Honeywell

UDC2800 Universal Digital Controller Specification

51-52-03-49
October 2020, Version 1.0

Revision History

Revision	Date	Description
1.0	October 2020	UDC2800 Universal Digital Controller software release and New hardware

Table of Contents

1.   Overview

New Power and Flexibility

The UDC2800 Universal Digital Controller packs new powerful features in the popular 1/4 DIN size.

Unmatched application power includes Bluetooth Configuration interface, two universal analog inputs and a Math Algorithm. When these are combined with the Accutune III™ tuning with fuzzy logic overshoot suppression, the result is price/performance leadership.

Application flexibility is assured by the universal analog inputs, universal AC power supply, two digital inputs, a maximum of two analog inputs and four digital outputs, RS485 Modbus RTU or Ethernet 10/100M Base-T TCP/IP communication protocols, simple configuration plus total field upgrade capability for any optional feature.

Figure 1 - UDC2800 Universal Digital Controller

The key features of the UDC2800 include:

- 2 Universal Analog Inputs
- 0.15% Accuracy
- Fast scanning rate (100ms)
- Up to 4 Output Types
- 2 Digital Inputs
- Math Functions
- Ethernet and Modbus communication
- Bluetooth configuration on mobile device
- NEMA4X and IP66 front face protection
- Multilanguage prompts
- ¼ DIN Size
- Jumper free configuration

Bright displays with multi-language prompts in English, make the operator interface easy to read, understand, and operate. Simple keystrokes let you set operating parameters that meet your process control needs.

Analog Inputs

The UDC2800 has two analog inputs with a typical accuracy of ±0.15% of full-scale input and a typical resolution of 16 bits. Both analog inputs are sampled ten times per second (every 100 ms).

The first, or Process Variable input, can be one of the various thermocouple, RTD, or linear actuations. Linear actuations have thermocouple, RTD characterization capability as a standard feature. Linear actuations also have square root capability.

The optional second input is isolated and accepts the same actuations as input one.

All actuations and characterizations are keyboard configurable. Cold junction compensation is provided for thermocouple type inputs. Upscale, downscale or failsafe sensor break protection is keyboard configurable. A configurable digital filter of 0 to 120 seconds provides input signal damping.

Thermocouple Health - In addition to the standard configurable upscale, downscale or failsafe output burnout selections, the condition of the thermocouple can be monitored to determine if it is good, failing or in danger of imminent failure.

Math Functions

Algorithm—A pre-configured algorithm is available for easy implementation. This includes the capability of using a Ratio and Bias with any input. You can select from the following menu:

- *Feedforward Summer*—Uses either input, followed by a Ratio/Bias calculation, summed directly with the computed PID output value to provide a resultant output to the final control element.
- *Weighted Average* —Computes the weighted average of a PV or SP for the control algorithm from two inputs.
- *Feedforward Multiplier*—Uses any input, multiplied by the calculated PID output to provide a resultant output which is sent to the final control element.
- *Summer/Subtractor*—Will add or subtract inputs with the result used as the derived PV.
- *Multiplier/Divider*—Uses the analog inputs to calculate a derived PV. Available with or without Square Root.
- *Input High/Low Select*—Specifies the PV input as the higher or lower of the two inputs.

Digital Inputs

Two* isolated digital inputs are provided for remote dry contact closure to select one of the following actions:

- Manual control mode.
- Local setpoint 1, 2, 3, 4.
- Direct controller action.
- Hold SP Ramp/Program.
- Select PID set 2, 3.
- PV = Input 2.
- ReRun - SP Ramp/Program.
- Run - SP Ramp/Program.
- External program reset.
- Disable PID integral action.
- Manual mode, failsafe output.
- Disable keyboard.
- Output 1 = Fixed value
- Start Timer.
- Auto/Manual Station
- Initiate Tuning.
- Initiate PV Hot Start.
- Output 1 tracks Input 2.
- To Remote Setpoint.
- PID reset feedback via Input 2
- Purge
- Low Fire
- To Latching Manual Mode.
- PV Hold

Also, the digital inputs can allow one of the following selections to be combined with one of the above selections:

- Select PID set 2.
- Direct controller action.
- Local setpoint 1, 2, 3, 4.
- Disable Accutune
- To Run – SP Ramp/Program

*The 2nd Current Output and the 2nd Digital Input are mutually exclusive. Selection is made via a keyboard entry.

Outputs and Control

Output Types - The UDC2800 may have as many as five outputs made up of the following types:

- Current Outputs (4-20 or 0-20 ma)
- Electromechanical Relays (5 amps)
- Dual Electromechanical Relays (2 amps)
- Open Collector Outputs (Transmitter Power)

Output Algorithms - The UDC2800 is available with one or more of the following output algorithms:

- **Time Proportional** provides On-Off or Time Proportional (Relay) output.
- **Current Proportional** supplies proportional direct current output for final control elements, which require a 4-20mA signal. Output can be easily configured via the keyboard for 0-20mA operation without recalibration.
- **Current Proportional Duplex** is similar to current proportional but provides a second set of tuning parameters and a split range current output or a second current output via the Auxiliary output option, for the heat and cool zones.
- **Time Proportional Duplex** - Depending on which control algorithm you select, this duplex output algorithm can provide On-Off Duplex, Time Proportional Duplex. The time proportional duplex output provides independent PID tuning constants and two-time proportional outputs; one for heat zone above 50% output, and one for cool zone below 50% output.
- **Current/Relay Duplex (Relay=Heat)** - A variation of Duplex with Current active for 0 to 50% output (PID Set 2) and Relay 2 active 50 to 100% output (PID Set 1). Note that only one alarm is available for this output type.
- **Relay/Current Duplex (Relay=Cool)** - A variation of Duplex with Current active for 50 to 100% output and Relay 2 is active for 0 to 50% output. Note that only one alarm is available for this output type.

Control Algorithms - Depending on the output algorithms specified, the controller can be configured for the following control algorithms:

- On-Off
- PID-A
- PID-B
- PD with Manual Reset
- 3 control modes: Manual, Automatic with Local Setpoint, Automatic with Remote Setpoint

Alarms

One or two electromechanical alarm relays are available to activate external equipment when preset alarm setpoints are reached. Each of the two alarms can be set to monitor two independent setpoints. Each alarm setpoint can be either high or low alarm. The alarm type can be selected to be either of the inputs, the Process Variable, Deviation, Output, Shed from communications, PV rate of change, or to alarm on manual mode activation or a Current Output Open failure. It can also be used as an On or Off event at the beginning or end of a Ramp/Soak segment. The alarm hysteresis is configurable from 0 to 100% of range.

- Alarms can be configured as latching or non-latching.
- Alarm blocking is also available which allows start-up without alarm energized until after it first reaches the operating region.
- PV rate of change alarm.
- Loop break alarm.
- Timer output reset.
- Diagnostic Alarm

Communication

A communications link is provided between the UDC2800 and a host computer or PLC via the RS485 Modbus® RTU or Ethernet TCP/IP communications option. A Bluetooth communication link is also available allowing a non-intrusive configuration of the instrument.

Miscellaneous Features

Auxiliary Output* - Either or both two current outputs can function as an Auxiliary Output which can be scaled from 0-20 mA or 4-20 mA for 0 to 100% for any range. It can be configured to represent Input 1, Input 2, PV, active Setpoint, Local SP1, Deviation, or the Control Output.

Transmitter Power - This output provides up to 28 volts DC to power a 2-wire transmitter (it requires the use of Open Collector Output (Transmitter Power Output) selection or the Auxiliary Output).

Four Local and one Remote Setpoints - Can be configured to provide Four Local and one Remote Setpoints, which are selectable either via the keyboard or by Digital Input.

Universal Switching Power - Operates on any line voltage from 90 to 264 Vac 50/60 Hz without jumpers. 24 Vac/dc instrument power is available as an option.

Timer - This standard feature provides a configurable time period of 0 to 99 hours, 59 minutes or units of minutes and seconds. It can be started via the keyboard, alarm 2, or by a digital input. The timer output is Alarm 1, which energizes at the end of the Timer Period. Alarm 1 can be automatically reset. The Timer Period can be changed between each batch. Status is shown on the lower display.

Moisture Protection - The NEMA4X and IP66 rated front face permits use in applications where it may be subjected to moisture, dust, or hose-down conditions.

Setpoint Ramp/Soak Programming (Optional) - Enables you to use 8 programs and store 4 Ramp and 4 Soak segments per program. Programs can be linked up to 64 segments. Run or Hold of program is keyboard or remote digital switch selectable.

Setpoint Rate - Lets you define a ramp rate to be applied to any local setpoint change. A separate upscale or downscale rate is configurable. A single setpoint ramp is also available as an alternative.

CE Mark - Conformity with Radio Equipment Directive 2014/53/EU as a standard feature.

Radio Compliance information -
Federal Communications Commission (FCC) contains FCC ID: 2AVFQ-MCUDISP

Industry Canada (IC) contains IC: 25762-MCUDISP

Approval Body Options – CSA/UL listed certification are available as an option. CE/FCC/IC is standard.

Four Sets of Tuning Constants - Four sets of PID parameters can be configured for each loop and automatically or keyboard selected.

Data Security - Five levels of keyboard security protect tuning, configuration, and calibration data, accessed by a configurable 4-digit code. Nonvolatile EEPROM memory assures data integrity during loss of power.

Diagnostic/Failsafe Outputs - Continuous diagnostic routines detect failure modes, trigger a failsafe output value and identify the failure to minimize troubleshooting time.

High Noise Immunity - The controller is designed to provide reliable, error-free performance in industrial environments that often affect highly noise-sensitive digital equipment.

Accutune III™ - This standard feature provides a truly plug and play tuning algorithm, which will, at the touch of a button or through a digital input, accurately identify and tune any process including those with deadtime and integrating processes. This speeds up and simplifies start-up plus allows retuning at any setpoint. The algorithm used is an improved version of the Accutune III™ algorithm. Two possibilities are now offered when tuning your process: Fast Tune and Slow Tune.

Fast Tune will tune the process in such a way that the temp is reached faster, a slight overshoot will be allowed.

Slow Tune will minimize overshoot, but it will take more time for the process temperature to reach the target setpoint.

Heat/Cool (Duplex Tune) will automatically tune both the heating and cooling sides of the process.

Fuzzy Logic - This standard feature uses fuzzy logic to suppress process variable overshoot due to SP changes or externally induced process disturbances. It operates independently from Accutune III™ tuning. It does not change the PID constants, but temporarily modifies the internal controller response to suppress overshoot. This allows more aggressive tuning to co-exist with smooth PV response. It can be enabled or disabled depending on the application or the control criteria.

Operator Interface

Indicators—Provide alarm, control mode, and temperature unit indication. There is also indication of when Remote Setpoint is active, the status of the control relays, and whether a setpoint program is in Run or Hold mode.

Displays— TFT screen is adopted for better display. During normal operation, the upper and middle display is dedicated to the process variable and setpoint variable and special annunciator features. During configuration, the upper, middle and lower display provides guidance for the operator through prompts.

During normal operation the lower display shows key-selected operating parameters such as Output, Setpoints, Inputs, Deviation, active Tuning Parameter Set, Timer Status, or minutes remaining in a setpoint ramp. During configuration, the lower display provides guidance for the operator through prompts. Diagnostic messages are displayed independently. Barchart of PV, SP, OUT displayed on screen.

You decide how the controller is to interact with the process by selecting, through simple keystrokes, the functions you want.

English prompts guide the operator step-by-step through the configuration process assuring quick and accurate entry of all configurable parameters.

Decimal Point Location—Configurable for none, one, two or three places.

Dedicated Keys—Provide direct access setpoint modes and setpoint program status to simplify and speed operation.

Universal Outputs – UDC2800 provides "out of the box" operations, with no need to open the case. There are no jumpers to connect, no switches to set, and no hardware configuration required.

Physical Description
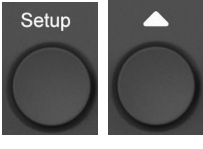
The controller is housed in a 4.5-inch (114 mm) deep, black plastic case with a dark gray elastomer bezel, that is panel mounted in a 1/4 DIN cutout. (See Figure 4.) The plug-in chassis allows easy access to the controller board and its various option boards. All power, input, and output wiring are connected to screw terminals on the rear panel. (See Figure 5.)

2. Operator Interface

Figure 2 – Front Face

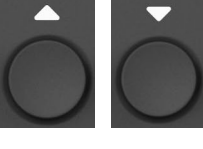| Display Indicators			
PV **-135.0**C	Upper display shows Process Variable value, its unit can be F, C, or none	OUT **74.8**%	Lower display shows key-selected operating parameters such as Output, Setpoints, Inputs, Deviation, active Tuning Parameter Set, Timer Status, or minutes remaining in a setpoint ramp
SP **26.9**C	Middle display shows working Setpoint and its value		
⚠ Output Fail (1/3)	Diagnostics display shows diagnostic messages	(bar display)	Bar display shows Process Variable, Setpoint, Output in percent of bar chart
MODE Manual	Indicate control mode is Auto or Manual	DI 1 2	Digital Input 1 and/or 2 annunciations
ALARM 1 2	Alarm 1 and/or Alarm 2 annunciation	DO 1 2	Control Relay 1 and/or 2 annunciation
(network icon)	Modbus, or Ethernet communication status annunciation	(bluetooth icon)	Bluetooth communication status annunciation

Keys and Functions				
Function	Selects functions within each configuration group. Hold key down to cycle through configured setpoints.	**Man Auto**	Selects Manual or Auto mode.	
Lower Display	Returns Controller to normal display from Set Up mode. Toggles various operating parameters for display.	**Setup**	Scrolls through the configuration groups.	
▲	Increases setpoint or output value. Increases the configuration values or changes functions in Configuration mode groups.	**Setup** ▲	Enables Run/Hold of the SP Ramp or Program plus Timer start. Push Setup key then click Increment key.	
▼	Decreases setpoint or output value. Decreases the configuration values or changes functions in Configuration mode groups.	▲ ▼	Push Increment key then click Decrement key to speed up value input, or vise versa	
✳	Bluetooth transceiver	◎	NEMA4X and IP66 screw attachment (each corner)	

3. PC Software and Mobile Device App

Features

- Create configurations with mobile application running on a Mobile device
- Create/edit configurations live. Just connect software to the controller.
- Create/edit configurations offline and download to controller later.
- Communication types available on every UDC2800:
  - Bluetooth (Standard / App)
  - RS-485 (Optional / Software)
  - Ethernet (Optional / Software)
- Same port types on UDC2800 allow interconnectivity
- This software is available in English
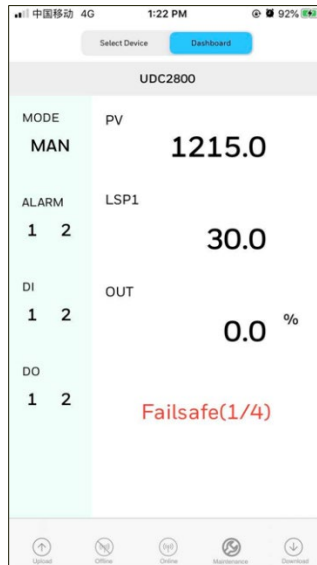
Screen capture of the configuration software running on a mobile device.

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 a 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.

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

Answer: The Bluetooth is normally "off". You activate the Bluetooth on a particular controller by pressing any key. Once activated, can now pairing with the controller. If a controller has been connected, then the Bluetooth status mark will show on the screen. Each controller also has a different Bluetooth ID.

4. Ethernet Communications

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.

5. Specifications

Design

Item	Specification
CE Conformity (Europe)	This product is in conformity with Radio Equipment Directive 2014/53/EU. 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	*Panel Mounted Equipment*: This controller must be panel-mounted with the rear terminals enclosed within the panel. The front panel of the Front Bezel: NEMA3R and IP54, or NEMA4X and IP66 with 4 screws
Installation Category (Overvoltage Category)	*Category II*: (EN61010-1) Energy-consuming equipment supplied from the fixed Installation. Local level appliances, and Industrial Control Equipment.
Pollution Degree	*Pollution Degree 2*: Normally non-conductive pollution with occasional conductivity caused by condensation. (Ref. IEC 664-1)
EMC Classification	Group 1, Class A, ISM Equipment (EN61326-1, emissions), Industrial Equipment (EN61326-1, immunity)
Method of EMC Assessment	Technical File (TF)
Approval Body Ratings	*CE, FCC, IC (Standard)* *UL Listed (Optional)*: UL 61010-1, 3rd Edition. UL 61010-2-201, 2nd Edition. *CSA Certified (Optional)*: CAN/CSA-C22.2 No. 61010-1-12+AMD1
Analog Inputs (One or Two) (See Table 1 for Input Actuations)	*Accuracy*: • ± 0.15% of full scale typical (± 1 digit for display) • Can be field calibrated to ± 0.05% of full scale typical • 16-bit resolution typical *Sampling Rate*: Both inputs are sampled ten times per second *Temperature Stability*: ± 0.01% of Full Scale span / ˚C change—typical *Input Impedance*: • 0-20 / 4-20 Milliampere Input: 250 ohms • All Other: 10 megohms *Maximum Lead Wire Resistance*: • Thermocouples: 50 ohms/leg • 100 ohm, 200 ohm and 500 ohm RTD: 100 ohms/leg • 100 ohm Low RTD: 10 ohms/leg
Analog Input Signal Failure Operation	*Burnout Selections*: Upscale, Downscale, Failsafe or None *Thermocouple Health*: Good, Failing, Failure Imminent or Failed *Failsafe Output Level*: Configurable 0-100% of Output range
Analog Input Filter	*Software*: Single pole lowpass section with selectable time constants, off to 120 seconds, available on both analog inputs.
Stray Rejection	**Common Mode** *AC (50 or 60 Hz)*: 120 dB (with maximum source impedance of 100 ohms) or ±1 LSB (least significant bit) whichever is greater with line voltage applied. *DC*: 120 dB (with maximum source impedance of 100 ohms) or a ±1 LSB whichever is greater with 120 Vdc applied. *DC (to 1 KHz)*: 80 dB (with maximum source of impedance of 100 ohms) or ±1 LSB whichever is greater with 50 Vac applied. **Normal Mode** AC (50 or 60 Hz): 60 dB (with 100% span peak-to-peak maximum)

Item	Specification
Digital Inputs (Two) (Optional)	+30 Vdc source for external dry contacts. Digital Inputs are isolated from line power, earth ground, analog inputs and all outputs except for the Second Current Output. On contact closure the controller will respond according to how each digital input is configured. Opening the contact causes a return to previous state. The second Digital Input is mutually exclusive with the Second Current Output.
Controller Output Types	**Electromechanical Relays (One or Two)** SPDT contacts. Both Normally Open and Normally Closed contacts are brought out to the rear terminals. Internally socketed Resistive Load: 5 amps @ 125 Vac, 250 Vac or 30 Vdc General use: 5 amps @ 125 Vac, 250 Vac (certified by UL) Inductive Load (cosφ = 0.4): 3 amps @ 130 Vac or 250 Vac Motor: 1/6 H.P 125 Vac, 250 Vac. **Dual Electromechanical Relays** Two SPST relays. One Normally Closed contact for each relay is brought out to the rear terminals. This option takes the place of one of the above electromechanical relays and is especially useful for Time Duplex applications. Instruments with this option can have a total of 4 relays plus one current output. Internally socketed *Resistive Load*: 2 amps @ 125 Vac, 250 Vac or 30 Vdc *General use*: 5 amps @ 125 Vac, 250 Vac (certified by UL) *Inductive Load (cosφ = 0.4):* 1 amps @ 130 Vac or 250 Vac **Open Collector Outputs (One or Two)** Socketed assembly replacing a relay. Two types of load are supported, resistive load and pilot duty load. Opto-isolated from all other circuits except current output, but not from each other. Internally powered @ 28 Vdc (0 mA) to 24 Vdc (20 mA). **Note**: Applying an external power supply to this output will damage the instrument. *Maximum Source Current*: 20 mA *Overload Protection*: 25 mA **Current Outputs (One or Two)** These outputs provide a 21mA dc maximum into a negative or positive grounded load or into a non-grounded load. Current outputs are isolated from each other, line power, earth ground and all inputs. Outputs can be easily configured via the keyboard to be 0 to 20 or 4 to 20 mA without field calibration and for either direct or reverse action. Either or both current outputs can be used in an Auxiliary Output mode. This Auxiliary Output can be configured to represent Input, PV, Setpoint, Deviation, or Control output. The range of an Auxiliary Output can be scaled per the range of the selected variable and can be set anywhere between 0 to 21 mA. The Second Current Output is mutually exclusive with the second Digital Input. *Resolution*: 16 bits over 0 to 21 mA *Accuracy*: 0.05% of full scale *Temperature Stability*: 0.01% F.S./°C *Load Resistance*: 0 to 1000 ohms
Alarm Outputs (Optional)	One SPDT electromechanical relay. A second alarm is available if the second control relay is not used for control purposes. Up to four setpoints are independently set as high or low alarm, two for each relay. Setpoint can be on any Input, Process Variable, Deviation, Manual Mode, Failsafe, PV Rate, RSP Mode, Communication Shed, or Output. A single adjustable hysteresis of 0.0 to 100.0% is provided. The alarm can also be set as an ON or OFF event at the beginning of a setpoint ramp/soak segment. *Alarm Relay Contacts Rating* *Resistive Load*: 5 amps at 125 Vac or 250 Vac or 30 Vdc

Item	Specification

RS485 Modbus RTU Communications Interface (Optional)	*Baud Rate*: 4800, 9600,19,200 or 38,400 baud selectable
	Data Format: Floating point or integer
	Length of Link:
	
	    2000 ft. (600 m) max. with Belden 9271 Twinax Cable and 120 ohm termination resistors
	
	    4000 ft. (1200 m) max. with Belden 8227 Twinax Cable and 100 ohm termination resistors
	
	Link Characteristics: Two-wire (half-duplex), multi-drop Modbus RTU protocol, 15 drops maximum or up to 31 drops for shorter link length.

Ethernet TCP/IP Communications Interface (Optional)	*Type*: 10/100M Base-T *Length of Link*: 330 ft. (100 m) maximum. Use Shielded twisted-pair, Category 5e (STP CAT5e) Ethernet cable. *Link Characteristics*: Four-wire plus shield, single drop, five hops maximum *IP Address*: IP Address is 10.0.0.2 as shipped from the Factory *Configuration*: Ethernet parameters are configured via front panel
RS-485 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)	*Type*: Bluetooth *Length of Link*: 10 ft. (3 m) maximum for mobile devices *Protocol*: BLE 4.2

Controller Output Algorithms	**On-Off or Time Proportional**
	
	One relay or open collector output. Control action can be set for direct or reverse.
	
	    Time Proportional Relay Resolution: 3 msec
	
	On-Off Duplex, or Time Proportional Duplex
	
	Two relays or open collector outputs. Control action can be set for direct or reverse.
	
	    Time Proportional Relay Resolution: 3 msec
	
	Current Proportional
	
	A single 4-20 mA current output signal that can be configured for direct or reverse action.
	
	Current Proportional Duplex
	
	This can be a single current output can providing both heat and cool signals (4-12 mA cool, 12-20 mA heat) or a combination of both current outputs with the First Current Output providing the Heat output (Heat = 50 to 100% of range) and Second Current Output providing the Cool output (Cool = 0 to 50% of range). Both are 4-20 mA signals that can be set for direct or reverse action.
	
	Current/Time Duplex
	
	Variation of time proportional duplex for Heat/Cool applications. Time proportional output (heat or cool) is a relay. Current proportional output (Heat or Cool) is a 4-20 mA signal that can be fed into a negative or positive grounded load of 0 to 1000 ohms and is operational over 50% of range or the entire range.

Digital Displays	**TFT LCD** A 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	Alarm Relay Status (ALARM 1 or 2) Control Mode (Auto or Manual) Temperature Units (F or C) Control Relay Status (DO 1 or 2) Digital Input Status (DI 1 and 2) Communication Status (Bluetooth, Ethernet and Modbus)
Modes of Operation	Manual Automatic with Local Setpoint Automatic with Remote Setpoint
Dimensions	See Figure 4.
Mounting	Panel-mounted, 4.5-inch (114 mm) depth

Item	Specification
Wiring Connections	Screw terminals on the rear of the case. (See Figure 5.)
Power Consumption	16 VA maximum (100 to 240 Vac)
	12 VA maximum (24 Vac/dc)
Power Inrush Current	1.84A maximum for 5.25ms (under operating conditions), reducing to a maximum of 200 mA (90 o 264 Vac operation) or 312 mA (24 Vac/dc operation) after 8.42 ms.
	Caution: When applying power to more than one UDC2800, make sure that sufficient power is supplied. Otherwise, the controllers may not start up normally due to voltage drop from the inrush current.
Weight	3 lbs. (1.3 kg)

Environmental and Operating Conditions

Parameter	Recommended	Rated	Operative Limits	Transportation and Storage
Ambient Temperature	25 ± 3°C 77 ± 5°F	0 to 55°C 32 to 131°F	0 to 55°C 32 to 131°F	–40 to 66°C –40 to 151°F
Relative Humidity	10 to 55*	5 to 90*	5 to 90*	5 to 95*
Vibration Frequency (Hz) Acceleration (g)	0 0	70 0.4	200 0.6	200 0.5
Mechanical Shock Acceleration (g) Duration (ms))	0 0	1 30	5 30	20 30
Line Voltage (Vdc)	+24 ±1	24	21.6 to 26.4	- -
Line Voltage (Vac) 100 to 240 Vac 24 Vac	120 ±1 240 ±2 24 ± 1	100 to 240 24	90 to 264 21.6 to 26.4	- - - - - -
Frequency (Hz) (For Vac)	50 ±0.2 60 ±0.2	50 60	50 ± 2 60 ± 2	- - - -
Altitude	2000 meters			
* The maximum moisture rating applies only up to 40°C (104°F). For higher temperatures, the RH specification is derated to maintain constant moisture content.				

Input Actuations

Input Actuation	Range					
	°F			°C		
Thermocouples (Per ITS-90)						
B	0	to	3300	−18	to	1816
E High	−454	to	1832	−270	to	1000
E Low	−200	to	1100	−129	to	593
J High	0	to	1600	−18	to	871
J Mid	20	to	900	−7	to	482
J Low	20	to	550	−7	to	288
K High	0	to	2400	−18	to	1316
K Mid	−20	to	1200	−29	to	649
K Low	−20	to	750	−29	to	399
M High (NNM)	32	to	2500	0	to	1371
M Low (NNM)	32	to	1260	0	to	682
N High (NIC)	0	to	2372	−18	to	1300
N Low (NIC)	0	to	1472	−18	to	800
R	0	to	3100	−18	to	1704
S	0	to	3100	−18	to	1704
T High	−300	to	700	−184	to	371
T Low	−200	to	500	−129	to	260
C High (W5W26)	0	to	4200	−18	to	2315
C Low (W5W26)	0	to	2240	−18	to	1227
PR40-PR20	32	to	3416	0	to	1880
Differential Thermocouple[1]	-50	to	150	−28	to	83

[1]Factory calibrated for pair of J thermocouples at an ambient temperature mean of 450°F / 232°C. Can be Field Calibrated for other input types and ranges.

RTD **Per IEC-60751 (1995)** **IEC Alpha = 0.00385**						
RTD Pt100	−300	to	1200	−184	to	649
RTD Pt100 Low	−300	to	300	−184	to	149
RTD Pt200	−300	to	1200	−184	to	649
RTD Pt500	−300	to	1200	−184	to	649
Linear						
Milliamps	4	to	20 mA[2]			
	0	to	20 mA[2]			
Millivolts	0	to	10 mV			
	0	to	50 mV			
	0	to	100 mV			
Volts	1	to	5 V			
	0	to	5 V			
	0	to	10V			
Combinational[3]						
Carbon	0	to	1250 mV			
Oxygen	−30	to	510 mV			

[2]Requires external dropping resistor assembly (Honeywell supplied).

[3]Combinational types require the use of two Inputs.

General Reference Data

Item	Specification
Isolation (Functional)	*AC Power(100-240VAC)*: 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. *DC Power(24VDC/AC)*: 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. *Analog Inputs and Outputs, Digital Inputs and Outputs*: Electrically isolated from all other circuits to withstand a HIPOT potential of 1500 Vac for 60 seconds. *Relay Contacts*: 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
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 Mode. All other circuits: 1.0 kV, Common Mode and Differential Mode. The instrument is capable of meeting 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.

6. Model Number Interpretation

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
_ _ _ _ _ _	- _ _	- _ _ _	- _ _ _	- _ _ _	- _ _	_

KEY NUMBER

Description	Selection	Availability	
Digital Controller for use with 100 to 240Vac Power	DC2800	↓	
Digital Controller for use with 24Vac/dc Power	DC2900		↓

TABLE I - Specify Control Output and/or Alarms

	Description	Selection	Availability	
Output #1	Current Output (4 to 20ma, 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	*	*

TABLE II - Communications and Software

	Description	Selection	Availability	
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	3 _ _	*	*
Software	Standard Software	_ S _	*	*
	Standard S/W and Setpoint Program	_ F _	*	*
Future Options	None	_ _ 0	*	*

TABLE III - Input 1 can be changed in the field using external resistors

	Description	Selection	Availability	
Input 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	*	*
	Carbon, Oxygen or Dewpoint (Provides 2 Inputs)	_ 60	b	b

TABLE IV - Options

	Description	Selection	Availability	
Approvals	CE (Standard)	0 _ _	*	*
	CE, UL, and CSA	1 _ _	*	*
Tags	None	_ 0 _	*	*
	Stainless Steel Customer ID Tag - 3 lines w/22 characters/line	_ T _	*	*
Future Options	None	_ _ 0	*	*

TABLE V - Documentation

	Description	Selection	Availability	
Documents	Quick Start Guide - English	0 _	*	*
Certificate	None	_ 0	*	*
	Certificate of Conformance (F3391)	_ C	*	*

TABLE VI - Extended Warranty

	Description	Selection	Availability	
Extended Warranty	None	0	*	*
	Extended Warranty Additional 1 year	1	*	*
	Extended Warranty Additional 2 years	2	*	*

RESTRICTIONS

Restriction Letters	Available Only With		Not Available With	
	Table	Selection	Table	Selection
b	III	1 _ _		

Figure 3 Model Number Interpretation

7.   Dimensions

The controller is housed in a 4.5-inch (114 mm) deep, black plastic case with a dark gray elastomer bezel that can be panel mounted in a 1/4 DIN cutout. The plug-in chassis allows easy access to the controller board and its various option boards. All power, input, and output wiring are connected to screw terminals on the rear panel. (See Figure 5.)
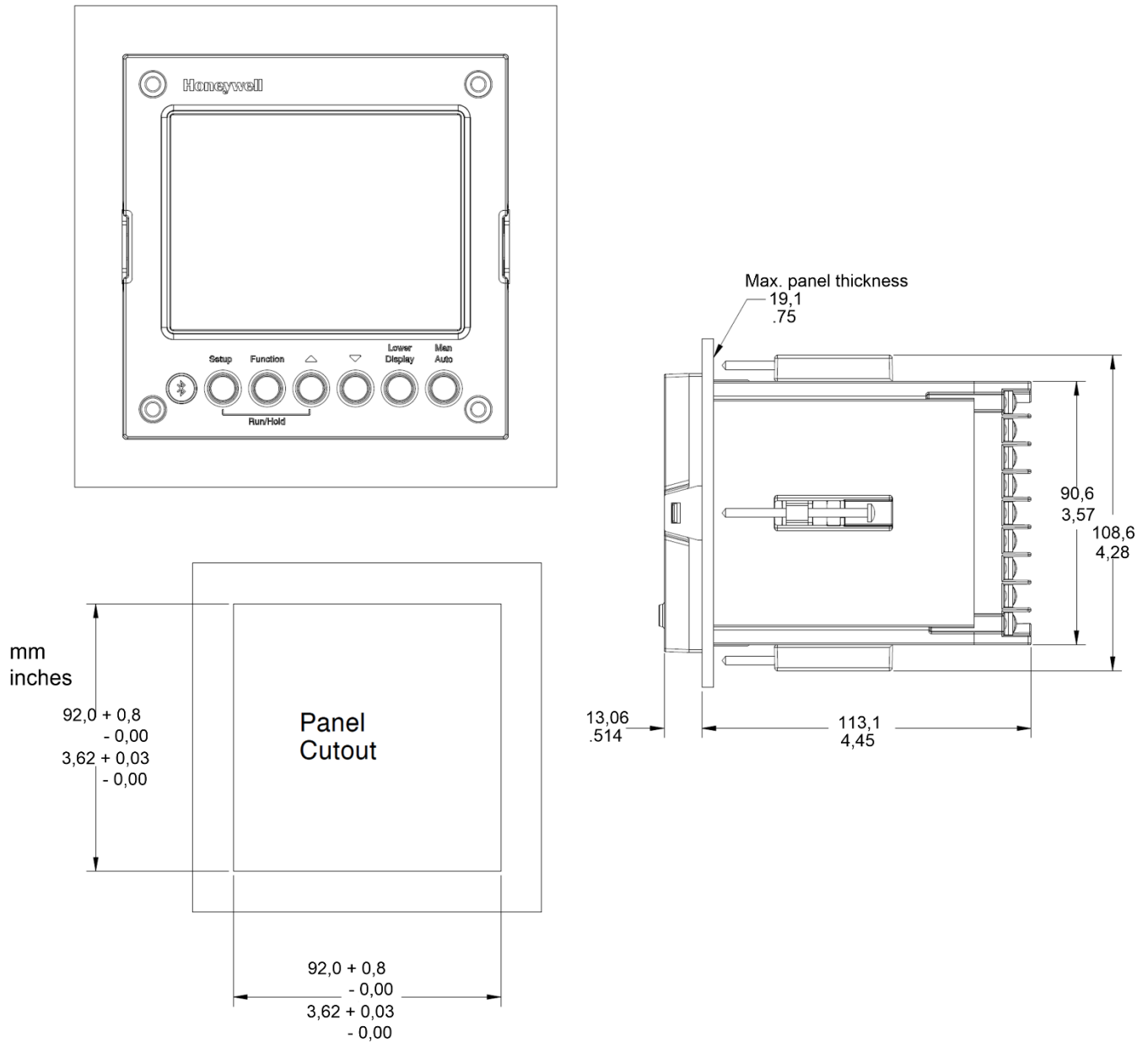

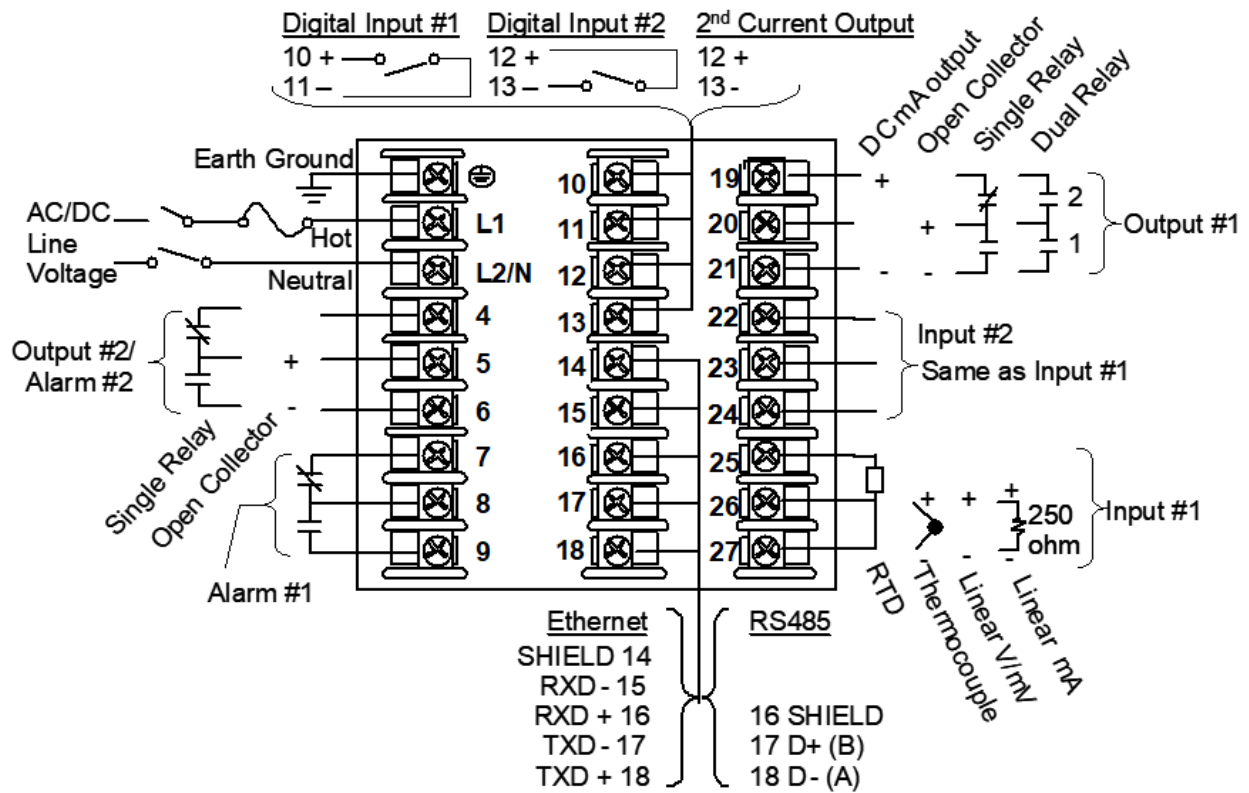**Figure 4—UDC2800 Controller and Cutout Dimensions**

8. Wiring Diagram

Figure 5—External Wiring Diagram

9. Ordering Information

For the complete ordering information on the UDC2800, request UDC2800 Product Manual (51-52-25-157).

Honeywell offers a full line of Sensors, Transmitters, and Final Control Devices for use with the UDC2800 Universal Digital Controller. These devices include:

- Thermocouples,
- RTDs,
- Pressure Transmitters,
- Flow Transmitters,
- Liquid Level Transmitters,
- Valves,
- Actuators, and
- Electric Motors.

10. Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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

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