WARNING
PERSONAL INJURY
DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.
Failure to comply with these instructions could result in death or serious injury.
A Series Digital Gauge User’s Guide

DCT Document Number: 77-01530-00
Rev B: September 2006

PORTABLE
Model AKW Battery Powered
Model AKT A/C Adapter Powered
Model AKV 11-32 VDC Powered

OUTPUT SIGNALS
Model ASB 4-20 mA (2-wire loop powered)
Model ASE 0-5 VDC
Model ASR 2 Programmable Limits & Relays
Model ASX 0-5 DVDC with 2 Programmable Limits

INTRINSICALLY SAFE
Model AIW Battery Powered

IMPORTANT
It is recommended that you read this document thoroughly before applying power to this unit. This document contains information on wiring, calibration, and use of features.

Honeywell and the Honeywell logo are registered trademarks of Honeywell, Inc.

Printed in U.S.A.
TABLE OF CONTENTS

Chapter 1
GETTING STARTED
  1.1 Quick Start Guide .............................. 7
  1.2 About This Manual ............................. 8

Chapter 2
INTRODUCTION
  2.1 Overview ........................................ 9
  2.2 Instrument Layout ............................... 10
    2.2.1 LCD Display .................................. 10
    2.2.2 Low Battery Indicator ....................... 10
    2.2.3 Decimal Point Position ...................... 11
    2.2.4 Incremental Display Step .................... 11
    2.2.5 Pressure Port Threads ....................... 11
  2.3 Maximum Safe Overpressure .................... 12
  2.4 Front and Side Views ........................... 13
  2.5 Dimensions ...................................... 15
  2.6 Specifications .................................. 16
  2.7 Accessories .................................... 18

Chapter 3
SET UP
  3.1 Installation ..................................... 19
  3.2 Front Panel Rotation ............................ 20
  3.3 Power Supply Options ............................ 21
    3.3.1 Battery Replacement ......................... 21
    3.3.2 AC Adapter .................................. 22
    3.3.3 External Power Supply ....................... 22
  3.4 Turning the Instrument On and Off ............ 23
  3.5 Zeroing the Display ............................. 23
3.6 Restoring the Calibrated Zero .......................... 23
3.7 Reading the High/Low Values ......................... 24
3.8 Clearing the High/Low Values ......................... 24

Chapter 4
CALIBRATION
4.1 Calibration Considerations ............................ 25
4.2 Required Pressures .................. .......................... 25
4.3 Calibration Procedure .................. .......................... 27
4.4 Rear View of Front Face Panel .................... 29
4.5 Calibration Error Messages .................... 30

Chapter 5
OUTPUT SIGNALS
5.1 Output Signal Overview ............................ 31
5.2 Specifications ............................ .......................... 32
  5.2.1 Limit Relay Option ............................ 32
  5.2.2 0-5 VDC Output ............................ 33
  5.2.3 2-wire 4-20 mA Output ............................ 34
5.3 Wiring Codes And Schematics .................... 35
  5.3.1 Wiring To The Terminal Blocks ............................ 35
  5.3.2 Limit Option ............................ 36
  5.3.3 0-5 VDC Output Option ............................ 36
  5.3.4 0-5 VDC Output And Limit Relay Option ............................ 37
  5.3.5 4-20 mA Output Option ............................ 37
5.4 Explanation Of Limits ............................ 38
5.5 Entering The Limit Setpoints .................... 39
5.6 Trimming Of Analog Outputs .................... 40

Chapter 6
FIELD SELECTABLE FEATURES
6.1 Introduction ............................ 43
6.2 Setup Menu Operation ............................ 44
6.3 Low Limit Setpoint ("L-LO") Menu Item ............................ 47
6.4 High Limit Setpoint ("LHI") Menu Item ............. 47
6.5 Enable Options ("EO") Description ................. 48
  6.5.1 Auto-off Feature .................................. 48
  6.5.2 Always-On Feature ................................ 48
  6.5.3 [Zero] Button Disable Feature ......................... 48
  6.5.4 [Hi/Lo] Button Disable Feature ......................... 48
  6.5.5 [Clear] Button Disable Feature ......................... 49
6.6 Enable Options ("EO") Menu Item ................. 50
6.7 Engineering Units ("UNIT") Menu Item .......... 51
6.8 Auto-off Time ("AOFF") Menu Item ............... 53
6.9 Update Rate ("RATE") Menu Item ............... 53
6.10 Analog Output Zero Scale ("R-LO") Menu Item ... 54
6.11 Analog Output Full Scale ("R-HI") Menu Item ... 54
6.12 Internal Firmware Version ("VER") Menu Item ... 54

Chapter 7
TROUBLESHOOTING
  7.1 Introduction ........................................ 55
  7.2 Help Message Codes ................................ 55
  7.3 Troubleshooting Hints ............................... 56

Chapter 8
INTRINSIC SAFETY
  8.1 Overview ........................................... 57
  8.2 Batteries ............................................ 57

Chapter 9
POWER ADAPTER SPECIFICATION

INDEX .................................................. 63

WARRANTY/REPAIR POLICY ......................... 65
Chapter 1
GETTING STARTED

1.1 Quick Start Guide

1. The instrument comes calibrated from the factory and needs no further calibration.

2. All instruments with optional intrinsic safety must be installed according to the installation drawings. If you are using the intrinsically safe Model AIW instrument, read “INTRINSIC SAFETY” on page 57 before proceeding.

3. For battery powered instruments, install one or two alkaline batteries by removing the rear center screw and then the front face plate (See page 2-3).
   If using an AC adapter with the Model AKT, connect the adapter into the back of the instrument.
   If using a Vehicle powered (Models ASE, ASR or ASX) or Loop powered (Model ASB) instrument, use the wiring diagrams in Chapter 6.

4. Screw the gauge into place noting the correct threads:
   9/16 - 18 UNF [Straight thread] with SAE spec J514 O-ring boss (7/8" Hex)

5. Push the [On/Off] button. (See page 2-5)

6. You are now ready to monitor pressure.
1.2 About This Manual

This is the User’s Guide for the standard “A Series” Digital Pressure Gauges listed on the inside front cover. As the “A Series” product line expands, other members of the “A Series” are made available with additional features, pressure ports and other options.

As DCT Instruments/Sensotec, Inc. continually improves its products, the information herein is subject to change without notice.
Chapter 2
INTRODUCTION

2.1 Overview

The “A Series” Digital Pressure Test Gauge builds on the achievements of the “J Series” products. The latest in pressure transducer technology is combined with modern microprocessor electronics to provide a high-accuracy digital readout of process pressure. Stainless-steel construction, high over-pressure protection and a solid-state design give “A Series” instruments a long lifetime with fewer recalibrations.

Features of these instrument include:

- An easy-to-read 4½-digit display.
- A waterproof membrane face with raised buttons and tactile feedback for ease of setup and operation.
- Zero adjustment, high, low and clear functions.
- Calibration and setup information are stored in non-volatile memory to protect from loss even when power is interrupted.
- Unauthorized calibrations are blocked with internal security.
- Field-selectable units of measure allows one instrument to be re-configured for a variety of tasks.

Added and improved features of the “A Series” instruments over the “J Series” instruments include:

- Increased accuracy and resolution
- Adjustable update rate
- User-selectable automatic shut-off interval
- Wider operating temperature range (when purchased with the NEMA4 option)
2.2 Instrument Layout

2.2.1 LCD Display
The 4½-digit liquid crystal display (LCD) readout displays the pressure applied to the instrument, interacts with the user when the instrument is being set up or calibrated, and indicates if there is a problem with the instrument.

When the instrument is turned on, it illuminates all LCD segments. Then, the engineering units the gauge will be using appears on the display. Most instruments are calibrated in PSI and the instrument has conversion factors for many standard engineering units built in. However, if the instrument displays SPCL (special) it has been specially calibrated to another engineering unit at the factory. In that case, the serial number tag on the top of the instrument will indicate the engineering units being used and the capability to select other engineering units is not available.

After the display of the engineering units, the pressure applied to the pressure port is shown on the display. If the pressure applied to the pressure port is above the instrument’s ability to measure, the display will indicate this overrange condition by showing a "-" on the far left hand side of the display. The display will read "-F" if the instrument is underranged.

2.2.2 Low Battery Indicator
On the left side of the display, just above the minus sign, is the low battery indicator (in the shape of an arrow). When the battery voltage is less than 5 volts, the display will be blanked and the low battery indicator will illuminate to indicate that the batteries should be replaced. The low battery indicator can be seen when the instrument is turned on and all segments of the display are momentarily lighted.

When the low battery indicator is illuminated, change the batteries as soon as possible. The instrument will not function if the battery voltage falls below approximately 4 volts.
2.2.3 **Decimal Point Position**
The decimal point position automatically changes depending upon:
- the user selected engineering units
- the pressure range of the instrument
The decimal point position cannot be changed manually.

2.2.4 **Incremental Display Step**
The incremental display step is the value which the last digit of the display will change by. This value will either be 1, 2, or 5 display counts. It automatically changes depending upon:
- the user selected engineering units
- the pressure range of the instrument
The incremental display step cannot be changed manually.

2.2.5 **Pressure Port Threads**
The “A Series” instruments use the same female pressure port for all pressure ranges: 9/16-18 UNF-2B female straight thread with SAE spec J514 O-ring boss. An O-ring is needed to seal all instruments with female threads. Optional pressure adapters are listed in the “Accessories” section of this chapter.
2.3 Maximum Safe Overpressure

Maximum safe overpressure is the pressure which the instrument can experience occasionally without loss of accuracy or permanent damage.

\textit{Table 1: Maximum Safe Overpressure}

<table>
<thead>
<tr>
<th>Pressure Range (PSI)</th>
<th>Maximum Safe Overpressure (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 -1 = 1</td>
<td>10</td>
</tr>
<tr>
<td>0 - 5 = 5</td>
<td>25</td>
</tr>
<tr>
<td>0 - 15 = 15</td>
<td>75</td>
</tr>
<tr>
<td>0 - 30 = 30</td>
<td>150</td>
</tr>
<tr>
<td>0 - 50 = 50</td>
<td>250</td>
</tr>
<tr>
<td>0 - 100 = 100</td>
<td>500</td>
</tr>
<tr>
<td>0 - 200 = 200</td>
<td>1000</td>
</tr>
<tr>
<td>0 - 300 = 300</td>
<td>1200</td>
</tr>
<tr>
<td>0 - 500 = 500</td>
<td>1500</td>
</tr>
<tr>
<td>0 - 750 = 750</td>
<td>1500</td>
</tr>
<tr>
<td>0 - 1000 = 1K</td>
<td>2000</td>
</tr>
<tr>
<td>0 - 1500 = 1.5K</td>
<td>3000</td>
</tr>
<tr>
<td>0 - 2000 = 2K</td>
<td>4000</td>
</tr>
<tr>
<td>0 - 3000 = 3K</td>
<td>6000</td>
</tr>
<tr>
<td>0 - 5000 = 5K</td>
<td>7500</td>
</tr>
<tr>
<td>0 - 7500 = 7.5K</td>
<td>12000</td>
</tr>
<tr>
<td>0 - 10000 = 10K</td>
<td>15000</td>
</tr>
</tbody>
</table>
2.4 Front and Side Views

![Figure 2-1: Front View](image-url)
Figure 2-2: Side View

Serial Number Tag
Front Face Panel
Rear Center Screw
Cable exit (as needed)
Pressure Port
2.5 Dimensions

Figure 2-3: “A Series” Dimensions
2.6 Specifications

DCT Instruments continually improves its products, and thus these specifications are subject to change without notice.

Enclosure Rating: NEMA 2 (standard), NEMA 4 (standard Model AIW; not available on model AK; optional on other models)

Diameter: 3.7 inches

Linearity and Hysteresis: .05% of full-scale, linearity and hysteresis (better than test gauge accuracy)

Operating Temperature: 30 to 160 °F (standard), 0 to 180 °F (with NEMA 4 option)

Pressure Ranges 0 to: 15, 50, 100, 200, 300, 500, 750, 1K, 1.5K, 2K, 5K, 7.5K, 10K PSI

Calibration Engineering Units: PSI

Built-in Engineering Unit Conversion: PSI, bar, mbar, inH₂O, inHg, kPa, mmHG, MPa, ftH₂O, mmH₂O, mH₂O (field selectable)

Special Engineering Units: Optional

Display: 4½ digit LCD digits, 0.5 inches high

A-to-D converter sample rate: 7.8 kHz

Display Update Rate: 2 to 10 per second (field selectable, factory default 3 per second)

Display, Limits and Output Update Rate: same as Display Update Rate
Pressure Port: 9/16 - 18 UNF-2B female straight thread with SAE spec J514 O-ring boss

Power Requirements: **Models AKW and AIW:**
one or two 9 Volt alkaline batteries
**Model AKT:**
110 VAC@60 Hz adapter (included)
**Models AKV, ASE, ASR, ASX:**
11 to 32 VDC (3 ft. cable included)

Wetted Parts: Stainless steel

Housing Material: Stainless steel

High and Low Capture: Standard, same update rate as display

Zero and Span Adjustment: Standard

Front Panel Membrane: Tactile feedback, raised buttons

Calibration Data: Stored on non-volatile memory chip
## 2.7 Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>DCT Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pressure Adapters</strong></td>
<td></td>
</tr>
<tr>
<td>(Zinc Plated Steel)</td>
<td></td>
</tr>
<tr>
<td>To 1/4 - 18 NPT female</td>
<td>AD6</td>
</tr>
<tr>
<td>To 1/4 - 18 NPT male</td>
<td>AD7</td>
</tr>
<tr>
<td>To 7/16 - 20 UNF male</td>
<td>AD9</td>
</tr>
<tr>
<td>with 37 degree flare</td>
<td></td>
</tr>
<tr>
<td><strong>Pressure Adapters</strong></td>
<td></td>
</tr>
<tr>
<td>(Stainless Steel)</td>
<td></td>
</tr>
<tr>
<td>To 1/4 - 18 NPT female</td>
<td>SS6</td>
</tr>
<tr>
<td>To 1/4 - 18 NPT male</td>
<td>SS7</td>
</tr>
<tr>
<td>To 7/16 - 20 UNF male</td>
<td>SS9</td>
</tr>
<tr>
<td>with 37 degree flare</td>
<td></td>
</tr>
<tr>
<td><strong>Panel Mounting Ring</strong></td>
<td>MR2</td>
</tr>
<tr>
<td><strong>Carrying Case</strong></td>
<td>CC2</td>
</tr>
<tr>
<td><strong>NIST Certification</strong></td>
<td>NISTCERTS</td>
</tr>
</tbody>
</table>
Chapter 3
SET UP

3.1 Installation

When installing the instrument into a process connection, make sure all back pressure is relieved from the system. Make sure that you use the proper fitting to mate with the instrument.

Use a 7/8” wrench with the pressure fitting to connect it to the process connection. The pressure fitting uses a 9/16-18 UNF-2B (straight thread). An O-ring is needed to seal the connection.

Failure to use the correct fitting will result in leaks. Always use the proper size wrench when tightening the instrument into your system. NEVER attempt to tighten the unit by turning the round housing by hand or other means. This may result in permanent damage to the instrument and will render the warranty void.

Figure 3-1: Always use a wrench
3.2 Front Panel Rotation

To allow for easy reading and operation regardless of the placement of the process connection, the front face panel can be rotated up to 360 degrees with respect to the pressure port. To re-mount the front face panel into the position of your choice:

1) Remove the center screw on the back of the instrument.
2) Remove the front face panel from the case.
3) Rotate the front face panel into the desired position. Take care not to disconnect the sensor ribbon cable from the electronics.
4) Replace the front face panel. Do not crush or crimp the ribbon cable while replacing the front face panel.
5) Carefully replace the rear center screw.

*Figure 3-2: Illustration of Front Face Panel Rotation*
3.3 Power Supply Options

3.3.1 Battery Replacement
Two nine volt alkaline batteries (NEDA 1604) are recommended for the models AKW and AIW. This is a common type of battery which is available at many stores. With two alkaline batteries, the instrument can operate continuously for approximately 3 weeks. **Carbon-zinc batteries (sometimes labeled as “general purpose” or “heavy duty”) should not be used.** Please note that the temperature specifications of the batteries you purchase may not be the same as those of the instrument.

If two batteries are not available, the instrument will operate with only one alkaline battery installed in either clip. However, this will reduce the continuous operation time to approximately one-and-a-half weeks.

The use of two lithium batteries will allow your instrument to operate continuously for over 6 weeks. **Lithium batteries should not be used in a Model AIW as this will violate the intrinsic safety rating.**

To install the batteries:

1) Remove the center screw on the back of the instrument.

2) Remove the front face panel from the case.

3) The colored ribbon cable extending from the sensor to the electronics may be disconnected to make the battery installation more convenient.

4) Replace the batteries one at a time, making sure of the correct polarity.

5) Reconnect the sensor cable to the electronics.
Important note: The brown wire of the sensor cable must be on the right as you face the circuit board, as shown in the figure on page 29. If you connect the sensor cable backwards, the instrument will not operate correctly.

6) Replace the front face panel.

7) Carefully replace the rear center screw.

Note: Calibration and setup values are stored in a nonvolatile memory, and are not lost during battery replacement.

3.3.2 AC Adapter
The wall mount power supply allows the Model AKT to operate from a North American standard 110 VAC, 60 Hz outlet. Connect the plug at the end of the supply’s cord into the socket on the rear of the instrument. An optional European 220VAC, 50Hz wall mount supply is also available. See “Power adapter specification” on page 61.

3.3.3 External Power Supply
The Models AKV, ASE, ASR and ASX operate from an external DC power source. You will need 11 to 32 VDC at 30 mA.

At the rear of the instrument is a gland fitting which secures the power supply wiring. The wiring code is given below:

Table 2: Model AKV and AIV wiring code

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>(+)Supply (11-32 VDC)</td>
</tr>
<tr>
<td>Black</td>
<td>Supply Return</td>
</tr>
</tbody>
</table>

---

page 22   77-01530-00
3.4 Turning the Instrument On and Off

Push the [On/Off] button to turn the instrument on or off.

As the instrument turns on, every segment on the display is momentarily lighted. The high/low data values are cleared.

3.5 Zeroing the Display

Hold the [Zero] button until the display shows “-0-” (about 5 seconds).

The instrument will retain this zero value even after the instrument has been turned off.

3.6 Restoring the Calibrated Zero

To restore the zero, first press and hold the [Clear] button, and while holding <Clear>...

... press the [Zero] button. Hold both buttons until the display shows “-0-”, then release.

The "calibrated zero" is the zero value of the instrument at the time it was last calibrated. Restoring the calibrated zero can be used to "undo" an inadvertent press of the [Zero] button.
3.7 Reading the High/Low Values

The high and low values are updated at the same rate as the tracking value.

Press the [Hi/Lo] button once to read the highest value since the last time the data was cleared.

The word "Hi" and the corresponding value will flash intermittently on the display. This flashing indicates that the instrument is not displaying the "live" tracking value of the process pressure. However, the instrument is still monitoring the process pressure and updating the high and low values.

Press the [Hi/Lo] button a second time to read the lowest value since the last time the data was cleared.

The word "Lo" and the corresponding value will flash intermittently on the display. This flashing indicates that the instrument is not displaying the "live" tracking value of the process pressure. However, the instrument is still monitoring the process pressure and updating the high and low values.

Press the [Hi/Lo] button a third time to return to the "live" tracking mode. The display will show "--" to indicate that the instrument has returned to the "live" tracking mode.

3.8 Clearing the High/Low Values

Press the [Clear] button to erase the high and low data values.

The high and low data values are also cleared when the instrument is turned off.
Chapter 4
CALIBRATION

4.1 Calibration Considerations

In order to obtain optimum performance from the instrument when testing or re-calibrating, DCT Instruments recommends the following:
• Allow a 5-minute warm-up period before testing or calibration.
• The pressure standard you use should be at least 4 times more accurate than the specification of the instrument.

4.2 Required Pressures

In order to re-calibrate the instrument, you must have a precision pressure standard that can produce the zero-scale, half-scale and full-scale pressures for the instrument's range. Examine the table below to determine the three pressures needed to calibrate your instrument. For example, if your instrument has a range of 100 PSIG, your pressure standard must be able to accurately produce pressures of 0 PSI, 50 PSI and 100 PSI.

All instruments are calibrated in PSI regardless of the field-selected engineering units. However, if the instrument displays the word "5PCL" (special) when it powers up, it has been specially calibrated to another engineering unit. In that case, the serial number tag on the top of the instrument will indicate the engineering units that will be used for re-calibration.

To maintain NIST traceability, DCT Instruments can re-calibrate an instrument for you. NIST certificates may be ordered as a separate accessory for a nominal fee.
### Table 3: Required Pressures (all in PSI)

<table>
<thead>
<tr>
<th>Pressure Range</th>
<th>Calibration Point 0 (zero-scale pressure)</th>
<th>Calibration Point 1 (half-scale pressure)</th>
<th>Calibration Point 2 (full-scale pressure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>2.5</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>7.5</td>
<td>15</td>
</tr>
<tr>
<td>30</td>
<td>0</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>50</td>
<td>0</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>100</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>200</td>
<td>0</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>300</td>
<td>0</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>500</td>
<td>0</td>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td>750</td>
<td>0</td>
<td>375</td>
<td>750</td>
</tr>
<tr>
<td>1K</td>
<td>0</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>1.5K</td>
<td>0</td>
<td>750</td>
<td>1500</td>
</tr>
<tr>
<td>2K</td>
<td>0</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>3K</td>
<td>0</td>
<td>1500</td>
<td>3000</td>
</tr>
<tr>
<td>5K</td>
<td>0</td>
<td>2500</td>
<td>5000</td>
</tr>
<tr>
<td>7.5K</td>
<td>0</td>
<td>3750</td>
<td>7500</td>
</tr>
<tr>
<td>10K</td>
<td>0</td>
<td>5000</td>
<td>10000</td>
</tr>
</tbody>
</table>
4.3 Calibration Procedure

Make certain the instrument is turned off.

Open up the instrument by removing the center screw on the back. Next, remove the front panel. Take care not to break the wires extending from the sensor to the electronics. As indicated on page 29, move the mode jumper from the "park" position to the "calibration" position.

Hold the [On/Off] button, then press the [Clear] button. The display will momentarily read "0P-F".

The display will begin to alternately flash between the pressure required for calibration point #0 (for example "000.0" and "- - - -"). If you wish to abandon the calibration procedure, press the [On/Off] button to turn the unit off. Otherwise...

Apply the indicated pressure to the instrument. Press [Clear] until "-P-" is displayed, indicating that the reading is being stored.

Next, the display will begin to alternately flash between the pressure required for calibration point #1 (for example, "050.0") and "- - - -".

Apply the indicated pressure to the instrument. Press [Clear] until "-P-" is displayed, indicating that the reading is being stored.
Finally, the display will begin to alternately flash between the pressure required for calibration point #2 (for example, "100.0" and ",- - - ").

Apply the indicated pressure to the instrument. Press [Clear] until "-P" is displayed, indicating that the reading is being stored.

When the last pressure point has been entered, the instrument will turn itself off. At this time, the mode jumper must be moved from its "calibration" position to its "park" position as indicated page 29. Close the unit up and replace the center screw.

Check that the instrument has been calibrated properly by turning it back on and using the pressure source.
4.4 Rear View of Front Face Panel

Figure 4-1: Front face panel (rear view), showing mode jumper positions and orientation of sensor cable
4.5 Calibration Error Messages

If unexpected pressures are encountered during the calibration procedure, the instrument will alert the user by flashing the word “HELP” and a message number on the display. This indicates that the calibration process cannot continue, and that you must turn the instrument off and re-calibrate again when the error has been corrected. A list of error message numbers and their causes is given in “TROUBLESHOOTING” on page 55.
Chapter 5
OUTPUT SIGNALS

5.1 Output Signal Overview

The “A Series” family of digital pressure test gauges offers the user not only the digital display but also a variety of output signals for use in remote monitoring and data logging applications.

Outputs of 4-20 mA, 0-5 VDC, and dual-limit relays are available as options. Each unit comes completely wired with 3 feet (standard) of cable so that the user can power and use the gauge immediately.
5.2 Specifications

5.2.1 Limit Relay Option

Applicable Models: ASR and ASX

Power Required: 11-32 VDC @ 30 mA max.

Number Of Relays: 2 form “C” (i.e. normally open, common, normally closed). One relay for “high” limit, another for “low” limit.

Connection: Via terminal blocks inside case

Interface: 3 feet of cable with strain relief

Update Rate: same as display

Relay Contact Rating: 1 Amp @ 24 VDC

0.5 Amp @ 48 VDC

Max. switched power: 24W

Max. switched voltage: 60V peak-peak

Limit Setup: Via front panel pushbuttons

Limit Hysteresis: 1% of full scale

Limit Indicators: Front panel LED

"L1" LED is lit when pressure is below the low limit setpoint.

"L2" LED is lit when pressure is above the high limit setpoint.
5.2.2 0-5 VDC Output

Applicable Models: ASE and ASX
Power Required: 11-32 VDC @ 30 mA max.
Output: 0-5 VDC +/- 0.25% of full scale output
Display & Output Zero Adjust: Via front panel pushbuttons
Output Only Zero Adjust: Internal Potentiometer
Output Only Span Adjust: Internal Potentiometer
Operating Temperature: 30 to 160 degrees F
Connection: Via terminal blocks inside case
Interface: 3 feet of cable with strain relief
Update Rate: same as display
Max. Output Current: 0.2 mA
Short Circuit Protection: +Output to -Output
Minimum Output: At least -2.5% of full scale
Maximum Output: At least 102.5% of full scale
Reverse Voltage Protected: Yes
5.2.3 2-wire 4-20 mA Output

Applicable Model: ASB
Supply Voltage: 2-wire loop, 11-32 VDC
负载 dependent, see figure 4-1
Output: 4-20 mA +/- .25% of full scale output
Display & Output Zero Adjust: Via front panel pushbuttons
Output Only Zero Adjust: Internal Potentiometer
Output Only Span Adjust: Internal Potentiometer
Operating Temperature: 30 to 160 degrees F
Connection: Via terminal blocks inside case
Interface: 3 feet of cable with strain relief
Update Rate: same as display
Minimum Output: At least -2.5% of full scale
Maximum Output: At least 102.5% of full scale
Reverse Voltage Protected: Yes

Figure 5-1: Load/power curve for 4-20 mA output
5.3 Wiring Codes And Schematics

5.3.1 Wiring To The Terminal Blocks
Although each digital pressure gauge comes completely wired with 3 feet of cable, it may be desired to remove the cable and directly wire to the terminal blocks on the analog circuit board.

A small flat-blade screwdriver should be used to press the orange opening lever on the terminal blocks when installing or removing wires. To achieve a reliable connection, use either fine stranded or solid stranded wire size 0.5mm² or 20 AWG.

The wire **must** be stripped as shown in the “Wire stripping diagram” below.

![Diagram](image)

Figure 5-2: Wire stripping diagram
5.3.2 Limit Option

*Figure 5-3: Wiring code for limit option*

5.3.3 0-5 VDC Output Option

*Figure 5-4: Wiring code for 0-5 VDC output option*
5.3.4  0-5 VDC Output And Limit Relay Option

Figure 5-5: Wiring code for 0-5 VDC output and relay option

5.3.5  4-20 mA Output Option

Figure 5-6: Wiring code for 4-20 mA output option
5.4 Explanation Of Limits

Limits allow the instrument to signal both the operator (via the front panel indicators) and other equipment (via the contact relays) that the pressure is within or outside of a specified range. Limit 1 is a “low limit” and Limit 2 is a “high limit.”

If the pressure applied to the instrument is less than the setpoint entered for Limit 1, the limit will turn “on.” That is,
• the LED indicator on the front panel will illuminate,
• the normally open relay terminal for Limit 1 (L1-NO) will be connected to its common terminal (L1-COM), and
• the normally closed relay terminal (L1-NC) will no longer be connected to its common terminal (L1-COM).

When the pressure rises above the Limit 1 setpoint plus 1% of the range of the instrument, the limit will turn “off.” When Limit 1 is turned “off,”
• the LED indicator on the front panel will not be lighted,
• the normally open relay terminal for Limit 1 (L1-NO) will not be connected to its common terminal (L1-COM), and
• the normally closed relay terminal (L1-NC) will be connected to its common terminal (L1-COM).

The 1% specification given above is the “hysteresis” or “deadband” of the J Series instrument limits. Hysteresis prevents the limits from chattering on and off when the pressure is slowly moving through the limit setpoint. For example, if the low limit setpoint is 100 PSI and the range of the instrument is 500 PSI, then Limit 1 will turn on when the pressure drops below 100 PSI and Limit 1 will turn off when the pressure rises above 105 PSI.
Correspondingly, Limit 2 (the “high” limit) will turn “on” when the pressure rises above its setpoint, and turns “off” when the pressure falls below the setpoint minus 1% of the range of the instrument. For example, if the high limit setpoint is 2000 PSI and the range of the instrument is 3000 PSI, the Limit 2 will turn on when the pressure rises above 2000 PSI and Limit 2 will turn off when the pressure drops below 1970 PSI.

5.5 Entering The Limit Setpoints

To change the limit setpoints with the Setup Menu, see “FIELD SELECTABLE FEATURES” on page 43.
5.6 Trimming Of Analog Outputs

Occasionally, the instrument's analog output signal (4-20 mA or 0-5 VDC) may need to be adjusted. The following sequence should be followed by anyone wishing to trim their analog output. The front display of the instrument should be calibrated (see “CALIBRATION” on page 25) before attempting to adjust the analog output. A calibrated standard is required to calibrate the front display, but no pressure source is needed to adjust the analog output.

1. Remove the center screw from the rear of the unit and gently remove the electronics from the housing. Apply power via the integral cable and run to an appropriate instrument.

2. FORCE ZERO - Select the Analog Output Zero Scale ("R-LO") menu item by following the directions in “FIELD SELECTABLE FEATURES” on page 43. When the display says “DONE”, the microprocessor has forced the analog output to 0 VDC or 4 mA.

3. TRIM ZERO - Use the zero potentiometer to trim the analog output zero reading (0 VDC or 4 mA).

4. FORCE SPAN - Select the Analog Output Full Scale ("R-HI") menu item by following the directions in “FIELD SELECTABLE FEATURES” on page 43. When the display says “DONE”, the microprocessor has forced the analog output to 5 VDC or 20 mA.

5. TRIM SPAN - Use the span potentiometer to trim the analog output full scale reading (5 VDC or 20 mA).

6. Repeat steps 2 through 5 until the zero and span readings are trimmed.

7. Turn the unit off, then turn the power supply off and disconnect the “+SUPPLY” of the instrument from the power supply.

8. Insert the electronics back into the housing of the instrument and
install the screw into the rear of the device.

9. Connect power supply back to the instrument and apply power to verify operation.

10. Trimming of the analog output is now complete.

Figure 5-7: Analog circuit board trimming diagram
Chapter 6
FIELD SELECTABLE FEATURES

6.1 Introduction

This Chapter discusses the field selectable features available on the “A Series” Digital Pressure Gauge. These features can be activated, deactivated and modified via the Setup Menu accessed by the front panel.

These field selectable features include:
• Setting the low limit setpoint
• Setting the high limit setpoint
• Enabling the automatic power off feature to conserve battery life
• Disabling the front panel buttons
• Changing the engineering units used by the display
• Adjusting the automatic power-off time
• Changing the update rate
• Forcing the analog output to 0 Volts or 4 mA
• Forcing the analog output to 5 Volts or 20 mA
• Displaying the program version
6.2 Setup Menu Operation

All of the field selectable features are accessed via the Setup Menu.
This section discusses its operation.

To change a feature with the Setup Menu:

Make sure the instrument is turned off.
Press the [On/Off] button

While unit is checking the display (lighting all LCD segments simultaneously) press and hold down the [Zero] button.

The display now reads "L-LO", which is the first item of the Setup Menu.
Release the [Zero] button.

Pressing and releasing the [Zero] button will scroll down through the available Setup Menu items.

The table below provides a list of the items available in the Setup Menu and a brief description of each.
Table 4: Setup Menu Items

<table>
<thead>
<tr>
<th>Display</th>
<th>Menu Item</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-LD</td>
<td>Low Limit setpoint</td>
<td>Change low limit setpoint</td>
</tr>
<tr>
<td>L-HI</td>
<td>High Limit setpoint</td>
<td>Change high limit setpoint</td>
</tr>
<tr>
<td>EO</td>
<td>Enable Options</td>
<td>Enable Auto-Off feature; Disable front panel buttons</td>
</tr>
<tr>
<td>UNIT</td>
<td>Engineering units</td>
<td>Change engineering units used to display pressure</td>
</tr>
<tr>
<td>A-POFF</td>
<td>Auto-off time</td>
<td>Change Auto-Off power down time</td>
</tr>
<tr>
<td>A-RATE</td>
<td>Update Rate</td>
<td>Change the update rate of pressure readings</td>
</tr>
<tr>
<td>A-LQ</td>
<td>Analog Output Zero Scale</td>
<td>Force analog output to 0 Volts or 4 mA</td>
</tr>
<tr>
<td>A-HI</td>
<td>Analog Output Full Scale</td>
<td>Force analog output to 5 Volts or 20 mA</td>
</tr>
<tr>
<td>VER</td>
<td>Firmware version</td>
<td>Display internal firmware part number and revision</td>
</tr>
</tbody>
</table>

When the menu item you wish to change is displayed, press [Clear].

The display now shows the present setting of that menu item. If you only wish to examine the present setting of the menu item, you can use the [On/Off] button to turn the instrument off. Otherwise...
Use the [Hi/Lo] and [Clear] buttons to scroll up and down, respectively. Hold a button down to change limit setpoints at a faster rate.

If you wish to abandon the changes you made to this setting, you can use the [On/Off] button to turn the instrument off. Otherwise...

Once the setting you want is displayed, press the [Zero] button to store this setting into memory.

After the instrument stores the setting into memory, the next menu item will be displayed.
6.3 Low Limit Setpoint ("L-L") Menu Item

The Low Limit Setpoint ("L-L") menu item determines the pressure reading below which Limit 1 will turn "on".

This value is displayed and modified in the user-selected engineering units specified in the Engineering Units ("UNIT") menu item. If the Engineering Units ("UNIT") menu item is changed, the value stored in the Low Limit Setpoint ("L-L") menu item will automatically convert the new engineering units.

For more information on limit operation, see “Explanation Of Limits” on page 38.

6.4 High Limit Setpoint ("L-Hf") Menu Item

The High Limit Setpoint ("L-Hf") menu item determines the pressure reading above which Limit 2 will turn "on".

This value is displayed and modified in the user-selected engineering units specified in the Engineering Units ("UNIT") menu item. If the Engineering Units ("UNIT") menu item is changed, the value stored in the High Limit Setpoint ("L-Hf") menu item will automatically convert the new engineering units.

For more information on limit operation, see “Explanation Of Limits” on page 38.
6.5 Enable Options ("ED") Description

The Enable Options ("ED") menu item controls the features described in the sub-sections below.

6.5.1 Auto-off Feature
The instrument will shut itself off if no buttons are pressed for the time duration specified with the Auto-off time ("ROFF") menu item. The unit can also be shut off with the [On/Off] button.

This feature is useful for conserving battery life.

6.5.2 Always-On Feature
The [On/Off] button is disabled and will not shut the unit off. This mode is used so that the high and low capture values, output signals, or limit alarms are not interrupted if an operator tries to shut the unit off during testing or monitoring.

6.5.3 [Zero] Button Disable Feature
This feature disables the ability to zero the display of the instrument. The ability to restore the calibrated zero is also disabled. When the [Zero] button is pressed, the display momentarily reads "-ED:" which indicates that the button has been disabled via the Enable Options menu item.

6.5.4 [Hi/Lo] Button Disable Feature
This feature disables the ability to read the stored high and low values on the display. The display will always read the "live" tracking value of the process pressure. When the [Hi/Lo] button is pressed, the display
will momentarily read "-EO:" which indicates that the button has been dis-
abled via the Enable Options menu item.

![On/Off, Zero, Clear buttons]

### 6.5.5 [Clear] Button Disable Feature
This feature disables the ability to clear the high and low data values with the [Clear] button. The ability to restore the calibrated zero is also disabled. When the [Clear] button is pressed, the display momentarily reads "-EO:" which indicates that the button has been disabled via the Enable Options menu item. **NOTE:** The high and low data values may also be cleared by turning the unit off and back on, unless the Always-on feature is used.
6.6 Enable Options ("EO") Menu Item

To activate or deactivate the features described in the previous section, the setting of the Enable Options ("EO") menu item must be changed. The procedure to change the setting of a menu item is described in the "Setup Menu Operation" section earlier in this Chapter.

The setting value of the Enable Options ("EO") menu item is obtained by adding together the values of the desired options according to the table below.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Disabled</th>
<th>Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto-off</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Always-on</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>[Zero] button</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>[Clear] button</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>[Hi/Lo] button</td>
<td>32</td>
<td>0</td>
</tr>
</tbody>
</table>

For example, to enable the Auto-off feature and disable the [Zero] button enter a setting value of "0005". As another example, to disable both the [Zero] and the [Clear] buttons enter a setting value of "0020".

If the Auto-off and Always-on features are both activated, the unit will behave as follows: The [On/Off] button can turn the instrument on but it cannot turn the instrument off. The only way to turn the instrument off is not to press any buttons for 1 hour.
6.7 Engineering Units ("UNIT") Menu Item

The Engineering Units ("UNIT") menu item determines which units-of-measure are used to display the pressure readings and change the limit setpoints. Most instruments are calibrated in PSI and the instrument has conversion factors for many standard engineering units built in. The procedure to change the setting of a menu item is described in the "Setup Menu Operation" section earlier in this Chapter.

**Note:** If the instrument displays "SPCL" (special) when powering up, it has been specially calibrated to another engineering unit. The ability to change the engineering units is not available.

The tables below gives a list of the engineering units built into the instrument. Instruments that use the "G" (gage), "A" (absolute), "C" (compound) and "D" (differential) reference will use the first table. Instruments sold with the "M" pressure reference will use the second.
Table 6: Engineering Units ("UNIT") Available Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Engineering Unit / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADC</td>
<td>for factory use only</td>
</tr>
<tr>
<td>PSI</td>
<td>PSI</td>
</tr>
<tr>
<td>BAR</td>
<td>bar</td>
</tr>
<tr>
<td>MBAR</td>
<td>mbar</td>
</tr>
<tr>
<td>TORR</td>
<td>torr</td>
</tr>
<tr>
<td>&quot;H2O</td>
<td>inH2O</td>
</tr>
<tr>
<td>'H2O</td>
<td>ftH2O</td>
</tr>
<tr>
<td>'Hg</td>
<td>inHg</td>
</tr>
<tr>
<td>MMHG</td>
<td>mmHg</td>
</tr>
<tr>
<td>KPA</td>
<td>kPa</td>
</tr>
<tr>
<td>MPA</td>
<td>MPa</td>
</tr>
<tr>
<td>MMH2</td>
<td>mmH2O</td>
</tr>
<tr>
<td>MH2O</td>
<td>mH2O</td>
</tr>
</tbody>
</table>

Table 7: Available Units for "M" Pressure Reference

<table>
<thead>
<tr>
<th>Setting</th>
<th>Engineering Unit / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADC</td>
<td>for factory use only</td>
</tr>
<tr>
<td>PSI</td>
<td>PSI</td>
</tr>
<tr>
<td>DUAL</td>
<td>inHg (&lt;0 PSI) or PSI (≥0 PSI)</td>
</tr>
</tbody>
</table>
6.8 Auto-off Time ("OFF") Menu Item

The Auto-off time ("OFF") menu item is only meaningful if the auto-off feature is enabled in the Enable Options ("Ed") menu item. The procedure to change the setting of a menu item is described in the "Setup Menu Operation" section earlier in this chapter.

The table below gives a list of the available settings for the Auto-off time ("OFF").

<table>
<thead>
<tr>
<th>Setting</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4 minutes</td>
</tr>
<tr>
<td>1</td>
<td>1 hour</td>
</tr>
<tr>
<td>2</td>
<td>2 hours</td>
</tr>
<tr>
<td>3</td>
<td>3 hours</td>
</tr>
<tr>
<td>4</td>
<td>4 hours</td>
</tr>
<tr>
<td>5</td>
<td>5 hours</td>
</tr>
<tr>
<td>6</td>
<td>6 hours</td>
</tr>
<tr>
<td>7</td>
<td>7 hours</td>
</tr>
<tr>
<td>8</td>
<td>8 hours</td>
</tr>
</tbody>
</table>

6.9 Update Rate ("Rate") Menu Item

The Update Rate ("Rate") menu item determines the number of times the pressure readings are updated per second. The track, high and low values are all updated at this rate. The update rate can be varied from 2 to 10 updates per second. As shipped from the factory, the update rate is set to 3 per second.
6.10 Analog Output Zero Scale ("R-LO") Menu Item

The Analog Output Zero Scale ("R-LO") menu item forces the analog output to either 0 Volts or 4 mA, then displays “DONE” on the display.

For more information on trimming the analog output, see “Trimming Of Analog Outputs” on page 40.

6.11 Analog Output Full Scale ("R-HF") Menu Item

The Analog Output Full Scale ("R-HF") menu item forces the analog output to either 5 Volts or 20 mA, then displays “DONE” on the display.

For more information on trimming the analog output, see “Trimming Of Analog Outputs” on page 40.

6.12 Internal Firmware Version ("VER") Menu Item

The Internal Firmware Version ("VER") menu item displays the part number and version number of instrument’s operating program. The firmware part number and version number are of the form:

084-1087-01 1.00

Where the “084-1087-01” is the part number, and the “1.00” is the version number.

Since this information is too long to fit on the 4½-digit display, pressing either the [Hi/Lo] or [Clear] buttons will scroll through this information 4 characters at a time.
Chapter 7
TROUBLESHOOTING

7.1 Introduction

This chapter provides information on correcting common problems that may be encountered operating and calibrating the instrument.

7.2 Help Message Codes

If the instrument detects a problem during its power-on self-test, operation, or calibration, it will alert the user by flashing the word "HELP" and an error message code number on the display. The instrument cannot continue operation and you must turn the instrument off and correct the error.

- "HELP 01": Calibration error.
  Analog to digital converter overrange.
  One of the pressure points is above the calibration range of the instrument. Or, the sensor cable is not connected properly.

- "HELP 02": Calibration error.
  Analog to digital converter underrange.
  One of the pressure points is below the calibration range of the instrument. Or, the sensor cable is not connected properly.

- "HELP 04": Calibration error.
  The applied pressures at any two calibration points did not differ enough.

- "HELP 23": Self-test error.
  The engineering unit conversion that you selected cannot be rendered on a 4½-digit display. For example, consider the case of an instrument with a range of 10000 PSI. If you were to select mbar in the Engineering Units ("UNIT") menu item the instrument would signal this error. This is because 10000 PSI equals 689475 mbar.
which cannot be shown on a 4½-digit display.

- "HELP 27": Non-volatile memory write error.
- "HELP 28": Non-volatile memory read error.
- "HELP 29": Non-volatile memory verify error.
- "HELP 39": Non-volatile memory version mismatch.
- "HELP 40": Analog-to-digital converter not ready.

Turn the instrument off and on again. If these problems persist, contact DCT Instruments.

### 7.3 Troubleshooting Hints

- Verify that the power source is operating correctly. Make sure the batteries are fresh or that the external supply is wired correctly.
- Verify that the sensor cable is connected correctly. The correct orientation of the sensor cable is shown on page 29.
- The sensor and the electronics are a matched set. Do not, under any circumstances, exchange sensor and electronics on two different instruments.
- The [Zero] button must be held down for 5 seconds before the display will be zeroed. This is in order to prevent unintentional zeroing of the display.
- If "EO" is displayed when a button is pressed, this indicates that the button has been disabled with the Enable Options ("EO") menu item. See "Enable Options ("EO") Description" on page 48 for more information.
Chapter 8
INTRINSIC SAFETY

8.1 Overview

The Model AIW Digital Pressure Gauge is the intrinsically safe version of the standard “A Series” instrument. They have been approved by Factory Mutual Research Corporation and the Canadian Standards Association; both are nationally recognized testing laboratories. The AIW instruments are rated Intrinsically Safe for hazardous outdoor locations when installed in accordance with the installation drawings given in this chapter. Additional copies are available upon request.

Intrinsic Safety limits electrical energy passed into a hazardous area in order to prevent ignition.

8.2 Batteries

Only 9 volt alkaline batteries may be used in the AIW Digital Pressure Gauge. Do not use lithium batteries as this will invalidate the approved intrinsic safety.

WARNING: To prevent ignition of a hazardous atmosphere, batteries must be only be changed in an area known to be non-hazardous.

CAUTION: The specific batteries that may be used for CSA approval are indicated on the CSA installation drawing.
Figure 8.2: CSA Approval Installation Drawing

---

**NON-HAZARDOUS LOCATION**

(NO EQUIPMENT IN NON-HAZARDOUS AREA)

WARNING: TO PREVENT IGNITION OF A HAZARDOUS ATMOSPHERE, BATTERIES MUST ONLY BE CHANGED IN AN AREA KNOWN TO BE NON-HAZARDOUS.

CAUTION: THE FOLLOWING BATTERIES MAY BE USED:
EVEREADY 522
DURACELL MN1504

---

**HAZARDOUS LOCATION**

CONTROL DRAWING -- 001-1060-00 (TEXT 1 OF 1)

PRESSURE GAUGE MODELS AHM & FWM
RATED INTRINSICALLY SAFE
CLASS I, DIVISION 2, GROUP A, B, C, D
CLASS II, DIVISION 2, GROUP E, F, G

FIELD WIRING PARAMETERS
NONE

---

CSA CONTROLLED DRAWING
DO NOT REUSE WITHOUT PRIOR APPROVAL OF CANADIAN STANDARDS ASSOCIATION
Chapter 9  
POWER ADAPTER SPECIFICATION

Figure 9-1: Power adapter specification
INDEX

A
AC adapter 22, 61
accessories 18, 61
R-HI menu item 54
R-LO menu item 54
always-on feature 48
analog output
force to span 54
force to zero 54
trimming 40
R-OFF menu item 53
auto-off feature 48, 53
display 10
display increments 11

E
EO menu item 48, 50
engineering units 10, 51

F
FM Approval 57

G
going started 7

H
HELP message codes 55
Hi/Lo button 24, 48
installation 7, 19
intrinsic safety 57

J
jumpers 29

L
L-HI menu item 47
limits
explained 38
wiring 36, 37
L-LO menu item 47

M
menu 44

N
NIST
certificate 18
traceability 25
NRTL/C Approval 57

O
On/Off button 23
overpressure 12

P
power supply 22
pressure port threads 11, 19

Q
quick-start guide 7

R
R RATE menu item 53
rotation of front panel 20

S
scaling 10, 51
setup menu 44
specifications

0-5 VDC output option 33
4-20 mA output options 34
AC adapter 61
general 16
limit relay output option 32
speed 53
stripping wires 35

T
terminal blocks 35
troubleshooting 55

U
UNIT menu item 51
update rate 53

V
VER menu item 54

W
warranty 65
wiring
0-5 VDC and limit 37
0-5 VDC option 36
4-20 mA option 37
limit option 36
terminal blocks 35

Z
Zero button 23
WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell’s standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. The foregoing is buyer’s sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing, contact your local sales office or:

E-mail: service@honeywell.com

Internet: www.honeywell.com/sensotec

Phone and Fax:

Tel: 614-850-5000
Fax: 614-850-1111

Automation and Control Solutions
Sensing and Control
Honeywell
Sensotec Sensors
2080 Arlingate Lane
Columbus, OH 43228
www.honeywell.com/sensotec

Printed in USA
September 2006
Copyright © 2006 Honeywell International Inc. All rights reserved.