Honeywell

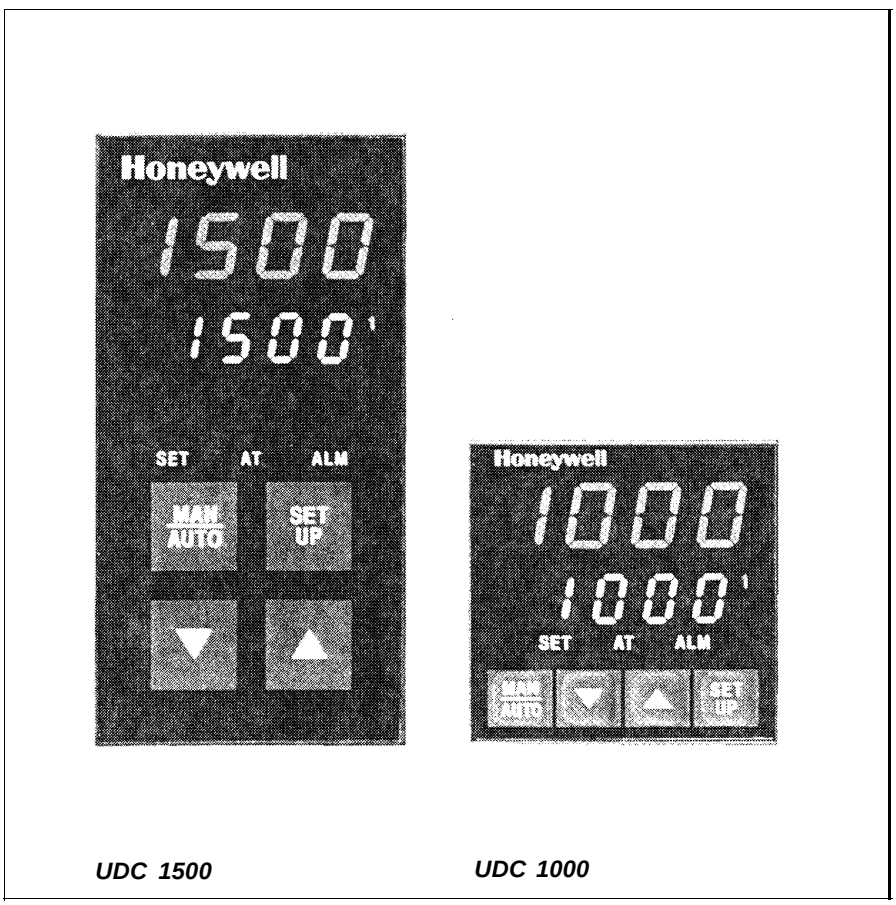
UDC 1000 & UDC 1500 MICRO-PRO SERIES

UNIVERSAL DIGITAL CONTROLLERS

EN0I-6041 11/98 **PRODUCT SPECIFICATION SHEET**

OVERVIEW

The UDC 1000 & UDC 1500 are microprocessor-based 1/16 DIN and I/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 the plastics and food industries, furnaces, packaging and environmental chambers. The large and easy-to-read dual 4-digit display and tactile keypad make the UDC 1000 and UDC 1500 easy to configure and use. Their outstanding flexibility enables you to configure any unit for any application and change it if required.



UDC 1500 *UDC 1000*

60412

FEATURES

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

Easy 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
The UDC1000 meets NEMA 4/IP65 while the UDC1500 meets NEMA 3/IP65 front-face protection against dust and water.

Universal input
Accepts seven different types of thermocouples, RTDÍ s, current and volt linear inputs. Ail inputs are configurable as standard.

Universal power supply
The UDC 1000 & UDC 1500 can operate on any line voltage from 90 Vac to 264 Vac at 50/60 Hz continuously. A 24/48 Vac/dc model is available as an option.

Easy output selection and upgrade
With only two basic modules (current and relay output) and plug-in options, you can configure the controller as you want for a wide range of applications.

Up to three outputs
The UDC 1000 & UDC 1500 provide up to three outputs for time and current proportioning, duplex mode (heat/cool), PV or SP retransmission, and alarms.

Alarm strategy
Two soft alarms on 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.

Manual/Automatic mode
Manual control (via bumpless transfer) is enabled by simply pressing the front-face AUTO/MAN key. The ñ SETî 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 might be used by the self-tuning algorithm to subsequently optimize the tuning parameters.

Limit Controller
Packaged in 1/16 DIN, the UDC 1000 limit controller is designed to provide a safety cut-out and optional alarms for use in a wide variety of applications.

Setpoint ramp
According to a defined ramp rate, the SP ramps the current setpoint to the new targeted setpoint.

Communications
An optional RS485 communications interface is available on the UDC 1000 and UDC 1500. It provides a link

computer through ASCII protocol or Modbus, at up to 9600 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. The design is centered around a no-battery concept. 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 serial communication
- Output 2
- Output 3

PHYSICAL DESCRIPTION

The UDC 1000 controller is housed in a 110 mm (4.33 inches) deep case with the standard UDC grey bezel. It can be mounted in a 1/16 DIN panel cutout. The UDC 1500 controller is housed in a 100 mm (3.94 inches) deep case and can be mounted into 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.

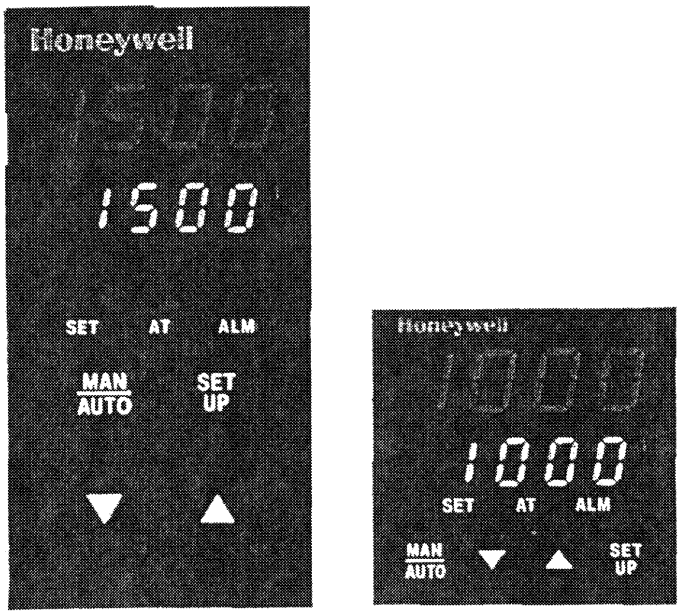
OPERATOR INTERFACE

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

UPPER DISPLAY - Four characters dedicated to show the PV. In configuration mode, it shows the parameter value or selection

LOWER DISPLAY - Four characters dedicated in normal operation to display the setpoint. In configuration mode, it displays the parameter name.



SET - LED indicates - that the controller is in configuration mode. When flashing, controller is in manual mode

AT - LED indicates that the controller is in selftune mode.
When flashing, controller is in pretune mode

ALM - LED informs that alarm is on.
ñ 1î - displays output 1 status.
ñ 2î - displays output 2 status.

Figure 2 Ð Operator interface

Key functions

MAN / AUTO	Selects manual or automatic mode. Becomes "RESET" on UDC 1000 limit model
SET UP	Allows operator mode parameters to be scrolled. In combination with the ñ Upperî key, allows configuration mode or set-up mode to be entered.
▲	- Increases setpoint, output or configuration parameter values.
▼	- Decreases setpoint, output or configuration parameter values.

between up to 32 units and a host

UNIVERSAL INPUTS

All input types are available on any unit. By positioning a jumper on the CPU board, the thermocouples, RTD's or linear input families can be field selected. Selection among the various types of inputs is made by prompt configuration. As soon as the Process Variable reaches a value out of the input range limits, the controller displays a message. A sensor break indication is also provided.
A configurable digital filter is available from 0.5 sec to 100.0 sec.

OUTPUTS

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

OUTPUT ALGORITHMS

The UDC 1000 & UDC 1500 are available with the following output algorithms:

- Time proportional:
  ON/OFF or time proportional with electromechanical relay SPDT 2A or SSR driver (open collector).
- Current proportional:
  Supply directly proportional current or volt 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 or 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/volt output, provides a second similar output with its own proportional band.
- 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, auto-pretune enable.
The CONFIGURATION mode is more oriented to unit personality: input selection, output 2 & 3 usage, alarm type, communication address, lockout code, hardware definition coding.

CONTROL MODE

Manual or automatic mode with bumpless transfer is a 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 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 or AND can be set which associates the two alarms status before energizing the relay. In order to detect a defective control loop, the controller can apply a special loop alarm control by continually monitoring the PV response to output demand. A timer is automatically set up when any output is in saturation mode. When the timer reaches twice the reset time with no PV response, then the loop alarm is activated. With this soft alarm, there is no need for a heater 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 UDC 1000 1/16 DIN limit controller provides a latched relay output which is activated when process parameters either exceed or fall below the desired value, providing a fail safe cut-off which has to be manually re-set before the process can continue.

The UDC 1000 limit controller can be configured to be either a "high limit" unit where the relay will de-energise 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.

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

The UDC1000 limit controller has been approved by both FM and UL.

*This Model Selection only available in Europe.

SPECIFICATIONS (Apply to both UDC 1000 and UDC 1500)

Technical data	
Accuracy	0.25% of span ± 1 LSD
Temperature Stability	0.01% of span per °C
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 volt input : Burnout set by open circuit detection
Input Impedance	Volt 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 0.5s to 100.0 seconds in 0.5s 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	**All models have been approved by UL** **The UDC1000 limit model has FM approval** **All models meet the CE mark requirements**
Control Output Type	*Type Available:* Output 1 : DC, Electromechanical relay, SSR drive (open collector) Output 2 : DC, Electromechanical relay, SSR drive (open collector) Output 3 : DC (transmission output only), Electromechanical relay, SSR drive (open collector) *DC output:* 0-20 mA, 4-20 mA, 0-5 V, 0-10 V Accuracy : ±0.5% (250 ohms for mA, 2 kohms for Volt) Resolution : 8 bits in 250 ms (10 bits in 1 second typical >10 bits in >1 second) Load impedance : 500 ohms max. for current output, 500 ohms min. for volt output Isolation : isolated 2500 V from all other inputs and outputs Range selection method : jumper positioning and 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 > 4.3 V dc into 250 ohms min. Isolation : not isolated from input and other SSR output

Alarms	Maximum number of alarms : 2 soft alarms setpoint + 1 loop alarm Alarm output : Up to two relays or SSR output on output 2 and 3 Types : PV high or low, band, deviation high or low, loop Combination alarms : Logical “OR” or “AND” of alarms available to individual hardware output
Loop control	Automatic tuning type : Pre-tune & 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 1s to 99min.59s Rate : From 0 to 99min.59s 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	Current and volt output of output 3 can be selected to retransmit the process value or setpoint
Communication Interface	RS485 – ASCII or Modbus Baud rate: 1200, 2400, 4800, or 9600 Baud Link characteristics: 32 drops maximum, ASCII protocol, 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 (UDC1000)	Weight : 210 grams max. Height : 48 mm / 1.89 inches Width : 48 mm / 1.89 inches Depth : 110 mm / 4.33 inches Cutout : 45 mm x 45 mm / 1.77 x 1.77 inches
Physical (UDC1500)	Weight : 250 grams max. Height : 96 mm / 3.78 inches Width : 48 mm / 1.89 inches Depth : 100 mm / 3.94 inches Cutout : 45 mm x 92 mm / 1.77 in x 3.62 inches
Environmental	EMI susceptibility : Designed to meet EN55101 EMI emission : Designed to meet EN55022 Safety considerations : Designed to comply with IEC1010-1 as far as applicable
Front Panel Sealing	**NEMA 4/IP65 for the UDC1000 NEMA 3/IP65 for the UDC1500**

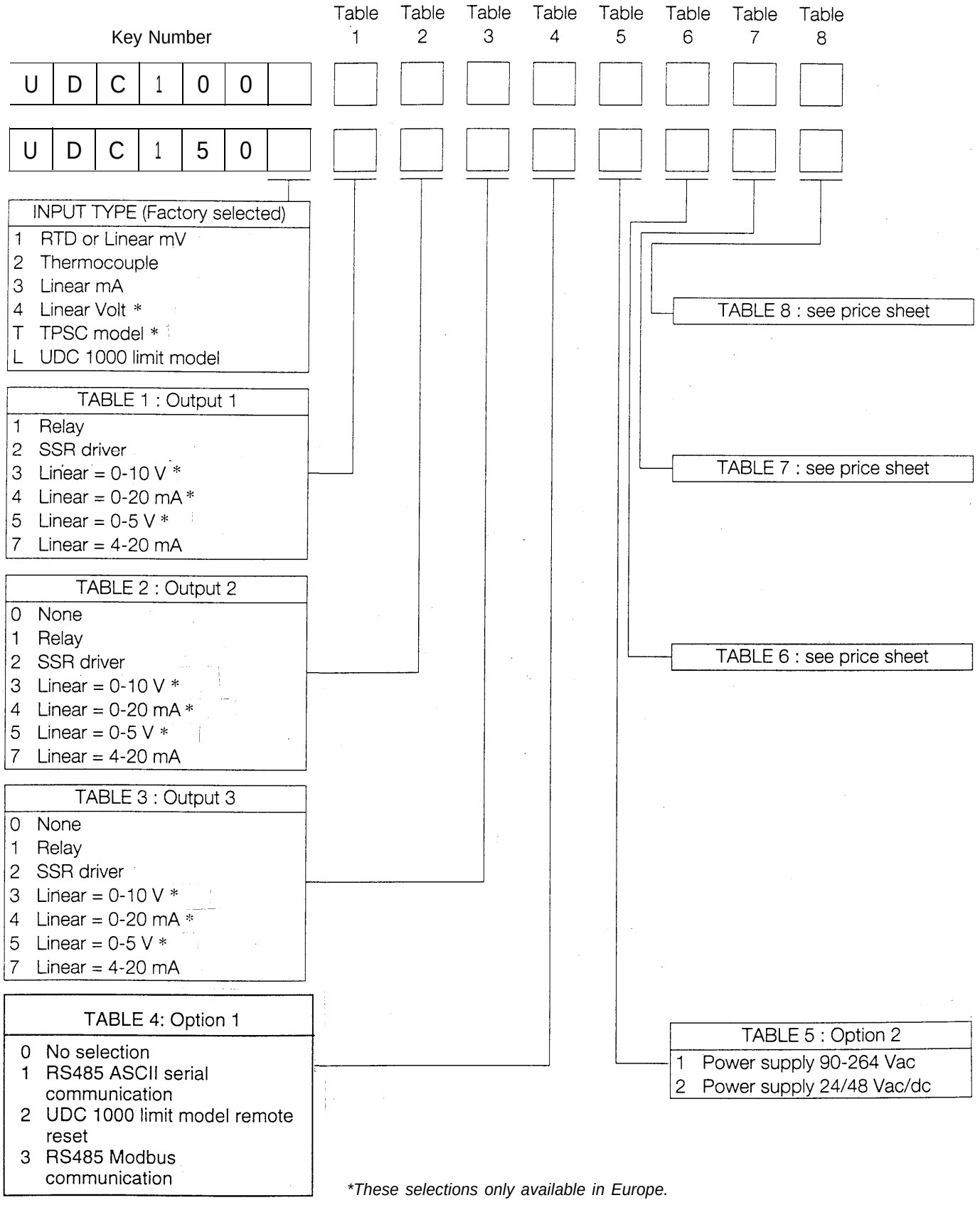
Input Actuations

		Ranges	
		°F	**°C**
Thermocouple types (Fixed decimal)	R	32-3002	0-1650
	S	32-3000	0-1649
	J	32.0- 401.7	0.0- 205.4
	J	32- 842	0- 450
	J	32-1402	0- 761
	T	-328- 504	-200- 262
	T	32- 501.1	0.0- 260.6
	K	32-1400	0- 760
	K	32-2503	0-1373
	L	32- 402.3	0.0- 205.7
	L	32- 842	0- 450
	L	32- 1404	0- 762
	B	212-3315	100-1824
RTD : (3 wires connection) PT100 (IEC) $\alpha = 0.00385$ (Fixed decimal)		32-1112	0-600
		32- 572	0-300
		-149.8- 212.0	-101.0-100.0
		32- 213.6	0.0-100.9
		-328- 403	-200-206
		-149.8- 572.9	-101.0-300.5
DC linear: (Decimal point location configurable up to three places)		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 max for thermocouple	
Lead resistance for RTD	< 0.1 ohm/lead (PT100)	50 ohms per lead maximum balanced	

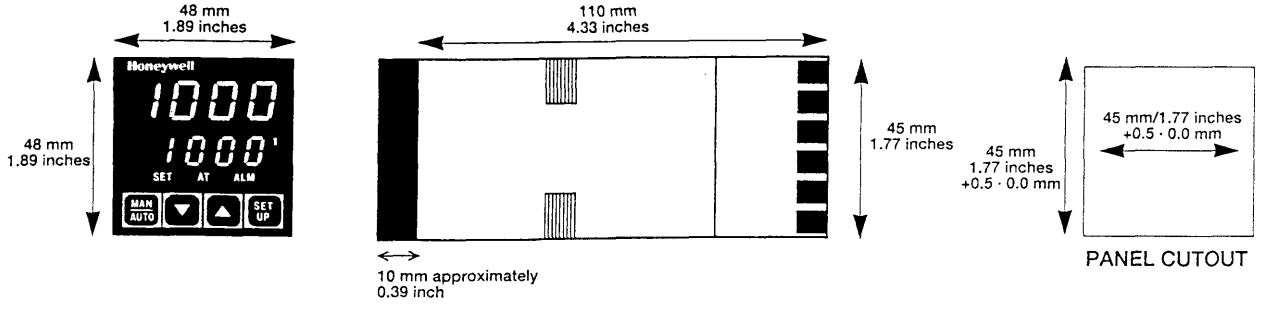
Model Selection Guide



*These selections only available in Europe.

EXTERNAL DIMENSIONS AND PANEL CUTOUT

UDC 1000



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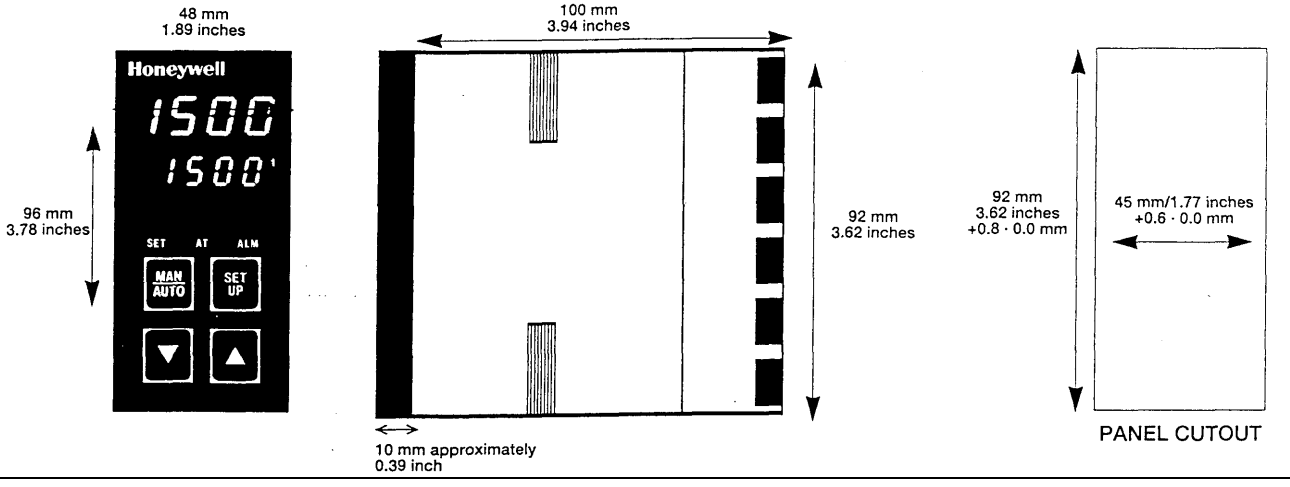

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