Honeywell

UDC1200 and UDC1700
MICRO-PRO SERIES
UNIVERSAL DIGITAL CONTROLLERS

51-52-03-35 5/03 **PRODUCT SPECIFICATION SHEET**

OVERVIEW

The UDC1200 & UDC1700 are microprocessor-based 1/16 DIN and 1/8 DIN controllers, which combine a high degree of functionality and reliability at low cost.
They are fully dedicated to monitor and control temperatures, pressures and levels in a wide range of applications such as environmental chambers, furnaces, ovens, packaging machines and other applications in plastics and the food and beverage industries. The large and easy-to-read dual 4-digit display and tactile keypad make the UDC1200 and UDC1700 easy to configure and use. Their outstanding flexibility enables you to configure any unit for any application and change it if required.

For the thousands of satisfied UDC1000/1500 users, the UDC1200/ 1700 controllers are downward compatible to existing UDC1000/1500 applications and installations.

UDC1700

UDC1200

- FEATURES

Dual display
Two 4-digit displays with 7 LED segments, each configurable for:
- PV and SP (non adjustable)
- PV and SP (adjustable)
- PV and Ramping SP
- PV only

Easier to configure
Two different configuration levels (Configuration mode and set-up mode) provide easy access to parameters. A 4-digit security code prevents unauthorized changes.

Moisture resistant front-face
Meets NEMA 3 / IP65 front-face protection against dust and water.

Universal input
Accepts seven different types of thermocouples, RTDs, current and voltage linear inputs. All inputs are configurable as standard.

Universal power supply
The UDC1200 and UDC1700 can operate on any line voltage from 90 Vac to 264 Vac at 50/60 Hz. A 24/48 Vac/dc model is available as an option.

Easy upgrade
NEW
All the option boards are jumper free and detected automatically by the instrument.

Easy output selection
NEW
All the outputs (including the control output) of the instrument can be changed to meet the exact customer's needs.

Alarm strategy
Two soft alarms for PV, deviation high/low/absolute. A special loop alarm is also provided to detect faults in the control loop by continuously analyzing the PV response to the control output. Alarm inhibit is available on power up and setpoint switching.

Manual/Automatic mode
Manual control (via bumpless transfer) is enabled by simply pressing the front-face AUTO/MAN key. The "SET" LED flashes and the output power is displayed on the lower display. Output can be adjusted with the upper and lower keys.

Pre-tuning and self-tuning strategy
Pre-tuning is used to set up the PID parameters close to the optimum values, which the self-tuning algorithm uses to subsequently optimize the tuning parameters.

Limit controller
Packaged in 1/16 DIN, the UDC1200 limit controller is designed to provide a safety shut-off and optional alarms for use in a wide variety of applications.

Up to three outputs
The UDC1200 and UDC1700 provide up to three outputs for time and current proportioning, duplex mode (heat/cool), PV or SP retransmission, and alarms.

Setpoint ramp
The current setpoint can ramp to a new-targeted setpoint by way of a user defined ramp rate.

Dual setpoint
Dual setpoint option is available on the UDC1200 and UDC1700. The current setpoint is selected by a digital input. This option is exclusive with UDC1200 limit model remote alarm reset.

Communication
An optional RS485 communications interface is available on the UDC1200 and UDC1700. It provides a link for up to 32 units and a host computer through ASCII or Modbus RTU protocol at up to 19200 baud.

Highly secure
A non-volatile memory based on EEPROM technology ensures data integrity during loss of power supply, with retention of more than 100 years. A 4-digit security code prevents unauthorized or accidental change.

OPTIONAL FEATURES
The following can be selected via the Model selection Guide (see page 7):
- RS485 ASCII communication
- RS485 Modbus RTU communication
- Digital Input
- Output 2
- Output 3
- Power Supply 24/48 Vac/dc

PHYSICAL DESCRIPTION
The UDC1200 controller is housed in a 110 mm (4.33 inches) deep case with a standard UDC gray bezel. It can be mounted in a 1/16 DIN panel cutout. The UDC1700 controller is housed in a 100 mm (3.94 inches) deep case and can be mounted in a 1/8 DIN panel cutout. By using the pre-assembled mounting fixture delivered with the unit, you can easily and securely install the controller into the panel cutout. Modular plug-in construction allows rapid access and saves time. All inputs and outputs are connected on the rear terminal block by screws.

Upper display:4 characters dedicated to show the PV. In configuration mode, it shows the parameter value or selection

Lower display: 4 characters dedicated in normal operation mode to display the SP. In configuration mode, it displays the parameter name.

UDC1700 UDC1200

Selects manual or automatic mode. Becomes « Reset » on UDC1200 Limit model.

Allows operator mode parameters to be scrolled. In combination with the «Upper» key, allows configuration mode or Setup mode to be entered.

Increases setpoint, output or configuration parameter values.

Decreases setpoint, output or configuration parameter values.

OPERATOR INTERFACE
Four display combinations are offered to the operator. The upper 4-digit 7-segment display is always dedicated to monitor the PV. The lower display can show:
- SETPOINT (read only)
- SETPOINT (adjustable)
- RAMPING setpoint (ramp mode)
- BLANK

UNIVERSAL INPUTS

All input types are available on any unit. Selection among the various types of inputs is made by prompt configuration. As soon as the Process Variable reaches the value of the input range limit, the controller displays a message. A sensor break indication is also provided. A configurable digital filter is available from 0.5 seconds to 100.0 seconds.

OUTPUTS

Three types of outputs (RELAY, SSR driver or DC linear) are selectable for three outputs, through the model selection guide or by adding a plug-in module for outputs 1, 2 and 3.

OUTPUTS ALGORITHMS

The UDC1200 and UDC1700 are available with the following output algorithms:

- *Time proportional:*
  ON/OFF or time proportional with electromechanical relay SPDT 2 A or SSR driver (open collector).

- *Current proportional:*
  Supply directly proportional current or voltage signal to the final control elements which require 0-20 mA, 4-20 mA, 0-10 V or 0-5 V.

- *Time proportional duplex:*
  Three duplex modes can be selected, either ON/OFF duplex, time proportional duplex (heat/cool with two proportional bands, two cycle times and deadband) or TPSC.

- *Current proportional duplex:*
  In addition to the first current/voltage output, a second similar output with its own proportional band is provided.

- *Current/Time or Time/Current duplex:*
  Provides a variation of traditional time or current duplex mode by mixing current and time proportioning together.

CONTROL ALGORITHMS

Four control algorithms can be set up through the configuration menu:

- On/Off
- PID
- PD + MR
- TPSC

The TPSC (Three Position Step Control) control algorithm is dedicated to control valve positioning without slidewire feedback from the motor shaft.

CONFIGURATION

There are two levels of configuration. The SET-UP mode allows modification of current parameters such as tuning parameters, alarm values, setpoint limit, ramp enable, auto-manual mode enable and auto-pretune enable.
The CONFIGURATION mode is more oriented to unit personality: input selection, output 2 and 3 usage, alarm type, communication address and lockout code.

The operator mode screens are only selectable via the configuration software only. For instance, the alarm value screen can be moved from setup mode to normal operator mode if desired.

CONTROL MODE

Manual or automatic mode with bumpless transfer is standard feature. In manual mode, the operator can directly control the output through the two front face keys (raise and lower keys). The output value is monitored on the lower display.

ALARMS

Outputs 1, 2 and 3 can be used as alarms. Two electromechanical single pole double throw relays can activate external equipment when alarm setpoints are reached. An LED is also activated on the front-face. A direct or reverse acting alarm output can be configured. A logical combination of the two alarms: OR, AND or hysteresis (active when both alarms are active and inactive when both alarms are inactive) can be set which associates the two alarms status before energizing the relay. In order to detect a defective control loop, the controller can supply special loop alarm control by continually monitoring the PV response to output demand. A timer is automatically set up when any output is on saturation mode. When the timer reaches twice the reset time with no PV response, the loop alarm is activated. With this soft alarm there is no need for a heater circuit breaker, saving wiring time and costs.

DISPLAY

Dual, four-digit LED display with decimal point location configurable up to three places for linear ranges only.

LIMIT CONTROLLER

The UDC1200 1/16 DIN limit controller provides a latched relay output which is activated when the process parameters either exceed or fall bellow the desired value, providing a failsafe cut-off which has to be manually reset before the process can continue.

The UDC1200 limit controller can be configured to be either a “high limit” unit where the delay will de-energize when the PV is above the limit setpoint, or a “low limit”, where the relay will drop out when the PV falls below the setpoint.

A LED indicator shows when limits have been exceeded, and when the relay is latched out.

The optional digital input allows a remote reset function.

REMOTE SETPOINT MODEL

The UDC1700 1/8 DIN "R" model controller has a second input available that accepts either a linear or potentiometer input signal as a remote setpoint. The input signals accepted are field-configurable and are: 0-5 V, 1-5 V, 0-10 V, 2-10 V, 0-20 mA, 4-20 mA (factory set), 0-50 mV, 10-50 mV, 0-100 mV, or 0-2000 ohms. This allows the controller to act as a "slave" controller accepting a setpoint value from a 'master' device such as a PLC or setpoint-programming controller (such as the DCP50, DCP100, DCP300, or DCP550 series). The UDC1700R also includes a standard digital input allowing remote switching between the local setpoint and the remote setpoint value. Also standard in this model is "fuzzy" autotune software that minimizes process variable overshoot when responding to a setpoint change.

PC SOFTWARE

The UDC1200 & 1700 are supported with PC software allowing you to quickly configure your device using configuration wizards, or to perform diagnostics.

(1) The UDC1700 will be released in Q4/2003.

(2) The UDC1200 Limit & TPSC models will be released in Q4/2003

SPECIFICATIONS (Applies to both UDC1200 and UDC1700)

Technical data

Accuracy	0.1 % of span ± 1 LSD
Temperature Stability	0.01 % of span per ºC
Input Signal Failure	*Fail-safe output value:* Achieved when burnout is detected. Value depends on configuration. *For thermocouple and mV input detected by any lead break:* Upscale burnout *For RTD:* Burnout detected by any lead break *Current or voltage input:* Burnout set by open circuit detection
Input Impedance	*Voltage impedance:* 47 Kohms *Current input:* 4.7 ohms *All others:* 100 Mohms
Input Sampling Rate	Four samples per second
Input Filter	Digital filter configurable from front panel 0.0 (Off), from 0.5 seconds to 100.0 seconds in 0.5 seconds increment
Input Resolution	14 bits approximately, always four times better than display resolution
Input Isolation	Universal input isolated at 2500 V from all outputs except SSR and from power supply
Stray Rejection	*Common mode rejection:* > 120 dB at 50/60 Hz *Serial mode rejection:* > 500% of span at 50/60 Hz
Approvals	UL FM approval on the UDC1200 limit model Product design to meet CE MARK requirement
Control Output Type	***Type available:*** *Output 1/2/3:* DC, Electromechanical relay, SSR drive (open collector) ***DC linear output:*** 0-20 mA, 4-20 mA, 0-5 V, 0-10 V *Accuracy:* ± 0.25 % (250 ohms for mA, 2 Kohms for voltage) *Resolution:* 80 bits in 250 ms (10 bits in 1 second typical > 10 bits in > 1 second) *Load impedance:* 500 ohms maximum for current output, 500 ohms minimum for voltage output *Isolation:* Isolated 2500 V from all other inputs and outputs *Range selection method:* Front panel code setting *Temperature stability:* 0.01 % / °C *Electromechanical relay:* SPDT contact *Resistive load:* 2 A at 120 V or 240 V *Life time:* > 500000 operations at rated voltage/current *SSR drive/TTL:* *Drive capability:* SSR > 10 Vdc into 250 ohms minimum *Isolation:* Not isolated from input and other SSR output
Alarms	*Maximum number of alarms:* 2 soft alarms setpoint + 1 loop alarm Alarm inhibit available on power up and setpoint switching *Alarm output:* Up to two relays or SSR output on outputs 2 and 3 *Types:* PV high or low, band, deviation high or low, loop *Combination alarms:* Logical “OR”, “AND” or hysteresis of alarms available to individual hardware output

Technical data (continued)

Loop Control	*Automatic tuning type:* Pre-tune and self-tune *Proportional bands:* 0 (inactive), 0.5 % to 999.9 % of input span with 0.1% increments. Two proportional bands available for duplex mode *Reset:* Off or from 1sec. to 99 min 59 sec. *Rate:* From 0 sec. to 99 min 59 sec. *Manual reset:* from 0 to 100 % of output (single output), from –100 % to 100 % of output (dual output) *Deadband:* ± 20 of PB1 + PB2 *ON/OFF hysteresis:* 0.1% to 10.0 % of input span *Auto/manual mode:* Front key selectable with bumpless transfer between automatic and manual mode *Cycle times:* Up to two cycle times available for time duplex control *Selection:* 0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, or 512 seconds *Setpoint ramp:* From 1 to 9999 engineering units per hour
Retransmission Output	Any output can be selected to retransmit the process value or setpoint as a linear (current or voltage) output
Communication Interface	RS485 – ASCII or Modbus RTU (selectable from the menu) *Baud rate:* 1200, 2400, 4800, 9600 or 19200 baud *Link characteristics:* 32 drops maximum, ASCII or Modbus protocols, two wires
Mounting	Plug-in with pre-assembled mounting fixture
Wiring Connection	Screw terminals on the rear of the case (combination head)
Power Consumption	4 W
Physical (UDC1200)	*Weight:* 210 grams maximum *Height:* 48 mm / 1.89 in *Width:* 48 mm / 1.89 in *Depth:* 110 mm / 4.33 in *Cut out:* 45 mm x 45 mm / 1.77 in x 1.77 in
Physical (UDC1700)	*Weight:* 250 grams maximum *Height:* 96 mm / 3.78 in *Width:* 48 mm / 1.89 in *Depth:* 100 mm / 3.94 in *Cut out:* 45 mm x 92 mm / 1.77 in x 3.62 in
Environmental	*EMI Susceptibility:* Designed to meet EN55101 *EMI Emission:* Designed to meet EN55022 *Safety Considerations:* Designed to comply with IEC1010-1as far as applicable
Front Panel Sealing	NEMA 3 / IP66

Input Actuations

		Ranges	
Thermocouple types		**°F**	**°C**
(Fixed decimal)	**R**	32 – 3198	0 – 1759
	S	32 – 3204	0 – 1762
	J	-328 – 2192	-200 – 1200
	J	-199.9 – 999.9	-128.8 – 537.7
	T	-400 – 752	-250 – 400
	T	-199.9 – 752	-128.8 – 400
	K	-400 – 2503	-240– 1373
	K	-128.8 – 537.7	-199.9 – 999.9
	L	32 – 1403	0 – 762
	L	32 – 999.9	0 – 537.7
	B	211 – 3315	100 – 1824
	C	32 – 4208	0 – 2320
	N	32 – 2551	0 – 1399
RTD: (3 wires connection)			
PT100 (IEC) α = 0.00385		-328 – 1472	-199 – 800
(Fixed decimal)		-199.9 – 999.9	-128.8 – 537.7
DC linear:		10 – 50 mV	0 – 50 mV
		4 – 20 mA	0 – 20 mA
		1 – 5 V	0 – 5 V
		2 – 10 V	0 – 10 V

Operating Conditions

	Reference Conditions	**Operative Limits**	**Transportation and Storage**
Ambient Temperature	20 °C ± 2 °C (68 °F ± 4 °F)	0 °C to 55 °C (32 °F to 131 °F)	–20 °C to 80 °C (–4 °F to 176 °F)
Relative Humidity	60-70 %	20-95 % non -condensing	
Voltage	90-264 Vac ± 1 %	90-264 Vac	
Frequency	50 Hz	50-60 Hz	
Source Resistance	< 10 ohms for thermocouple	1000 ohms maximum for thermocouple	
Lead resistance for RTD	< 0.1 ohm/lead (PT100)	50 ohms per lead maximum balanced	

Model Selection Guide

UDC1200

UDC1200 MICRO-PRO Universal Digital Controller — Model Selection Guide

Model Selection Guide
51-51-16-78 Issue 1

Honeywell Proprietary

Instructions

- Select the desired key number. The arrow to the right marks the selections available.
- Make one selection each from Tables I through VIII using the column below the proper arrow.

List Price equals the sum of all selections made.

Key Number		I	II	III	IV	V	VI	VII	VIII
_ _ _ _ _ _	-	_	_	_	_	_	_	_	_

KEY NUMBER		Selection	Availability					
	Description							
1/16 DIN Controller:	RTD or Linear mV	**DC1201**	↓					
48x48mm	Thermocouple	**DC1202**		↓				
Input Type	Linear mA	**DC1203**			↓			
(Field Selectable)	Linear Voltage	**DC1204**				↓		
Future release	Limit Controller	**DC120L**						
Future release	TPSC Controller (Thermocouple Factory Set)	**DC120T**						

TABLE I - OUTPUT 1

(Control 1)	Relay	1	•	•	•	•		
	SSR Driver	2	•	•	•	•		
	Linear: 0 - 10 Volts	3	•	•	•	•		
	Linear: 0 - 20 ma	4	•	•	•	•		
	Linear: 0 - 5 Volts	5	•	•	•	•		
	Linear: 4-20mA	7	•	•	•	•		

TABLE II - OUTPUT 2

(Control 2 or Alarm 2)	None	0	•	•	•	•		
	Relay	1	•	•	•	•		
	SSR Driver	2	•	•	•	•		
(Control 2 only)	Linear: 0 - 10 Volts	3	•	•	•	•		
	Linear: 0 - 20 ma	4	•	•	•	•		
	Linear: 0 - 5 Volts	5	•	•	•	•		
	Linear: 4-20mA	7	•	•	•	•		

TABLE III - OUTPUT 3

(Alarm 1 only)	None	0	•	•	•	•		
	Relay	1	•	•	•	•		
	SSR Driver	2	•	•	•	•		
(Retransmission only)	Linear: 4-20mA	7	•	•	•	•		

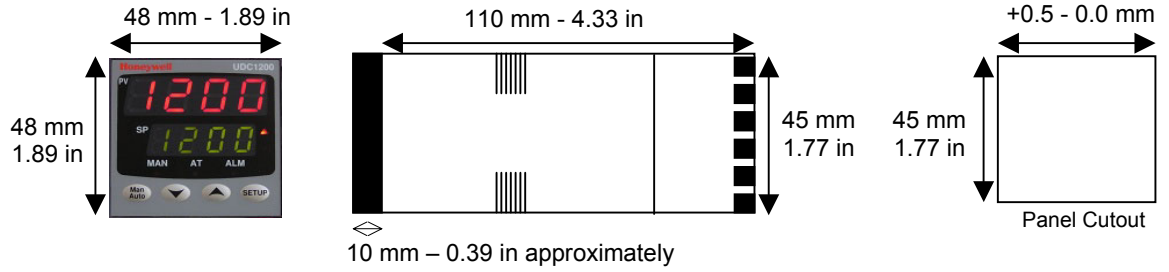
TABLE IV - COMMUNICATIONS

	No Selection	0	•	•	•	•		
	RS485 ASCII Serial Communication	1	•	•	•	•		
	Digital Input (SP1/SP2 Selection or DC100L Remote Reset)	2	•	•	•	•		
	RS485 MODBUS Communication	3	•	•	•	•		

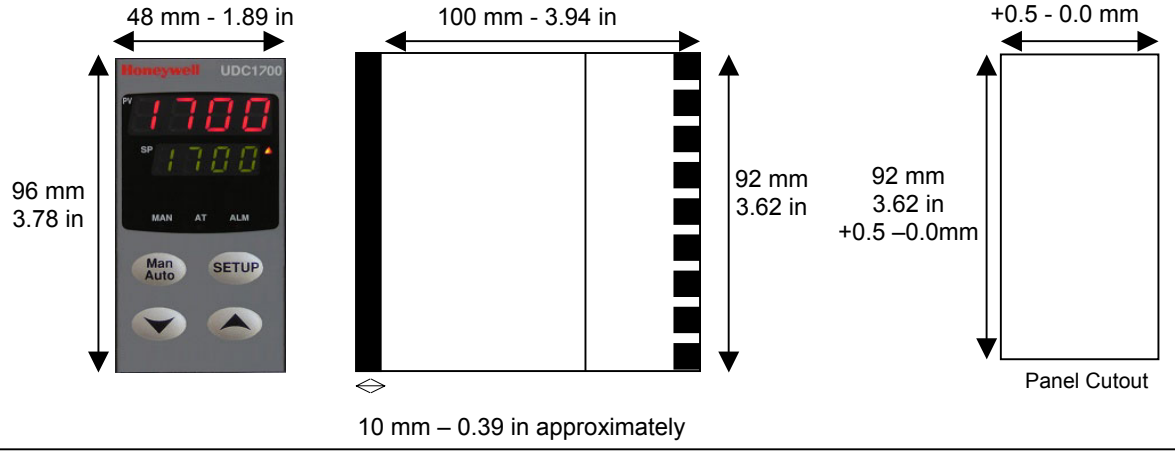
		DC120_ Selection	Availability 1	2	3	4	L	T
TABLE V - POWER SUPPLY								
	Power Supply 90 to 264 Vac	1	•	•	•	•		
	Power Supply 24 to 48 Vac/dc	2	•	•	•	•		
TABLE VI - MANUALS								
Single sheet Concise manuals	English (51-52-25-123)	0	•	•	•	•		
	French (51-52-25-123-FR)	1	•	•	•	•		
	German (51-52-25-123-GE)	2	•	•	•	•		
	Italian (51-52-25-123-IT)	3	•	•	•	•		
	Spanish (51-52-25-123-SP)	4	•	•	•	•		
TABLE VII - PACKAGING								
	Individual Carton	0	•	•	•	•		
	Bulk Pack of 10 identical models	1	•	•	•	•		
	Bulk Pack of 50 identical models	2	•	•	•	•		
	Bulk Pack of 100 identical models	3	•	•	•	•		
TABLE VIII - SPECIALS								
	None	0	•	•	•	•		
	Special Instrument (Consult Factory)	S	•	•	•	•		

EXTERNAL DIMENSIONS, PANEL CUTOUT

UDC1200



UDC1700



Specifications are subject to change without notice

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