microBlox™
Signal Conditioners

High-Density Analog I/O Signal Conditioners
New Product Announcement

Acromag’s microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

**microBlox I/O Modules Advantages**

- Selection of 175 I/O modules with Bluetooth wireless technology capability, fixed-range, and cost-saving commercial grade versions
- User-configurable I/O ranges with smartphone or tablet
- Input polling with trend charts in Android® or iOS® app
- Alarm output function with setpoint and deadband
- 1500Vac isolation field-to-host and channel-to-channel
- Up to 0.05% accuracy and 130db CMR
- Shock and vibration-resistant without screws

### User-configurable & fixed I/O range models available

<table>
<thead>
<tr>
<th>Input Modules</th>
<th>uB30/uB40</th>
<th>±10mV to ±100mV input, 0-5V or ±5V output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>uB31/uB41</td>
<td>±1V to ±60V input, 0-5V or ±5V output</td>
</tr>
<tr>
<td></td>
<td>uB32</td>
<td>0-20mA or 4-20mA DC input, 0-5V or ±5V output</td>
</tr>
<tr>
<td></td>
<td>uB34/uB35</td>
<td>RTD input, 0-5V or ±5V output</td>
</tr>
<tr>
<td></td>
<td>uB37/47</td>
<td>Thermocouple input, 0-5V or ±5V output</td>
</tr>
<tr>
<td></td>
<td>uB42</td>
<td>2-wire transmitter (0-20mA) input, 0-5V or ±5V output</td>
</tr>
<tr>
<td></td>
<td>uB45</td>
<td>0-50KHz input, 0-5V or ±5V output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output Modules</th>
<th>uB39</th>
<th>0-20mA or 4-20mA DC field output, ±5V host input</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>uB49</td>
<td>0-10V or ±10V field output, ±10V host input</td>
</tr>
</tbody>
</table>

### Backpanels

<table>
<thead>
<tr>
<th>Backpanels</th>
<th>uB04/uB04D</th>
<th>4 channel uB backpanel, surface or DIN-rail mount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>uB08/uB08D</td>
<td>8 channel uB backpanel, panel or DIN-rail mount</td>
</tr>
<tr>
<td></td>
<td>uB16/uB16D</td>
<td>16 channel uB backpanel, panel or DIN-rail mount</td>
</tr>
</tbody>
</table>

### Power Options

| Power Options       | uBDC1                       | 5V DC power module, 10-32V DC supply input |

Telephone: 877-214-6267 or 248-295-0880  ■  Fax: 248-624-9234  ■  sales@acromag.com  ■  www.acromag.com
Key Features & Benefits

- **Flexible Power**
  5V power modules enable use of 10-32V supplies

- **Alarm Function**
  Wireless (-B) models support alarm setpoint/deadband control to drive 0 or 5V output

- **Wireless Configuration**
  Easily set I/O scaling and alarms or poll inputs using Bluetooth wireless technology with a smartphone or tablet using Android or iOS app.

- **Mix-and-Match Modules**
  175 modules support a wide variety of input and output signal types

- **Easy, Secure Mounting**
  Clip holds module tightly without screws for fast insertion/removal

- **Analog Bus Port**
  DB25 cable simplifies connection to DAQ systems

- **Rugged, Over-molded Circuit**
  Superior shock, vibration, moisture, and dust protection

- **High-Density Analog I/O**
  Up to 16 channels in a compact footprint

- **User-Programmable I/O Ranges**
  Models with Bluetooth wireless technology allow custom input and output ranges

- **High-performance**
  High-accuracy / high noise immunity
  -40 to 80˚C

- **Alarm Function**

- **Wireless Configuration**

- **Mix-and-Match Modules**

- **Easy, Secure Mounting**

- **Analog Bus Port**

- **Rugged, Over-molded Circuit**

- **High-Density Analog I/O**

- **User-Programmable I/O Ranges**

- **High-performance**
The Agility™ Config Tool is a mobile application that allows easy setup and configuration of Acromag microBlox™ Series signal conditioners. Connect via Bluetooth® wireless technology to smart devices with Android 4.3 or higher or iOS 5.0 or later.

This mobile app. supports smart devices with Android 4.3 or later or iOS 5.0 or later. You can download the Agility application free of charge from the Google Play™ store at play.google.com (Android), or the Apple® App Store® at itunes.apple.com (Apple iOS).

With a couple of taps, quickly configure input, output, unit and scaling options.

Quick and easy access to the wiring diagram, even offline without internet access.

Key Features & Benefits
- Connects to microBlox signal conditioners via Bluetooth wireless technology
- Requires the use of a smart device
- Configures and calibrates microBlox UB Series products via phone or tablet running Android 4.3 or later or iOS 5.0 or later.
- View wiring diagrams, even without an internet connection
- Perform quick and easy field diagnostics and troubleshooting
- Ideal for field technicians
- Trend and share field data
Signal Conditioners: microBlox™ Series

Acromag Agility™ Config Tool Mobile Application

Alarm Function

**High-Alarm with Deadband (Reverse Acting Alarm Output Off)**

- **Input Signal**
- **Setpoint (sp)**
- **Deadband (DB)**
- **SP-DB**

**Normal State (Out Zero)**

**Alarm State (Out Full-Scale)**

**Normal State (Out Zero)**

- **t1** is time input signal increases to SP
- **t2** is time input signal decreases to SP minus DB

**Low-Alarm with Deadband (Reverse Acting Alarm Output Off)**

- **Input Signal**
- **Setpoint (sp)**
- **SP-DB**
- **SP**

**Normal State (Out Zero)**

**Alarm State (Out Full-Scale)**

**Normal State (Out Zero)**

- **t1** is time input signal decreases to SP
- **t2** is time input signal increases to SP plus DB

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**Calibration**

**Data Logging**

**Diagnostics**

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Tel 248-295-0880 ■ Fax 248-624-9234 ■ sales@acromag.com ■ www.acromag.com ■ 30765 Wixom Rd, Wixom, MI 48393 USA

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Signal Conditioners: microBlox™ Series

**uB30/40 milliVolt Field Input**

**Bluetooth®** wireless configuration option ◆ Narrow or wide band mV field input ◆ Voltage host output

**Description**

**Field Input:** ±10mV to ±100mV ranges

**Host Output:** 0-5V or ±5V ranges

Acromag’s microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB30 and uB40 models condition and convert a low-level DC voltage field input signal to a scaled 0-5V or ±5V output. The uB30 has more filtering for low-band applications, while the uB40 relaxes filtering for higher speed applications. uB30 modules are recommended for noisier environments where conversion speed is less of a concern. uB40 modules drive a faster response, but with less filtering for noise.

Bluetooth wireless technology versions enable configuration using a smartphone or tablet. Acromag’s Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

**Key Features & Benefits**

- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection
- Wide operating temperature range
- UL/CSA Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals

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ISO9001

AS9100

Made in USA

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Signal Conditioners: microBlox™ Series

uB30/40 milliVolt Field Input

**Performance Specifications**

See Backpanels for additional system specifications.

- **Field Input**
  - **Field Range**
    - Fixed ranges: ±10mV, ±50mV or ±100mV.
    - User-configurable -B models: ranges inside ±100mV.
  - **Resolution**
    - 16-bit ADC, ±10mV: 1/28894.
    - ±50mV/±100mV: 1/36118.
  - **Resistance**
    - 100MΩ.
  - **Input Sample Rate**
    - uB30: 40ps.
    - uB40: 2Kps.
  - **Normal Mode (Bandwidth)**
    - uB30: -3dB at 5Hz, typical.
    - uB40: -3dB at 1KHz, typical.
  - **Protection**
    - TVS & diode clamps built-in plus additional protection on back-panel.
  - **Common Mode Rejection**
    - 103dB typical, 50-60Hz.

- **Host Output**
  - **Host Range**
    - 0-5V or ±5V per range model.
    - User-configurable -B models: ±5V.
  - **Resolution**
    - 16-bit DAC. 0-5V: 1/26305. ±5V: 1/52610.
  - **Current Drive**
    - 5V into 1kΩ minimum or 5mA maximum.
  - **Response Time**
    - uB30: Output step 0-98% in 300ms, typical.
    - uB40: Output step 0-98% in 2ms, typical.

- **General**
  - **Power Consumption**
    - 0.25W; 50mA from +5V maximum.
  - **I/O Resolution**
    - Effective resolution is the least of input (A/D) and output (D/A) resolution: uBx0-01: 1/28894, uBx0-02/03: 1/36118. uBx0-04/05/06: 1/26305.
  - **Accuracy**
    - Better than ±0.1%. 0.05% typical.
    - -CG models: Better than ±0.125%. 0.075% typical.
  - **Non-Linearity**
    - Better than ±0.05%, typical.
  - **Noise**
    - Less than 0.03% of span p-p, rms.
  - **Ambient Effect**
    - Less than ±80ppm/°C.
  - **Dimensions**
    - Height: 1.380” with connectors, 0.970” without.
    - Width: 0.425”. Length: 1.425”.

- **Environmental**
  - **Operating Temperature**
    - -40 to 80°C (-40° to 176°F).
    - -CG models: 0 to 55°C (32 to 131°F).
  - **Storage Temperature**
    - -40 to 85°C (-40° to 185°F).
  - **Relative Humidity**
    - 0 to 95% non-condensing.
  - **Power Requirement**
    - 5V powered, 10-32V power optional (requires uBDC-1 power module & backpanel.)
  - **Safety Isolation**
    - Field channels are individually isolated field channel-to-field channel and from the field to the host I/O bus (host group includes 5V power) for common-mode voltages up to 250V AC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC HiPOT/dielectric strength test for one minute without breakdown). This complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.
  - **Shock and Vibration Immunity**
    - Conforms to:
      - IEC 60068-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.
      - IEC 60068-2-64: 10-500 Hz, 4G rms, 2 hours/axis, for random vibration.
      - EC 60068-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.
  - **Electromagnetic Compatibility (EMC) Compliance**
    - Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
    - Radiated Field Immunity (RFI), per IEC 61000-4-4.
    - Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
    - Surge Immunity, per IEC 61000-4-5. Conducted RF Immunity (CRI), per IEC 61000-4-6.
  - **Emissions**
  - **Approvals**
    - CE compliant, RoHS Compliant.
    - UL/cUL Class 1, Division 2, Groups ABCD.
  - **Emittance (CRF) Immunity**
    - CE marked, per EMC Directive 2004/108/EC.
  - **Environmental**
    - Minimum immunity per BS EN 61000-6-1 (2007): enclosure port, per CISPR 16.
  - **Safety Isolation**
    - 5V powered, 10-32V power optional (requires uBDC-1 power module & backpanel.)
  - **Field Input**
    - Configurable -B models: ±50mV/±100mV DC.
    - ±10mV DC or ±5V DC.
  - **Host Output**
    - Configurable -B models: ±5V DC or ±5V DC.

**Configuration using Agility™ Config. Tool via Bluetooth technology**

The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules.

Bluetooth wireless technology microBlox™ modules (-B models) allow their input and output ranges to be wirelessly reconfigured and calibrated using a smart phone or tablet. This mobile app supports smart devices with Android 4.3 + or iOS 5.0 +. You can download the Agility application free of charge from the Google Play™ store or the Apple® App Store®.

**Ordering Information**

To order commercial grade modules append with -CG (except -B models) e.g., uB30-01-CG.

<table>
<thead>
<tr>
<th>Model</th>
<th>Model</th>
<th>Field Input</th>
<th>Host Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5Hz)</td>
<td>(1kHz)</td>
<td>±10mV DC</td>
<td>±5V DC</td>
</tr>
<tr>
<td>uB30-01</td>
<td>uB40-01</td>
<td>±10mV DC</td>
<td>±5V DC</td>
</tr>
<tr>
<td>uB30-02</td>
<td>uB40-02</td>
<td>±50mV DC</td>
<td>±5V DC</td>
</tr>
<tr>
<td>uB30-03</td>
<td>uB40-03</td>
<td>±100mV DC</td>
<td>±5V DC</td>
</tr>
<tr>
<td>uB30-04</td>
<td>uB40-04</td>
<td>±10mV DC</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB30-05</td>
<td>uB40-05</td>
<td>±50mV DC</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB30-06</td>
<td>uB40-06</td>
<td>±100mV DC</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB30-8</td>
<td>uB40-8</td>
<td>Configurable</td>
<td>0-5V DC or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>±5V DC or ±5V DC</td>
<td></td>
</tr>
</tbody>
</table>

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**Accessories**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uBDC-1</td>
<td>Non-isolated, 10-32V: 5V/1A power supply</td>
</tr>
<tr>
<td>uB04</td>
<td>4 channel panel, surface mount</td>
</tr>
<tr>
<td>uB04D</td>
<td>4 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB08</td>
<td>8 channel panel, surface mount</td>
</tr>
<tr>
<td>uB08D</td>
<td>8 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB16</td>
<td>16 channel panel, surface mount</td>
</tr>
<tr>
<td>uB16D</td>
<td>16 channel panel, DIN rail mount</td>
</tr>
</tbody>
</table>

Tel 248-295-0880  ■ Fax 248-624-9234  ■ sales@acromag.com  ■ www.acromag.com  ■ 30765 Wixom Rd, Wixom, MI 48393 USA
Signal Conditioners: microBlox™ Series

uB31/41 DC Voltage Field Input

Bluetooth® wireless configuration option ◆ Narrow or wide band voltage field input ◆ Host voltage output

Description

Field Input: ±1V to ±60V ranges
Host Output: 0-5V or ±5V ranges

Acromag’s microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB31 and uB41 models condition and convert a high-level DC voltage field input signal to a scaled 0-5V or ±5V output. The uB31 has more filtering for low-band applications, while the uB41 relaxes filtering for higher speed applications. uB31 modules are recommended for noisier environments where conversion speed is less of a concern. uB41 modules drive a faster response, but with less filtering for noise.

Bluetooth wireless technology versions enable configuration using a smart phone or tablet. Acromag’s Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

Key Features & Benefits

- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection
- Wide operating temperature range
- UL/cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals

ISO9001
AS9100
MADE IN USA

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Bulletin #8400-866
Signal Conditioners: microBlox™ Series

Performance Specifications

- **Field Input**
  - **Field Range**
    - Fixed ranges: ±1V to ±60V.
    - User-configurable: -B models: DC ranges up to ±60V.
  - **Resolution**
    - 16-bit ADC: ±1V: 1/2,739.5. ±5V/±10V/±20V: 1/34244.
    - ±40V/±60: 1/5,136.6.
  - **Resistance**
    - 203.2KΩ (via resistive input divider x 0.0163).
  - **Input Sample Rate**
    - uB31: 40ps.
    - uB41: 2000ps.
  - **Normal Mode (Bandwidth)**
    - uB31: -3dB at 4Hz.
    - uB41: -3dB at 1kHz.
  - **Common Mode Rejection**
    - 103dB typical, 50-60Hz.

- **Host Output**
  - **Host Range**
    - Fixed ranges: -5V to ±5V DC.
    - User-configurable: -B models: ±5V.
  - **Resolution**
    - 16-bit DAC, 0-5V: 1/2,739.5.
    - ±5VDC: 1/34244.
    - ±1V: 1/27,395.
    - ±5V: 1/34,244.
    - ±10V: 1/26,305.
    - ±20V: 1/26,305.
  - **Current Drive**
    - 5V into 1KΩ minimum or 5mA max.
  - **Response Time**
    - uB31: Output Step 0-98% in 200ms.
    - uB41: Output step 0-98% in 2ms.

- **General**
  - **Power Consumption**
    - Up to 0.25W, or 50mA max. from 5V.
  - **I/O Resolution**
    - Effective resolution is the least of input (A/D) and output (D/A) resolution: uBx1-01/04: 1/2,739.5.
    - uBx1-02/03: 1/34244. uBx1-04/05/06: 1/26,305.
    - uBx1-07: 1/34244. uBx1-08/10/13: 1/26,305.
    - uBx1-09/12: 1/5,136.6.
  - **Accuracy**
    - Better than ±0.1%. 0.05% typical.
    - -CG models: Better than ±0.125%. 0.075% typical.
  - **Non-Linearity**
    - Better than ±0.05%, typical.
  - **Noise**
    - Less than 0.03% of 10V span p-p rms.
  - **Ambient Effect**
    - Less than ±80ppm/°C.
  - **Dimensions**
    - Height: 1.380” with connectors, 0.970” without.
    - Width: 0.425”. Length: 1.425”.

- **Environmental**
  - **Operating Temperature**
    - -40 to 80°C (-40° to 176°F).
    - -CG models: 0 to 55°C (32 to 131°F).
  - **Storage Temperature**
    - -40 to 85°C (-40° to 185°F).
  - **Relative Humidity**
    - 0 to 95% non-condensing.
  - **Power Requirement**
    - 5V powered. 10-32V power optional.
    - ±10V/±20V (requires uBDC-1 power module & backpanel.)
  - **Safety Isolation**
    - Field channels are individually isolated field-channel-to-field-channel and from the field to the host I/O bus (host group includes 5V power) for common-mode voltages up to 250V AC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC HIPOT/dielectric strength test for one minute without breakdown). This complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.
  - **Shock and vibration Immunity**
    - Conforms to: IEC 60608-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.
    - IEC 60608-2-6: 10-500 Hz, 4G-1ms, 2 hours/axis , for random vibration.
    - EC 60608-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.
  - **Electromagnetic Compatibility (EMC) Compliance**
    - Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
    - Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
    - Radiated Field Immunity (RFI), per IEC 61000-4-3.
    - Surge Immunity, per IEC 61000-4-5. Conducted RF Immunity (CRI), per IEC 61000-4-6.
  - **Emissions**
  - **Approvals**
    - CE compliant. RoHS Compliant.
    - UL/cUL Class 1, Division 2, Groups ABCD.
    - CE marked, per EMC Directive 2004/108/EC.
    - Minimum immunity per BS EN 61000-6-1 (2007): enclosure port, per CISPR 16.
  - **Configuration using Agility™ Config. Tool via Bluetooth technology**

The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules.

Bluetooth wireless technology microBlox™ modules (-B models) allow their input and output ranges to be wirelessly reconfigured and calibrated using a smartphone or tablet. This mobile app supports smart devices with Android 4.3 or later or iOS 5.0 or later.

You can download the Agility application free of charge from the Google Play™ store at play.google.com (Android), or the Apple® App. Store® at itunes.apple.com (Apple iOS).

Ordering Information

To order commercial grade modules append with -CG (except -B models) e.g., uB31-01-CG.

<table>
<thead>
<tr>
<th>Model (4Hz)</th>
<th>Model (1KHz)</th>
<th>Field Input</th>
<th>Host Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>uB31-01</td>
<td>uB41-01</td>
<td>-1V to +1V</td>
<td>±5V</td>
</tr>
<tr>
<td>uB31-02</td>
<td>uB41-02</td>
<td>-5V to +5V</td>
<td>±5V</td>
</tr>
<tr>
<td>uB31-03</td>
<td>uB41-03</td>
<td>-10V to +10V</td>
<td>±5V</td>
</tr>
<tr>
<td>uB31-04</td>
<td>uB41-04</td>
<td>-1V to +1V</td>
<td>0 to +5V</td>
</tr>
<tr>
<td>uB31-05</td>
<td>uB41-05</td>
<td>-5V to +5V</td>
<td>0 to +5V</td>
</tr>
<tr>
<td>uB31-06</td>
<td>uB41-06</td>
<td>-10V to +10V</td>
<td>0 to +5V</td>
</tr>
<tr>
<td>uB31-07</td>
<td>uB41-07</td>
<td>-20V to +20V</td>
<td>±5V</td>
</tr>
<tr>
<td>uB31-08</td>
<td>uB41-08</td>
<td>-20V to +20V</td>
<td>0 to +5V</td>
</tr>
<tr>
<td>uB31-09</td>
<td>uB41-09</td>
<td>-40V to +40V</td>
<td>0 to +5V</td>
</tr>
<tr>
<td>uB31-10</td>
<td>uB41-10</td>
<td>-40V to +40V</td>
<td>0 to +5V</td>
</tr>
<tr>
<td>uB31-12</td>
<td>uB41-12</td>
<td>-60V to +60V</td>
<td>±5V</td>
</tr>
<tr>
<td>uB31-13</td>
<td>uB41-13</td>
<td>-60V to +60V</td>
<td>0 to +5V</td>
</tr>
<tr>
<td>uB31-14</td>
<td>uB41-14</td>
<td>-100V to +100V</td>
<td>0 to +5V</td>
</tr>
</tbody>
</table>

Configuration using Agility™ Config. Tool via Bluetooth technology

Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uB5DC1</td>
<td>10-32V, non-isolated: 5V/1A power supply</td>
</tr>
<tr>
<td>uB04</td>
<td>4 channel panel, surface mount</td>
</tr>
<tr>
<td>uB04D</td>
<td>4 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB08</td>
<td>8 channel panel, surface mount</td>
</tr>
<tr>
<td>uB08D</td>
<td>8 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB16</td>
<td>16 channel panel, surface mount</td>
</tr>
<tr>
<td>uB16D</td>
<td>16 channel panel, DIN rail mount</td>
</tr>
</tbody>
</table>
**Signal Conditioners: microBlox™ Series**

**uB32 Narrow Band DC Current Field Input**

**Bluetooth®** wireless configuration option ◆ Narrow band DC current field input ◆ Voltage host output

**Description**

**Field Input:** 0-20mA or 4-20mA DC  
**Host Output:** 0-5V or ±5V ranges

Acromag's microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB32 model conditions and converts a DC process current field input signal to a scaled 0-5V or ±5V output. To convert AC current signals, Acromag offers the model 5020-350 toroid sensor which provides a 0 to 11.17mA output. For interfacing two-wire transmitters, please refer to the uB42 which is similar to the uB32 but provides field excitation for the loop-powered transmitter.

Bluetooth wireless technology versions enable configuration using a smart phone or tablet. Acromag's Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (uB32-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

**Key Features & Benefits**

- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection
- Wide operating temperature range
- UL/cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals
**Performance Specifications**

See Backpanels for additional system specifications.

- **Field Input**
  - **Field Range**
    Fixed ranges: 0-20mA or 4-20mA DC.
    User-configurable -B models: 0 to 20mA.
  - **Resolution**
    16-bit ADC. 0-20mA: 1/30399. 4-20mA: 1/24319. 0-11.17mA: 1/16978.
  - **Resistance**
    47.3Ω (input shunt to ground/return).
  - **Input Sample Rate**
    40ps.
  - **Normal Mode (Bandwidth)**
    -3dB at 7Hz, typical.
  - **Common Mode Rejection**
    130dB typical, 50-60Hz.
  - **Protection**
    TVS & diode clamps built-in plus additional protection on back-panel.

- **Host Output**
  - **Host Range**
    Fixed ranges: 0-5V.
    User-configurable -B models: ±5V.
  - **Resolution**
    16-bit DAC. 0-5V: 1/26305. ±5VDC: 1/52610.
  - **Current Drive**
    5V into 1KΩ minimum or 5mA maximum.
  - **Response Time**
    Output Step 0-98% in 150ms typical.

- **General**
  - **Power Consumption**
    0.25W or 50mA from 5V maximum.
  - **I/O Resolution**
    Effective resolution is the least of input (A/D) and output (D/A) resolution: uB32-01/uB32-02: 1/26305. uB32-03: 1/16978.
  - **Accuracy**
    Better than ±0.1%. ±0.05% typical.
    -CG models: Better than ±0.125%. ±0.075% typical.
  - **Non-Linearity**
    Better than ±0.05%, typical.
  - **Noise**
    Less than 0.06% of span p-p, rms.
  - **Ambient Effect**
    Less than ±80ppm/°C.
  - **Dimensions**
    Height: 1.380” with connectors, 0.970” without.
    Width: 0.425”. Length: 1.425”.

- **Environmental**
  - **Operating Temperature**
    -40 to 80°C (-40° to 176°F).
    -CG models: 0 to 55°C (32 to 131°F).
  - **Storage Temperature**
    -40 to 85°C (-40° to 185°F).
  - **Relative Humidity**
    0 to 95% non-condensing.
  - **Power Requirement**
    5V powered 10-32V power optional (requires uBDC-1 power module & backpanel.)

- **Safety Isolation**
  Field channels are individually isolated field channel-to-field channel and from the field to the host I/O bus (host group includes 5V power) for common-mode voltages up to 250V AC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC HIPOT/dielectric strength test for one minute without breakdown). This complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.

- **Shock and Vibration Immunity**
  Conforms to:
  - IEC 60068-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.
  - IEC 60068-2-64: 10-500 Hz, 4G-rams, 2 hours/axis, for random vibration.
  - EC 60668-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.

- **Electromagnetic Compatibility (EMC) Compliance**
  Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
  Radiated Field Immunity (RFI), per IEC 61000-4-4.
  Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
  Surge Immunity, per IEC 61000-4-5. Conducted RF Immunity (CRI), per IEC 61000-4-6.

- **EMissions**
  Class B product with emissions per BS EN 61000-6-3 (2007+A1:2011); enclosure port, per CISPR 16.
  Low voltage AC mains port, per CISPR 16.

- **Approvals**
  CE compliant. RoHS Compliant.
  UL/UL Class 1, Division 2, Groups ABCD.
  ATEX Zone 2. No UL or ATEX on -CG models.

### Ordering Information

To order commercial grade modules append with -CG (except -B models) e.g., uB32-01-CG.

<table>
<thead>
<tr>
<th>Model</th>
<th>Field Input</th>
<th>Host Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>uB32-01</td>
<td>4 to 20mA DC</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB32-02</td>
<td>0 to 20mA DC</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB32-03</td>
<td>0 to 11.17mA DC</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB32-B</td>
<td>Configurable</td>
<td>Configurable</td>
</tr>
</tbody>
</table>

**Configuration using Agility™ Config. Tool via Bluetooth technology**

The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules. Bluetooth wireless technology microBlox™ modules (-B models) allow their input and output ranges to be wirelessly reconfigured and calibrated using a smart phone or tablet. This mobile app. supports smart devices with Android 4.3 or later or iOS 5.0 or later. You can download the Agility application free of charge from the Google Play™ store at [play.google.com](http://play.google.com) (Android), or the Apple App Store® at [itunes.apple.com](http://itunes.apple.com) (Apple iOS).

### Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uBDC1</td>
<td>10-32V, non-isolated: 5V/1A power supply</td>
</tr>
<tr>
<td>uB04</td>
<td>4 channel panel, surface mount</td>
</tr>
<tr>
<td>uB04D</td>
<td>4 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB08</td>
<td>8 channel panel, surface mount</td>
</tr>
<tr>
<td>uB08D</td>
<td>8 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB16</td>
<td>16 channel panel, surface mount</td>
</tr>
<tr>
<td>uB16D</td>
<td>16 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>5020-350</td>
<td>AC current sensor</td>
</tr>
</tbody>
</table>

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**Signal Conditioners: microBlox™ Series**

**uB34/uB35 Platinum RTD Field Input**

*Bluetooth®* wireless configuration option • Platinum RTD (2, 3, or 4-wire) field input • Voltage host output

**Description**

**Field Input:** -100 to +100°C or 0 to 600°C ranges, 3Hz  
**Host Output:** 0-5V or ±5V ranges

Acromag's microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB34 and uB35 models condition and convert a Platinum RTD sensor or resistance signal to a scaled 0-5V or ±5V output. For two and three-wire RTDs, use the uB34. Four-wire RTDs use the uB35. Both models provide sensor excitation, linearization, lead-wire compensation, lead-break or sensor burnout protection, and input isolation.

Bluetooth wireless technology versions enable configuration using a smart phone or tablet. Acromag's Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

**Key Features & Benefits**

- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection
- Wide operating temperature range
- UL/cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals

**ISO9001  
AS9100**

**Made in USA**

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**Bulletin #8400-871**
Signal Conditioners: microBlox™ Series

### uB34/uB35 Platinum RTD Field Input

#### Performance Specifications

**Field Input**

- **Field Range**
  - Fixed ranges: ±100°C or 0-100/200/600°C.
  - User-configurable -8 models: inside -200°C to +850°C range limits for 10Ω Pt RTD sensors, or linear resistance.
- **Resolution**
- **Excitation**
  - uB35: 500uA.
  - uB34: 1mA (Dual matched 500uA sources at ± leads).
- **Lead-Wire Compensation**
  - Up to 25Ω/lead and requires balanced ±sensor leads (same size, length, type).
- **Lead Resistance Effect**
  - Less than ±0.01% of output shift per ohm of lead resistance with a maximum shift less than ±0.1% for up to 10Ω/lead.
- **Lead Break Detection**
  - -8 model: Upscale, or selectable upscale/downscale.
- **Input Sample Rate**
  - 40fps.
- **Normal Mode (Bandwidth)**
  - -3dB at 3Hz, typical.
- **Protection**
  - TVS & diode clamps built-in plus additional protection on back-panel.
- **Common Mode Rejection**
  - 130dB typical, 50-60Hz.

**Host Output**

- **Host Range**
  - Fixed ranges: 0-5V per range model.
  - User-configurable -8 models: 0-5V/±5V selectable.
- **Resolution**
  - 16-bit DAC, 0-5V: 1/26305. ±5V: 1/52610.
- **Current Drive**
  - 5V into 1KΩ minimum or 5mA maximum.
- **Response Time**
  - Output Step 0-98% in 250ms, typical/

#### General

- **Power Consumption**
  - 0.23W, or 46mA from +5V maximum.
- **I/O Resolution**
  - Effective resolution is least of input (A/D) & output (D/A) resolution (see Input).
- **Non-linearity**
  - Better than ±0.05%, typical.

#### Accuracy

Better than ±0.1%. 0.05% typical.
- CG models: Better than ±0.125%. 0.075% typical.

#### Noise

Better than 0.06% of span p-p rms.

#### Ambient Effect

Better than ±80ppm/°C.

#### Dimensions

- Height: 1.380" with connectors, 0.970" without. Width: 0.425". Length: 1.425".

#### Environmental

- **Operating Temperature**
  - -40 to 80°C (40 to 176°F).
  - -CG models: 0 to 55°C (32 to 131°F).
- **Storage Temperature**
  - -40 to 85°C (40 to 185°F).
- **Relative Humidity**
  - 0 to 95% non-condensing.

#### Power Requirement

5V powered.10-32V power optional (requires uBDC1 power module & backpanel.)

#### Safety Isolation

Field channels are individually isolated field channel-to-field channel and from the field to the host I/O bus (host group includes 5V power) for common-mode voltages up to 250V AC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC HIPOT/electric strength test for one minute without breakdown). This complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.

#### Shock and Vibration Immunity

Conforms to:
- IEC 60608-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.
- IEC 60608-2-64: 10-500 Hz, 4G-rams, 2 hours/axis, for random vibration.
- EC 60608-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.

#### Electromagnetic Compatibility (EMC) Compliance

Minimum immunity per BS EN 61000-6-1 (2007):
- CE marked, per EMC Directive 2004/108/EC.
- Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
- Radiated Field Immunity (RFI), per IEC 61000-4-4.
- Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
- Surge Immunity, per IEC 61000-4-5. Conducted RF Immunity (CRI), per IEC 61000-4-6.

#### Emissions

- Low voltage AC mains port, per CISPR 16.

#### Approvals

- CE compliant. RoHS Compliant.
- UL/CUL Class 1, Division 2, Groups A,B,C,D.
- ATEX Zone 2. No UL or ATEX on -CG models.

### Ordering Information

To order commercial grade modules append with -CG (except -8 models) e.g., uB34-01-CG.

#### Model (2/3 Wire)  Model (4-WIRE)  FIELD INPUT  HOST OUTPUT

<table>
<thead>
<tr>
<th>Model</th>
<th>Model</th>
<th>FIELD INPUT</th>
<th>HOST OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>uB34-01</td>
<td>uB35-01</td>
<td>±100°C</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB34-02</td>
<td>uB35-02</td>
<td>0°C to +100°C</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB34-03</td>
<td>uB35-03</td>
<td>0°C to +200°C</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB34-04</td>
<td>uB35-04</td>
<td>0°C to +600°C</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB34-B</td>
<td>uB35-B</td>
<td>Config. -200°C to +850°C</td>
<td>Config. ±5V</td>
</tr>
</tbody>
</table>

### Configuration using Agility™ Config. Tool via Bluetooth technology

The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules. Bluetooth wireless technology microBlox™ modules (-8 models) allow their input and output ranges to be wirelessly reconfigured and calibrated using a smart phone or tablet. This mobile app supports smart devices with Android 4.3 or later or iOS 5.0 or later. You can download the Agility application free of charge from the Google Play™ store at play.google.com (Android), or the Apple® App Store® at itunes.apple.com (Apple iOS).

### Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uBDC1</td>
<td>10-32V, non-isolated: 5V/1A power supply</td>
</tr>
<tr>
<td>uB04</td>
<td>4 channel panel, surface mount</td>
</tr>
<tr>
<td>uB04D</td>
<td>4 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB08</td>
<td>8 channel panel, surface mount</td>
</tr>
<tr>
<td>uB08D</td>
<td>8 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB16</td>
<td>16 channel panel, surface mount</td>
</tr>
<tr>
<td>uB16D</td>
<td>16 channel panel, DIN rail mount</td>
</tr>
</tbody>
</table>

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**Signal Conditioners: microBlox™ Series**

**uB37/uB47 Thermocouple Field Input**

**Bluetooth**

- **Bluetooth® wireless configuration option**
- **Thermocouple (type J,K,T,R,S) field input**
- **Voltage host output**

**Description**

**Field Input:** T/C type J, K, T, R, S  
**Host Output:** 0-5V or ±5V ranges

Acromag’s microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB37 and uB47 models condition and convert low-level input voltages from field thermocouple sensors to a scaled 0-5V or ±5V output. On uB37 models, output is linear with thermocouple voltage, while uB47 output is linear with thermocouple temperature. Both models have up/downscale sensor-break detection. Cold junction compensation is performed on the backpanel.

Bluetooth wireless technology versions enable configuration using a smart phone or tablet. Acromag’s Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

**Key Features & Benefits**

- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection
- Wide operating temperature range
- UL/cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals
Signal Conditioners: microBlox™ Series

uB37/uB47 Thermocouple Field Input

Performance Specifications

- Field Input
  - Fixed ranges: TC type per range model.
  - User-configurable -B models: TC type/range.
  - Resolution: 16-bit ADC. Varies by model & calibration from 1/5878 to 1/36118 (see manual).
  - Input Sample Rate: 40fps.
  - Normal Mode (Bandwidth): 3dB at 5Hz, typical.
  - Common Mode Rejection: 130dB typical, 50-60Hz.

- Host Output
  - Fixed ranges: 0-5V. User-configurable -B models: ±5V.
  - Resolution: 16-bit DAC. 0-5V / 1/26305.
  - ±5V: 1/52610.
  - Current Drive: 5V into 1KΩ minimum or 5mA maximum.
  - Response Time: Output Step 0-98% in 300ms typical.

- General
  - Power Consumption: 0.25W maximum, 50mA from +5V maximum.
  - I/O Resolution: Varies by range. See manual for details.
  - Accuracy/Non-Linearity: Better than ±0.1%, 0.05% typical for full range.
  - -CG models: Better than ±0.125%. 0.075% typical. See manual for accuracy details on narrow ranges.
  - Cold Junction Compensation: Better than ±2°C, typical.
  - Noise: Better than 0.03% of span p-p rms.
  - Ambient Effect: Better than ±80ppm/°C.
  - Dimensions: Height: 1.380” with connectors, 0.970” without. Width: 0.425”. Length: 1.425”.

Environmental

- Operating Temperature: -40 to 80°C (-40° to 176°F).
  - -CG models: 0 to 55°C (32 to 131°F).
- Storage Temperature: -40 to 85°C (-40° to 185°F).
- Relative Humidity: 0 to 95% non-condensing.
- Power Requirement: 5V powered. 10-32V power optional. Requires uBDC-1 power module & backpanel.
- Safety Isolation: Field channels are individually isolated field-channel-to-field channel and from the field to the host I/O bus (as a group including 5V power) for common-mode voltages up to 250V AC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC HIPOT/dielectric strength test for one minute without breakdown). ANSI/ISA-82.01-1988.
- Shock and Vibration Immunity: Conforms to: IEC 60068-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.
  - IEC 60068-2-6: 10-500 Hz, 4G-rms, 2 hours/axis, for random vibration.
  - EC 60068-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.
- Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
- Radiated Field Immunity (RFI), per IEC 61000-4-6.
- Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
- Surge Immunity, per IEC 61000-4-5. Conducted RF Immunity (CFI), per IEC 61000-4-6.

Configuration using Agility™ Config. Tool via Bluetooth technology

The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules.

Ordering Information

To order commercial grade modules append with -CG (except -B models) e.g., uB37J-CG.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>FIELD INPUT</th>
<th>HOST OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Linearized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uB37J</td>
<td>-100 to +760°C</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB37K</td>
<td>-100 to +1350°C</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB37T</td>
<td>-100 to +400°C</td>
<td>0-5V DC</td>
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<tr>
<td>-CG models: Better than ±0.125%. 0.075% typical.</td>
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<tr>
<td>-CG models: Better than ±0.1%. 0.05% typical for full range.</td>
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<tr>
<td>-B model: Upscale, or selectable upscale/downscale.</td>
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<tr>
<td>-B models: 10-32V power optional. Requires uBDC-1 power module &amp; backpanel.</td>
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<tr>
<td>-B models: Config. ±5V</td>
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<tbody>
<tr>
<td>Linearized</td>
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</tr>
<tr>
<td>uB47J-01</td>
<td>0 to +760°C</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB47J-02</td>
<td>-100 to +300°C</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB47J-03</td>
<td>0 to +500°C, 5Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB47J-12</td>
<td>-100 to +760°C</td>
<td>0-5V DC</td>
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<tr>
<td>uB47K-04</td>
<td>0 to +1000°C</td>
<td>0-5V DC</td>
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<tr>
<td>uB47K-05</td>
<td>0 to +500°C</td>
<td>0-5V DC</td>
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<tr>
<td>uB47K-05</td>
<td>-100 to +1350°C</td>
<td>0-5V DC</td>
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<tr>
<td>uB47K-13</td>
<td>0 to +1200°C</td>
<td>0-5V DC</td>
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<tr>
<td>uB47T-06</td>
<td>-100 to +400°C</td>
<td>0-5V DC</td>
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<tr>
<td>uB47T-07</td>
<td>0 to +200°C</td>
<td>0-5V DC</td>
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Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Accessories Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uBDC-1</td>
<td>Non-isolated, 10-32V: 5V/1A power supply</td>
</tr>
<tr>
<td>uB04</td>
<td>4 channel panel, surface mount</td>
</tr>
<tr>
<td>uB04D</td>
<td>4 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB08</td>
<td>8 channel panel, surface mount</td>
</tr>
<tr>
<td>uB08D</td>
<td>8 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB16</td>
<td>16 channel panel, surface mount</td>
</tr>
<tr>
<td>uB16D</td>
<td>16 channel panel, DIN rail mount</td>
</tr>
</tbody>
</table>
Signal Conditioners: microBlox™ Series

**uB39 DC Current Field Output**

**Bluetooth®** wireless configuration option ◆ DC current field output ◆ Voltage host input

**Description**

**Host Input:** ±5V or 0-5V ranges  
**Field Output:** 0-20mA or 4-20mA DC ranges

Acromag's microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB39 model converts a 0-5V or ±5V signal received from the host system to drive a scaled process current field output signal. It functions like an isolated, voltage-controlled current source to drive field instruments.

Bluetooth wireless technology versions enable configuration using a smart phone or tablet. Acromag’s Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

Backpanels provide power, I/O wiring terminals, and host access to an industry-standard analog signal bus. Modules are hot-swappable without screws. Data acquisition boards can access all host I/O signals on the DB25 bus connector.

**Key Features & Benefits**

- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection.
- Wide operating temperature range
- UL/cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals
**Signal Conditioners: microBlox™ Series**

**uB39 DC Current Field Output**

### Performance Specifications

See Backpanels for additional system specifications.

- **Host Input**
  - **Host Range**
    - Fixed ranges: ±5V or 0-5V.
    - User-configurable -B models: ±5V.
  - **A/D Resolution**
  - **Input Resistance**
    - 111.4kΩ.
  - **Input Sample Rate**
    - 1200sp/s.
  - **Normal Mode (Bandwidth)**
    - 100Hz: -3dB at 110Hz typical.
  - **Protection**
    - TVS & diode clamps built-in.

- **Field Output**
  - **Field Range**
    - 0-20mA or 4-20mA DC, per model.
    - User-configurable -B models: 0-20mA.
  - **D/A Resolution**
    - 4-20mA: 1/47395, 0-20mA: 1/59244.
  - **Output Maximum**
    - 21.5mA, typical.
  - **Response Time**
    - Output Step 0-98% into 250Ω load in 7ms, typical.

- **General**
  - **Power Consumption**
    - Output 0mA: 0.18W max. or 35mA max. from +5V.
    - Output 20mA: 0.59W max. or 117mA max. from +5V.
  - **Resolution**
    - Effective resolution is the least of input (A/D) or output (D/A) resolution.
    - uB39-01: 1/29442,
    - uB39-02: 1/47395,
    - uB39-03: 1/59244,
  - **Accuracy**
    - Better than ±0.1%. 0.05% typical.
    - -CG models: Better than ±0.125%. 0.075% typical.
  - **Non-Linearity**
    - Better than ±0.05%, typical.
  - **Noise**
    - Less than 0.08% of span p-p, rms.
  - **Ambient Effect**
    - Less than ±80ppm/°C.
  - **Common Mode Rejection**
    - 100dB typical, 50-60Hz.
  - **Dimensions**
    - Height: 1.380" with connectors. 0.970" without.
    - Width: 0.425". Length: 1.425".

### Environmental

- **Operating Temperature**
  - -40 to 80°C (-40° to 176°F).
  - -CG models: 0 to 55°C (32 to 131°F).
- **Storage Temperature**
  - -40 to 85°C (-40° to 185°F).
- **Relative Humidity**
  - 0 to 95% non-condensing.
- **Power Requirement**
  - 5V powered. 10-32V power optional (requires uBDC-1 power module & backpanel.)
- **Safety Isolation**
  - Field channels are individually isolated field channel-to-field channel and from the field to the host I/O bus (host group includes 5V power) for common-mode voltages up to 250V AC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC HIPOT/dielectric strength test for one minute without breakdown). This complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.
- **Shock and Vibration Immunity**
  - Conforms to:
    - IEC 60068-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration. IEC 60068-2-6: 10-500 Hz, 4G-rms, 2 hours/axis, for random vibration.
    - EC 60068-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.
- **Electromagnetic Compatibility (EMC) Compliance**
  - Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
  - Radiated Field Immunity (RFI), per IEC 61000-4-4.
  - Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
  - Surge Immunity, per IEC 61000-4-5. Conducted RF Immunity (CFI), per IEC 61000-4-6.
- **Emissions**
- **Approvals**
  - CE compliant. RoHS Compliant.
  - UL/cUL Class 1, Division 2, Groups ABCD.
  - ATEX Zone 2. No UL or ATEX on -CG models.

### Ordering Information

To order commercial grade modules append with -CG (except -B models) e.g., uB39-01-CG.

<table>
<thead>
<tr>
<th>Model</th>
<th>Field Output</th>
<th>Host Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>uB39-01</td>
<td>4mA to 20mA DC</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB39-02</td>
<td>4mA to 20mA DC</td>
<td>±5V DC</td>
</tr>
<tr>
<td>uB39-03</td>
<td>0 to 20mA DC</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB39-04</td>
<td>0 to 20mA DC</td>
<td>±5V DC</td>
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<tr>
<td>uB39-B</td>
<td>Configurable</td>
<td>Configurable</td>
</tr>
</tbody>
</table>

### Configuration using Agility™ Config. Tool via Bluetooth technology

The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules.

Bluetooth wireless technology microBlox™ modules (-B models) allow their input and output ranges to be wirelessly reconfigured and calibrated using a smart phone or tablet. This mobile app. supports smart devices with Android 4.3 or later or iOS 5.0 or later. You can download the Agility application free of charge from the Google Play™ store at play.google.com (Android), or the Apple® App Store® at itunes.apple.com (Apple iOS).

### Accessories

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**Signal Conditioners: microBlox™ Series**

**ub42 2-Wire Transmitter Field Input with Loop Excitation**

**Bluetooth®** wireless configuration option ◆ DC current input - 2-wire loop excitation ◆ Voltage host output

**Description**

**Field Input:** 0-20mA or 4-20mA DC ranges  
**Host Output:** 0-5V, 1-5V or ±5V ranges

Acromag's microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB42 model conditions and converts a DC process current field input signal from a 2-wire transmitter to a scaled 0-5V or ±5V output. It provides field excitation (12V/22mA) for the transmitter and is useful to isolate non-isolated transmitters. This module can also interface AC current signals with the model 5020-350 toroid sensor producing a 0 to 11.17mA input.

Bluetooth wireless technology versions enable configuration using a smart phone or tablet. Acromag's Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

**Key Features & Benefits**

- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection
- Wide operating temperature range
- UL/cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals
**Performance Specifications**

See Backpanels for additional system specifications.

- **Field Input**
  - **Field Range**
  - Fixed ranges: 0-20mA or 4-20mA.
  - User-configurable -B models: 0-20mA DC.
  - **Resolution**
  - 16-bit ADC: 4.20mA: 1/24319, 0-20mA: 1/30399.
  - When used with AC Current Sensor 5020-350: 1/16978 for 0-11.17mA range.
  - **Accuracy**
  - 4-20mA: 1/21044, 0-20mA: 1/30399.
  - Output (D/A) resolution with 0-20mA/0-5V: 1/30399.
  - Effective resolution is the least of input (A/D) and I/O Resolution.
  - **Excitation**
  - ±0.1%. Input shunt to ground or loop load.
  - **Noise**
  - Better than ±0.05%, typical.
  - -CG models: Better than ±0.125%. 0.075% typical.

- **Environmental**
  - **Operating Temperature**
  - -40 to 80°C (-40° to 176°F).
  - -CG models: 0 to 55°C (32 to 131°F).
  - **Storage Temperature**
  - -40 to 85°C (-40° to 185°F).
  - **Relative Humidity**
  - 0 to 95% non-condensing.
  - **Power Requirement**
  - 5V powered. 10-32V power optional (requires uBDC-1 power module & backpanel.)

- **Common Mode Rejection**
  - 130dB typical, 50-60Hz.

- **Host Output**
  - Host Range
  - **Resolution**
  - 16-bit DAC: 0-5V: 1/26305, ±5VDC: 1/52610, 1-5V: 1/21044.
  - **Drive Capability**
  - 5V into 1KΩ minimum or 5mA maximum load.
  - **Response Time**
  - Output Steps 0-98% in 6ms, typical.

- **General**
  - **Power Consumption**
  - 0.25W max. with 0 excitation load, 0.6W max. or 120mA from 5V with 20mA excitation load.
  - **I/O Resolution**
  - Effective resolution is the least of input (A/D) and output (D/A) resolution with 0-20mA/0-5V: 1/30399, 4-20mA/1-5V: 1/21044, 0-11.17mA/0-5V: 1/16978.
  - **Accuracy**
  - Better than ±0.1%. 0.05% typical.
  - -CG models: Better than ±0.125%. 0.075% typical.
  - **Non-Linearity**
  - Better than ±0.05%, typical.
  - **Noise**
  - Less than 0.06% of span p-p, rms.
  - **Ambient Effect**
  - Less than ±0.08ppm/°C.

**Dimensions**
- Height: 1.380" with connectors, 0.970" without.
- Width: 0.425". Length: 1.425".

**Configuration using Agility™ Config. Tool via Bluetooth technology**
The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules. Bluetooth wireless technology microBlox™ modules (-B models) allow their input and output ranges to be wirelessly reconfigured and calibrated using a smart phone or tablet. This mobile app. supports smart devices with Android 4.3 or later or iOS 5.0 or later. You can download the Agility application free of charge from the Google Play™ store at play.google.com (Android), or the Apple® app. store at itunes.apple.com (Apple iOS).

**Ordering Information**

<table>
<thead>
<tr>
<th>Model</th>
<th>Field Input</th>
<th>Host Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>uB42-01</td>
<td>0-20mA DC with excitation, 100Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB42-02</td>
<td>4-20mA DC with excitation, 100Hz</td>
<td>1-5V DC</td>
</tr>
<tr>
<td>uB42-B</td>
<td>Config. 0-20mA DC with excitation</td>
<td>Config. ±5V</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uBDC</td>
<td>Non-isolated, 10-32V: 5V/1A power supply</td>
</tr>
<tr>
<td>uB04</td>
<td>4 channel panel, surface mount</td>
</tr>
<tr>
<td>uB04D</td>
<td>4 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB08</td>
<td>8 channel panel, surface mount</td>
</tr>
<tr>
<td>uB08D</td>
<td>8 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB16</td>
<td>16 channel panel, surface mount</td>
</tr>
<tr>
<td>uB16D</td>
<td>16 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>5020-350</td>
<td>AC current sensor</td>
</tr>
</tbody>
</table>
**Signal Conditioners: microBlox™ Series**

**uB45 Frequency Input Module with Excitation Supply**

**Bluetooth® wireless configuration option ◆ Frequency field input ◆ Voltage host output**

**Description**

**Field Input:** 0-50kHz frequency ranges  
**Host Output:** 0-5V or ±5V ranges

Acromag’s microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB45 model conditions and converts a frequency field input signal to a scaled 0-5V or ±5V output. It includes a 5V excitation at the input for interface pull-up when using sensors such as magnetic pickups or contact closures. Bipolar (zero-crossing) and unipolar (digital/TTL) signals are supported.

**Key Features & Benefits**

- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app. configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection.
- Wide operating temperature range
- UL/cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals

Bluetooh wireless technology versions enable configuration using a smart phone or tablet. Acromag’s Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

**Backpanels** provide power, I/O wiring terminals, and host access to an industry-standard analog signal bus. Modules are hot-swappable without screws. Data acquisition boards can access all host I/O signals on the DB25 bus connector.

---

**Bluetooh® wireless configuration option ◆ Frequency field input ◆ Voltage host output**

**uB45 Frequency Input Module with Excitation Supply**

**Description**

**Field Input:** 0-50kHz frequency ranges  
**Host Output:** 0-5V or ±5V ranges

Acromag’s microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB45 model conditions and converts a frequency field input signal to a scaled 0-5V or ±5V output. It includes a 5V excitation at the input for interface pull-up when using sensors such as magnetic pickups or contact closures. Bipolar (zero-crossing) and unipolar (digital/TTL) signals are supported.
**uB45** Frequency Input Module with Excitation Supply

### Performance Specifications

See Backpanels for additional system specifications.

**Field Input**

**Field Range**

Fixed ranges from 0-50KHz.

User-configurable -B models: 0-50KHz.

**Resistance**

10.4MΩ unipolar (IN+ to IN-).

10.1MΩ bipolar (EX+ to IN-) excitation.

**Threshold**

Bipolar (zero-crossing) ±60-85mVpk (1-50KHz) up to ±85Vpk (60V AC or 170Vp-p max.).

Unipolar (TTL) 85Vpk (170Vp-p max), 0.8V max. TTL input low, 2.3-2.7V (5-50KHz) min. TTL high.

**Hysteresis**

120mVp-p bipolar/zero-crossing, 1.5V unipolar.

**Field Excitation**

+5V/11mA supply (EX- to IN-), for interface applications requiring external pull-up.

**Protection**

TVS & diode clamps built-in plus additional protection on back-panel.

**Common Mode Rejection**

130dB typical, 50-60Hz.

**Host Output**

**Host Range**

Fixed ranges: 0-5V DC.

User-configurable -B models: ±5V.

**DAC Resolution**

16-bit, 0-5V: 1/26305, ±5VDC: 1/52610.

**Drive Current**

5V into 1kΩ minimum or 5mA max load.

**Response Time**

uB45-01: 160ms

uB45-02: 80ms

uB45-03: 35ms

uB45-04: 16ms

uB45-05: 8.5ms

uB45-06: 3.4ms

uB45-07: 1.6ms

uB45-B: varies by range

**General**

**Power Consumption**

0.45W, 90mA from 5V max. with no exc. & 5mA host load.

0.6W, 120mA from 5V w/ 10mA exc. load & 5mA host load.

**Accuracy**

Better than ±0.1%. 0.05% typical.

-CG models: Better than ±0.125%. 0.075% typical.

**Non-Linearity**

Better than ±0.05%, typical.

**Noise**

Less than 0.05% of span p-p rms.

**Ambient Effect**

Less than ±40ppm/°C.

**Dimensions**

Height: 1.380” with connectors. 0.970” without. Width: 0.425”. Length: 1.425”.

**Environmental**

**Operating Temperature**

-40 to 80°C (-40° to 176°F).

-CG models: 0 to 55°C (32 to 131°F).

**Storage Temperature**

-40 to 85°C (-40° to 185°F).

**Relative Humidity**

0 to 95% non-condensing.

**Power Requirement**

5V powered. 10-32V power optional (requires uBDC1 power module & backpanel.)

**Safety Isolation**

Field channels are individually isolated field-channel-to-field channel and from the field to the host I/O bus (host group includes 5V power) for common-mode voltages up to 250V AC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500V/AC HIPOT/dielectric strength test for one minute without breakdown). This complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.

**Shock and Vibration Immunity**

Conforms to:

IEC 60068-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.

IEC 60068-2-64: 10-500 Hz, 4G-rms, 2 hours/axis, for random vibration.

EC 60068-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.

**Electromagnetic Compatibility (EMC) Compliance**


Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.

Radiated Field Immunity (RFI), per IEC 61000-4-4.

Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.

Surge Immunity, per IEC 61000-4-5.

Conducted RF Immunity (CRI), per IEC 61000-4-6.

**Emissions**


**Approvals**

CE compliant. RoHS Compliant.

UL/ULC Class 1, Division 2, Groups A/B/C/D.

ATEX Zone 2. No UL or ATEX on -CG models.

CE marked, per EMC Directive 2004/108/EC.

Minimum immunity per BS EN 61000-6-1 (2007): enclosure port, per CISPR 16.


**Shock and Vibration Immunity**

Conforms to:

IEC 60068-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.

IEC 60068-2-64: 10-500 Hz, 4G-rms, 2 hours/axis, for random vibration.

EC 60068-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.

**Power Ground**

Power ground, on a continuous basis (will withstand 1500VAC HIPOT/dielectric strength test for one minute without breakdown). This complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.

**Resistance**

User-configurable -B models: 0-50KHz.

**Ordering Information**

To order commercial grade modules append with -CG (except -B models) e.g., uB45-01-CG.

<table>
<thead>
<tr>
<th>Model</th>
<th>Field Input</th>
<th>Min Hz</th>
<th>Host Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>uB45-01</td>
<td>0-500Hz</td>
<td>2Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB45-02</td>
<td>0-1KHz</td>
<td>4Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB45-03</td>
<td>0-2.5KHz</td>
<td>8Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB45-04</td>
<td>0-5KHz</td>
<td>14Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB45-05</td>
<td>0-10KHz</td>
<td>20Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB45-06</td>
<td>0-25KHz</td>
<td>30Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB45-07</td>
<td>0-50KHz</td>
<td>30Hz</td>
<td>0-5V DC</td>
</tr>
<tr>
<td>uB45-B</td>
<td>Configurable</td>
<td>30Hz</td>
<td>Configurable ±5V</td>
</tr>
</tbody>
</table>

**Configuration using Agility™ Config. Tool via Bluetooth technology**

The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules. Bluetooth wireless technology microBlox™ modules (-B models) allow their input and output ranges to be wirelessly reconfigured and calibrated using a smart phone or tablet. This mobile app. supports smart devices with Android 4.3 or later or iOS 5.0 or later. You can download the Agility application free of charge from the Google Play™ store at play.google.com (Android), or the Apple® App Store® at itunes.apple.com (Apple iOS).

**Accessories**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uBDC1</td>
<td>Non-isolated, 10-32V: 5V/1A power supply</td>
</tr>
<tr>
<td>uB04</td>
<td>4 channel panel, surface mount</td>
</tr>
<tr>
<td>uB04D</td>
<td>4 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB08</td>
<td>8 channel panel, surface mount</td>
</tr>
<tr>
<td>uB08D</td>
<td>8 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB16</td>
<td>16 channel panel, surface mount</td>
</tr>
<tr>
<td>uB16D</td>
<td>16 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB02</td>
<td>AC current sensor, outputs 0-11.17mA</td>
</tr>
<tr>
<td>uB020-350</td>
<td>AC current sensor, outputs 0-11.17mA</td>
</tr>
</tbody>
</table>

**Width:** 0.425". **Length:** 1.425". **Height:** 1.380" with connectors. 0.970" without. **Front Panel:** 2.400" W x 0.200" H. **Weight:** 4 oz. **IP Rating:** 65, 30765 Wixom Rd, Wixom, MI 48393 USA

Tel 248-295-0880 ■ Fax 248-624-9234 ■ sales@acromag.com ■ www.acromag.com ■ 30765 Wixom Rd, Wixom, MI 48393 USA

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Description
Field Output: ±5V, ±10V, 0-5V, 0-10V
Host Input: ±5V, ±10V, 0-5V, 0-10V or programmable ±10V

Acromag’s microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uB49 model conditions a DC voltage signal received from the host system to drive a scaled process voltage field output signal. It functions as an isolated, voltage-controlled voltage source to drive field instruments.

Bluetooth wireless technology versions enable configuration using a smart phone or tablet. Acromag’s Agility™ app, available for Android™ and iOS® mobile devices, helps you vary input/output ranges and scaling to your specific application. The Agility app can also set an alarm output function with a setpoint limit and deadband. Other app functions include polling inputs, trending values in a sharable chart, updating calibration, and diagnostic troubleshooting.

For cost-sensitive projects, a commercial-grade version is available (-CG models). These units offer similar performance, but over a limited temperature range and lack hazloc approvals.

Backpanels provide power, I/O wiring terminals, and host access to an industry-standard analog signal bus. Modules are hot-swappable without screws. Data acquisition boards can access all host I/O signals on the DB25 bus connector.

Key Features & Benefits
- Wide variety of input and output ranges
- Mixes with different I/O types on compact 4, 8, or 16 channel backpanels
- Select fixed I/O range models or Bluetooth wireless technology user-configurable models
- Cost-saving commercial-grade versions available for less demanding applications
- Android® and iOS® apps simplify wireless configuration with a smartphone or tablet
- Mobile app configures I/O ranges, sets scaling, calibrates and performs diagnostics
- Optional alarm function with setpoint and deadband control driving 0/5V host output
- Poll and trend I/O values to sharable charts
- High accuracy, noise immunity, and stability
- Isolated field-to-host and channel-to-channel (1500Vac peak, 250Vac/354Vdc continuous)
- Over-molded I/O circuits offer superior shock, vibration, moisture, and dust protection
- Wide operating temperature range
- UL/cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals
### Performance Specifications

#### Field Input

- **Field Range**
  - Fixed ranges: ±5V, 0-5V, ±10V, 0-10V.
  - User-configurable -B models: ±10V.

- **A/D Resolution**
  - 16-bit A/D, ±5V/±10V:
  - 1/60275. 0-5V/0-10V: 1/30137.

- **Resistance**
  - 103.1kΩ.

- **Input Sample Rate**
  - 12000ps.

- **Normal Mode (Bandwidth)**
  - 100Hz minimum, 3dB at 102Hz typical.

- **Protection**
  - TVS & diode-to-rail clamps built-in.

#### Host Output

- **Host Range**
  - Fixed ranges: ±5V, 0-5V, ±10V, 0-10V.
  - User-configurable -B models: ±10V.

- **D/A Resolution**
  - ±5V: 1/129701.
  - 0-5V: 1/149401.
  - ±10V: 0-10V: 1/29700.

- **Output Over-Range**
  - ±11V, typical.

- **Output Load**
  - 0V into 2KΩ minimum or 5mA maximum.

- **Response Time**
  - Output Step 0.98% of 5V into 5KΩ load in 9ms, typical.

#### General

- **Power Consumption**
  - 0.28W maximum, 56mA from +5V maximum with 5mA power ground, on a continuous basis.

- **Effective Resolution**
  - The least of input (A/D) and output (D/A) resolution:
    - uB49-01/02: 1/29701.
    - uB49-03: 1/14950.
    - uB49-04: 1/30137.
    - uB49-05/06/07: 1/59401.

- **Accuracy**
  - Better than ±0.1%, 0.05% typical.
  - -CG models: Better than ±0.125%. 0.075% typical.

- **Non-Linearity**
  - Better than ±0.05%, typical.

- **Noise**
  - Better than ±0.03% of span p-p rms.

- **Ambient Effect**
  - Better than ±80ppm/°C.

- **Common Mode**
  - 100dB typical, 50-60Hz.

### Ordering Information

To order commercial grade modules append with -CG (except -B models) e.g., uB49-01-CG.

<table>
<thead>
<tr>
<th>Model</th>
<th>Field Output</th>
<th>Host Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>uB49-01</td>
<td>±5V</td>
<td>0 to +5VDC</td>
</tr>
<tr>
<td>uB49-02</td>
<td>±5V</td>
<td>±5V</td>
</tr>
<tr>
<td>uB49-03</td>
<td>0V to +5VDC</td>
<td>±5V</td>
</tr>
<tr>
<td>uB49-04</td>
<td>±10V</td>
<td>0V to +10VDC</td>
</tr>
<tr>
<td>uB49-05</td>
<td>±10V</td>
<td>±10V</td>
</tr>
<tr>
<td>uB49-06</td>
<td>0V to +10V</td>
<td>±10V</td>
</tr>
<tr>
<td>uB49-07</td>
<td>±10V</td>
<td>±5V</td>
</tr>
<tr>
<td>uB49-B</td>
<td>Configurable</td>
<td>Configurable</td>
</tr>
</tbody>
</table>

### Configuration using Agility™ Config. Tool via Bluetooth technology

The Acromag Agility™ configuration tool is a mobile application that allows easy setup, calibration, and reconfiguration of microBlox™ I/O modules.

Bluetooth wireless technology microBlox™ modules (-B models) allow their input and output ranges to be wirelessly reconfigured and calibrated using a smartphone or tablet. This mobile app. supports smart devices with Android 4.3 or later or iOS 5.0 or later. You can download the Agility application free of charge from the Google Play™ store at play.google.com (Android), or the Apple® App Store® at itunes.apple.com (Apple iOS).

### Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uBDC 1</td>
<td>Non-isolated, 10-32V: 5V/1A power supply</td>
</tr>
<tr>
<td>uB04</td>
<td>4 channel panel, surface mount</td>
</tr>
<tr>
<td>uB04D</td>
<td>4 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB08</td>
<td>8 channel panel, surface mount</td>
</tr>
<tr>
<td>uB08D</td>
<td>8 channel panel, DIN rail mount</td>
</tr>
<tr>
<td>uB16</td>
<td>16 channel panel, surface mount</td>
</tr>
<tr>
<td>uB16D</td>
<td>16 channel panel, DIN rail mount</td>
</tr>
</tbody>
</table>

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**Signal Conditioners: microBlox™ Series**

**uBDC1 DC Power Module**

**Description**

Acromag's microBlox™ uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

The uBDC1 power module allows a backpanel populated with I/O modules to operate off DC power voltage levels other than 5V. This optional module plugs into a special socket on the backpanel to convert a power supply voltage from 10-32V DC to 5V/1A which will drive up to 16 I/O modules. uBDC1 modules include over-voltage, reverse-voltage and short-circuit protection (current limiting).

With the uBDC1 power module, users can also implement redundant power methods for the backpanel. In redundant applications, the uBDC1 becomes the primary power source.

**Key Features & Benefits**

- Allows use of wide range 10-32V DC power supplies to operate backpanels
- Enables implementation of redundant power to uB backpanels.
- Polarized to only fit in panel power slot
- Over-molded circuit has superior shock, vibration, moisture, and dust protection.
- -40 to 80°C (-40 to 176°F) operation
- UL, cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals

**Wide-Range DC Voltage Input ◆ 5V/1A DC Output to Backpanel ◆ Supports Redundant Power**

---

**Diagram:**

- Wide-Range DC Voltage Input
- 5V/1A DC Output to Backpanel
- Supports Redundant Power

**Diagram Components:**

- 10-32V DC
- CM FILTER
- REVERSE POLARITY PROTECT
- POWER TO PANEL BUS
- COMMON
- POWER
- FILTER
- CM FILTER
- (UP TO 1A) +5V
- HOST
- +24V
- POWER (ON BACK-PANEL)
- SWITCHING BUCK REGULATOR
- FB
- 500KHz
- SOFT START
- LIM
- OUT ADJ
- 10uH
- CM FILTER (UP TO 1A)
- +5V
- COMMON
Signal Conditioners: microBlox™ Series

uBDC1 DC Power Module

Performance Specifications

See Backpanels for additional system specifications.

- **General**

  - **Dimensions**
    - Height: 1.380” with connectors. 0.970” without.
    - Width: 0.425”. Length: 1.425”.
  - **Input**
    - 10-32V DC.
  - **Output Voltage**
    - 5V DC ±5% (4.7V to 5.3V range).
  - **Output Current**
    - 1A (1.25A absolute maximum).
  - **Efficiency**
    - 90% typical.
  - **Output Ripple**
    - Less than 150mVp-p, typical.
  - **Response Time**
    - Less than 15ms typical.
  - **Over-Voltage Protection**
    - TVS in module plus additional TVS protection provided on backpanel.
  - **Current-Limiting**
    - Built-in, plus additional limiting provided on backpanel.
  - **Reverse-Voltage Protection**
    - Built-in, plus additional protection provided on backpanel.
  - **Filtering**
    - Transient voltage suppression, capacitors, & common-mode I/O filtering.
  - **Line Regulation**
    - Less than 0.005% 10-32V, 1A, typical.
  - **Load Regulation**
    - Less than 4%, 0.05A to 1A, typical.

- **Environmental**

  - **Operating Temperature**
    - -40 to 80°C (-40° to 176°F).
  - **Ambient Operating Temperature**
    - -40°C to +80°C, no deration.
  - **Storage Temperature**
    - -40 to 85°C (-40° to 185°F).
  - **Relative Humidity**
    - 0 to 95% non-condensing.
  - **Isolation**
    - Non-isolated.
    - Power is common to host-side of I/O.
  - **Shock and Vibration Immunity**
    - Conforms to:
      - IEC 60068-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.
      - IEC 60068-2-64: 10-500 Hz, 4G-rms, 2 hours/axis, for random vibration.
      - EC 60068-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.
  - **Electromagnetic Compatibility (EMC) Compliance**
    - Minimum immunity per BS EN 61000-6-1 (2007):
      - CE marked, per EMC Directive 2004/108/EC.
      - Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
      - Radiated Field Immunity (RFI), per IEC 61000-4-4.
      - Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
      - Surge Immunity, per IEC 61000-4-5. Conducted RF Immunity (CRI), per IEC 61000-4-6.
  - **Emissions**
    - Low voltage AC mains port, per CISPR 16.
  - **Approvals**
    - CE compliant. RoHS Compliant.
    - UL/cUL Class 1, Division 2, Groups ABCD.
    - ATEX Zone 2.

Ordering Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Non-Isolated Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>uBDC1</td>
<td>10-32V DC</td>
<td>5V, 1A DC</td>
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Accessories

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Signal Conditioners: microBlox® Series

uB04/08/16 microBlox® Backpanels

**Description**

Acromag's microBlox® uB Series I/O modules offer a compact, high-performance solution for interfacing sensors and field devices with data acquisition systems. uB signal conditioning modules are ideal to isolate, filter, convert and amplify a wide variety of signal types for test, measurement and control systems. Just plug uB modules into 4, 8, or 16-channel backpanels in any mix for a high-density analog I/O interface. Channel-to-channel isolation provides optimal noise and surge protection from ground loops, spikes, and high common mode voltages.

These backpanels serve as a carrier for up to 16 microBlox I/O modules. They provide power connections, input/output wiring terminals, and earth grounding (host-side) for the I/O modules. Each module slot (I/O channel) has switches to enable Bluetooth communication (with LED) and cold junction compensation for thermocouple inputs.

An industry-standard analog I/O bus aggregates all host I/O channels on a DB25 connector to facilitate simultaneous access by high-speed data acquisition systems. Field points are isolated channel-to-channel and as a group to the host analog I/O bus (host includes power).

**Key Features & Benefits**

- Choice of 4, 8, and 16 channel carriers
- Optional DIN-rail mounting
- Bluetooth and CJC support on all slots
- Slot for DC power converter module uBDC1
- Redundant power capable
- DB25 port for simultaneous access to all I/O over a single cable connection
- -40 to 80°C (-40 to 176°F) operation
- UL, cUL Class I, Div 2, ABCD and ATEX Zone 2 hazardous location approvals
uB04/08/16 microBlox® Backpanels

Performance Specifications
See specific I/O models for additional system specifications.

■ General
Reverse Voltage Protection
Solid-state protection included.
Over-Voltage Protection
1ms to break power above 8.6V.
Under-Voltage Protection
1ms to break power under 2.5V.
Transient Protection
Transient Voltage Suppressor (TVS) per field channel, plus TVS per Host channel, TVS at Host power connections.

Power
Back-panel power is +5V sourced by wiring 5V to the +5V terminals, or via an optional uBDC1 module with wiring to the 24V terminals (10-32V). Power can be driven redundantly if both the host 5V and 24V power terminals are wired to separate power supplies and uBDC1 power module is installed (uBDC1 dominates).

Pass-Thru Power Limit
Current limiting from 5V set by capacity to 480-720mA (uB04), 990-1350mA (uB08), and 1900-2500mA (uB16).

Power Consumption
Less than 4mA (back-panel only), 30mA (including uBDC1 Including I/O modules plugged in).

Channel I/O
Printed circuit edge connector sockets are polarized to prevent a mix-up between the power module socket and I/O module sockets.

Module Retainer
I/O modules and power module are retained via 3AG clips, 1 per channel.

Earth Ground
Screw terminal earth ground connection on panel and common to host minus.

LED Indicators
5V power: green
24V power: green
Bluetooth link: blue LED/channel.

Switches
Two DIP switches/channel: CJC enable/disable, thermistor connection to IN- set ON or OFF per I/O model, enable/disable Bluetooth link ability (set ON for access to -B modules).

Interface Connector
Field & host channel: high-density screw clamp type, 16AWG maximum.
Host analog I/O bus: DB25, industry-standard I/O pin assignment bundles host-side I/O and shared host common.

Dimensions
uB04: 2.845" high, 4.005" wide, 1.8" deep
uB08: 2.845" high, 6.213" wide, 1.8" deep
uB16: 2.845" high, 11.181" wide, 1.8" deep

DIN rail versions (uBxD) add 0.105" to width and 0.3" to depth.

Inserting plug-in I/O modules add 0.780" to depth.

■ Environmental
Operating Temperature
-40 to 80°C (-40° to 176°F).
-CG Models: 0 to 50°C (32 to 131°F)

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

Relative Humidity
0 to 95% non-condensing.

■ Safety Isolation
Field channels are individually isolated field channel-to-field channel and from the field to the host I/O bus (host group includes 5V power) for common-mode voltages up to 250V AC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC HIPOT/dielectric strength test for one minute without breakdown). This complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.

Shock and Vibration Immunity
Conforms to:
IEC 60668-2-6: 10-500 Hz, 4G, 2 hours/axis, for sinusoidal vibration.
IEC 60668-2-6: 10-500 Hz, 4G-rms, 2 hours/axis, for random vibration.
EC 60668-2-27: 25G, 11ms half-sine, 18 shocks at 6 orientations, for mechanical shock.

Electromagnetic Compatibility (EMC) Compliance
Minimum immunity per BS EN 61000-6-1 (2007):
CE marked, per EMC Directive 2004/108/EC.
Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
Radiated Field Immunity (RFI), per IEC 61000-4-4.
Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
Surge Immunity, per IEC 61000-4-5. Conducted RF Immunity (RFI), per IEC 61000-4-6.

Emissions
Class B product with emissions per BS EN 61000-6-3 (2007+A1:2011); enclosure port, per CISPR 16.
Low voltage AC mains port, per CISPR 16.

Approvals
CE compliant, RoHS Compliant.
UL/CUL Class 1, Division 2, Groups ABCD.
ATEX Zone 2. No UL or ATEX Approvals on -CG models.

Accessories
Model Description
5028-606 Interface cable for microBlox uB backpanels, DB25 male/female, 1m long
5028-607 Interface cable for microBlox uB backpanels, DB25 male/female, 2m long
5028-608 Interface cable for microBlox uB backpanels, DB25 male/female, 7m long
uBXIF Universal interface board, rack mount

Ordering Information
To order commercial grade panels append with -CG, e.g. uB04-CG. Note: Commercial grade panels should be paired only with -CG modules.

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Acromag
THE LEADER IN INDUSTRIAL I/O

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