Description

The ST133 is a low-cost two-wire transmitter that isolates and converts a millivolt or thermocouple sensor input to a proportional 4-20mA control signal. Power is received from the output loop current. The transmitter performs signal linearization, cold-junction compensation, and lead-break detection functions.

High-voltage isolation separates the input from the output circuit. Isolation protects from surges, reduces noise, and eliminates ground loop errors.

Setup and calibration are fast and easy with a convenient USB connection to your PC and Acromag’s Windows configuration software.

Advanced signal processing capabilities, variable range input, and convenient USB programming make this instrument a very versatile temperature measurement device. These transmitters can withstand harsh industrial environments and operate reliably across a wide temperature range with very low drift. They feature RFI, EMI, ESD, EFT, and surge protection plus low radiated emissions.

Key Features & Benefits

- Easy setup and digital calibration via USB with Windows configuration software
- Flexible thermocouple or millivolt input ranges (TC Type J, K, T, R, S, E, B, N or ±100mV)
- 1500V input isolation
- 24-bit A/D microcontroller
- High accuracy, linearity, stability, and reliability
- Low temperature drift (<75ppm/°C)
- User selectable filtering (none, low, med. high)
- Fast response time (as low as 90ms)
- Supports reverse-acting (inverse) output
- Selectable upscale or downscale operation for sensor errors and lead-break detection
- Non-polarized output/power connection
- Mounts in DIN Form B sensor heads
- Shock (50g) and vibration (5g) resistant
- Optional DIN rail adapter
- Wide ambient operation (-40 to 80°C)
- Hardened for harsh environments
- CE compliant. UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

ST133 software allows you to configure transmitters offline, save the file, and download settings into units later, at your convenience.
### Transmitters: ST130 Series

**ST133** Isolated thermocouple input head-mount transmitter with USB-configuration

#### Performance Specifications

**Important:** To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an ST130 transmitter.

**USB Interface**

- **USB Connector**: USB Mini-B type socket, 5-pin.
- **USB Data Rate**: 12Mbps. USB v1.1 and 2.0 compatible.
- **USB Transient Protection**: Transient voltage suppression on power and data lines.
- **USB Cable Length**: 5.0 meters maximum.
- **USB Transient Protection**: 75dB @ 60Hz, typical with 100 ohm input unbalance.
- **Input Filters**: Normal mode filtering, plus selectable digital filtering fixed per input range within the A/D converter.
- **Input Over-Voltage Protection**: Bipolar Transient Voltage Suppressors (TVS), 5.6V clamp level typical.
- **Power Requirement**: 12-32V DC SELV (Safety Extra Low Voltage), 5 to 95% non-condensing.
- **Output**: 4 to 20mA DC.
- **Output Compliance**: RLOAD = (Vsupply -12V) / 0.024A.
- **Output Response Time (for step input change)**: Time to reach 98% of final output value (typical)

### Input

- **Input Configuration/Calibration**: Input: TC J, -210 to 760°C, upscale fault, high filter. Output: 4 to 20mA.
- **Input Ranges and Accuracy**:

<table>
<thead>
<tr>
<th>Input</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC J</td>
<td>-210 to 760°C (-346 to 1400°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>TC K</td>
<td>200 to 1372°C (-328 to 2502°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>TC T</td>
<td>-260 to 400°C (-436 to 752°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>TC R</td>
<td>50 to 1768°C (-58 to 3214°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>TC S</td>
<td>50 to 1768°C (-58 to 3214°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>TC E</td>
<td>200 to 1000°C (-328 to 1832°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>TC B</td>
<td>260 to 1820°C (500 to 3308°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>TC N</td>
<td>230 to 1300°C (-382 to 2372°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>mV</td>
<td>-100 to 100mV</td>
<td>±0.1mV</td>
</tr>
</tbody>
</table>

*Error includes the effects of repeatability, terminal point conformity, and linearization at 25°C operating ambient temperature.*

- **Thermocouple Reference (Cold Junction Compensation)**: ±0.1°C typical, ±0.3°C maximum at 25°C.
- **Ambient Temperature Effect**: Better than ±75ppm/°C (±0.0075%/°C).
- **Zero Scaling Adjust**: 0 to 95% of range, typical.
- **Full Scale Adjust**: 5 to 100% of full scale range, typical.
- **Lead Break (Sensor Burnout) Detection**: Configurable for either upscale (24mA) or downsclass (3.3mA) operation.

#### Environmental

- **Operating temperature**: -40 to 80°C (-40 to 176°F).
- **Storage temperature**: -40 to 85°C (-40 to 185°F).
- **Relative humidity**: 5 to 95% non-condensing.
- **Power Requirement**: 12-32V DC SELV (Safety Extra Low Voltage), 24mA max.
- **Isolation**: 1500V AC peak. 250V AC (354V DC) continuous isolation between input and output circuits.
- **Shock and Vibration Immunity**:
  - Vibration: 5g, per IEC 60068-2-64.
  - Shock: 50g, per IEC 60068-2-27.
- **Electromagnetic Compatibility (EMC) Compliance**:
  - Radiated Emissions: BS EN 61000-6-4, CISPR 16.
  - RFI: BS EN 61000-6-2, IEC 61000-4-3.
  - Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
  - ESD: BS EN 61000-6-2, IEC 61000-4-2.
  - EFT: BS EN 61000-6-2, IEC 61000-4-4.
  - Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

#### Ordering Information

- **Models**
  - **ST133-1600**: Transmitter, thermocouple/millivolt input, CE approval.
  - **ST133-1610**: Same as ST133-1600 plus UL/cUL Class 1 Division 2 Zone 2 approval and ATEX Certified.

#### Services

- **ST13x-Config/Cal**: Factory custom configuration/calibration service. Specify input type, input/output zero and full-scale values, filtering, and sensor fault settings on order.
- **Software**
  - **ST13C-SIP**: (recommend one kit per customer)

#### Accessories

- **Connection Head Enclosures**: General purpose enclosure with potted circuit designed for mounting in DIN Form B connection heads.
- **Accessories**
  - **ST130-DIN**: DIN-rail adapter (Type G or T).
  - **USB-ISOLATOR**: USB-to-USB isolator, includes USB cable (4001-112).

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**Description**
For your convenience, Acromag offers a variety of head-mount enclosures and other mounting accessories to simplify your system installation.

**Ordering Information**
NOTE: For more information visit www.acromag.com.

**Mounting Accessories**

**ST130-MTG**
Replacement mounting Kit – Includes two (2) M4 mounting screws, (2) 6-32 mounting screws, and (2) two relief springs for mounting an ST130 transmitter in a DIN Form B connection head.

**4001-115K**

**4001-116K**
Explosion-Proof Stainless Steel Connection Head – FM/FMTC, Class I, Division I, Groups A, B, C, D, T6; Class II, Division I, Groups E, F, G, T6; Class III, NEMA 4X rated. Includes M4 mtg screws and springs.

**4001-117K**
General-Purpose Aluminum Connection Head – NEMA 4X and IP68 rated. Includes M4 mounting screws and springs.

**4001-119K**
General-Purpose Cast Iron Connection Head – NEMA 4X rated. Includes M4 mtg screws and springs.

**ST130-DIN**
Series ST DIN Rail Adapter – Includes a DIN rail bracket with mounting screws that connects a ST130 transmitter to a 35mm T-type or G-type DIN rail. Includes M4 mounting screws and springs.

**Dimensions:**

- **4001-115K**
- **4001-116K**
- **4001-117K**
- **4001-119K**
- **ST130-MTG**
- **ST130-DIN**

Simplifies mounting of ST130 Series transmitters ◆ Ideal for mounting in the field or in a control room.