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CONTROL SYSTEM

All in One.



Dimension® Model 8705

- Multi-loop PID control
- Sequential, digital control
- Process monitoring
- Setpoint ramping and event outputs
- Data communications
- Secondary operator station able to communicate over modem or cable
- User configurable display screen
- Memory card data storage



**EUROTHERM
CONTROLS**

The
DIMENSION®
Model 8705
Data Bulletin



ALL in ONE DIMENSION[®]



When your control application calls for just a little bit more, you can choose Dimension.

THERE IS A WHOLE WORLD of control needs. Some applications require closed loop, PID control. Others require sequencing logic. There are applications that need setpoint ramping, remote setpoints, process variable retransmission, multiple alarming strategies and digital communications. Then there are the more difficult applications that require cascade control, ratio control, combining multiple inputs for one process variable, math functions, custom displays, memory card storage, etc.

There are a number of dedicated controllers on the market that take care of each of the above functions. But what if your application requires more than just one of the above functions? If this is the case, you can now choose Dimension.

There are two ways to handle applications that require two or more of the above functions. The system designer can purchase loop controllers, a Programmable Logic Controller (PLC), frequency converters, signal conditioning equipment, etc. and then spend significant time designing a control system that combines these functions into the desired result. This is already taken care of with Dimension. You get a customized control system with only a fraction of the work.

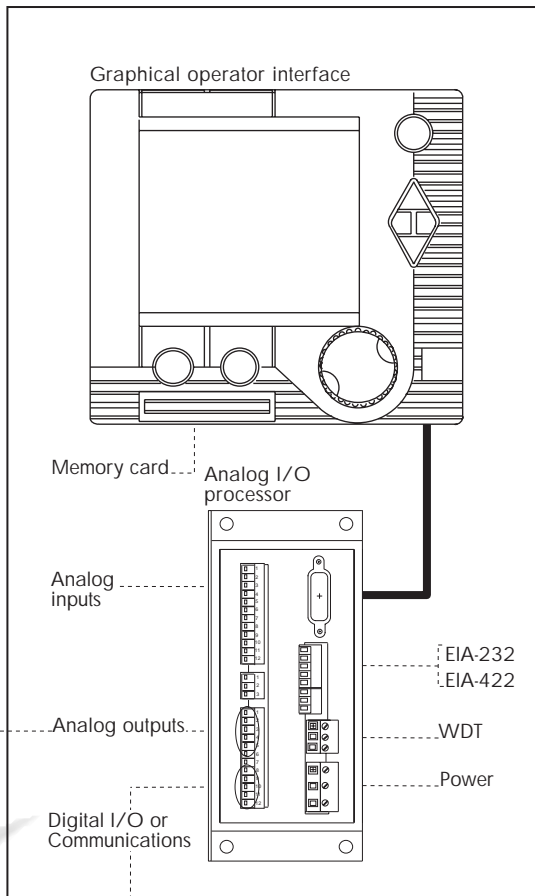
If your control application requires a mixture of control functions, call your Eurotherm representative to discuss how we can help. You owe it to yourself to take a look at Dimension.

Features

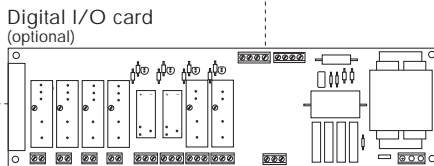
.....
Multi-loop PID control	Memory card for storage
.....
Sequential, digital control	User configurable display screens
.....
Process monitoring	Programmable function keys
.....
Setpoint ramping & event outputs	Context sensitive help key
.....
Multiple alarm strategies	Real time, 7 day/week clock
.....
Data communications	Digital inputs/outputs
.....
PID values change based upon process condition	Secondary operator station, able to communicate over modem or cable
.....
Math functions	Process variable retransmission
.....

Dimension Model 8705 Controller Specifications

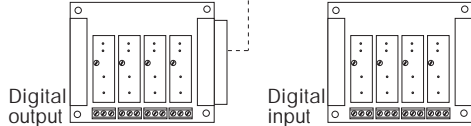
8705/RGOI



8781-00



8781-OX



8782-01



Graphical operator interface

- 1-4 control loops
- 0-4 setpoint programmers
- Displays process control information, configurations and options
- Memory card
- Graphical display of setpoint programs

Analog input/output processor

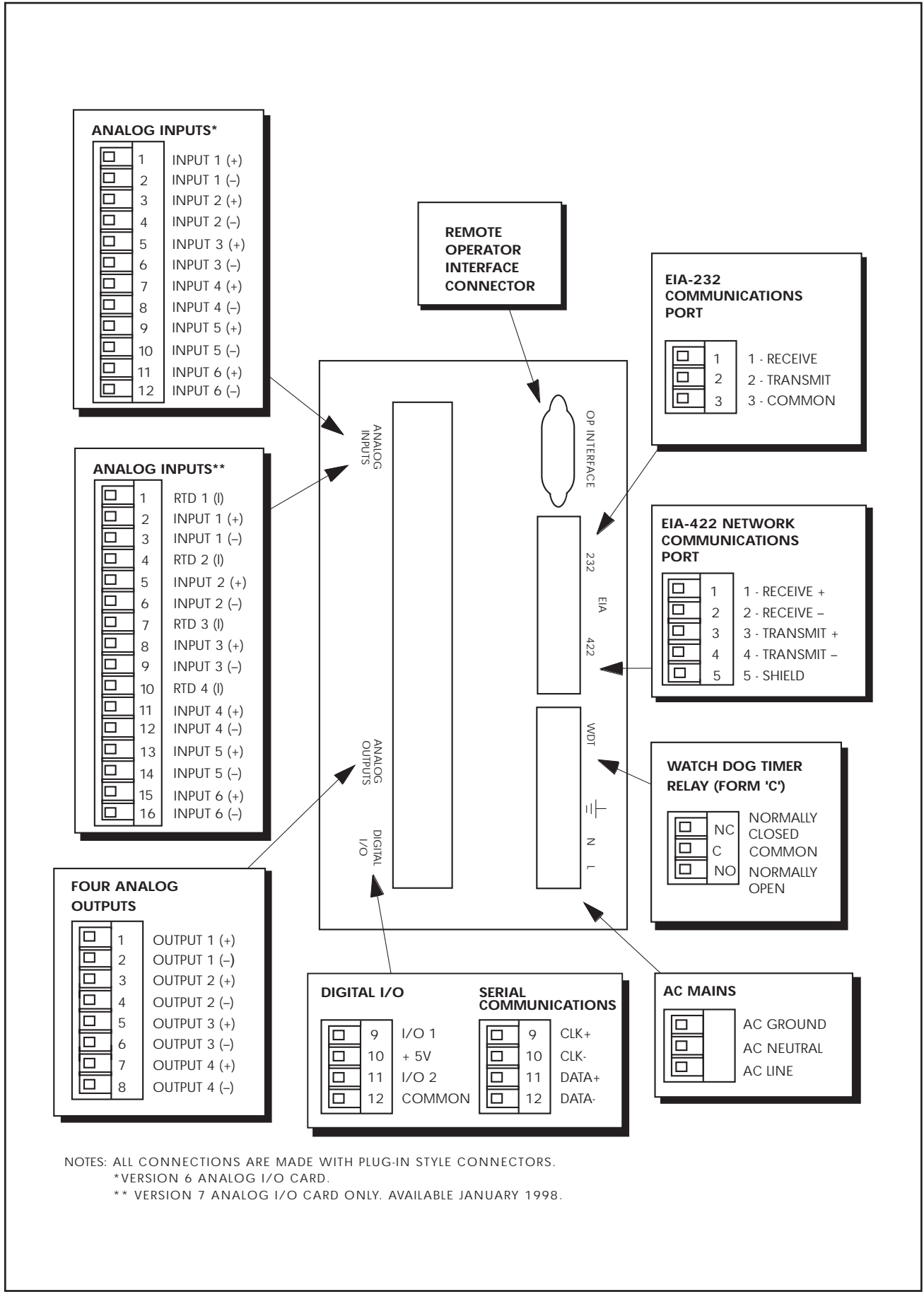
- 6 analog inputs
- 4 analog or time proportioned outputs
- 2 digital I/O or expansion serial port to digital I/O cards (8781-00)
- EIA-232 and EIA-422
- Watch dog timer (WDT)

Digital input/output cards, Model 8781

- Up to 2 digital I/O cards, Model 8781-00 with 4 inputs and 4 outputs each (expandable to 32 digital I/O)
- Expansion card, 4 additional inputs
- Expansion card, 4 additional outputs
- Isolated solid state input/output modules or mechanical relays

Time proportioning solid state relay output, 8782-01

- 4 SSR outputs per card



ANALOG INPUTS*

1	INPUT 1 (+)
2	INPUT 1 (-)
3	INPUT 2 (+)
4	INPUT 2 (-)
5	INPUT 3 (+)
6	INPUT 3 (-)
7	INPUT 4 (+)
8	INPUT 4 (-)
9	INPUT 5 (+)
10	INPUT 5 (-)
11	INPUT 6 (+)
12	INPUT 6 (-)

ANALOG INPUTS**

1	RTD 1 (I)
2	INPUT 1 (+)
3	INPUT 1 (-)
4	RTD 2 (I)
5	INPUT 2 (+)
6	INPUT 2 (-)
7	RTD 3 (I)
8	INPUT 3 (+)
9	INPUT 3 (-)
10	RTD 4 (I)
11	INPUT 4 (+)
12	INPUT 4 (-)
13	INPUT 5 (+)
14	INPUT 5 (-)
15	INPUT 6 (+)
16	INPUT 6 (-)

FOUR ANALOG OUTPUTS

1	OUTPUT 1 (+)
2	OUTPUT 1 (-)
3	OUTPUT 2 (+)
4	OUTPUT 2 (-)
5	OUTPUT 3 (+)
6	OUTPUT 3 (-)
7	OUTPUT 4 (+)
8	OUTPUT 4 (-)

DIGITAL I/O		SERIAL COMMUNICATIONS	
9	I/O 1	9	CLK+
10	+ 5V	10	CLK-
11	I/O 2	11	DATA+
12	COMMON	12	DATA-

REMOTE OPERATOR INTERFACE CONNECTOR

EIA-232 COMMUNICATIONS PORT

1	1 - RECEIVE
2	2 - TRANSMIT
3	3 - COMMON

EIA-422 NETWORK COMMUNICATIONS PORT

1	1 - RECEIVE +
2	2 - RECEIVE -
3	3 - TRANSMIT +
4	4 - TRANSMIT -
5	5 - SHIELD

WATCH DOG TIMER RELAY (FORM 'C')

NC	NORMALLY CLOSED
C	COMMON
NO	NORMALLY OPEN

AC MAINS

	AC GROUND
	AC NEUTRAL
	AC LINE

NOTES: ALL CONNECTIONS ARE MADE WITH PLUG-IN STYLE CONNECTORS.
 *VERSION 6 ANALOG I/O CARD.
 ** VERSION 7 ANALOG I/O CARD ONLY. AVAILABLE JANUARY 1998.

SPECIFICATIONS

	Model 8705 Analog I/O Processor	Model 8705 Operator Interface
Dimensions (overall W x H x D)	2.78" x 6.375" x 9.875" (69mm x 162mm x 251mm)	6.75" x 6.06" x 2.27" (173mm x 155mm x 58mm)
Weight	3lbs (1.4kg)	2.5lbs (1.1kg)
Environmental Limits Operating temperature Storage temperature Relative humidity	0°C to 50°C (32°F to 122°F) -25°C to 85°C (-13°F to 185°F) 0 to 90 percent, non-condensing	0°C to 50°C (32°F to 122°F) -20°C to 60°C (-4°F to 140°F) 10 to 90 percent, non-condensing
Voltage	102-264Vac	
Frequency	47-63Hz	
Power	30W (typical)	
Process control types Manual control Auto control	0.0 to 100.0 percent reverse output and/or 0.0 to 100.0 percent direct output PID parameters (five groups for each loop of control except Manual Reset) Gain: 0.0 to 200.0 Auto Reset: 0.0 to 75.0 repeats per minute with anti-reset windup Manual reset: 0.0 to 100.0 percent, reverse and direct Rate: 0.00 to 99.99 minutes	
Control Loops Number	One to four control loops	
Programmer Capacities Number of programmers Number of segments Number of events Number of programs Maximum segment time Minimum segment time Segment sequencing Number of cycles Programmer update rate	Zero to four (one programmer for each loop of control) or one for all loops 750 (shared by all programmers) 12 (programmed on a per segment basis) 15 99hrs 0.2sec. Forward or backward jumps with nested recycling 255 0.2sec.	

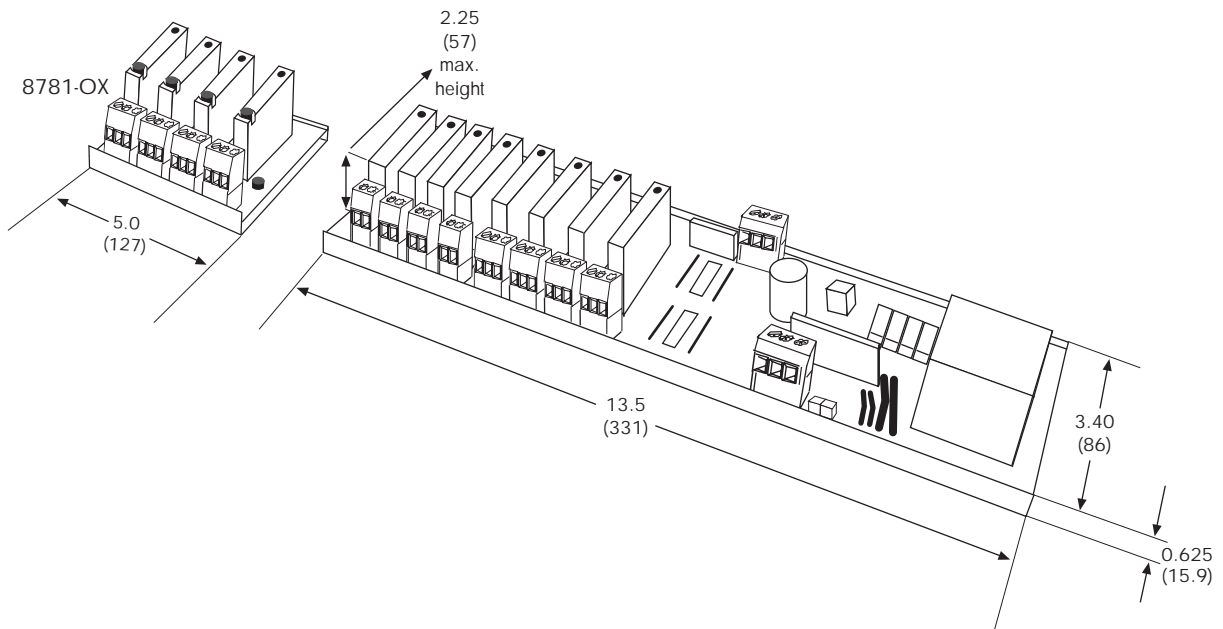
<p>Analog inputs</p> <p>General</p> <p>Thermocouple</p> <p>RTD/PT1000</p> <p>Process</p>	<p>Number</p> <p>Range</p> <p>Sample rate</p> <p>Calibration accuracy</p> <p>Resolution</p> <p>Linearization accuracy</p> <p>Zero drift with ambient temperature</p> <p>Gain drift with ambient temperature</p> <p>Input filter</p> <p>Zero and span offset</p> <p>Types</p> <p>Cold junction compensation</p> <p>Type</p> <p>Bulb current</p> <p>Lead compensation</p> <p>Range</p> <p>Type</p> <p>Application</p>	<p>Six (max of 4 RTDs)</p> <p>±100mV and 0 to 10Vdc (auto ranging)</p> <p>5Hz (200ms)</p> <p>0.1% of reading, ±1 LSD or ±.5°C/F</p> <p><1µV for ± 100mV range, < 0.2mV for 10Vdc range, 18 bit</p> <p>No discernable error</p> <p><0.1µV per °C for ± 100mV range, 0.1mV per °C on 10Vdc range</p> <p><0.004% of reading per °C</p> <p>1.0 to 999.9sec.</p> <p>User adjustable over the full display range</p> <p>Refer to Sensor inputs and display ranges table</p> <p>Automatic compensation typically >30 to 1 rejection of ambient temperature change</p> <p>3-wire, Pt100 DIN43760</p> <p>0.2mA</p> <p>No error for 22 ohms in all 3 leads</p> <p>±100mV, 0 to 20mA or 0 to 10Vdc (All configurable between limits)</p> <p>Linear or custom</p> <p>Process value, remote setpoint, setpoint trim</p>
<p>Control outputs</p> <p>Range</p> <p>Number</p> <p>Output action</p> <p>Resolution</p> <p>Update time</p> <p>Bi-Model band</p> <p>Output limiting</p> <p>Application</p> <p>Input filter</p>	<p>0 to 20mA (into 600Ω max) or 0 to 10Vdc</p> <p>Time proportioning 0/10Vdc (20mA max.)</p> <p>Four analog</p> <p>Configurable for reverse, direct or bi-modal (both reverse and direct)</p> <p>Analog: 13 bit (.015%)</p> <p>Time-proportioned: 8 bit (.4%)</p> <p>200ms</p> <p>-10.0% [overlapping to +10% (deadband)]</p> <p>Separately adjustable high and low limits for each channel</p> <p>Heating, cooling, direct or reverse, bimodel, time proportioned or analog</p> <p>0-100sec.</p>	
<p>Math functions</p>	<p>Mathematically combine 4 inputs to create a calculated process variable</p> <p>The process variable will be calculated by the following equation:</p> $[(Anlgn01 * Mult01) + (Anlgn02 * Mult02) + (Anlgn03 * Mult03) + (Anlgn04 * Mult04)]/scale$	
<p>Alarms</p> <p>Control</p> <p>Monitor input</p>	<p>Eight full-scale alarms per control loop (High, High-High, Low, Low-Low)</p> <p>Four full-scale deviation alarms (High, High-High, Low, Low-Low)</p> <p>Five groups of process alarm values</p> <p>Failed sensor alarm</p> <p>Two alarms for each analog input (High and Low)</p>	

<p>Logic functions</p> <p>Logic boxes available: Con_Out</p> <p>Logic</p> <p>Out_Off</p>	<p>Contact output assignment (OutSet##) selections</p> <p>Allows four alarm conditions and/or contact inputs to be logically “OR’d” together to energize a contact relay output</p> <p>Internal logic (OR/NOR, AND/NAND) selections. Allows four alarm conditions and/or contact inputs to be logically combined (OR/NOR, AND/NAND) to operate an internal logic function</p> <p>Control outputs off assignment (OFFSet##) selections. Allows four alarm conditions and/or contact inputs to be logically “OR’d” together to force all control outputs of the loop number specified by ## to off</p>		
<p>Digital Outputs</p> <p>Number</p> <p>Type</p> <p>Function</p>	<p>Two without Model 8781 Digital I/O card</p> <p>16 with Model 8781 Digital I/O card</p> <p>Low level, TTL, 20mA without 8781; 3A solid state or mechanical relay with 8781</p> <p>User configurable for programmer event outputs and alarms</p>		
<p>Digital Inputs</p> <p>Number</p> <p>Type</p> <p>Function</p>	<p>Two without Model 8781 Digital I/O card</p> <p>16 with Model 8781 Digital I/O card</p> <p>Contact closure or TTL Level signal without 8781</p> <p>12-280Vac and 5-200Vdc with 8781</p> <p>Program run/hold, program abort, controller auto/manual, alarm knowledge, logic inputs</p>		
<p>Communications</p> <p>Types</p> <p>Protocol</p> <p>Baud Rate</p> <p>Maximum distance</p>	<p>Standard EIA-232 single drop, optional EIA-422 multidrop and IEEE-488</p> <p>All 3 types of communication are available on one unit</p> <p>ENQ/ACK</p> <p>300, 1200, 2400, 9600, 19.2K</p> <p>EIA-232: 50ft (15m)</p> <p>EIA-422: 4000ft (1200m)</p>		
<p>Operator interface</p> <p>Interconnection cable</p> <p>Type of display</p> <p>Display resolution</p>	<p>10ft (3.3m) (used to connect the operator interface panel to the 8705 analog I/O processor)</p> <p>LCD with backlighting</p> <p>160 pixels wide x 128 pixels high</p>		
<p>Altitude Input Conversion accuracy</p>	<p>Range</p>	<p>Overall accuracy</p>	<p>Temperature Coefficient</p>
<p>Full scale</p>	<p>0 to 200Kft</p>	<p>@72°F or 22°C</p>	<p>±%FS Per °F ±%FS Per °C</p>
<p>Range segments</p>	<p>100 to 200Kft</p> <p>80 to 100Kft</p> <p>50 to 80Kft</p> <p>0 to 50Kft</p>	<p>±1.00%FS</p> <p>±0.75%FS</p> <p>±0.25%FS</p> <p>±0.10%FS</p>	<p>.015 .008</p>

Standard Dimension Input Types/Ranges

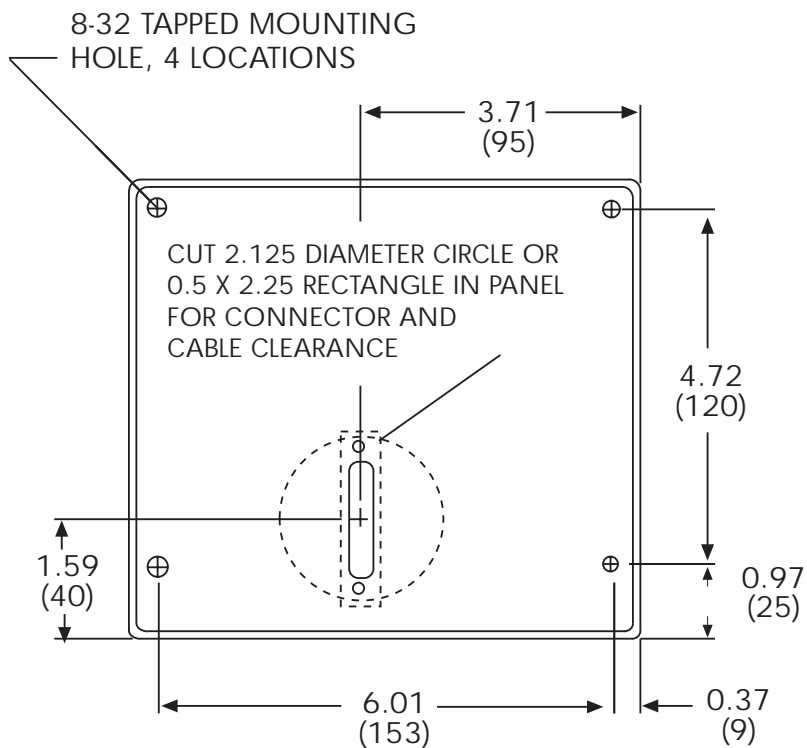
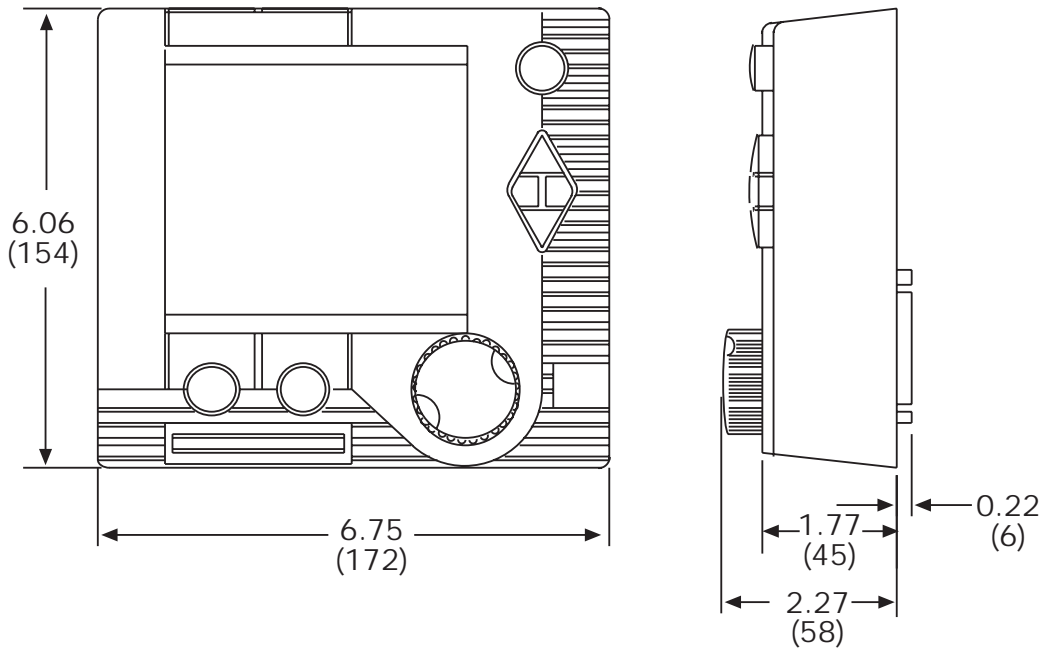
Standard Sensor Inputs	Celsius		Fahrenheit	
	Min	Max	Min	Max
J thermocouple	-22	760	-7	1400
K thermocouple	-20	1372	-5	2500
T thermocouple	-232	400	-380	750
N thermocouple	-23	1300	-11	2370
C thermocouple - W5%Re/W26%Re (Hoskins)	-18	2319	0	4200
R thermocouple	-20	1768	-5	3200
S thermocouple	-20	1768	-4	3200
B thermocouple	47	1820	117	3300
Platinel II thermocouple	-28	1450	-19	2640
RTD/PT100DIN 43760 European (.00385) or American (.00392)	-200	630	-345	1130
E thermocouple	-270	1000	-450	1830
Ni/Ni 18%Mo thermocouple	0	1350	32	2460
D thermocouple - W3%Re/W25%Re	23	2300	-9	4200
G thermocouple - W/W26%Re	-20	2315	0	4200
Linear Inputs	-999	9999		
Linear range Millivolt Voltage Current	0mV to + 100mV 0V to + 10V 0mA to + 20mA			

Model 8781-00 Digital I/O Card



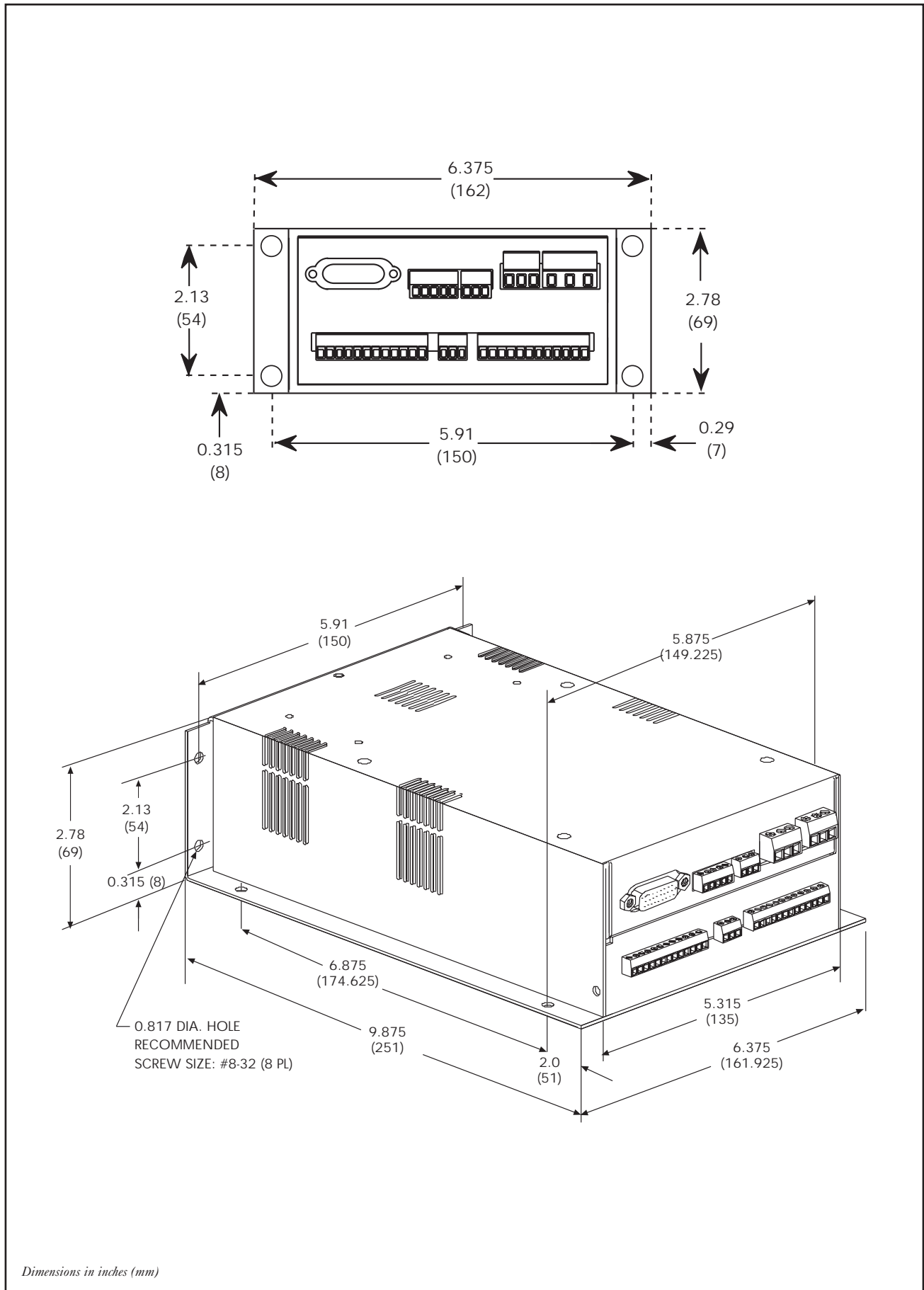
Dimensions in inches (mm)

Dimension® Graphical Operator Interface



Dimensions in inches (mm)

Dimension[®] 8705 Input/Output Processor



Coding

8705/RGOI/....

<i>outputs (4 included)</i>		<i>[3]</i>																	
X...	output 1																		
.X..	output 2																		
..X.	output 3																		
...X	output 4																		
<i>control loops (maximum of 4)</i>																			
0	no control loops																		
CL1	one control loop																		
CL2	two control loops																		
CL3	three control loops																		
CL4	four control loops																		
<i>programmer</i>																			
0	no programmers																		
PR1	one programmer																		
PR2	two programmers																		
PR3	three programmers																		
PR4	four programmers																		
<i>communications</i>																			
232	EIA-232																		
422	EIA-422																		
488	IEEE-488																		
<i>options/nonstandards</i>		<i>[2] [4]</i>																	
@AD93	software v4.13 w/manual																		
@AD94	software v5.13 w/manual																		
@AD95	one digital input and one digital output, local																		
@AD96	two digital inputs on std. analog board, local																		
@AD97	two digital outputs on std. analog board, local																		
<p><i>Notes:</i></p> <p><i>[1] Digital I/O modules must be ordered separately.</i></p> <p><i>[2] Consult factory for additional nonstandards.</i></p> <p><i>[3] Specify "1" for 4-20mA or 0-20mA, "2" for 0-5Vdc, or "3" for 5V time proportioning.</i></p> <p><i>[4] Blank space for standard unit.</i></p> <p><i>Example:</i></p> <table border="1"> <thead> <tr> <th>Model</th> <th>Operator interface</th> <th>Output</th> <th>Control loop</th> <th>Prog</th> <th>Comms</th> <th>Options/nonstandards</th> </tr> </thead> <tbody> <tr> <td>8705/</td> <td>RGOI/</td> <td>1133/</td> <td>CLA/</td> <td>PR1/</td> <td>232/</td> <td>@AD95./</td> </tr> </tbody> </table>						Model	Operator interface	Output	Control loop	Prog	Comms	Options/nonstandards	8705/	RGOI/	1133/	CLA/	PR1/	232/	@AD95./
Model	Operator interface	Output	Control loop	Prog	Comms	Options/nonstandards													
8705/	RGOI/	1133/	CLA/	PR1/	232/	@AD95./													

Accessories

<i>External expansion packages</i>		<i>[1]</i>
<i>SUBDIM</i>	<i>base</i>	
8782-01	4 CH T/P SSR output card	
8781-00	4 IN/4 OUT digital I/O card	
8781-03	4 CH input expansion card	
8781-04	4 CH solid state output expansion card	
8781-05	4 CH mechanical output card	
092218-002	2ft cable (connects two 8781-00 together)	
090478-002	optional 1ft cable for 8781-03, 8781-04, and 8781-05	
<i>Communications expansion packages</i>		
<i>SUBDIM</i>	<i>base</i>	
MODEM	modem comms pkg	
SGOI	secondary graphic operator interface	
<i>Personal computer support packages</i>		
<i>SUBDIM</i>	<i>base</i>	
85106	DDE server and sample program	
SVAUTO/XX	SpecView Auto	
SV+/SP/XX	SpecView Plus— Supervisory software for Windows®	
088541-002	10ft cable/EIA-232 comms	
088547-002	10ft cable/EIA-422 comms	
<i>Digital I/O modules and accessories</i>		
<i>SUBDIM</i>	<i>base</i>	
8700-MC	memory card	
086304-001	DC input 2.5-28V	
086303-001	AC input 90-140V	
086303-002	AC input 108-280V	
086302-002	output SSR 12-140Vac 3A	
086302-001	output SSR 24-280Vac 1A	
086308-001	output SSR 5-200Vdc 3A	
086308-002	output SSR 5-60Vdc 3A	
085501-002	output mechanical relay 8A	
094616-001	extra Users manual (one provided with each 8705)	

Ask about...

The Model 8725 is an expanded version of the 8705. It uses the same operator interface but has a higher input/output capacity.

The capacity of the 8725 is:

- 8 PID control loops
- 8 programmers
- 18 analog inputs
- 12 analog outputs
- 32 digital I/O



In addition, all 3 communication ports EIA-232/422 and IEEE-488 are available on the same unit.

Dimension User Group E-mail List Server:

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Place only the word subscribe in the subject field.

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