

Introduction

The Dynapar brand S428 Process Meter provides indication for a wide variety of process input signals, along with a host of intelligent features.

Housed in an industry standard 1/8 DIN case, the instrument is field configurable to accept standard DC current or voltage process signals as well as most thermocouples and RTDs. The 0.56" high display, available in either red or green LED, is easily scaled through the front panel to display in engineering units. The S428 comes standard with a relay alarm output. Other functions are highly modular through the use of plug-in boards which can be installed at the factory or later in the field. Choose from additional alarm relays, an auxiliary power supply for use with the input transmitter/sensor, a remote alarm reset, or a DC output for retransmission to a strip chart recorder or PLC. In addition, total factory automation can be enhanced through an RS-485 serial communication board which is field selectable for Modbus or open ASCII protocol.

The alarm outputs are highly versatile with the ability to be field configurable for high or low operation and combinational logic. Not only can the S428 indicate that an alarm is active, but with a unique accumulated alarm time function, it can also tell how long the alarm condition has been present. Also standard are such key process monitoring features as Max and Min value capture, Process Value Offset, and programmable input filtering.

A universal AC power supply enables the S428 to meet global power requirements, and an EEPROM retains all data when power is not present. The front panel is NEMA 4/IEC IP65 rated for use in washdown environments.



Features

- Universal input capability: DC Volts, DC Process, Temperature
- Quick and easy front panel input scaling
- Field interchangeable outputs provide flexibility and minimize downtime
- Up to 3 alarms, fully configurable for High or Low operation as well as for latching output and combinational logic
- 4-20 mA output can be used to retransmit the process value to a strip chart recorder or PLC
- Min & Max Value Capture provides valuable process information
- NEMA 4/IP65 rated front panel for use in washdown environments
- Transmitter power supply simplifies wiring
- Universal AC power supply

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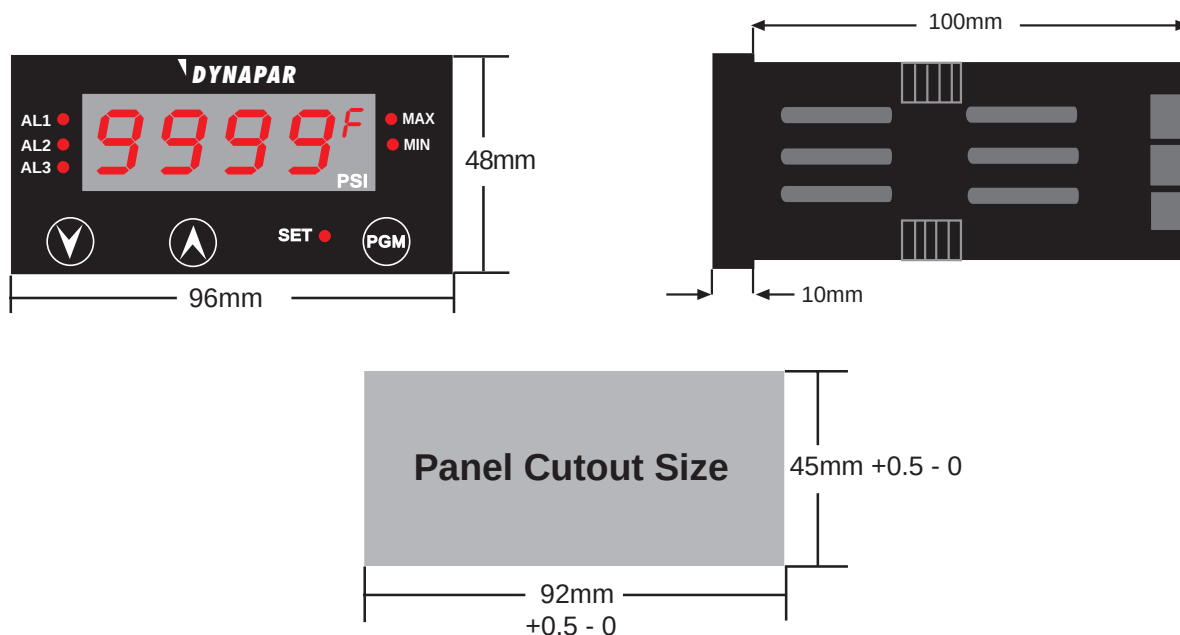
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Technical Manual
#702037-0001

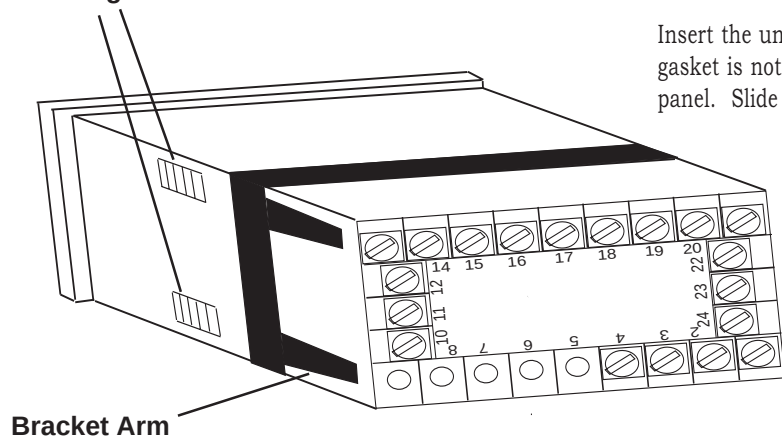
Dynapar brand
S428
Intelligent
Process
Meter

INSTALLATION

PANEL MOUNTING



Mounting Grooves



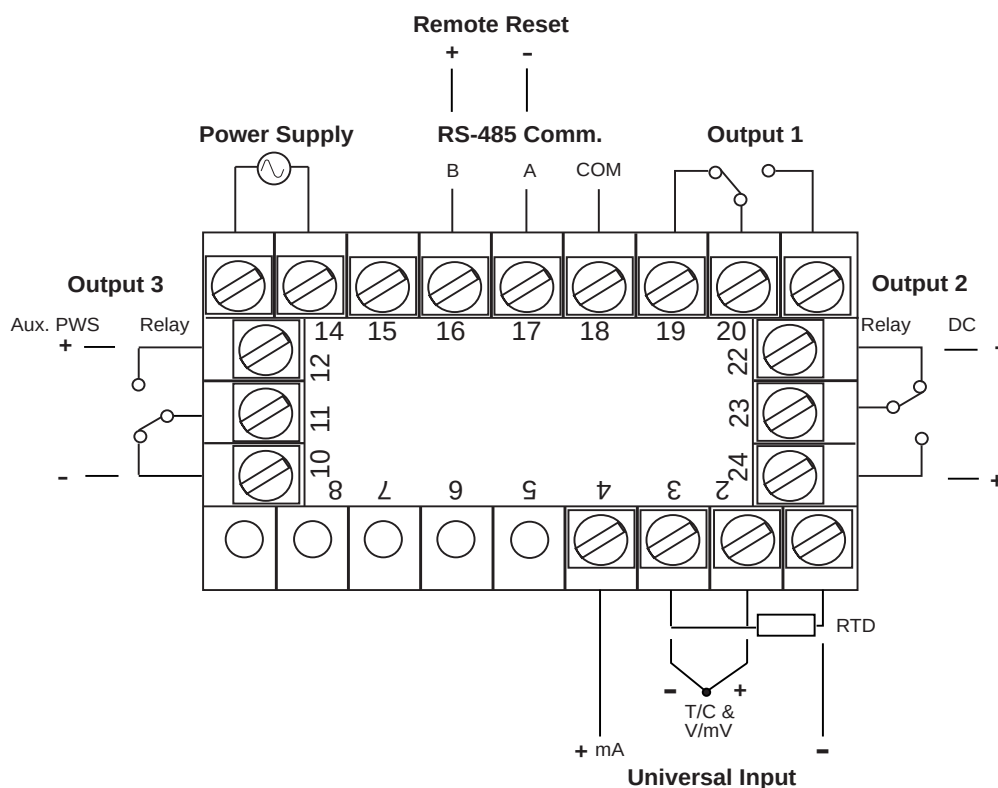
The instrument can be mounted in a panel with a thickness of up to 6mm. The cutout(s) should be made based on the recommended panel opening illustrated in the drawing above.

Insert the unit in the panel through the cutout. Ensure that the panel gasket is not distorted and instrument is positioned squarely against the panel. Slide the mounting clamp into place on the instrument, as shown below, and push it forward until it is firmly in contact with the rear face of the mounting panel, and the tabs on the bracket arm are seated in the mounting grooves on the side of the unit.

The electronic components of the instrument can be removed from the housing after installation without disconnecting the wiring. To remove the components, grip the side edges of the panel and pull the instrument forward. Take note of orientation of the unit for subsequent replacement in the housing

REAR TERMINAL CONNECTIONS

Due to the flexible plug in board configuration of the S428, the function of many of the terminals will vary based upon the type of board installed in the unit.



Thermocouple Input: Connect the positive lead to terminal 2 and the negative lead to terminal 3

RTD Input: For a 3 wire RTD the resistive (A) leg should be connected to terminal 1 and the common B legs to terminals 2 and 3. If a 2 wire RTD is used it is necessary to jumper terminals 2 and 3.

Voltage, MV Input: Connect the positive lead to terminal 2 and the negative lead to terminal 3.

Milliamp (mA) Input: Connect the positive lead to terminal 4 and the negative lead to terminal 1.

Relay Output 1: The instrument has a relay standard for output 1. Terminal 19 is NC, Terminal 20 is common and terminal 21 is NO

Relay Output 2: A relay can be installed as Output 2. Terminal 22 is NC, terminal 23 is common and terminal 24 is NO.

Relay Output 3: A relay can be installed as Output 3. Terminal 10 is NC, terminal 11 is common and terminal 12 is NO.

Linear Output: A linear output which can be used to retransmit the process value can be installed as output 2. The output has a default range of 4 - 20 mA but can be configured for 0 - 20 mA 0 - 5 VDC or 0 - 10 VDC via an on-board jumper. Terminal 22 is the negative side of the connection, and terminal 24 is the positive side.

Transmitter Power Supply: A 20 - 28 VDC power supply for powering external sensors and transmitters can be installed as output 2. Terminal 10 is the negative side of the connection, and terminal 12 is the positive side.

Serial Communication: An RS-485 communication board can be installed in the option slot. The protocol is configurable through the front panel to be an open ASCII format or Modbus. Terminals 16 and 17 serve as the B and A connections respectively, while terminal 18 can be connected as a common.

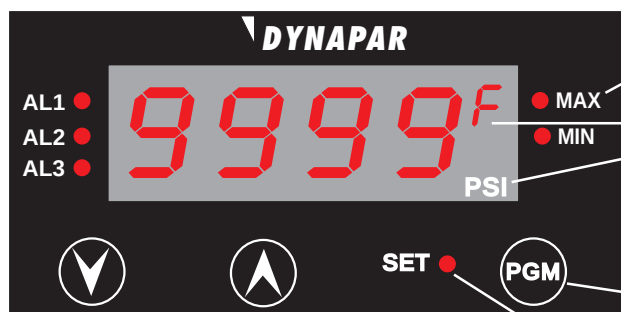
Remote Reset Input: Installed in the option slot (Terminals 16 & 17), is used to reset latched alarms via a contact or NPN input.

Input Power: For an AC powered unit terminal 13 serves as the line input and terminal 14 as neutral. For a DC powered unit, terminal 13 is the negative connection and 14 is the positive.

Terminals 5, 6, 7, 8, 9 & 15 are not used.

OPERATION

FRONT PANEL OPERATION



Up and Down Keys

Used to increment or decrement the value of the displayed parameter. The Up key is also used in conjunction with the Program key to change modes of operation. Holding either key can be used to reset a the Min and Max Values, the Elapsed Alarm Time Value, or a Latched Alarm.

Max & Min Value Indicators

Annunciators illuminate when the respective value is being shown on the display

Display Units Indication

When the unit is being used to measure temperature the selected scale (C or F) will appear on the display. For other units of measure a wide variety of placards are provided which can be affixed to the display.

Program Key

Used in conjunction with the Up key to change modes of operation. Once a mode has been selected, this key is used to move between parameters in that mode.

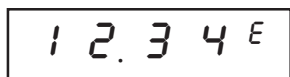
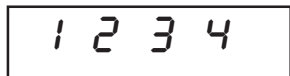
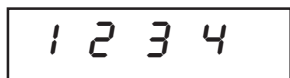
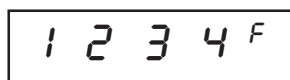
Set Indicator

Blinks to indicate the unit is in Configuration Mode, and is steady On for Set up Mode.

OPERATION MODE

The Operation Mode is used for normal day-to-day operation of the unit once it has been programmed and configured as required.

The actual values accessible in this mode can be altered via the Operation Mode Display parameter in Set-up Mode.



Process Value Display

The current process value is displayed. For temperature inputs, a legend for Fahrenheit or Celsius legend is also shown.

Maximum Value Display

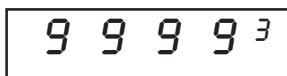
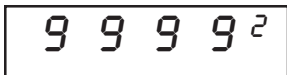
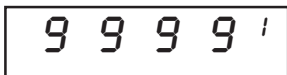
Displays the maximum process value the unit has received as an input. This value can be reset by pressing the Up or Down key for 3 second while this value is being displayed. The "MAX" annunciator illuminates when this value is being displayed.

Minimum Value Display

Displays the minimum process value the unit has received as an input. This value can be reset by pressing the Up or Down key for 3 second while this value is being displayed. The "MIN" annunciator illuminates when this value is being displayed.

Alarm 1 Elapsed Time

Displays the accumulated amount of time the alarm 1 condition was present. This value will continue to accumulate for every occurrence of alarm 1 until it is reset by pressing the Up or Down key for 3 seconds while the value is being displayed. The value is displayed in mm.ss up to 99 minutes 59 seconds, then changes over to mmm.m. Time does not accumulate for a latched output when the alarm condition is no longer present.



Alarm 1 Value

Defines the process value at or above which alarm 1 will be active if set to a Process High Alarm in Configuration Mode, or the process value at or below which alarm 1 will be active if set to Process Low Alarm in Configuration Mode. The default value will either be the input range minimum or maximum depending upon whether the Process Low or Process High Alarm was selected. The units display will show "1" if multiple outputs are installed or "A" if only one alarm output is installed.

Alarm 2 Value

Defines the process value at or above which alarm 2 will be active if set to a Process High Alarm in Configuration Mode, or the process value at or below which alarm 2 will be active if set to Process Low Alarm in Configuration Mode. The default value will either be the input range minimum or maximum depending upon whether the Process Low or Process High Alarm was selected.

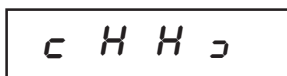
Note: This parameter will not appear if "None" is selected for Alarm 2 Type in Configuration Mode

Alarm 3 Value

Defines the process value at or above which alarm 3 will be active if set to a Process High Alarm in Configuration Mode, or the process value at or below which alarm 3 will be active if set to Process Low Alarm in Configuration Mode. The default value will either be the input range minimum or maximum depending upon whether the Process Low or Process High Alarm was selected.

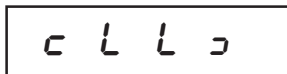
Note: This parameter will not appear if "None" is selected for Alarm 2 Type in Configuration Mode

Other Operating Displays



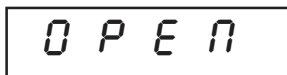
Over Range Display

If the process value becomes higher than the input full scale value, the display will appear as at the left.



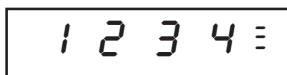
Under Range Display

If the process value becomes lower than the input minimum scale value, the display will appear as at the left.



Sensor Break Display

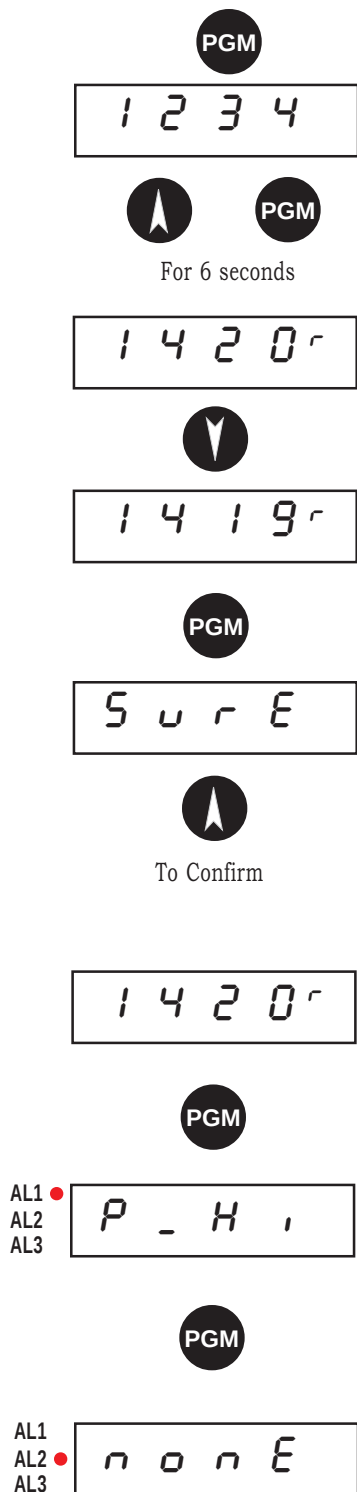
If the instrument does not receive an input signal for 2 seconds a sensor break will be indicated as at the left. For a temperature input the alarms will act as if the process value has gone upscale. For a 4 - 20 mA, 1 - 5 V and 2 - 10 volt input the alarms will act as if the process value has gone downscale.



Cold Junction Compensation Disabled

If the cold junction compensation has been turned Off in the Set-up Mode, the symbol at the left will appear in the units display when the process variable is being viewed.

CONFIGURATION MODE



Basic Operation

To access the Configuration Mode, simultaneously hold down the Program and Up keys. After 3 seconds the unit will first enter the Set Up Mode. Continue to hold down the keys for an additional 3 seconds. The Set light will blink to indicate the unit is in Configuration Mode. This procedure must be done from the Operating Mode with the Process Value being displayed and **must be within 10 minutes of power-up**.

The Program key is used to move from one parameter to the next, while the up and Down keys are used to change the setting. Once a change has been made to a parameter, pressing the Program key will bring up SurE? on the display. Pressing the Up key will confirm the change and move you to the next parameter. Hitting any other key will eliminate the change and return the display to that parameter. To return to the Operation mode press the Program and Up keys simultaneously.

Input Select

Used to determine the input type and range. A full list of codes can be found in Appendix D. Default is dependent on Model # ordered.

Alarm 1 Type

Sets the action of the alarm to one of the following choices: (Default is Process High)

Process High (P_Hi) - Alarm is activated if the Process Value exceeds the value set for Alarm 1

Process Low (P_Lo) - Alarm is activated if the Process Value falls below the value set for Alarm 1

Alarm 2 Type

Sets the action of the alarm to one of the following choices: (Default is none):

None (nonE)

Process High (P_Hi) - Alarm is activated if the Process Value exceeds the value set for Alarm 2

Process Low (P_Lo) - Alarm is activated if the Process Value falls below the value set for Alarm 2

AL1
AL2
AL3 ●

n o n E

PGM

A 1 n d 1

PGM

A 2 - d 2

PGM

A 3 - d 3

Alarm 3 Type

Sets the action of the alarm to one of the following choices: (Default is none):

None (nonE)

Process High (P_Hi) - Alarm is activated if the Process Value exceeds the value set for Alarm 3

Process Low (P_Lo) - Alarm is activated if the Process Value falls below the value set for Alarm 3

Output 1 Use

Determines how the relay output in slot 1 is utilized. Choices are :

Alarm 1, Non Latching Direct Acting (A1nd) - Output is ON when alarm 1 is active

Alarm 1, Non Latching Reverse Acting (A1nr) - Output is ON when alarm 1 is inactive

Alarm 1, Latching Direct Acting (A1Ld) - Output is ON and latched when alarm 3 is active

Alarm 1, Latching Reverse Acting (A1Lr) - Output is ON and latched when alarm 3 is inactive

Logical OR of Alarm 1 & 2, Direct Acting (O12d) - Output is ON when a logical OR condition between Alarm 1 and Alarm 2 is present

Logical OR of Alarm 1 & 2, Reverse Acting (O12r) - Output is ON when a logical OR condition between Alarm 1 and Alarm 2 is not present

Output 2 Use

Determines how output slot 2 is utilized. When a relay is installed this parameter sets how output 2 will operate in relation to the alarm status. Choices are :

Alarm 2, Direct Acting (A2_d) - Output is ON when alarm 2 is active

Alarm 2, Reverse Acting (A2_r) - Output is ON when alarm 2 is inactive

Alarm 3, Direct Acting (A3_d) - Output is ON when alarm 3 is active

Alarm 3, Reverse Acting (A3_r) - Output is ON when alarm 3 is inactive

Logical OR of Alarm 1 & 2, Direct Acting (O12d) - Output is ON when a logical OR condition between Alarm 1 and Alarm 2 is present

Logical OR of Alarm 1 & 2, Reverse Acting (O12r) - Output is ON when a logical OR condition between Alarm 1 and Alarm 2 is not present

Logical OR of Alarm 1 & 3, Direct Acting (O13d) - Output is ON when a logical OR condition between Alarm 1 and Alarm 3 is present

Logical OR of Alarm 1 & 3, Reverse Acting (O13r) - Output is ON when a logical OR condition between Alarm 1 and Alarm 3 is not present

Logical OR of Alarm 1 & 2, Direct Acting (O23d) - Output is ON when a logical OR condition between Alarm 2 and Alarm 3 is present

Logical OR of Alarm 1 & 3, Reverse Acting (O23r) - Output is ON when a logical OR condition between Alarm 2 and Alarm 3 is not present

Recorder Output (rEcP): Used when output 2 is configured with a DC retransmission output

Output 3 Use

Determines how output slot 3 is utilized. When a relay is installed this parameter sets how output 3 will operate in relation to the alarm status. Choices when a relay output is installed are the same as for Output 2. When a transmitter power supply is installed, this parameter should be set to **tPSU**.

4 8 0 0 ^b

PGM

1 ^a

PGM

U J E S ^P

PGM

E n A b ^J

Communications Baud Rate

Sets the communication speed with the host device. Choices are 1200, 2400, 4800, 9600

Note: This parameter will only appear if the RS-485 board is installed in the option slot

Comm. Address

Establishes a unit number from 1-32 for use in multi-drop communication. Default is 1.

Note: The above parameter will only appear if the RS-485 board is installed in the option slot.

Communication Protocol

Sets the protocol for use in communicating with the host device. Choices are:

ASCII (WES): Open ASCII format

Modbus, odd parity (Mbo)

Modbus, even parity (MbE)

Modbus, no parity (Mbn)

Note: The above parameter will only appear if the RS-485 board is installed in the option slot.

Cold Junction Compensation

Turns On (EnAb) and Off (DiSA) the instruments cold junction compensation.

SET UP MODE

1 2 3 4



PGM

For 3 seconds

PGM

9 9 9 9 ⁱ

PGM

Basic Operation

To access the Set Up Mode, simultaneously hold down the Program and Up keys for 3 seconds. The Set light will illuminate to indicate the unit is in Set Up Mode.

Press the Program key to call up the first parameter. Use the up and Down keys to change the parameter's value. Each additional press of the Program key steps to the next parameter. To return to the Operation mode press the Program and Up keys simultaneously. The unit will automatically return to Operation Mode if there is no key activity for 1 minute.

Alarm 1 Value

Defines the process value at or above which alarm 1 will be active if set to a Process High Alarm in the Configuration Mode, or the process value at or below which alarm 1 will be active if set to Process Low Alarm in Configuration Mode. The default value will either be the input range minimum or maximum depending upon whether the Process Low or Process High Alarm was selected. The units display will show "1" if multiple outputs are installed or "A" if only one alarm output is installed.

1 -

PGM

9 9 9 9 2

PGM

Alarm 1 Hysteresis Value

Sets a deadband between the point the alarm activates and deactivates. Default is 1 Least Significant digit, and is settable up to 10% of the Span of the displayed units.

Alarm 2 Value

Defines the process value at or above which alarm 2 will be active if set to a Process High Alarm in Configuration Mode, or the process value at or below which alarm 2 will be active if set to Process Low Alarm in Configuration Mode. The default value will either be the input range minimum or maximum depending upon whether the Process Low or Process High Alarm was selected.

Note: This parameter will not appear if "None" is selected for Alarm 2 Type in Configuration Mode

1 =

PGM

9 9 9 9 3

PGM

Alarm 2 Hysteresis Value

Sets a deadband between the point the alarm activates and deactivates. Default is 1 Least Significant digit, and is settable up to 10% of the Span of the displayed units.

Alarm 3 Value

Defines the process value at or above which alarm 3 will be active, if set to a Process High Alarm in Configuration Mode, or the process value at or below which alarm 3 will be active, if set to Process Low Alarm in Configuration Mode. The default value will either be the input range minimum or maximum depending upon whether the Process Low or Process High Alarm was selected.

Note: This parameter will not appear if "None" is selected for Alarm 3 Type in Configuration Mode

1 =

PGM

Alarm 3 Hysteresis Value

Sets a deadband between the point the alarm activates and deactivates. Default is 1 Least Significant digit, and is settable up to 10% of the Span of the displayed units.

0 0

PGM

Process Variable Offset

This parameter is used to correct a known offset of the input in order to more accurately display the Process Value. The input correction factor is adjustable within the selected full scale range of the controller. Default value is 0.

2.0 t

PGM

Input Filter

The input may be filtered over a user definable time period in order to minimize the effect on the Process Value of any extraneous impulses. The time period can be set from 0.0 (Off) to 100.0 secs. in 0.5 sec. increments. Default is 2.0 secs.

1 P

PGM

0 L

PGM

1 0 0 0 h

PGM

0 d

PGM

9 9 9 9 u

0 5

Decimal Position

Defines the number of digits that will be displayed right of the decimal point for the process and alarm values. Settable in a range from 0 to 3. Default is 1 (XXX.X).

Engineering Units Low Scale Value

Creates the lower end of a linear scale used to convert the input signal to meaningful engineering units which will be displayed as the Process Value. The value set in this parameter will be equal to the minimum input signal; for example, with a 4-20 mA input this would be the value corresponding to 4 mA. Adjustable in a range from -1999 to 9999. Default is 0.

Engineering Units High Scale Value

Creates the upper end of a linear scale used to convert the input signal to meaningful engineering units which will be displayed as the Process Value. The value set in this parameter will be equal to the maximum input signal; for example, with a 4-20 mA input this would be the value corresponding to 20 mA. Adjustable in a range from -1999 to 9999. Setting this parameter to a value less than, but not equal to, the Engineering Units Lower Value will create an inverse relationship between the input and the Process Value. Default is 1000.

Note: The Decimal Position, Engineering Units Low and High Scale Value parameters will only appear if the unit has been configured for a process input.

Retransmission Output Low Scale Value

This parameter creates the lower end of the linear scale for the retransmission output by defining the value equated to the minimum output signal; for a 4-20 mA output, this would be the value corresponding to 4 mA. Adjustable in a range from -1999 to 9999. Default is Input minimum.

Retransmission Output High Scale Value

This parameter creates the upper end of the linear scale for the retransmission output by defining the value equated to the maximum output signal; for a 4-20 mA output, this would be the value corresponding to 20 mA. Adjustable in a range from -1999 to 9999. Setting this parameter to a value less than the Retransmission Output Low Scale Value will create an inverse relationship between the retransmitted variable and the output signal. Default value is Input maximum.

Operation Mode Display

Defines which parameters are accessible in Operation Mode. The Choices are:

0	1	2	3	4
Process Value	Process Value	Process Value	Process Value	Process Value
Max. PV	Max. PV	Alarm 1 Value	Max. PV	Max. PV
Min. PV	Min. PV	Alarm 2 Value	Min. PV	Min. PV
Elapsed Time		Alarm 3 Value	Alarm 1 Value	Elapsed Time
			Alarm 2 Value*	Alarm 1 Value
			Alarm 3 Value*	Alarm 2 Value*
				Alarm 3 Value*

SPECIFICATIONS

Inputs

Sample Rate:	250 ms
Resolution:	14 bits approximately
Impedance:	Greater than 100Mohm resistive (except for DC mA and V inputs)
Isolation:	Input isolated from all outputs at 240 VAC
Filter:	Time Constant (0.5 to 100 seconds in 0.5 second increments)

Thermocouple

Types:	R, S, J, K, L, T, B and N
Calibration:	Complies w/BS4937, NBS125, and IEC584
Accuracy:	$\pm 0.25\%$ of Full Scale ± 1 LSD
Sensor Break:	Detected within 2 seconds.

RTD and DC mV

Type:	Three-wire Pt100
Calibration:	Complies w/BS1904 and DIN 43760
Accuracy:	$\pm 0.25\%$ of Full Scale ± 1 LSD
Lead Compensation:	Automatic
Sensor Current:	150 μ A
Sensor Break:	Detected within 2 seconds

DC mA and DC V

Types:	0-20 mA, 4-20 mA, 0-5V, 1-5V, 0-10V, 2-10V
Scale Range Max:	-1999 to 9999
Scale Range Min:	-1999 to 9999
Minimum Span:	1 display LSD
Accuracy:	$\pm 0.05\%$ of Full Scale ± 1 LSD
Sensor Break:	Detected within 2 seconds (Applies only to 4-20 mA, 1-5V and 2-10V inputs)

Remote Reset Input

Type:	Contact Closure, NPN, TTL
Max. Delay:	1 second

Outputs

Relay

Contact Type:	SPDT (Form C)
Rating:	2A resistive at 120/240 VAC
Service Life:	> 500,000 operations at rated specs
Isolation:	Inherent

DC

Ranges:	0-20mA, 4-20mA, 0-10V and 0-5V
Load Impedance:	500 Ω max, mA inputs; 500 Ω min, V inputs
Resolution:	Eight bits in 250ms,
Update Rate:	250 ms
Isolation:	Isolated from all inputs and outputs

Transmitter Power Supply

Voltage:	20 - 28 VDC, 24 VDC nominal
Min. Impedance:	910 Ω (22mA @ 20 VDC)

Electrical

Supply Voltage:	90 - 264 VAC, 50/60 Hz
Power Consumption:	4 Watts
Common Mode Rejection:	120 dB at 50/60 Hz
Series Mode Rejection:	>500% of span at 50/60 Hz
Source Resistance:	<10 Ohm for T/C input
Lead Resistance:	<0.1 Ohm/lead balanced (Pt100)

Display

Type:	Red or Green, 7 segment LED
Height:	0.56"
Number:	4 digits and 6 annunciators

Physical:

Dimensions:	48mm x 96mm, 110mm deep
Mounting:	Panel mount (mounting bracket supplied) 45mm x 92mm cutout
Terminals:	Screw Type - combination head
Front Panel Rating:	NEMA 4/IEC IP65
Weight:	16.1 Oz. (480 grams)

Environmental:

Operating Temperature:	0° to 55° Celsius, 32° to 131° Fahrenheit
Storage Temperature:	-20° to 80° Celsius, -4° to 176° Fahrenheit
Relative Humidity:	20% to 95% non-condensing

Communication:

Type:	Serial asynchronous, UART to UART
Data Format:	Open ASCII: One start bit, even parity seven data bits, one stop bit Modbus: as above with odd, even or no parity
Physical Layer:	RS-485
Maximum Address:	32 (1 - 32)
Baud Rate:	Selectable from 9600, 4800, 2400 or 1200

ALARM OPERATION

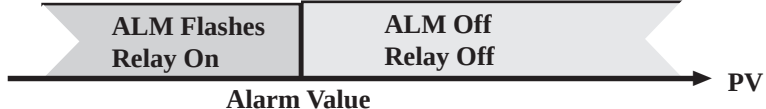
Process High Alarm
Direct-Acting



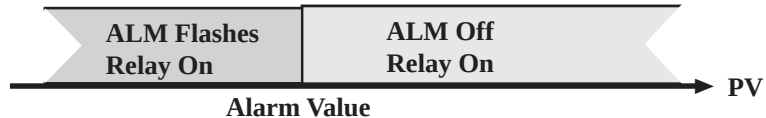
Process High Alarm
Reverse Acting



Process Low Alarm
Direct Acting

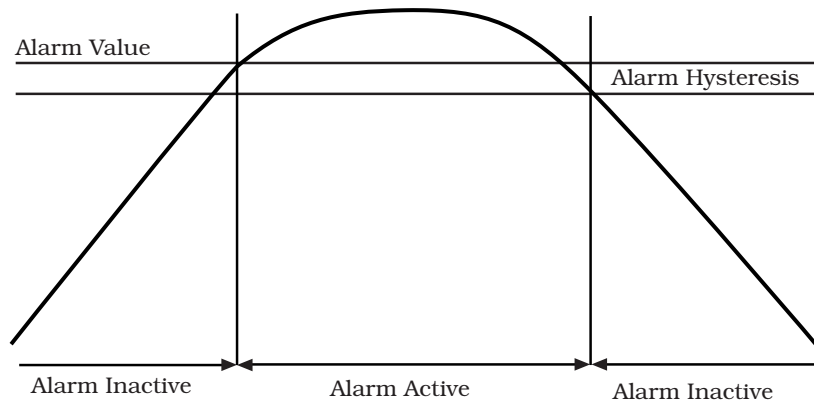


Process Low Alarm
Reverse Acting

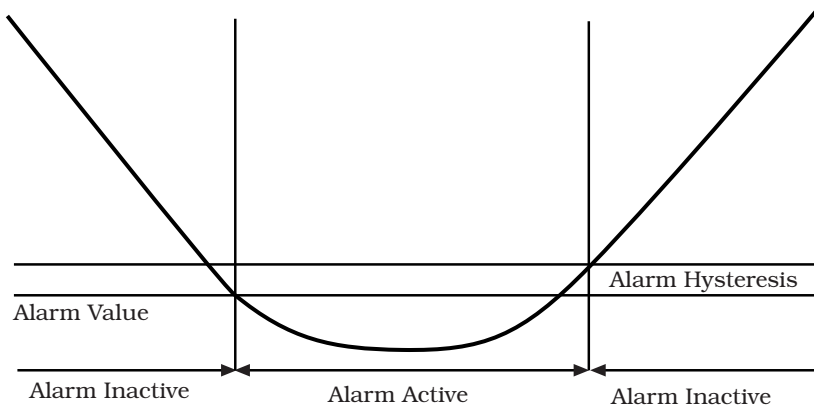


Alarm Hysteresis Operation

Process High Alarm

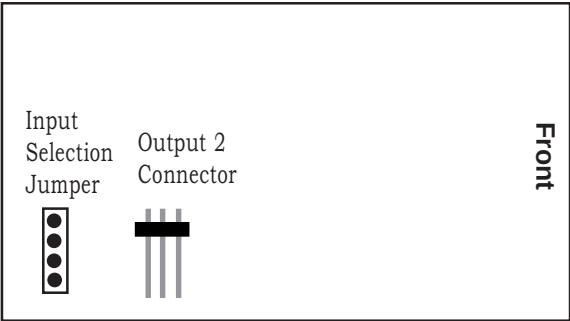


Process Low Alarm

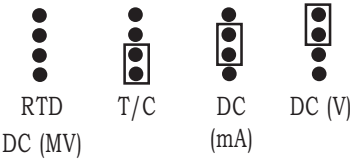
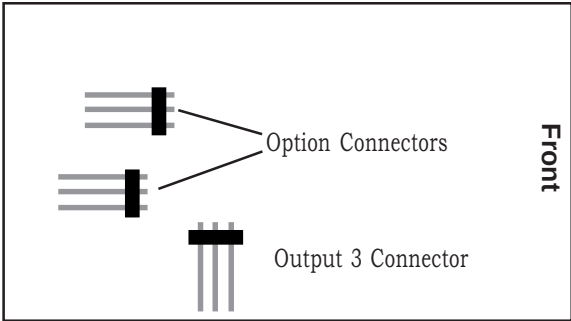


INTERNAL LINKS AND SWITCHES

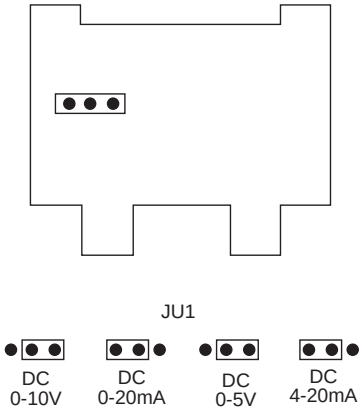
CPU (Upper) Board



Power Supply (Lower) Board

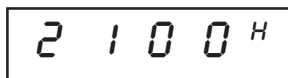


Option PWA DC Output 2



HARDWARE DEFINITION CODE

The Hardware Definition Code is used to represent the hardware installed (Input type, Output 1 type, Output 2 type and Output 3 type); this must be compatible with the hardware actually installed. It can be accessed, with the instrument in Configuration mode, by simultaneously depressing the Down and Program keys.



the first (left-most) digit is input type:

- 1 = RTD/Linear mV
- 2 = Thermocouple
- 3 = Linear DC mA
- 4 = Linear DC V

the second digit is Output 1 type:

- 1 = Relay

the third digit is Output 2 type:

- 0 = Output 2 not installed
- 1 = Relay
- 3=DC 0-10V
- 4=DC 0-20mA
- 5=DC 0-5V
- 7=DC 4-20mA

the forth digit is Output 3 type:

- 0 = Not Fitted
- 1 = Relay
- 8 = Transmitter PWS

Use the Up and Down keys to change the code. Once a change has been made to a parameter, pressing the Program key will bring up SurE? on the display. Pressing the Up key will confirm the change and move you to the next parameter. Hitting any other key will eliminate the change and return the display to that parameter. Press the Program and Down keys simultaneously to return to Configuration Mode.

The Hardware Definition Code can also be accessed in Setup Mode in the same manner. However, in Setup Mode, this is a read only parameter that can not be altered.

Note: If a change is made to the unit's hardware configuration in the field, it is essential to change the Hardware Definition code to match the new configuration in order to guarantee proper operation.

APPENDIX D

INPUT RANGE CODES

For Thermocouple Inputs

Type	Input Range	Displayed Code	Type	Input Range	Displayed Code
R	0 - 1650°C	1127	K	0 - 760°C	1719
R	32 - 3002°F	1128	K	32 - 1400°F	1720
S	0 - 1649°C	1227	K	0 - 1373°C	1723
S	32 - 3000°F	1228	K	32 - 2503°F	1724
J	0.0 - 205.4°C	1415	L	0.0 - 205.7°C	1815
J	32.0 - 401.7°F	1416	L	32.0 - 402.3°F	1816
J	0 - 450°C	1417	L	0 - 450°C	1817
J	32 - 842°F	1418	L	32 - 842°F	1818
J	0 - 761°C	1419	L	0 - 762°C	1819
J	32 - 1402°F	1420	L	32 - 1404°F	1820
T	-200 - 262°C	1525	B	212 - 3315°C	1934
T	-328 - 504°F	1526	B	100 - 1824°C	1938
T	0.0 - 260.6°C	1541	N	0 - 1399°C	5371
T	32.0 - 501.1°F	1542	N	32 - 2550°F	5324

For RTD Inputs

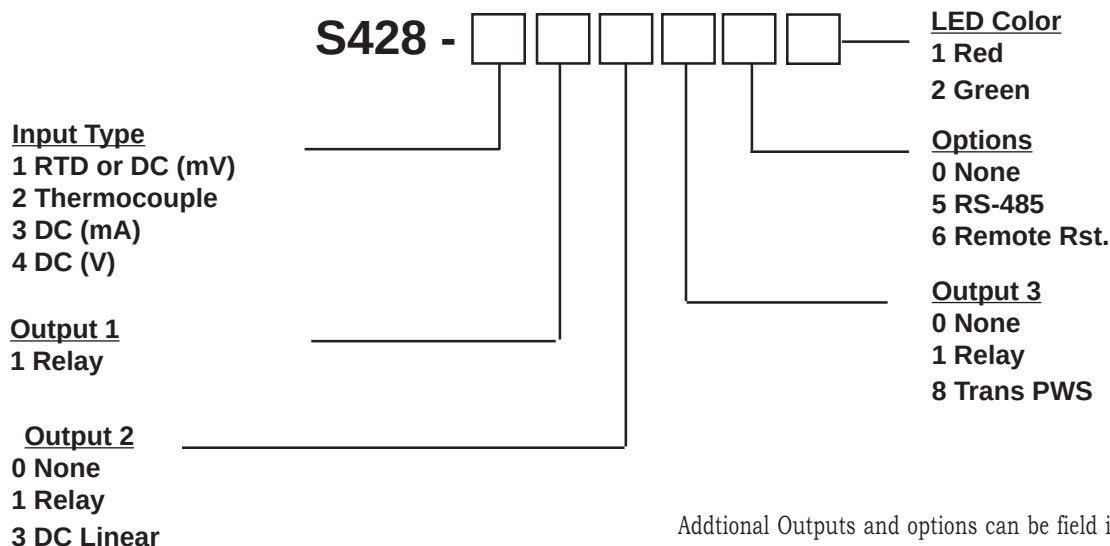
Input Range	Displayed Code	Input Range	Displayed Code
0 - 600°C	2221	0.0 - 100.9°C	2295
32 - 1112°F	2222	32.0 - 213.6°F	2296
32 - 575°F	2229	-200 - 206°C	2297
-101.0 - 100.0°C	2230	-328 - 403°F	2298
-149.8 - 212.0°F	2231	-101.0 - 300.5°C	7201
0 - 300°C	2251	-149.8 - 572.9°F	7202

For DC Inputs

Input Range	Displayed Code	Input Range	Displayed Code
0 - 20 mA	3413	0 - 5 V	4445
4 - 20 mA	3414	1 - 5 V	4434
0 - 50 mV	4443	0 - 10 V	4446
10 - 50 mV	3399	2 - 10 V	4450

Note: When changing between Thermocouple, RTD and DC Input Ranges it is necessary to move input condition jumper (Appendix B) and change the Hardware Definition Code (Appendix C).

ORDERING INFORMATION



Additional Outputs and options can be field installed through plug-in boards which can be ordered separately.

Description	Part #
Relay Board	T50-001
DC Linear Board	T50-003
RS-485 Comm. Board	T50-005
Remote Reset Board	T50-006
Transmitter PWS	T50-008

WARRANTY

Standard S428 products manufactured by the Company are warranted to be free from defects in workmanship and material for a period of three years from the date of shipment, and products which are defective in workmanship or material will be repaired or replaced, at the option of the Company, at no charge to the Buyer. Final determination as to whether a product is actually defective rests with the Company. The obligation of the Company hereunder shall be limited solely to repair and replacement of products that fall within the foregoing limitations, and shall be conditioned upon receipt by the Company of written notice of any alleged defects or deficiency promptly after discovery within the warranty period, and in the case of components or units purchased by the Company, the obligation of the Company shall not exceed the settlement that the Company is able to obtain from the supplier thereof. No products shall be returned to the Company without its prior consent. Products which

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