MICRISTAR®

SPECIFICATION 8828-D-01-H

Model 828 Micristar Digital Process Controller

Single or Dual-Loop Digital Controller and Real-Time Programmer for Process Control Applications

- Four programmable analog outputs for process retransmit or process control
- Industry standard and custom ranges for thermocouple, RTD and linear inputs
- Highly accurate reverse, direct or bimodal PID control action
- Ten contact inputs and 16 contact outputs
- Ten programmable alarms
- Command cartridge stores setup and operating parameters, including programmer profiles
- Optional digital communications
- Cascade control capability

P.O. Box 157, Elk River, MN 55330 USA – (763) 241-1456 – Fax (763) 241-1829

Model 828 Micristar Digital Process Controller

Application

The Micristar Digital Process Controller provides precise control of process variables such as temperature, speed, pressure, etc. With the optional real-time programmer, the Micristar can also automate and repeat control functions whenever they are needed.

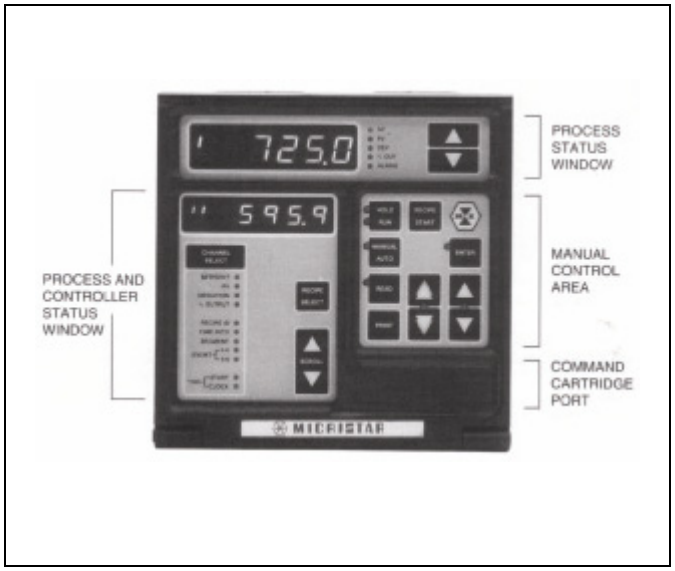


Figure 1. Operator Interface

Description and Technical Information

The Micristar is a single or dual-channel process control instrument. It consists of the following major components:

Front Panels – The Micristar has two front panels. The first panel, called the operator interface, allows the user to start a process recipe and gather process information (see Figure 1). When this hinged panel is down, it reveals the second panel, called the primary interface, that accesses the Micristar's configuration and profile programming capabilities (see Figure 2).

Figure 2. Primary Interface

Automatic transfer between the operator interface and primary interface is accomplished through electronic sensing. Three hidden security keys allow access to the primary interface which helps prevent accidental changes to configuration and real-time programmer information.

The primary interface is in limited access when the operator interface is first pulled down. In limited access, all primary interface values can be displayed but the only values that can be changed are those which were changeable using the operator interface. Full access allows all controller and programmer table parameters to be changed.

The Micristar's front panel is divided into four logical areas with bold touch pads and LED displays:

- With a scrolling technique, the process status window allows users to display setpoint, process input variable, setpoint deviation, percent output and alarms in engineering units.
- Centered in the manual control area, manual operator functions include manual process control, program recipe start (for controller/programmer models) and print commands.
- The process and controller status window on the operator interface becomes the controller or programmer tuning and set up area on the primary interface. The LED display in this area allows display of controller parameters and programmer parameters where applicable. In full access, process control or programmer parameters are manipulated via the manual control area.
- The command cartridge part will accept either the optional command cartridge or optional range cartridge.

Analog Input Types – One input is provided for each channel. Industry standard input types are supported:

- Thermocouple type T, J, K, R, S, E, Platinell II, B, G, C, D and Nickel Nickel Molly.
- RTD (100 ohm, American or European curves)
- Linear DC ranges of 0–100mv, 0-50mv, 0-10mv, -5-10mv, 0-10 volt, 0-5 volt, 0-1volt, 4-20mA, 0-20mA and 1-5mA

In addition, special input types can be developed for to meet other requirements.

Control Output Types – The Micristar's four analog and two time proportioned outputs control a wide variety of power controls, CAT valves, PAT valves, heaters, burners and other final control devices which accept a DC voltage, current signal or on/off contact input. The analog outputs can be configured as 0-5VDC, 0-20mA or 4-20mA and can also be used to retransmit set point, process actual or deviation signals from the Micristar to a chart recorder or other device.

Contact Inputs – Twelve contact inputs are provided for a variety of functions (see Specifications).

Control Actions – The type of control action can be defined as reverse, direct or bimodal as required to control temperature, relative humidity or virtually any other process condition.

Control Strategies – The Micristar can be used effectively with advanced control strategies including:

- Cascade control
- Guaranteed soak
- Remote Setpoint generation
- Ratio control
- Auto/Manual control with bumpless transfer
- External program hold, start, abort, output suppression and panel security switches

Alarms – Each channel has a High and Low process variable limit and process deviation alarm to enable corrective action to be taken when a process deviates from

its Setpoint. There are also sensor failure alarms and a special Watch Dog Timer Alarm that continuously verifies that the Micristar is functioning properly.

Electrical Connections – All signal and control input and output electrical connections are made at the screw terminals on the rear terminal board or the optional relay board at the rear of the Micristar (see Figure 3).

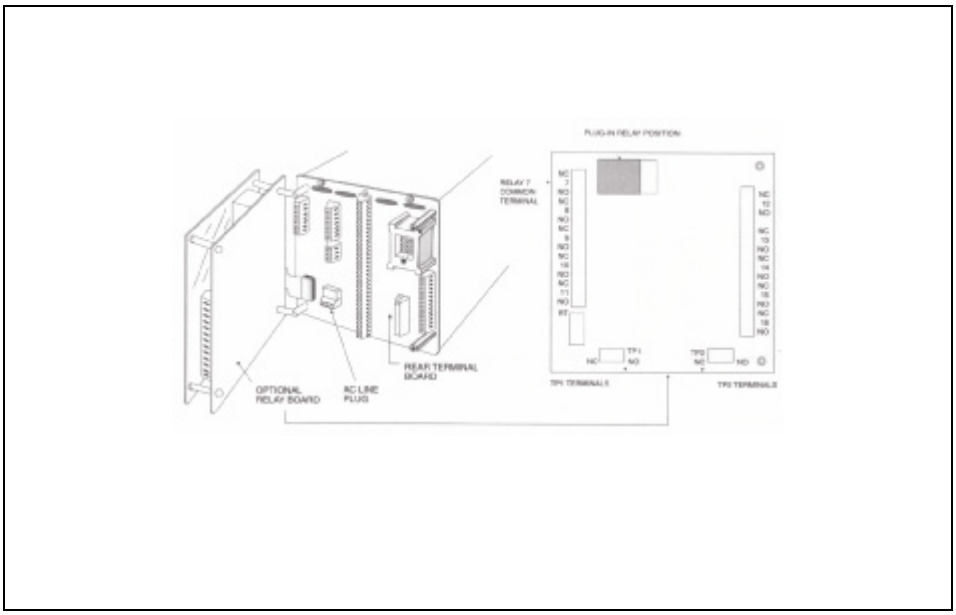


Figure 3. Back Panel

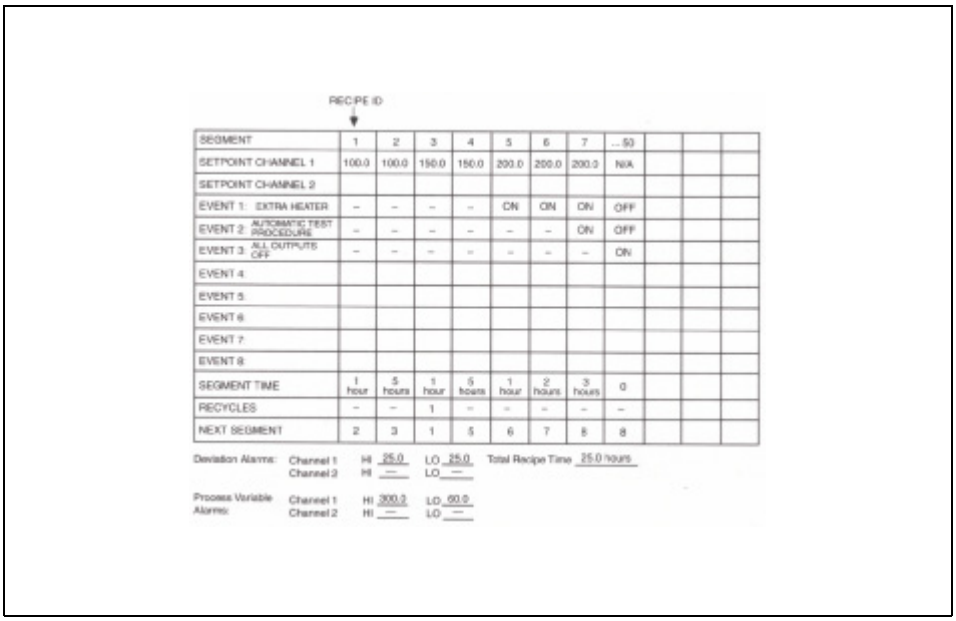


Figure 4. A Typical Process Recipe

Options

Real-Time Programmer – Micristar models 828D and 828E provide a real-time programmer. The real-time programmer contains a 50-segment (step) recipe that can ramp or soak both channels of process control, switch any or all of the eight digital outputs, and act upon any or all of the eleven digital inputs. Recipes can be stored on a command cartridge or central supervisory computer for later use.

A time of day start feature enables the programmer to begin automatically during off-peak hours or prior to the workday. Controlled abort and stop sequences can be programmed to provide a safe exit from a process that must be terminated.

Recipes are easily entered or selected using the PGMR TABLES, SCROLL, INCREASE/DECREASE and ENTER keys on the front panel. A programmed recipe log worksheet can be used to document controller and programmer information for any recipe to provide a permanent record of each segment in a recipe (see Figure 4).

Remote Setpoint – Micristar models 828C and 828E have a remote Setpoint input for

each channel. When remote Setpoint operation is used, the controller Setpoint is determined by 0-5 VDC signals connected to terminals on the Micristar's rear terminal board.

Relative Humidity – The relative humidity option uses a dry bulb/wet bulb measurement method to provide precise control of temperature and humidity. The Micristar compares temperatures of the dry bulb and wet bulb (thermocouples or RTDs) and, based on a psychometric principles, calculates the relative humidity. This provides display programming and control in percent RH without the added cost of an RH transmitter.

Advanced Valve Control – The position adjusting transmitter (PAT) option provides two PAT stations. Each station can control a motorized actuator with slidewire feedback that opens or closes a valve. When assigned to a control signal, a PAT station allows the control signal to position a valve from 0.0 percent (fully closed) to 100.0 percent (fully open).

Communications – The Micristar can communicate with supervisory computers and other instruments at up to 19.2 K baud through RS-422, RS-232 or IEEE-488 communications.

The data logger option uses a built-in software program to provide process reports to a printer. The logger's output shows the current date/time, controller values (Setpoint, process variable, deviation, percent out), controller mode (auto, manual), alarm status and programmer values (programmer status, run time and recipe ID).

The computer communications option provides two communications ports – one for data logger and one for computer communications. The computer communications port is configurable as RS422 or RS232. With RS-422, up to 31 Micristar's can be networked to a single computer.

The IEEE-488 option allows the Micristar to communicate with instrumentation on the General Purpose Interface Bus (GPIB). It can be ordered with the Micristar or added after installation. No internal software modifications are necessary; the Micristar will automatically locate the IEEE-488 board when powered up.

Relay Board – The relay board option mounts on the Micristar rear panel and provides relay output capabilities for alarm, event or time-proportioning outputs (see Figure 3). The board has the capacity for 10 relays and two time proportioned outputs. The relay board is ordered separately from the Micristar.

Command Cartridge – The Micristar can store and retrieve information in an optional solidstate command cartridge (see Figure 5). The command cartridge is a memory module that plugs into the cartridge port on the lower right of the Micristar's primary panel (see Figure 6). The command cartridge has two sides, each of which can independently store a complete set of Micristar controller, programmer and configuration data. Complete process profiles can be loaded in seconds, ensuring totally repeatable results from every programmer recipe. Data stored on the command cartridge can also be transferred between Micristar's. Command cartridges are ordered separately from the Micristar.

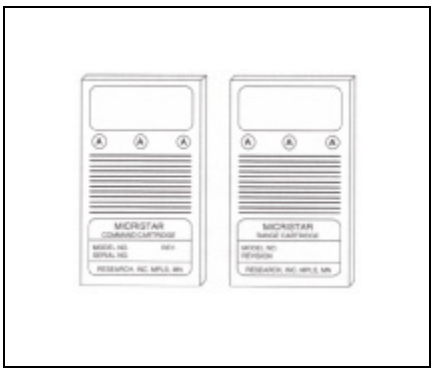


Figure 5. Command Cartridge and Range Cartridge

Range Cartridge – The optional range cartridge (see Figure 5) is a factory-programmed module that also plugs into the cartridge port on the Micristar's primary panel. The range cartridge can be used to reprogram the Micristar to use a variety of different sensors and ranges (see Table 1). It is ordered separately from the Micristar. An input module (ordered separately) is also required if the input module number for the new range does not match the input module number for the existing range. Input module numbers are listed in Table 1.

Rack Mounting Panel – A 19 inch (483 mm) rack mounting panel with cutouts for three Micristars can be ordered separately from the Micristar. If one or two of the cutouts will not be used to mount Micristars, filler plates can also be ordered.

Figure 6. The Micristar with a Plugged-in Command Cartridge

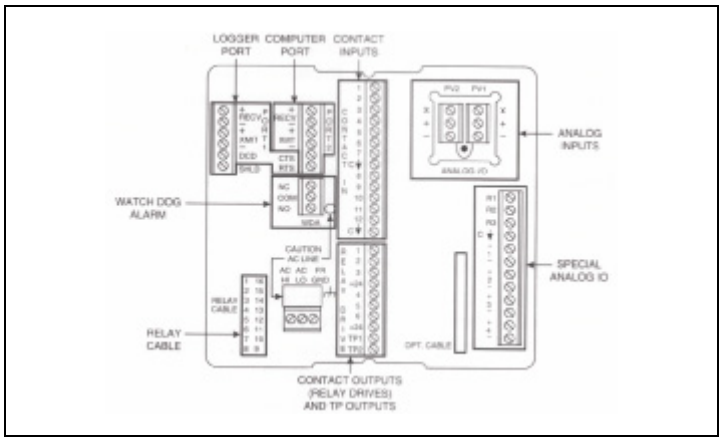


Figure 7. Typical Rear View

Table 1. Input Types and Ranges

Input Type		Setpoint Range		Input Module Number	Selection Code
		Degrees C	Degrees F		
Thermocouple					
J	Iron vs.	-20.6 to 759.7	-5.1 to 1400.0	03	101
	Copper-Nickel	-20.6 to 386.6	-5.1 to 728.1	02	102
	Iron-Constantan	-124.7 to 186.0	-192.4 to 366.8	06	103
K	Nickel-Chromium vs.	-26.6 to 1371.5	-16 to 2500	04	201
	Nickel-Aluminm	-26.6 to 510.8	-15.8 to 951.7	02	202
	Chrome-Alumel	-182.8 to 246.3	-297.1 to 475.3	06	203
-	Platinel II	-35.0 to 1379.6	-31 to 2516	04	211
		-14.5 to 521.2	5.9 to 970.2	02	212
-	Nickel vs. Nickel				
	18% Molybdenum	0.0 to 1350.8	32 to 2462	19	251

E	Nickel-Chromium vs.	-17.8 to 1054.9	0 to 1932	05	301*
		-17.8 to 721.9	0.0 to 1331.5	04	302
	Copper-Nickel	-17.8 to 300.9	0.0 to 573.8	02	303
	Chromel-Constantan	-267.9 to 300.1	-449.9 to 571.9	07	304
T	Copper vs.	-419.7 to 402.7	722.9 to 756.5	07	401*
	Copper-Nickel	-27.4 to 403.9	-17.3 to 758.7	02	402
	Copper-Contantan	-200.1 to 213.4	-328.2 to 416.2	06	403
S	Platinum vs.				
	Platinum-10% Rhodium	-73 to 1822	-100 to 3312	02	501
R	Platinum vs.				
	Platinum-13% Rhodium	-74 to 1768	-101 to 3215	02	511
B	Platinum-6% Rhodium vs.				
	Platinum-30%Rhodium	39 to 1846	102 to 3354	01	521**
G	Tungsten vs.	-429 to 2361	-741 to 4282	03	601*
	Tungsten-26% Rhenium	-131.1 to 1317.8	-204 to 2406	02	602
C	Tungsten-5% Rhenium vs.	-81 to 2392	-113 to 4337	03	611*
	Tungsten-26% Rhenium	-30.5 to 1159.4	-23 to 2118	02	612
D	Tungsten-3% Rhenium	-119 to 2406	-183 to 4364	03	621*
(G3)	Tungsten-25% Rhenium	-41.9 to 1146.3	-43 to 2095	02	622
RTD					
-	RTD	-200.0 to 649.9	-328 to 1202.6	11	701
	100 ohm	-100 to 250.0	-148.0 to 481.8	10	702
	Platinum	0.0 to 200.0	32.0 to 392.0	09	703
	American Alpha (1)	0.00 to 99.98	32.0 to 212.0	08	704
-	RTD	-203.7 to 660.2	-334.4 to 1219.1	11	711
	100 ohm	-101.2 to 253.5	-150.2 to 488.2	10	712
	Platinum	0.0 to 202.8	32.0 to 397.0	09	713
	European Alpha (2)	0.00 to 101.31	32.0 to 214.5	08	714
Linear		Input Range			
Millivolt		0 to 100		05	801
		0 to 50		04	802
		0 to 10		01	803*
		-5 to 10		06	804
Voltage		0 to 10		14	811
		0 to 5		13	812
		0 to 1		12	813
Current (MA)		4 to 20		15	901
		0 to 20		16	902
		1 to 5		17	903

* Input resolution slightly reduced in these ranges

** Accuracy specification does not apply below 250 degrees F (125 degrees C) American Curve (1)=.003920 per ohm per degree C European Curve (2)=.00385 per ohm per degree C

Table 2. Special Input Types and Ranges

Input Type	Setpoint Range		Input Module Number	Selection Code
	Degrees C	Degrees F		
Thermocouple				
T	-27.4 to 287.1	-17.3 to 548.8	1	451
S	-133.4 to 1378.1	-208 to 2514	1	551
G3	-31.1 to 1304.7	-24 to 2380	2	651
G3	0.0 to 1638.4	32 to 2980	106	654
R	0.0 to 1001.0	32 to 1834	107	552
J	-17.8 to 538.3	0.0 to 1001.0	106	151
R T/C	0.0 to 1350.8	32 to 2462	1	553
C T/C	0.0 to 1638.4	32 to 2980	106	659
K T/C	-128.8 to 1371.1	-200 to 2500	4	253
NI vs. NI-18% Mo	0.0 to 1350.8	32 to 2462	105	251
N T/C	-40.0 to 1421.6	-40 to 2591	4	631
B T/C	37.9 to 1638.7	100 to 2981	1	554
K T/C	-17.8 to 788.0	0.0 to 1448.8	106	254
R T/C	-17.8 to 892.1	0 to 1638.4	107	555
N T/C	0.3 to 1286.9	33 to 2348	4	665
E T/C	-195 to 649	-320 to 1200	111	351
K T/C	-212 to 1038	-350 to 1900	112	255
S T/C	0.0 to 15.00	32 to 2732	1	556
RTD				
100 ohms European	5.00 to 55.02	41.0 to 131.0	103	751
100 ohms European	-40.00 to 70.09	-40.0 to 158.0	104	752
100 ohms European	-5.03 to 50.02	22.94 to 122.03	103	753
Linear				
RTC 11c Pyrometer	700.00 to 1420.0	1292 to 2588	2	653
(1.19mV - 19.08mV)				
RTC 11c Pyrometer	771.2 to 1583.3	1420.2 to 2881.7	2	655
(1.19mV - 19.08mV)				
Pyrometer	600.0 to 1305.5	1112.0 to 2381.1	106	656
(0.013mV - 28.771mV)				
Pyrometer	685 to 1850	1265 to 3362	14	657
(0V - 10V)				
Altitude Sensor	0.0 to 120.0	0.0 to 120.0	15	951
(4mA - 20mA)				
Type RTC Retransm.	750.0 to 1520.3	1382 to 2768	14	854
(0V - 9.5357V)				
Pyrometer Retransm.	800.0 to 1620.0	1472 to 2948	14	855
(0V - 7.2862V)				
Type RTC Retransm.	850.0 to 1720.2	1562 to 3128	14	856
(0V - 9.5541V)				
Type STC Retransm.	900.0 to 1850.0	1652 to 3362	14	857
(0V - 11.0345V)				
Altitude Sensor	0.0 to 80.0	0.0 to 80.0	15	952
(4mA - 20mA)				
Pyrometer	685 to 1425	1265 to 2597	109	658
(-0.0265mV - 1.504V)				
Land oRo Pyro	1000.0 to 1400.0	1832.0 to 2552.0	1	660

(3.54mV - 16.08mV)				
Land oQo Pyro	1100.0 to 1400.0	2012.0 to 2552.0	4	661
(6.547 - 50.73mV)				
PR 401 Pyro	600.0 to 1800.1	1112 to 3272	2	662
(.19 - 23.80mV)				
RP-LD32 Pyro	699.9 to 1609.7	1292.0 to 2930.7	19	663
(.022 - 72.85mV)				
RH Pyrometer	500.0 to 1870.0	932 to 3398	4	664
(.13 - 56.54mV)				
RT/C RETR	650.0 to 1150.0	1202.0 to 408.0	14	858
(0V - 9.0211V)				
Current SP 0-20mA	600.0 to 1300.0	1112.0 to 2372.0	16	956
RGE Accur 4-20mA	1000.0 to 1300.0	1832.0 to 2372.0		
Current SP 0-20mA	600.0 to 1225.0	1112.0 to 2237.0	16	957
RGE Accur 4-20mA	975.0 to 1225.0	1787.0 to 2237.0		
Current SP 0-20mA	600.0 to 1300.0	1112.0 to 2372.0	16	958
RGE Accur 4-20mA	980.0 to 1300.0	1796.0 to 2372.0		
Current SP 0-20mA	600.0 to 1500.0	1112.0 to 2732.0	16	959
RGE Accur 4-20mA	1000.0 to 1500.0	1832.0 to 2372.0		
Linear	**Input Range**			
Voltage	0V to 1.4V		18	852
Voltage	0mV to 200mV		102	853
Current	0mA to 21.6128mA		16	953
Current	0mA to 164.08mA		108	954
Voltage	-10V to 10V		110	955

Specifications

Dimensions	
Bezel Max. Dimensions	5.87 Inches (149 MM) wide x 5.89 Inches (150 mm) high x 0.87 Inches (22 mm) Deep.
Cut-Out Dimensions	5.43 Inches (139 mm) x 5.43 Inches (139 mm) (1/2 DIN = 138mm square – Reference DIN43700)
Length	12.06 Inches (307mm) Maximum from Bezel Mounting Surface to Farthest Rear Projection with No Attached Options. 13.25 Inches (338mm) Maximum with the Optional Relay Board Attached 15.25 Inches (388 mm) Maximum with Both Optional Relay Board and Optional IEEE-488 Board Attached.
Weight	
	Without Options: 6.75 Pounds (3.0 kilograms) With Optional Relay Board: 7.1 pounds (3.2 kilograms) With Both Optional Relay Board and Optional IEEE-488 Board: 7.2 Pounds (3.3 Kilograms)
Voltage	
	120 or 240 VAC (+10 percent, -15 percent)
Frequency	
	47 to 63Hz
Current	
	0.5 Ampere at 120VAC, or 0.25 Ampere at 240 VAC (exclusive of relay drives)
Power	
	60 Watts (typical) or 75 Watts (with relay board)

Isolation	
	The circuitry is organized into four elements, each with 1000 VDC Isolation: Process Variable 1 Process Variable 2 Digital Logic/Communications Interface Contact Inputs, Contact outputs, Analog Outputs and Relay Drives
Environmental Limits	
Operating Temperature	32 °F to 122°F (0°C to 50°C)
Storage Temperature	-13°F to 140°F (-25°C to 60°C)
Relative Humidity	0 to 90 Percent, Non-Condensing
Operating Modes	
Auto/Manual	Simultaneously Selected for Both Channels in Two-Channel Units
Run/Hold	Simultaneously Selected for Both Channels in Two-Channel Units
Process Control Types	
Manual Control	000.0 to 100.0 Percent Reverse Output and/or 000.0 to 100.0 Percent Direct Output
Auto Control	Output PID Parameters (Four groups; channel one/direct, channel one/reverse, Channel two/direct, channel two/reverse) Gain: 000.0 to 200.0 Auto Reset: 00.00 to 75.00 Repeats Per Minute with Anti-Reset Windup Manual Reset: 00.0 to 99.9 Percent, Reverse and Direct Rate: 00.00 to 99.99 Minutes
Real-Time Programmer Capacities	
Number of Segments	50
Number of Setpoints	One or Two
Number of Events	Eight
Segment Sequencing	Forward or Backward Jumps with Nested Recycling
Real-Time Programmer Update Time	
	0.2 Second
Analog Inputs	
Temperature	Industry Standard Thermocouples (1 Meg-ohm input resistance) and RTDs
Linear	mA, mV, V
Open Sensor Protection	Available for Thermocouple, RTD, and Millivolt Inputs. Controller Response to an Open Sensor Condition is Selectable as “Output Hold” or “Output Off”.
Filtering	Keyboard Selectable
Minimum Span	10 mV
Resolution	12 Bits (0.025 percent)
Sampling Rate	5 Samples Per Second
Conformity (Thermocouple or RTD)	±0.03 Percent of Span
Accuracy	±0.1 Percent of Span
Repeatability	.03 Percent of Span
Noise Rejection	Normal Mode: Determined by the Value of the Filter Selected Common Mode: Greater than 120 dB at 60 Hz
Temperature Stability	Ambient Temperature Affects Input by 0.02 Percent of Input Span Per Degree C
Control Outputs	
Output Action	User Configurable as Reverse, Direct, or Bimodal
Output Signal Types	Analog: Four outputs, each configurable as direct- or reverse-acting and as 0-5 VDC, 0-20 mA, or 4-20 mA. The minimum load for voltage-type analog outputs is 300 ohms. The maximum load for current-type analog outputs is 600ohms.
Time-Proportioned	Two open-collector relay drive signals at up to 80 mA each (using ±24 VDC excitation output). Each output can be configured as direct- or reverse-acting and is available on both the rear terminal board and the optional relay board.
Output Limiting	Separately Set for Each Output (reverse- and/or direct-acting) of Each

	Controller Channel as High Limit and/or Low Limit
Bimodal Band Relationship	-10.0 Percent to +10.0 Percent (adjoining band, deadband, and overlapping Band)
Update Time	0.2 Second
Resolution	10 Bit (0.10 percent)
Retransmit Outputs	
	Zero to four analog outputs are available depending on the process control output configuration. Retransmit outputs are assignable as setpoint, process variable, or deviation for either channel.
Process Alarms	
	There can be up to five alarms per channel: 1) High Process Variable; 2) Low Process Variable; 3) High Deviation; 4) Low Deviation; 5) Open Sensor. The trigger levels for the process variable and deviation alarms are User-entered. Each alarm is independently assignable to any of the 16 Alarm/event relay drive outputs.
Alarm and/or Event outputs	
	There are 6 relay drive outputs, each of which can supply up to 80mA using The ±24 VDC excitation output. However, the total current drain of all relay Drive outputs that are energized at one time cannot exceed 500 mA. Six relay Drive outputs are available at screw terminals on the rear terminal board. Ten Relay outputs connect to the optional relay board through a ribbon cable. Any Process alarm or programmer event (or combination of alarms and events) Can be assigned to any relay drive output. The Watch Dog Alarm has one Form C mechanical relay (NO and NC) on the rear terminal board.

Serial Communication Standard

Hardware Standard	Topography	Handshake Protocol	Baud Rate	Separation Distance
RS-232	Point to Point	INQ/ACK Or None	300, 1200,2400 4800, 9600, 19.2K	50’ (15.24 m)
RS-422	Multidrop Bus	ENQ/ACK	300, 1200, 2400 4800, 9600, 19.2K	4000’ (1219.2m)

Parallel Communication Standards	
IEEE-488	GPIB Parallel Interface Bus
Contact Inputs	
Program Hold	When terminal CI-1 is connected to common, the programmer enters the HOLD mode. When terminal CI-1 is removed from common, the programmer enters the RUN mode.
Start at Segment 50	When terminal CI-2 is connected to common, the programmer will immediately begin execution of segment 50. This is commonly used for controlled abort sequences.
Start at Segment 49	When terminal CI-3 is connected to common, the programmer will immediately begin Execution of segment 49. This is commonly used for controlled abort sequences.
Outputs Off	When terminal CI-4 is connected to common, all analog and time proportioned outputs are turned off (to 0 percent output). When terminal CI-4 is removed from common, The Micristar will resume normal control operation. This is used for emergency shut-down.
Security Lockout	When terminal CI-5 is connected to common, the Micristar enters a special security mode which: 1) Keeps the Micristar from entering full access mode; 2) Keeps the Micristar from entering configuration access mode; 3) Allows the command cartridge to be read but not changed; 4) Allows recipes to be reviewed but not changed. When Terminal CI-5 is removed from common, the Micristar front panel resumes normal operation.
Print Demand	When terminal CI-6 is momentarily connected to common, the optional logger port will print the Micristar’s status on an external Printer.
Auto/Manual Mode	When terminal CI-7 is connected to common, the controller executes a bumpless transfer from automatic to manual control mode. This leaves all control outputs at the existing levels and suppresses PV and process alarms. When terminal CI-7 is removed from common, the controller

	executes a bumpless transfer from manual to automatic control mode, the alarms are reactivated and PID control resumes.
Remote Setpoint	When terminal CI-8 is connected to common, the Micristar accesses the remote setpoint option. When terminal CI-8 is removed from common, the Micristar controls to its internally programmed Setpoint.
Auto Restart	When terminal CI-9 is connected to common, the Micristar will resume operation where it stopped when power was cut (auto restart). When terminal CI-9 is removed from common, the Micristar will return its memory to default values after power is cut (cold start).
Computer Lockout	When terminal CI-10 is connected to common, a host computer can read data from the Micristar via the computer communication option but it cannot change the data. When terminal CI-10 is removed from common, a hast computer can both read and change data in the Micristar.

Ordering Information

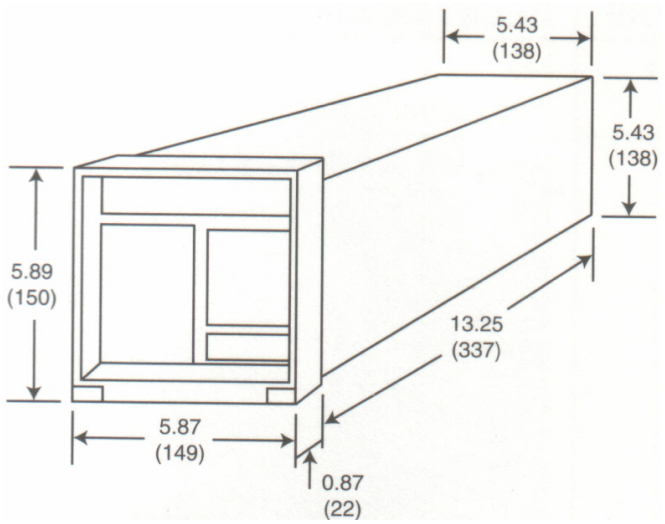
Model 828	Micristar Digital Process Controller							
Code	**Base Model**							
B	Controller							
C	Controller with remote setpoint							
D	Controller/Programmer							
E	Controller/Programmer with remote setpoint							
	Code	**Control Version**						
	10	Standard Control						
	11	Relative Humidity (requires two-channel unit)						
	12	PAT Outputs (requires Base Model C or E; for relays, order relay board and two relays-solid state only-per output)						
		Code	**Channel 1 Input Range**					
		See Table 1	Select Range Code from Table 1* For Special Ranges** see Table 2					
			Code	**Channel 2 Input Range**				
			000	None (defines as single channel unit)				
			See Table 1	Select Range Code from Table 1* (defines as two-channel unit). For Special Ranges** see Table 2				
				Code	**Relay Board**			
				0	No			
				1	Yes			
					Code	**Digital Communications**		
					0	None		
					1	Logger		
					2	Serial Communications RS422/RS232 and Logger		
					3	IEEE 488 Communications		
					4	IEEE 488 Communications and Logger		
					5	IEEE 488 Communications, RS422/RS232 and Logger		

828 D	11	101	101	1	2	0	00	<---------MODEL NO. *(example)*

* For two loop units, if one input range is for a thermocouple, the thermocouple range must be assigned to Channel 1.
** For Special Ranges, consult factory for pricing.

Description	Model Number
Accessories	
Command Cartridge (memory storage device)	065332-001
Standard Range Cartridge - allows any standard linearization table to be loaded for either Channel 1 or Channel 2 if range change is desired. If existing Input Module matches new range, linearization cartridge may be used to change range without changing Input Modules. See Table 1.(contains ranges listed in Table 1).	067512-001
Special Range Cartridge. See Table 2. (contains ranges listed in Table 2)	067512-002
Standard Input Module (XX in model number is input module number from Table 1. If changing range, also order Range Cartridge.)	065424-0XX
Plug-in Relays for Relay board:	
Solid State Relay (AC only, 120 or 240 VAC, 3A @ 25 °C, 2A @ 50 °C)	067018-001
Solid State Relay (DC only, 4 to 60 VDC, 2-1/2A @ 25 °C, 2A @ 50 °C)	073829-001
Mechanical Relay (SPDT, 3A resistive, up to 120 VAC / 28 VDC)	065331-001
Paper for Logging Printer (1 roll)	074018-001
Micristar User Manual (B&C)	063252-001
Micristar User Manual (D&E)	063241-001

Dimensions



ALL DIMENSIONS IN INCHES