IntelliPack®: 800 Series

IntelliPack 800 Series Signal Conditioners

800T Models

801T: Universal temperature input (thermocouple, RTD, DC mV, and resistance)
811T: DC voltage/current input with optional AC current sensor
841T: Frequency/pulse counter input
851T: Strain gauge / load cell input

IntelliPack transmitters isolate and convert sensor inputs to noise-free, proportional DC current or voltage output signals. An optional relay output adds a local limit alarm function.

Each unit offers a selection of input and output ranges, as well as several signal conditioning options. This flexibility enables a single IntelliPack to handle a broad range of applications. As your needs change, you can easily reconfigure the unit for different ranges or functions.

The internal microprocessor provides several computation functions. A linearization function lets you linearize/characterize the input signal with custom break points. The averaging function outputs a signal that is proportional to the average of the previous “n” samples, where n is user-defined. IntelliPacks can also generate an output signal that is proportional to the square root of the input signal. Other functions are possible (consult factory).

Setup is very easy. IntelliPack modules are quickly configured with the user-friendly Windows software program. Field adjustments are simple with the module’s front-panel push-buttons and status LEDs. Once configured, IntelliPacks operate independent of any host computer.

Key Features & Benefits

General operation

- Advanced microcontroller has integrated, downloadable flash memory and EEPROM for intelligent signal processing.
- Windows XPVista/7 software configuration speeds setup and replacement.
- Push-button reprogrammability facilitates changes in the field without a host PC.
- Plug-in terminal blocks make module installation and removal easy.
- Built-in self-diagnostic routines operate upon power-up and during operation for easy maintenance and troubleshooting.
- 4-way optical isolation separates input, output, power, and relay contacts from each other.
- EMC compliant. Ruggedized circuitry meets directives to provide increased transient immunity and low emissions.
- Wide ambient temperature range ensures reliable performance from -25 to 70°C.
- Wide DC supply range with diode-coupled reverse polarity protection is useful for redundant supplies and battery backup.

Transmitter Operation

- Multi-purpose inputs accept many signal types to reduce spare stock requirements.
- User-programmable outputs let you select and change ranges to meet your needs (0-1mA, 0-20mA, 4-20mA, 0-5V, 0-10V DC).
- Intelligent signal processing functions perform mathematical computations on the input signal for customized outputs.
  - signal linearization (25 breakpoints)
  - average signal computation
  - square root computation
  - pulse counter (frequency input)
- High-resolution Sigma-Delta A/D converter delivers high accuracy with low noise.
- Relay output option provides local limit alarm capability in addition to the DC current/voltage output signal.
- High-power relays switch voltages up to 230V AC at currents up to 5A.
- User-programmable relay settings let you customize the alarm operation.
  - high or low limit setpoint
  - automatic or latching alarm reset
  - failsafe or non-failsafe operation
  - relay delay to filter transient signals
- Input excitation supply provides power for a

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IntelliPack®: 800 Series

Tel: 248-295-0880  ■  Fax: 248-624-9234  ■  sales@acromag.com  ■  www.acromag.com  ■  30765 S Wixom Rd, Wixom, MI 48393 USA
After the initial software configuration, a PC is no longer required. Field calibration is easily handled with the IntelliPack’s push-buttons, status LEDs and a standard field calibrator.

**Intelligent Transfer Functions**

IntelliPack transmitters support the signal processing functions listed below. The functions are easily selected via the configuration software. The next page shows sample screens for the following applications.

**Signal Linearizing**

IntelliPacks let you define a transfer function where the output is a function of an equation or a complex curve. The input signal is characterized using straight line approximation with a user-defined table of up to twenty-five breakpoints. Typical applications include linearizing analyzer output, flow rates, transducer nonlinearities, tank characterization, and logarithmic equations.

**Signal Averaging**

This function provides an output signal that is a run-time average of the input signal. Input data samples are taken every 100mS. The output is computed using a user-defined number of the previous “n” samples. Applications include temperature and level measurements subject to electrical transients, air currents, agitation, and vibration.

**Square Root Computation**

IntelliPacks can also output a signal that is proportional to the square root of the input signal. A common use involves flowmeters where the flow rate equals the square root of the measured differential pressure. In this case, the IntelliPack output is equivalent to a linear flow rate signal that is ideal for interfacing to a standard display device.
IntelliPack 800 Series Signal Conditioners

Software Configuration Examples

Square Root Computation

Linearizer/Characterizer

Proportional/Inverse

Transmitter configuration property sheet.

Proportional or inverse output graph.

Square root transfer function graph.

Customizable linearizer transfer function graph.
Limit alarm property sheet.

Thermocouple reference calibration property sheet.
**801T Transmitters**

**Thermocouple, RTD, Millivolt, and Resistance Input**

**Models**
- 801T-0500: Universal temperature transmitter
- 801T-1500: Transmitter with limit alarm

**Input Ranges**
- TC types: J, K, T, R, S, E, B, N
- Millivolt: ±15.625mV to ±1.0V DC
- RTD: 100 ohm Pt, 120 ohm Ni, 10 ohm Cu
- Resistance: 0 to 500 ohms

**Output Ranges**
- 0 to 1mA, 0 to 20mA, 4 to 20mA DC
- 0 to 5V, 0 to 10V DC

**Limit Alarm**
- SPDT electro-mechanical relay (-1500 unit only)

**Power Requirement**
- 10 to 36V DC

**Approvals**
- CE marked. UL, cUL listed.

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**Description**

These transmitters isolate and convert sensor inputs to noise-free, proportional DC current or voltage output signals. An optional relay output adds a local limit alarm function.

Each unit offers a selection of input and output ranges, as well as several signal conditioning options. This flexibility enables a single IntelliPack to handle a broad range of applications. As your needs change, you can easily reconfigure the unit for different ranges or functions.

Setup is very easy. IntelliPack modules are quickly configured with the user-friendly Windows software program. Field adjustments are simple with the module's front-panel push-buttons and status LEDs. Once configured, IntelliPacks operate independent of any host computer.

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**Special Features**

- High-resolution Sigma-Delta A/D converter delivers high accuracy with low noise.
- Advanced microcontroller provides intelligent signal processing power for linearization, averaging, and square root computations.
- Windows XP/Vista/7 software configuration speeds setup and replacement.
- Multi-purpose inputs and outputs reduce spare stock requirements.
- Relay output option provides local limit alarm capability.

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**Performance**

**General Input**

Analog to Digital Converter (ADC)
- 16-bit 2- to 4-bit A/D converter.

**Resolution**
- ±0.005% of span or 0.1°C.

**Ambient Temperature Effect**
- Better than ±0.005% of input span per °C or ±1µV, whichever is greater.

**Noise Rejection**
- Normal Mode: Better than 40dB @ 60Hz.
- Common Mode: Better than 130dB @ 60Hz.

**Input Response Time (for input step change)**
- Less than 200mS typical to 98% of final output value.

**Input Overvoltage Protection**
- Bipolar Transient Voltage Suppressors (TVS).

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**Thermocouple Input**

**Thermocouple Input Ranges**

<table>
<thead>
<tr>
<th>TC Type</th>
<th>°C Range (°F Range)</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>-210 to 760°C (-346 to 1400°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>K</td>
<td>-200 to 1372°C (-238 to 2502°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>T</td>
<td>-260 to 400°C (-436 to 752°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>R</td>
<td>-50 to 1768°C (-58 to 3214°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>S</td>
<td>-50 to 1768°C (-58 to 3214°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>E</td>
<td>-200 to 1000°C (-328 to 1832°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>B</td>
<td>260 to 1820°C (500 to 3308°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>N</td>
<td>-230 to 1300°C (-382 to 2372°F)</td>
<td>±1.0°C</td>
</tr>
</tbody>
</table>

**Thermocouple Break Detection**
- TC sensor failure can be configured for either upscale or downscale.

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**Signal Conditioning and Intelligent Transfer Functions**

**SPDT Relay (801T-1500)**

**Alarm**
- N.O.
- N.C.

**Output**
- DC Voltage or Current Output

**Power**
- 10 - 36V DC

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**Transmitter w/Alarm**

**Input**

TC Input
- 2-Wire RTD
- 3-Wire RTD
- 4-Wire RTD (Kelvin)
- 4-Wire RTD w/Loop Comp.
- Millivolt
- Resistance
**RTD Input**

RTD Input Ranges
100 ohm Platinum, 120 ohm Nickel, or 10 ohm Copper, user-configured.

<table>
<thead>
<tr>
<th>RTD</th>
<th>°C Range (°F Range)</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt1</td>
<td>-200 to 850°C (-328 to 1562°F)</td>
<td>±0.25°C</td>
</tr>
<tr>
<td>Pt2</td>
<td>-200 to 850°C (-328 to 1562°F)</td>
<td>±0.25°C</td>
</tr>
<tr>
<td>Ni</td>
<td>-80 to 320°C (-112 to 608°F)</td>
<td>±0.25°C</td>
</tr>
<tr>
<td>Cu</td>
<td>-200 to 260°C (-328 to 500°F)</td>
<td>±1.00°C</td>
</tr>
</tbody>
</table>

Alpha: Pt1 (a = 1.3850), Pt2 (a = 1.3911), Ni (a = 1.6720), Cu (a = 1.4272).

2, 3, or 4-wire configurations supported. Module provides sensor excitation, linearization, lead-wire compensation, and sensor break detection.

RTD Excitation Current
1mA DC typical, all types.

RTD Lead-Wire Compensation
25 ohms per lead.

RTD Break Detection
RTD sensor failure can be configured for either upscale or downscale.

**Millivolt Input**

DC Millivolt/Voltage Input Ranges
- ±1.0V
- ±125mV
- ±31.25mV
- ±500mV
- ±62.5mV
- ±15.625mV
- ±250mV

Millivolt Accuracy
Better than ±0.05% of input span.

**Resistance Input**

Resistance Input Range
0 to 500 ohms.

Resistance Accuracy
±0.05 ohms.

**Output (DC V/mA)**

D/A Converter
16-bit S-D.

Current Output
Ranges: 0-1mA, 0-20mA, 4-20mA.
Compliance: 10V minimum (500 ohm load).
Accuracy: ±0.025% of span.

Voltage Output
Ranges: 0-5V, 0-10V.
Compliance: 10mA maximum with short circuit protection. 1 ohm output impedance.
Accuracy: ±0.025% of span.

Accuracy (overall input to output)
0.075% of span.

**Output (Relay)**

Relay
One SPDT electro-mechanical relay.

Relay Ratings (CSA ratings)
25V DC @ 5A.
120/240V AC @ 5A.

Relay Time Delay
Adjustable alarm delay of up to 25 seconds.

Contact Material
Silver-cadmium oxide (AgCdO).

**Environmental**

Ambient Temperature
Operating: -25 to 70°C (-13 to 158°F).
Storage: -40 to 85°C (-40 to 185°F).

Relative Humidity
5 to 95%.

Power Requirements
10 to 36V DC. 75mA @ 24V. 120mA @ 15V.

Isolation (optical)
4-way (input/output/relay/power).
1500V AC for 60 seconds or 250V AC continuous.

**Ordering Information**

IMPORTANT: All IntelliPacks require initial software configuration (order 800C-SIP).
See Note 1 below.

801T-0500
IntelliPack transmitter (TC/RTD/mV/resistance input).

801T-1500
Same as above, plus an SPDT relay output.

800C-SIP
Software Interface Package.

5034-225
USB-to-RS232 adapter. See page 121 for more info.

PS5R-D24
Power supply (24V DC, 2.1A).
See Power Supplies on Page 199.

TBK-S01
Optional terminal block kit, spring clamp style, 2 pcs.
(Does not include terminal block for input wiring.)

NOTE 1: To order factory configuration, call Acromag for a configuration form which must accompany your order. Also, append “C” to model number (example: 801T-1500-C). 800C-SIP kit is still recommended.
811T Transmitters

DC Current, DC Voltage, and AC Current Input

Models
811T-0500: Universal DC input transmitter
811T-1500: Transmitter with limit alarm

Input Ranges
DC Current: 0 to 22mA
DC Voltage: ±100V DC
AC Current: 0 to 20A AC (with external sensor)

Output Ranges
0 to 1mA, 0 to 20mA, 4 to 20mA DC
0 to 5V, 0 to 10V DC

Limit Alarm
SPDT electro-mechanical relay (-1500 unit only)

Power Requirement
10 to 36V DC

Approvals
CE marked. UL, cUL listed.

Description
These transmitters isolate and convert sensor inputs to noise-free, proportional DC current or voltage output signals. An optional relay output adds a local limit alarm function.

Each unit offers a selection of input and output ranges, as well as several signal conditioning options. This flexibility enables a single IntelliPack to handle a broad range of applications. As your needs change, you can easily reconfigure the unit for different ranges or functions.

Setup is very easy. IntelliPack modules are quickly configured with the user-friendly Windows software program. Field adjustments are simple with the module's front-panel push-buttons and status LEDs. Once configured, IntelliPacks operate independent of any host computer.

Special Features
- High-resolution Sigma-Delta AD converter delivers high accuracy with low noise.
- Advanced microcontroller provides intelligent signal processing power for linearization, averaging, and square root computations.
- Windows XP/Vista/7 software configuration speeds setup and replacement.
- Multi-purpose inputs and outputs reduce spare stock requirements.
- Relay output option provides local limit alarm capability.

Performance

DC Current Input

DC Current Input Range (100% rangeable)
Input Ranges
0 to 22mA DC
0 to 5mA DC
Resolution
757nA
189nA

DC Current Input Impedance
24.9 ohms.

Excitation Supply (for 2-wire instruments)
+15V DC at 24mA maximum.

DC Current Input Accuracy
Better than ±0.05% of input span.
Signal Conditioners

**DC Voltage Input**
DC Voltage Input Ranges (100% rangeable)

<table>
<thead>
<tr>
<th>Input Ranges</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>±100V DC</td>
<td>3.77mV</td>
</tr>
<tr>
<td>±50V DC</td>
<td>1.88mV</td>
</tr>
<tr>
<td>±25V DC</td>
<td>942µV</td>
</tr>
<tr>
<td>±12V DC</td>
<td>471µV</td>
</tr>
<tr>
<td>±6V DC</td>
<td>236µV</td>
</tr>
<tr>
<td>±3V DC</td>
<td>118µV</td>
</tr>
</tbody>
</table>

Input impedance
Greater than 500K ohms.

DC Voltage Input Accuracy
Better than ±0.05% of input span.

**AC Current Input**
An optional external AC current sensor is required to monitor AC current signals (Model 5020-350).

<table>
<thead>
<tr>
<th>AC Current Range</th>
<th>Primary Turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20A AC</td>
<td>1</td>
</tr>
<tr>
<td>0 to 10A AC</td>
<td>2</td>
</tr>
<tr>
<td>0 to 5A AC</td>
<td>4</td>
</tr>
<tr>
<td>0 to 2A AC</td>
<td>10</td>
</tr>
<tr>
<td>0 to 1A AC</td>
<td>20</td>
</tr>
</tbody>
</table>

AC Current Input Accuracy
Better than ±0.05% of input span.

**Output (DC V/mA)**
D/A Converter
16-bit 2+2.

Current Output
Ranges: 0-1mA, 0-20mA, 4-20mA.
Compliance: 10V minimum (500Ω load).
Accuracy: 0.025% of span.

Voltage Output
Ranges: 0-5V, 0-10V.
Compliance: 10mA maximum with short circuit protection. 10Ω output impedance.
Accuracy: 0.025% of span.

Accuracy (overall input to output)
0.075% of span.

**Output (Relay)**
Relay
One SPDT electro-mechanical relay.

Relay Ratings (CSA ratings)

- 25V DC @ 5A
- 120V240V AC @ 5A

Relay Time Delay
Adjustable alarm delay of up to 25 seconds.

Contact Material
Silver-cadmium oxide (AgCdO).

Expected Mechanical Life
20 million operations.

**Environmental**
Ambient Temperature
Operating: -25 to 70°C (-13 to 158°F).
Storage: -40 to 85°C (-40 to 185°F).

Relative Humidity
5 to 95%.

Power Requirements
10 to 36V DC. 110mA @ 24V. 170mA @ 15V.

Isolation (optical)
4-way (input/output/relay/power).
1500V AC for 60 seconds or 250V AC continuous.

Radiated Field Immunity (RFI)
EN61000-4-3, EN50082-1.

Electromagnetic Field Immunity (EMI)
Less than ±0.25% of output span effect under the influence of electromagnetic fields from switching solenoids, commutator motors, and drill motors.

Electrical Fast Transient (EFT)
EN61000-4-4, EN50082-1.

Surge Withstanding Capability (SWC)
EN61000-4-5, EN50082-1.

Electrostatic Discharge (ESD)
EN61000-4-2, EN50082-1.

**Physical**
Enclosure
Case: Self-extinguishing NYLON type 6.6 polyamide thermoplastic UL94 V-2 NEMA Type 1 enclosure.

Connectors (Removable Terminal Blocks)
Wire Range: AWG #14-22 (AWG #12 stranded only).

Printed Circuit Boards
Military grade FR-4 epoxy glass circuit board.

Dimensions
1.05W x 4.68H x 4.35D inches.
26.7W x 118.9H x 110.5D millimeters.

Shipping Weight
1 pound (0.45 Kg) packed.

**Ordering Information**
IMPORTANT: All IntelliPacks require initial software configuration (order 800C-SIP).

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>811T-0500</td>
<td>IntelliPack transmitter unit (DC voltage/current input).</td>
<td></td>
</tr>
<tr>
<td>811T-1500</td>
<td>Same as above, plus an SPDT relay output.</td>
<td></td>
</tr>
<tr>
<td>5020-350</td>
<td>AC current sensor. Required for AC current inputs. See Page 205 for more information.</td>
<td></td>
</tr>
<tr>
<td>800C-SIP</td>
<td>Software Interface Package. Only one kit is required for all IntelliPack models. See diagram on Page 83 for included parts.</td>
<td></td>
</tr>
<tr>
<td>5034-225</td>
<td>USB-to-RS232 adapter. See page 121 for more info.</td>
<td></td>
</tr>
<tr>
<td>PS5R-D24</td>
<td>Power supply (24V DC, 2.1A). See Power Supplies on Page 199.</td>
<td></td>
</tr>
<tr>
<td>TBK-801</td>
<td>Optional terminal block kit, barrier strip style, 2 pcs. (For use with 811T-0500 model.)</td>
<td></td>
</tr>
<tr>
<td>TBK-802</td>
<td>Optional terminal block kit, barrier strip style, 4 pcs. (For use with 811T-1500 model with alarm.)</td>
<td></td>
</tr>
<tr>
<td>TBK-501</td>
<td>Optional terminal block kit, spring clamp style, 2 pcs. (For use with 811T-0500 model.)</td>
<td></td>
</tr>
<tr>
<td>TBK-502</td>
<td>Optional terminal block kit, spring clamp style, 4 pcs. (For use with 811T-1500 model with alarm.)</td>
<td></td>
</tr>
</tbody>
</table>

NOTE 1: To order factory configuration, call Acromag for a configuration form which must accompany your order. Also, append “-C” to model number (example: 811T-1500-C). 800C-SIP kit is still recommended.
**Description**

These transmitters isolate and convert sensor inputs to noise-free, proportional DC current or voltage output signals. An optional relay output adds a local limit alarm function.

Each unit offers a selection of input and output ranges, as well as several signal conditioning options. This flexibility enables a single IntelliPack to handle a broad range of applications. As your needs change, you can easily reconfigure the unit for different ranges or functions.

Setup is very easy. IntelliPack modules are quickly configured with the user-friendly Windows software program. Field adjustments are simple with the module's front-panel push-buttons and status LEDs. Once configured, IntelliPacks operate independent of any host computer.

**Special Features**

- High-resolution Sigma-Delta A/D converter delivers high accuracy with low noise.
- Advanced microcontroller provides intelligent signal processing power for linearization, averaging, and square root computations.
- Windows XP/Vista/7 software configuration speeds setup and replacement.
- Multi-purpose inputs and outputs reduce spare stock requirements.
- Relay output option provides local limit alarm capability.

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**Performance**

**General Input**

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Input Range</th>
<th>Resolution</th>
<th>Input Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01Hz</td>
<td>0 to 100Hz</td>
<td>0.1Hz</td>
<td>0 to 1000Hz</td>
</tr>
<tr>
<td>1Hz</td>
<td>0 to 50,000Hz</td>
<td>1 pulse</td>
<td>0 to 65,535 pulses</td>
</tr>
</tbody>
</table>

**Noise Rejection**

Common Mode: Better than 80dB @ 60Hz.

**Input Response Time (for input step change)**

40μs @ 35kHz.

**Input Overvoltage Protection**

Bipolar Transient Voltage Suppressors (TVS).

Continued on next page.
### Signal Conditioners

#### Performance

**Frequency Input**
- Input Types: TTL, dry contact, open collector, NPN, NAMUR, magnetic pickups, proximity sensors.
- Frequency Ranges:
  - 0 to 100Hz
  - 0 to 1000Hz
  - 0 to 50,000Hz
- Pulse Counter Input Range: 0 to 65535 pulses.
- Minimum Input Pulse Width: Frequency inputs: 10µS, Pulse counting inputs: 5mS.
- Voltage Ranges:
  - Unipolar: 0 to 100V DC
  - Bipolar: ±50mV to ±100V peak.
- Zero/Full Scale Adjustment:
  - Zero and span: 100% full range adjustment.
  - Pulse counting: Up to 65535 spans within range.
- Input Threshold/Hysteresis:
  - Bipolar: Threshold: 0.01V, typical, Hysteresis: ±25mV or ±83mV
  - Unipolar: Threshold: 1.5V or 5V, Hysteresis: ±25mV or ±83mV
- Input Debounce (Event Counter): 0 to 1000mS (configurable in 5mS increments).
- Frequency Excitation Supply: Selectable, ±8.2V or ±12V @ 15mA.
- Input Impedance: 35K ohms, typical.
- Accuracy:
  - Input Range
    - 0 to 100Hz: ±0.04Hz
    - 0 to 1000Hz: ±0.4Hz
    - 0 to 50,000Hz: ±10Hz
    - 0 to 65,535 pulses: ±1 pulse

#### Output (DC V/mA)
- D/A Converter: 16-bit 
- Current Output: Ranges: 0-1mA, 0-20mA, 4-20mA.
- Compliance: 10V minimum (50Ω load).
- Accuracy: 0.025% of span.
- Voltage Output: Ranges: 0-5V, 0-10V.
- Compliance: 10mA maximum with short circuit protection. 1 ohm output impedance.
- Accuracy: 0.025% of span.
- Accuracy (overall input to output): 0.075% of span.

#### Output (Relay)
- Relay:
  - One SPDT electro-mechanical relay.
- Relay Ratings (CSA ratings):
  - 25V DC @ 5A.
  - 120/24V AC @ 5A.
- Relay Time Delay: Adjustable alarm delay of up to 25 seconds.
- Contact Material: Silver-cadmium oxide (AgCdO).
- Expected Mechanical Life: 20 million operations.

#### Environmental
- Ambient Temperature: Operating: -25 to 70°C (-13 to 158°F), Storage: -40 to 85°C (-40 to 185°F).
- Relative Humidity:
  - Operating: 5 to 95%.
  - Storage: 20 million operations.
- Power Requirements:
  - 10 to 36V DC, 100mA @ 24V, 160mA @ 15V.
- Isolation (optical):
  - 10 to 36V DC, 100mA @ 24V, 160mA @ 15V.
- Radiated Field Immunity (RFI):
  - EN61000-4-2, EN50082-1.
- Radiated Emissions:
  - EN50081-1 for Class B equipment.
- Electrostatic Discharge (ESD):
  - EN61000-4-5, EN50082-1.
- Electrical Fast Transient (EFT):
  - EN61000-4-4, EN50082-1.
- Surge Withstanding Capability (SWC):
  - EN61000-4-3, EN50082-1.
- Electromagnetic Field Immunity (EMI):
  - Less than ±0.25% of output span effect under the influence of electromagnetic fields from switching solenoids, commutator motors, and drill motors.
- Electrical Fast Transient (EFT):
  - EN61000-4-4, EN50082-1.
- Surge Withstanding Capability (SWC):
  - EN61000-4-5, EN50082-1.
- Radiated Emissions:
  - EN50081-1 for Class B equipment.
- Approvals:
  - CE, UL listed, CSA C22.2 No. 16, NAMUR, magnetic pickups, proximity sensors.

#### Ordering Information
- IMPORTANT: All IntelliPacks require initial software configuration (order 800C-SIP).
- Software Configuration:
  - Software Interface Package.
  - Same as above, plus an SPDT relay output.
  - 800C-SIP, Software Interface Package.
- Connectors (Removable Terminal Blocks):
  - 841T-0500: IntelliPack transmitter unit (freq/pulse counter input).
  - 841T-1500: Same as above, plus an SDPT relay output.
- Dimensions and Shipping Weight:
  - 1.05W x 4.68H x 4.35D in. (26.7 x 118.9 x 110.5 mm)
  - 1 pound (0.45 Kg) packed.

#### Physical
- Enclosure:
  - Case: Thermoplastic UL94 V-2 NEMA Type 1 enclosure.
- Connectors (Removable Terminal Blocks):
  - 841T-0500: USB-to-RS232 adapter. See page 83 for more info.
  - 841T-1500: Optional terminal block kit, barrier strip style, 4 pcs. (For use with 841T-1500 model.)
- Printed Circuit Boards:
  - Military grade FR-4 epoxy glass circuit board.
- Dimensions and Shipping Weight:
  - 1.05W x 4.68H x 4.35D in. (26.7 x 118.9 x 110.5 mm)
  - 1 pound (0.45 Kg) packed.

#### Technical Specifications

841T-1500-C - 841T-0500-C

**Ordering Information**

**IntelliPack®**

- 841T-1500: Optional terminal block kit, barrier strip style, 4 pcs. (For use with 841T-1500 model.)
- 841T-1500: Optional terminal block kit, spring clamp style, 4 pcs. (For use with 841T-1500 model.)

**Software Configuration**

- Software Interface Package.
- Same as above, plus an SDPT relay output.
- 800C-SIP, Software Interface Package.
- Integrating Pulse Input: 0 to 65,535 pulses ±1 pulse
- Integrating Accumulated Time: 0 to 65,535 time units ±1 time unit
- Integrating Accumulated Energy: 0 to 65,535 energy units ±1 energy unit

**Physical**

- Enclosure:
  - Case: Thermoplastic UL94 V-2 NEMA Type 1 enclosure.
- Connectors (Removable Terminal Blocks):
  - 841T-0500: IntelliPack transmitter unit (freq/pulse counter input).
  - 841T-1500: Same as above, plus an SPDT relay output.
- 800C-SIP, Software Interface Package.
- Connectors (Removable Terminal Blocks):
  - 841T-0500: USB-to-RS232 adapter. See page 83 for more info.
  - 841T-1500: Optional terminal block kit, barrier strip style, 4 pcs. (For use with 841T-1500 model.)
- Dimensions and Shipping Weight:
  - 1.05W x 4.68H x 4.35D in. (26.7 x 118.9 x 110.5 mm)
  - 1 pound (0.45 Kg) packed.

**Ordering Information**

**IntelliPack®**

- 841T-1500: Optional terminal block kit, barrier strip style, 4 pcs. (For use with 841T-1500 model.)
- 841T-1500: Optional terminal block kit, spring clamp style, 4 pcs. (For use with 841T-1500 model.)

**Software Configuration**

- Software Interface Package.
- Same as above, plus an SPDT relay output.
- 800C-SIP, Software Interface Package.

**Physical**

- Enclosure:
  - Case: Thermoplastic UL94 V-2 NEMA Type 1 enclosure.
- Connectors (Removable Terminal Blocks):
  - 841T-0500: IntelliPack transmitter unit (freq/pulse counter input).
  - 841T-1500: Same as above, plus an SPDT relay output.
- 800C-SIP, Software Interface Package.
- Connectors (Removable Terminal Blocks):
  - 841T-0500: USB-to-RS232 adapter. See page 83 for more info.
  - 841T-1500: Optional terminal block kit, barrier strip style, 4 pcs. (For use with 841T-1500 model.)
- Dimensions and Shipping Weight:
  - 1.05W x 4.68H x 4.35D in. (26.7 x 118.9 x 110.5 mm)
  - 1 pound (0.45 Kg) packed.

**Ordering Information**

**IntelliPack®**

- 841T-1500: Optional terminal block kit, barrier strip style, 4 pcs. (For use with 841T-1500 model.)
- 841T-1500: Optional terminal block kit, spring clamp style, 4 pcs. (For use with 841T-1500 model.)
IntelliPack® 800 Series

**851T Transmitters**

**Strain Gauge, Load Cell Input**

**Input**
- Sensor types:
  - Load cells (4- or 6-wire configurations),
  - Strain gauges (full-, half-, or quarter-bridge),
  - Millivolt
- Bridge/gauge resistance: Supports 85 ohms or greater with 10V excitation
- Input sensitivity: Accepts load cell and strain gauge rated outputs up to 10mV/V DC
- Internal excitation: Adjustable from 4 to 11V DC, 120mA max.

**Output**
- Universal output: 0 to 20mA (user-configured ranges), 0 to 10V DC (user-configured ranges),
- Relay Output (optional): 5A SPDT dry contact relay
- Power Requirement: 12 to 36V DC
- Approvals: CE marked, UL, cUL listed.

**Description**

IntelliPack strain gauge and load cell transmitters offer many powerful features beyond the limited capabilities found in typical bridge amplifiers. 851T models accept signals from sensors wired in a Wheatstone bridge configuration. Common uses include measurement of force, weight, level, torque, acceleration, pressure, and vibration.

The transmitter's input circuit allows true 6-wire bridge measurement and includes an adjustable bridge excitation supply (4 to 11V DC) with a remote sense feature. Sense wires ensure the programmed excitation voltage is applied at the sensor and enable lead-wire compensation. The differential input performs true ratiometric conversions for extremely stable measurements that remain accurate over time and temperature. Plus, lead break detection is inherent in the device.

Intellipack configuration software simplifies setup for use with basic load cells, millivolt inputs, or seven bridge sensor formats. Internal bridge completion resistors are supplied for half and quarter bridges. The software also downloads sensor parameters such as gauge factor and Poisson's ratio into the transmitter for internal calculation of complex equations to determine sensor strain (ε). The strain is then converted to a representative process signal output.

Screw terminals enable a remote "auto-tare" function to compensate for non-zero dead weights and other sensor offsets (e.g. container weight or bridge imbalances). Alternatively, these same screw terminals may be used to reset latched relay alarms.

All these powerful features combined with Acromag's user-friendly configuration software, make the 851T a versatile device that's easy to use and maintain. Plus, a rugged, compact design makes it ideal for use out in the field, on the plant floor, or inside a laboratory.

**Special Features**

- Intelligent signal processing functions perform math computations for custom output:
  - strain (ε) calculations
  - signal linearization (25 breakpoints)
  - average signal computation
- Relay output option provides local limit alarm capability in addition to the DC output
- Adjustable bridge excitation supports a wide variety of sensor types
- An internal bridge completion function (half-to-full and quarter-to-full) accommodates a broad range of applications
- Remote auto-tare function compensates for extraneous loads and corrects for imbalances in the input bridge
- High-resolution Sigma-Delta A/D converter delivers high accuracy with low noise.
- Windows XP/Vista/7 software configuration speeds setup and replacement.
Complex strain (ε) calculations are easily configured and computed for full, half, and quarter-bridge sensors.

The configuration software makes it easy to set up the transmitter for use with basic load cell sensor devices. Common input sources include pressure transducers, torque converters, and vibration sensors.
851T Transmitters

- **Bridge Input**
  - **Input Types**
    Select from basic load cell, two quarter-bridge options, two half-bridge options, three full-bridge options, or millivolts.
  - **Input Span/Range**
    Bipolar input range is determined from the ± product of the gauge’s rated output and the nominal excitation selection (2mV/V x 10V = ±20mV range).
  - **Input Over-range**
    The actual input range is ±150% typical of the range obtained via the ± product of the gauge’s rated output and the nominal excitation applied.
  - **Input Impedance**
    ±IN at 1M ohms min.; ±SEN at 29.09K ohms, typical.
  - **Input Lead Break Detection**
    Sensor failure detection is upscale only.
  - **Input Bridge Excitation (Internal)**
    Adjustable from 4V to 11V, 120mA maximum. Internal excitation may be turned OFF for external excitation supply connection.
  - **Input Bridge Excitation (External)**
    4V to 11V. The internal excitation must be turned OFF for connection to an external excitation supply.

- **Output (DC V/mA)**
  - **D/A Converter**
    16-bit Σ-Δ.
  - **Current Output**
    Ranges: 0-1mA, 0-20mA, 4-20mA. Compliance: 10V minimum (500 ohm load).
  - **Voltage Output**
    Ranges: 0-5V, 0-10V. Compliance: 10mA maximum with short circuit protection. 1 ohm output impedance.

- **Output (Relay)**
  - **Relay**
    One SPDT, Form C, dry contact relay.
  - **Relay Ratings (CSA ratings)**
    25V DC @ 5A, resistive load.
    120/240V AC @ 5A, resistive load.
  - **Relay Time Delay**
    Adjustable alarm delay of up to 25 seconds.
  - **Relay Response (No Relay Time Delay)**
    Relay contacts switch within 580ms 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.
  - **Initial Dielectric Strength**
    1000V AC rms between open contacts.
  - **Contact Material**
    Silver-cadmium oxide (AgCdO).
  - **Expected Mechanical Life**
    20 million operations.

Performance specifications continued on next page.
**Environmental**

Ambient Temperature
- Operating: -25 to 70°C (-13 to 158°F).
- Storage: -40 to 85°C (-40 to 185°F).

Relative Humidity
- 5 to 95%.

Power Requirements
- 12 to 36V DC. 11V DC minimum.
- 175mA @ 24V. 290mA @ 15V.

Isolation (optical)
- 5-way (input/output/relays/trigger/power).
- Input, analog output, trigger, and power circuits are isolated from each other for up to 1500V AC for 60 seconds or 250V AC continuous. Optional relay outputs are isolated from other circuits up to 150V AC, or 150V DC.

Radiated Field Immunity (RFI)
- EN61000-4-3, EN50082-1.

Electromagnetic Field Immunity (EMI)
- Less than ±0.25% of output span effect under the influence of electromagnetic fields from switching solenoids, commutator motors, and drill motors.

Electrical Fast Transient (EFT)
- EN61000-4-4, EN50082-1.

Surge Withstanding Capability (SWC)
- EN61000-4-5, EN50082-1.

Electrostatic Discharge (ESD)
- EN61000-4-2, EN50082-1.

Radiated Emissions
- EN50081-1 for Class B equipment.

Approvals
- CE, UL listed (USA, Canada).
- UL3121 - general product safety.

**Configuration**

Software Configuration
- Units are fully programmable via the Windows XP/Vista/7 IntelliPack Configuration Program. Configuration downloads from PC through EIA232 serial port using Acromag 800C-SIP kit.

Field Configuration
- Output, zero/full-scale, relay setpoint and deadband are configurable via push-buttons and a standard calibrator.

LED Indicators
- LEDs indicate power, status, calibration, and alarm.

**Physical**

Enclosure
- Case: Self-extinguishing NYLON type 6.6 polyamide thermoplastic UL94 V-2 NEMA Type 1 enclosure.

Connectors (Removable Terminal Blocks)
- Wire Range: AWG #14-22 (AWG #12 stranded only).

Printed Circuit Boards
- Military grade FR-4 epoxy glass circuit board.

Dimensions
- 1.05W x 4.68H x 4.35D inches.
- 26.7W x 118.9H x 110.5D millimeters.

Shipping Weight
- 1 pound (0.45 Kg) packed.

**Ordering Information**

IMPORTANT: All IntelliPacks require initial software configuration (order 800C-SIP).
See Note 1 below.

- **851T-0500**
  - IntelliPack transmitter unit, strain gauge input

- **851T-1500**
  - Same as above, plus an SPDT relay output.

- **800C-SIP**
  - Software Interface Package.
  - Only one kit is required for all IntelliPack models.
  - See diagram on Page 83 for included parts.

- **5034-225**
  - USB-to-RS232 adapter. See page 121 for more info.

- **PS5R-D24**
  - Power supply (24V DC, 2.1A).
  - See Power Supplies on Page 199.

- **TBK-B02**
  - Optional terminal block kit, barrier strip style, 4 pcs.

- **TBK-S02**
  - Optional terminal block kit, spring clamp style, 4 pcs.

NOTE 1: To order factory configuration, call Acromag for a configuration form which must accompany your order. Also, append “-C” to model number (example: 851T-1500-C). 800C-SIP kit is still recommended.
Dimensions

NOTE: ALL DIMENSION ARE IN INCHES (MILLIMETERS)
Accessories

Terminal Blocks

Barrier strip (left) and spring clamp (right).

■ Ordering Information

See individual I/O modules for compatibility.

Barrier Strip Terminal Blocks

6-position: L = 1.47 inches (37.7 mm)

3-position: L = 0.87 inches (22.3 mm)

TBK-801: Terminal block kit, two 6-position pieces
TBK-802: Terminal block kit, four 6-position pieces

Spring Clamp Terminal Blocks

3-position: L = 0.66 inches (16.9 mm)
6-position: L = 1.26 inches (32.3 mm)

TBK-S01: Terminal block kit, two 6-position pieces
TBK-S02: Terminal block kit, four 6-position pieces
TBK-S03: Terminal block kit, one 3-position and three 6-position pieces

Mounting Hardware

50W Supply

Input Power Requirement
85 to 264V AC or 105 to 370V DC

Output
24V DC, 2.1A (50W)

■ Ordering Information

PS5R-D24: Universal 50W power supply

USB / RS232 Adapter

Length: 3.15 in (8.0 cm)
Height: 0.80 in (2.03 cm)
Width: 1.75 in (4.44 cm)
Weight: 1.6 oz (45.36 g)

■ Ordering Information

5034-225: USB-to-RS232 adapter

AC Current Sensor

■ Ordering Information

5020-350: AC current sensor (See page 205)