



**UDC2800 Universal Digital Controller**  
**Limit Control Model**  
**Release 110.3**

**Product Manual**

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# ABOUT THIS GUIDE

## Abstract

This document provides descriptions and procedures for the Installation, Configuration, Operation, and Troubleshooting of your controller.

## Revision history

| Revision | Date          | Document ID  | Description                      |
|----------|---------------|--------------|----------------------------------|
| 1.0      | December 2022 | 51-52-25-165 | Initial release of this document |

## Special Terms

The following table lists those symbols used in this document to denote certain conditions.

| Symbol | Definition                      |
|--------|---------------------------------|
| PIE    | Process Instrument Explorer     |
| PV     | Process Variable                |
| RTD    | Resistance Temperature Detector |
| SP     | Setpoint                        |
| SPDT   | Single-Pole Double-Throw        |
| SPDT   | Single-Pole Single-Throw        |
| TC     | Thermocouple                    |
| TFT    | Thin Film Transistor            |
| UDC    | Universal Digital Controller    |

## References

The following list identifies all documents that may be sources of reference for material discussed in this publication.

- How to Apply Digital Instrumentation in Severe Electrical Noise Environments: 51-52-05-01

# INTRODUCTION

## What's in this section?

The following topics are covered in this section.

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In this section:

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# Overview

## Function

UDC2800 Limit Controllers accept input signals from any of several types of external sensors such as Thermocouples (T/Cs) and Resistance Temperature Detectors (RTDs). It conditions these signals, as necessary, to derive the equivalent Process Variable (PV) value that drives various circuits in the controller.

The equivalent PV signal is compared with the Limit control set point and any error signal from the differential amplifier de-energizes the coil of an electromechanical, single-pole, dual-throw (SPDT) limit output relay.

When de-energized, the output relay “Locks Out” and remains that way until the PV input signal drops below the High Limit Set Point or goes above the Low Limit Set Point and the controller is reset manually via the keyboard or from a remote location (Contact Input Option).

The contact of the output relay terminates at the rear terminal of the controller to which you make the appropriate field wiring connections.

A flashing “LIMIT” in the lower display indicates that the output relay is de-energized.

## Features

- 90 – 264 Vac or 24 Vac/dc Power Supply
- Input/Output Isolation
- Isolated Auxiliary Current Output / Digital Input
- Modbus® RS-485 or Ethernet TCP/IP Communications

## High Limit Controller

When the PV input signal is below the limit set point, the output relay energizes. If the PV signal exceeds the limit set point, the output relay de-energizes and the flashing “LIMIT” display is turned on.

When the PV signal returns to a value below the limit set point, the controller can be reset manually using the RESET key or Contact Input Option.

## **Low Limit Controller**

When the PV input signal is above the limit set point, the output relay energizes. If the PV signal falls below the limit set point, the output relay de-energizes and the flashing “LIMIT” display is turned on.

When the PV signal returns to a value above the limit set point, the controller can be reset manually using the RESET key or Contact Input Option.

## **Easy to read displays**

The dedicated vacuum fluorescent displays with multi-language prompts make the operator interface easy to read, understand and operate. Programmed sequences of displays assure quick and accurate entry of all configurable parameters.

## **Easy to operate**

Simple keystrokes let you select input and range configuration, set the operating parameters that meet you process control needs now, and change them later to meet new ones.

## **Mount anywhere**

This instrument is intended for industrial control applications. It must be panel mounted with the wiring terminals enclosed within the panel. The instrument is environmentally hardened and, when suitably enclosed, can be mounted anywhere in plant or factory, on the wall, or even on the process machine itself. The front face is NEMA3 and IP55 rated and can be easily upgraded to NEMA4X and IP66 for the most severe hose-down applications. It withstands ambient temperatures up to 55°C (133°F) and resists the effects of vibration and shock.

# Operator Interface

## Function of Displays

Figure 2-1: Function of Displays

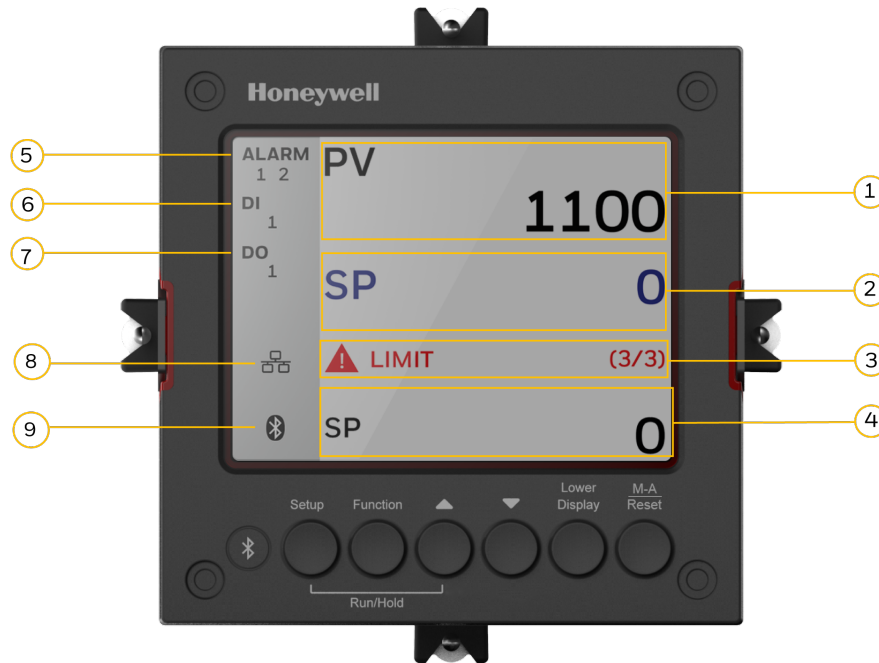




Table 2-1: Function of Displays

| Item | Description  |
|------|--|
| 1    | Upper display shows Process Variable value (maximum 10 digits including decimal point, eg. -XXXX.X). Its unit can be F, C or none.   |
| 2    | Middle display shows working Setpoint and its value (maximum 10 digits including decimal point, eg. -XXXX.X).<br>SP = Limit Setpoint   |
| 3    | Diagnostics display shows diagnostic messages. See Diagnostic Messages for more information.   |
| 4    | Lower display shows key-selected operating parameters such as Setpoints, Input percentage, and Auxiliary output.<br>See Viewing the operating parameters for more information. |

| Item | Description  |
|------|--|
| 5    | Alarm 1 and/or Alarm 2 annunciations.  |
| 6    | Digital Input 1 annunciations.   |
| 7    | Control Relay 1 annunciations.   |
| 8    | <p>Modbus, or Ethernet communication status annunciation.</p> <p>Modbus: </p> <p>Ethernet: </p> <p>Grey: The function is disabled.</p> <p>White: The function is enabled, but the connection is not established.</p> <p>Blinking: The function is enabled, and the connection is established.</p> <p>Red: The function has errors.</p> <p>No icon: No communication board inserted, or the inserted board does not have communication feature.</p> |
| 9    | <p>Bluetooth communication status annunciation.</p> <p>Grey: The function is disabled.</p> <p>White: The function is enabled, but the connection is not established.</p> <p>Blue: The function is enabled, and the connection is established.</p> <p>Blinking: The function is enabled, and the connection is established, and the controller is communicating with a mobile device.</p> <p>Red: The function has errors.</p>  |

## Function of Keys

Figure 2-2: Function of Keys

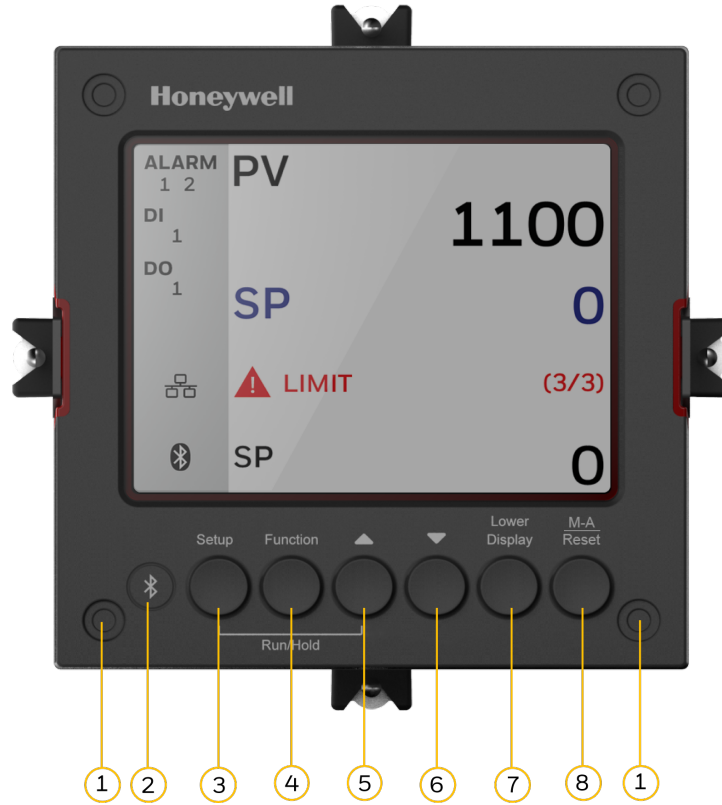


Table 2-2: Function of Keys

| Item | Description  |
|------|--|
| 1    | NEMA4X and IP66 screw attachment (each corner).  |
| 2    | Bluetooth transmitter<br><br>Enables to configure and operate controllers from mobility devices (mobile phones and tablet PCs), and download/upload the complete device configuration.   |
| 3    | Setup key<br><br><ul style="list-style-type: none"> <li>• When in the main screen, press it to enter in the setup screen.</li> <li>• When in the setup screen, it is used to scrolls through the configuration set up groups.</li> </ul> |



| Item     | Description   |
|----------|---|
| 4        | <p>Function key</p> <p>Selects functions within each configuration group.</p> <ul style="list-style-type: none"> <li>• When in the setup screen. The first press will set the focus to the Function Group, and the subsequent presses used to navigate between Function Group and Option Group.</li> <li>• When in the setup screen and the focus in on the Option Group, press it to leave the focus from the Option Group, and immediately save the changes user made on the Option Group.</li> </ul>                       |
| 5        | <p>Increment key</p> <p>Increases setpoint or output value. Increases the configuration values or changes functions in Configuration mode groups.</p>   |
| 6        | <p>Decrement key</p> <p>Decreases setpoint or output value. Decreases the configuration values or changes functions in Configuration mode groups.</p>   |
| 7        | <p>Lower Display key</p> <p>Returns Controller to normal display from the setup screen. Toggles various operating parameters for display.</p> <ul style="list-style-type: none"> <li>• When in the main screen, the first press of Lower Display key will set the focus to the Lower Display area of the main screen. The subsequent presses will select the next item from the Lower Display choices list.</li> <li>• When in the setup screen, press it to leave the setup screen and return to the main screen.</li> </ul> |
| 8        | <p>M-A/Reset Key</p> <p><b>MAN-AUTO:</b> This function is not available on the Limit controller.</p> <p><b>RESET:</b> Reset the Limit Relay.</p>  |
| 3+4      | <p>When in the main screen, press this combination will enter the display and keypad self-testing mode.</p>   |
| Run/Hold | <ul style="list-style-type: none"> <li>• Acknowledges a latched alarm 1.</li> </ul>   |
| 5+6      | <p>When editing numerical values in main or setup screen, holding both</p>  |

| Item | Description  |
|------|--|
|      | Increment and Decrement keys will cause the current editable digit move one step left. |

**NOTE:** The default password for the UDC device is 1234. It is recommended to change the password after the first login.

## Mobile Device App

The controller can be configured via a Honeywell EasySet. Honeywell EasySet is running on a Mobile Device,

The following communication types are available on UDC2800 Limit Controller.

- Bluetooth (Standard / App)  
See Configuration Tool via Bluetooth for more information.
- RS485 (Optional / Software)  
See Modbus Read, Write and Override Parameters plus Exception Codes for more information.
- Ethernet (Optional / Software)  
See Modbus Read, Write and Override Parameters plus Exception Codes for more information.

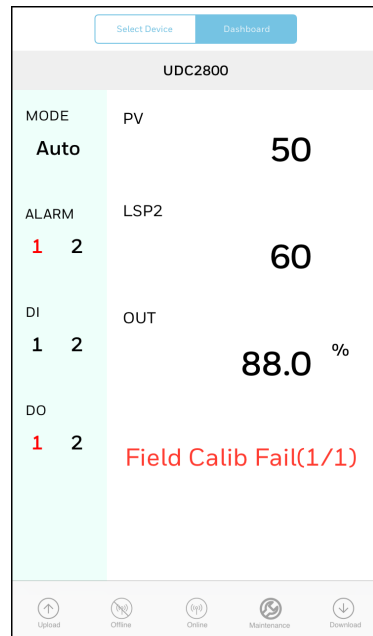
**NOTE:** For FM models, Ethernet & 485 communication for the modbus is read only.

## Configuration Tool via Bluetooth

### Overview

This configuration tool (Honeywell EasySet) lets you configure your instrument on a Mobile Device via Bluetooth. It is available to detect and connect controllers within 3 meters. This app can be installed on IOS 12.0 or higher operating system. See Configuration via Honeywell EasySet for more information.

*Figure 2-3: Screen capture of Honeywell EasySet running on a Mobile Device*



### Features

- Create configurations with the application (Honeywell EasySet) running on a Mobile Device.
- Create / edit configurations online or offline and download to controller later.
- This software is available in English.

## Bluetooth communications

The Bluetooth connection provides a non-intrusive wireless connection with the instrument and maintains NEMA4X and IP66 integrity.

No need to get access to the back of the controller to communicate with the instrument, no need to take your screwdriver to wire the communication cable, no wiring mistake possible. You can now duplicate an instrument's configuration upload, or download a new configuration in a matter of seconds, just by connecting your mobile device to instrument through Bluetooth.

**Connect & Upload:** It takes less than 2 seconds to upload configuration from an instrument. You can then save the configuration file onto your mobile device for review modification, or archiving.

Furthermore, the software and app also give you important maintenance information on the controller: instantly, get information on the current operating parameters, digital inputs, and alarm status, identify internal or analog input problems.

**Questions:** What if I have several controllers on the same panel? How can I be sure I am communicating with the correct one?

**Answer:** The UDC device's **Bluetooth ID** appears in the communications group on the controller screen, each controller is assigned with different Bluetooth ID's, user can identify same Bluetooth ID in the menu under the device list and connect to the controller.

## CE Conformity (Europe)

This product is in conformity with the protection requirements of the following European Council Directives: 2014/35/EU, the Low Voltage Directive, and 2014/30/EU, the EMC Directive. Conformity of this product with any other "CE Mark" Directive(s) shall not be assumed.

**Product Classification:** Class I: Permanently connected, panel-mounted Industrial Control Equipment with protective earthing (grounding) (EN61010-1).

**Enclosure Rating:** This controller must be panel-mounted with the rear terminals enclosed within the panel. The front panel of the controller is rated at NEMA4X and IP66 when properly installed.

**Installation Category (Overvoltage Category):** Category II (EN61010-1)

Pollution Degree: Pollution Degree 2: Normally non-conductive pollution with occasional conductivity caused by condensation. (Ref. IEC 60664-1)

EMC Classification: Group 1, Class A, ISM Equipment (EN61326-1, emissions), Industrial Equipment (EN61326-1, immunity)

Method of EMC Assessment: Technical File (TF)

Declaration of Conformity: 51453655

Deviation from the installation conditions specified in this manual, and the special conditions for CE conformity in Subsection Installation, may invalidate this product's conformity with the Low Voltage and EMC Directives.

**ATTENTION:** The emission limits of EN61326-1 are designed to provide reasonable protection against harmful interference when this equipment is operated in an industrial environment. Operation of this equipment in a residential area may cause harmful interference. This equipment generates, uses, and can radiate radio frequency energy and may cause interference to radio and television reception when the equipment is used closer than 30 meters (98 feet) to the antenna(e). In special cases, when highly susceptible apparatus is used in close proximity, the user may have to employ additional mitigating measures to further reduce the electromagnetic emissions of this equipment.

**WARNING:** If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

## North America

*Installation Category (Overvoltage Category): Category II (EN61010-1)*

Pollution Degree: Pollution Degree 2: Normally non-conductive pollution with occasional conductivity caused by condensation. (Ref. IEC 60664-1)

**WARNING:** If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

# FCC

**Radio Compliance information:** Federal Communications Commission (FCC) contains FCC ID: 2AVFQ-MCUDISP Industry Canada (IC) contains IC: 25762-MCUDISP.

This device complies with Part 15 of the FCC Rules / Innovation, Science and Economic Development Canada's license-exempt RSS (s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé 2 pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

# INSTALLATION

## What's in this section?

The following topics are covered in this section.

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In this section:

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# Overview

## Introduction

Installation of the UDC2800 Limit Controller consists of mounting and wiring the controller according to the instructions given in this section. Read the pre-installation information, check the model number interpretation (Subsection Model Number Interpretation), and become familiar with your model selections, then proceed with installation.

## Pre-installation Information

If the controller has not been removed from its shipping carton, inspect the carton for damage then remove the controller.

- Inspect the unit for any obvious shipping damage and report any damage due to transit to the carrier.
- Make sure a bag containing mounting hardware is included in the carton with the controller.
- Check that the model number shown on the inside of the case agrees with what you have ordered.

# Condensed Specifications

Honeywell recommends that you review and adhere to the operating limits listed in the table below when you install your controller.

*Table 3-1: Condensed Specifications*

| Items        | Specifications   |
|--------------|--|
| Analog Input | <p><b>Accuracy:</b></p> <p>± 0.15% of full scale typical (± 1 digit for display)</p> <p>Can be field calibrated to ± 0.05% of full scale typical</p> <p>16-bit resolution typical</p> <p><b>Sampling Rate:</b> Input is sampled six times per second</p> <p><b>Temperature Stability:</b> ± 0.01% of Full-Scale span / °C change—typical</p> |

| Items                                       | Specifications  |
|---|---|
|   | <p><b>Input Impedance:</b></p> <p>4-20 Milliampere Input: 250 ohms</p> <p>0-10 Volt Input: 200K ohms</p> <p>All Others: 10 megohms</p> <p><b>Maximum Lead Wire Resistance:</b></p> <p>Thermocouples: 50 ohms/leg</p> <p>100 ohm, 200 ohm and 500 ohm RTD: 100 ohms/leg</p> <p>100 ohm Low RTD: 10 ohms/leg</p>  |
| Analog Input<br>Signal Failure<br>Operation | <p><b>Burnout Selections:</b> Upscale, Downscale</p> <p><b>Thermocouple Health:</b> Good, Failing(warning), Failure Imminent or Failed</p> <p><b>Failsafe Output Level:</b> Configurable 0-100% of Output range</p>   |
| Stray Rejection                             | <p><b>Common Mode</b></p> <p><i>AC (50 or 60 Hz):</i> 120 dB (with maximum source impedance of 100 ohms) or <math>\pm 1</math> LSB (least significant bit) whichever is greater with line voltage applied.</p> <p><i>DC:</i> 120 dB (with maximum source impedance of 100 ohms) or a <math>\pm 1</math> LSB whichever is greater with 120 Vdc applied.</p> <p><i>DC (to 1 KHz):</i> 80 dB (with maximum source of impedance of 100 ohms) or <math>\pm 1</math> LSB whichever is greater with 50 Vac applied.</p> <p><b>Normal Mode</b></p> <p><i>AC (50 or 60 Hz):</i> 60 dB (with 100 % span peak-to-peak maximum)</p> |
| Digital Input (One)<br>(Optional)           | <p>+30 Vdc source for external dry contacts or isolated solid state contacts. Digital Input is isolated from line power, earth ground, analog input, and all outputs except for the Second Current Output.</p>  |
| Controller Output<br>Types                  | <p><b>Electromechanical Relay</b></p> <p>SPDT contacts. Both Normally Open and Normally Closed contacts are brought out to the rear terminals. Internally socketed.</p>   |

| Items   | Specifications   |
|---|--|
|   | <p><i>Resistive Load:</i> 5 amps @ 120 Vac or 240 Vac or 30 Vdc</p> <p><i>Inductive Load (cosj = 0.4):</i> 3 amps @ 130 Vac or 250 Vac</p> <p><i>Inductive Load (L/R = 7 msec):</i> 3.5 amps @ 30 Vdc</p> <p><i>Motor:</i> 1/6 H.P.</p> <div style="border: 1px solid blue; padding: 5px; margin: 10px 0;"> <p><b>NOTE:</b> Applying an external power supply to this output is damages the instrument.</p> </div> <p><i>Maximum Sink Current:</i> 20 mA</p> <p><i>Short-circuit current limit:</i> 100 mA</p> <p><b>Open Collector Outputs (One or Two)</b></p> <p>Socketed assembly replacing a relay. Two types of loads are supported, resistive load and pilot duty load. Opto-isolated from all other circuits except current output and not from each other. Internally powered @ 28 Vdc (0 mA) ~ 24 Vdc (20 mA).</p> <div style="border: 1px solid blue; padding: 5px; margin: 10px 0;"> <p><b>NOTE:</b> Applying an external power supply to this output will damage the instrument.</p> </div> <ul style="list-style-type: none"> <li>• Maximum Source Current: 20 mA</li> <li>• Overload Protection: 25 mA</li> </ul> |
| <p>Alarm Outputs (Optional)</p>                                 | <p><b>One or two SPDT Electromechanical relays:</b></p> <p>Up to four setpoints are independently set as high or low alarm, two for each relay. Setpoint can be on Process Variable, Deviation, PV Rate, Communication Shed or Thermocouple Health. A single adjustable hysteresis of 0.0 to 100.0% is provided.</p> <p><b>Alarm Relay Contacts Rating:</b> Resistive Load: 5 amps at 120 Vac or 240 Vac or 30 Vdc</p>   |
| <p>RS422/485 Modbus RTU Communications Interface (Optional)</p> | <p><b>Baud Rate:</b> 4800, 9600,19,200 or 38,400 baud selectable</p> <p><b>Data Format:</b> Floating point or integer</p> <p><b>Length of Link:</b></p>  |

| Items   | Specifications   |
|---|--|
|   | <ul style="list-style-type: none"> <li>• 2000 ft (600 m) max. with Belden 9271 Twinax Cable and 120 ohm termination resistors</li> <li>• 4000 ft. (1200 m) max. with Belden 8227 Twinax Cable and 100 ohm termination resistors</li> </ul> <p><b>Link Characteristics:</b> Two-wire, multi-drop Modbus RTU protocol, 15 drops maximum or up to 31 drops for shorter link length.</p> |
| Ethernet TCP/IP Communications Interface (Optional) | <p><b>Type:</b> 10/100M Base-T</p> <p><b>Length of Link:</b> 330 ft. (100 m) maximum</p> <p><b>Link Characteristics:</b> Four-wire, single drop, five hops maximum</p> <p><b>IP Address:</b> IP Address is 10.0.0.2 as shipped from the Factory</p> <p><b>Configuration:</b> Ethernet parameters are configured via the Front Panel.</p>   |
| RS485 and Ethernet Transaction rates                | Host computer must allow a minimum of 20 milliseconds between Read transactions and a minimum of 200 milliseconds between Write transactions.  |
| Bluetooth Communications (Standard)                 | <p><b>Type:</b> Bluetooth</p> <p><b>Length of Link:</b> 10 ft. (3 m) maximum for mobile devices</p> <p><b>Protocol:</b> BLE 4.2</p>  |
| Digital Displays                                    | TFT LCD: A Thin Film Transistor (TFT) LCD screen is dedicated to display process variable, setpoint, and output. Key selected operating parameters can be shown in the lower area of the screen. Alternate information displayed during configuration mode.  |
| Indicators  | <p>Alarm Relay Status (Alarm 1 or 2)</p> <p>Temperature Units (F or C)</p> <p>Active Set Point (■)</p> <p>Control Relay Status (DO 1)</p> <p>Digital Input Status (DI 1)</p>   |

| Items                            | Specifications   |
|----------------------------------|--|
|                                  | Communication Status (Bluetooth, Ethernet, and Modbus)   |
| Dimensions                       | See <a href="#">Overall Dimensions</a> for more information.   |
| Wiring Connections               | Screw terminals on the rear of the case.<br>See Wiring Diagrams for more information.  |
| Power Consumption                | 20 VA maximum (90 to 264 Vac)<br>15 VA maximum (24 Vac/dc)   |
| Power Inrush Current             | 10A maximum for 4 ms (under operating conditions), reducing to a maximum of 225 mA (90 to 264 Vac operation) or 750 mA (24 Vac/dc operation) after one second.<br><br><div style="border: 1px solid orange; padding: 5px;"><b>CAUTION:</b> When applying power to more than one instrument, make sure that sufficient power is supplied. Otherwise, the instruments may not start up normally due to voltage drop from the inrush current.</div>   |
| Weight                           | 3 lbs. (1.3 kg)  |
| Isolation (Functional)           | <b>AC Power(100~240VAC):</b> Electrically isolated from all other inputs and outputs to withstand a HIPOT potential of 3000 Vac for 60 seconds, from earth ground to withstand a HIPOT potential of 1500 Vac for 60 seconds per EN61010-1 and CSA Std C22.2 No.24-15.<br><br><b>DC Power(24VDC/AC):</b> Electrically isolated from all other inputs and outputs and earth ground to withstand a HIPOT potential of 840 Vac for 60 seconds per EN61010-1 and CSA Std C22.2 No.24-15.<br><br><b>Analog Inputs and Outputs, Digital Inputs and Outputs:</b> Electrically isolated from all other circuits to withstand a HIPOT potential of 1500 Vac for 60 seconds.<br><br><b>Relay Contacts:</b> With a working voltage of 125/250 Vac, these are electrically isolated from all other circuits to withstand a HIPOT potential of 3000 Vac for 60 seconds per EN61010-1 and CSA Std C22.2 No.24-15. |
| Surge Withstand Capability (SWC) | Immunity: ANSI/IEEE C37.90.1, Surge Withstand Capability (SWC) (Formerly IEEE 472). Mains power input and relay contact outputs: 2.5 kV, Common Mode, and Differential   |

| Items                              | Specifications  |
|------------------------------------|---|
|                                    | Mode. All other circuits: 1.0 kV, Common Mode, and Differential Mode. The instrument can meet these test levels with no component failures, no reset, and no incorrect outputs. |
| Radio Frequency Interference (RFI) | Immunity: No effect on performance from a 5 W walkie-talkie operated at 151 or 450 MHz, one meter from the controller.  |

| Environmental and Operating Conditions |                        |                            |                            |                               |
|--|------------------------|----------------------------|----------------------------|-------------------------------|
| Parameter                              | Recommended            | Rated                      | Operative Limits           | Transportation and Storage    |
| Ambient Temperature                    | 25 ± 3 °C<br>77 ± 5 °F | 0 to 55 °C<br>32 to 131 °F | 0 to 55 °C<br>32 to 131 °F | -40 to 66 °C<br>-40 to 151 °F |
| Relative Humidity                      | 10 to 55*              | 5 to 90*                   | 5 to 90*                   | 5 to 95*                      |
| Vibration:                             |                        |                            |                            |                               |
| Frequency (Hz)                         | 0                      | 1                          | 5                          | 20                            |
| Acceleration (g)                       | 0                      | 30                         | 30                         | 30                            |
| Mechanical Shock:                      |                        |                            |                            |                               |
| Acceleration (g)                       | 0                      | 1                          | 5                          | 20                            |
| Duration (ms)                          | 0                      | 30                         | 30                         | 30                            |
| Line Voltage (Vdc)                     | +24 ± 1                | 24                         | 21.6 to 26.4               | --                            |
| Line Voltage (Vac)                     |                        |                            |                            |                               |
| 100 to 240 Vac                         | 120 ± 1<br>240 ± 2     | 100 to 240                 | 90 to 264                  | --<br>--                      |
| 24 Vac                                 | 24 ± 1                 | 24                         | 21.6 to 26.4               | --                            |
| Frequency (Hz)                         | 50 ± 0.2               | 50                         | 50 ± 2                     | --                            |
| (For Vac)                              | 60 ± 0.2               | 60                         | 60 ± 2                     | --                            |
| Altitude                               | 2000 meters            |                            |                            |                               |

### Environmental and Operating Conditions

\* The maximum moisture rating only applies up to 40 °C (104 °F). For higher temperatures, the RH specification is derated to maintain constant moisture content.

## Model Number Interpretation

### Introduction

Write your controller's model number in the spaces provided below and circle the corresponding items in each table. This information will also be useful when you wire your controller.

### UDC2800 Universal Digital Limit Controller Model Selection Guide

The UDC2800 controller packs new powerful features while retaining all the simplicity and flexibility of the industry standard UDC2500 controller including:

- Enhanced Display
- Bluetooth for configuring with Honeywell EasySet
- Ethernet Communications
- Thermocouple Health Monitoring

### Instructions

Select the desired key number. The arrow to the right marks the selection available.

Make the desired selections from Tables I through VI using the column below the proper arrow. A dot (•) denotes availability.

| Key Number | I  | II  | III | IV  | V  | VI |
|------------|----|-----|-----|-----|----|----|
| -----      | -- | --- | --- | --- | -- | -  |

|  |   |     |   |   |
|--|---|-----|---|---|
| Output #1                                | Current Output (4 to 20 ma, 0 to 20 ma)                       | C _ | • | • |
|  | Electro Mechanical Relay (5 Amp Form C)                       | E _ | • | • |
|  | Open Collector transistor output                              | T _ | • | • |
|  | Dual 2 Amp Relays (Both are Form A) (Heat /Cool Applications) | R _ | • | • |
| Output #2 and Alarm #1 or Alarms 1 and 2 | No Additional Outputs or Alarms                               | _ 0 | • | • |
|  | One Alarm Relay Only  | _ B | • | • |
|  | E-M Relay (5 Amp Form C) Plus Alarm 1 (5 Amp Form C Relay)    | _ E | • | • |
|  | Open Collector Plus Alarm 1 (5 Amp Form C Relay)              | _ T | • | • |

|                |   |       |   |   |
|----------------|---|-------|---|---|
| Communications | None  | 0 _ _ | • | • |
|                | Auxiliary Output/Digital Inputs (1 Aux and 1 DI or 2 DI)                  | 1 _ _ | • | • |
|                | RS-485 Modbus Plus Auxiliary Output/Digital Inputs                        | 2 _ _ | • | • |
|                | 10/100M Base-T Ethernet (Modbus RTU) Plus Auxiliary Output/Digital Inputs | 3 _ _ | • | • |
| Software       | Limit Controller  | _ L _ | e | e |
|                | Standard Software   | _ S _ | • | • |
|                | Standard S /W and Set Point Programming                                   | _ F _ | • | • |
| Future options | None  | _ _ 0 | • | • |



| <b>Table III - Input 1 and Input 2</b>                                       |  |      |   |   |
|--|--|------|---|---|
| Input 1<br>(See Note 1)  | TC, RTD, mV, 0-5V, 1-5V, 0-10V                                       | 1 __ | • | • |
|  | TC, RTD, mV, 0-5V, 1-5V, 0-10V, 0-20mA, 4-20mA                       | 2 __ | • | • |
| Input 2  | None   | _ 00 | • | • |
|  | TC, RTD, mV, 0-5V, 1-5V, 0-10V                                       | _ 10 | • | • |
|  | TC, RTD, mV, 0-5V, 1-5V, 0-10V, 0-20mA, 4-20mA                       | _ 20 | • | • |
|  | Slidewire Input for Position Proportional (Requires 2 Relay Outputs) | _ 40 | • | • |
|  | Carbon, Oxygen or Dewpoint (Provides 2 Inputs)                       | _ 60 | • | • |
| <b>Note 1:</b> Input 1 can be changed in the field using external resistors. |  |      |   |   |

| <b>Table IV - Options</b>                         |  |       |   |   |
|---|--|-------|---|---|
| Approvals<br>(Note 2)                             | CE (Standard)  | 0 __  | • | • |
|   | CE, UL and CSA   | 1 __  | • | • |
|   | CE, UL, CSA and FM (Limit controller)                          | 2 __  | d | d |
| Tags  | None   | _ 0 _ | • | • |
|   | Stainless Steel Customer ID Tag - 3 lines w/22 characters/line | _ T _ | • | • |
| Future Options                                    | None   | -- 0  | • | • |
| <b>Note 2:</b> FM certified for Limit controller. |  |       |   |   |

| <b>Table V - Documentation</b> |                                    |     |   |   |
|--------------------------------|------------------------------------|-----|---|---|
| Documents                      | Quick Start Guide - English        | 0 _ | • | • |
| Certificate                    | None                               | _ 0 | • | • |
|                                | Certificate of Conformance (F3391) | _ C | • | • |

| <b>Table VI - Extended Warranty</b> |      |   |   |   |
|-------------------------------------|------|---|---|---|
| Extended                            | None | 0 | • | • |

|          |                                      |   |   |   |
|----------|--------------------------------------|---|---|---|
| Warranty | Extended Warranty Additional 1 year  | 1 | • | • |
|          | Extended Warranty Additional 2 years | 2 | • | • |

**ORDERING INSTRUCTIONS:** These are provided as guidance for ordering such as those listed.

1. Part numbers are provided to facilitate Distributor Stock.
2. Orders may be placed either by model selection or by part number.
3. Part numbers are shown within the model selection tables to assist with compatibility information.
4. Orders placed by model selection are systematically protected against incompatibility.
5. Compatibility assessment is the responsibility of the purchaser for orders placed by part number.
6. Items labeled as N/A are not available via the stocking program and must be ordered by model selection.

## RESTRICTIONS

| Restriction Letters | Available Only With |           | Not Available With |           |
|---------------------|---------------------|-----------|--------------------|-----------|
|                     | Table               | Selection | Table              | Selection |
| a                   | I                   | EE, R_    |                    |           |
| b                   | III                 | 1 _ _     |                    |           |
| c                   | II                  | _ S _     |                    |           |
| d                   | II                  | _ L _     |                    |           |
| e                   | III                 | _00       | I                  | C _, R _  |

- FM approved units with communication are limited to read only.
- UL listed for regulatory use only.
- CSA listed for regulatory use only.

## UDC2800 Universal Digital Controller Supplemental Accessories & Kits

| Description  |         | Part Number  |
|--|---------|--------------|
| Front panel assembly, UDC 2800/2900                          |         | 50159507-501 |
| TFT-LCD module for UDC2800, CTM320240N01                     |         | 50152823-501 |
| Power/Output PWA without E-M Relays (90-264 Vac Operation)   |         | 51308438-528 |
| Power/Output PWA with E-M Relays (90-264 Vac Operation)      |         | 51308438-529 |
| Power/Output PWA with E-M Relays (24 Vac/dc Operation)       |         | 51308440-526 |
| Auxiliary Output/Digital Input PWA                           |         | 51308448-526 |
| Auxiliary Output/Digital Input/RS-422/485 Communications PWA |         | 51308448-527 |
| Auxiliary Output/Digital Input/Ethernet Communications PWA   |         | 51308448-528 |
| Analog Input/Control Output (1ch Ai), PWA                    |         | 51308452-526 |
| MCU/Display PWA  |         | 51308456-526 |
| Current Output PWA   |         | 51308460-526 |
| Open Collector Output PWA                                    |         | 51308462-526 |
| Ethernet Adaptor Board Kit PWA                               |         | 50009071-501 |
| Electro-Mechanical Relay                                     |         | 51508015-505 |
| 4-20 mA Input Resistor Assembly (250 ohm)                    |         | 30731996-506 |
| CHASSIS ASSEMBLY, UDC  |         | 50150597-501 |
| Case Assembly (including Mounting Kit with four brackets)    |         | 51452759-501 |
| Mounting Kits (12 Brackets)                                  |         | 51452763-501 |
| DIN Adaptor Kit  |         | 30755223-003 |
| Panel Bracket Kit  |         | 50004821-501 |
| Quick Start Guide  | English | 51-52-25-166 |
| Product Manual   | English | 51-52-25-165 |

**ATTENTION:** It is recommended to use Honeywell provided accessories and kits. Otherwise, using non-Honeywell provided components would take risks.

## Limit and Alarm Relay Contact Information

### Limit Relay

**ATTENTION:** The Limit relay is designed to operate in a Failsafe mode. This results in momentary (5 seconds maximum) limit action when power is initially applied, until the unit completes self-diagnostics. If power is lost to the unit, the Limit Control Relay will still function.

Table 3-2: Limit Relay Contact Information

| Unit Power | Limit Control Relay Wiring | Variable NOT in Limit State |            | Variable in Limit State |            |
|------------|----------------------------|-----------------------------|------------|-------------------------|------------|
|            |                            | Relay Contact               | Indicators | Relay Contact           | Indicators |
| Off        | N.O.                       | Open                        | Off        | Open                    | Off        |
|            | N.C.                       | Closed                      |            | Closed                  |            |
| On         | N.O.                       | Closed                      | Off        | Open                    | On         |
|            | N.C.                       | Open                        |            | Closed                  |            |

### Alarm Relays

**ATTENTION:** Alarm relays are designed to operate in a failsafe mode (that is, de-energized during alarm state). This results in alarm actuation when power is OFF or when initially applied, until the unit completes self diagnostics. If power is lost to the unit, the alarms will de-energize and thus the alarm contacts will close.

Table 3-3: Alarm Relay Contact Information

| Unit Power | Alarm Relay Wiring | Variable NOT in Alarm State |            | Variable in Alarm State |            |
|------------|--------------------|-----------------------------|------------|-------------------------|------------|
|            |                    | Relay Contact               | Indicators | Relay Contact           | Indicators |
| Off        | N.O.               | Open                        | Off        | Open                    | Off        |
|            | N.C.               | Closed                      |            | Closed                  |            |
| On         | N.O.               | Closed                      | Off        | Open                    | On         |
|            | N.C.               | Open                        |            | Closed                  |            |

## Mounting

### Physical Considerations

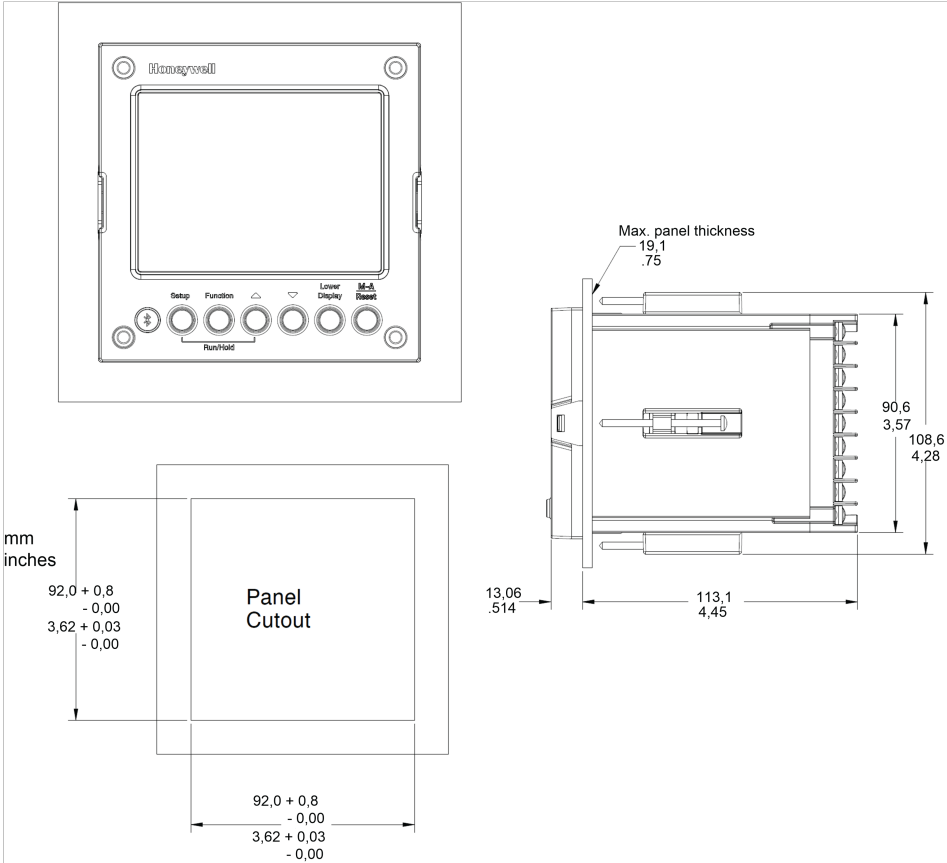
The controller can be mounted on either a vertical or tilted panel using the mounting kit supplied. Adequate access space must be available at the back of the panel for installation and servicing activities.

- The controller must be installed indoors.
- It must be panel mounted with the wiring terminals enclosed within the panel.
- The instrument is environmentally hardened and, when suitably enclosed, can be mounted anywhere in plant or factory, on the wall, or even on the process machine itself.
- The front panel is moisture rated NEMA3R and IP54 rated and can be easily upgraded to NEMA4X and IP66 for the most severe hose-down applications. See [Mounting Method](#) and [Mounting Procedure](#) for more information.
- It withstands ambient temperatures 0 ~ 55 C (32 ~ 131 F) and resists the effects of vibration and shock.
- Overall dimensions and panel cutout requirements for mounting the controller are shown in figure below. See Overall Dimensions for more information.
- The controller’s mounting enclosure must be grounded according to CSA standard C22.2 No. 0.4.

# Overall Dimensions

## Dimensions and Mounting

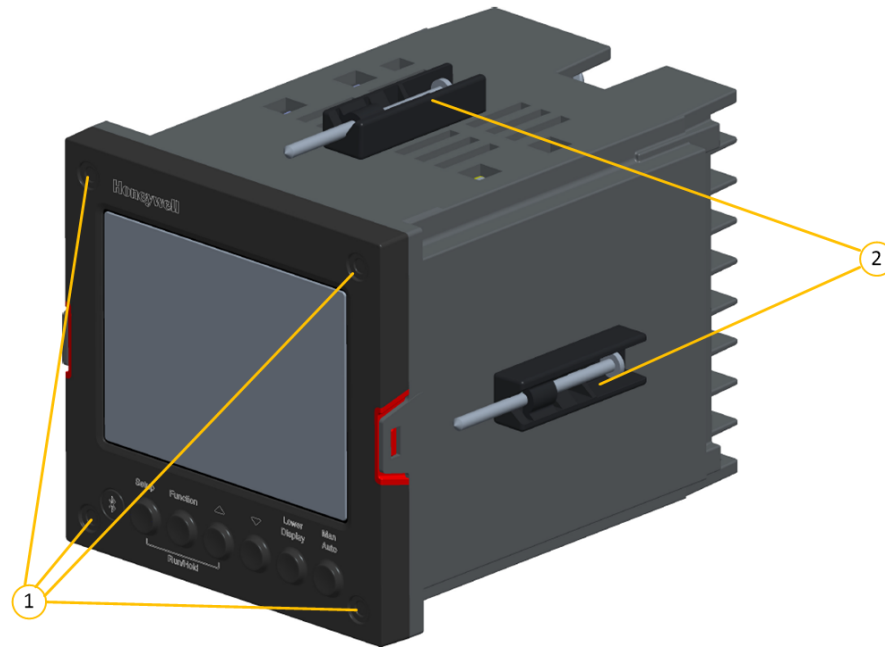
Figure 3-1: Mounting Dimensions (not to scale)



## Mounting Method

Before mounting the controller, refer to the nameplate on the outside of the case and make a note of the model number. It will help later when selecting the proper wiring configuration.

Figure 3-2: Mounting Methods



| Item | Description   |
|------|---|
| 1    | Attach screws and washers here for water protection |
| 2    | Mounting clips                                      |

## Mounting Procedure

Table 3-4: Mounting Procedure

| Step | Action   |
|------|--|
| 1    | Mark and cut out the controller hole in the panel according to the dimension information. See <a href="#">Overall Dimensions</a> for more information.   |
| 2    | Orient the case properly and slide it through the panel hole from the front.   |
| 3    | <p>Remove the mounting kit from the shipping container and install the kit as follows:</p> <ul style="list-style-type: none"> <li>• For normal (NEMA3/IP55) installation two mounting clips are required. Insert the prongs of the clips into the two holes in the top and bottom center of the case</li> <li>• For water protected (NEMA4X/IP66) installation four mounting clips are required. There are two options of where to install the mounting clips: 1) Insert the prongs of the clips into the two holes on the left and right side of the top and bottom of the case or 2) on the center on each of the four sides.</li> <li>• Tighten screws to 2 lb-inch (22 N•cm) to secure the case against the panel. CAUTION:</li> </ul> <div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <p><b>CAUTION:</b> Over tightening will cause distortion and the unit may not seal properly.</p> </div> |
| 4    | For water-protected installation, install four screws with washers into the four recessed areas in the corners of the front bezel. Push the point of the screw through the center piercing the elastomeric material and then tighten screws to 5 lb-in (56 N•cm).  |



# Wiring

## Electrical Considerations

### Line voltage wiring

This controller is considered “rack and panel mounted equipment” per EN61010-1, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements. Conformity with 72/23/EEC, the Low Voltage Directive requires the user to provide adequate protection against a shock hazard. The user shall install this controller in an enclosure that limits OPERATOR access to the rear terminals.

### Mains Power Supply

This equipment is suitable for connection to 90 to 264 Vac or to 24 Vac/dc 50/60 Hz, power supply mains. It is the user’s responsibility to provide a switch and non-time delay (North America), quick-acting, high breaking capacity, Type F (Europe), 1/2A, 250V fuse(s), or circuit-breaker for 90-264 Vac applications; or 1 A, 125 V fuse or circuit breaker for 24 Vac/dc applications, as part of the installation. The switch or circuit-breaker shall be in close proximity to the controller, within easy reach of the OPERATOR. The switch or circuit-breaker shall be marked as the disconnecting device for the controller.

**CAUTION:** Applying 90-264 Vac to an instrument rated for 24 Vac/dc will severely damage the instrument and is a fire and smoke hazard.

When applying power to multiple instruments, make certain that sufficient current is supplied. Otherwise, the instruments may not start up normally due to the voltage drop caused by the in-rush current.

### Controller Grounding

PROTECTIVE BONDING (grounding) of this controller and the enclosure in which it is installed shall be in accordance with National and Local electrical codes. To minimize electrical noise and transients that may adversely affect the system, supplementary bonding of the controller enclosure to a local ground, using a No. 12

(4 mm<sup>2</sup>) copper conductor, is recommended.

## Control/Alarm Circuit Wiring

The insulation of wires connected to the Control/Alarm terminals shall be rated for the highest voltage involved. Extra Low Voltage (ELV) wiring (input, current output, and low voltage Control/Alarm circuits) shall be separated from HAZARDOUS LIVE (>30 Vac, 42.4 Vpeak, or 60 Vdc) wiring per Permissible Wiring Bundling, Electrical Considerations-.

Electrical noise is composed of unabated electrical signals which produce undesirable effects in measurements and control circuits.

Digital equipment is especially sensitive to the effects of electrical noise. Your controller has built-in circuits to reduce the effect of electrical noise from various sources. If there is a need to further reduce these effects:

- **Separate External Wiring**—Separate connecting wires into bundles (See Permissible Wiring Bundling - Electrical Considerations-) and route the individual bundles through separate conduit metal trays.  
Use Suppression Devices—For additional noise protection, you may want to add suppression devices at the external source. Appropriate suppression devices are commercially available.

**ATTENTION:** For additional noise information, refer to document number 51-52-05-01, *How to Apply Digital Instrumentation in Severe Electrical Noise Environments*.

## Permissible Wiring Bundling

Table 3-5: Permissible Wiring Bundling

| Bundle No. | Wire Functions  |
|------------|---|
| 1          | <ul style="list-style-type: none"> <li>• Line power wiring</li> <li>• Earth ground wiring</li> <li>• Line voltage control relay output wiring</li> <li>• Line voltage alarm wiring</li> </ul> |

| Bundle No. | Wire Functions   |
|------------|--|
| 2          | <p><b>Analog</b> signal wire, such as:</p> <ul style="list-style-type: none"> <li>• Input signal wire (thermocouple, 4 to 20 mA, etc.)</li> <li>• 4-20 mA output signal wiring</li> </ul>  |
| 3          | <p><b>Digital</b> input signals</p> <ul style="list-style-type: none"> <li>• Low voltage alarm relay output wiring</li> <li>• Low voltage wiring to solid state type control circuits</li> <li>• Low voltage wiring to open collector type control circuits</li> </ul> |

## Wiring Diagrams


### Identify Your Wiring Requirements

To determine the appropriate diagrams for wiring your controller, refer to the model number interpretation in this section. The model number of the controller can be found on the outside of the case.

## Wiring the Controller

Using the information contained in the model number, select the appropriate wiring diagrams from the composite wiring diagram below. Refer to the individual diagrams listed to wire the controller according to your requirements.

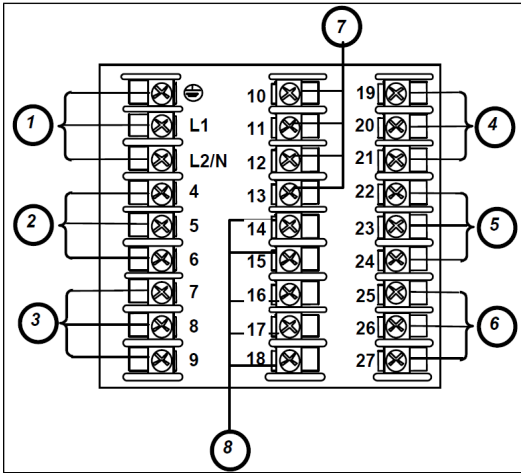
**NOTE:** Torque screw assembly to 10 lb-inch (1.13 N•m) 27 places.

**CAUTION:**  Use Copper Conductors Only for field-wiring terminals.

**ATTENTION:** The wire gauge of terminal blocks is AWG 14~28.

**CAUTION:** ⚠ Minimum temperature rating of the cable to be connected to the field wiring terminals is 68 °C.

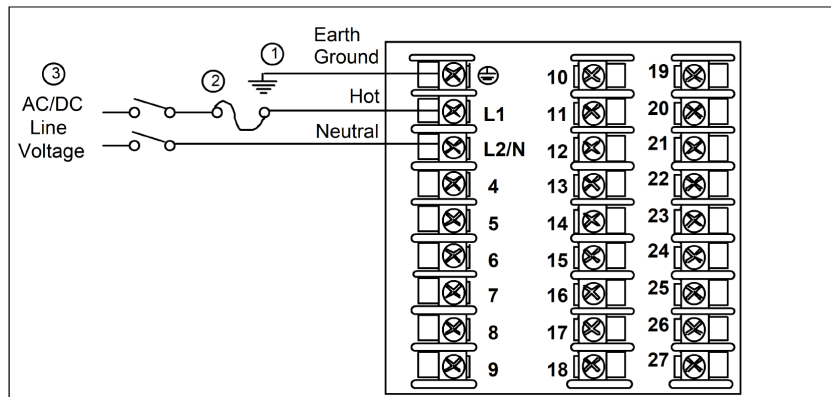
Figure 3-3: Composite Wiring Diagram



| Item | Description  |
|------|--|
| 1    | AC/DC Line Voltage Terminals.  |
| 2    | Output 3 Terminals ( Alarm #2 in the Table I of UDC2800 Universal Digital Limit Controller Model Selection Guide).<br><br><b>ATTENTION:</b> If they are used as Relay Outputs, the wire gauge should be AWG 14~22. |
| 3    | Output 4 Terminals (Alarm #1 in the Table I of UDC2800 Universal Digital Limit Controller Model Selection Guide).<br><br><b>ATTENTION:</b> If they are used as Relay Outputs, the wire gauge should be AWG 14~22.  |
| 4    | Outputs 1Terminals (Output #1 in the Table I of UDC2800 Universal Digital Limit Controller Model Selection Guide).<br><br><b>ATTENTION:</b> If they are used as Relay Outputs, the wire gauge should be AWG 14~22. |

| Item | Description                               |
|------|---|
| 5    | Not used.                                 |
| 6    | Input #1 Terminals.                       |
| 7    | Aux. Output and Digital Inputs Terminals. |
| 8    | Communications Terminals.                 |

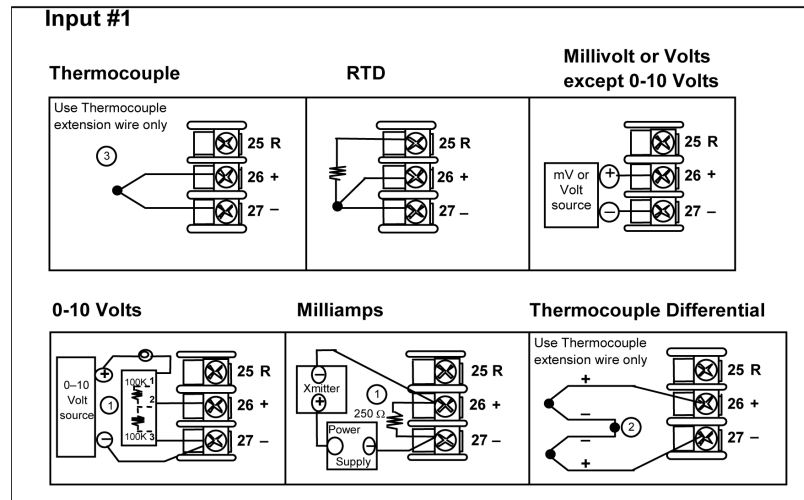
Figure 3-4: Mains Power Supply



| Item | Description   |
|------|---|
| 1    | <p>PROTECTIVE BONDING (grounding) of this controller and the enclosure in which it is installed, shall be in accordance with National and local electrical codes. To minimize electrical noise and transients that may adversely affect the system, supplementary bonding of the controller enclosure to local ground using a 14AWG ~ 20AWG copper conductor is recommended.</p> <p>The wire gauge of power supply is AWG 14 (2.0 mm<sup>2</sup>) ~20 (0.5 mm<sup>2</sup>).</p> |
| 2    | <p><b>NOTE:</b> It is only required for 90~264 Vac applications.</p> <p>It is the user's responsibility to provide a switch and non-time delay (North America), quick-acting, high breaking capacity, Type F (Europe), 1/2 A, 250 V UL listed fuse(s), or 1 A UL listed circuit-breaker for 90-264 Vac applications, as part of the installation.</p> <p><b>ATTENTION:</b> The nominal current of the switch must be larger than fuse's related current.</p>                    |
| 3    | <p>The wire area of power supply is AWG 14 (2.0 mm<sup>2</sup>) ~20 (0.5 mm<sup>2</sup>).</p>   |

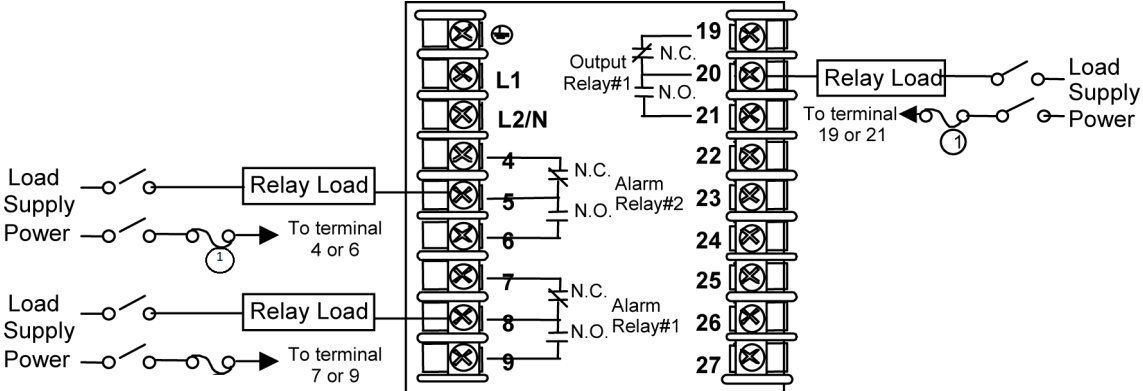
| Item | Description   |
|------|---|
|      | <p><b>CAUTION:</b> Applying 90-264 Vac to an instrument rated for 24 Vac/dc will severely damage the instrument and is a fire and smoke hazard.</p> |

Figure 3-5: Input 1 Connections



| Item | Description  |
|------|--|
| 1    | The 250 ohm resistor for milliamp inputs is supplied with the controller when those inputs are specified. These items must be installed prior to start up when the controller is wired. For 0-20 mA applications, the resistor should be located at the transmitter terminals if Burnout detection is desired.   |
| 2    | Splice and tape this junction between the two thermocouples. This junction may be located anywhere between the thermocouples and the instrument terminals, it does not need to be close to the other thermocouple junctions. Both thermocouples must be of the same type. For best accuracy, the two thermocouples should be matched or, preferably, made from the same batch of wire. |
| 3    | This controller does not produce a steady current for burnout detection. For that reason, when a thermocouple is used in parallel with another instrument.   |
| 4    | The millivolt values for the Thermocouple Differential Input are for a pair of J thermocouples at an ambient temperature mean of 450°F/ 232°C.   |

Figure 3-6: Electromechanical Relay Output

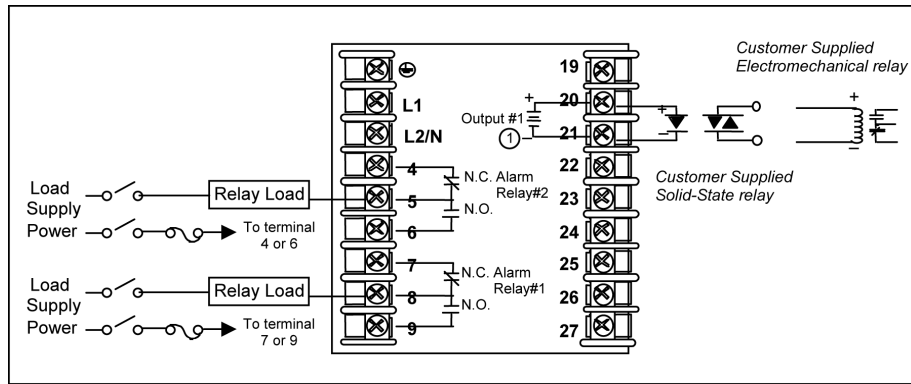


| Item | Description   |
|------|---|
| 1    | Electromechanical relays are rated at 5 Amps @ 125 Vac or 250 Vac or 30 Vdc. Users should size fuses accordingly. Use Fast Blow fuses only. |

See the table Wiring Diagrams for relay terminal connections for other Output Algorithm Types.



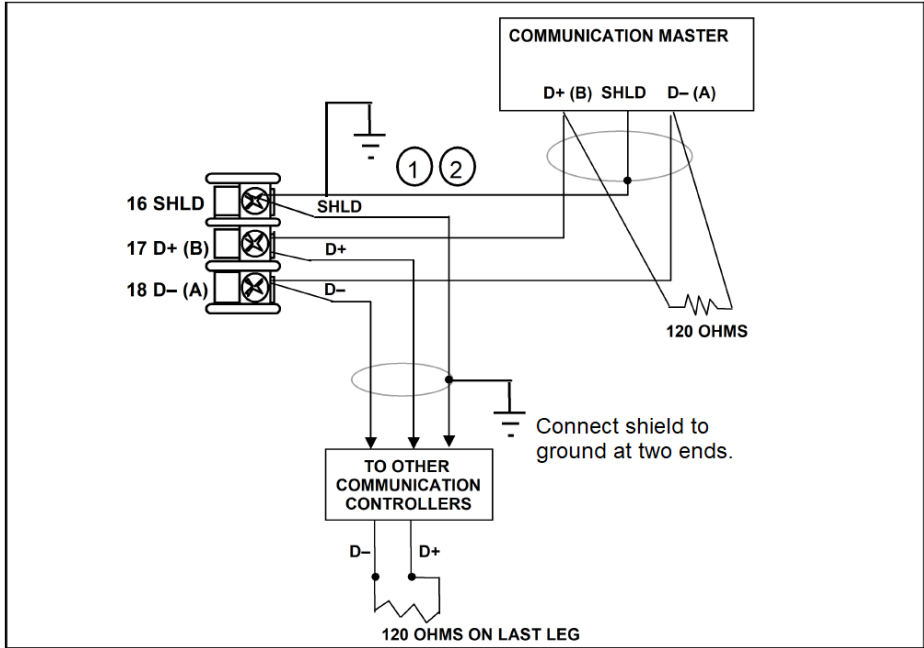
Figure 3-7: Open Collector Output



| Item | Description  |
|------|--|
| 1    | <b>CAUTION:</b> Open collector outputs are internally powered at 28 Vdc (0 mA) ~ 24 Vdc (20 mA). Connecting an external power supply will damage the controller. |
| 2    | Electromechanical relays are rated at 5 Amps @ 125 Vac or 250 Vac or 30 Vdc. Users should size fuses accordingly. Use Fast Blow fuses only.                      |

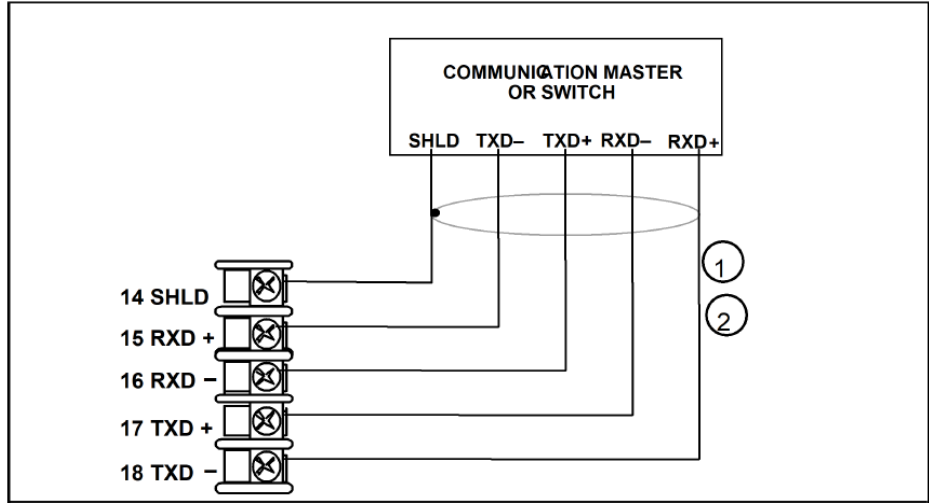
See the table Wiring Diagrams for relay terminal connections for other Output Algorithm Types.

Figure 3-8: RS485 Communications Option Connections



| Item | Description  |
|------|--|
| 1    | Do not run the communications lines in the same conduit as AC power. |
| 2    | Use shielded twisted pair cables (Belden 9271 Twinax or equivalent). |

Figure 3-9: Ethernet Communications Option Connections



| Item | Description   |
|------|---|
| 1    | Do not run the communications lines in the same conduit as AC power. Correct connections may require the use of an Ethernet cross-over cable. |
| 2    | Use shielded twisted pair, Category 5e (STP CAT5e) Ethernet cable.  |

For Ethernet cable with RJ45 connector, an Ethernet Adapter Kit is required to install on the terminals.

Figure 3-10: Auxiliary Output and Digital Inputs Option Connections

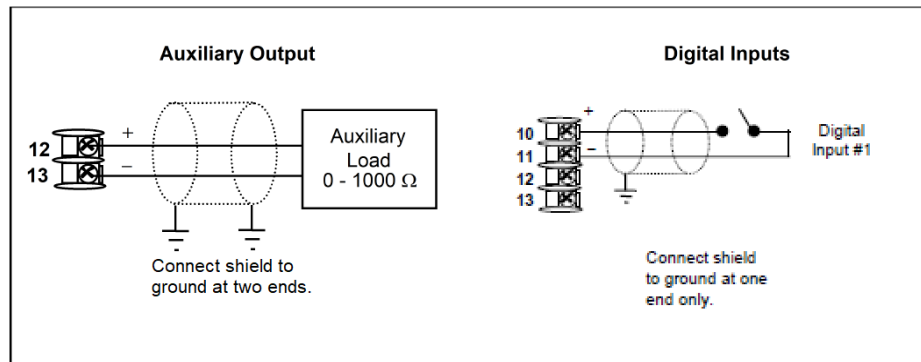


Figure 3-11: Transmitter Power for 4-20 mA – 2 wire Transmitter Using Open Collector Alarm 2 A2S1TY Deviation Output

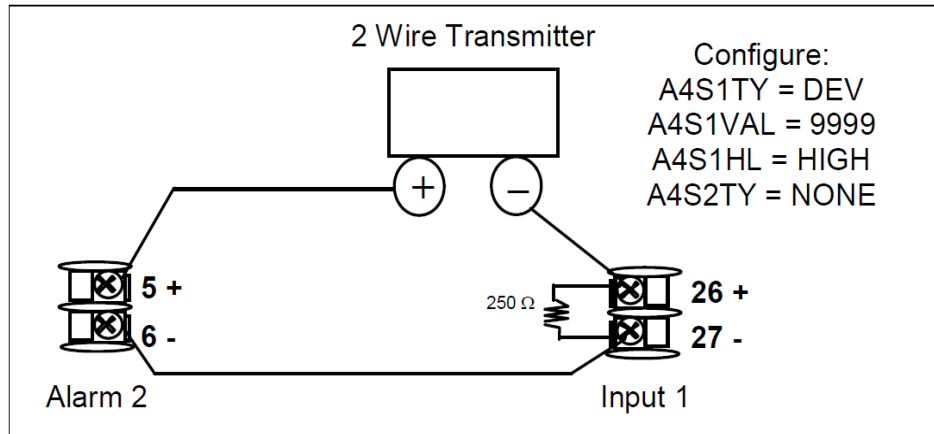
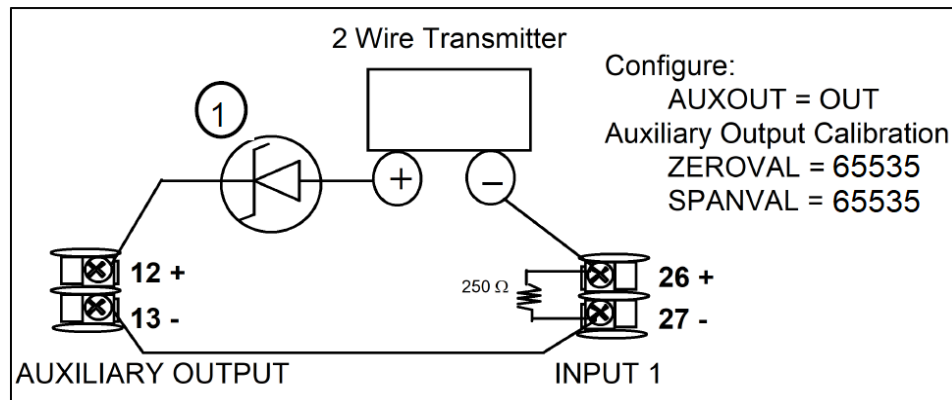


Figure 3-12: Transmitter Power for 4-20 mA – 2 Wire Transmitter Using Auxiliary Output



- ① If necessary, install a zener diode here to reduce voltage at the transmitter. A 1N4733 will reduce the voltage at the transmitter to approximately 25 Vdc.

# Limit Control Application Diagram

## Limit Controller Wiring

The following Limit Controller Application Diagram shows the RIGHT and WRONG way to wire the Limit Controller.

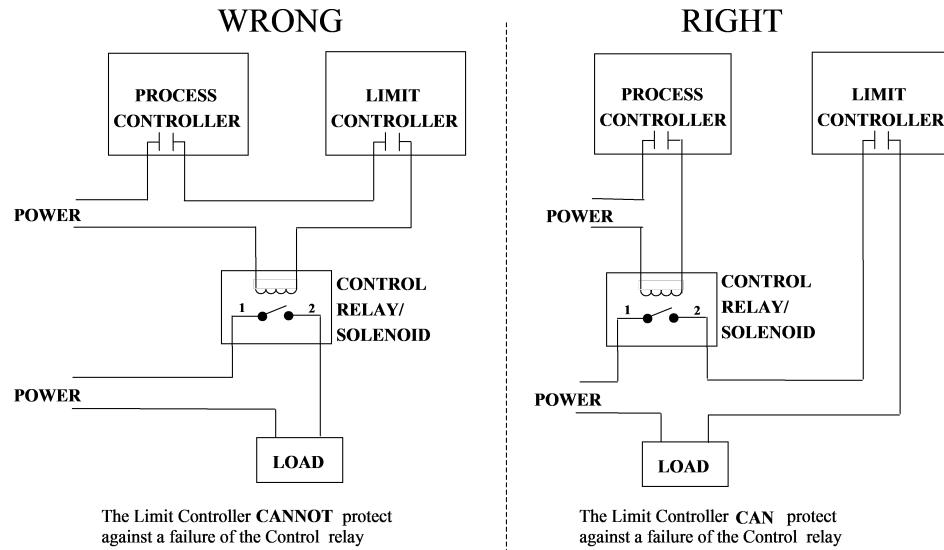


Figure 3-13: Limit Controller Application Diagram

# CONFIGURATION

## What's in this section?

The following topics are covered in this section.

---

In this section:

|   |    |
|---|----|
| <i>Overview</i> .....                       | 55 |
| <i>Configuration Prompt Hierarchy</i> ..... | 55 |
| <i>Configuration Procedure</i> .....        | 57 |
| <i>Security Set Up Group</i> .....          | 58 |
| <i>Limit Set Up Group</i> .....             | 61 |
| <i>Input 1 Set Up Group</i> .....           | 62 |
| <i>Options Set Up Group</i> .....           | 67 |
| <i>Communications Group</i> .....           | 69 |
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| <i>Auxiliary Calib Set Up Group</i> .....   | 81 |
| <i>Configuration Record Sheet</i> .....     | 82 |

# Overview

## Introduction

Configuration is a dedicated operation where you use straightforward keystroke sequences to select and establish (configure) pertinent control data best suited for your application.

To assist you in the configuration process, there are prompts that appear in the upper and lower displays. These prompts let you know what group of configuration data (Set Up prompts) you are working with and the specific parameters (Function prompts) associated with each group.

## Configuration Prompt Hierarchy

Table 4-1: Configuration Prompt Hierarchy

| Setup Group | Function Prompts   |
|-------------|--|
| Security    | <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">Password</div> <div style="border: 1px solid black; padding: 2px;">Lockout</div> <div style="border: 1px solid black; padding: 2px;">FM<br/>Version</div> <div style="border: 1px solid black; padding: 2px;">Restore<br/>Settings</div> <div style="border: 1px solid black; padding: 2px;">Change<br/>Password</div> </div>   |
| Limit       | <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">Low or High Limit</div> <div style="border: 1px solid black; padding: 2px;">Power Up Status</div> <div style="border: 1px solid black; padding: 2px;">SP High Limit</div> <div style="border: 1px solid black; padding: 2px;">SP Low Limit</div> <div style="border: 1px solid black; padding: 2px;">Setpoint</div> </div>  |
| Input 1     | <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">Input1<br/>Type</div> <div style="border: 1px solid black; padding: 2px;">Input1<br/>Transmitter</div> <div style="border: 1px solid black; padding: 2px;">Input1<br/>High Value</div> <div style="border: 1px solid black; padding: 2px;">Input1<br/>Low Value</div> <div style="border: 1px solid black; padding: 2px;">Input1<br/>Bias</div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px;">Input1<br/>Filter</div> <div style="border: 1px solid black; padding: 2px;">Input1<br/>Burnout</div> </div> |
| Options     | <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">Auxiliary<br/>Output</div> <div style="border: 1px solid black; padding: 2px;">Co Range</div> <div style="border: 1px solid black; padding: 2px;">CO Low<br/>Value</div> <div style="border: 1px solid black; padding: 2px;">CO High<br/>Value</div> <div style="border: 1px solid black; padding: 2px;">DI 1<br/>Function</div> </div>   |

| Setup Group                   | Function Prompts |
|-------------------------------|------------------|
| Communication                 |                  |
| Alarms                        |                  |
| Display                       |                  |
| Input1 Calib (Calibration)    |                  |
| Auxiliary Calib (Calibration) |                  |
| Status                        |                  |



# Configuration Procedure

## Introduction

Each of the Set-Up groups and their functions are pre-configured at the factory.

The factory settings are shown in Section Configuration Record Sheet.

If you want to change any of these selections or values, follow the procedure in Configuration Procedure-. This procedure tells you the keys to press to get to any Set Up group and any associated Function parameter prompt.

## Procedure

See [Operator Interface](#) for more information of keys.

Table 4-2: Configuration Procedure

| Step | Operation                   | Press                                       | Result  |
|------|-----------------------------|---|---|
| 1    | Enter Set Up Mode           | Setup key                                   | Enter in the first set up group, Security.  |
| 2    | Select any Set Up Group     | Setup key or Increment key or Decrement key | Sequentially displays the other set up groups shown in the prompt hierarchy. See Configuration Prompt Hierarchy for more information.<br><br>You can also use the Increment key or Decrement keys to scan the set-up groups in both directions. Stop at the set-up group title that describes the group of parameters you want to configure. Then proceed to the next step. |
| 3    | Select a Function Parameter | Function key                                | Enter in the first function prompt of the selected set up group.  |
|      |                             | Increment key or Decrement key              | Press Increment key or Decrement keys to display the other function prompts of the selected set up group. Stop at the function prompt   |

| Step | Operation                     | Press                          | Result  |
|------|-------------------------------|--------------------------------|---|
|      |                               |                                | that you want to change.  |
| 4    | Change the Value or Selection | Function key                   | Enter in the value or selection of the selected function prompt.  |
|      |                               | Increment key or Decrement key | Increment or decrement the value or selection that appears for the selected function prompt.<br><br>You can press the Increment and Decrement keys at the same time to move the current editable digit one step left. |
| 5    | Enter the Value or Selection  | Function key                   | Enter value or selection made into memory.  |
| 6    | Exit Configuration            | Lower Display key              | Exit the set up mode, and returns to the main screen.   |

## Security Set Up Group

### Introduction

Security enables you to configure lockout, password, restore the product, and we recommend that you configure this group last, after all other configuration data has been loaded.

**ATTENTION:** Users must be careful while entering the password as the password is not hidden.

**ATTENTION:** It is recommended to change the password after each use.

## Function Prompts

Table 4-3: Security Group Function Prompts

| Function Prompt | Selections or Range of Setting | Parameter Definition  |
|-----------------|--------------------------------|---|
| Password        | 0000 to 9999                   | <p>The level of keyboard lockout may be changed in the Set Up mode. Knowledge of a password may be required to change from one level to another. This configuration should be copied and kept in a secure location.</p> <div data-bbox="672 730 1378 877" style="border: 1px solid blue; padding: 5px;"> <p><b>NOTE:</b> The default password for the UDC device is 1234. It is recommended to change the password after the first login.</p> </div> <div data-bbox="672 903 1378 1012" style="border: 1px solid blue; padding: 5px;"> <p><b>NOTE:</b> The password is for keyboard entry only and is not available via communications.</p> </div> <div data-bbox="672 1037 1378 1222" style="border: 1px solid blue; padding: 5px;"> <p><b>NOTE:</b> Holding both the Increment and Decrement keys while editing numerical values in the main or setup screen allows the current editable digit to move one step left.</p> </div> <div data-bbox="672 1247 1378 1394" style="border: 1px solid orange; padding: 5px;"> <p><b>ATTENTION:</b> If the password is not correct, the following prompts cannot be displayed except <b>Restore Settings</b>.</p> </div> |
| Lockout         |                                | <p>Lockout applies to one of the functional groups: Configuration, Calibration and SP.</p> <div data-bbox="672 1512 1378 1621" style="border: 1px solid orange; padding: 5px;"> <p><b>ATTENTION:</b> Do not configure it until all configuration is complete.</p> </div> <div data-bbox="672 1646 1378 1793" style="border: 1px solid blue; padding: 5px;"> <p><b>NOTE:</b> In the Honeywell EasySet app, lockout options appears under the security group only after entering the password.</p> </div>   |

| Function Prompt        | Selections or Range of Setting | Parameter Definition  |
|------------------------|--------------------------------|---|
|                        | None                           | No lockout; all groups are read/write.  |
|                        | Calibration                    | All groups are available for read/write except for the Calibration and Keyboard Lockout groups.   |
|                        | + Configuration                | All groups are read only. Calibration and Keyboard Lockout groups are not available.  |
|                        | +SP                            | All groups are not available. read only security and status groups are available.   |
| FM version (Read only) |                                |   |
| Restore Settings       |                                | Allows you to reset the controller  |
|                        | Disable                        | Disable   |
|                        | Enable                         | Enable  |
| Restore*               |                                | It allows you to reset the controller while preserving configuration.<br><br><b>ATTENTION:</b> The device will restart if enabled.      |
|                        | Disable                        | Disable   |
|                        | Enable                         | Enable  |
| Change Password        | 0 to 9999                      | Allows you to change the password.<br><br><b>NOTE:</b> The password is for keyboard entry only and is not available via communications. |
|                        |                                | <b>ATTENTION:</b> Can only be viewed when the password you entered is correct.  |

# Limit Set Up Group

## Introduction

This data deals with the type of Limit Control you want, power up Logic, setpoint high and low limits, and the default display function Prompts

Table 4-4: LIMIT Group Function Prompts

| Function Prompt Lower Display | Selection or Range of Setting Upper Display | Parameter Definition   |
|-------------------------------|---|--|
| Low or High                   | LOW<br>HIGH                                 | <p>LOW - Limit Control - latching relay de-energizes when PV goes below configured setpoint; cannot be reset until PV rises above configured setpoint and M-A RESET key is pressed.</p> <p>HIGH - Limit Control - latching relay de-energizes when PV goes above configured setpoint; cannot be reset until PV drops below configured setpoint and M-A RESET key is pressed.</p> |
| Power up                      | Reset<br>Normal                             | <p>Reset- after power down, the controller latching relay will have to be reset.</p> <p>Normal- after power down, the controller will operate normally in the same mode as before power was removed unless a limit has been exceeded. If the limit was latched at power down, the unit will be in "Limit" at power up and must be reset.</p>                                     |
| SetPoint High Limit           | 0 % to 100 % of input in engineering units  | HIGH SETPOINT LIMIT - this selection prevents the setpoint from going above the value selected here. The setting must be equal to or less than the upper range of the input.   |
| SetPoint Low Limit            | 0 % to 100 % of input in engineering units  | LOW SETPOINT LIMIT - this selection prevents the setpoint from going below the value selected here. The setting must be equal to or greater than the lower range of the input.   |

# Input 1 Set Up Group

## Introduction

This data deals with various parameters required to configure Input 1.

## Function Prompts

Table 4-5: INPUT 1 Group Function Prompts

| Function Prompt | Selections or Range of Setting | Parameter Definition  |
|-----------------|--------------------------------|---|
| Input 1 Type    |                                | <p><b>Input 1 Actuation Type</b> – This selection determines what actuation you are going to use for Input 1. See Minimum and Maximum Range Values for more information.</p> <div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <p><b>ATTENTION:</b> Changing the input type will result in the loss of Field Calibration values and will restore Factory Calibration values.</p> </div> |
|                 | Disable                        | Disables Input  |
|                 | TC B                           | B Thermocouple  |
|                 | TC E High                      | E Thermocouple High   |
|                 | TC E Low                       | E Thermocouple Low  |
|                 | TC J High                      | J Thermocouple High   |
|                 | TC J Mid                       | J Thermocouple Med  |
|                 | TC J Low                       | J Thermocouple Low  |
|                 | TC K High                      | K Thermocouple High   |
|                 | TC K Mid                       | K Thermocouple Med  |
|                 | TC K Low                       | CK Thermocouple Low   |
|                 | TC M High                      | M Thermocouple High (Ni-Ni-Moly)  |

| Function Prompt | Selections or Range of Setting | Parameter Definition  |
|-----------------|--------------------------------|---|
|                 | TC M Low                       | M Thermocouple Low (Ni-Ni-Moly)                               |
|                 | TC N High                      | N Thermocouple High (Nicrosil-Nisil)                          |
|                 | TC N Low                       | N Thermocouple Low (Nicrosil-Nisil)                           |
|                 | TC R                           | R Thermocouple  |
|                 | TC S                           | S Thermocouple  |
|                 | TC T High                      | T Thermocouple High   |
|                 | TC T Low                       | T Thermocouple Low  |
|                 | TC C High                      | C Thermocouple High (W5W26)                                   |
|                 | TC C Low                       | C Thermocouple Low (W5W26)                                    |
|                 | TC PR40-PR20                   | PR40-PR20 Thermocouple  |
|                 | RTD Pt100                      | 100 Ohm RTD High  |
|                 | RTD Pt100 Low                  | 100 Ohm RTD Low   |
|                 | RTD Pt200                      | 200 Ohm RTD   |
|                 | RTD Pt500                      | 500 Ohm RTD   |
|                 | 0-20mA                         | 0 to 20 Milliamperes  |
|                 | 4-20mA                         | 4 to 20 Milliamperes  |
|                 | 0-10mV                         | 0 to 10 Millivolts  |
|                 | 0-50mV                         | 0 to 50 Millivolts  |
|                 | 0-100mV                        | 0 to 100 Millivolts   |
|                 | 0-5 V                          | 0 to 5 Volts  |
|                 | 1-5 V                          | 1 to 5 Volts  |
|                 | 0-10 V                         | 0 to 10 Volts   |
|                 | TC Differential                | Thermocouple Differential                                     |
| Input 1         | TC B                           | <b>Transmitter Characterization</b> – This selection lets you |

| Function Prompt | Selections or Range of Setting  | Parameter Definition   |
|-----------------|---|--|
| Transmitter     | TC E High<br>TC E Low<br>TC J High<br>TC J Mid<br>TC J Low<br>TC K High<br>TC K Mid<br>TC K Low<br>TC M High<br>TC M Low<br>TC N High<br>TC N Low<br>TC R<br>TC S<br>TC T High<br>TC T Low<br>TC W High<br>TC W Low<br>TC PR40-PR20<br>RTD Pt100<br>RTD Pt100 Low<br>RTD Pt200<br>RTD Pt500 | instruct the controller to characterize a linear input to represent a non-linear one. If characterization is performed by the transmitter itself, then select Linear. <div style="border: 1px solid orange; padding: 5px; margin: 10px 0;"> <p><b>ATTENTION:</b> Prompt only appears when a linear actuation is selected at prompt Input 1 Type.</p> </div> <p>FOR EXAMPLE:</p> <p>If input 1 is a 4 to 20 mA signal, but the signal represents a type K H thermocouple, then configure K TC H and the controller will characterize the 4 to 20 mA signal so that it is treated as a type K thermocouple input (high range).</p> <p>Parameter definitions are the same as in Input 1 Type.</p> |



| Function Prompt    | Selections or Range of Setting  | Parameter Definition  |
|--------------------|---|---|
|                    | Linear<br>Square Root   |   |
| Input 1 High Value | -999. To 9999. Floating (in engineering units)                                | Input 1 High Range Value in engineering units is displayed for all inputs but can only be configured for linear or square root transmitter characterization.<br><br>Scale the #1 input signal to the display value you want for 100 %.<br><br>FOR EXAMPLE:<br><br>Process Variable = Flow Range of Flow = 0 to 250 Liters/Minute Actuation (Input 1) = 4 to 20 mA Characterization (XMITTER) = LINEAR Set IN1 HI display value to 250 Set IN1 LO display value to 0 Then 20 mA = 250 Liters/Minute and 4 mA = 0 Liters/Minute<br><br><div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <b>ATTENTION:</b> The control setpoint will be limited by the range of units selected here.                     </div> |
| Input 1 Low Value  | -999. To 9999. Floating (in engineering units)                                | Input 1 Low Range Value in engineering units is displayed for all inputs but can only be configured for linear or square root transmitter characterization. Scale the #1 input signal to the display value you want for 0 %. See example above.<br><br><div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <b>ATTENTION:</b> The control setpoint will be limited by the range of units selected here.                     </div>   |
| Input 1 Bias       | -999. to 9999. (in engineering units for non FM version)<br><br>-10 to 10 for | Bias on Input 1 – Bias is used to compensate the input for drift of an input value due to deterioration of a sensor, or some other cause. Select the bias value you want on Input 1.  |

| Function Prompt | Selections or Range of Setting    | Parameter Definition  |
|-----------------|-----------------------------------|---|
|                 | FM version                        |   |
| Input 1 Filter  | 0 to 120 seconds<br>No filter = 0 | Filter for Input 1 –A software digital filter is provided for Input 1 to smooth the input signal. You can configure the first order lag time constant from 1 to 120 seconds. If you do not want filtering, enter 0. |
| Input 1 Burnout |                                   | <b>Burnout Protection (Sensor Break)</b> provides most input types with upscale or downscale protection if the input fails.   |
|                 | Upscale Burnout                   | It will force the Input 1 signal to the full scale value when the sensor fails. Diagnostic message IN1 FAIL intermittently flashed on the lower display.  |
|                 | Downscale Burnout                 | It will force the Input 1 signal to the lower range value when the sensor fails. Diagnostic message IN1 FAIL intermittently flashed on the lower display.   |

# Options Set Up Group

## Introduction

The Options group lets you configure the remote mode switch (Digital Inputs) to a specific contact closure response or configure the Auxiliary Output to be a specific selection with desired scaling.

## Function Prompts

Table 4-6: OPTION Group Function Prompts

| Function Prompt<br>Lower Display | Selection or<br>Range of<br>Setting<br>Upper Display | Parameter<br>Definition  |
|----------------------------------|--|--|
| Auxiliary Output                 |  | <p>AUXILIARY OUTPUT SELECTION</p> <p>This selection provides an mA output representing one of several control parameters. The display for auxiliary output viewing will be in engineering units for all but output. Output will be displayed in percent.</p> <div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <p><b>ATTENTION:</b> Other prompts affected by these selections: 4mA VAL and 20mA VAL.</p> </div> |
|                                  | Disable  | NO AUXILIARY OUTPUT  |
|                                  | PV   | PROCESS VARIABLE—Represents the percentage of the process variable calculated with respect to configured Auxiliary Output range (Auxiliary output low scaling factor to Auxiliary output high scaling factor).   |
|                                  | Deviation  | DEVIATION (PROCESS VARIABLE MINUS SETPOINT)—Represents Deviation percentage calculated with respect to the configured Auxiliary Output range (Auxiliary low scaling factor to Auxiliary high scaling factor).  |

| Function Prompt<br>Lower Display | Selection or<br>Range of<br>Setting<br>Upper Display | Parameter<br>Definition   |
|----------------------------------|--|---|
|                                  |  | <p><b>NOTE:</b> If PV or deviation value goes below Auxiliary output low scaling factor, display percentage is set to 0 % and the output current driven is limited to 4 mA. If PV or deviation value goes above the Auxiliary output high scaling factor, then the display percentage can be greater than 100 % and output current to a maximum value of 22 mA.</p> |
| 0 Percentage                     | Value in<br>Engineering<br>Units                     | <p>AUXILIARY OUTPUT LOW SCALING FACTOR—Use a value in engineering units to represent all AUX OUT parameters except output.</p> <p>Use value in percent (%) for output. (Output can be between -5 % and +105 %.)</p>   |
| 100<br>Percentage                | Value in<br>Engineering<br>Units                     | <p>AUXILIARY OUTPUT HIGH SCALING FACTOR—Use a value in engineering units to represent all AUX OUT parameters except output.</p> <p>Use a value in percent (%) for Output. (Output can be between -5 % and +105 %.)</p>  |
| Digital Input<br>1               | Disable<br><br>Enable                                | <p>EXTERNAL RESET (DIGITAL INPUT) – resets the latching relay on contact closure.</p> <p>Disable the function.</p> <p>Enable the function.</p>  |

# Communications Group

## Introduction

The Communications group lets you configure the controller with Easyset, a mobile app that communicates through Bluetooth, and lets a Modbus® client/master host communicate with the controller via Ethernet TCP/IP protocol.

A controller with the Ethernet option looks for messages from the host computer. If these messages are not received within the configured shed time, the controller will SHED from the communications link and return to stand-alone operation. You can also set the SHED output mode and setpoint recall, and communication units.

Up to 99 addresses can be configured over this link. The number of units that can be configured depends on the link length, with 31 being the maximum for short link lengths and 15 drops being the maximum at the maximum link length.

## Function Prompts

Table 4-7: Communications Group Function Prompts

| Function Prompt       | Selections or Range of Setting | Parameter Definition   |
|-----------------------|--------------------------------|--|
| Bluetooth Function    | Disable<br>Enable              | Disables/enables the Bluetooth function.   |
| Bluetooth ID          | UXXXXXXXX                      | Read only. It is an ID that is assigned to a controller that is to be used with the communications option. |
| Bluetooth Mac Address | XX:XX:XX:XX:XX<br>:XX          | Read only.   |
| Communication Type    |                                | Communication type selection - enables the RS485 or Ethernet communication port.                           |
|                       | Disable                        | Disable —Disables communications option.   |
|                       | Modbus                         | Modbus —Enables RS485 Modbus RTU communication port.   |

| Function Prompt      | Selections or Range of Setting  | Parameter Definition  |              |              |   |   |             |              |              |              |
|----------------------|---|---|--------------|--------------|---|---|-------------|--------------|--------------|--------------|
|                      | Ethernet  | Ethernet –Enables Ethernet communication port.  |              |              |   |   |             |              |              |              |
| Modbus Address       | 1 to 99   | Communications station address –This is a number that is assigned to a controller that is to be used with the communications option. This number will be its address.   |              |              |   |   |             |              |              |              |
| Baud Rate            |   | Baud Rate is the transmission speed in bits per second. This value is used for RS-485.  |              |              |   |   |             |              |              |              |
|                      | 4800  | 4800 BAUD   |              |              |   |   |             |              |              |              |
|                      | 9600  | 9600 BAUD   |              |              |   |   |             |              |              |              |
|                      | 19200   | 19200 BAUD  |              |              |   |   |             |              |              |              |
|                      | 38400   | 38400 BAUD  |              |              |   |   |             |              |              |              |
| Response Delay       | 1 to 500 milliseconds   | Response Delay –Configurable response-delay timer allows you to force the instrument to delay its response for a time period of from 1 to 500 milliseconds compatible with the host system hardware/software.   |              |              |   |   |             |              |              |              |
| Word Order for Float |   | Defines word/byte order of floating point data for communications. Byte values:<br><table border="1" style="margin-left: 20px;"> <tr> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>seeeee<br/>e</td> <td>emmmmm<br/>mm</td> <td>mmmmmm<br/>mm</td> <td>mmmmmm<br/>mm</td> </tr> </table> <p>Where:<br/>s = sign, e = exponent, m = mantissa bit</p> | 0            | 1            | 2 | 3 | seeeee<br>e | emmmmm<br>mm | mmmmmm<br>mm | mmmmmm<br>mm |
|                      | 0   | 1   | 2            | 3            |   |   |             |              |              |              |
|                      | seeeee<br>e   | emmmmm<br>mm  | mmmmmm<br>mm | mmmmmm<br>mm |   |   |             |              |              |              |
|                      | FP_B  | <table border="1" style="margin-left: 20px;"> <tr> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> </table>   | 0            | 1            | 2 | 3 |             |              |              |              |
|                      | 0   | 1   | 2            | 3            |   |   |             |              |              |              |
|                      | FP_BB   | <table border="1" style="margin-left: 20px;"> <tr> <td>1</td> <td>0</td> <td>3</td> <td>2</td> </tr> </table>   | 1            | 0            | 3 | 2 |             |              |              |              |
| 1                    | 0   | 3   | 2            |              |   |   |             |              |              |              |
| FP_L                 | <table border="1" style="margin-left: 20px;"> <tr> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> </table> | 3   | 2            | 1            | 0 |   |             |              |              |              |
| 3                    | 2   | 1   | 0            |              |   |   |             |              |              |              |
| FP_LB                | <table border="1" style="margin-left: 20px;"> <tr> <td>2</td> <td>3</td> <td>0</td> <td>1</td> </tr> </table> | 2   | 3            | 0            | 1 |   |             |              |              |              |
| 2                    | 3   | 0   | 1            |              |   |   |             |              |              |              |
| Ethernet Address     | 0.0.0.0 to 255.255.255.2  | Ethernet address, ranging from 0.0.0.0 to 255.255.255.255. It only applies to Ethernet  |              |              |   |   |             |              |              |              |

| Function Prompt     | Selections or Range of Setting | Parameter Definition  |
|---------------------|--------------------------------|---|
|                     | 55                             | communication port.<br>The default value is 10.0.0.2.   |
| Subnet Mask Address | 0.0.0.0 to 255.255.255.255     | Subnet Mask address, ranging from 0.0.0.0 to 255.255.255.255. It only applies to Ethernet communication port.<br>The default value is 255.255.255.255.  |
| Default Gateway     | 0.0.0.0 to 255.255.255.255     | Default Gateway, ranging from 0.0.0.0 to 255.255.255.255. It only applies to Ethernet communication port.<br>The default value is 0.0.0.0.  |
| Shed Function       | Disable<br>Enable              | Disables/enables shed functionality.  |
| Shed Time           | 0 to 255                       | Shed Time –The number that represents how many sample periods there will be before the controller sheds from communications. Each period equals 1/3 seconds; 0 equals No shed.<br><br><b>NOTE:</b> Shed Time is not configurable if Communication Type is set to Modbus, and Shed Function is set to Disable. |
| Shed SP Recall      |                                | Shed Setpoint Recall<br><br><b>NOTE:</b> It is not configurable if Shed Function is set as Disable.   |
|                     | To Local SP                    | Controller will use last local setpoint.  |
|                     | To Computer SP                 | When in “slave” mode, the controller will store the last host computer setpoint and use it at the Local setpoint. When in “monitor” mode, the controller will shed to the last instrument Local or Remote setpoint used, and the LSP is unchanged.  |

| Function Prompt  | Selections or Range of Setting | Parameter Definition   |
|------------------|--------------------------------|--|
| Computer SP Unit |                                | Computer Setpoint Units  |
|                  | Engineering Unit               | Engineering units  |
|                  | Percent                        | Percent of PV range  |
| Local Loopback   |                                | Local Loopback tests the RS-485 communications port. It is not used for any other communications port.   |
|                  | Disable                        | Disables the Loopback test.  |
|                  | Enable                         | <p>Allows loopback test. The instrument goes into Loopback mode in which it sends and receives its own message. The instrument displays PASS or FAIL status in the upper display and LOOPBACK in the lower display while the test is running. The instrument will go into manual mode when LOOPBACK is enabled with the output at the Failsafe value. The test will run until the operator disables it here, or until power is turned off and on.</p> <div data-bbox="672 1121 1378 1413" style="border: 1px solid orange; padding: 5px;"> <p><b>ATTENTION:</b> The instrument does not have to be connected to the external communications link in order to perform this test. If it is connected, only one instrument should run the loopback test at a time. The host computer should not be transmitting on the link while the loopback test is active.</p> </div> |



# Alarms Set Up Group

## Introduction

An alarm is an indication that an event that you have configured (for example—Process Variable) has exceeded one or more alarm limits. There are two alarms available. Each alarm has two setpoints. You can configure each of these two setpoints to alarm on various controller parameters.

There are two alarm output selections, High and Low. You can configure each setpoint to alarm either High or Low. These are called single alarms.

You can also configure the two setpoints to alarm on the same event and to alarm both high and low. A single adjustable Hysteresis of 0 % to 100 % is configurable for the alarm setpoint.

See Alarm Relay Contact Information in the Installation section for Alarm relay contact information.

The prompts for the Alarm Outputs appear whether the alarm relays are physically present or not. This allows the Alarm status to be shown on the display and/or sent via communications to a host computer.

## Function Prompts

Table 4-8: ALARMS Group Function Prompts

| Function Prompt<br>Lower Display | Selection or Range<br>of Setting<br>Upper Display | Parameter<br>Definition  |
|----------------------------------|---|--|
| A1S1 type                        |   | ALARM 1 SETPOINT 1 TYPE—Select what you want Setpoint 1 of Alarm 1 to represent. It can represent the Process Variable, Deviation, and if you have a model with communications, you can configure the controller to alarm on SHED. |
|                                  | None  | No Alarm   |
|                                  | PV  | Process Variable   |
|                                  | Deviation   | Deviation  |

| Function Prompt<br>Lower Display | Selection or Range<br>of Setting<br>Upper Display | Parameter<br>Definition  |
|----------------------------------|---|--|
|                                  |   | <b>ATTENTION:</b> Alarm set-point range is configurable from 0 to 9999.  |
|                                  | SHED  | Shed from Communications   |
|                                  | Failsafe  | Failsafe   |
|                                  | PV Rate of Change                                 | PV Rate of Change<br><br><b>ATTENTION:</b> Alarm set-point range is configurable from 0 to 9999.   |
|                                  | DI 1 Actuated                                     | Digital Input 1 Actuated   |
|                                  | TC Warning  | Thermocouple Warning<br><br><b>ATTENTION:</b> NOTE 1. Thermocouple Warning means that the instrument has detected that the Thermocouple Input is starting to fail. Not valid for input types other than Thermocouple.  |
|                                  | TC Failed   | Thermocouple Fail<br><br><b>ATTENTION:</b> NOTE 2. Thermocouple Failing means that the instrument has detected that the Thermocouple Input is in imminent danger of failing. Not valid for input types other than Thermocouple.                                    |
| A1S1 Value                       | Value in engineering units                        | ALARM 1 SETPOINT 1 VALUE—This is the value at which you want the alarm type chosen in prompt A1S1 Type to actuate. The value depends on what the setpoint has been configured to represent. No setpoint is required for alarms configured for Communications SHED. |

| Function Prompt Lower Display | Selection or Range of Setting Upper Display          | Parameter Definition   |
|-------------------------------|--|--|
|                               |  | This prompt does not appear for Alarm Types that do not use values. For example: A1S1 Type = DI 1 Actuated.  |
| A1S1 State                    | HIGH Alarm<br>LOW Alarm                              | ALARM 1 SETPOINT 1 STATE—Select whether you want the alarm type chosen in prompt A1S1 Type to alarm High or Low.<br><br>HIGH ALARM<br>LOW ALARM  |
| A1S1 Hysteresis               | 0.0 to 100.0 % of span or full output as appropriate | ALARM HYSTERESIS—A single adjustable hysteresis is provided on alarms such that when the alarm is OFF it activates at exactly the alarm setpoint; when the alarm is ON, it will not deactivate until the variable is 0.0 % to 100 % away from the alarm setpoint.<br><br>Configure the hysteresis of the alarms based on INPUT signals as a % of input range span.<br><br>Configure the hysteresis of the alarm based on OUTPUT signals as a % of the full scale output range. |
| A1S2 Type                     |  | ALARM 1 SETPOINT 2 TYPE—Select what you want Setpoint 2 of Alarm 1 to represent.<br><br>The selections are the same as A1S1TYPE.   |
| A1S2 Value                    | Value in engineering units                           | ALARM 1 SETPOINT 2 VALUE—This is the value at which you want the alarm type chosen in prompt A1S2 Type to actuate.<br><br>The details are the same as A1S1 VAL.  |
| A1S2 State                    | HIGH Alarm<br>LOW Alarm                              | ALARM 1 SETPOINT 2 STATE—Same as A1S1HL.   |
| A1S2 Hysteresis               | 0.0 to 100.0 % of span or full output as appropriate | ALARM HYSTERESIS—A single adjustable hysteresis is provided on alarms such that when the alarm is OFF it activates at exactly the alarm setpoint; when the alarm is ON, it will not deactivate until the variable is 0.0 % to  |

| Function Prompt<br>Lower Display | Selection or Range<br>of Setting<br>Upper Display    | Parameter<br>Definition   |
|----------------------------------|--|---|
|                                  |  | <p>100 % away from the alarm setpoint.</p> <p>Configure the hysteresis of the alarms based on INPUT signals as a % of input range span.</p> <p>Configure the hysteresis of the alarm based on OUTPUT signals as a % of the full scale output range.</p>   |
| A2S1 Type                        |  | <p>ALARM 2 SETPOINT 1 TYPE—Select what you want Setpoint 1 of Alarm 2 to represent.</p> <p>The selections are the same as A1S1 Type.</p> <div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <p><b>ATTENTION:</b> Not applicable with Relay Duplex unless using Dual Relay PWA.</p> </div>  |
| A2S1 Value                       | Value in engineering units                           | <p>ALARM 2 SETPOINT 1 VALUE—This is the value at which you want the alarm type chosen in prompt A2S1 Type to actuate.</p> <p>The details are the same as A1S1 VAL.</p>  |
| A2S1 State                       | HIGH Alarm<br>LOW Alarm                              | ALARM 2 SETPOINT 1 STATE—Same as A1S1HL.  |
| A2S1 Hysteresis                  | 0.0 to 100.0 % of span or full output as appropriate | <p>ALARM HYSTERESIS—A single adjustable hysteresis is provided on alarms such that when the alarm is OFF it activates at exactly the alarm setpoint; when the alarm is ON, it will not deactivate until the variable is 0.0 % to 100 % away from the alarm setpoint.</p> <p>Configure the hysteresis of the alarms based on INPUT signals as a % of input range span.</p> <p>Configure the hysteresis of the alarm based on OUTPUT signals as a % of the full scale output range.</p> |
| A2S2 Type                        | Value in engineering units                           | ALARM 2 SETPOINT 2 TYPE—Select what you want Setpoint 2 of Alarm 2 to represent.  |

| Function Prompt Lower Display | Selection or Range of Setting Upper Display          | Parameter Definition  |
|-------------------------------|--|---|
|                               |  | <p>The selections are the same as A1S1 Type.</p> <p><b>ATTENTION:</b> Not applicable with Relay Duplex unless using Dual Relay PWA.</p>   |
| A2S2 Value                    |  | <p>ALARM 2 SETPOINT 2 VALUE—This is the value at which you want the alarm type chosen in prompt A2S2 Type to actuate.</p> <p>The details are the same as A1S1 VAL.</p>  |
| A2S2 State                    | HIGH Alarm<br>LOW Alarm                              | ALARM 2 SETPOINT 1 STATE—Same as A1S1HL.  |
| A2S2 Hysteresis               | 0.0 to 100.0 % of span or full output as appropriate | <p>ALARM HYSTERESIS—A single adjustable hysteresis is provided on alarms such that when the alarm is OFF it activates at exactly the alarm setpoint; when the alarm is ON, it will not deactivate until the variable is 0.0 % to 100 % away from the alarm setpoint.</p> <p>Configure the hysteresis of the alarms based on INPUT signals as a % of input range span.</p> <p>Configure the hysteresis of the alarm based on OUTPUT signals as a % of the full scale output range.</p> |
| ALARM Output1                 | Non-latching<br>Latching                             | <p>LATCHING ALARM OUTPUT 1—Alarm output 1 can be configured to be Latching or Non-latching.</p> <p>Non-latching<br/>Latching</p> <p><b>ATTENTION:</b> When configured for latching, the alarm will stay active after the alarm condition ends until the RUN/HOLD key is pressed.</p>  |
| Alarm Blocking                |  | ALARM BLOCKING—Prevents nuisance alarms when the controller is first powered up. The  |

| Function Prompt<br>Lower Display | Selection or Range of Setting<br>Upper Display   | Parameter Definition   |
|----------------------------------|--|--|
|                                  | Disable<br>Alarm 1<br>Alarm 2<br>Alarm 1 & 2     | alarm is suppressed until the parameter gets to the non-alarm limit or band. Alarm blocking affects both alarm setpoints.<br><br>Disables blocking<br>Blocks alarm 1 only<br>Blocks alarm 2 only<br>Blocks both alarms<br><br><div style="border: 1px solid orange; padding: 5px;"> <p><b>ATTENTION:</b> When enabled on power up or initial enabling via configuration, the alarm will not activate unless the parameter being monitored has not been in an alarm condition for a minimum of one control cycle (167 ms).</p> </div> |
| AO/CO<br>Diagnostic              | Disable<br>Alarm 1<br>Alarm 2<br>Disable Warning | DIAGNOSTIC—Monitors the Current Output and/or Auxiliary Output for an open circuit condition. If either of these two outputs falls below about 3.5 mA, then an Alarm is activated. This configuration is in addition to whatever was selected for AxSx Type.<br><br>Disables Diagnostic Alarm<br>Alarm 1 is diagnostic alarm<br>Alarm 2 is diagnostic alarm<br>Disables Output Fail message on lower display   |

# Display Set Up Group

## Introduction

This group includes selections for Decimal place, Units of temperature, and Language.

## Function Prompts

Table 4-9: Display Group Function Prompts

| Function Prompt  | Selections or Range of Setting | Parameter Definition  |
|------------------|--------------------------------|---|
| Decimal Digits   |                                | Decimal Point Location –This selection determines where the decimal point appears in the main screen display.   |
|                  | None                           | No Decimal Place—fixed, no auto-ranging   |
|                  | One Digit                      | One Place   |
|                  | Two Digits                     | Two Places  |
|                  | Three Digits                   | Three Places  |
| Temperature Unit |                                | This selection will affect the indication and operation.  |
|                  | Deg Fahrenheit                 | Degrees Fahrenheit – Degrees F Annunciator lighted  |
|                  | Deg Centigrade                 | Degrees Centigrade – Degrees C Annunciator lighted  |
|                  | None                           | No temperature annunciators lighted. Upper and Lower Displays will show temperature in Degrees Fahrenheit when inputs are configured for Thermocouple or RTD types. |
| Language         | English                        | This selection designates the prompt language, English.   |
| TC Diagnostics   |                                | Thermocouple Diagnostics – Enable or disable Thermocouple diagnostic messages on the Lower Display.   |
|                  | Enable                         | Enable Diagnostic Messages  |

| Function Prompt | Selections or Range of Setting | Parameter Definition   |
|-----------------|--------------------------------|--|
|                 | Disable                        | Disable Diagnostic Messages  |
| Theme           | Dark                           | This selection applies the Dark theme to the UDC device.   |
|                 | White                          | This selection applies the White theme to the UDC device.<br><br><div style="border: 1px solid blue; padding: 5px;"> <p><b>NOTE:</b> After changing the theme, the UDC device must be restarted for the new theme to take effect.</p> </div> |

# Input1 Calib Set Up Group

## Introduction

This group appears when **Input 1 Type** of **Input 1** set up group is NOT configured as **Disabled**. See Input 1 Set Up Group for more information.

## Function Prompts

Table 4-10: Input1 Calib Group Function Prompts

| Function Prompt   | Selections or Range of Setting | Parameter Definition  |
|-------------------|--------------------------------|---|
| Calibrate Input 1 | Disable                        | Disable the calibration.  |
|                   | Begin                          | To begin the calibration. The following function prompts appear except Cold Junction Temp 1.  |
| Input 1 Zero      | It depends on the input type.  | Adjust your calibration device to an output signal equal to the 0 % range value for your particular input sensor. See the table <a href="#">Voltage, Milliamp and Resistance Equivalents for Input Range Values</a> for Voltage, Degrees, or Resistance equivalents for 0 % range values. |



| Function Prompt      | Selections or Range of Setting      | Parameter Definition  |
|----------------------|-------------------------------------|---|
| Input 1 Span         | It depends on the input type.       | Adjust your calibration device to an output signal equal to the 100 % range value for your particular input sensor. See the table <a href="#">Voltage, Milliamp and Resistance Equivalents for Input Range Values</a> for Voltage, Degrees, or Resistance equivalents for 100 % range values. |
| Cold Junction Temp 1 | The value is in tenths of a degree. | It only appears when the Input 1 Type is configured as TC.<br><br>It is the current reading of the temperature as measured at the thermocouple terminals and recognized by the controller. You can change this value, if it is in error, using the Increment key or Decrement key.            |

## Auxiliary Calib Set Up Group

### Introduction

This group appears when **Auxiliary Output of Options** set up group is NOT configured as **Disable**. See Options Set Up Group for more information.

### Function Prompts

Table 4-11: Auxiliary Calib Group Function Prompts

| Function Prompt | Selections or Range of Setting | Parameter Definition  |
|-----------------|--------------------------------|---|
| Zero Value      | It ranges from 0 to 65535.     | The desired 0 % output is read on the milliammeter. Normally, this will be the setting that produces 4 mA.    |
| Span Value      | It ranges from 0 to 65535.     | The desired 100 % output is read on the milliammeter. Normally, this will be the setting that produces 20 mA. |

# Configuration Record Sheet

Enter the value or selection for each prompt on this sheet so you will have a record of how your controller was configured.

| Group Prompt   | Function Prompt       | Value or Selection | Factory Setting   |
|----------------|-----------------------|--------------------|-------------------|
| Security       | Password              | _____              | 0                 |
|                | Lockout               | _____              | Calibration       |
|                | FM Version            | _____              | Disable           |
|                | Restore Settings      | _____              | Disable           |
|                | Change Password       | _____              | - -               |
| Limit Control  | Low or High Limit     | _____              | High Limit        |
|                | Power Up Status       | _____              | Normal            |
|                | SP High Limit         | _____              | 1000              |
|                | SP Low Limit          | _____              | 0                 |
| Input 1        | Input 1 Type          | _____              | 0-10 mV           |
|                | Input 1 Transmitter   | _____              | Linear            |
|                | Input 1 High Value    | _____              | 1000              |
|                | Input 1 Low Value     | _____              | 0                 |
|                | Input 1 Bias          | _____              | 0                 |
|                | Input 1 Filter        | _____              | 1                 |
|                | Input 1 Burnout       | _____              | No Burnout        |
| Options        | Auxiliary Output      | _____              | Disable           |
|                | DI 1 Function         | _____              | None              |
|                | DI 1 Combination      | _____              | Disable           |
| Communication  | Bluetooth Function    | _____              | Disable           |
|                | Bluetooth ID          | Read only          | UXXXXXXXX         |
|                | Bluetooth MAC Address | Read only          | XX:XX:XX:XX:XX:XX |
|                | Communication Type    | _____              | Disable           |
|                | Modbus Address        | _____              | 3                 |
|                | Baud Rate             | _____              | 19200             |
|                | Response Delay        | _____              | 1                 |
|                | Word Order for Float  | _____              | FP B 0123         |
|                | Ethernet Address      | _____              | 10.0.0.2          |
|                | Subnet Mask Address   | _____              | 255.255.255.0     |
|                | Default Gateway       | _____              | 0.0.0.0           |
|                | Shed Function         | _____              | Disable           |
|                | Shed Time             | _____              | 30                |
|                | Shed SP Recall        | _____              | To Local SP       |
|                | Computer SP Unit      | _____              | Engineering Unit  |
| Local Loopback | _____                 | Disable            |                   |

| Group Prompt  | Function Prompt       | Value or Selection | Factory Setting   |
|---|-----------------------|--------------------|-------------------|
| Alarms  | A1S1 Type             | _____              | None              |
|   | A1S1 Value            | _____              | 90                |
|   | A1S1 State            | _____              | High Alarm        |
|   | A1S1 Delay            | _____              | 0                 |
|   | A1S1 Hysteresis       | _____              | 0.1               |
|   | A1S2 Type             | _____              | None              |
|   | A1S2 Value            | _____              | 10                |
|   | A1S2 State            | _____              | Low Alarm         |
|   | A1S2 Delay            | _____              | 0                 |
|   | A1S2 Hysteresis       | _____              | 0.1               |
|   | A2S1 Type             | _____              | None              |
|   | A2S1 Value            | _____              | 95                |
|   | A2S1 State            | _____              | High Alarm        |
|   | A2S1 Delay            | _____              | 0                 |
|   | A2S1 Hysteresis       | _____              | 0.1               |
|   | A2S2 Type             | _____              | None              |
|   | A2S2 Value            | _____              | 5                 |
|   | A2S2 State            | _____              | Low Alarm         |
|   | A2S2 Delay            | _____              | 0                 |
|   | A2S2 Hysteresis       | _____              | 0.1               |
| Alarm Output 1  | _____                 | Non Latching       |                   |
| Alarm Blocking  | _____                 | Disable            |                   |
| AO/CO Diagnostic  | _____                 | Disable            |                   |
| Display   | Decimal Digits        | _____              | None              |
|   | Temperature Unit      | _____              | None              |
|   | Language              | _____              | English           |
|   | TC Diagnostics        | _____              | Enable            |
|   | Theme                 | _____              | White/Black       |
| Communication with RS485 board (Accessible via Communication set up group or Honeywell EasySet) | Bluetooth Function    | _____              | Disable           |
|   | Bluetooth ID          | Read only          | UXXXXXXXX         |
|   | Bluetooth MAC Address | Read only          | XX:XX:XX:XX:XX:XX |
|   | Communication Type    | _____              | Disable           |
|   | Modbus Address        | _____              | 3                 |
|   | Baud Rate             | _____              | 19200             |
|   | Response Delay        | _____              | 1                 |
|   | Word Order for Float  | _____              | FP B 0123         |
|   | Shed Function         | _____              | Disable           |
|   | Shed Time             | _____              | 30                |
|   | Shed Mode             | _____              | Last Mode         |
|   | Shed SP Recall        | _____              | To Local SP       |



# OPERATING THE LIMIT CONTROLLER

## What's in this section?

The following topics are covered in this section.

---

In this section:

|   |    |
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| <i>Overview</i> .....                         | 86 |
| <i>Operator Interface</i> .....               | 86 |
| <i>Entering a Security Code</i> .....         | 87 |
| <i>Lockout Feature</i> .....                  | 88 |
| <i>Monitoring Your Controller</i> .....       | 88 |
| <i>Start Up Procedure for Operation</i> ..... | 91 |
| <i>Setpoints</i> .....                        | 91 |
| <i>Alarm Setpoints</i> .....                  | 93 |

# Overview

## Introduction

This section gives you all the information necessary to help you monitor your controller including an Operator Interface overview, how to lockout changes to the controller, entering a security code, and monitoring the displays.

## Operator Interface

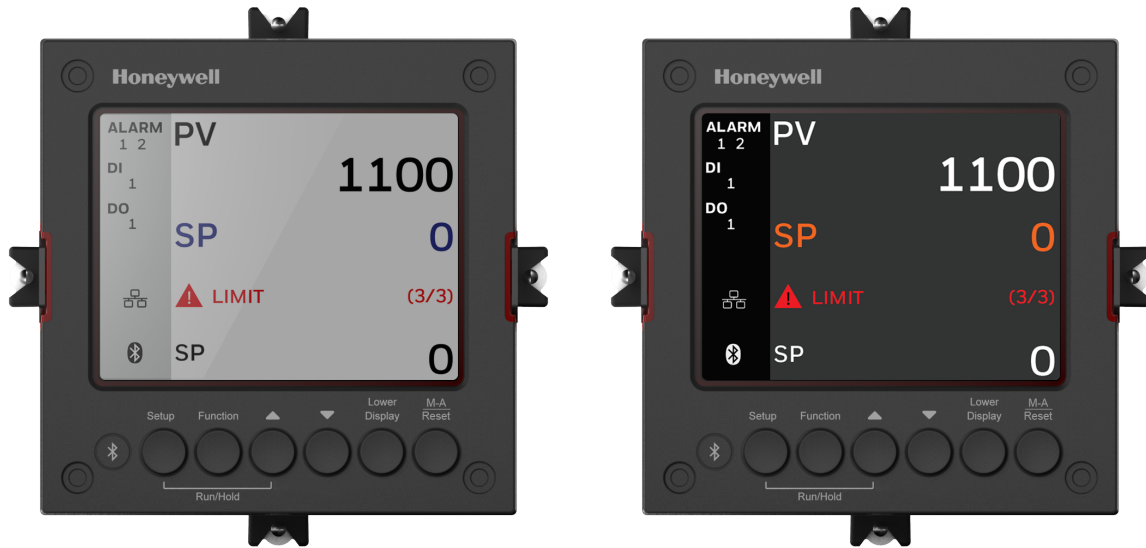


Figure 5-1: Operator Interface

# Entering a Security Code

## Introduction

The level of keyboard lockout may be changed in the Setup mode. However, knowledge of a security code number (0 to 9999) may be required to change from one level of lockout to another. When a controller leaves the factory, it has a security code of 1234 which should be entered and changed after the first power up or after restoring to factory default settings.

## Procedure

If you require the use of a security code, select a number from 0001 to 9999 and enter it when the lockout level is configured as None. Thereafter, that selected number must be used to change the lockout level from something other than None.

| Step | Operation                           | Press                          | Result  |
|------|-------------------------------------|--------------------------------|---|
| 1    | Enter Setup Mode                    | Setup key                      | The first set up group is Security.   |
| 2    | Select the function prompt Password | Function key                   | Enter into the first function prompt Password of the Security set up group.<br><br>Press the Function key again to enter in the configuration prompt of Password.                             |
| 3    | Enter Security Code                 | Increment key or Decrement key | To enter a four digit number (0001 to 9999)<br><br>This will be your security code.<br><br><b>ATTENTION:</b> Users must be careful while entering the password as the password is not hidden. |

# Lockout Feature

## Introduction

The lockout feature is used to inhibit changes (via keyboard) of certain functions or parameters by unauthorized personnel.

See Security Set Up Group for more information.

## Lockout levels

**NOTE:** In the EasySet app, lockout options appears under the security group only after entering the password.

There are different levels of Lockout depending on the level of security required. These levels are:

- None: No Lockout. All groups Read/Write.
- Calibration: Calibration prompts are deleted from the Setup List.
- +Configuration: LIMIT, Input 1 and options, communication alarm display states read only. All Setup are Read only. Calibration Group is not available.
- +SP: Status and security group are Read/write only. others not available

## Key error

When a key is pressed and the prompt “Key Error” appears in the Diagnostics display, it will be for one of the following reasons:

- Parameter not available or locked out
- Not in setup mode, press Setup key first
- Function locked out

# Monitoring Your Controller

## Annunciators

For annunciators provided to help monitor the controller, see [Function of displays](#) for more information.



## Viewing the operating parameters

Under the main screen, press the Lower Display key to scroll through the operating parameters listed in table below. The lower display will show only those parameters and their values that apply to your specific model.

*Table 5-1: Lower Display Key Parameter Prompts*

| Lower Display | Description  |
|---------------|--|
| CSP XXXX.XXX  | Computer Setpoint—When SP is in override. <ul style="list-style-type: none"> <li>• In the <b>Communication</b> set up group, enable <b>Shed Function</b>. And CSP is successfully override by SP override through Modbus.</li> </ul> |

## Diagnostic Messages

The UDC2800 limit controller performs background tests to verify data and memory integrity. If there is a malfunction, an error message is displayed. In the case of more than one simultaneous malfunction, the messages are displayed sequentially on the lower display. If any of these error messages in Table 4-3 occur, See the section [Background Tests and Diagnostic Messages](#) for a list of the Diagnostic Messages and how to correct the problems that they indicate.

| Prompt               | Description   |
|----------------------|---|
| EE Fail              | Unable to write to nonvolatile memory.  |
| Input 1 Fail         | Two consecutive failures of input 1 integration.  |
| Configuration Errors | Configuration Errors—Low limit greater than high limit for PV or SP   |
| Input 1 Range        | Input 1 Out-of-Range<br>Out-of-range criteria: <ul style="list-style-type: none"> <li>• Linear range: <math>\pm 10\%</math> out-of-range</li> <li>• Characterized range: <math>\pm 1\%</math> out-of-range</li> </ul> |
| PV Limits            | PV Out-of-Range<br>$PV = PV + PV \text{ bias}$  |
| Fails Safe           | Failsafe – conditions for Failsafe are: <ul style="list-style-type: none"> <li>• EEROM Test Failed</li> <li>• Scratch Pad RAM Test Failed</li> <li>• Configuration Test Failed</li> </ul>                             |
| TC Warning           | Thermocouple sensor is starting to burnout.   |
| TC Fail              | Thermocouple sensor is in imminent danger of burning out.   |
| Output 2 Fail        | Current Output 2 failure is less than 3.5 mA.   |

## Start Up Procedure for Operation

It is required to enter the initial password and a new password when start up the controller for the first time. The initial password is 1234.

For more information of interface displays, see the section [Function of displays](#).

Table 5-2: Procedure for Starting Up the Controller

| Step | Operation                | Press                      | Result   |
|------|--------------------------|----------------------------|--|
| 1    | Enter the Local Setpoint | Lower Display key          | Until the required "SP" and the Local Setpoint Value are displayed.                          |
|      |                          | Increment or Decrement key | To adjust the local setpoint to the value at which you want the process variable maintained. |

## Setpoints

### Introduction

You can configure the following setpoints for the UDC2800 Limit Controller controller.

- A Single Local Setpoint

### Change the Setpoint value

Table 5-3: Procedure for Changing the Local Setpoints

| Step | Operation           | Press                          | Result  |
|------|---------------------|--------------------------------|---|
| 1    | Select the Setpoint | Lower Display key              | Until you see:<br>Lower Display = SP  |
| 2    | Change the Value    | Increment key or Decrement key | To change the Local Setpoint to the value at which you want the process maintained. The display "blinks" if you attempt to enter setpoint values beyond the high and low limits.<br><br>The configured setpoint will be stored immediately. |



# Alarm Setpoints

## Introduction

An alarm consists of a relay contact and an operator interface indication. The alarm relay is de-energized if setpoint 1 is exceeded.

The alarm relay is energized when the monitored value goes into the allowed region by more than the hysteresis.

The relay contacts can be wired for normally open (NO) energized or normally closed (NC) de-energized using internal jumper placement.

There are four alarm setpoints, two for each alarm. The type and state (High or Low) are selected during configuration.

## Alarm Setpoints Display

*Table 5-4: Procedure for Displaying Alarm Setpoints*

| Step | Operation                  | Press                                       | Result                            |
|------|----------------------------|---|-----------------------------------|
| 1    | Select Alarms Set-up Group | Setup key or Increment key or Decrement key | Until you see Alarms set up group |

| Step | Operation                        | Press                          | Result  |
|------|----------------------------------|--------------------------------|---|
| 2    | Select the Alarm Setpoint Values | Function key                   | Enter in the first function prompt A1S1 Type.   |
|      |                                  | Increment key or Decrement key | <p>Until you see the required Alarm setpoint.</p> <p>A1S1 Value = Alarm 1, Setpoint 1 Value</p> <p>A1S2 Value = Alarm 1, Setpoint 2 Value</p> <p>A2S1 Value = Alarm 2, Setpoint 1 Value</p> <p>A2S2 Value = Alarm 2, Setpoint 2 Value</p> <p>To successively display the alarm setpoints and their values. Their order of appearance is shown below.</p> <p>Lower Display = (the alarm setpoint value)</p> <p>Range values are within the range of the selected parameters except:</p> <p>Deviation value = Configurable from 0 to 9999</p> <p>PV Rate of Change = The amount of PV change in one minute in engineering units.</p> <p>Loop Break Alarms (Loop Break) = The timer value may be changed only for controllers configured for ON/OFF control.</p> <div style="border: 1px solid blue; padding: 5px; margin-top: 10px;"> <p><b>NOTE:</b> TC warning, TC Fail and Failsafe selections do not have setpoint values.</p> </div> |
| 3    | Change a value                   | Function key                   | Enter in the first selection of the selected Alarm Setpoint   |
|      |                                  | Increment key or Decrement key | Change any alarm setpoint value.  |
| 4    | Enter the value                  | Function key                   | Enter the value made into memory.   |
| 5    | Return to Normal Display         | Lower Display key              | Exit the set up mode and returns to the main screen.  |

# INPUT CALIBRATION

## What's in this section?

The following topics are covered in this section.

---

In this section:

|  |     |
|--|-----|
| <i>Overview</i> .....                          | 96  |
| <i>Minimum and Maximum Range Values</i> .....  | 97  |
| <i>Preliminary Information</i> .....           | 100 |
| <i>Input 1 Set up Wiring</i> .....             | 101 |
| <i>Input 1 Calibration Procedure</i> .....     | 104 |
| <i>Restore Input Factory Calibration</i> ..... | 107 |

**WARNING:** INPUT CALIBRATION MAY REQUIRE ACCESS TO HAZARDOUS LIVE CIRCUITS, AND SHOULD ONLY BE PERFORMED BY QUALIFIED SERVICE PERSONNEL. MORE THAN ONE SWITCH MAY BE REQUIRED TO DE-ENERGIZE UNIT BEFORE CALIBRATION.

## Overview

### Introduction

This section describes the field calibration procedures for Input 1.

- All input actuations in every UDC2800 limit controller are fully factory-calibrated and are ready for configuration by the user.
- Field Calibration can improve the accuracy of the Controller if necessary for a particular application.

**CAUTION:** The field calibration will be lost if a change in input type configuration is implemented at a later time. The original factory calibration data remains available for later use after a field calibration is done. See subsection Restore Input Factory Calibration if you want to restore factory calibration values.

### Calibration Steps

Use the following steps when calibrating an input.

| Step | Action   |
|------|--|
| 1    | Find the minimum and maximum range values for your PV input range from Minimum and Maximum Range Values.   |
| 2    | Disconnect the field wiring and find out what equipment you will need to calibrate.  |
| 3    | Wire the calibrating device to your controller according to the set up wiring instructions for your particular input (See Input 1 Set up Wiring ). |
| 4    | Follow the calibration procedure given for Input #1 (See Input 1 Calibration Procedure).   |



# Minimum and Maximum Range Values

## Select the Range Values

Calibrate the controller for the minimum (0 %) and maximum (100 %) range values of your particular input type.

Select the Voltage, Current or Resistance equivalents for 0 % and 100 % range values from [Table 5-1 Voltage, Milliamp and Resistance Equivalents for Input 1 Range Values](#). Use these values when calibrating your controller.

Table 6-1: Voltage, Milliamp and Resistance Equivalents for Input 1 Range Values

| Sensor Type                | PV Input Range |              | Range Values |           |
|----------------------------|----------------|--------------|--------------|-----------|
|                            | °F             | °C           | 0%           | 100%      |
| Thermocouples (per ITS-90) |                |              |              |           |
| TC B                       | 0 to 3300      | -18 to 1816  | -0.100 mV    | 13.769 mV |
| TC E High                  | -454 to 1832   | -270 to 1000 | -9.835 mV    | 76.373 mV |
| TC E Low                   | -200 to 1100   | -129 to 593  | -6.472 mV    | 44.555 mV |
| TC J High                  | 0 to 1600      | -18 to 871   | -0.886 mV    | 50.060 mV |
| TC J Mid                   | 20 to 900      | -7 to 482    | -0.334 mV    | 26.400 mV |
| TC J Low                   | 20 to 550      | -7 to 288    | -0.334 mV    | 15.650 mV |
| TC K High                  | 0 to 2400      | -18 to 1316  | -0.692 mV    | 52.952 mV |
| TC K Mid                   | -20 to 1200    | -29 to 649   | -1.114 mV    | 26.978 mV |
| TC K Low                   | -20 to         | -29 to       | -1.114       | 16.350 mV |

| Sensor Type                              | PV Input Range |                 | Range Values |              |
|--|----------------|-----------------|--------------|--------------|
|  | °F             | °C              | 0%           | 100%         |
|  | 750            | 399             | mV           |              |
| TC M High (Ni-Ni-Moly)                   | 32 to 2500     | 0 to 1371       | 0.000 mV     | 71.773 mV    |
| TC M Low (Ni-Ni-Moly)                    | 32 to 1260     | 0 to 682        | 0.000 mV     | 31.825 mV    |
| TC N High (Nicrosil-Nisil)               | 0 to 2372      | -18 to 1300     | -0.461 mV    | 47.513 mV    |
| TC N Low (Nicrosil-Nisil)                | 0 to 1472      | -18 to 800      | -0.461 mV    | 28.455 mV    |
| TC R                                     | 0 to 3100      | -18 to 1704     | -0.090 mV    | 20.281 mV    |
| TC S                                     | 0 to 3100      | -18 to 1704     | -0.092 mV    | 17.998 mV    |
| TC T High                                | -300 to 700    | -184 to 371     | -5.341 mV    | 19.097 mV    |
| TC T Low                                 | -200 to 500    | -129 to 260     | -4.149 mV    | 12.574 mV    |
| TC C High                                | 0 to 4200      | -18 to 2315     | -0.234 mV    | 37.075 mV    |
| TC C Low                                 | 0 to 2240      | -18 to 1227     | -0.234 mV    | 22.283 mV    |
| Thermocouple Differential *              | -50 to 150     | -27.78 to 83.33 | -1.54 mV     | 4.62 mV      |
| RTD Alpha = 0.00385 per IEC-60751 (1995) |                |                 |              |              |
| RTD Pt100                                | -300 to 1200   | -184 to 649     | 25.202 ohms  | 329.289 ohms |
| RTD Pt100 Low                            | -300 to 300    | -184 to 149     | 25.202 ohms  | 156.910 ohms |
| RTD Pt200                                | -300           | -184            | 50.404       | 658.578      |

| Sensor Type   | PV Input Range                                |                | Range Values                           |   |
|---------------|---|----------------|--|---|
|               | °F  | °C             | 0%                                     | 100%                                    |
|               | to<br>1200                                    | to 649         | ohms                                   | ohms                                    |
| RTD Pt500     | -300<br>to<br>1200                            | -184<br>to 649 | 126.012<br>ohms                        | 1646.445<br>ohms                        |
| TC PR40-PR20  | 32 to<br>3416                                 | 0 to<br>1880   | 0.000 mV                               | 4.933 mV                                |
| Linear        |   |                |  |   |
| Milliamps     | 4 to 20 mA<br>0 to 20 mA                      |                | 4.00 mA<br>0.00 mA                     | 20.00 mA<br>20.00 mA                    |
| Millivolts    | 0 to 10 mV<br>0 to 50 mV<br>0 to 100 mV       |                | 0.00 mV<br>0.00 mV<br>0.00 mV          | 10.00 mV<br>50.00 mV<br>100.00 mV       |
| Volts         | 1 to 5 Volts<br>0 to 5 Volts<br>0 to 10 Volts |                | 1.00 Volts<br>0.00 Volts<br>0.00 Volts | 5.00 Volts<br>5.00 Volts<br>10.00 Volts |
| Carbon Oxygen | 0 to 1250 mV<br>-30 to 510 mV                 |                | 0.00 mV<br>-30.00<br>mV                | 1250.00<br>mV<br>510.00 mV              |

\* The Factory Calibrated millivolt values for the Thermocouple Differential Input are for a pair of J thermocouples at an ambient temperature mean of 450°F / 232°C. Other thermocouple types and ambient temperature means may be accomplished via Field Calibration of the input, with the range value limits being -4 mV to +16 mV for the zero and span values. See Input 1 Set up Wiring for procedure.

\*\* The range values for Radiamatic Type RI are customer configurable.

# Preliminary Information

## Disconnect the Field Wiring

Tag and disconnect any field wiring connected to the input terminals on the rear of the controller.

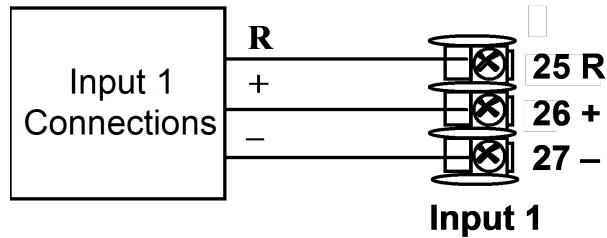


Figure 6-1: Input 1 Wiring Terminals

## Equipment Needed

Table below lists the equipment you will need to calibrate the specific types of inputs that are listed in the table. You will need a screwdriver to connect these devices to your controller.

Table 6-2: Equipment Needed

| Type of Input                          | Equipment Needed   |
|--|--|
| Thermocouple Inputs (Millivolt Source) | <ul style="list-style-type: none"> <li>A calibrating device with at least <math>\pm 0.02</math> % accuracy for use as a signal source such as a millivolt source.</li> <li>Two insulated copper leads for connecting the thermocouple inputs to the millivolt source.</li> </ul>   |
| RTD (Resistance Thermometer Device)    | <ul style="list-style-type: none"> <li>A decade box, with at least <math>\pm 0.02</math> % accuracy, capable of providing stepped resistance values over a minimum range of 0 to 1650 ohms with a resolution of 0.001 ohm.</li> <li>Three insulated copper leads of equal length for connecting the decade box to the controller.</li> </ul> |
| Milliampere, Millivolt and Volts       | <ul style="list-style-type: none"> <li>A calibrating device with at least <math>\pm 0.02</math> % accuracy for use as a signal source.</li> <li>Two insulated copper leads for connecting the</li> </ul>   |

| Type of Input | Equipment Needed   |
|---------------|--|
|               | <p>calibrator to the controller.</p> <ul style="list-style-type: none"> <li>Place current source at zero before switching ON.</li> <li>Do not switch current sources OFF/ON while connected to the UDC2800 input.</li> </ul> |

## Input 1 Set up Wiring

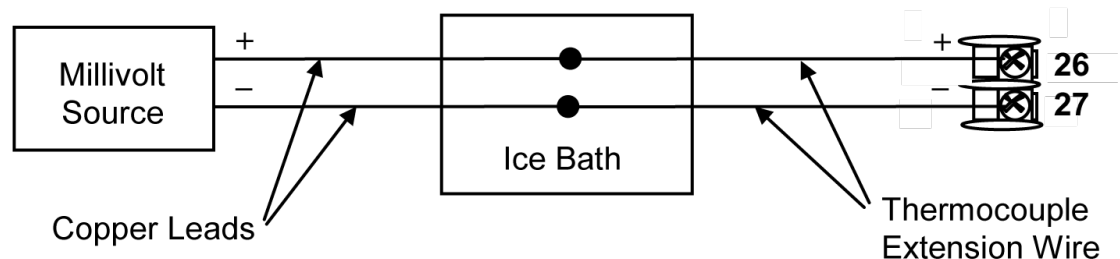
### Thermocouple Input using a Millivolt Source

See Figure Wiring Connections for Thermocouple Inputs using a Millivolt Source" and wire the controller according to the procedure given in Table "Set Up Wiring Procedure for Thermocouple Inputs using a Millivolt Source".

Table 6-3: Set Up Wiring Procedure for Thermocouple Inputs using a Millivolt Source

| Step | Action   |
|------|--|
| 1    | Connect the copper leads to the terminals for Input #1 as shown in the following figure "Wiring Connections for Thermocouple Inputs using a Millivolt Source". |
|      | Connect a length of thermocouple extension wire to the end of each copper lead and insert the junction points into the ice bath.                               |
|      | Connect the thermocouple extension wires to the terminals for Input #1. See the following figure.  |

Figure 6-2: Wiring Connections for Thermocouple Inputs using a Millivolt Source



### RTD Inputs

Refer to Input 1 Set up Wiring - and wire the controller according to the procedure given in Set Up Wiring Procedure for RTD Inputs.

Table 6-4: Set Up Wiring Procedure for RTD Inputs

| Step | Action  |
|------|---|
| 1    | Connect the copper leads from the calibrator to the Input #1 terminals as shown in figure Input 1 Set up Wiring . |

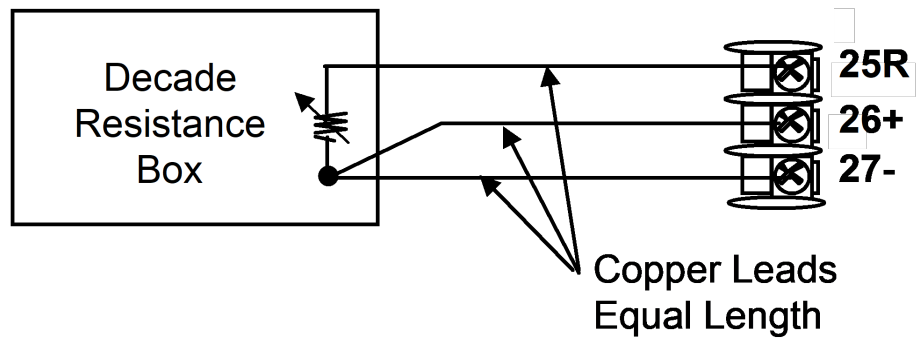


Figure 6-3: Wiring Connections for RTD (Resistance Thermometer Device)

### Millivolts, Volts or Thermocouple Differential Inputs

See the following figure and wire the controller according to the procedure given in the following table.

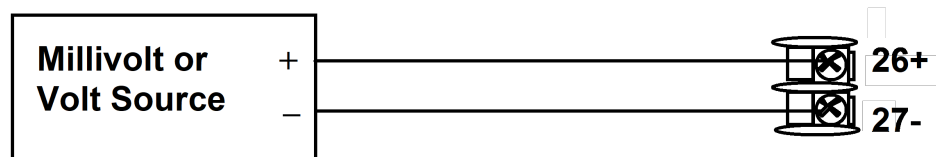


Figure 6-4: Wiring Connections for, Millivolts, Volts or Thermocouple Differential (Except 0 to 10 Volts)

Table 6-5: Wiring Connections for Thermocouple Differential, Millivolts or Volts (Except 0 to 10 Volts)

| Step | Action   |
|------|--|
| 1    | Connect the copper leads from the calibrator to the Input #1 terminals as shown in figure Wiring Connections for Thermocouple Inputs using a Millivolt Source. |
| 2    | Place current/voltage source at zero before switching on.  |
| 3    | Do not switch current/voltage source ON/OFF while connected to the instrument.   |

### Milliamperes

Table 6-6: Set Up Wiring Procedure for Milliampere Inputs

| Step | Action  |
|------|---|
| 1    | Connect the copper leads from the calibrator to the Input #1 terminals as shown in Wiring Connections for 0 to 20 mA or 4 to 20 mA Inputs-. |
| 2    | Place current source at zero before switching on.   |
| 3    | Do not switch current source ON/OFF while connected to the instrument.  |

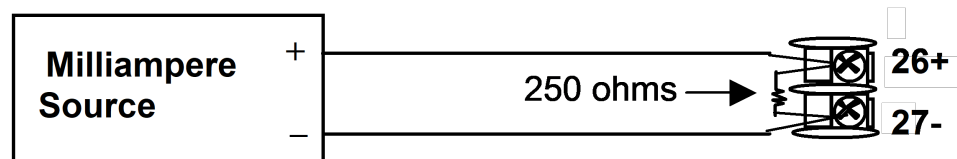


Figure 6-5: Wiring Connections for 0 to 20 mA or 4 to 20 mA Inputs

## Input 1 Calibration Procedure

### Preliminary Steps

- Apply power and allow the controller to warm up for 30 minutes before you calibrate.
- Before beginning the procedure, see [Input 1 Set up Wiring](#) for more information.
- Make sure you have set Lockout to NONE in the Security set up group. See Security Set Up Group for more information.
- See the table [Voltage, Milliamp and Resistance Equivalents for Input Range Values](#) for Voltage vs. Resistance equivalents or 0 % and 100 % range values.

**CAUTION:** For linear inputs, avoid step changes in inputs. Vary smoothly from initial value to final 100 % value.



## Procedure

The calibration procedure for Input #1 is listed in table below.

Table 6-7: Input 1 or 2 Calibration Procedure

| Step | Operation                   | Press                          | Result  |
|------|-----------------------------|--------------------------------|---|
| 1    | Enter Calibration Mode      | Setup key                      | Enter into the setup mode.  |
|      |                             | Increment key or Decrement key | Until you see "Input 1 Calib".  |
| 2    | Enable Calibration function | Function key                   | Enter the first function prompt "Calibrate Input 1" of the Input 1 Calib set up group.<br><br>Press the Function key again to enter the first configuration prompt of Calibrate Input N.  |
|      |                             | Increment key or Decrement key | Until you see Begin.  |
|      |                             | Function key                   | Enable the Calibration function<br><br>At the completion of the sequence, the selection automatically reverts to disable.   |
| 3    | Calibrate 0 %               | Increment key or Decrement key | <p>You will see Input N Zero (N=1 or 2)</p> <ul style="list-style-type: none"> <li>Adjust your calibration device to an output signal equal to the 0 % range value for your particular input sensor. See the table <a href="#">Voltage, Milliamp and Resistance Equivalents for Input Range Values</a> for Voltage, Degrees, or Resistance equivalents for 0 % range values.</li> <li>Wait 15 seconds or press the function key twice, then go to the next step.</li> </ul> <div style="border: 1px solid blue; padding: 5px; margin-top: 10px;"> <p><b>NOTE:</b> It is recommended to wait 15 seconds before pressing the function key for stable readings from the source.</p> </div> |

| Step | Operation                           | Press                          | Result   |
|------|-------------------------------------|--------------------------------|--|
| 4    | Calibrate 100 %                     | Increment key or Decrement key | <p>You will see Input 1 Span.</p> <ul style="list-style-type: none"> <li>Adjust your calibration device to an output signal equal to the 100 % range value for your particular input sensor. See the table <a href="#">Voltage, Milliamp and Resistance Equivalents for Input Range Values</a> for Voltage, Degrees, or Resistance equivalents for 100 % range values.</li> <li>Press the function key twice, and if                             <ul style="list-style-type: none"> <li>you are calibrating a Thermocouple input, go to step 5.</li> <li>you are calibrating other than a Thermocouple input, go to step 6.</li> </ul> </li> </ul> <div style="border: 1px solid blue; padding: 5px; margin-top: 10px;"> <p><b>NOTE:</b> It is recommended to wait 15 seconds before pressing the function key for stable readings from the source.</p> </div> |
| 5    | Check the Cold Junction Temperature | Increment key or Decrement key | <p>The calculations for zero and span are now stored, and you will see Cold Junction Temp 1:</p> <p>The value is in tenths of a degree. It is the current reading of the temperature as measured at the thermocouple terminals and recognized by the controller. You can change this value, if it is in error, using the Increment key or Decrement key.</p> <div style="border: 1px solid blue; padding: 5px; margin-top: 10px;"> <p><b>NOTE:</b> Users must measure the temperature on the rear terminals before calibrating the Cold junction.</p> </div> <div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <p><b>CAUTION:</b> The accuracy of the controller is directly affected by the accuracy of this value. It is recommended that this value not be changed under normal circumstances.</p> </div>                             |
| 6    | Exit the Calibration                | Function key                   | The controller stores the calibration constants  |

| Step | Operation | Press                | Result                     |
|------|-----------|----------------------|----------------------------|
|      | Mode      | Lower<br>Display key | Exit the calibration mode. |

## Restore Input Factory Calibration

### Introduction

The factory calibration constants for all the input actuation types that can be used with the controller are stored in its non-volatile memory. Thus, you can quickly restore the “Factory Calibration” for a given input actuation type by simply changing the actuation type to another type and then changing it back to the original type.

**ATTENTION:** A restored factory calibration overwrites any previous field calibration done for the input and may change the High and Low Range Limits. Protect your field calibration from accidental overwrites by configuring the appropriate Lockout selection after calibration. See Configuration for more information.

Table 6-8: Restore Factory Calibration

| Step | Operation                | Press                          | Result  |
|------|--------------------------|--------------------------------|---|
| 1    | Set Lockout to None      | Setup key                      | Until you see Security.   |
|      |                          | Function key                   | Enter into the first function prompt Password of the Security set up group. Press the Function key again to enter the correct password.<br><br><b>ATTENTION:</b> Users must be careful while entering the password as the password is not hidden. |
|      |                          | Function key                   | You can see Lockout appears. Press the Function key again to enter into the configuration prompt of the Lockout.  |
|      |                          | Increment key or Decrement key | Until you see None.   |
|      |                          | Function key                   | Set Lockout to None.  |
| 2    | Enter Input set up group | Setup key                      | Until you see Input 1.  |
|      |                          | Function key                   | Enter into the first function prompt Input 1 Type of the Input set up group.<br><br>Press the Function key again to enter into the configuration prompt of Input 1 Type.  |
|      |                          | Increment key or Decrement key | To change the current selection to another selection.   |
| 3    | Scroll through Functions | Function key                   | Until the lower display rolls through the rest of the functions and returns to Input 1 Type.  |
|      |                          | Increment key or Decrement key | Until you change the input selection back to the proper selection.  |
| 4    | Return to Normal         | Lower Display key              | Return to Normal operating mode.  |

| Step | Operation | Press | Result  |
|------|-----------|-------|---|
|      | Operation |       | The factory calibration will be restored. If the problem is not corrected, contact your Honeywell representative. |

# OUTPUT CALIBRATION

## What's in this section?

The following topics are covered in this section.

---

In this section:

|   |     |
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| <i>Auxiliary Output Calibration</i> .....       | 111 |
| <i>Restore Output Factory Calibration</i> ..... | 114 |

# Overview

## Introduction

This section describes the field calibration procedures for the Auxiliary Output.

**WARNING:** OUTPUT CALIBRATION MAY REQUIRE ACCESS TO HAZARDOUS LIVE CIRCUITS, AND SHOULD ONLY BE PERFORMED BY QUALIFIED SERVICE PERSONNEL. MORE THAN ONE SWITCH MAY BE REQUIRED TO DE-ENERGIZE UNIT BEFORE CALIBRATION.

# Auxiliary Output Calibration

## Introduction

Calibrate the controller so that the auxiliary output provides the proper amount of current over the desired range. The controller can provide an auxiliary current output range of from 0 mA to 20 mA and can be calibrated at 4 mA for 0 % of output and 20 mA for 100 % of output or any other values between 0 mA and 21 mA.

## Equipment Needed

You will need a calibrating device with whatever accuracy is required, capable of measuring 0 to 20 mA.

## Calibrator Connections

See the figure Wiring Connections for Calibrating Auxiliary Output- and wire the controller according to the procedure given in Set Up Wiring Procedure for Auxiliary Output-.

Table 7-1: Set Up Wiring Procedure for Auxiliary Output

| Step | Action   |
|------|--|
| 1    | Apply power and allow the controller to warm up 30 minutes before you calibrate. |

| Step | Action   |
|------|--|
| 2    | Set LOCK in the Tuning Set Up group to NONE.   |
| 3    | Tag and disconnect the field wiring, at the rear of the controller, from terminals 12 (+) and 13 (-). See Wiring Connections for Calibrating Auxiliary Output. |
| 4    | Connect a milliammeter across these terminals.   |

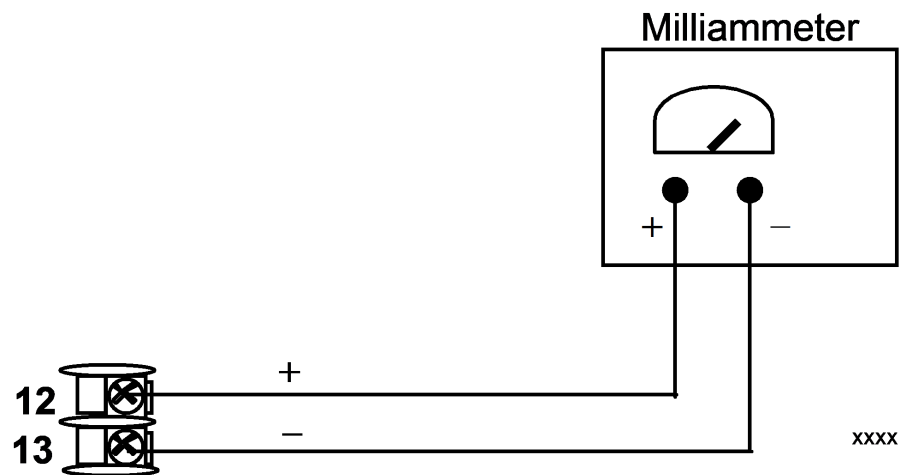


Figure 7-1: Wiring Connections for Calibrating Auxiliary Output

## Procedure

The procedure for calibrating the auxiliary output is listed in the following table

Make sure Lockout in the security group set to “NONE” See Security Set Up Group for more information.



Table 7-2: Auxiliary Output Calibration Procedure

| Step | Operation                 | Press                                       | Result   |
|------|---------------------------|---|--|
| 1    | Enter Calibration Mode    | Setup key                                   | Enter into the Setup mode.   |
|      |                           | Setup key or Increment key or Decrement key | Until you see Auxiliary Calib.   |
| 2    | Calibrate 0 %             | Function key                                | Enter into the first function prompt Zero Value of the Auxiliary Calib set up group. Press the Function key again to enter the configuration prompt of Zero Value.   |
|      |                           | Increment key or Decrement key              | Until the desired 0 % output is read on the milliammeter. Normally, this will be the setting that produces 4 mA.<br><br>If tuning Zero Value of 0-20 mA output type, the output should be tuned to non-zero value first, and then tuned back to the edge. The edge means that the output will be greater than 0 mA when the Increment key is pressed, and the output will still be 0 mA when the Decrement key is pressed. |
| 3    | Calibrate 100 %           | Function key                                | To store the 0 % value.  |
|      |                           | Increment key or Decrement key              | Until you see Span Value.  |
|      |                           | Function key                                | Enter into the configuration prompt of Span Value.   |
|      |                           | Increment key or Decrement key              | Until the desired 100 % output is read on the milliammeter. Normally, this will be the setting that produces 20 mA.  |
| 4    | Exit the Calibration Mode | Function key                                | The controller stores the span value.  |
|      |                           | Lower                                       | To exit the calibration mode.  |

| Step | Operation | Press       | Result |
|------|-----------|-------------|--------|
|      |           | Display key |        |

## Restore Output Factory Calibration

### Introduction

The factory calibration constants for the Current and Auxiliary Outputs are stored in its non-volatile memory. Thus, you can quickly restore the “Factory Calibration” for those outputs by simply changing the CO Range setting for that output to the other setting and then changing it back to the original type.

See table below for procedure.

**ATTENTION:** A restored factory calibration overwrites any previous field calibration done for the output. Protect your field calibration from accidental overwrites by configuring the appropriate LOCKOUT selection after calibration. See Configuration for more information.

Table 7-3: Restore Factory Calibration

| Step | Operation                  | Press                          | Result  |
|------|----------------------------|--------------------------------|---|
| 1    | Select Lockout to None     | Setup key                      | Until you see Security.   |
|      |                            | Function key                   | Enter into the first function prompt Password of the Security set up group. Press the Function key again to enter the correct password.<br><br><b>ATTENTION:</b> Users must be careful while entering the password as the password is not hidden. |
|      |                            | Function key                   | You can see Lockout appears. Press the Function key again to enter into the configuration prompt of the Lockout.  |
|      |                            | Increment key or Decrement key | Until you see None.   |
|      |                            | Function key                   | Set Lockout to None.  |
| 2    | Enter Options set up Group | Setup key                      | Until you see Options.<br><br>Options is for the Auxiliary Output.  |
|      |                            | Function key                   | Enter into the first function prompt of the Output or Options set up group.   |
|      |                            | Increment key or Decrement key | Until you see CO Range.   |
|      |                            | Function key                   | Enter into the first configuration prompt of the Output or Options set up group.  |
|      |                            | Increment key or Decrement key | To change the range configuration to the other selection  |
| 3    | Scroll through Functions   | Function key                   | Until the lower display rolls through the rest of the functions and returns to Co Range.  |
|      |                            | Increment key or Decrement key | To change the range selection in the upper display back to the proper selection.  |
| 4    | Return to Normal Operation | Lower Display key              | Return to Normal operating mode.<br><br>The factory calibration will be restored. If the problem is not corrected, contact your   |

| Step | Operation | Press | Result                    |
|------|-----------|-------|---------------------------|
|      |           |       | Honeywell representative. |

# TROUBLESHOOTING/SERVICE

## What's in this section?

The following topics are covered in this section.

---

In this section:

|  |     |
|--|-----|
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| <i>Troubleshooting Aids</i> .....            | 119 |
| <i>Power-up Tests</i> .....                  | 120 |
| <i>Status Tests</i> .....                    | 121 |
| <i>Background Tests and Diagnostic</i> ..... | 122 |
| <i>Controller Failure Symptoms</i> .....     | 126 |
| <i>Troubleshooting Procedures</i> .....      | 127 |
| <i>Restoring Factory Configuration</i> ..... | 133 |

# Overview

## Introduction

Instrument performance can be adversely affected by installation and application problems as well as by hardware problems. We recommend that you investigate the problems in the following order:

- installation related problems
- application related problems
- hardware and software related problems

and use the information presented in this section to solve them.

## Installation related problems

Read the Installation section in this manual to make sure the UDC2800 has been properly installed. The installation section provides information on protection against electrical noise, connecting external equipment to the controller, and shielding and routing external wiring.

**ATTENTION:** System noise induced into the controller will result in diagnostic error messages recurring. If the diagnostic error messages can be cleared, it indicates a “soft” failure and is probably noise related.

If system noise is suspected, completely isolate the controller from all field wiring. Use calibration sources to simulate PV and check controller functions of limit and alarms.

## Application related problems

Review the application of the controller; then, if necessary, direct your questions to the local sales office.

## Hardware and software related problems

Use the troubleshooting error message prompts and controller failure symptoms to identify typical failures which may occur in the controller. Follow the troubleshooting procedures to correct them.

# Troubleshooting Aids

## Overall error messages

An error message can occur:

- At power-up. See Power-up Tests for more information.
- When the Status Tests are requested. See Status Tests for more information.
- During continuous background tests while in normal operation. See Background Tests and Diagnostic for more information.

## Controller failure symptoms

Other failures may occur that deal with the Power, Output, or Alarms. Refer to the controller failure symptom in Table [Controller Failure Symptoms](#) to determine what is wrong and the troubleshooting procedures to use to correct the problem.

## Check installation

If a set of symptoms still persists, ensure proper installation and proper use of the controller in the system. See Installation for more information.

## Customer support

If you cannot solve the problem using the troubleshooting procedures listed in this section, you can get technical assistance by dialing 1-800-423-9883 USA and Canada.

An engineer will discuss your problem with you. Please have your complete model number, serial number, and Software version available. The model and serial numbers can be found on the chassis nameplate. The software version can be viewed under Setup Group "Status." See Table [Procedure for Identifying the Software Version](#).

If it is determined that a hardware problem exists, a replacement controller or part will be shipped with instructions for returning the defective unit.

Do not return your controller without authorization from Honeywell’s Technical Assistance Center or until the replacement has been received.

Check out Honeywell’s web site at <http://www.honeywell.com/imc>.

### Determining the software version

Table below lists the procedure for identifying the software version number.

*Table 8-1: Procedure for Identifying the Software Version*

| Step | Operation                  | Press        | Result   |
|------|----------------------------|--------------|--|
| 1    | Select Status set up group | Setup key    | Until you see Status.  |
| 2    | Read the software version  | Function key | Enter into the first function prompt Software Version of the Status set up group. You can see the software version then.<br><br>Please give this number to the Customer Support person. It will indicate which version of UDC2800 you have and help them determine a solution to your problem. |

## Power-up Tests

### What happens at power-up

When power is applied, the controller will run several diagnostic tests, including RAM test and EEPROM test. After these tests are completed, “Success” is displayed.

### Failsafe Failures

If one or more of these tests fail, the controller will go to the Failsafe Mode, and FailSafe will flash in the diagnostics display and a message indicating which test failed will appear in the diagnostic display.



# Status Tests

## Introduction

When required, the results of these tests can be checked to determine the reason the controller has gone to Failsafe.

## How to check the status tests

The procedure in table below tells you how to display the results of the status tests.

*Table 8-2: Procedure for Displaying the Status Test Results*

| Step | Operation                  | Press                          | Result   |
|------|----------------------------|--------------------------------|--|
| 1    | Select Status set up group | Setup key                      | Until you see Status.  |
| 2    | Read the test results      | Function key                   | Enter into the first function prompt Software Version of the Status set up group.                    |
|      |                            | Increment key or Decrement key | Until you see Failsafe Status. You can see the Failsafe status, No or Yes. Yes, indicates a failure. |
|      |                            | Increment key or Decrement key | Until you see Self Tests. You can see the status of Self Tests, Pass or Fail.                        |

# Background Tests and Diagnostic

## Introduction

This instrument performs ongoing background tests to verify data and memory integrity. If there is a malfunction, a diagnostic message will be displayed (blinking) in the diagnostics display.

In the case of simultaneous malfunctions, the messages will appear in sequence in the diagnostics display. Table below lists these background tests, the reason for their failure, and how to correct the problem.

Table 8-3: Background Tests

| Lower Display | Reason for Failure   | How to Correct the Problem  |
|---------------|--|---|
| RAM Error     | RAM test failed at start up.   | <ol style="list-style-type: none"> <li>1. Run through STATUS check to determine the reason for the failure.</li> <li>2. Run through the STATUS check a second time to see if the error cleared.</li> <li>3. Power cycle the instrument. If the message reappears, replace the instrument.</li> </ol>  |
| EEPROM Error  | Unable to write to non-volatile memory. Anytime you change a parameter, and it is not accepted, you will see EEPROM Error. | <ol style="list-style-type: none"> <li>1. Check the accuracy of the parameter and re-enter.</li> <li>2. Try to change something else in configuration.</li> <li>3. Run through Read STATUS tests to re-write to EEPROM.</li> <li>4. Run through the STATUS check a second time to see if the error cleared. If error did not clear, then power cycle the instrument. If the message reappears, replace the instrument.</li> </ol> |

| Lower Display          | Reason for Failure  | How to Correct the Problem  |
|------------------------|---|---|
| Calibration Test Error | Calibration test failed at start up.  | <ol style="list-style-type: none"> <li>1. Run through STATUS check to determine the reason for the failure.</li> <li>2. Restore factory settings. See Restoring Factory Configuration for more information.</li> <li>3. Power cycle the instrument. If the message reappears, replace the instrument.</li> </ol>                                  |
| Configuration Error    | <p>It appears when one of the following conditions is happened:</p> <ul style="list-style-type: none"> <li>• PV low limit is &gt; PV high limit</li> <li>• SP low limit is &gt; SP high limit</li> <li>• Output low limit &gt; Output high limit</li> </ul>   | Check the configuration for each item and reconfigure if necessary.   |
| Config Test Error      | Calculated checksum is mismatched with the checksum in EEPROM.  | Restore the instrument.   |
| Failsafe               | <p>This error message shows whenever the controller goes into a failsafe mode of operation. This will happen if:</p> <ul style="list-style-type: none"> <li>• RAM test failed</li> <li>• Configuration test failed</li> <li>• Calibration test failed</li> <li>• Burnout is configured for none, and the input failed.</li> </ul> | <ol style="list-style-type: none"> <li>1. Run through STATUS check to determine the reason for the failure.</li> <li>2. Press the Setup and Increment key until Status appears.</li> <li>3. Press the Function key to see whether the tests pass or fail, then run through the Status codes a second time to see if the error cleared.</li> </ol> |
| Input 1 Range          | Input 1 out of range. The   | <ol style="list-style-type: none"> <li>1. Make sure the range and</li> </ol>  |

| Lower Display          | Reason for Failure   | How to Correct the Problem  |
|------------------------|--|---|
|                        | <p>process input is outside the range limits.</p>  | <p>actuation are configured properly.</p> <ol style="list-style-type: none"> <li>2. Check the input source.</li> <li>3. Restore the factory calibration. (See Restore Input Factory Calibration for more information.)</li> <li>4. Field calibrate. See Input Calibration for more information.</li> </ol>  |
| <p>Input 1 Fail</p>    | <p>Two consecutive failures of input 1 integration, i.e., cannot make analog to digital conversion. This will happen if:</p> <ul style="list-style-type: none"> <li>• Upscale or Downscale burnout is selected, and the input is open</li> <li>• Input not configured correctly for the sensor being used</li> <li>• Calibration test failed</li> <li>• Input source is grossly out of range.</li> </ul> | <ol style="list-style-type: none"> <li>1. Make sure the actuation is configured correctly. See Configuration for more information.</li> <li>2. Make sure the input is correct and that it has not burned-out (opened).</li> <li>3. Check for gross over-ranging with a multimeter</li> <li>4. Restore factory calibration. See Restore Input Factory Calibration for more information.</li> </ol> |
| <p>PV Limit</p>        | <p>PV in engineering unit (with ratio and bias) is out of limit.</p> <p>PV limit is same as burnout high/low limit, Linear ±10%, TC/RTD ±1%, Input Algorithm 0%.</p> <p><math>PV = Input\ 1 \times Ratio\ 1 + Input\ 1\ BIAS</math></p>  | <ol style="list-style-type: none"> <li>1. Make sure the input signal is correct.</li> <li>2. Make sure the Ratio and Bias settings are correct.</li> <li>3. Recheck the calibration. Use Bias of 0.0.</li> </ol>  |
| <p>Slidewire Calib</p> | <ol style="list-style-type: none"> <li>1. Input 2 Type is configured as</li> </ol>   | <p>Field Calibrate the slidewire. See Position Proportional and Three</p>   |

| Lower Display  | Reason for Failure   | How to Correct the Problem  |
|----------------|--|---|
|                | Slidewire.<br><b>2.</b> Slidewire calibration never performed.   | Position Step Output Calibration for more information.  |
| Slidewire Fail | <b>1.</b> Input 2 Type is configured as Slidewire.<br><b>2.</b> Position Proportional slidewire input failure. | See Troubleshooting Procedures for more information.  |
| TC 1 Warning   | Thermocouple on Input 1 is starting to burn out.   | This diagnostic message means that the controller has detected that the thermocouple is starting to burn out. This error message may also be created if the resistance of the wires used to connect the thermocouple to the instrument is above 1000 ohms.  |
| TC 1 Fail      | Thermocouple on Input 1 is in imminent danger of burning out.  | This diagnostic message means that the controller has detected that the thermocouple will soon fail. User should consider replacing the thermocouple as soon as possible. This message will also be generated if the resistance of the wires used to connect the thermocouple to the instrument is above 2000 ohms. |
| Output 2 Fail  | Auxiliary Output is configured as 4-20mA, and Auxiliary Output is less than 3.5 mA.                            | The auxiliary output is open circuit. Check the field wiring. See Procedure #9.   |

# Controller Failure Symptoms

## Introduction

In addition to the error message prompts, there are failure symptoms that can be identified by noting how the controller displays and indicators are reacting.

## Symptoms

Compare your symptoms with those shown in table below.

Table 8-4: Controller Failure Symptoms

| Upper Display   | Lower Display                                     | Indicators | Controller Output  | Probable Cause                       | Troubleshooting Procedure |
|---|---|------------|--|--------------------------------------|---------------------------|
| Blank   | Blank   | Off        | None   | Power Failure                        | 1                         |
| OK  | OK  | OK         | External Alarm function does not operate properly              | Malfunction in alarm output          | 2                         |
| OK  | Displayed Output disagrees with Controller Output | OK         | Controller Output disagrees with Displayed Output              | Position Proportional or TPSC Output | 3                         |
| Display does not change when a key is pressed                       |   |            |  | Keyboard Malfunction                 | 4                         |
| Controller fails to go into "Slave" operation during communications |   |            |  | Communications Failure               | 5                         |
| OK  | Displayed Output disagrees with Auxiliary Output  | OK         | Controller Auxiliary Output disagrees with Displayed Auxiliary | Auxiliary Output                     | 6                         |

| Upper Display | Lower Display | Indicators | Controller Output | Probable Cause | Troubleshooting Procedure |
|---------------|---------------|------------|-------------------|----------------|---------------------------|
|               |               |            | Output            |                |                           |

## Other symptoms

If a set of symptoms or prompts other than the one you started with appears while troubleshooting, re-evaluate the symptoms. This may lead to a different troubleshooting procedure.

If the symptom still persists, refer to the installation section in this manual to ensure proper installation and proper use of the controller in your system.

# Troubleshooting Procedures

## Introduction

The troubleshooting procedures are listed in numerical order as they appear in Table "Controller Failure Symptoms". Each procedure lists what to do if you have that particular failure and how to do it or where to find the data needed to accomplish the task.

**WARNING:** TROUBLESHOOTING MAY REQUIRE ACCESS TO HAZARDOUS LIVE CIRCUITS, AND SHOULD ONLY BE PERFORMED BY QUALIFIED SERVICE PERSONNEL. MORE THAN ONE SWITCH MAY BE REQUIRED TO DEENERGIZE UNIT BEFORE SERVICING.

## Equipment needed

You will need the following equipment in order to troubleshoot the symptoms listed in the tables that follow:

- Multimeter – Capable of measuring millivolts, milliamps and resistance.
- Calibration sources – T/C, mV, Volt, etc.

## Procedure #1

This table explains how to troubleshoot power failure symptoms.

*Table 8-5: Troubleshooting Power Failure Symptoms*

| Step | What to do   | How to do it   |
|------|--|--|
| 1    | Check the AC line voltage.   | Use a voltmeter to measure the AC voltage across terminals L1 and L2 on the rear terminal panel of the controller.<br><br>Check the earth ground connection. |
| 2    | Make sure the chassis plugs into the rear of the case properly.  | Withdraw the chassis and visually inspect the controller board and the inside of the case.   |
| 3    | Check the system for Brown-outs, heavy load switching, etc., and conformance to installation instructions. | See Section - Installation.  |
| 4    | Change Power board.  | Installation instructions supplied with new board.   |

### **Procedure #2**

This table explains how to troubleshoot Alarm Relay Output failure.

*Table 8-6: Troubleshooting Alarm Relay Output Failure*

| Step | What to do   | How to do it  |
|------|--|---|
| 1    | Check the alarm configuration data. If it is correct, check the field wiring.  | Reconfigure if necessary.<br>See Configuration for more information.  |
| 2    | Check that the applicable alarm relay actuates properly depending on what you have set at prompt AxSx TYPE.<br><br>If it does, check the field wiring. | If the alarm type is set for PV, vary the input to raise and lower the PV around the setpoint. Listen for a click from the relay as the PV moves in either direction and note that the proper ALM1 or ALM2 is lit.<br><br>EXAMPLE: If the alarm is set to failsafe, disconnect the input 1 wire from the controller terminals. user will notice that the alarm light is ON. Connect back the input wires properly then the alarm light will be OFF. |
| 3    | Check the contacts.  | Make sure the NO or NC contact wiring is correct.   |



| Step | What to do  | How to do it  |
|------|---|---|
|      |   | See Installation for more information.                          |
| 4    | Change the relay and/or the current output board. | Installation instructions supplied with the new relay or board. |
| 5    | Change MCU board.                                 | Installation instructions supplied with the new board.          |

### Procedure #3

This table explains how to troubleshoot a Keyboard failure.

*Table 8-7: Troubleshooting a Keyboard Failure*

| Step | What to do   | How to do it   |
|------|--|--|
| 1    | Make sure the keyboard is connected properly to the MCU/output and power/input boards. | Withdraw the chassis from the case and visually inspect the connection.  |
| 2    | Controller Keyboard or specific keys may be LOCKED OUT via the security code.          | Use your four-digit security code number to change the lockout level. See Configuration for more information.  |
| 3    | Run the keyboard test.   | Press the Setup key and hold in, then press the Function key at the same time. The controller will run a display test. Then you will see Try keys in the Lower Display.<br><br>Press each key. If it works, the key name will appear in the Lower Display. |
| 4    | Replace the display/keyboard if any keys do not function.                              | See "Parts Replacement Procedures" in this section.  |

### Procedure #4

This table explains how to troubleshoot a RS 485 Communications failure.

*Table 8-8: Troubleshooting a RS-485 Communications Failure*

| Step | What to do   | How to do it  |
|------|--|---|
| 1    | Check the Address Number, ComState and Baud Rate settings. | See Communications Group for more information.  |
| 2    | Check the field wiring and termination resistor.           | Using an ohm meter, check the resistance across the communications rear terminals. See Section for wiring diagrams. |

| Step | What to do   | How to do it   |
|------|--|--|
| 3    | Make sure the Communications Printed Wiring Board is installed properly in the controller.   | Withdraw the chassis from the case and inspect the board. See the exploded view for location of the board. Return the chassis to the case.   |
| 4    | Determine if the Communications board is faulty by running a Local Loopback Test.<br><br>If the test fails, replace the board. If the test passes, the problem is most likely elsewhere in the communications network. | Disconnect the communications cable from the rear terminals. Run the Local Loopback Test.<br><br>Press the Setup key until you see Communication.<br><br>Press the Function key to enter in the first function prompt of the Communication set up group.<br><br>Press Increment key or Decrement key until you see Local Loopback.<br><br>Press the Function key to enter in the configuration prompt of Local Loopback.<br><br>Press Increment key or Decrement key until you see Enable.<br><br>The test will run until the operator disables it here. |

### Procedure #5

This table explains how to troubleshoot an Ethernet Communications failure.

*Table 8-9: Troubleshooting an Ethernet Communications Failure*

| Step | What to do  | How to do it  |
|------|---|---|
| 1    | Check the IP address, Subnet Mask address and Gateway address settings. | See Communication set up group and Honeywell EasySet. |
| 2    | Check if the  | The Ethernet symbol:                                  |

| Step | What to do                            | How to do it   |
|------|---------------------------------------|--|
|      | Ethernet Connection is active.        | <ul style="list-style-type: none"> <li>• Is <b>red</b> when there is no Ethernet connection.</li> <li>• Is <b>solid White</b> when there is an Ethernet connection, but no data exchange.</li> <li>• Is <b>white and blinks once per second</b> when there is an Ethernet connection and data exchange.</li> </ul> |
| 3    | Change Ethernet Communications board. | Installation instructions provided with new board.   |
| 4    | Change Controller                     |  |

### Procedure #6

This table explains how to troubleshoot Auxiliary Output failure symptoms.

*Table 8-10: Troubleshooting Auxiliary Output Failure*

| Step | What to do   | How to do it  |
|------|--|---|
| 1    | Make sure the controller is configured for Auxiliary Output and the proper range (4 to 20 or 0 to 20) is configured. | <p>Make Options set up group function prompt Auxiliary Output any selection other than Disable.</p> <p>Make the Options Set UP group function prompt CO Range = 4-20 or 0-20 per your application.</p> <p>See Configuration for more information.</p> |
| 2    | Check the field wiring.  | Output impedance must be less than or equal to 1000 ohms.   |
| 3    | Check the output.  | Change the Auxiliary Output selection to SP and then change the SP from 0 % to 100 % (4-20 mA). Use a DC milliammeter at the rear terminals to verify the output.   |
| 4    | Recalibrate the Auxiliary output.  | See Output Calibration for more information.  |
| 5    | Change Auxiliary Output board.   | Installation instructions provided with new board.  |

| Step | What to do        | How to do it |
|------|-------------------|--------------|
| 6    | Change Controller |              |

## Restoring Factory Configuration

### Introduction

This procedure restores the configuration of the instrument back to the Factory Settings. See Configuration Record Sheet for more information.

**ATTENTION:** Restoring the factory configuration overwrites all user-entered configuration changes. This procedure cannot be undone, it is a one-way process.

Table 8-11: Restoring Factory Configuration

| Step | Operation                   | Press                                       | Result  |
|------|-----------------------------|---|---|
| 1    | Enter Security set up group | Setup key                                   | Enter into the Setup mode.  |
|      |                             | Setup key or Increment key or Decrement key | Until you see Security.   |
| 2    | Enter Security Code         | Function key                                | Enter into the first function prompt Password of Security set up group. Press the Function key again to the password configuration. |
|      |                             | Increment key or Decrement key              | Enter the correct password.   |

**ATTENTION:** Users must be careful while entering the password as the password is not hidden.

| Step | Operation                | Press                          | Result  |
|------|--------------------------|--------------------------------|---|
| 3    | Enter Restoring Settings | Function key                   | The Lockout function prompt appears.  |
|      |                          | Increment key or Decrement key | Until you see Restoring Settings.   |
|      |                          | Function key                   | Enter into the configuration prompt of Restoring Settings.  |
|      |                          | Increment key or Decrement key | Until you see Enable.   |
|      |                          | Function key                   | <p>A dialog appears asking you are sure to restore the settings. Configuration will be restored in 5 seconds.</p> <p>You can press the Lower Display key to cancel the restore within 5 seconds.</p> <p>When the instrument finishes the restore operation, it automatically resets itself and restarts. It is required to change the password. See Start Up Procedure for Operation for more information.</p> <p>The instrument configuration is now the same as it was when it left the factory, and all user-entered configurations since that time have been overwritten.</p> |

# PARTS LIST

## What's in this section?

The following topics are covered in this section.

---

In this section:

*Exploded View* ..... 136

*Removing the chassis* ..... 141

# Exploded View

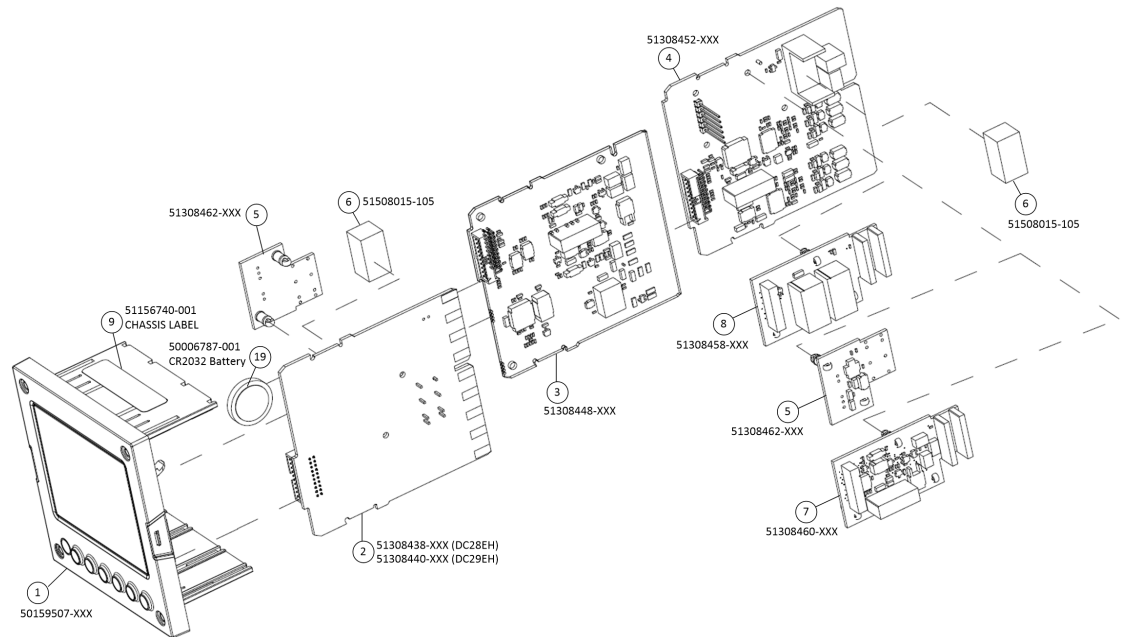
## Introduction

This figure shows an exploded view of the UDC2800 Controller. Each part is labeled with a key number. The part numbers are listed by key number in table [Parts Identification](#).

**NOTE:** Not all parts are standard.

**ATTENTION:** Internal parts of the product must be replaced and maintained by Honeywell representative.

Figure 9-1: UDC2800 Exploded View





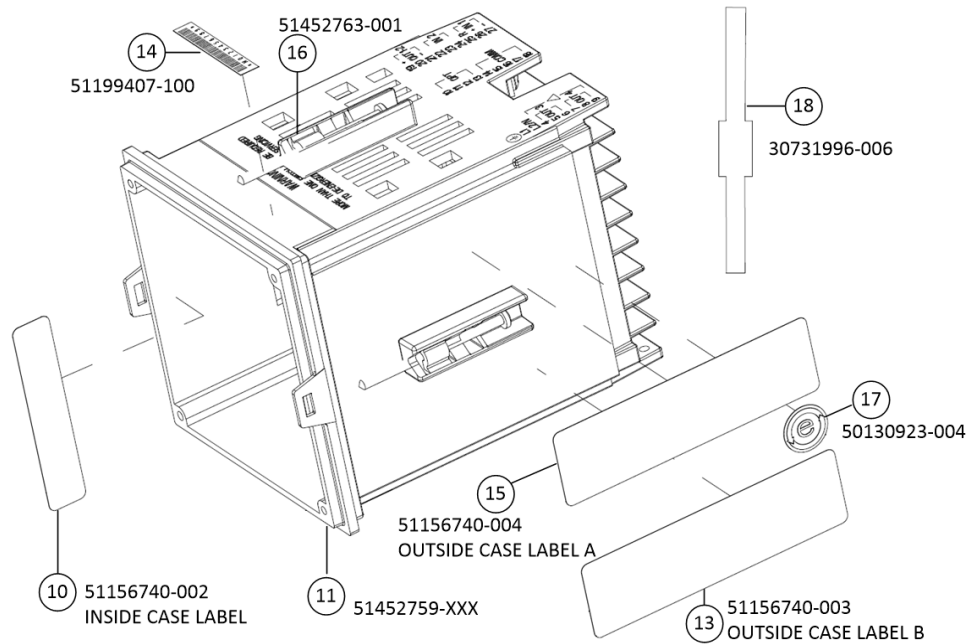
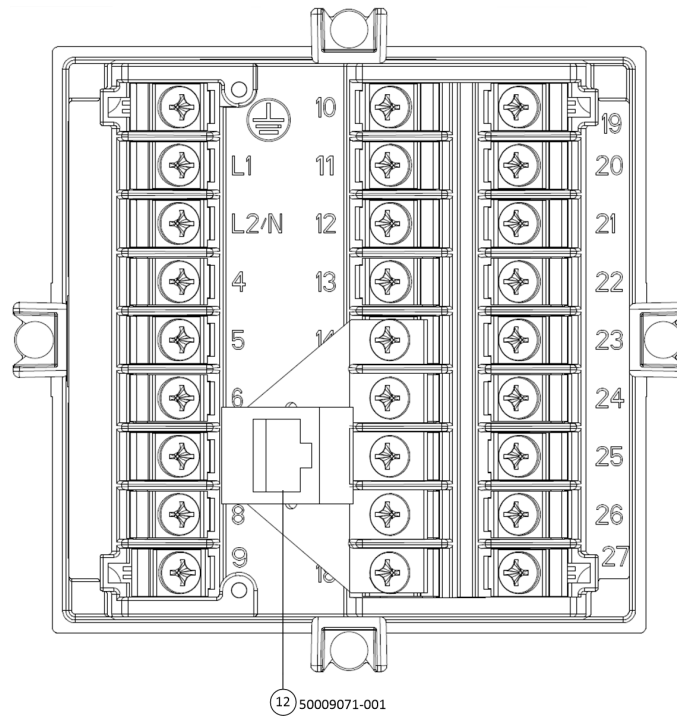
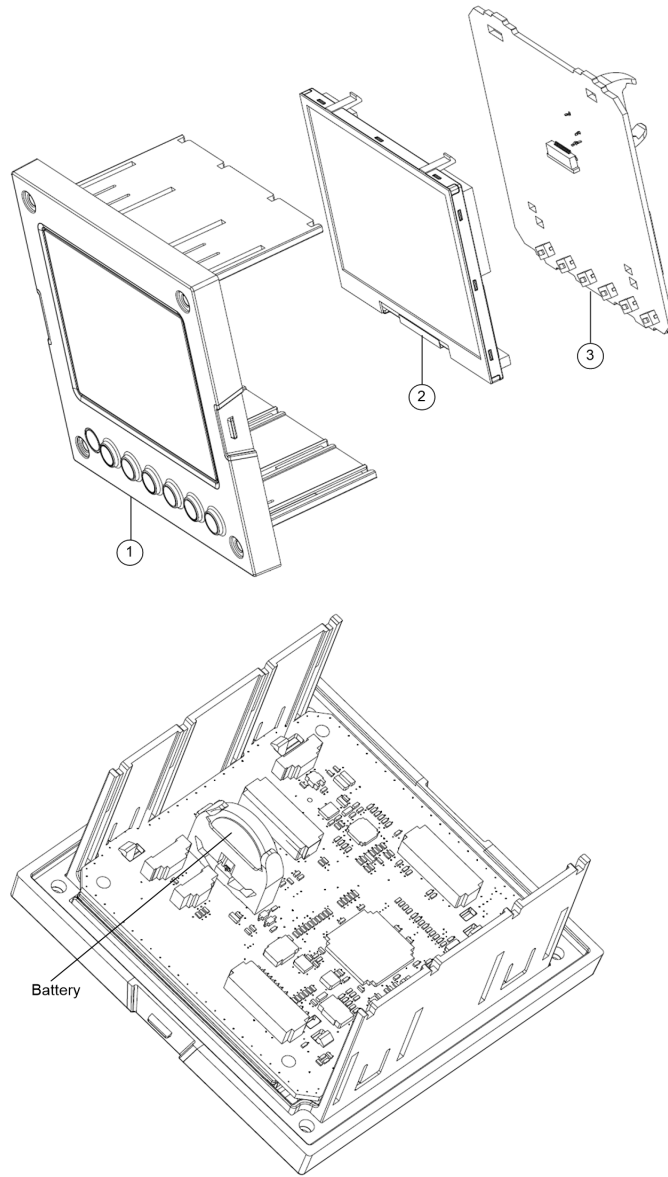


Table 9-1: Parts Identification

| Key Number | Part Number  | Description  |
|------------|--------------|--|
| 1          | 50159507-501 | Front panel assembly, UDC 2800/2900                          |
| 2          | 51308438-528 | Power/Output PWA without E-M Relays (90-264 Vac Operation)   |
|            | 51308438-529 | Power/Output PWA with E-M Relays (90-264 Vac Operation)      |
|            | 51308440-526 | Power/Output PWA with E-M Relays (24 Vac/dc Operation)       |
| 3          | 51308448-526 | Auxiliary Output/Digital Input PWA                           |
|            | 51308448-527 | Auxiliary Output/Digital Input/RS-422/485 Communications PWA |
|            | 51308448-528 | Auxiliary Output/Digital Input/Ethernet Communications PWA   |
| 4          | 51308452-526 | Analog Input/Control Output (1ch AI), PWA                    |
|            | 51308452-527 | Analog Input/Control Output (2ch AI), PWA                    |
| 5          | 51308462-526 | Open Collector Output (TPS) PWA                              |
| 6          | 51508015-505 | Electro-Mechanical Relay                                     |
| 7          | 51308460-526 | Current Output PWA   |
| 8          | 51308458-526 | Dual Electromechanical Relay PWA                             |
| 9          | 51156740-001 | Chassis Label  |
| 10         | 51156740-002 | Inside Case Label  |
| 11         | 51452759-501 | Case Assembly (including Mounting Kit with four brackets)    |
| 12         | 50009071-501 | Ethernet Adaptor Board Kit PWA                               |
| 13         | 51156740-003 | Outside Case Label B   |
| 14         | 51199407-100 | Label, Module Barcode  |
| 15         | 51156740-004 | Outside Case Label A   |
| 16         | 51452763-501 | Mounting Kits (12 brackets & screws)                         |
| 17         | 50130923-004 | China RoHS 2 Label, Compliant                                |

| Key Number | Part Number  | Description   |
|------------|--------------|---|
| 18         | 30731996-506 | 4-20 mA Input Resistor Assembly (250 ohm)   |
| 19         | 50006787-001 | CR2032 Battery.<br>Battery is installed in MCU display. For more information, see the following figures.<br><b>NOTE:</b> Battery is not used for the current release. |

Figure 9-2: 50159507 Exploded View



| Key Number | Part Number  | Description                              |
|------------|--------------|--|
| 1          | 50150597-501 | CHASSIS ASSEMBLY, UDC                    |
| 2          | 50152823-501 | TFT-LCD module for UDC2800, CTM320240N01 |
| 3          | 51308456-526 | MCU/Display PWA                          |

## Removing the chassis



Using a thin screwdriver, gently twist the screwdriver to pry the side tabs from the front face. Pry just enough to release it, otherwise you'll bend or break the tab. If you break or bend the tab and can't reattach the front snugly, you'll need to reattach the front using the 4 NEMA4 screws provided. See Mounting for more information.

**WARNING:** Do not put your fingers inside the case to touch rail terminals to avoid electric shock.

# CONFIGURATION VIA HONEYWELL EASYSET

## What's in this section?

The following topics are covered in this section.

---

In this section:

|   |     |
|---|-----|
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| <i>Upload Configuration</i> .....                                       | 150 |
| <i>Offline Configuration</i> .....                                      | 151 |
| <i>Download</i> .....   | 158 |
| <i>Online Configuration</i> .....                                       | 160 |
| <i>Maintenance Data</i> .....   | 164 |
| <i>About EasySet</i> .....  | 168 |
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# Overview

Honeywell EasySet app lets users configure their instrument (Non-FM) on a Mobile Device via Bluetooth. It is available to detect and connect controllers within 3 meters.

This app can be installed on IOS 12.0 and Android 9 or higher operating system.

**ATTENTION:** Before using the EasySet app on an Android device, it is recommended to install and keep all Android security updates up-to-date.

**NOTE:** It is recommended to use the default keyboard when using the EasySet app on an Android device.

**NOTE:** It is recommended to use the Honeywell EasySet app on 5 inch and above screen size iOS mobiles for a better experience.

The configurations are accessed using icons introduced below.

Figure 10-1: Honeywell EasySet interface

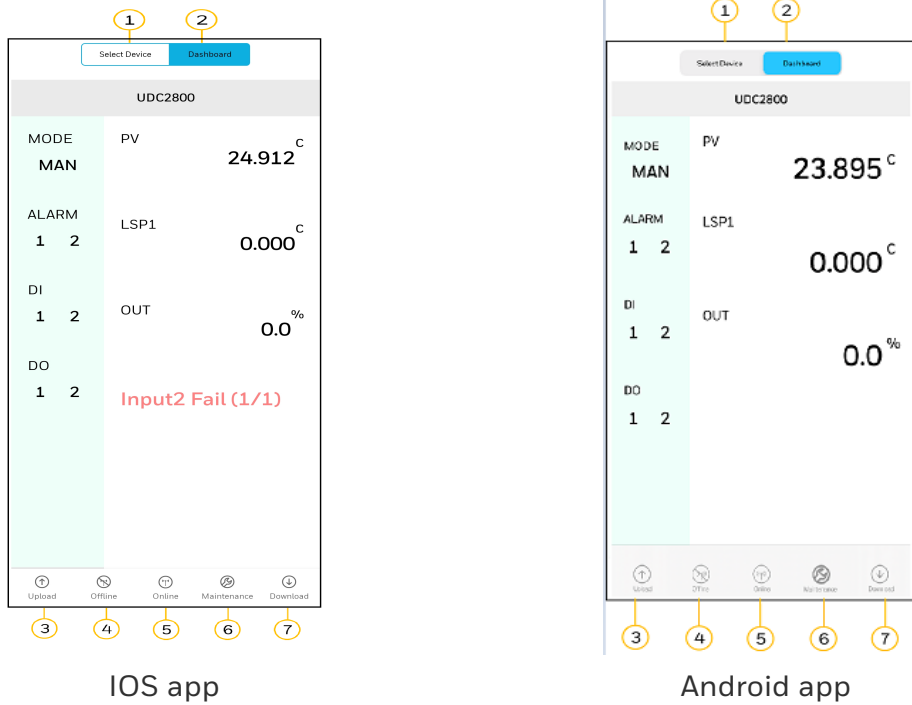


Table 10-1: Description of icons

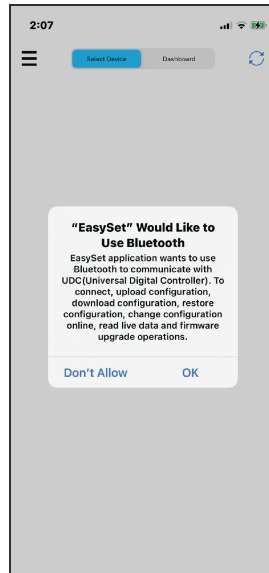
| Item | Description  |
|------|--|
| 1    | The Select Device Tab shows list of available UDC devices. It is used to set up communications before uploading or downloading instrument configurations. See Communications Setup for more information.   |
| 2    | <p>The Dashboard is used to configure &amp; operate controllers and download/upload the complete configuration.</p> <div data-bbox="331 684 1377 800" style="border: 1px solid blue; padding: 5px;"> <p><b>NOTE:</b> The displayed data on the Dashboard page refreshes every 10 seconds.</p> </div>                                 |
| 3    | The Upload tab is used to upload instrument configuration to Mobile Device. See Upload Configuration for more information.   |
| 4    | The Offline tab is used to edit an instrument configuration for later downloading. See Offline Configuration for more information.   |
| 5    | The Online tab is used to edit and download one instrument settings at a time. See Online Configuration for more information.  |
| 6    | <p>The Maintenance tab displays key operating parameters and status parameters of the instrument without switching between the instrument screens. Some of the information presented here is not visible through the instrument display panel. Used primarily for diagnostics.</p> <p>See Maintenance Data for more information.</p> |
| 7    | The Download tab is used to download an instrument configuration to an instrument. See Download for more information.  |

## Communications Setup

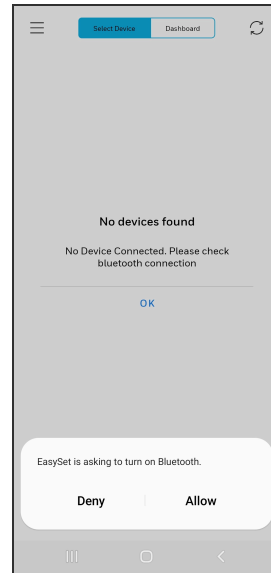
Before transferring the data between the EasySet app and instrument, the user must set up the mobile device communication parameters using following procedure.



1. Open the EasySet app. The Bluetooth permission pop-up appears.

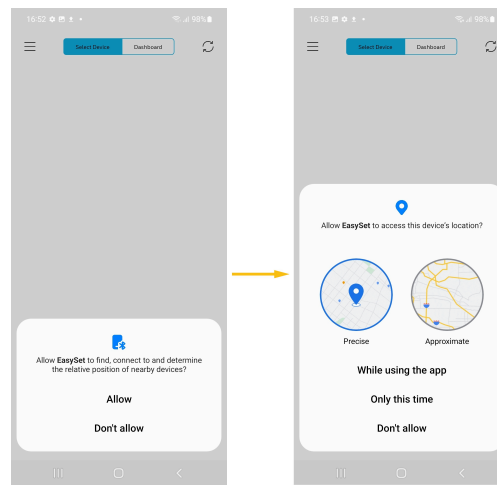


IOS app



Android app

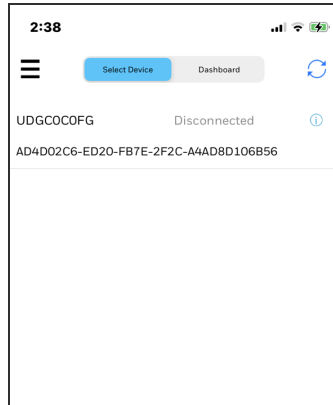
**NOTE:** In Android device, if the Easyset app opened for the first time, users need to allow **Location** access permission. It is recommended to choose **Precise** location for better results.



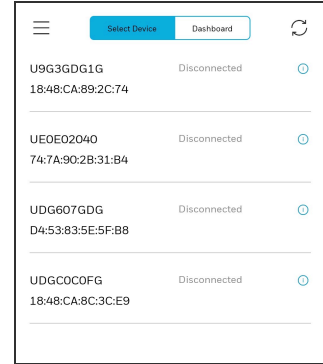
2. Perform the following:

- In IOS device, Click **OK**.
- In Android devices, Click **Allow**.

3. Click **Select Device**, all available controllers are detected and displayed with Bluetooth IDs.



IOS app

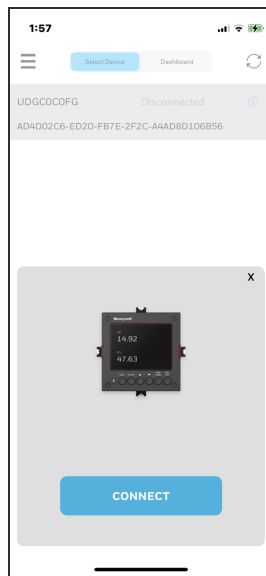


Android app

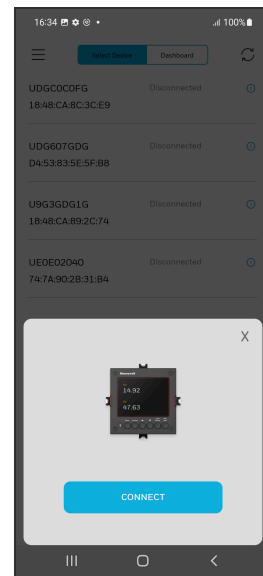
**NOTE:** The UDC device's **Bluetooth ID** appears in the communications group on the controller screen.

**NOTE:** If the required controller is not listed, click the **Refresh** icon to refresh the page.

4. Select the desired controller to connect, the connect dialog appears.



IOS app



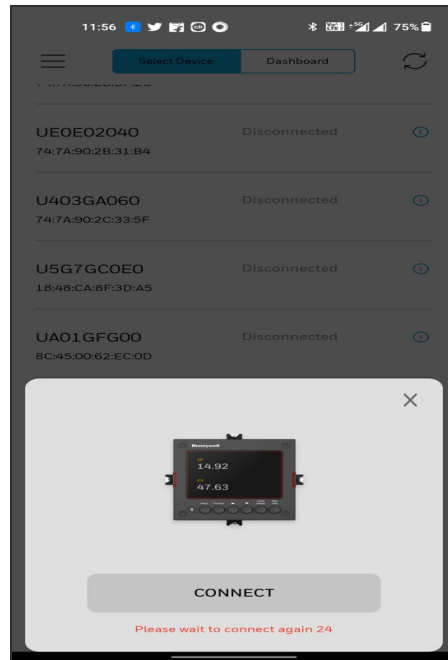
Android app

5. Click **CONNECT**, Bluetooth pairing request dialog appears.

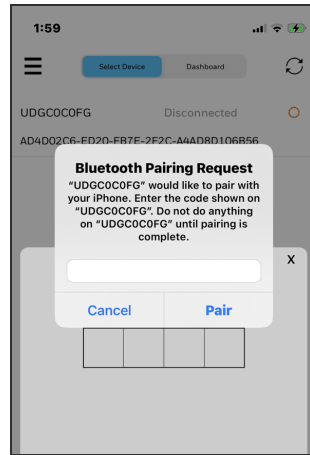
**NOTE:** The UDC device displays a pairing code. Record the code.

6. Enter the UDC device pairing code, and then click **Pair**.

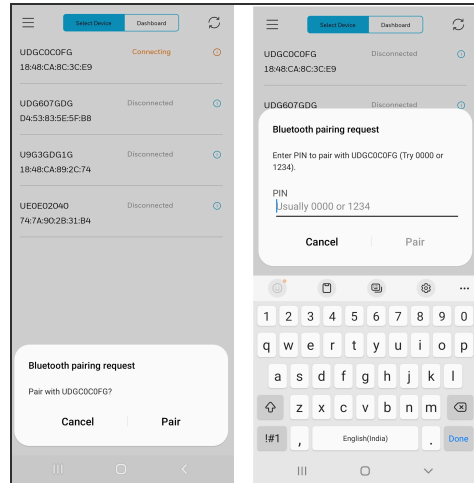
**ATTENTION:** If the user clicks cancel option while pairing with UDC device, at that point controller will still be in active state with phone for 30 seconds, to repair with the UDC device user needs to wait for 30 seconds.



**ATTENTION:** After clicking cancel option, if the user clicks on refresh button then the device name will disappear from the list.



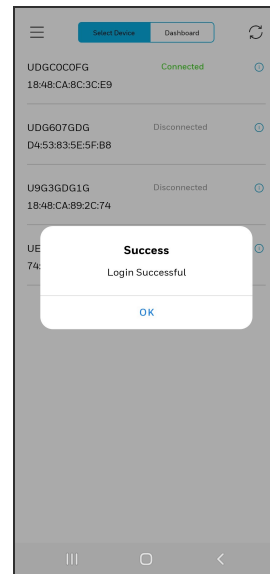
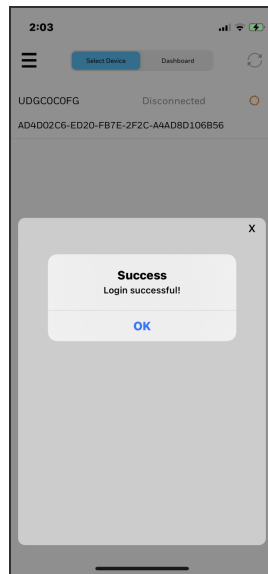
IOS app



Android app

7. Once Bluetooth pair is success, enter a PIN dialog appears.
8. Enter the UDC device PIN.
  - The entered PIN is valid, and **Success** dialog appears.
  - The entered PIN is not valid, and **Login failed** dialog appears. Check the device password try again.

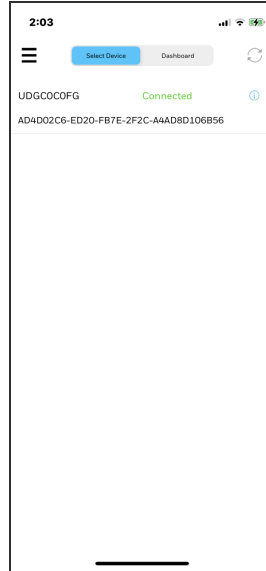
**ATTENTION:** Enter the four digit UDC device PIN in the EasySet app to login.



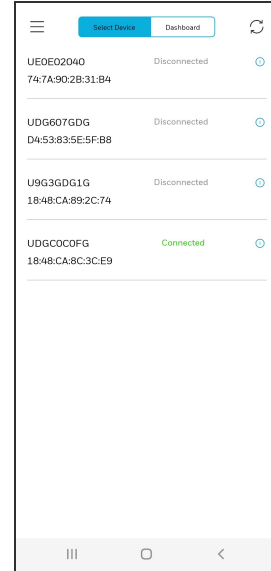
IOS app

Android app

9. Click OK.



IOS app



Android app

**ATTENTION:** Once the UDC device is connected to the EasySet app through Bluetooth, do not disable or turn off the Bluetooth function in the UDC device.

**NOTE:** The user must disconnect the current device from the EasySet app before connecting to the new device.

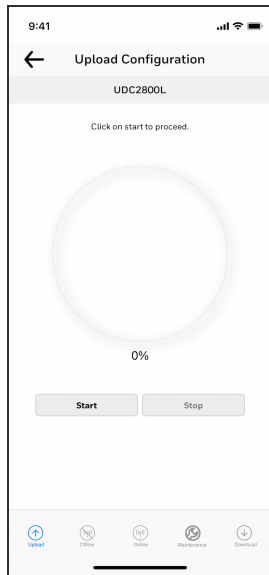
**NOTE:** If the Android app is unable to connect to the controller after retrying, user must turn On and Off their phone's bluetooth.

**ATTENTION:** The EasySet app does not allow the user to connect to new devices if a UDC device is paired with the app but the PIN is not entered. In this instance, the user must either close the app or enter the PIN to log in.

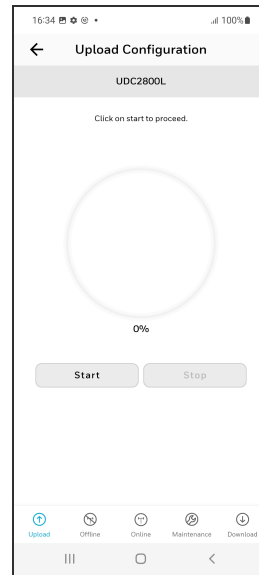
# Upload Configuration

Using Upload Configuration user can upload the instrument's configuration into the EasySet app, where user can save, edit, and download the configurations back to the instrument or other instruments.

1. Click **Dashboard**. The dashboard page appears.
2. Click **Upload**. The **Upload Configuration** page appears.

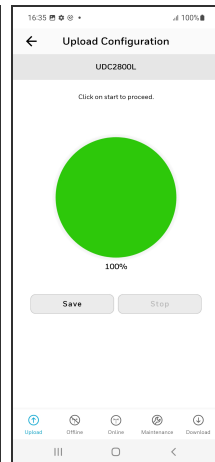
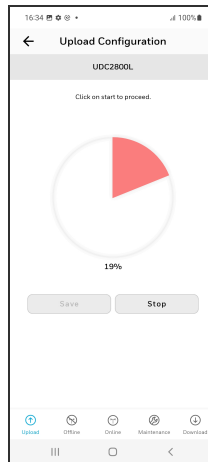
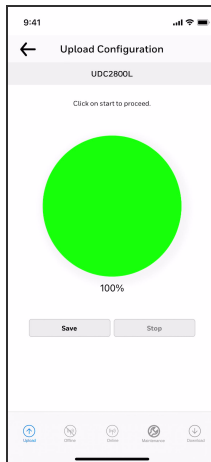
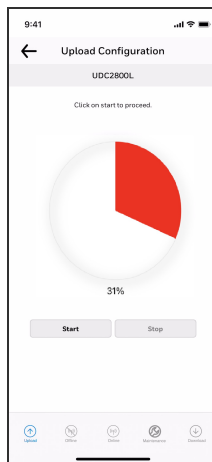


IOS app



Android app

3. Click **Start** to begin upload. The status of upload (% complete) is shown.



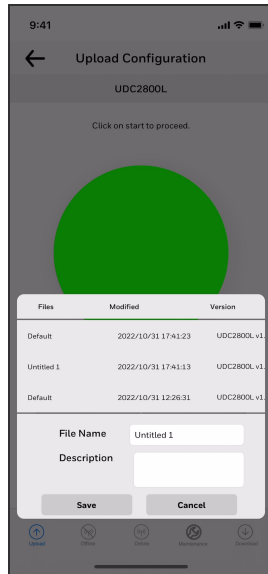
IOS app

Android app

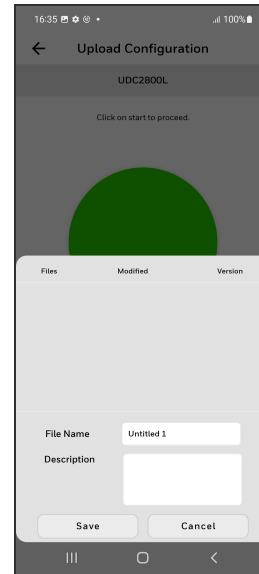
**NOTE:** To terminate upload, click **Stop**.

If upload is successful, Users can save the configuration.

4. Click **Save**, and enter the **File Name** and **Description**.



IOS app



Android app

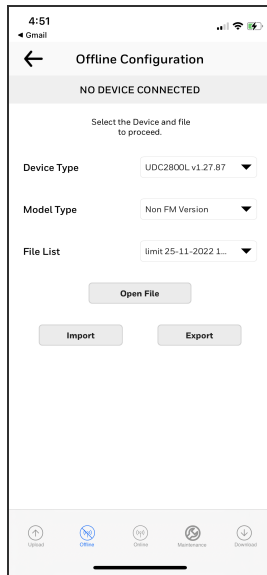
5. Click **Save**. The configuration is saved in the mobile device.

**NOTE:** If do not want to save the configuration, click **Cancel**.

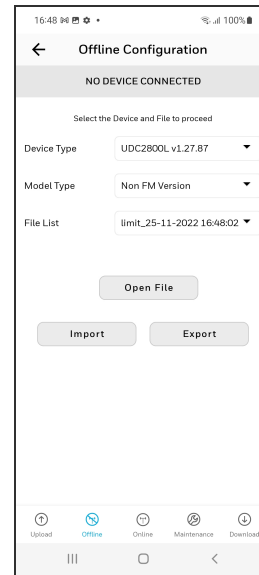
## Offline Configuration

Offline Configuration lets users to edit an instrument's configuration file for later downloading to the instrument. This operation is mostly used for initial configuration, where the configuration from one instrument is copied, duplicated, or modified and then downloaded to other instruments.

1. Click **Dashboard**. The dashboard page appears.
2. Click **Offline**. The **Offline Configuration** page appears.



IOS app



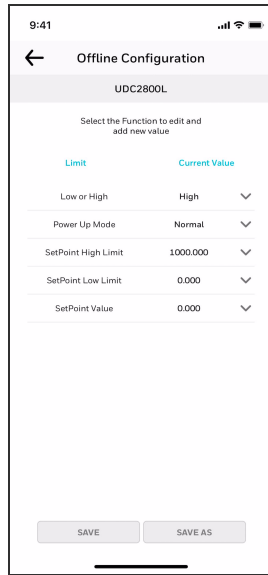
Android app

3. Select **Device Type** and **File List**.

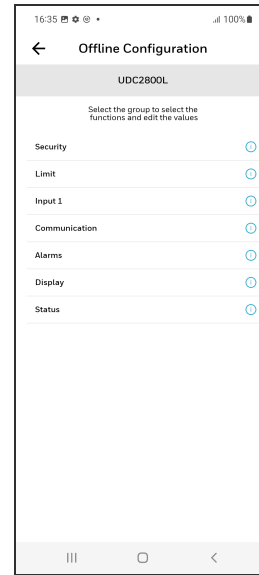
| Item        | Description  |
|-------------|--|
| Device Type | Select the device type whose configuration you want to edit, e.g. UDC2800. |
| File List   | Previously saved configuration files are shown.                            |
| Model Type  | Based on the device type model type can be selected.                       |

4. Click **Open File**, the offline configuration page appears.





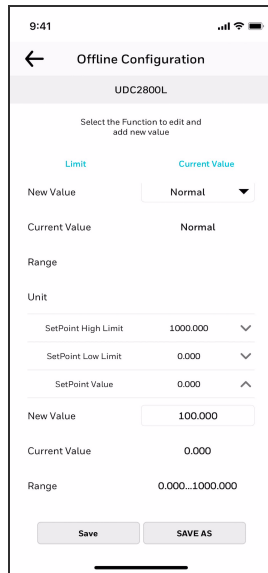
IOS app



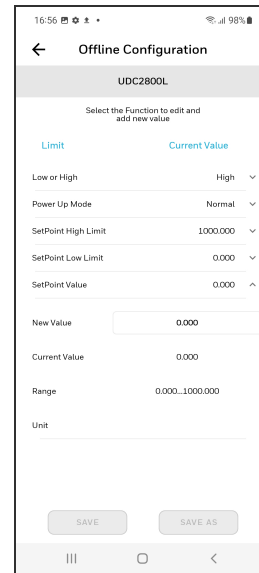
Android app

5. Select a group and edit configurations.

**NOTE:** The groups are organized exactly as on the instrument itself.



IOS app



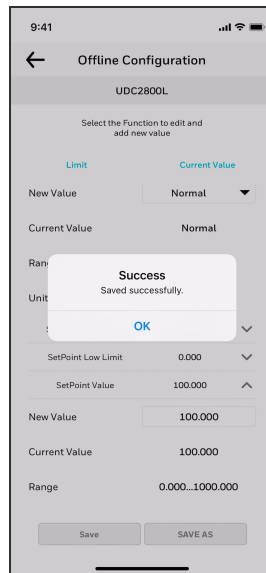
Android app

If an analog configuration is highlighted with red text or a digital configuration is shown blank, it means that the stored value is now out of range, either because of previous changes to the instrument's configuration or because of incompatibilities with the configuration set. Change the configuration to an in-range setting to correct the error.

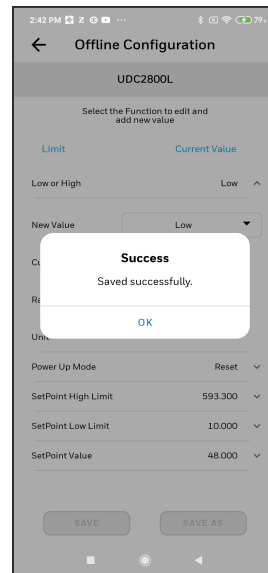
**NOTE:** Save or SAVE AS options are enabled only if any configuration changes happen.

After finishing the configuration:

- Click **Save**. The **Success** dialog appears, and then click **OK**.

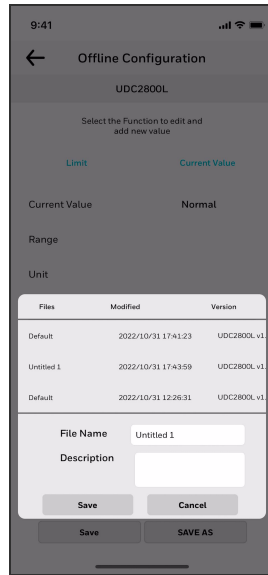


IOS app

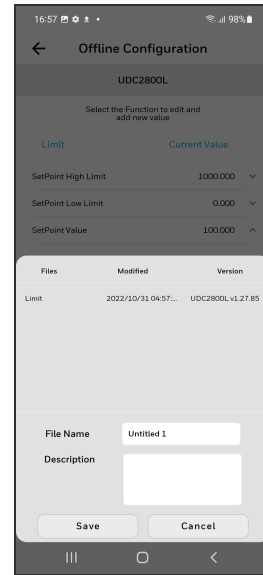


Android app

- If the user wants to save as a new configuration, click **SAVE AS**. Enter **File Name** and **Description** and then click **OK**



IOS app



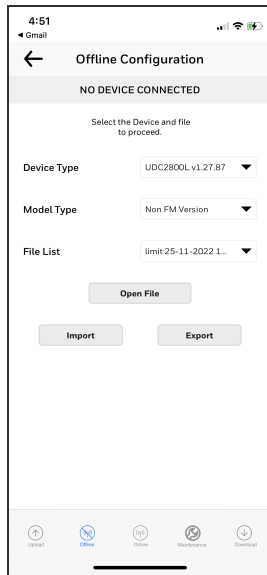
Android app

**ATTENTION:** Users must **Download** the offline configuration to reflect the changes in the UDC device. See Download.

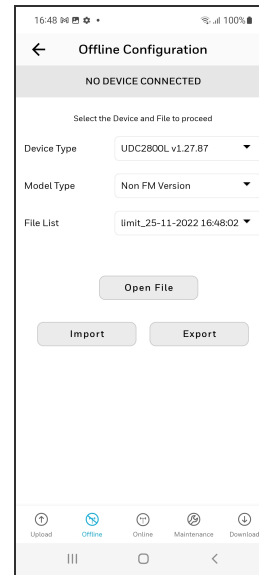
## Export configuration

Users can Export the UDC2800 offline configuration files to .cvt format using the Export option. The exported .cvt files can import to other UDC2800 devices.

1. Open the **EasySet** app.
2. Click **Dashboard**, and click **Offline**. The **Offline Configuration** dialog appears.

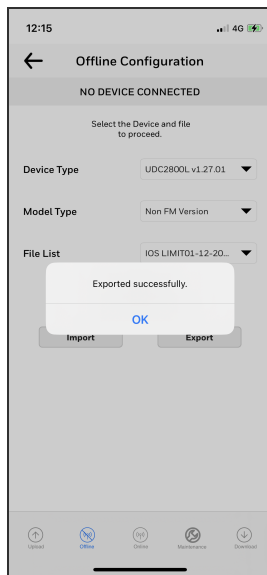


IOS app

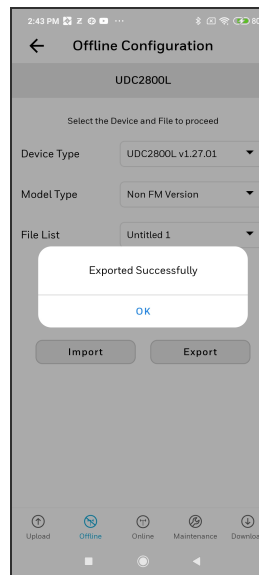


Android app

3. Configure the all parameters and Save the file.
4. Click **Export**. Export options appears.
5. Click **Save to Files** and select the location, and click **Save**. **Exported successfully** pop-up appears, click **OK**.



IOS app



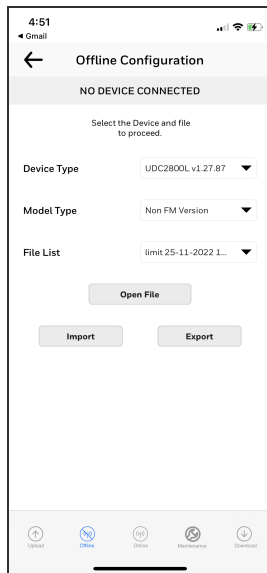
Android app

6. Exported .cvt file can be shared through email to import to the other UDC2800 devices.

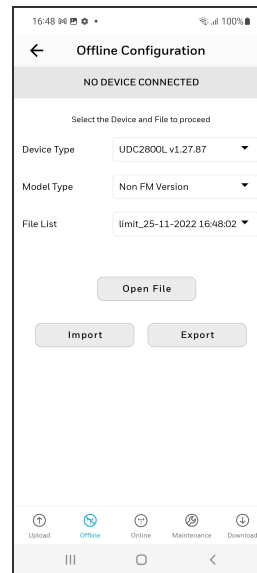
## Import configuration

Using the Import option, users can import the UDC2800 configuration files (.cvt) to the UDC device through the app.

1. Open the mail that contains configuration (.cvt) file. Download the file and save to the IOS mobile.
2. Open the **EasySet** app.
3. Click **Dashboard**, and click **Offline**. The **Offline Configuration** dialog appears.

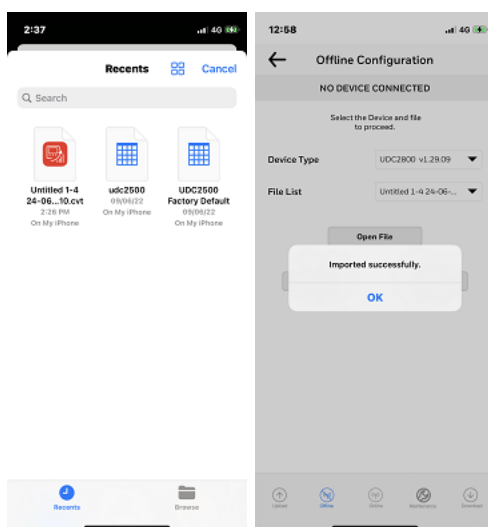


IOS app



Android app

4. Click **Import**. The import window appears and select the configuration file from the storage. **Imported successfully** pop-up appears, click **OK**.

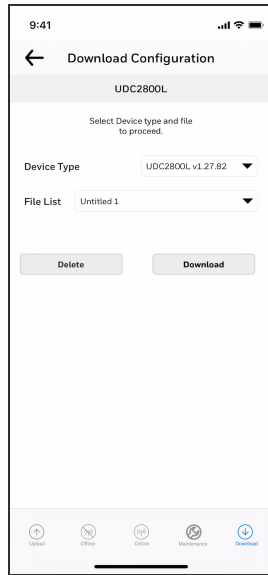


5. Click the arrow at the top left corner to return to the **Dashboard** page.
6. Click **Download**. See Download.

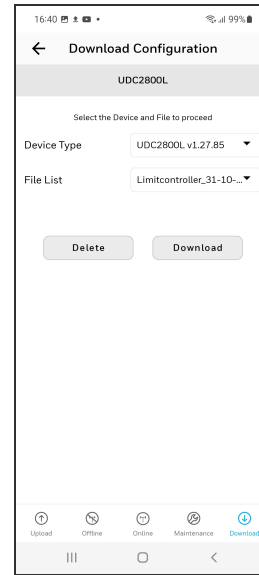
## Download

Using the Download option, users can download saved and offline configurations from the EasySet app to the instrument.

1. Click **Dashboard**. The dashboard page appears.
2. Click **Download**. The **Download Configuration** page appears.



IOS app



Android app

3. Select **Device Type** and **File List**.

| Item        | Description  |
|-------------|--|
| Device Type | Select the device type whose configuration you want to download, e.g. UDC2800. |
| File List   | Previously saved configuration files are shown.                                |

- Click **Download**, and a dialog appears indicating that the configuration is downloaded successfully.
- Click **OK**.

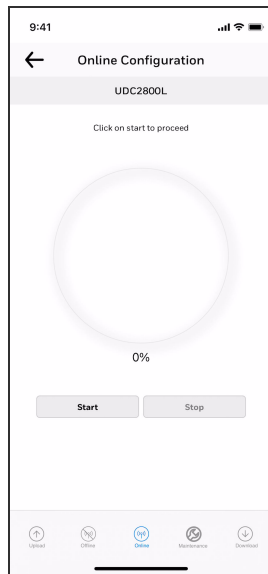
**NOTE:** If user want to delete the selected configuration file, click **Delete**. A confirmation dialog appears, and then click **OK**.

**ATTENTION:** Before downloading any configuration, the user must ensure that the selected configuration's MSG matches to the device's MSG.

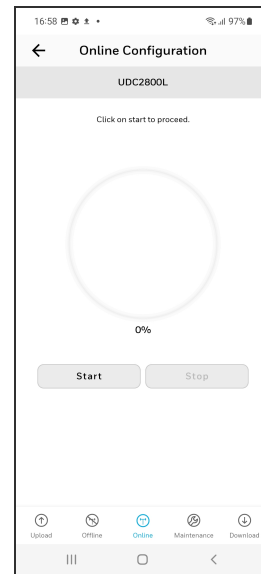
# Online Configuration

Online Configuration lets users upload an instrument configuration and modify one change at a time back to the instrument. This option is useful for tuning instruments and is faster than downloading the entire configuration. However, it is recommended to do the offline configuration for multiple changes.

1. Click **Dashboard**. The dashboard page appears.
2. Click **Online Configuration**. The **Online Configuration** dialog appears.



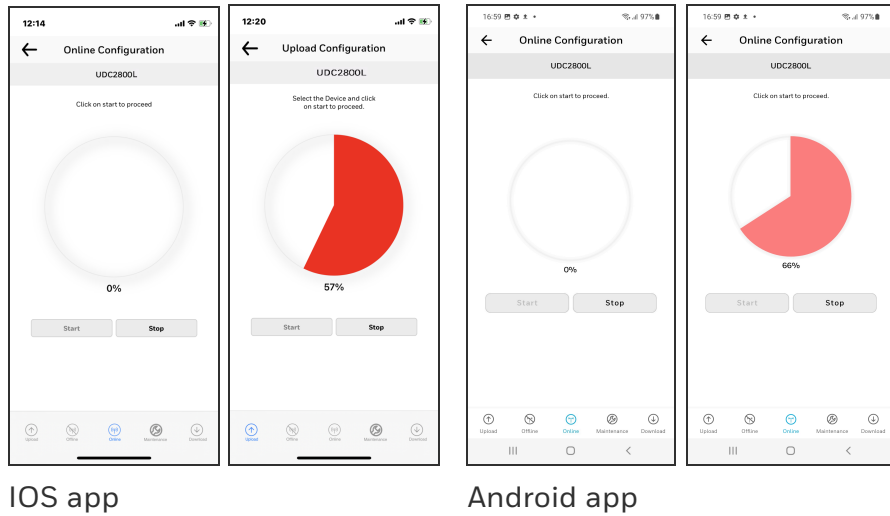
IOS app



Android app

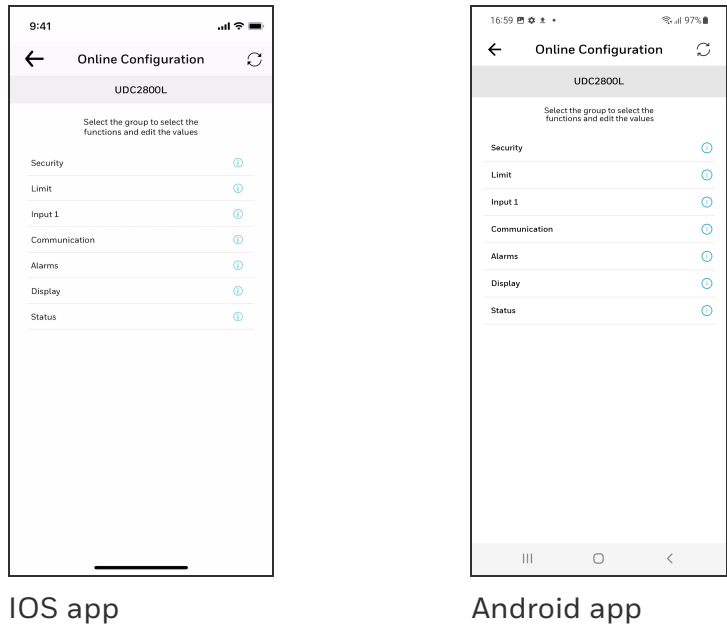
3. Click **Start** to begin upload. Status of upload (% complete) is shown.





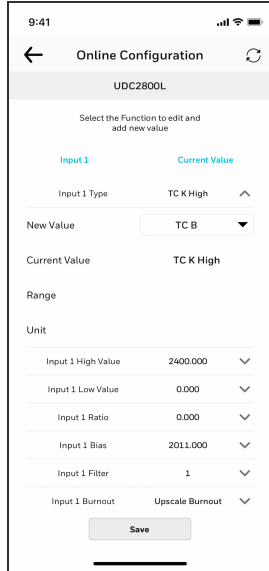
**NOTE:** To terminate upload, click **Stop**.

If upload is successful, configurable groups appear.

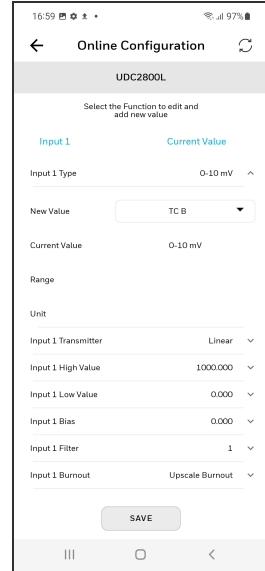


4. Select a group and edit configurations.

**NOTE:** The groups are organized exactly as on the instrument itself.



IOS app

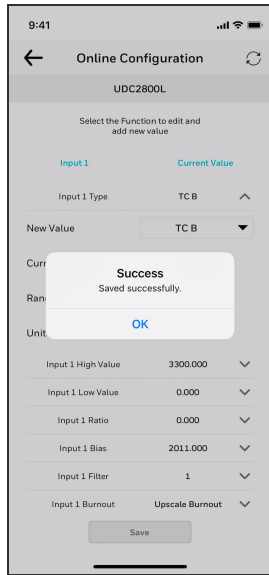


Android app

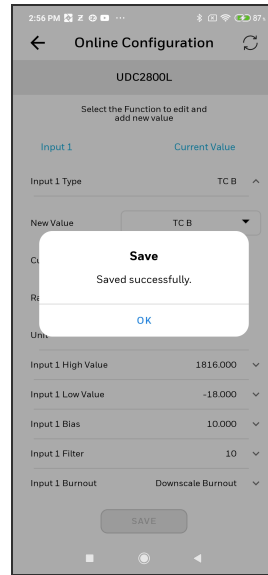
If an analog configuration is highlighted with red text or a digital configuration is shown blank, it means that the value read up from the instrument is now out of range, either because of previous changes to the instrument's configuration or because of incompatibilities with a downloaded configuration set. Change the configuration to an in-range setting to correct the error.

**ATTENTION:** In Easysset app, the SP Programming value is displayed as Px.Sy00, for which the event applies. Px.Sy00 = Program x. Segment y 00. For example, Program2. Segment300 (2.300).

5. Once the configuration is completed, click **Save**. The **Success** dialog appears. Click **OK**.

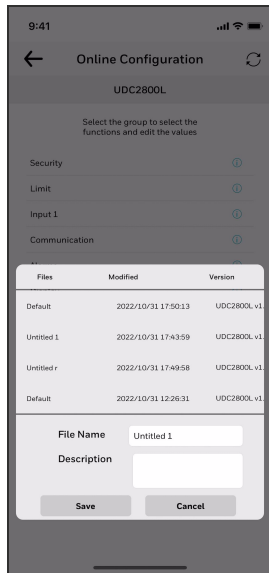


IOS app

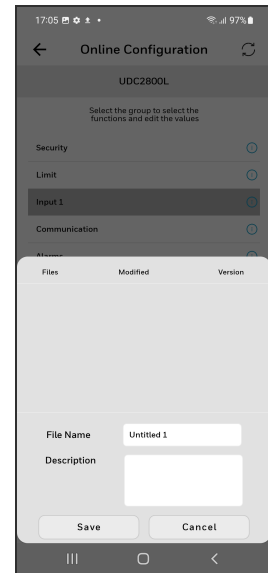


Android app

6. Click the arrow icon at the top left corner to return to the configurable groups page.
7. Click the arrow icon at the top left corner again, a dialog appears to ask you to save the changed configuration for later use in the mobile device.
8. Enter **File Name** and **Description** and click **Save**.



IOS app



Android app

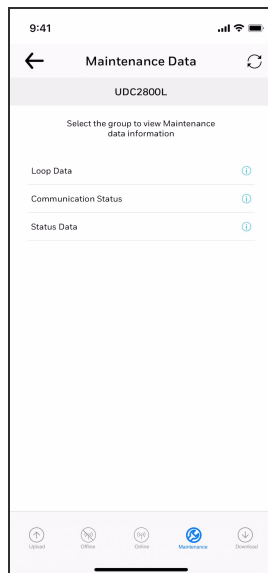
**NOTE:** If user do not want to save the configuration, click **Cancel**.

**NOTE:** Click the **Refresh** icon to reflect the UDC device's configured settings in the Honeywell EasySet app.

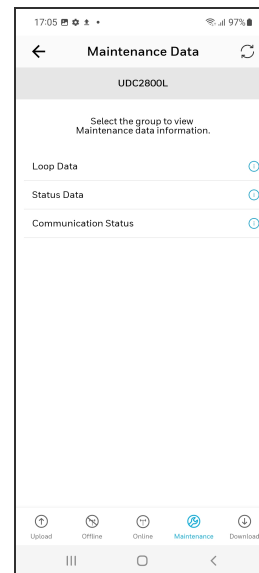
## Maintenance Data

Maintenance Data displays key operating parameters and status parameters of the instrument without switching between the instrument screens. Primarily it is used for diagnostics. Some of the information presented here is not visible through the instrument display panel.

1. Click **Dashboard**. The dashboard page appears.
2. Click **Maintenance**. The **Maintenance Data** page appears with **Loop Data**, **Communication Status**, and **Status Data**.

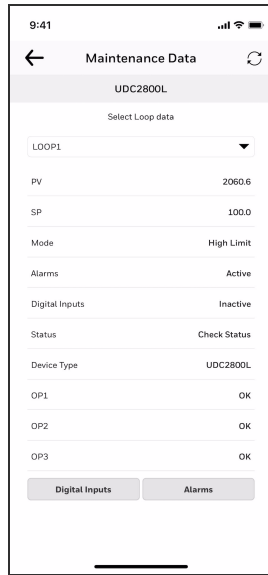


IOS app

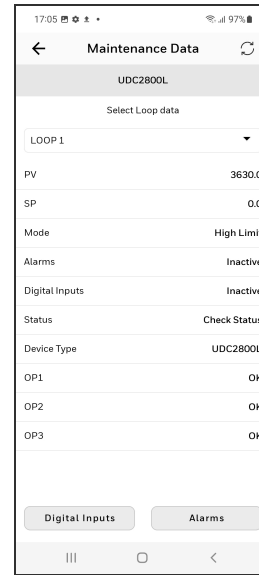


Android app

3. Click **Loop Data**. Loop data page appears.
4. Select the loop from the drop-down list, the loop data appears.



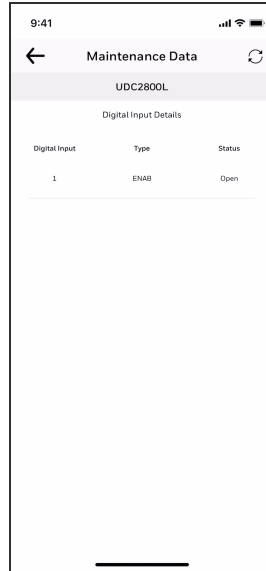
IOS app



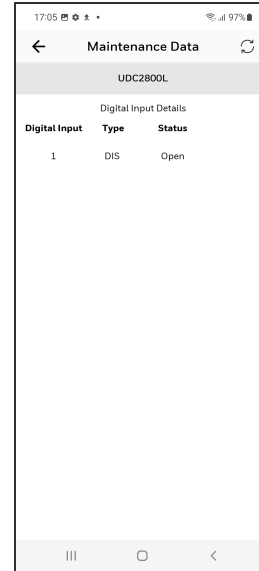
Android app

**NOTE:** To refresh the loop data, click the **Refresh** icon.

- Click **Digital Inputs**. The **Digital Inputs Details** page appears.



IOS app

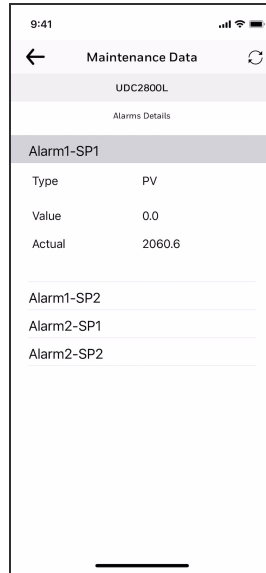


Android app

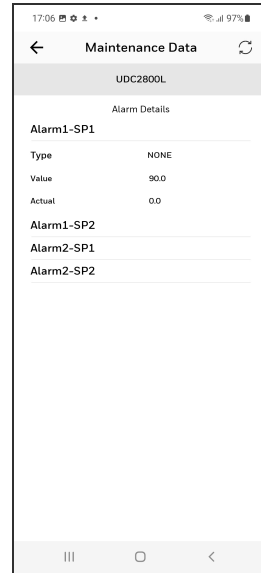
**NOTE:** To refresh Digital Input Details, click the **Refresh** icon.

Click the arrow icon at the top left corner to return to the loop data page.

- Click **Alarms**. The **Alarms Details** page appears.



IOS app

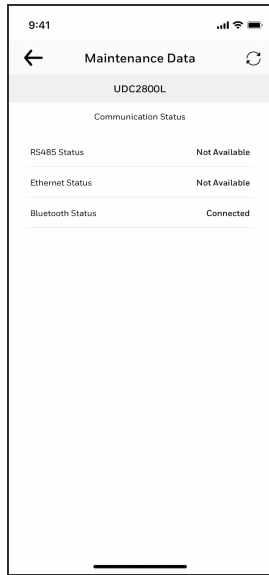


Android app

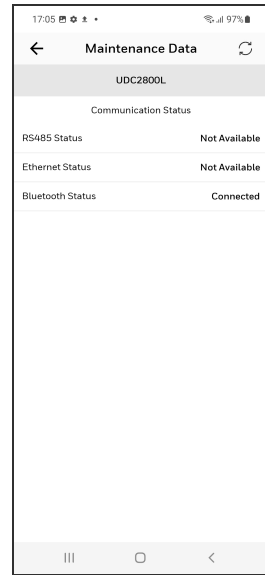
**NOTE:** To refresh Alarms Details, click the **Refresh** icon.

Click the arrow icon at the top left corner to return to the loop data page.

5. Click the arrow icon at the top left corner to return to the maintenance page.
6. Click **Communication Status**. The Communication status page appears.



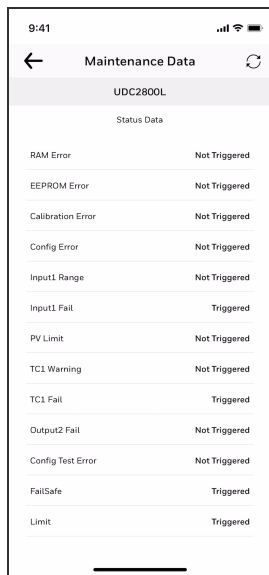
IOS app



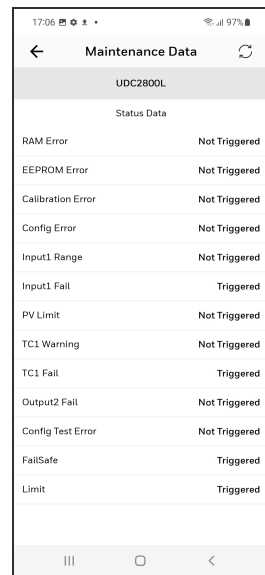
Android app

**NOTE:** The latest EasySet App supports only bluetooth communication.

- Click the arrow icon at the top left corner to return to the maintenance page and click **Status**. Status data page appears.



IOS app



Android app

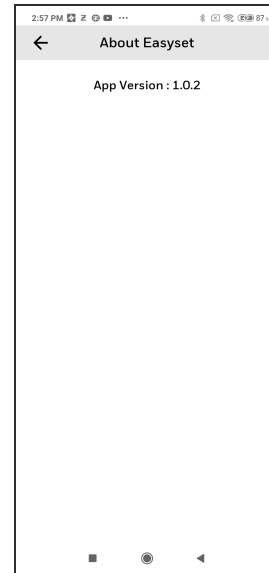
## About EasySet

The About EasySet page includes information about the app's release version.

Click **Menu**, and then click **About Easyset**.



IOS app



Android app

## Firmware update through Easyset app

Users can update the UDC2800 Limit Controller device firmware using Honeywell EasySet IOS or Android app.

**NOTE:** This Easyset IOS app can be installed on IOS 12.0 or higher operating system.

**NOTE:** This Easyset Android app can be installed on Android 9 or higher operating system.

**NOTE:** The R110.3 UDC limit controller device has the latest firmware. So, no need to update again.

**ATTENTION:** After a firmware update, the UDC device is reset to default factory settings and the user loses all configurations.



### Prerequisites


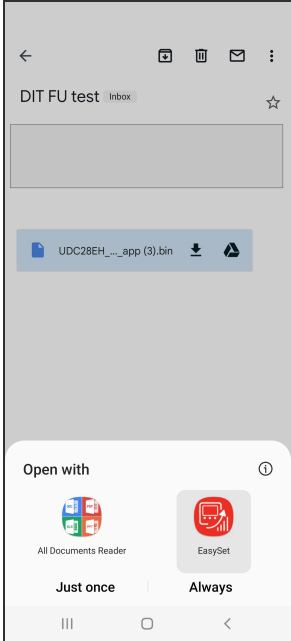
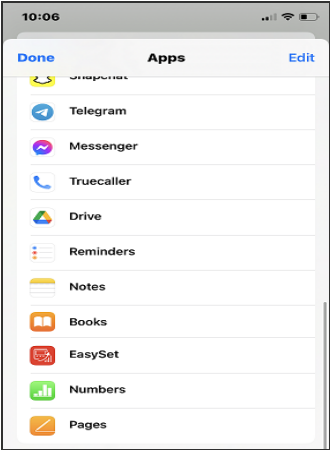
- Connect to the UDC2800 limit controller device. See Communications Setup for more information.

### Download the firmware package

1. Go to Honeywell Process Solutions website (<https://process.honeywell.com>).
2. Click **Sign In** at the top-right corner of the page.
3. If you are a new user, create a new account at this website. Click **Create an Account** and follow the on-screen instructions.
4. If you are an existing user, Click **SIGN IN TO MYHPS** and type your **user name** and **password**, and then click **SIGN IN**.  
After successful sign in, your account name appears at the top-right of the page.
5. Click **Support>Product Documents & Downloads**. The **Product Documents & Downloads** page appears.
6. In the **Search** box, enter **UDC2800 Firmware**, and then click **Search**.
7. Click the document link from the search results to download it.
8. Open the document and download the firmware file to the IOS mobile.

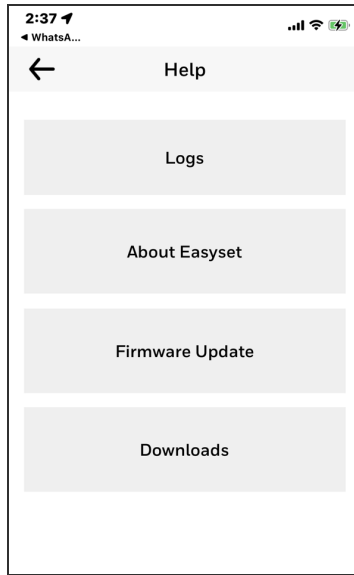
### Import the firmware package

| On EasySet IOS app                           | On EasySet Android app  |
|--|---|
| 1. Open the firmware file on the IOS mobile. | 1. Click the firmware file, and select open with EasySet app. |

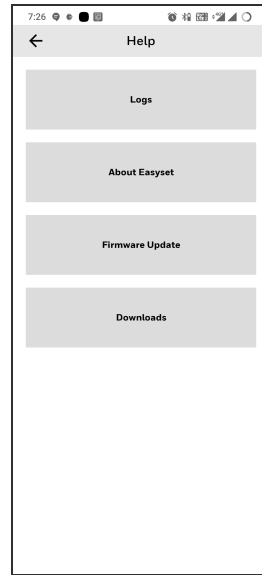
| On EasySet IOS app  | On EasySet Android app  |
|---|---|
|    |                         |
| <ol style="list-style-type: none"> <li>2. Click the share icon. Share options appear.</li> <li>3. Click <b>More</b> and select <b>EasySet</b> app.</li> </ol>                                 | <ol style="list-style-type: none"> <li>2. Firmware file is imported to the <b>EasySet</b> app.</li> </ol> |
|  <ol style="list-style-type: none"> <li>4. Firmware file is imported to the <b>EasySet</b> app.</li> </ol> |   |

### Update firmware package

1. Open the **EasySet** app.
2. Click **Menu**, the menu options page appears.

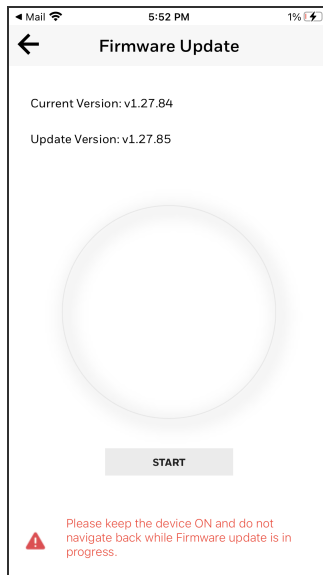


IOS app

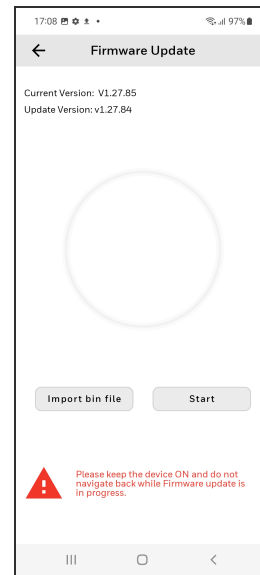


Android app

3. Click **Firmware Update** and then click **START**.

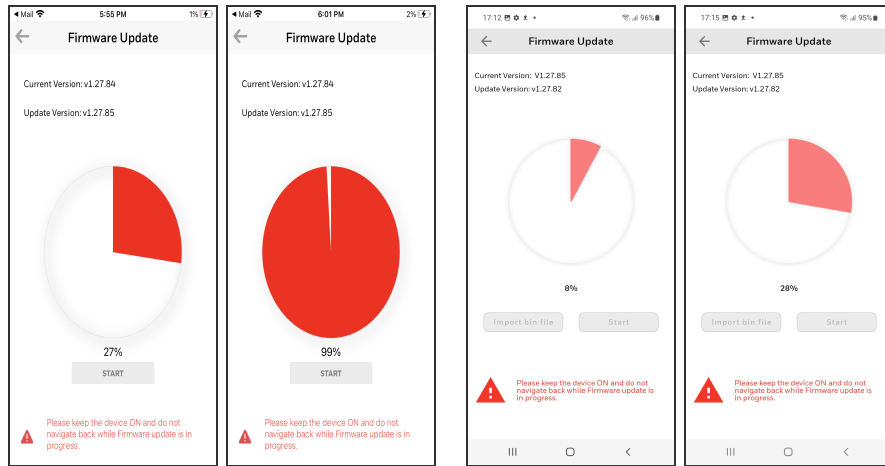


IOS app



Android app

4. Firmware update process is started.



IOS app

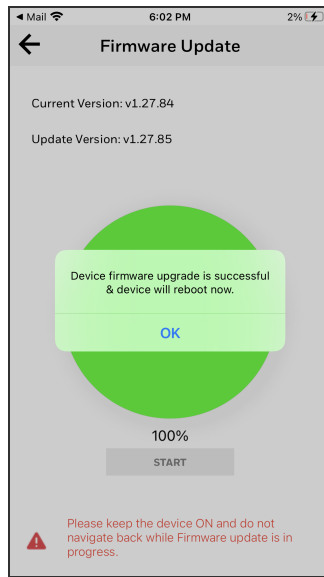
Android app

**ATTENTION:** Do not close the EasySet app during firmware update.

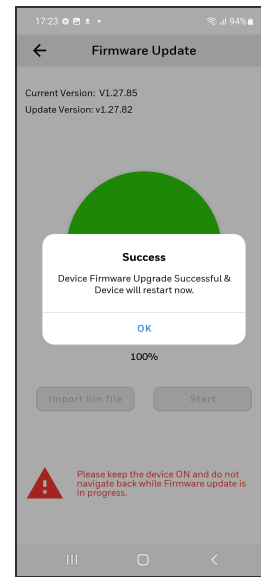
**ATTENTION:** Do not turn off the UDC device during firmware update.

**ATTENTION:** Keep the mobile and the UDC device in the Bluetooth range while updating the firmware.

5. When the firmware update is complete, a message appears that the UDC device is going to reboot. Click **OK** and wait for the device to restart.



IOS app



Android app

**ATTENTION:** The device takes some time to reboot. Do not turn off or stop the device.

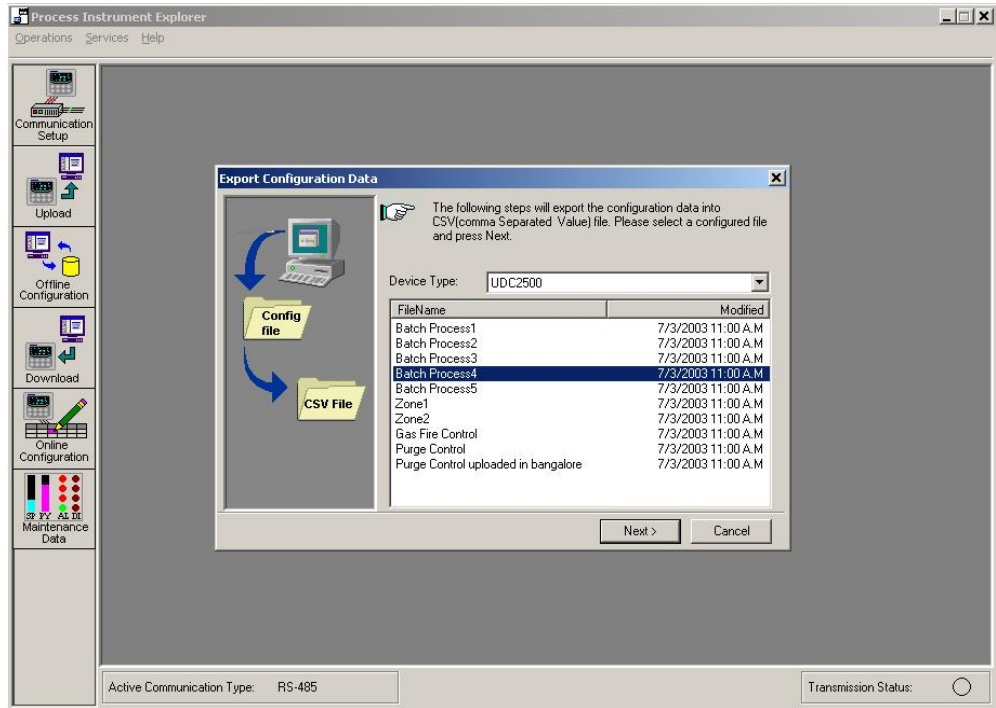
Once the device restarts, the new firmware is installed in the device.

**NOTE:** The default password for the UDC device is 1234. It is recommended to change the password after the first login.

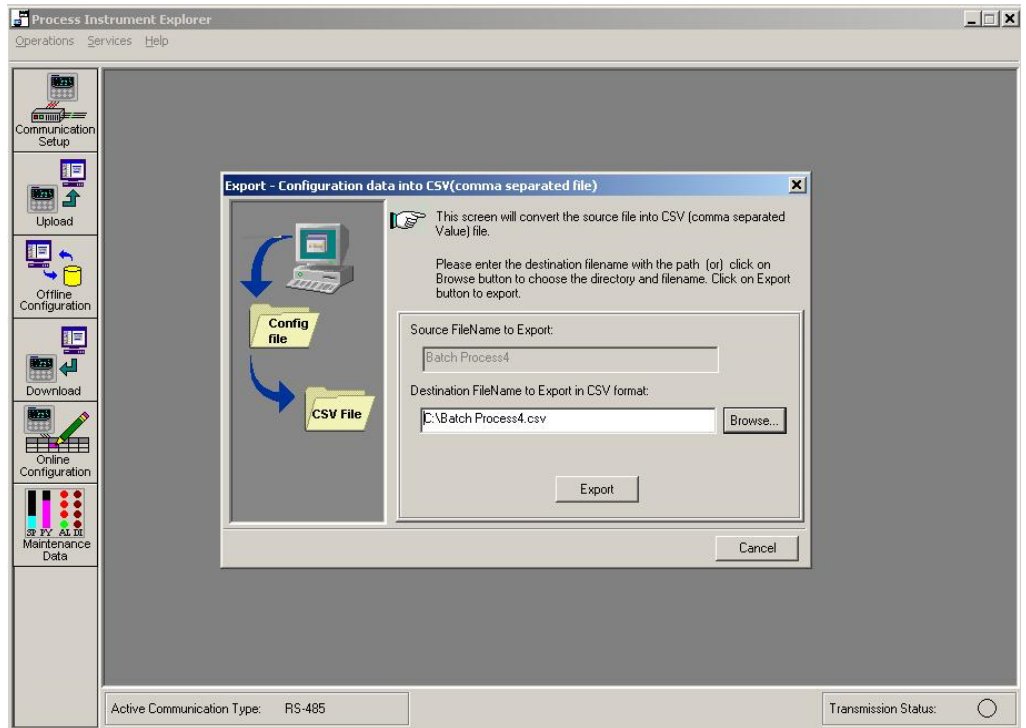
## Transfer configuration from the legacy device to the UDC2800

### *Export configuration from legacy device using PIE tool*

1. Open the PIE tool in the PC (Desktop or Laptop) or pocket PC.
2. Configure communication setup with PIE tool and UDC device.
3. Click **Services>Export Configuration**. A dialog box appears with configuration file information.



4. Select configuration file and click **Next**. A Dialog appears with the selected file for export.



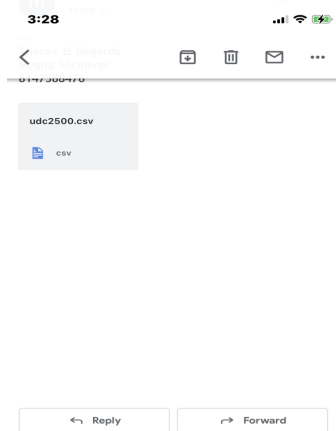
5. Click **Browse** and select the export file destination path. Click **OK**
6. Click **Export**. A confirmation dialog box appears.

The configuration file is exported in .csv format. Send .csv file through mail to import configuration in UDC 2800 limit controller device.

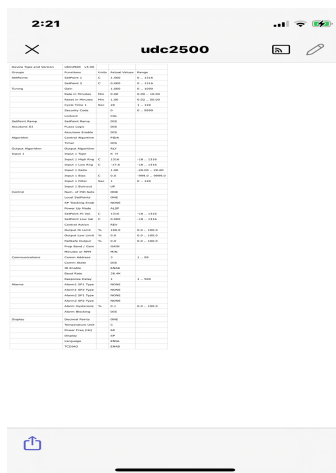
## Import configuration to the UDC 2800 using Easy Set app

Set up communications before uploading or downloading instrument configurations. See Communications Setup for more information.

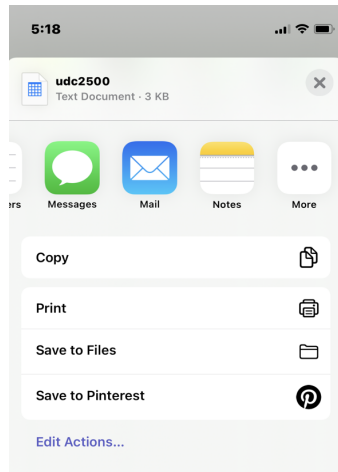
1. Open the mail that contains legacy instrument configuration (.csv) file.



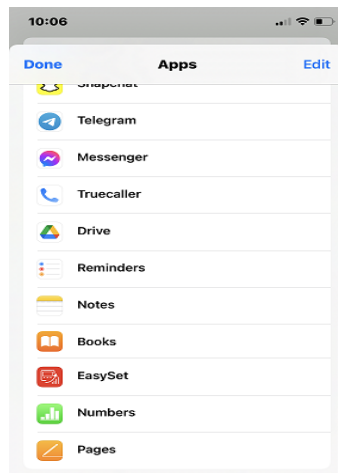
2. Open the .csv file.



3. Click the share icon. Share options are appear.

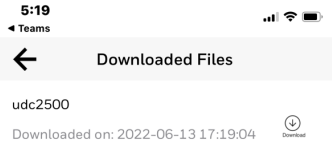


4. Click **More** and select **EasySet** app.

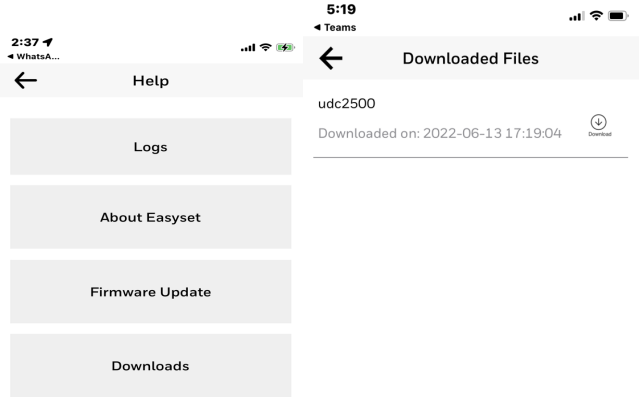


5. Configuration file is uploaded to the app.

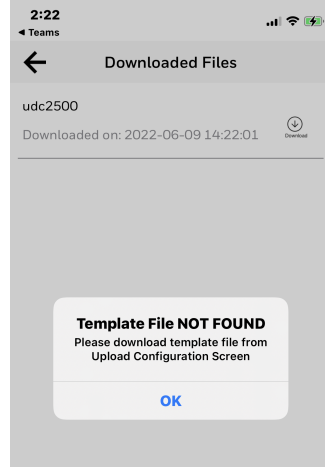




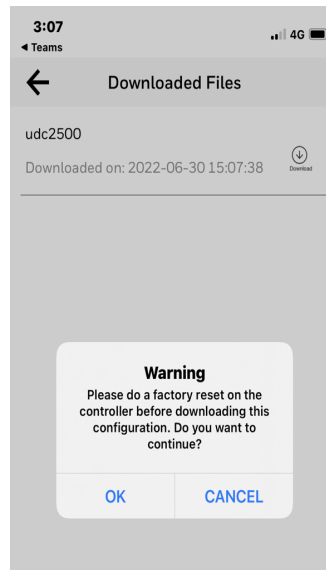
- 6. Open the **EasySet** app.
- 7. Click **Menu >Downloads**. The Download Files page appears



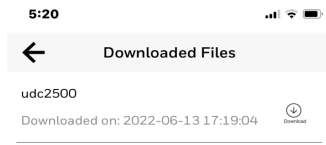
**NOTE:** The **Template file NOT FOUND** pop-up appears on the download page if the configuration file is not uploaded to the app even once.



**ATTENTION:** The UDC device must Factory reset from the controller side before downloading any configuration (.csv) file.

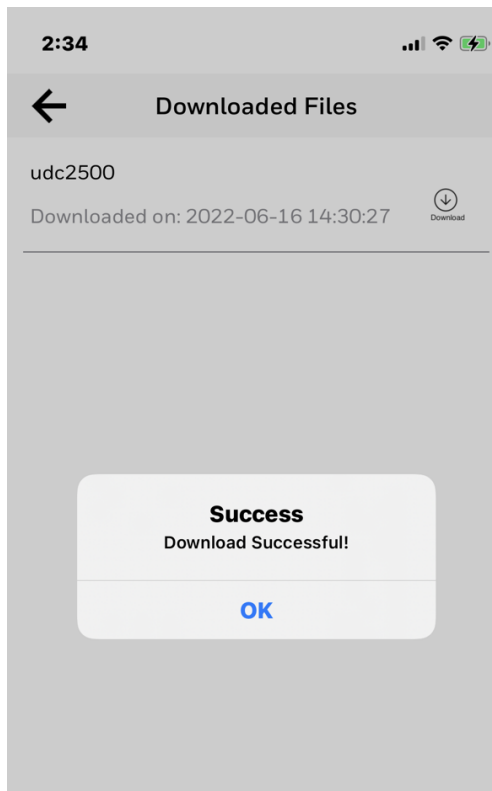


8. Click the **Download** icon to download configuration.



Downloading...

9. The **Success** dialog appears. Click **OK**.



**ATTENTION:** As the menu layout for the UDC 2800 changes, the old device SPP and Security settings do not migrate. The user must configure the settings manually for the first time.

Legacy UDC device configuration is successfully imported to the UDC 2800 limit controller.

# MODBUS RTU FUNCTION CODES

## What's in this section?

The following topics are covered in this section.

---

In this section:

|  |     |
|--|-----|
| <i>Overview</i> .....  | 181 |
| <i>General Information</i> .....   | 181 |
| <i>Function Code 20 (14h) - Read Configuration Reference Data</i> ....       | 184 |
| <i>Function Code 21 (15h) - Write Configuration Reference Data</i> ....      | 187 |
| <i>Modbus Read, Write and Override Parameters plus Exception Codes</i> ..... | 190 |

## Overview

This section describes the function codes needed to upload and download the configuration from a host computer into this instrument.

**NOTE:** The UDC 2800 Limit Controller Modbus address are different with legacy UDC limit controller modules.

Table 11-1: Modbus Function Codes 20&21 Definitions

| Function Code | Name                    | Usage  |
|---------------|-------------------------|--|
| 20 (14h)      | Read General Reference  | Used to Read or upload the instrument's configuration into the host device.<br><br>See Function Code 20 (14h) - Read Configuration Reference Data for more information.                      |
| 21 (15h)      | Write General Reference | Used to Write or download an instrument's configuration into the instrument from a host device.<br><br>See Function Code 21 (15h) - Write Configuration Reference Data for more information. |

## General Information

This instrument uses a subset of the standard Modbus RTU function codes to provide access to process-related information. Several MODICON function codes are implemented. It is appropriate to define instrument-specific "user-defined" function codes. Where differences occur between the two protocols it will be noted. Several standard Modbus RTU function codes are supported.

### Configuration ID Tags

Function codes 20 and 21 use the RS485 tag IDs for accessing configuration and process-related data. These tags are fully explained in Section Modbus Read, Write and Override Parameters plus Exception Codes.

The tag IDs represent the register addresses used in the Request Message.

## Other Modbus Codes

For Modbus codes other than for accessing configuration and process-related data for this controller, see the Modbus RTU Serial Communications User Manual # 51-55-25-66.

Table 11-2: Integer Parameter Type

| Register Numbers (Dec) | Name                            | Access        | Notes                         |
|------------------------|---------------------------------|---------------|-------------------------------|
| 1                      | Type = 1                        | NOT SUPPORTED | 16-bit Unsigned Integer       |
| 2                      | Attribute                       | NOT SUPPORTED | 1 = Read Only, 2 = Read/Write |
| 3                      | Value (16 bit integer)          | Read / Write  |                               |
| 4                      | Not Used                        | NOT SUPPORTED |                               |
| 5                      | Low Range (16 bit integer)      | NOT SUPPORTED |                               |
| 6                      | Not Used                        | NOT SUPPORTED |                               |
| 7                      | High Range (16 bit Integer)     | NOT SUPPORTED |                               |
| 8                      | Not Used                        | NOT SUPPORTED |                               |
| 9 to 13                | Description Text (ASCII string) | NOT SUPPORTED |                               |

Table 11-3: Floating Point Parameter Type

| Register Numbers (Dec) | Name      | Access        | Notes               |
|------------------------|-----------|---------------|---------------------|
| 1                      | Type = 2  | NOT SUPPORTED | IEEE Floating Point |
| 2                      | Attribute | NOT           | 1 = Read Only,      |

| Register Numbers (Dec) | Name                            | Access        | Notes          |
|------------------------|---------------------------------|---------------|----------------|
|                        |                                 | SUPPORTED     | 2 = Read/Write |
| 3                      | Value (float high word)         | Read / Write  |                |
| 4                      | Value (float low word)          | NOT SUPPORTED |                |
| 5                      | Low Range (float high word)     | NOT SUPPORTED |                |
| 6                      | Low Range (float low word)      | NOT SUPPORTED |                |
| 7                      | High Range (float high word)    | NOT SUPPORTED |                |
| 8                      | High Range (float low word)     | NOT SUPPORTED |                |
| 9 to 13                | Description Text (ASCII string) | NOT SUPPORTED |                |

### Register Count

The register count depends on the data format of the registers being read or written.

Integer data is represented in sixteen bits and is transferred high byte first.

Floating point data is transferred in IEEE 32-bit format.

The register count definitions are:

0001 = Integer Data

0002 = Floating Point Data

# Function Code 20 (14h) - Read Configuration Reference Data

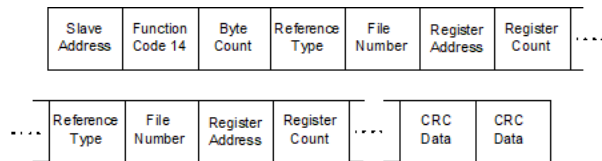
## Description

Function code 20 (14 Hex) is used in this instrument to read information stored in its configuration database. Each UDC2300 configuration item is explicitly addressed by a file number and register address. IEEE 32-bit floating point and 16-bit integer formats are supported.

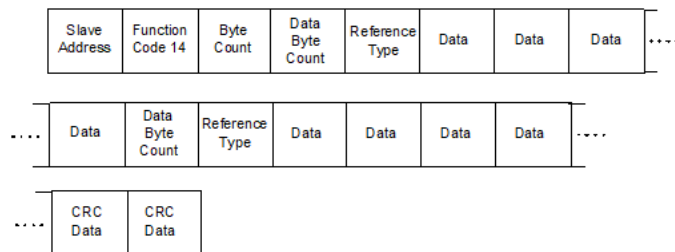
## Request and Response Formats

The Request and Response formats for Function code 20 (14 Hex) are shown below. Details for each block reference follow.

### Request Message Format



### Response Message Format



## Byte Count

The Byte Count equals the number of bytes transmitted in either the request or response message and will be the minimum number required to transmit all requested data.



### Data byte count heading

The Data Byte Count is the number of data bytes of the sub response including the Reference Type but not including itself. A floating point sub response has four bytes of data and one byte representing the reference type making the data byte count equal to five.

### Reference Type Definitions

The Reference Type definition is always 06.  
See examples in Subsection Read Configuration Examples

### File Number

The file number word contains the register number from the register address structure tables on page 3. Although the register address structure tables indicate up to 13 data registers are available for access, only register address 3 is currently supported.

### Register Address

The register address word represents the tag ID number for the parameter(s) being accessed. The register address word is made up of two bytes—the MSB = 00 always. The LSB contains the tag ID number. The tag ID numbers represent the parameter’s register address(es). See Configuration for more information.

Table 11-4: Register Address Format for Function Code 20

| Register Address(es)<br>(Decimal) | Register Address(es)<br>(Hex) | Format  |
|-----------------------------------|-------------------------------|---|
| 1 to 2048                         | 1 to 800                      | analog formatted data<br>(2 registers – IEEE 32-bit floating point) |
| 2049 to 4096                      | 801 to 1000                   | integer formatted data<br>(1 register – 16-bit integer)             |

## Read Configuration Examples

### Example #1

The following is an example of a request to read the Gain 1 value using Function code 20.

Request Message (Read Input 1 HIGH value = ID Tag 001)

02 14 07 06 00 03 00 CE 00 02 (CRC16)

Where:

02 = Address

14 = Function Code 20 (14 hex)

07 = Byte Count

06 = Reference Type

00,03 = File Number (Access Data Value)

00,CE = Register Address (Standard Input 1 HIGH value- Tag ID #1)

00 02 = Register Count (Floating Point Data)  
(CRC16)

This is the response to the above request.

### Response Message

02 14 06 05 06 3F C0 00 00 (CRC16)

Where:

02 = Address

14 = Function Code 20 (14 Hex)

06 = Byte Count

05 = Sub Message Length

06 = Reference Type (IEEE Floating Point)

3F C0 00 00 = 1.50 (Value of Proportional Band)  
(CRC16)

### Example #2

The following is another example of a request and response message using Function code 20.

Request Message (Read LSP #1 = ID Tag 39 and LSP #2 = ID Tag 53)

02 14 0E 06 00 03 00 27 00 02 06 00 03 00 35 00 02 (CRC16)

Where:

02 = Address

14 = Function Code 20 (14 Hex)

0E = Byte Count

06 = Reference Type (IEEE Floating Point)

00,03 = File Number (Access Data Value)

00,27 = Register Address (Standard Access LSP #1 - ID Tag 39)

00,02 = Register Count to read (Floating Point Data)

06 = Reference Type (IEEE Floating Point)

00,03 = File Number (Access Data Value)

00,35 = Register Address (Standard Access LSP #2 - ID Tag 53)

00,02 = Register Count to read (Floating Point Data)

(CRC16)

This is the response to the above request.

### **Response Message**

02 14 0C 05 06 43 C8 00 00 05 06 44 60 00 00 (CRC16)

Where:

02 = Address

14 = Function Code 20 (14 Hex)

0C = Byte Count

05 = Data Byte Count (Sub Message Length)

06 = Reference Type (IEEE Floating Point)

43 C8 00 00 = 400.0 (Value of Local Setpoint #1)

05 = Data Byte Count (Sub Message Length)

06 = Reference Type (IEEE Floating Point)

44 60 00 00 = 896.0 (Value of Local Setpoint #2)

(CRC16)

## **Function Code 21 (15h) - Write Configuration Reference Data**

### **Introduction**

Function Code 21 (15 Hex) is used in this instrument to allow writes of integer and floating point values to the configuration database and override values.

The configuration database of this instrument is located in EEROM. The override values are stored in RAM.

Integer format is used to write to “Digital” configuration items. Floating Point format is used to write to “Analog” configuration items as defined by the configuration ID tags.

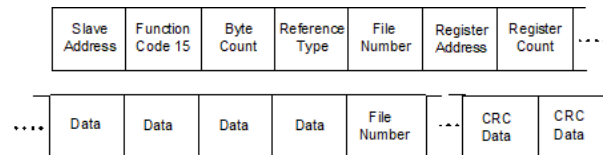
## Write Restrictions

Care should be taken not to exceed the 100,000 write limit of the EEROM.

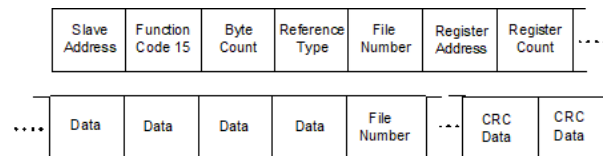
## Request and Response Formats

The Request and Response formats for Function code 21 (15 Hex) are shown below. Details for each block reference follow.

### Request Message Format



### Response Message Format (echo back of request)



The register address is interpreted as the tag ID configuration number.

## Reference Type Definitions

The Reference Type definition is always 06. See examples in Subsection Write Configuration Examples

## File Number

The file number word contains the register number from the register address structure shown in Integer Parameter Type and Floating Point Parameter Type. Although the register address structure tables indicate up to 13 data registers are available for access, only register address 3 is currently supported.

## Register Address

The register address is used to designate the tag ID number for the parameter being accessed. The register address is made up of two bytes—the MSB = 00 always. The LSB contains the tag ID number. The tag ID numbers represent the parameter’s register address(es). See Section Modbus Read, Write and Override Parameters plus Exception Codes for the tag ID numbers.

Table 11-5: Register Address Format for Function Code 21

| Register Address(es)<br>(Dec) | Register Address(es)<br>(Hex) | Format  |
|-------------------------------|-------------------------------|---|
| 1 to 2048                     | 1 to 800                      | analog formatted data<br>(2 registers – IEEE 32-bit floating point) |
| 2049 to 4096                  | 801 to 1000                   | integer formatted data<br>(1 register – 16-bit integer)             |

## Unrestricted Registers

As mentioned previously, all register data is stored in the EEROM of this instrument with some exceptions. These exceptions were made to allow write access to override information. The registers, which are designated as Override values, are listed below. These registers do not have restrictions on the number of writes.

| ID Tag | Register Number | UDC Usage         |
|--------|-----------------|-------------------|
| 263    | 107 (Hex)       | Computer Setpoint |

## Restrictions on Parameter Numbers in One Message

The maximum number of writeable parameters per write request is 1.

## Write Configuration Examples

### Example #1

The following is an example of a request to write the Gain 1 value using Function code 21 (15 Hex).

**Request Message** (Input 1 type 1= 6 “ID Tag 1”)

02 15 09 06 00 03 08 99 00 01 00 06 (CRC16)

Where:

02 = Address

15 = Function Code 21 (15 Hex)

09 = Byte Count

06 = Reference Type (IEEE Floating Point)

00 03 = File Number (Access Data Value)

08 09 = Register Address (Standard Access - Input 1 type 1- ID Tag 1)

00 01 = Register Count (Integer)

00 06 = 6  
(CRC16)

This is the response to the above request.

**Response Message** (The response is an echo of the request)

02 15 09 06 08 99 00 01 00 06 (CRC16)

## Modbus Read, Write and Override Parameters plus Exception Codes

### What's in this section?

The following topics are covered in this section.

---

In this section:

## Overview

### Introduction

This section contains information concerning Reading, Writing, and Overriding parameters in this instrument. There are two types of parameters:

- Data Transfer—These parameters include reading control data, option status, and reading or changing setpoints.
- Configuration Data—All the configuration data is listed in the order in which it appears in the controller.

Each type of parameter has the identifying codes listed with it.

### General Information

#### *Non-volatile Memory Retention*

- This controller uses non-volatile memory to store configuration data. These memories are guaranteed to retain data for a minimum of ten years as long as the data is not written and erased more than 10,000 times. In order not to exceed this number, it is strongly recommended that configurations which change rapidly such as Computer Setpoint use the Override feature which does not affect non-volatile memory.

#### *Analog Parameters*

- Whenever analog register addresses (those that can be changed via communications) are changed, a Write cycle occurs after receipt of the message and the response is returned.

#### *Override Parameters*

- Override analog register address 107 (computer setpoint) is not stored in non-volatile memory. It can be changed as frequently as desired with no effect on non-volatile memory retentivity, but the controller must remain in the slave mode.

### ***Digital Parameters***

- Whenever digital configuration register addresses are updated via communications, the non-volatile memory is updated as soon as the message is received.

### ***Communications Transfer Rates***

- Reads minimum 20mS and writes minimum 200mS

### ***Supported Function Codes***

- Bluetooth port 20 and 21
- RS485 and Ethernet ports 1,2,3,4,6,16,17,20,21

### ***Communications Modes of Operation***

- When the Shed Timer is enabled and a write or override occurs the controller will enter Slave Mode. The keypad is locked from the operator. The purpose of this mode is that if communications is lost and the shed timer times out then the controller will enter a known state of operation. The configuration of the “Shed Mode and Output” and Shed Setpoint Recall are used to configure the controller’s shed state. While in Slave Mode pushing the MAN/AUTO key enters Emergency Manual mode. The local operator then has control of the output. The controller is in Monitor Mode if the Shed timer is disabled.



## Reading Control Data

### Overview

The following control data can be read from this instrument:

- Input 1

### Register Addresses

Use the identifying codes listed in Control Data Parameters to read the specific items.

A Write request for these codes will result in an Error message.

Table 11-6: Control Data Parameters

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection              |
|-----------------------|------------------|---------|-----------|--------|---|
|                       | Hex              | Decimal |           |        |   |
| Input #1              | 190              | 400     | FP        | RD     | In Engineering Units or Percentage              |
| LSP1                  | 129              | 297     | FP        | R/W    | In Engineering Units<br>Within Set point Limits |

### Read Software Options Status

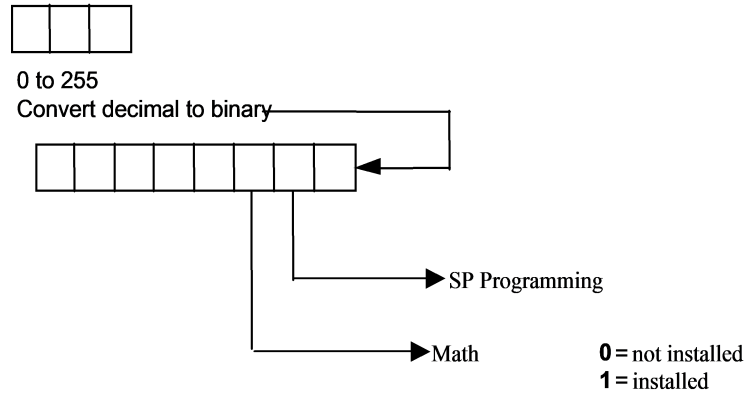
Doing a Read of register address 9C4 listed in the following table will tell you which of the available options are enabled / installed or disabled / not installed.

Table 11-7: Option Status

| Parameter Description  | Register Address |         | Data Type | Access | Data Range or Enumerated Selection |
|------------------------|------------------|---------|-----------|--------|------------------------------------|
|                        | Hex              | Decimal |           |        |                                    |
| Software Option Status | 9C4              | 2500    | INT       | RD     | See figure below                   |

The data field in the response message will be a decimal number from 0 to 255. Convert the decimal number to binary as shown in the figure below to determine which options are or are not active.

Figure 11-1: Software Option Status Information



**EXAMPLE: 2**

Binary 

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|

 SP Programming – installed

## Miscellaneous Read Only

### Register Addresses for Read Only

The identifying register addresses listed in Miscellaneous Read Only represent some information that is Read only. No Writes allowed.

Table 11-8: Miscellaneous Read Only

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection |
|-----------------------|------------------|---------|-----------|--------|------------------------------------|
|                       | Hex              | Decimal |           |        |                                    |
| Software Type         | 9C5              | 2501    | INT       | RD     | 0 ~ 65535                          |
| Software Version      | 9C6              | 2502    | INT       | RD     | 0 ~ 65535                          |

## Setpoints

You can use two separate local setpoints in the controller. The identifying register addresses listed in the following table allow you to select which setpoint you want to use and to enter a value in Engineering Units (whichever is selected at register address 8D7 (Hex)) for that setpoint via communications.

## Associated Parameters

Refer to table below to display or change any of the parameters associated with the setpoint.

Table 11-9: Setpoint Associated Parameters

| Parameter         | Register Address |          |
|-------------------|------------------|----------|
|                   | Hex              | Decimal  |
| Setpoint Limits   | E5, E6           | 229, 230 |
| Computer Setpoint | 107              | 263      |

## Using a Computer Setpoint (Overriding Controller Setpoint)

You can use a setpoint generated from the computer to override the setpoint being used by the controller. The value generated by the computer will have ratio and bias applied by the controller.

## Register Address

Use the identifying code in table below to enter the computer setpoint.

Table 11-10: Computer Setpoint Selection

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection  |
|-----------------------|------------------|---------|-----------|--------|---|
|                       | Hex              | Decimal |           |        |   |
| Computer Setpoint     | 107              | 263     | FP        | R/W    | Value from computer with Ratio and Bias applied by the controller. Within the Setpoint Range Limits |

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection |
|-----------------------|------------------|---------|-----------|--------|------------------------------------|
|                       | Hex              | Decimal |           |        |                                    |
|                       |                  |         |           |        | in Engineering Units or Percent.   |

## Shed

The computer setpoint override will continue until SHED from communications occurs or the controller is placed into monitor mode through communications. Doing periodic SLAVE READS within the shed time will allow the override to continue until communication is stopped and shed time elapses. Does not apply to Bluetooth communications.

**ATTENTION:** 0 Shed (code 8D4 (Hex)) allows the override to continue indefinitely or until the reset shed timer register address 1B90 is written using function code 6 or register address 199 (Hex) using function code 21. Any data value can be written because it is ignored.

When SP is overridden, the middle display shows the CSP value as CSP XXXX.

Table 11-11: Shed Timer Reset

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection |
|-----------------------|------------------|---------|-----------|--------|------------------------------------|
|                       | Hex              | Decimal |           |        |                                    |
| Shed Time Reset       | 199              | 409     | FP        | W      | Exit Slave Mode                    |

## Configuration Parameters

### Overview

Listed on the next pages are the identifying codes for the parameters in the various Set-up Groups in the UDC2800 Limit Controller. Most of the parameters are configurable through the hosts. Some are Read Only and are indicated as such and cannot be changed.

### Reading or Writing

Do a Read or Write, depending on your requirements, using the identifying code and format code listed in the tables. The range or selection available for each range is listed in the tables

### Security

Table below lists all the register addresses and ranges or selections for the function parameters in the Set-up Group Security.

Table 11-12: Set-up Group – Security

| Parameter Description   | Register Address |         | Data Type | Access | Data Range or Enumerated Selection  |
|---|------------------|---------|-----------|--------|---|
|   | Hex              | Decimal |           |        |   |
| FM Version ( Read only)   | 806              | 2054    | INT       | R      | 0 = Disable<br>1 = Enable   |
| Lockout (keyboard only)<br><br>Changes to data are always possible via communications regardless of this configuration. | 801              | 2049    | INT       | R/W    | 0 = No Lockout<br>1 = Calibration Locked out<br>2 = +Configuration – Timer, Tuning, SP Ramp, Accutune are read/write<br>3 = +SP – Only the Lockout group is available for read/write. Setpoint value is Read Only |

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection |
|-----------------------|------------------|---------|-----------|--------|------------------------------------|
|                       | Hex              | Decimal |           |        |                                    |
| Restore Settings      | 805              | 2053    | INT       | R/W    | 0 = Disable<br>1 = Enable          |

### **Limit**

The identifying register addresses listed in Set-up Group Limit lists all the register addresses and ranges or selections for the function parameters in Set-up Group Limit.

*Table 11-13: Set-up Group Limit*

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection     |
|-----------------------|------------------|---------|-----------|--------|--|
|                       | Hex              | Decimal |           |        |  |
| High/Low Limit        | 902              | 2306    | INT       | R/W    | 0 = Low Limit<br>1 = High Limit        |
| Power Up Selections   | 903              | 2307    | INT       | R/W    | 0 = Normal<br>1 = Reset                |
| Set Point High Limit  | 127              | 295     | FP        | R/W    | 0 to 100% of PV<br>(Engineering Units) |
| Set Point Low Limit   | 128              | 296     | FP        | R/W    | 0 to 100% of PV<br>(Engineering Units) |

### **Input 1**

Table below lists all the register addresses and ranges or selections for the function parameters in Set-up Group Input 1.

Table 11-14: Set-up Group – Input 1

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection  |
|-----------------------|------------------|---------|-----------|--------|---|
|                       | Hex              | Decimal |           |        |   |
| Input 1 Type          | 899              | 2201    | INT       | R/W    | 0 = Disable<br>1 = TC B<br>2 = TC E High<br>3 = TC E Low<br>4 = TC J High<br>5 = TC J Mid<br>6 = TC J Low<br>7 = TC K High<br>8 = TC K Mid<br>9 = TC K Low<br>10 = TC M High<br>11 = TC M Low<br>12 = TC N High<br>13 = TC N Low<br>14 = TC R<br>15 = TC S<br>16 = TC T High<br>17 = TC T Low<br>18 = TC C High<br>19 = TC C Low<br>20 = TC PR40-PR20<br>21 = Thermocouple Differential<br>22 = RTD Pt100 |

| Parameter Description                | Register Address  |         | Data Type | Access | Data Range or Enumerated Selection   |
|--------------------------------------|---|---------|-----------|--------|--|
|                                      | Hex   | Decimal |           |        |  |
|                                      |   |         |           |        | 23 = RTD Pt100 Low<br>24 = RTD Pt200<br>25 = RTD Pt500<br>26 = 0-20 mA<br>27 = 4-20 mA<br>28 = 0-10 mV<br>29 = 0-50 mV<br>30 = 0-100 mV<br>31 = 1-5 Vdc<br>32 = 0-5 Vdc<br>33 = 0-10 Vdc |
|                                      | <div style="border: 1px solid orange; padding: 5px;"> <b>ATTENTION:</b> Changing the Input Type will result in the loss of Field Calibration values and will restore the Factory Calibration values.                 </div> |         |           |        |  |
| Input 1 Transmitter Characterization | 89A   | 2202    | INT       | R/W    | 0 = TC B<br>1 = TC E High<br>2 = TC E Low<br>3 = TC J High<br>4 = TC J Mid<br>5 = TC J Low<br>6 = TC K High<br>7 = TC K Mid<br>8 = TC K Low<br>9 = TC M High                             |



| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection   |
|-----------------------|------------------|---------|-----------|--------|--|
|                       | Hex              | Decimal |           |        |  |
|                       |                  |         |           |        | 10 = TC M Low<br>11 = TC N High<br>12 = TC N Low<br>13 = TC R<br>14 = TC S<br>15 = TC T High<br>16 = TC T Low<br>17 = TC C High<br>18 = TC C Low<br>19 = TC PR40-PR20<br>20 = RTD Pt100<br>21 = RTD Pt100 Low<br>22 = RTD Pt200<br>23 = RTD Pt500<br>24 = Linear<br>25 = Square Root |
| Input 1 High Value    | CE               | 206     | FP        | R/W    | -999. to 9999. Engineering Units (Linear types only)   |
| Input 1 Low Value     | CF               | 207     | FP        | R/W    | -999 to 9999. Engineering Units (Linear types only)  |
| Input 1 Bias          | D1               | 209     | FP        | R/W    | -999 to 9999 (For non-FM model) & -10 to 10 (For FM model). Engineering Units  |

| Parameter Description                                 | Register Address |         | Data Type | Access | Data Range or Enumerated Selection   |
|---|------------------|---------|-----------|--------|--|
|   | Hex              | Decimal |           |        |  |
| Input 1 Filter  | D2               | 210     | FP        | R/W    | 0 to 120 seconds   |
| Input 1 Burnout (Open Circuit Detection) ( Read only) | 89B              | 2203    | INT       | R      | 0 = Not used<br>1 = Upscale Burnout<br>2 = Downscale Burnout<br>3 = Not used |

**Options**

Table below lists all the register addresses and ranges or selections for the function parameters in Set-up Group Options.

*Table 11-15: Set-up Group – Options*

| Parameter Description    | Register Address |         | Data Type | Access | Data Range or Enumerated Selection                  |
|--------------------------|------------------|---------|-----------|--------|---|
|                          | Hex              | Decimal |           |        |   |
| Auxiliary Output *       | 8B7              | 2231    | INT       | R/W    | 0 = Disable<br>1 = PV<br>2 = Deviation              |
| CO Low Value             | FB               | 251     | FP        | R/W    | Within the range of the selected variable in ID 134 |
| CO High Value            | FC               | 252     | FP        | R/W    | Within the range of the selected variable in ID 134 |
| CO Range                 | 8B8              | 2232    | INT       | R/W    | 0 = 4-20 mA<br>1 = 0-20 mA                          |
| Digital Input 1 Function | 8B9              | 2233    | INT       | R/W    | 0 = Disable<br>1 = Enable                           |

**Communications**

Table below lists all the register addresses and ranges or selections for the function parameters in Set-up Group Communications.

*Table 11-16: Set-up Group – Communications*

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection |
|-----------------------|------------------|---------|-----------|--------|------------------------------------|
|                       | Hex              | Decimal |           |        |                                    |
| Bluetooth Function    | 8C1              | 2241    | INT       | R/W    | 0 = Disable<br>1 = Enable          |
| Communicatio          | 8C2              | 2242    | INT       | R/W    | 0 = Disable                        |

| Parameter Description | Register Address |         | Data Type | Access | Data Range or Enumerated Selection                                 |
|-----------------------|------------------|---------|-----------|--------|--|
|                       | Hex              | Decimal |           |        |  |
| ns Type               |                  |         |           |        | 1 = RS-485 Modbus<br>2 = Ethernet                                  |
| Modbus Address        | 8C3              | 2243    | FP        | R/W    | 1 - 99   |
| Baud Rate             | 8C4              | 2244    | INT       | R/W    | 0 = 4800<br>1 = 9600<br>2 = 19200<br>3 = 38400                     |
| Response Delay        | 8C5              | 2245    | FP        | R/W    | Response Delay in ms<br>(1 to 500) + 6ms                           |
| Word Oder for Float   | 8C6              | 2246    | INT       | R/W    | 0 = FP B 0123<br>1 = FP BB 1032<br>2 = FP L 3210<br>3 = FP LB 2301 |
| Ethernet Address 1    | 8C7              | 2247    | INT       | R/W    | Ethernet Address = Add1.Add2.Add3.Add4<br>Ranges: 0~255            |
| Ethernet Address 2    | 8C8              | 2248    | INT       | R/W    |  |
| Ethernet Address 3    | 8C9              | 2249    | INT       | R/W    |  |
| Ethernet Address 4    | 8CA              | 2250    | INT       | R/W    |  |
| Subnet Mask Address 1 | 8CB              | 2251    | INT       | R/W    | Subnet Mask Address = Add1.Add2.Add3.Add4<br>Ranges: 0~255         |
| Subnet Mask Address 2 | 8CC              | 2252    | INT       | R/W    |  |
| Subnet Mask Address 3 | 8CD              | 2253    | INT       | R/W    |  |

| Parameter Description   | Register Address |         | Data Type | Access | Data Range or Enumerated Selection                                     |
|-------------------------|------------------|---------|-----------|--------|--|
|                         | Hex              | Decimal |           |        |  |
| Subnet Mask Address 4   | 8CE              | 2254    | INT       | R/W    |  |
| Default Gateway 1       | 8CF              | 2255    | INT       | R/W    | Default Gateway = Gateway1.Gateway2.Gateway3.Gateway4<br>Ranges: 0~255 |
| Default Gateway 2       | 8D0              | 2256    | INT       | R/W    |  |
| Default Gateway 3       | 8D1              | 2257    | INT       | R/W    |  |
| Default Gateway 4       | 8D2              | 2258    | INT       | R/W    |  |
| Shed Function           | 8D3              | 2259    | INT       | R/W    | 0 = Enable<br>1 = Disable  |
| Shed Time               | 12A              | 298     | FP        | R/W    | 0~255<br>Unit: 1/3 second  |
| Shed Setpoint Recall    | 8D6              | 2262    | INT       | R/W    | 0 = To Last Local Setpoint used<br>1 = To Computer SP                  |
| Computer Setpoint Units | 8D7              | 2263    | INT       | R/W    | 0 = Engineering Units<br>1 = Percent                                   |
| Local Loopback          | 8D8              | 2264    | INT       | R/W    | 0 = Disable<br>1 = Enable  |

**Alarms**

Table below lists all the register addresses and ranges or selections for the function parameters in Set-up Group Alarms.

Table 11-17: Set-up Group – Alarms

| Parameter Description         | Register Address |         | Data Type | Access | Data Range or Enumerated Selection   |
|-------------------------------|------------------|---------|-----------|--------|--|
|                               | Hex              | Decimal |           |        |  |
| Alarm 1 Setpoint 1 Type       | 8DF              | 2271    | INT       | R/W    | 0 = None<br>1 = PV<br>2 = Deviation<br>3 = Alarm on Shed<br>4 = Failsafe<br>5 = PV Rate of Change<br>6 = Alarm on Digital Input 1<br>7 = T/C Warning<br>8 = T/C Fail |
| Alarm 1 Setpoint 1 Value      | 10F              | 271     | FP        | R/W    | Within the range of selected parameter.  |
| Alarm 1 Setpoint 1 State      | 8E0              | 2272    | INT       | R/W    | 0 = High Alarm<br>1 = Low Alarm  |
| Alarm 1 Setpoint 1 Delay      | 12B              | 299     | FP        | R/W    | 0~30 seconds   |
| Alarm 1 Setpoint 1 Hysteresis | 110              | 272     | FP        | R/W    | 0.0 to 100% of output or span  |
| Alarm 1 Setpoint 2 Type       | 8E3              | 2275    | INT       | R      | Same as 8DF  |
| Alarm 1 Setpoint 2 Value      | 111              | 273     | FP        | R/W    | Within the range of selected parameter.  |
| Alarm 1 Setpoint 2 State      | 8E4              | 2276    | INT       | R/W    | 0 = High Alarm<br>1 = Low Alarm  |
| Alarm 1 Setpoint 2 Delay      | 12C              | 300     | FP        | R/W    | 0~30 seconds   |

| Parameter Description         | Register Address |         | Data Type | Access | Data Range or Enumerated Selection         |
|-------------------------------|------------------|---------|-----------|--------|--|
|                               | Hex              | Decimal |           |        |  |
| Alarm 1 Setpoint 2 Hysteresis | 112              | 274     | FP        | R/W    | 0.0 to 100% of output or span              |
| Alarm 2 Setpoint 1 Type       | 8E7              | 2279    | INT       | R      | Same as 8DF                                |
| Alarm 2 Setpoint 1 Value      | 113              | 275     | FP        | R/W    | Within the range of selected parameter.    |
| Alarm 2 Setpoint 1 State      | 8E8              | 2280    | INT       | R/W    | 0 = High Alarm<br>1 = Low Alarm            |
| Alarm 2 Setpoint 1 Delay      | 12D              | 301     | FP        | R/W    | 0~30 seconds                               |
| Alarm 2 Setpoint 1 Hysteresis | 114              | 276     | FP        | R/W    | 0.0 to 100% of output or span              |
| Alarm 2 Setpoint 2 Type       | 8EB              | 2283    | INT       | R/W    | Same as 8DF                                |
| Alarm 2 Setpoint 2 Value      | 115              | 277     | FP        | R/W    | Within the range of selected parameter.    |
| Alarm 2 Setpoint 2 State      | 8EC              | 2284    | INT       | R/W    | 0 = High Alarm<br>1 = Low Alarm            |
| Alarm 2 Setpoint 2 Event      | 8ED              | 2285    | INT       | R/W    | 0 = Begin of Segment<br>1 = End of Segment |
| Alarm 2 Setpoint 2 Delay      | 12E              | 302     | FP        | R/W    | 0~30 seconds                               |
| Alarm 2 Setpoint 2 Hysteresis | 116              | 278     | FP        | R/W    | 0.0 to 100% of output or span              |
| Alarm Latching for Output 1   | 8EF              | 2287    | INT       | R/W    | 0 = Non Latching<br>1 = Latching           |
| Alarm Blocking                | 8F0              | 2288    | INT       | R/W    | 0 = Disable<br>1 = Alarm 1                 |

| Parameter Description  | Register Address |         | Data Type | Access | Data Range or Enumerated Selection                               |
|------------------------|------------------|---------|-----------|--------|--|
|                        | Hex              | Decimal |           |        |  |
|                        |                  |         |           |        | 2 = Alarm 2<br>3 = Alarm 1&2                                     |
| AO/CO Diagnostic Alarm | 8F1              | 2289    | INT       | R/W    | 0 = Disable<br>1 = Alarm 1<br>2 = Alarm 2<br>3 = Disable Warning |

### **Display**

Table below lists all the register addresses and ranges or selections for the function parameters in Set-up Group Display.

*Table 11-18: Set-up Group – Display*

| Parameter Description  | Register Address |         | Data Type | Access | Data Range or Enumerated Selection   |
|------------------------|------------------|---------|-----------|--------|--|
|                        | Hex              | Decimal |           |        |  |
| Decimal Point Location | 8FD              | 2301    | INT       | R/W    | 0 = None – Fixed<br>1 = One Digit– Floating decimal point to one<br>2 = Two Digits– Floating decimal point to two<br>3 = Three Digits– Floating decimal point to three |
| Temperature Units      | 8FE              | 2302    | INT       | R/W    | 0 = °F<br>1 = °C<br>2 = None   |
| Language               | 900              | 2304    | INT       | R/W    | 0 = English  |
| TC Diagnostics         | 901              | 2305    | INT       | R/W    | 0 = Disable<br>1 = Enable  |



# STANDARD MODBUS READ, WRITE AND OVERRIDE PARAMETERS

## What's in this section?

The following topics are covered in this section.

---

In this section:

|   |     |
|---|-----|
| <i>Modbus RTU Message Format</i> .....                        | 210 |
| <i>Modbus RTU Function Codes</i> .....                        | 210 |
| <i>Digital Output Register Map</i> .....                      | 212 |
| <i>Digital Input Register Map</i> .....                       | 213 |
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# Modbus RTU Message Format

For more information, see "Modbus RTU Message Format" of 51-52-25-66 *Modbus RTU Serial Communications User Manual*, which is available at [Honeywellprocess.com](http://Honeywellprocess.com).

Table 12-1: Modbus RTU Message Formats

|  |  |
|--|--|
| <b>Coding system</b>                     | 8 bit binary   |
| <b>Number of data bits per character</b> | 10 Bits<br><br>start bits - 1<br>data bits - 8<br>parity bits - 0<br>stop bits - 1                                 |
| <b>Parity</b>                            | Not used   |
| <b>Bit transfer rate</b>                 | 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 Selectable<br><br>NOTE: Not all instruments support all Baud Rates. |
| <b>Duplex</b>                            | Half duplex Transceiver or TX/RX   |
| <b>Error checking</b>                    | CRC (cyclic redundancy check)  |
| <b>Polynomial</b>                        | (CRC-16 10100000000001)  |
| <b>Bit transfer order</b>                | LSB first  |
| <b>End of message</b>                    | Idle line for 3.5 or more characters (>1.82 msec for 19200).   |

## Modbus RTU Function Codes

The Honeywell Universal Modbus RTU protocol uses a subset of the standard Modbus RTU function codes to provide access to process-related information. Several MODICON function codes are employed. It is appropriate to define instrument-specific "user-defined" function codes. Several standard Modbus RTU function codes are supported. These standard function codes provide basic support for IEEE 32-bit floating point numbers and 16-bit integer register representation of instrument's process data.

Repolling of data is not supported by these instruments.

Table 12-2: Modbus RTU Function Codes Definitions

| Function Code | Name                      | Usage   |
|---------------|---------------------------|---|
| 01            | Read Coil Status          | Read the State of a Digital Output  |
| 02            | Read Input Status         | Read the State of a Digital Input   |
| 03            | Read Holding Registers    | Read Data in 16 bit Register Format (high/low). Used to read integer or floating point process data. Registers are consecutive and are imaged from the instrument to the host.  |
| 04            | Read Input Registers      |   |
| 06            | Preset Single Register    | Write Data in 16-bit Integer Format (high/low) ONLY.  |
| 08            | Loopback Test             | Used for diagnostic testing of the communications port.   |
| 16 (10h)      | Preset Multiple Registers | Write Data in 16-bit Format (high/low). Used to write integer and floating point override data. Registers are consecutive and are imaged from the host to the instrument.<br><br>Note: UDC will write floating point data using this Function Code. |
| 17 (11h)      | Report Device ID          | Read instrument ID and connection information, ROM version, etc.  |

For more information, see "Modbus RTU Function Codes" of 51-52-25-66 *Modbus RTU Serial Communications User Manual*, which is available at [Honeywellprocess.com](http://Honeywellprocess.com).

## Digital Output Register Map

Use the identifying codes listed in the following table to read the specific items.

A Write request for these codes will result in an Error message.

Table 12-3: Digital Output Parameters

| Parameter Description    | Register Address |         | Data Type | Access | Description                                  |
|--------------------------|------------------|---------|-----------|--------|--|
|                          | Hex              | Decimal |           |        |  |
| Output 1                 | 0x00             | 1       | Float     | R      | 0: No output<br>1: Hardware channel Output 1 |
| Output 2                 | 0x01             | 2       | INT16     | R      | 0: No output<br>1: Hardware channel Output 2 |
| Alarm Relay 2 / Output 2 | 0x02             | 3       | Coil      | R      | 0: No output<br>1: Hardware channel Output 3 |
| Alarm Relay 1            | 0x03             | 4       | Coil      | R      | 0: No output<br>1: Hardware channel Output 4 |

## Digital Input Register Map

Use the identifying codes listed in the following table to read the specific items.

A Write request for these codes will result in an Error message.

Table 12-4: Digital Input Parameters

| Parameter Description | Register Address |         | Data Type | Access | Description                       |
|-----------------------|------------------|---------|-----------|--------|-----------------------------------|
|                       | Hex              | Decimal |           |        |                                   |
| Digital Input 1       | 0x0000           | 10001   | Coil      | R      | 0: No input<br>1: Digital Input 1 |

## Loop Value Integer Register Map

Table 12-5: Loop Value Integer Register Map

| Parameter Description | Register Address |         | Access | Description                                   |
|-----------------------|------------------|---------|--------|---|
|                       | Hex              | Decimal |        |   |
| PV                    | 0000             | 40001   | R      | Signed 16 bit integer, prescale * 10 (Note 1) |
| Working Set Point     | 0002             | 40003   | R/W    | Signed 16 bit integer, prescale * 10 (Note 1) |
| Input #1              | 0004             | 40005   | R      | Signed 16 bit integer, prescale * 10          |
| PV Low Range          | 000B             | 40012   | R      | Signed 16 bit integer, prescale * 10          |
| PV High Range         | 000C             | 40013   | R      | Signed 16 bit integer, prescale * 10          |
| Alarm #1 SP #1        | 000D             | 40014   | R/W    | Signed 16 bit integer, prescale * 10          |
| Alarm #1 SP #2        | 000E             | 40015   | R/W    | Signed 16 bit integer, prescale * 10          |
| Alarm #1 Action       | 000F             | 40016   | R      | Signed 16 bit integer,                        |

| Parameter Description | Register Address |         | Access | Description  |
|-----------------------|------------------|---------|--------|--|
|                       | Hex              | Decimal |        |  |
|                       |                  |         |        | prescale *1<br><br>Bit 0: 1 = Alarm 1 SP 1 State is High, or Event is End; 0 = State is Low, or Event is Begin<br><br>Bit 1: 1 = Alarm 1 SP 2 State is High, or Event is End; 0 = State is Low, or Event is Begin                        |
| Alarm #2 SP #1        | 0017             | 40024   | R/W    | Signed 16 bit integer, prescale * 10   |
| Alarm #2 SP #2        | 0018             | 40025   | R/W    | Signed 16 bit integer, prescale * 10   |
| Alarm #2 Action       | 0019             | 40026   | R      | Signed 16 bit integer, prescale *1<br><br>Bit 0: 1 = Alarm 2 SP 1 State is High, or Event is End; 0 = State is Low, or Event is Begin<br><br>Bit 1: 1 = Alarm 2 SP 2 State is High, or Event is End; 0 = State is Low, or Event is Begin |
| SP Low Limit          | 001A             | 40027   | R/W    | Signed 16 bit integer, prescale * 10 ( Note 1)   |
| SP High Limit         | 001B             | 40028   | R/W    | Signed 16 bit integer, prescale * 10 ( Note 1)   |
| Working Set Point     | 001C             | 40029   | R/W    | Signed 16 bit integer, prescale * 10 ( Note 1)   |
| PV Override Value     | 0020             | 40033   | R/W    | Signed 16 bit integer, prescale * 10   |
| SP Override Value     | 0021             | 40034   | R/W    | Signed 16 bit integer, prescale * 10 ( Note 1)   |

| Parameter Description | Register Address |         | Access | Description   |
|-----------------------|------------------|---------|--------|---|
|                       | Hex              | Decimal |        |   |
| Deviation             | 0025             | 40038   | R      | Signed 16 bit integer, prescale * 10  |
| Decimal Point         | 0028             | 40041   | R/W    | Signed 16 bit integer, prescale *1  |
| Shed Enable           | 0039             | 40058   | R/W    | Bit Packed<br>Bit 0: 0: Disable 1: Enable   |
| Loop Status           | 003E             | 40063   | R      | Bit Packed<br>Bit 0: Unused<br>Bit 1: Unused<br>Bit 2: Unused<br>Bit 3: Unused<br>Bit 4: Unused<br>Bit 5: Unused<br>Bit 6: CSP<br>Bit 7: Unused<br>Bit 8: Unused<br>Bit 9: Unused<br>Bit 10: Unused<br>Bit 11: Unused<br>Bit 12: 1 = Any Digital Input Active<br>Bit 13: 1 = Any Alarm Active<br>Bit 14: Unused<br>Bit 15: Unused |
| Limit relay status    | 3641             | 53890   | R      | 0 = Not Latched   |

| Parameter Description | Register Address |         | Access | Description   |
|-----------------------|------------------|---------|--------|---|
|                       | Hex              | Decimal |        |   |
|                       |                  |         |        | 1 = Latched if in Limit condition   |
| Device Status         | 003F             | 40064   | R/W    | 1) Bit 0: Emergency Manual<br>Bit 1: Failsafe<br>Bit 2: Working Calibration Checksum Error<br>Bit 3: Configuration Checksum Error<br>Bit 4: Factory Calibration Error<br>Bit 5: Hardware Failure<br>Bit 6: Restart After Shed<br>Bit 7: Configuration/ Calibration Memory Changed<br>2) Writing any value to this register via Function Code 6 clears bits 6 and 7 only |

## Loop Value Register Map

Table 12-6: Loop Value Register Map

| Parameter Description | Register Address |         | Access | Description                          |
|-----------------------|------------------|---------|--------|--------------------------------------|
|                       | Hex              | Decimal |        |                                      |
| PV                    | 0040             | 40065   | R      | Floating Point in Engineering Units. |
| Working Set Point     | 0044             | 40069   | R      | Floating Point in Engineering Units. |
| Input #1              | 0048             | 40073   | R      | Floating Point in                    |



| Parameter Description | Register Address |         | Access | Description                          |
|-----------------------|------------------|---------|--------|--------------------------------------|
|                       | Hex              | Decimal |        |                                      |
|                       |                  |         |        | Percentage.                          |
| PV Low Range          | 0056             | 40087   | R      | Floating Point in Engineering Units. |
| PV High Range         | 0058             | 40089   | R      | Floating Point in Engineering Units. |
| Alarm #1 SP #1        | 005A             | 40091   | R/W    | Floating Point in Engineering Units. |
| Alarm #1 SP #2        | 005C             | 40093   | R/W    | Floating Point in Engineering Units. |
| Alarm #2 SP #1        | 006E             | 40111   | R/W    | Floating Point in Engineering Units. |
| Alarm #2 SP #2        | 0070             | 40113   | R/W    | Floating Point in Engineering Units. |
| SP Low Limit          | 0074             | 40117   | R/W    | Floating Point in Engineering Units. |
| SP High Limit         | 0076             | 40119   | R/W    | Floating Point in Engineering Units. |
| Working Set Point     | 0078             | 40121   | R/W    | Floating Point in Engineering Units. |
| PV Override Value     | 0080             | 40129   | R/W    | Floating Point in Engineering Units. |
| SP Override Value     | 0082             | 40131   | R/W    | Floating Point in Engineering Units. |
| Deviation             | 008A             | 40139   | R      | Floating Point in Engineering Units. |
| Aux Output            | 00A2             | 40163   | R      | Floating Point in Engineering Units. |
| Input 1 Bias          | 00AA             | 40171   | R/W    | Floating Point in Engineering Units. |
| Shed Enable           | 00F8             | 40249   | R/W    | Bit Packed<br>Bit 0: 0: Disable 1:   |

| Parameter Description | Register Address |         | Access | Description   |
|-----------------------|------------------|---------|--------|---|
|                       | Hex              | Decimal |        |   |
|                       |                  |         |        | Enable  |
| Loop Status           | 00FE             | 40255   | R      | Bit Packed<br>Bit 0: Unused<br>Bit 1: Unused<br>Bit 2: Unused<br>Bit 3: Unused<br>Bit 4: Unused<br>Bit 5: Unused<br>Bit 6: CSP<br>Bit 7: Unused<br>Bit 8: Unused<br>Bit 9: Unused<br>Bit 10: Unused<br>Bit 11: Unused<br>Bit 12: 1 = Any Digital Input Active<br>Bit 13: 1 = Any Alarm Active<br>Bit 14: Unused<br>Bit 15: Unused |

## Analog Input Register Map

Use the identifying codes listed in the following table to read the specific items.

A Write request for these codes will result in an Error message.

Table 12-7: Analog Input Parameters

| Parameter Description | Register Address |         | Access | Description                          |
|-----------------------|------------------|---------|--------|--------------------------------------|
|                       | Hex              | Decimal |        |                                      |
| Analog Input 1        | 1800             | 46145   | R      | Floating Point in Engineering Units. |
| Analog Input 2        | 1802             | 46147   | R      | Floating Point in Engineering Units. |

## Math, Calculated Value, or Variable Register Map

Table 12-8: Math, Calculated Value, or Variable Register Map

| Parameter Description | Register Address |         | Access | Description                          |
|-----------------------|------------------|---------|--------|--------------------------------------|
|                       | Hex              | Decimal |        |                                      |
| Math Value #1         | 18C0             | 46337   | R      | Floating Point in Engineering Units. |

## Math or Calculated Value Status Register Map

Table 12-9: Math or Calculated Value Status Register Map

| Parameter Description | Register Address |         | Access | Description   |
|-----------------------|------------------|---------|--------|---|
|                       | Hex              | Decimal |        |   |
| Math Status #1 ~ #16  | 1AC0             | 46849   | R      | Bit Packed:<br>Bit 0: Math #1 Status<br>⋮<br>Bit 15: Math #16 Status<br>0: Math OFF<br>1: Math ON |

## Shed Timer Reset Register Map

Table 12-10: Shed Timer Reset Register Map

| Parameter Description | Register Address |         | Access | Description   |
|-----------------------|------------------|---------|--------|---|
|                       | Hex              | Decimal |        |   |
| Math Status #1-#16    | 1B90             | 47057   | W      | Signed 16 bit integer<br><br>Write this address to clear an infinite shed condition. (Shed time = 0) Data is ignored. |

## Alarm Status Register Map

Table 12-11: Alarm Status

| Parameter Description | Register Address |         | Access | Description   |
|-----------------------|------------------|---------|--------|---|
|                       | Hex              | Decimal |        |   |
| Alarm Status #1 ~ #16 | 1BF0             | 47153   | R      | Bit Packed:<br><br>Bit 0: Alarm #1 Status<br><br>⋮<br><br>Bit 15: Alarm #16 Status<br><br>0: Alarm OFF<br><br>1: Alarm ON |

## Alarm Set Point Value Register Map

Table 12-12: Alarm Set Point Value Register Map

| Parameter Description   | Register Address |         | Access | Description                          |
|-------------------------|------------------|---------|--------|--------------------------------------|
|                         | Hex              | Decimal |        |                                      |
| Alarm Set Point Value 1 | 1C00             | 47169   | R/W    | Floating Point in Engineering Units. |

| Parameter Description   | Register Address |         | Access | Description                          |
|-------------------------|------------------|---------|--------|--------------------------------------|
|                         | Hex              | Decimal |        |                                      |
| Alarm Set Point Value 2 | 1C02             | 47171   | R/W    | Floating Point in Engineering Units. |
| Alarm Set Point Value 3 | 1C04             | 47173   | R/W    | Floating Point in Engineering Units. |
| Alarm Set Point Value 4 | 1C06             | 47175   | R/W    | Floating Point in Engineering Units. |

# MODBUS COMMUNICATION EXCEPTION CODES

## What's in this section?

The following topics are covered in this section.

---

In this section:

*Introduction* .....223

## Introduction

When a master device sends a query to a responder device it expects a normal response. One of four possible events can occur from the master's query:

- Responder device receives the query without a communication error and can handle the query normally. It returns a normal response.
- Responder does not receive the query due to a communication error. No response is returned. The master program will eventually process a time-out condition for the query.
- Responder receives the query but detects a communication error (parity, LRC or CRC). No response is returned. The master program will eventually process a time-out condition for the query.
- Responder receives the query without a communication error but cannot handle it (i.e., request is to a non-existent coil or register). The responder will return with an exception response informing the master of the nature of the error (Illegal Data Address.)

The exception response message has two fields that differentiate it from a normal response:

### Function Code Field

In a normal response, the responder echoes the function code of the original query in the function code field of the response. All function codes have a most-significant bit (MSB) of 0 (their values are below 80 hex). In an exception response, the responder sets the MSB of the function code to 1. This makes the function code value in an exception response exactly 80 hex higher than the value would be for a normal response.

With the function code's MSB set, the master's application program can recognize the exception response and can examine the data field for the exception code.

### Data Field:

In a normal response, the responder may return data or statistics in the data field. In an exception response, the responder returns an exception code in the data field. This defines the responder condition that caused the exception.

## Query

**Example:** Internal slave error reading 2 registers starting at address 1820h from slave at slave address 02.

02 03 18 20 00 02 CRC CRC

## Response

**Example:** Return MSB in Function Code byte set with responder Device Failure (04) in the data field.

02 83 04 CRC CRC

*Table 13-1: Modbus RTU Data Layer Status Exception Codes*

| Exception Code | Definition           | Description  |
|----------------|----------------------|--|
| 01             | Illegal Function     | The message received is not an allowable action for the addressed device.  |
| 02             | Illegal Data Address | The address referenced in the function-dependent data section of the message is not valid in the addressed device. |
| 03             | Illegal Data Value   | The value referenced at the addressed device location is no within range.  |



# ETHERNET TCP/IP

## What's in this section?

The following topics are covered in this section.

---

In this section:

*Overview* ..... 226

# Overview

Ethernet parameters can only be configured via the Communication set up group, or Honeywell EasySet.

Ethernet IP Address is 10.0.0.2 as shipped from the Factory.

The MAC address is printed on the case label of each instrument.

Widely used by manufacturers, the Ethernet connection, which uses Modbus TCP/IP, allows the controller to connect to other Ethernet networks and exchange data with computers or devices on that network for monitoring or managing your process from almost any location.

When constructing a network, it is recommended that a Switch be used to connect UDCs to a LAN rather than using a Hub. This is because a Switch passes only those messages for IP addresses that are connected to the Switch while a Hub passes all message traffic. Using a Switch thus improves the overall throughput of the traffic to and from the UDCs.

To secure the network communication, it is recommended to use IP security (IPSec) to set up a Virtual Private Network (VPN).

Figure 14-1: Private network

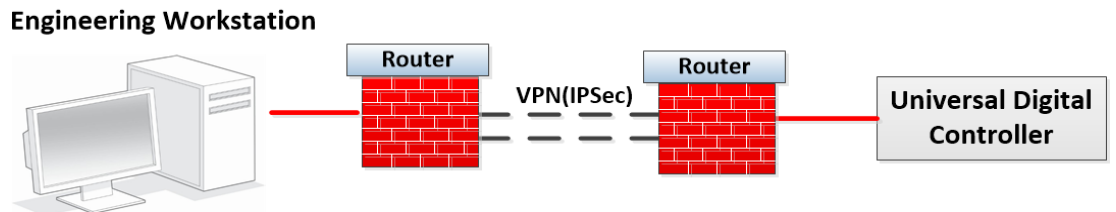
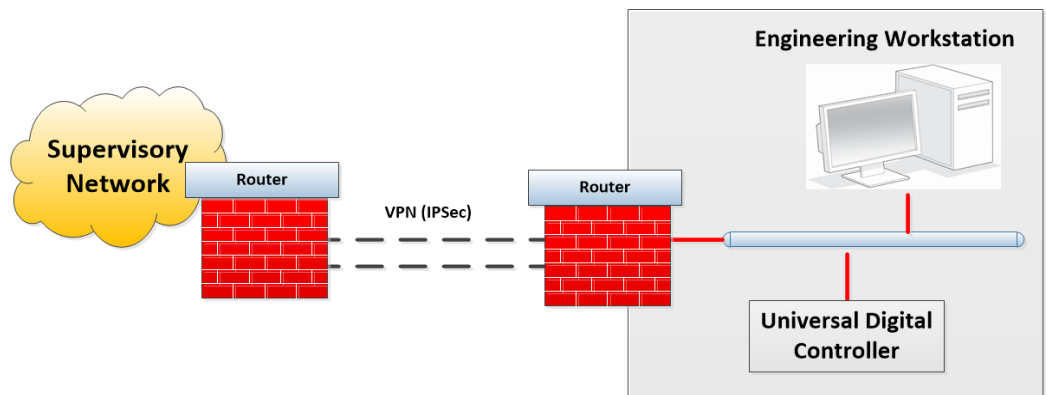


Figure 14-2: Public network



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