsafe
On/Off
K1
Relay (811T-1500): SPDT
RELAY CONTACT OUTPUTS
SPDT (Form C)

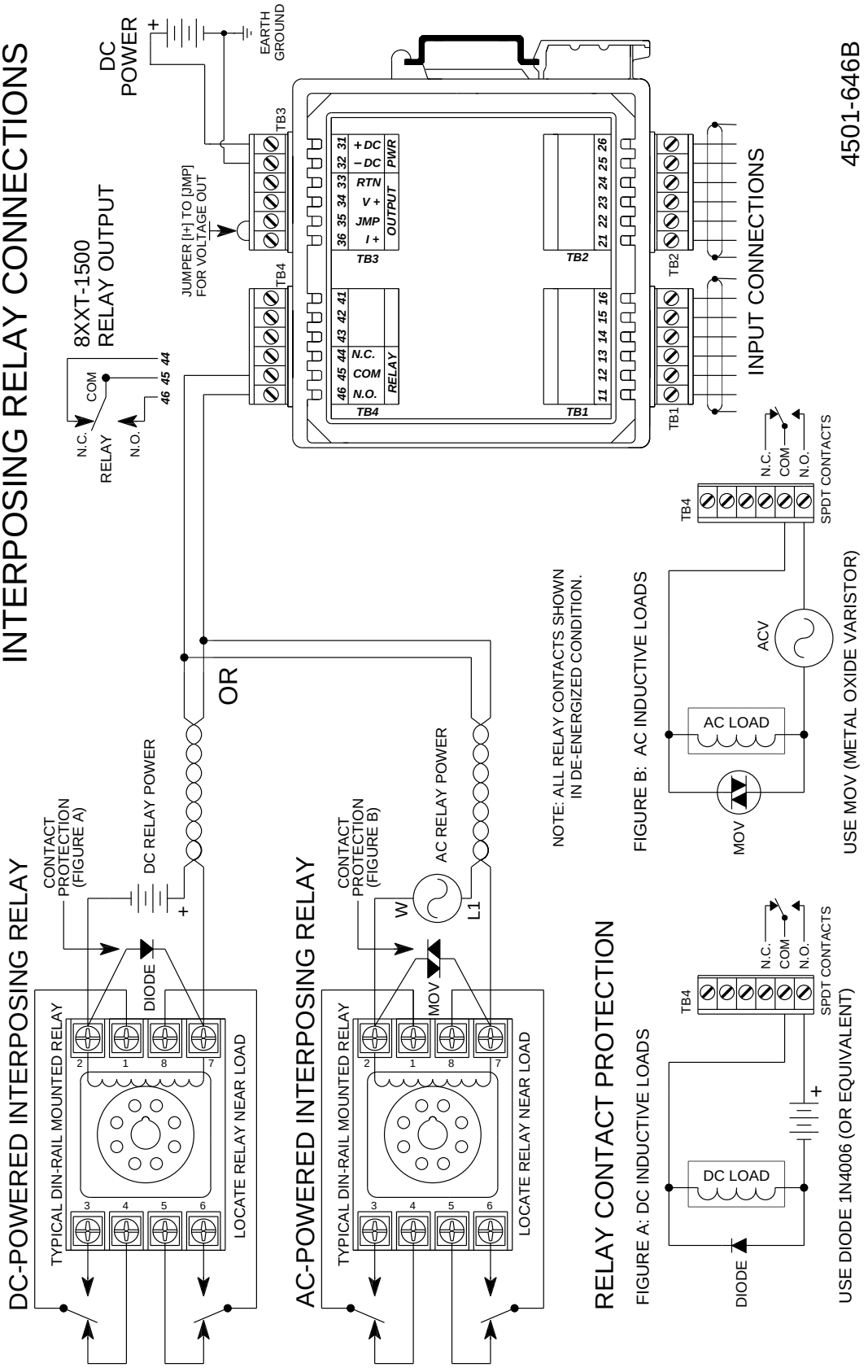

SERIES 8XXT COMPUTER CONNECTIONS
4501-643B
PERSONAL COMPUTER WITH WINDOWS OPERATING SYSTEM
HOST PC RUNNING ACROMAG CONFIGURATION SOFTWARE
HOST USB
TO HOST USB PORT
USB MALE
6 FEET OF CABLE
HOST RS232 SERIAL PORT CONNECTOR OR USB CONNECTOR AT BACK OF PC
USB SERIAL CONVERTER 4001095
LED
RS232
DB9
OR
ATTACH ADAPTER 5030-913 TO USB ADAPTER 4001095, OR
ATTACH ADAPTER TO COM1 OR COM2 ON THE PC.
TO HOST RS232 SERIAL PORT
NOTE: USB & COM SERIAL PORTS ARE OS SOFTWARE CONFIGURED
HOST RS232
DB9
9-PIN CONNECTOR (DB9S) MATES TO THE DB9P CONNECTOR AT THE SERIAL PORT OF THE HOST COMPUTER.
INTELLIPACK SERIAL ADAPTER
MODEL 5030-913
RJ11 JACK (6 CONDUCTOR)
RJ11 PLUG (6 CONDUCTOR)
6 FOOT CABLE
MODEL 5030-902 SERIAL PORT ADAPTER TO INTELLIPACK CABLE
RJ11 PLUG (6 CONDUCTOR)
CABLE SCHEMATIC (REFERRED TO AS REVERSE TYPE)
+5V 1
DOUT 2
DINP 3
SCLK 4
RST 5
COM 6
10 TO 36VDC
POWER
RUN/PWR LED (GREEN)
STATUS LED (YELLOW)
RELAY 1 LED (YELLOW)
RELAY 2 LED (YELLOW)
MODE SWITCH
SET SWITCH
RELAY 1 RESET SWITCH
RELAY 2 RESET SWITCH
CONFIGURATION PORT: FOR MODULE CONFIGURATION (SEE USER'S MANUAL).
INTELLIPACK MODULE

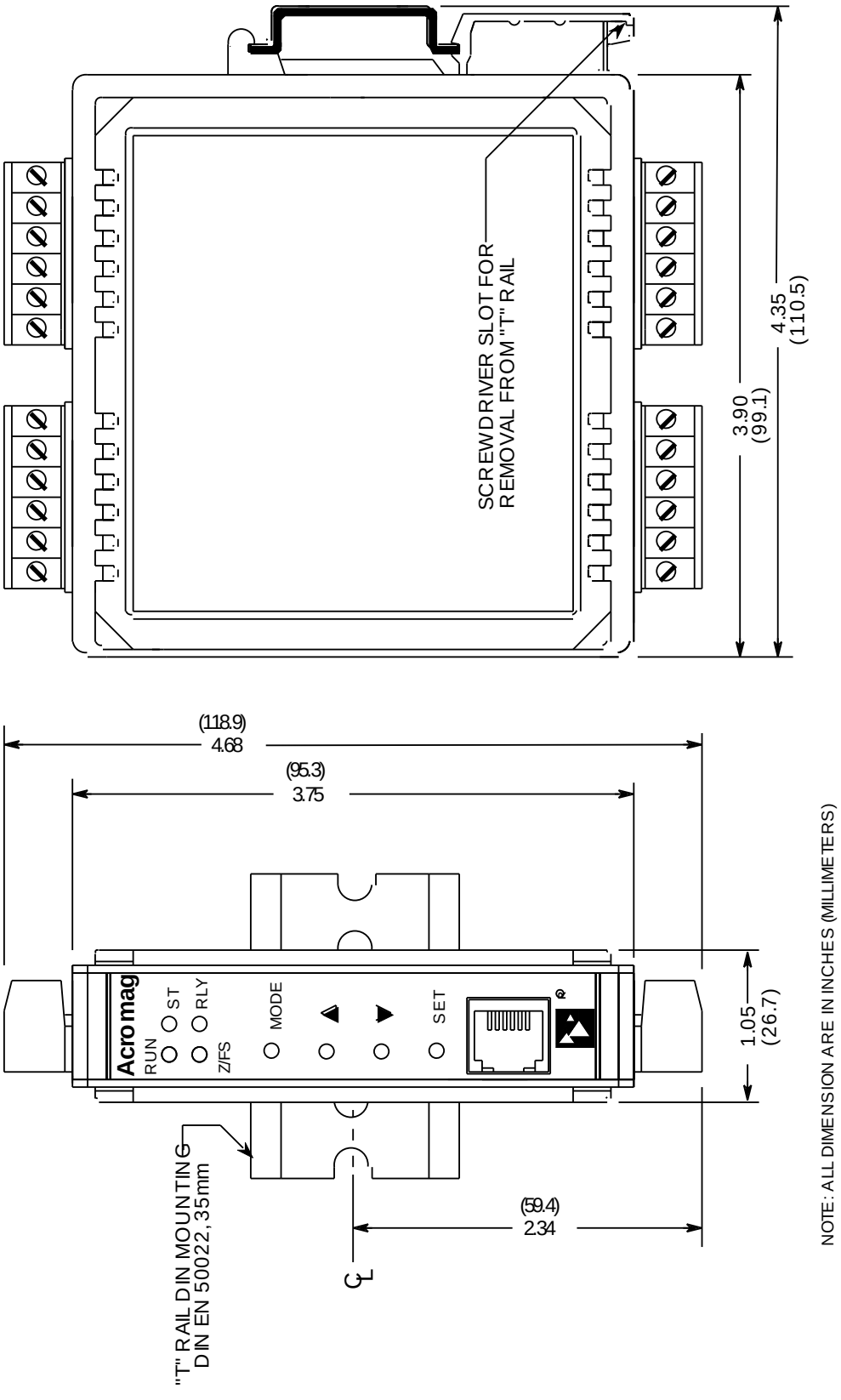

ELECTRICAL CONNECTIONS
RELAY CONNECTIONS
TWO-WIRE TRANSMITTER DC CURRENT (MA)
DC VOLTAGE INPUT AC CURRENT SENSOR INPUT
(UNIPOLAR OR BIPOLAR)
MODEL 811T INPUT CONNECTIONS AT TB2
ANALOG OUTPUT
INPUT CONNECTIONS
DC POWER
10 TO 36VDC
4501-640B



AC CURRENT SENSOR CONNECTIONS

4501-633B


INTERPOSING RELAY CONNECTIONS
4501-646B
DC POWER
EARTH GROUND
8XT-1500 RELAY OUTPUT
JUMPER [I+] TO [JMP] FOR VOLTAGE OUT
TB3
TB4
TB2
TB1
+ DC
– DC
RTN
V +
JMP
I +
PWR
OUTPUT
N.C.
COM
N.O.
RELAY
INPUT CONNECTIONS
OR
DC-POWERED INTERPOSING RELAY
CONTACT PROTECTION (FIGURE A)
DC RELAY POWER
DIODE
TYPICAL DIN-RAIL MOUNTED RELAY
LOCATE RELAY NEAR LOAD
AC-POWERED INTERPOSING RELAY
CONTACT PROTECTION (FIGURE B)
AC RELAY POWER
MOV
W
L1
NOTE: ALL RELAY CONTACTS SHOWN IN DE-ENERGIZED CONDITION.
FIGURE B: AC INDUCTIVE LOADS
AC LOAD
ACV
MOV
SPDT CONTACTS
USE MOV (METAL OXIDE VARISTOR)
RELAY CONTACT PROTECTION
FIGURE A: DC INDUCTIVE LOADS
DC LOAD
DIODE
USE DIODE 1N4006 (OR EQUIVALENT)



4501-642A

INTELLIPACK TRANSMITTER
ENCLOSURE DIMENSIONS

NOTE: ALL DIMENSION ARE IN INCHES (MILLIMETERS)

Revision History

The following table details the revision history for this document:

Release Date	Version	EGR/DOC	Description of Revision
03 AUG 2017	K	CAP/JAA	Remove CE Mark due to non-RoHS compliant part. Refer to ECN# 17G016.
08 JAN 2019	L	CAP/ARP	Update Installation Category per uL.

Notes: