Application Example - Voltage Input to Current Output

A flow sensor with 0-20 mA output needs to be connected to a 0-10 VDC input on a PLC. The sensor measures fluid levels between 0 and 60" in a tank. When using the 884114, low and high alarms will be set at 5" and 55" respectively with a 3" hysteresis and 5 second on delay for each alarm. In the event of a sensor error, both relays will hold in their current state when the error occurred. Relay switching will work as follows:

Relay 1 ON
- In the configuration menu press setup or until VOLT is displayed on line 1. Press setup.
- Select input range. Press setup or until 0-5 V is displayed and hold for UC.RANGE. Press setup.
- Select output units. Press setup or until Hz is displayed for UNIT. Press setup.
- Select decimal point location. Press setup or until 111.1 is displayed for DECP. Press setup.
- Set display value for minimum input. Press setup or until 0.0 is displayed for DSP.LO. Press setup.
- Set display value for maximum input. Press setup or until 6.0 is displayed for DSP.HI. Press setup.

Relay 2 ON
- In the configuration menu press setup or until UC.RANGE is displayed for 884116 only set relay on delay in seconds. Press setup or until 5.0 is displayed for R1.HYST. Press setup.
- In the configuration menu press setup or until UC.RANGE is displayed for 884116 only select relay activation increasing mode. Press setup or until 3.0 is displayed for R1.FUNC. Press setup.
- In the configuration menu press setup or until UC.RANGE is displayed for 884116 only set relay hysteresis. Press setup or until 3.0 is displayed for R2.HYST. Press setup.
- In the configuration menu press setup or until UC.RANGE is displayed for 884116 only set relay 1 function. Press setup or until OFF is displayed for R2.FUNC. Press setup.

Use “SETUP” to return to the configuration menu.

Application Example - Thermocouple Input

An oven's temperature is to be monitored using a type K thermocouple. The unit's input signal is 0-10 VDC for a temperature range of 100-400 °F

- In the configuration menu press setup or until TEMP is displayed on line 1. Press setup.
- Select input type. Press setup or until TC is displayed for SENSOR. Press setup.
- Select TC type. Press setup or until TC is displayed for TC.TYPE. Press setup.
- Select temperature units. Press setup or until °F is displayed for UNIT. Press setup.
- 884116 only - select relay 1 function. Press setup or until OFF is displayed for R1.FUNC. Press setup.
- 884116 only - select relay 2 function. Press setup or until OFF is displayed for R2.FUNC. Press setup.
- Select output mode. Press setup or until 60.0 is displayed for DSP.HI. Press setup.
- Select output range. Press setup or until 0.0 is displayed for O.RANGE. Press setup.
- Set temperature for analog output low. Press setup or until 100.0 is displayed for OUT.LO. Press setup.
- Set temperature for analog output high. Press setup or until 400.0 is displayed for OUT.HI. Press setup.

Wait while the settings are stored and the unit switches to run mode.

Application Example - Voltage Input to Voltage Output with Custom Scaling - Cont’d

A flow sensor delivers a 0-5 VDC output over a range of 0-50 gallons per minute. The signal conditioner will convert the 0-5 VDC input signal to a 0-10 VDC output signal. The unit must first be configured to the voltage output range. The two-point calibration mode in Advanced Settings is used to calibrate the unit's custom input range.

- In the configuration menu press setup or until 0.0 is displayed on line 1. Press setup.
- Select input range. Press setup or until 0.0 is displayed for UC.RANGE. Press setup.
- Select output units. Press setup or until 0.0 is displayed for UNIT. Press setup.
- Select injection units. Press setup or until 50.0 is displayed for UC.RANGE. Press setup.
- Select decimal point location. Press setup or until 111.1 is displayed for DECP. Press setup.
- Set display value for minimum input. Press setup or until 0.0 is displayed for DSP.LO. Press setup.
- Set display value for maximum input. Press setup or until 50.0 is displayed for DSP.HI. Press setup.

Application Example Continued above.

Universal Signal Conditioners

Quick Start Guide

Models:

884114 - Universal Transmitter
884116 - Universal Transmitter with (2) relay outputs
884501 - Display / Programming Module

Universal Transmitter Signal Conditioner models 884114 and 884116 are single input devices that accept milliamperes, voltage, RTD, thermocouple or potentiometer inputs. Both models support a selectable single analog output. They feature a plastic slim-line housing, integral 35mm DIN rail mounting adapter, and removable screw terminals. The detachable 884114 programming / display module (purchased separately) is required for configuration. The programming / display module may remain affixed for operational display of input and output values.

Configuring a new unit

- Mount the unit on a 35mm DIN rail and connect supply, input and output wires to the appropriate terminals based on the connection diagrams in this Quick Start Guide.
- Snap the 884114 Programming Module on the front of the unit.
- Press setup to power up the unit.
- The unit should display the configuration menu similar to the figure below. If not, press setup once.

NO

Note: If no sensor is connected to the input terminals, the unit will display the word 'NO' to acknowledge the error and then press setup again to display the first screen of the menu as shown above.

- Press setup to begin configuration. Press setup or setup to scroll through options on each step. Press setup to confirm an option and move to the next step.
- Press setup to step backwards through the configuration menu.

Abbreviations used on the 884501 display

REL1 = relay 1 output
REL2 = relay 2 output
RANGE = range
RFFNC = relay 1 function
RFFNC2 = relay 2 function
AMT = input range
RFLNC = relay 1 lockout
PRESET = preset
ADJSET = advanced settings
UNIT = input type
ALT = alternate range
OVERRIDE = override
TC = thermocouple type
OVERRIDE2 = override 2
MSP = multiple setpoint
OVERRIDE3 = override 3
STP = setpoint
Additional Help and Support

- For product support, specifications, installation and troubleshooting, a hardware Manual can be downloaded from the On-line Documentation area of the AutomationDirect web site.
- Additional technical support and questions, call Technical Support Team 1-800-631-3925 or 770-992-1000.

Copyright 2017, AutomationDirect Incorporated/All Rights Reserved Worldwide
### Universal Signal Conditioner Specifications

#### Universal Signal Conditioners 884114/884116 Specifications (with or without 884501)

<table>
<thead>
<tr>
<th>General Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature Range</strong></td>
<td>20°C to +60°C (-4°F to 140°F)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>DIN 43760, IEC 60584-1</td>
</tr>
<tr>
<td><strong>Consumption</strong></td>
<td>≤ 2.5 W</td>
</tr>
<tr>
<td><strong>Fuse</strong></td>
<td>500 mA slow blow / 250 VAC (not user replaceable)</td>
</tr>
</tbody>
</table>

#### Auxiliary Power Supply Output

- 24 VDC, 50 mA max (Terminal 6 and 4)

#### Isolation Voltage, Test/Operation

- 2200 VAC, 50/60 Hz

#### Programming/display module, 884501

- Setpoint, Window, Sensor Error, Power and Off

### Input Specifications

<table>
<thead>
<tr>
<th>Current Input</th>
<th>Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Programmable Ranges</strong></td>
<td>0 to 20 and 4 to 20 mA DC</td>
</tr>
<tr>
<td><strong>Measurement Range</strong></td>
<td>1 to 25 mA</td>
</tr>
<tr>
<td><strong>Input Resistance</strong></td>
<td>≥ 20 kΩ / FST / 50Ω</td>
</tr>
<tr>
<td><strong>Sensor Error Detection</strong></td>
<td>4 to 20 loop break, ≤ 20 kΩ / FST / 50Ω</td>
</tr>
</tbody>
</table>

#### Voltage Input

- Programmable Ranges: 0 to 1, 0.2 to 1, 0.5 to 1, 0 to 10, and 2 to 10 VDC

#### Measurement Range

- 0 to 10 mV to 12 VDC

- **Input Resistance**: 10 MΩ

#### Thermocouple Inputs

- **Thermocouple Type**: B, E, J, K, L, N, S, T, U, W, and V
- **Cold Junction Compensation**: Via internally mounted sensor at 0 to 2°C (+32°F) or 3.3 V

#### Sensor Error Detection

- Sensor break: >15 kΩ (1.25V)

<table>
<thead>
<tr>
<th>Type</th>
<th>Min. value (max. value)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>1</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>2</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>3</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>4</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>5</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>6</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>7</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>8</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>9</td>
<td>≥ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Min. value (max. value)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>1</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>2</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>3</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>4</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>5</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>6</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>7</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>8</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
<tr>
<td>9</td>
<td>≤ 400°C (+752°F)</td>
<td>IC 6094-1</td>
</tr>
</tbody>
</table>

#### Output Specifications

- **Output Range**:
  - 884114: 0 / 3.5 mA / 23 mA / none selectable
  - 884116: 0 / 3.5 mA / 23 mA / none selectable

| Output | 2.4, 5.1, 6.6, 7.5, 8.8, 10.2, 12.0, 15.0, 20.0, 25.0, and 30.0 mA |

#### Universal Signal Conditioner Dimensions

884114 and 884116 Dimensions

- 100mm [3.93”] x 110mm [4.33”] x 23.5mm [0.93”]

884501 Dimensions

- 11mm [0.43”] x 23mm [0.91”] x 7mm [0.28”]

### Wiring Diagrams

#### Inputs

- R1, R2
- 41 42 43 44
- TC, internal temperature

#### Outputs

- R1, R2
- Voltage
- Current
- Voltage

#### Video Links

- Click or scan the QR code to the right for a Programming and Setup video on the Universal Signal Conditioners
- Click or scan the QR code to the right for an Overview and Applications video on the Universal Signal Conditioners

---

Data Sheet: 884-QSG