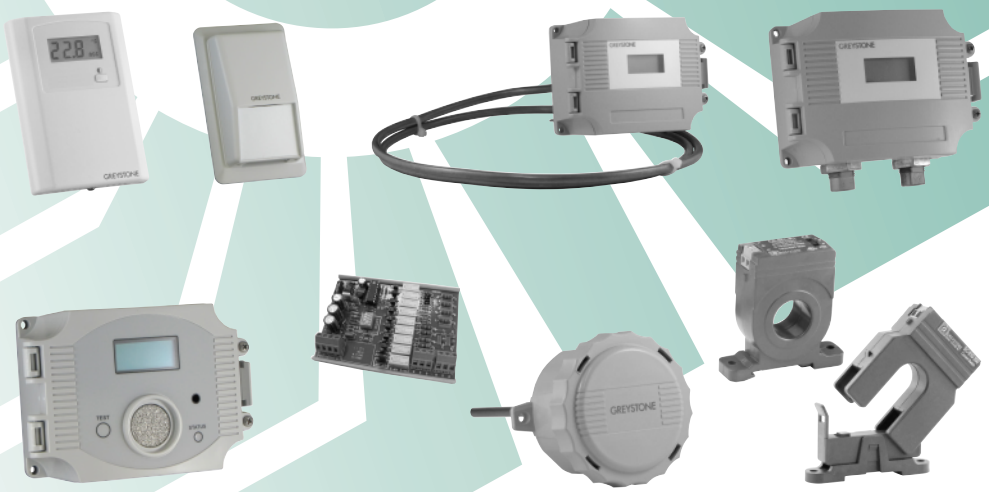
GREYSTONE
ENERGY SYSTEMS INC

Greystone Accuracy by Design Products for the HVAC Professional



Greystone Energy Systems Inc., is one of North America's largest ISO registered manufacturers of HVAC sensors and transducers for Building Automation Management Systems.

We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

- Temperature Sensors
- Temperature Transmitters
- Humidity Transmitters
- Gauge Pressure Transmitters
- Differential Pressure Transmitters
- Static Pressure Transmitters
- Air Flow Transmitters
- Current Switches & Sensors
- Analog to Pneumatic (I/P) Transducers
- Signal Conditioning Transmitters
- Proportional Resistive Output Boards
- Pulse Width Modulated Boards
- Power Supplies
- Air Quality Monitor
- Carbon Dioxide Detectors
- Carbon Monoxide Detectors

Peace of mind through reliable sensors

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

GREYSTONE ENERGY SYSTEMS INC

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GREYSTONE ENERGY SYSTEMS INC

ROOM TEMPERATURE SENSORS
TSRC Series

Precision temperature control/sensing

FEATURES:

- Thermistor or Precision RTD sensing elements
- Optional LCD display
- Various options: Setpoint Adjustment, Override, etc.
- Custom laser etching available

Peace of mind through reliable temperature monitoring

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TSRC SERIES - ROOM TEMPERATURE SENSOR:

DESCRIPTION:

The TSRC series of room temperature sensors incorporates a precision platinum or nickel RTD or NTC thermistor in an attractive wall mount enclosure. The universal back plate can be mounted directly to several electrical box styles or directly on any wall.

The TSRC has various options available such as setpoint adjustment, manual override, LCD display, etc. that allows for use in a multitude of applications.

SPECIFICATIONS:

Sensor	Several available - See Ordering Information
Sensor Accuracy	Thermistors: ±0.2˚C (±0.36˚F) @ 25˚C (77˚F) Platinum RTD's: ±0.3˚C (±0.54˚F) @ 0˚C (32˚F) Nickel RTD's: ±0.4˚C (±0.72˚F) @ 0˚C (32˚F)
Operating Temperature	0 - 50˚C (32 - 122˚F), 0 - 95%RH non-condensing
Enclosure	White ABS - IP30 (NEMA 1) 84mmW x 117mmH x 29mmD (3.3" x 4.6" x 1.15")
Wiring Connections	Sensor only - Pigtail, 2 or 3 wire With Options - Screw terminal block (14 to 22 AWG)

OPTIONS:

Setpoint Adjustment

Type	Front panel slidepot, 2 wire resistance output
Range	0K to 10K Ω standard
Custom spans available	1K, 2K, 5K, 10K or 20K Ω

Manual Override

Type	Front panel, momentary pushbutton
Ratings	50 mA @12 Vdc, N.O., SPST

Temperature Display

Power Supply	12-24 Vdc/24 Vac ±10%
Consumption @ 24 Vdc	13 mA w/o backlight, 23 mA w/ backlight
Protection	Reverse voltage protected
Display Range	0 – 35˚ C/32 – 95˚ F (Jumper selectable)
Display Resolution	0.1˚ C/F
Display Size	38.1 mm W x 16.5 mm H (1.5" x 0.65")
Digit Height	11.43 mm (0.45")
Symbols	˚C, ˚F, OCC
Backlight	Encable or disable via jumper

Occupied Input (Requires LCD)

Signal Type	Digital input, 0/5 Vdc standard, active low
Action	Causes "OCC" segment to light on LCD

Status LED Input (N/A when LCD selected)

Signal Type	Active high, low or 2-wire, 5 V current limited standard
LED Colors	Yellow (Y), Red (R) or Green (G),
Power Supply	5 Vdc standard, 10 or 24 Vdc optional

Communication Jacks

Molex	4 Pin header to 4 pin terminal block. Requires HHTA - Hand Held Adapter

Fan Speed Switch

Type	Side mounted, 5 position slide switch
Designators	Off, Auto, Low, Medium, High
Signal	2 wire, resistance output - 0, 2, 4, 6, 8 KΩ Custom ranges available, contact Greystone

TSRC - ROOM TEMPERATURE SENSOR:

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
TSRC	Room Temperature Sensor

CODE	Sensor
2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
5	1801 Ω, NTC Thermistor, ±0.2 C
6	3000 Ω, NTC Thermistor, ±0.2 C
7	10,000 Ω, type 3, NTC Thermistor, ±0.2 C
8	2.252K Ω, NTC Thermistor, ±0.2 C
12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
13	1000 Ω Nickel, Class B, DIN 43760
14	10,000 Ω, type 3, NTC Thermistor, ±0.2 C c/w 11K shunt resistor
20	20,000 Ω, NTC Thermistor, ±0.2 C
24	10,000 Ω, type 2, NTC Thermistor, ±0.2 C

CODE	Options (Multiple selections can be made)
P	0-10K linear slide pot for set point control (Other ranges available, contact Greystone)
S	Front panel push button momentary switch (NO)
C	LCD Display temperature indicator ˚C/˚F (Includes Occupied Input)
Y	Yellow LED (n/a when LCD is selected)
R	Red LED (n/a when LCD is selected)
G	Green LED (n/a when LCD is selected)
E	External jack for remote system access (4-pin header)
F	Fan Speed Switch, 5 position, (Off, Auto, Low, Mid, High)

TSRC	7	P	S

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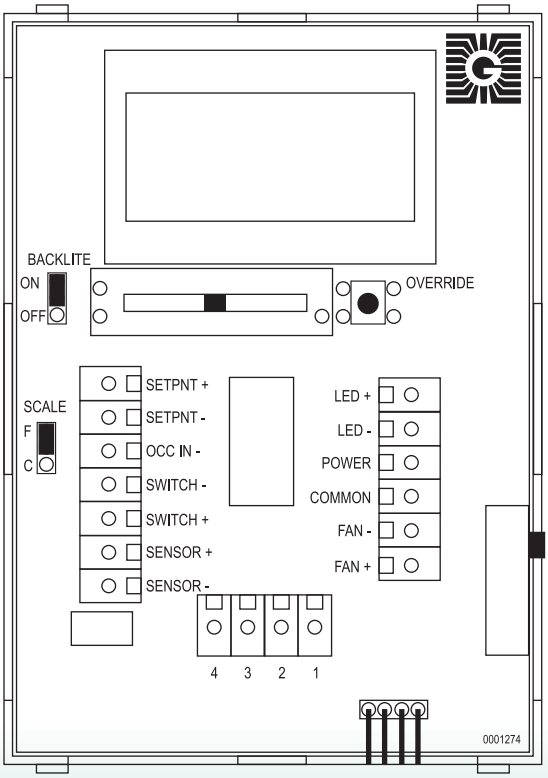
NOTE: Due to the many possible configurations, special part numbers may be required, please contact Greystone for more information.

PCB/WIRING INFORMATION



Terminal	Function
SETPNT +	Resistance Output
SETPNT -	GND or COMMON
OCC IN -	Vdc input (5 Vdc)
SWITCH -	GND or COMMON
SWITCH +	Digital output
SENSOR +	Resistance output
SENSOR -	GND or COMMON
LED +	Vdc input (5 Vdc standard)
LED -	GND or COMMON
POWER	Power input (Only required when LCD is selected)
COMMON	GND or COMMON (Only required when LCD is selected)
FAN -	GND or COMMON
FAN +	Resistance output
1	To External Jack PIN 1 (Farthest right)
2	To External Jack PIN 2
3	To External Jack PIN 3
4	To External Jack PIN 4

* Some models do not have all these features

**To save on number of connection wires, all GND or COMMON may connected together.

***Illustration shows standard wiring configuration. Custom configurations are available. Please contact Greystone.

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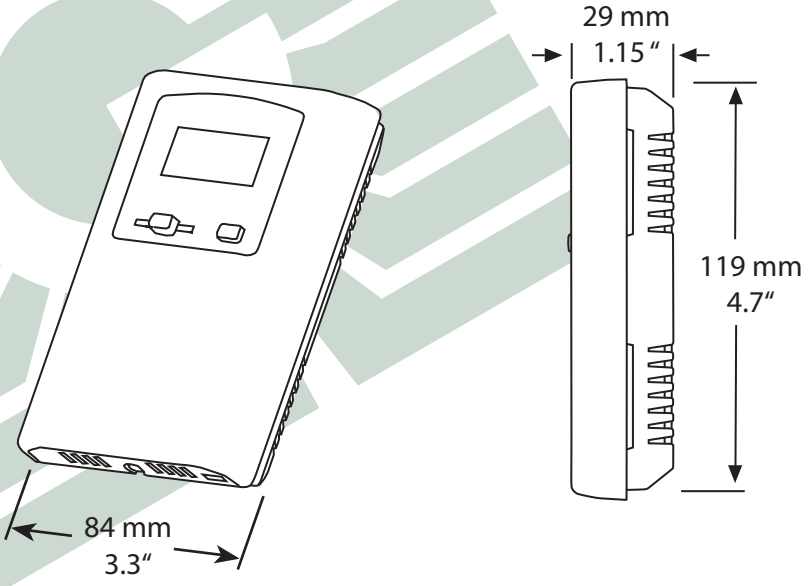
DIMENSIONS:



ACCESSORIES:

HHTA-XXX
The HHTA - Handheld Adapter converts the Greystone standard 4 pin connector to the connector of choice such as a RJ12, phone jack. Several styles and configurations are available. Please contact Greystone.

A35R
A multi-purpose screw driver that includes a standard flat screwdriver and a 1/16" allen key, and can be used on all Greystone wall sensors.

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www.greystoneenergy.com

RoHS COMPLIANT

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GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

V.12/13
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GREYSTONE ENERGY SYSTEMS INC

ROOM TEMPERATURE SENSORS
TSPC Series

Precision temperature control/sensing

FEATURES:

- Precision Thermistor or RTD sensing elements
- LCD Display
- Setpoint Adjustment
- Optional Override, Fan Speed Switch and Communication Jack
- Custom laser etching available

Peace of mind through reliable temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The TSPC room temperature sensor with resistive setpoint control is available in an attractive wall mount enclosure and can be configured with various options. It is available with various curve-matched thermistors or RTD sensors to measure temperature.

A back-lit LCD displays room temperature, setpoint on demand and occupancy. Several operating parameters can be programmed using a keypad and on-board jumpers configure the ˚C/F display or disable the backlight.

Available options include a dry-contact override switch, a five position fan speed switch and a jack for a network connection.

SPECIFICATIONS:

Power Supply	24 Vac/dc ±10% (non-isolated half-wave rectified)
Consumption	20 mA max.
Operating Conditions	0 - 50˚C (32 - 122˚F), 0-95% RH non-condensing
Enclosure	White ABS - IP30 (NEMA 1) 84 w x 119 h x 29 d mm (3.3" x 4.7" x 1.15")
Wiring Connections	Screw terminal block (14 to 22 AWG)

Temperature Sensor

Sensor	Several thermistors or RTD's available - See ordering information
Sensor Accuracy	Thermistors: ±0.2˚C (±0.36˚F) @ 25˚C (77˚F) Platinum RTD's: ±0.3˚C (±0.54˚F) @ 0˚C (32˚F) Nickel RTD's: ±0.4˚C (±0.72˚F) @ 0˚C (32˚F)

Setpoint Adjustment

Type	Up/Down pushbuttons for ± 10 resistive steps
Range	Several resistive ranges available - See ordering information
Midpoint	Programmable, 20-23 ˚C or 68-73 ˚F
LCD Increment	Setpoint step size is 0.5 ˚C or 1.0 ˚F
Action	Programmable, direct or reverse acting

LCD Display

Power Supply	12-24 Vdc/24 Vac ±10%
Consumption @ 24 Vdc	13 mA w/o backlight, 23 mA w/ backlight
Protection	Reverse voltage protected
Display Range	0 – 35˚ C/32 – 95˚ F (Jumper selectable)
Display Resolution	0.1˚ C/F
Display Size	38.1 mm W x 16.5 mm H (1.5" x 0.65")
Digit Height	11.43 mm (0.45")
Symbols	˚C, ˚F, OCC
Backlight	Enable or disable via jumper

Manual Override

Type	Front panel, momentary pushbutton
Ratings	50 mA @12 Vdc, N.O., SPST

Occupied Input

Signal type	Digital input, 0/5 Vdc standard, active low
Action	Causes "OCC" segment to light on LCD

Communication Jacks

Molex	4 Pin header to 4 pin terminal block. Requires HHTA - Hand Held Adapter

Fan Speed Switch

Type	Side mounted, 5 position slide switch
Designators	Off, Auto, Low, Medium, High
Signal	2 wire, resistance output - 0, 2, 4, 6, 8 KΩ Custom ranges available, contact Greystone

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TSPC - ROOM TEMPERATURE SENSOR:

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
TSPC	Room Temperature Sensor w/ Setpoint Adjustment & LCD

CODE	Sensor
2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
5	1801 Ω, NTC Thermistor, ±0.2 C
6	3000 Ω, NTC Thermistor, ±0.2 C
7	10,000 Ω, type 3, NTC Thermistor, ±0.2 C
8	2.252K Ω, NTC Thermistor, ±0.2 C
12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
13	1000 Ω Nickel, Class B, DIN 43760
14	10,000 Ω, type 3, NTC Thermistor, ±0.2 C c/w 11K shunt resistor
20	20,000 Ω, NTC Thermistor, ±0.2 C
24	10,000 Ω, type 2, NTC Thermistor, ±0.2 C

CODE	Resistance Output (Range 16-26˚C in 0.5˚C Increments or 60-80˚F in 1˚F Increments)
P	0 - 10,000 ohms
P1	20,000 - 30,000 ohms
P2	2000 - 3000 ohms
P3	0 - 20,000 ohms
P4	4000 - 2000 ohms
P5	0 - 2000 ohms
P6	8000.7 - 3107.3 ohms

CODE	Options
E	4 Pin molex external jack for communications
S	Exposed override switch with LCD indication option (OCC)
F	5 position fan switch Off/Auto/Low/Med/High

TSPC	7	A	BS	-

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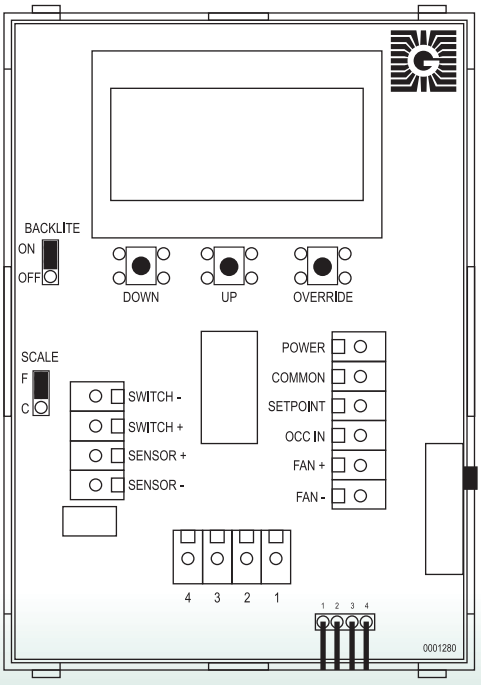
NOTE: Due to the many possible configurations, special part numbers may be required, please contact Greystone for more information.

PCB/WIRING INFORMATION



Terminal	Function
SWITCH -	GND or COMMON
SWITCH +	Digital output
SENSOR +	Resistance output
SENSOR -	GND or COMMON
POWER	Power input
COMMON	GND or COMMON
SETPOINT	Resistance Output
OCC IN	Vdc input (5 Vdc)
FAN +	Resistance output
FAN -	GND or COMMON
1	To External Jack PIN 1
2	To External Jack PIN 2
3	To External Jack PIN 3
4	To External Jack PIN 4

* Some models do not have all these features
**To save on number of connection wires, all GND or COMMON may connected together.
***Illustration shows standard wiring configuration. Custom configurations are available. Please contact Greystone.

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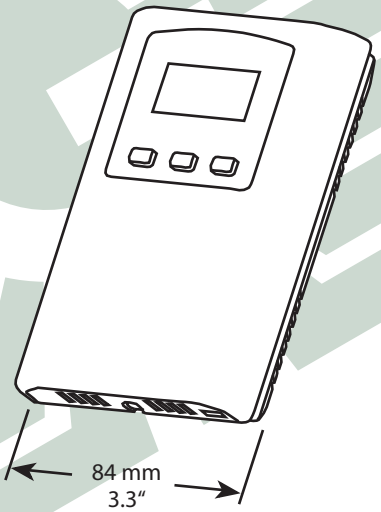
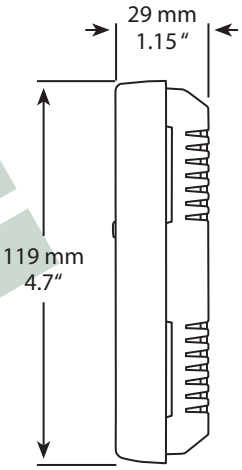
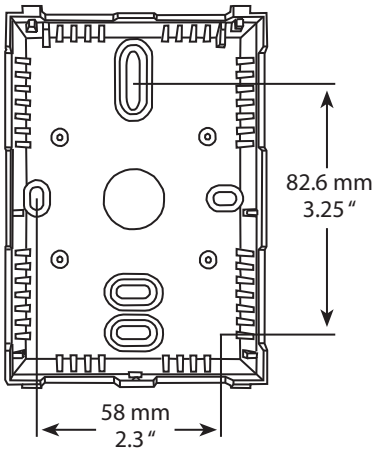
DIMENSIONS:







ACCESSORIES:

HHTA-XXX
The HHTA - Handheld Adapter converts the Greystone standard 4 pin connector to the connector of choice such as a RJ12, phone jack. Several styles and configurations are available. Please contact Greystone.

A35R
A multi-purpose screw driver that includes a standard flat screwdriver and a 1/16” Allen key, and can be used on all Greystone wall sensors.

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GREYSTONE ENERGY SYSTEMS INC

ROOM TEMPERATURE SENSORS
TE200 Series

Precision temperature control/sensing

FEATURES:

- Precision Thermistor or RTD sensing elements
- Various enclosure styles
- Various options: Setpoint Adjustment, Override, etc.
- Custom laser etching available

Peace of mind through reliable temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The TE200 series of room temperature sensors incorporate a precision platinum RTD or NTC thermistor in an attractive wall mount enclosure for the most efficient environmental monitoring and control systems.

The TE200 series is available in three different enclosures and has various options available such as setpoint adjustment, manual override, etc. that allows for use in a multitude of applications.

SPECIFICATIONS:

Sensor	Several available - See Ordering Information
Sensor Accuracy	Thermistors: ±0.2˚C (±0.36˚F) @ 25˚C (77˚F) Platinum RTD's: ±0.3˚C (±0.54˚F) @ 0˚C (32˚F) Nickel RTD's: ±0.4˚C (±0.72˚F) @ 0˚C (32˚F)
Operating Temperature	0 - 50˚C (32 - 122˚F)
Enclosures	A - White ABS - IP20 (NEMA 1) AD - White ABS - IP20 (NEMA 1) AS - Stainless Steel - IP50 (NEMA 1)
Wiring Connections	Sensor only - Pigtail, 2 or 3 wire With Options - Screw terminal block (14 to 22 AWG)

OPTIONS:

Setpoint Adjustment

Standard	20K to 30K Ω linear slidepot
Custom spans available	1K, 2K, 5K, 10K or 20K Ω

Manual Override

Concealed	Momentary pushbutton, N.O., SPST, 50 mA @12 Vdc **AD only**
Exposed	Momentary pushbutton, N.O., SPST, 50 mA @12 Vdc
Grayhill Exposed	Momentary pushbutton, N.O., SPST, 3A @ 115 Vac **AS only**

Status Indicator

LED	Yellow (LY), Red (LR) or Green (LG), Various voltage models available.

Communication Jacks

Phono	3.5 mm phono jack, 3 wire connection (Ring, Tip, Mid)
4 pin	4 Pin header. Requires HHTA - Hand Held Adapter

Miscellaneous

Tamperproof Screws	18-8 SS, Tamper-Resist, Flat Head, Machine Screw, Drilled Spanner, 6-32 Thread, 1" Length **AS Only**

AD) Designer – Features include a two-piece enclosure that mounts directly to a wall box or on any wall. Available with various options, including setpoint adjustments, & push button overrides.

AS) Surface - A stainless steel plate which can be mounted to a wall box used where tamper-proof or protection is required. Available with various options, including push button overrides and or LED's.

A) Micro – Includes a compact snap-mounted cover for ease of installation, available with various temperature sensors.

TE200 - ROOM TEMPERATURE SENSOR:

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
TE200	Temperature Sensor Series

CODE	Enclosure
A	Micro
AD	Designer
AS	S/S plate

CODE	Sensor
2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
5	1801 Ω, NTC Thermistor, ±0.2 C
6	3000 Ω, NTC Thermistor, ±0.2 C
7	10,000 Ω, type 3, NTC Thermistor, ±0.2 C
8	2.252K Ω, NTC Thermistor, ±0.2 C
12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
13	1000 Ω Nickel, Class B, DIN 43760
14	10,000 Ω, type 3, NTC Thermistor, ±0.2 C c/w 11K shunt resistor
20	20,000 Ω, NTC Thermistor, ±0.2 C
24	10,000 Ω, type 2, NTC Thermistor, ±0.2 C

CODE	TE200AD/AS Options (Multiple selections can be made)	Enclosure Availability
AP	20-30K linear slide pot for set point control (call for other values)	AD
AS	Concealed push button momentary switch (N.O.)	AD
BS	Exposed push button momentary switch (NO)	AD
GB	Grayhill exposed pushbutton, (N.O)., SPST, 3A	AS
LY	Yellow LED	AD, AS
LR	Red LED	AD, AS
LG	Green LED	AD, AS
CJ	3.5mm Phono jack for remote system access	AD, AS
AE	External jack for remote system access (4-pin header)	AS
TP	Tamper proof security screws	AS

TE200	AD	7	AP	BS

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NOTE:
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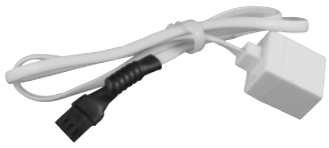
ACCESSORIES:



HHTA-XXX
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A35R
A multi-purpose screw driver that includes a standard flat screwdriver and a 1/16" allen key, and can be used on all Greystone wall sensors.

94062A114
A No 6, Spanner screwdriver for use with the tamperproof screw option (TP) on TE200AS series surface sensors.

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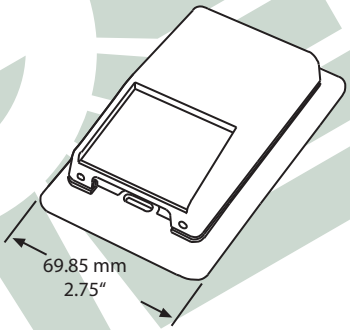
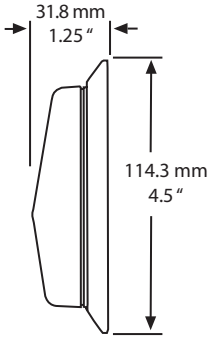
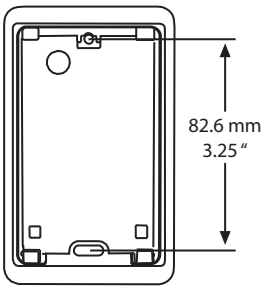
DIMENSIONS:

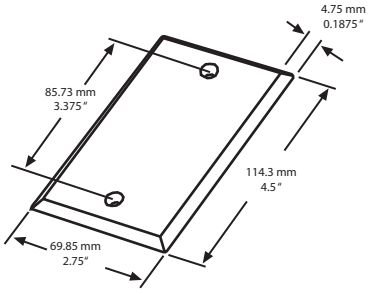
AD) Designer







AS) Surface



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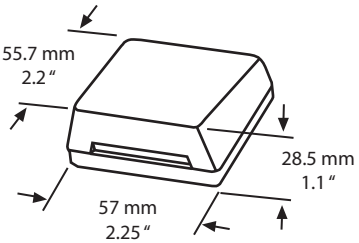

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www.greystoneenergy.com

RoHS COMPLIANT

Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

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GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

PROBE TEMPERATURE SENSORS
TE200 Series

Precision temperature control/sensing

FEATURES:

- Thermistor or Precision RTD
- Various configurations available
- Selection of enclosures
- Custom laser etching available

Peace of mind through reliable temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

TE200 - PROBE TEMPERATURE SENSOR CONFIGURATIONS

FEATURES:

The TE200 temperature sensors offer a choice of precision platinum or nickel RTD's, or NTC Thermistors which can be interfaced with a computerized monitoring or control system. A wide variety of configurations are available such as:

B & BB) Duct Sensor – The B & BB is for single point monitoring. Both are available with various probe lengths. The B has various enclosures available and the BB provides a mounting bracket for installation.

B)

BB)

C & AP) Immersion Sensor – The C comes in two configurations. It has either spring loaded or non-spring loaded probes and has a 1/2" NPT fitting to be mounted into a thermowell. It is available in various lengths and enclosures styles. The AP is a non-spring loaded probe with a 1/2" NPT fitting to be mounted in a thermowell.

C)

AP)

FD, D, DC & DR) Duct Averaging Sensor – All models incorporate numerous sensors along the assembly and act as a single sensor averaging the temperature across the sensors. They are available in various lengths. The FD probe is constructed of FT-6 rated plenum cable which allows for easy installation. The D & DC probes are constructed of bendable soft copper and the DR is a constructed of rigid stainless steel. Various enclosures are available.

FD)

D & DC)

DR)

E) & ES) Strap-on Sensor – The E comes with stainless steel probe and is available in several lengths and 1.5 m (5') of cable for remote mounting. The ES has an aluminum plate with an expandable 10" clamp assembly to strap directly to a pipe. Various enclosures are available.

E)

ES)

F, FE, & FX) OSA Sensor – Comes in an aluminum LB (F) or ABS (FE/FX) enclosure. The LB is c/w 1/2" NPT fitting for connection to conduit. All incorporate a sun/wind shield to protect the sensor.

F)

FE)

FX)

G) Glass – The sensor is encapsulated in a 1/2" square x 2" aluminum wafer that can be affixed to any surface. It comes with 5' of zip cable.

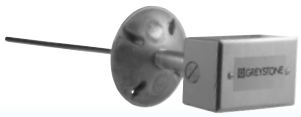
G)

FL) Flying Lead – The sensor is encapsulated in a 2" S/S probe with 6' of FT-6 rated cable and can be used in almost any application where temperature monitoring is required.

FL)

H) Stack – Is designed for installation in an exhaust stack to measure flue gas temperature. Comes standard with a mounting flange and weatherproof enclosure

H)



SPECIFICATIONS:

Sensor..... Several Thermistors, Platinum or Nickel RTD's available.
See product ordering information

Sensor Accuracy ..... **Thermistors:** ±0.2˚C (±0.36˚F) @ 25˚C (77˚F)
Platinum RTD's: ±0.3˚C (±0.54˚F) @ 0˚C (32˚F)
Nickel RTD's: ±0.4˚C (±0.72˚F) @ 0˚C (32˚F)

Operating Temperature ..... **AP, B, C, E, EX, G, & HC:** -20 - 105˚C (-4 - 221˚F)
BB, D, DR, FD & FL: -20 - 60˚C (-4 - 140˚F)
DC: -40 - 100˚C (-40 - 212˚F)
F, FE & FX: -50 - 100˚C (-58 - 212˚F)
H: (Sensor 4 & 28) -100 - 600˚C (-148 - 1112˚F)

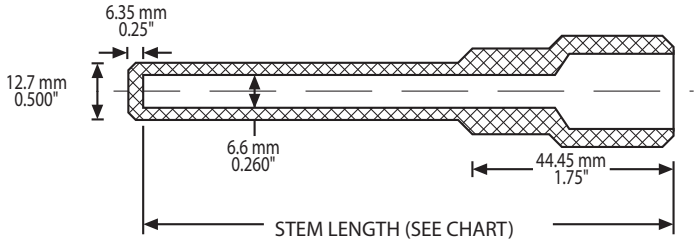
Probe Material ..... **AP, B, BB, C, DR, E, FL, H:** 6.35 mm (0.25") O.D., 304 series stainless steel
D & DC: 7.94 mm (0.3125") O.D. soft copper
FD: FT-6 rated plenum cable
ES: 2" x 2" aluminum plate
G: 0.5" x 0.5" x 2" aluminum wafer

Wire Material ..... **AP, B, C, DR, E, ES, G, HC:** PVC insulated, parallel bonded, 22 AWG
(Sensor type 2, 100 ohm platinum uses FT-4)
BB, D, FD, FL : FT-6 rated plenum cable, 22 AWG
DC: PTFE insulated, 22 AWG
H : Fiberglass insulated cable, 24 AWG

Enclosure ..... Standard - ABS - UL94-5VB - IP61 (NEMA 2)
Round (**E**) - ABS - UL94-5VB - IP65 (NEMA 4X)
Metal (**M**) - Galvanized Steel - IP50 (NEMA 1)
Weatherproof (**W**) - Cast Aluminum - IP64 (NEMA 3X)
Hinged Weatherproof (**FX**) - ABS - UL94-5VB - IP65 (NEMA 4X)

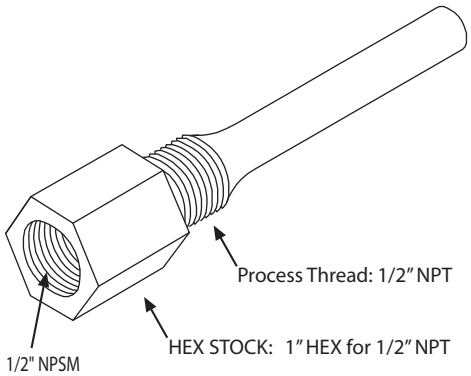
Wiring Connections ..... Pigtail, 2 or 3 wire
Round (**E**) enclosure- screw terminal block (14 to 22 AWG)

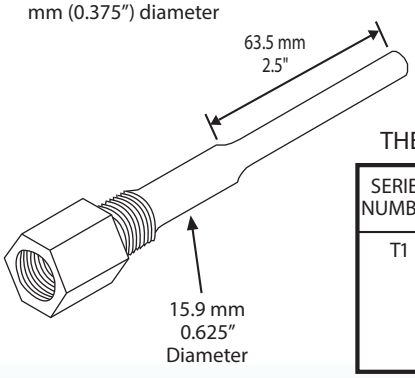
THERMOWELLS:



NOTE:

6" and up machined thermowells have a two step stem as shown. welded construction have a 9.5 mm (0.375") diameter





THERMOWELL PART NUMBERING SYSTEM

SERIES NUMBER	NPT THREAD SIZE	MATERIAL	STEM LENGTH	CONSTRUCTION
T1	1/2"	P - 304 SS R - 316 SS	2" 4" 6" 8" 12" 18"	- MACHINED W - WELDED (12" and up only)

EXAMPLE: T1 1/2 P 4
4" 304 STAINLESS THERMOWELL
WITH 1/2" NPT PROCESS THREAD

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PRODUCT ORDERING INFORMATION:

MODEL	Product Description
TE200	Temperature Sensor Series

CODE	Mounting Style
AP	All purpose
B	Duct mount
BB	Duct probe w/ mounting bracket only
C	Immersion
D	Duct average, copper probe
DC	Duct average, continuous copper probe (Available with Type 12, 1000 ohm RTD only)
DR	Duct average, rigid stainless steel probe
E	Strap-on - 50 mm (2") probe assembly
ES	Strap-on - Assembly clamps around pipe with aluminum plate c/w 254 mm (10") stainless clamp
F	O.S.A. , LB fitting
FE	O.S.A. , Round ABS, w/ gasketed cover
FD	Duct average, Flexible plenum rated cable probe
FL	Flying lead
FX	O.S.A. , Hinged ABS enclosure
G	Glass
H	Stack (Only available with Platinum RTD sensor types 4 & 28)
HC	Sensor with mounting clip

CODE	Enclosure (N/A for AP, BB, F, FD, FE, FL, FX, H & HC)
-	ABS enclosure, standard (no code required, leave blank)
E	Round ABS, w/gasketed cover
M	Metal utility box
W	Aluminum weatherproof box

CODE	Flex Duct Only (FD)
A	Lead only, no box
B	ABS enclosure
C	Aluminum weatherproof
D	Metal utility box
E	Round ABS w/ Gasketed cover

CODE	Sensor
2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
4	100 Ω Platinum, IEC 751, 385 Alpha, wire wound-ceramic* **H Mounting Style (see below)**
5	1801 Ω, NTC Thermistor, ±0.2 C
6	3000 Ω, NTC Thermistor, ±0.2 C
7	10,000 Ω, Type 3, NTC Thermistor, ±0.2 C
8	2.252K Ω, NTC Thermistor, ±0.2 C
12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
13	1000 Ω Nickel, Class B, DIN 43760
14	10,000 Ω, Type 3, NTC Thermistor, ±0.2 C c/w 11K shunt resistor
20	20,000 Ω, NTC Thermistor, ±0.2 C
24	10,000 Ω, Type 2, NTC Thermistor, ±0.2 C
28	1000 Ω Platinum, IEC 751, 385 Alpha, wire wound-ceramic* **H Mounting Style (see below)**

CODE	Probe Length (B, BB, C, E & H)
A2	50 mm (2")
B2	100 mm (4")
C2	150 mm (6")
D2	200 mm (8")
E2	300 mm (12")
F2	450 mm (18")

CODE	Averaging (D, DC, & DR)
G3	1800 mm (6') - D & DC
H3	3600 mm (12') - D
I3	6100 mm (20') - D & DC
J3	7300 mm (24') - D
K2	450 mm (18") - DR
L2	600 mm (24") - DR
M2	900 mm (36") - DR

CODE	Flex Duct Only (FD)
A	1800 mm (6')
B	3600 mm (12')
C	6100 mm (20')
D	7300 mm (24')

CODE	**Fitting** (only required for immersion "C)
A	Spring loaded 1/2 " NPT
E	Non-spring loaded 1/2 " NPT

Custom ranges available upon request

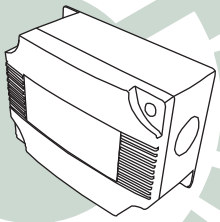
TE200	D	-	7	I3	-

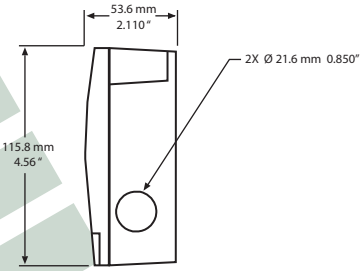
Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

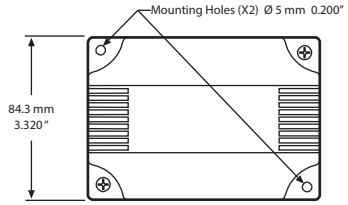
EXAMPLE:
Duct Average, 10 K Thermistor, 20' Copper

* must use for high temperature applications over 400 C (752 F)

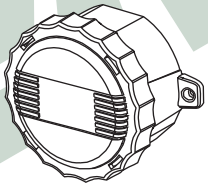
ENCLOSURE DIMENSIONS:

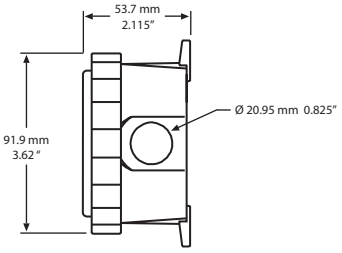


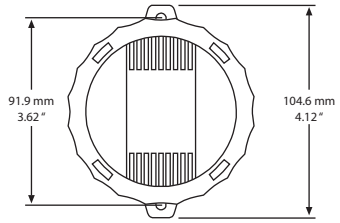




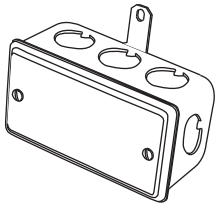
ABS Enclosure

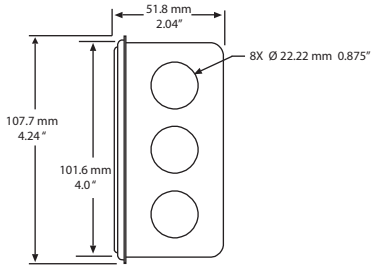


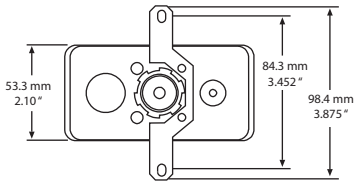




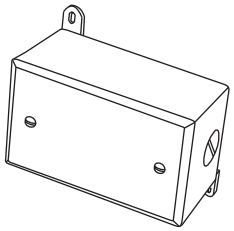
Round ABS Enclosure (E)

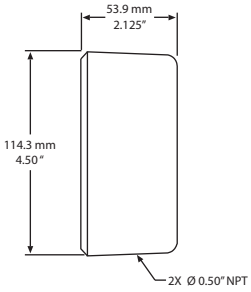


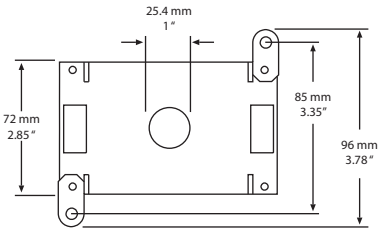




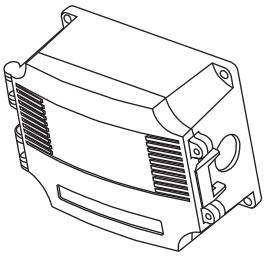
Metal Enclosure (M)

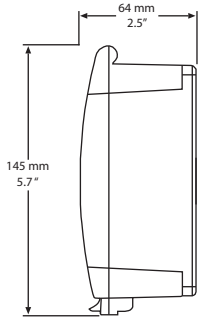


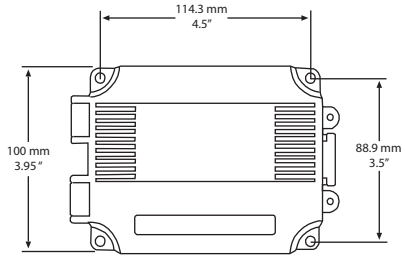




Weatherproof Enclosure (W)







ABS Hinged Weatherproof Enclosure (FX)

ACCESSORIES:

120-*) Thermal Compound – The 120- Thermal Conducting Compound is a zinc oxide-filled, dielectric, silicone oil-based compound that facilitates heat transfer by filling voids and gaps between mating surfaces. The operating temperature range is -40° to 200°C (-40° to 392°F). It is available in a 5 oz tube or 2 & 8 oz jars.

DC-01) Duct collar - The DC-01 is an adjustable collar for mounting the duct temperature sensor probes. It incorporates a foam backed mounting flange with 2 mounting holes. A compression type fitting accommodates a 1/4" probe and allows for an adjustable probe depth.

CC-1G) Averaging probe clip – The CC-1G is used to mount averaging sensors in duct applications. It can be used for probe diameters of 1/8",1/4" and 3/8". The bracket provides support and a smooth arc for direction reversal allowing for criss-crossing the duct. It eliminates kinking of the sensor and damaging the probe.

A fixed 1/4" probe may also be mounted as part of the bracket design using the scored break-off. It is made out of tough UL94V Nylon and limits heat/cold conduction to the probe and has multiple mounting holes to make mounting quick and easy.

TS17R-*) Probe clamp – The TS17R-* is a zinc plated, rubber coated tube clamp that can be used to secure a temperature probe. It is available in several sizes to fit a wide variety of probes.

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GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

ROOM TEMPERATURE TRANSMITTERS
TXRC Series

Precision temperature control/sensing

FEATURES:

- Precision RTD sensing element
- Choice of scaled ranges and outputs
- Various options: Setpoint Adjustment, Override, etc.
- Custom laser etching available

Peace of mind through reliable temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The TXRC Seies room temperature transmitter is a precision current loop transmitter. It utilizes the platinum RTD and is available in various configurations. The transmitter provides a high accuracy signal with excellent long term stability, low hysteresis and fast response while being virtually immune to power supply noise and input voltage fluctuations. All models operate on a wide range of AC or DC power supplies.

The TXRC is supplied in an attractive wall mount enclosure. The universal back plate can be mounted directly to several electrical box styles or directly on any wall.

The TXRC has various options available such as setpoint adjustment, manual override, etc. that allows for use in a multitude of applications.

SPECIFICATIONS:

Sensor	1000 ohm or 100 ohm Platinum RTD
Sensor Accuracy	±0.3˚C (±0.54˚F) @ 0˚C (32˚F)
Output Signal	4-20mA current loop, 0-5 vdc, or 0-10 Vdc (factory configured)
Transmitter Accuracy	±0.1% of span, including linearity
4-20 mA loop Power Supply	15-35 Vdc or 22-32 Vac
Minimum Current Loop	2 mA nominal (occurs with shorted sensor)
Maximum Loop Current	22.5 mA nominal (occurs with open sensor)
Maximum Loop Load	>600 ohms
0-5 Vdc Power Supply	10-35 Vdc or 10-32 Vac
0-10 Vdc Power Supply	15-35 Vdc or 15-32 Vac
Maximum Current (Voltage)	5 mA nominal
Maximum Output (Voltage)	Limited to <5.5 Vdc for 0-5 Vdc, <10.5 for 0-10 vdc
Input Voltage Effect	Negligible over specified operating range
RFI Rejection	Good RFI rejection of normal frequencies
Protection Circuitry	Reverse voltage protected and output limited
Operating Conditions	0 - 50˚C (32 - 122˚F), 0-95% RH non-condensing
Enclosure	White ABS - IP30 (NEMA 1) 84mmW x 117mmH x 29mmD (3.3" x 4.6" x 1.15")
Wiring Connections	Screw terminal block (14 to 22 AWG)

OPTIONS:

Setpoint Adjustment

Type	Front panel slidepot, 2 wire resistance output
Range	0K to 10K Ω standard
Custom spans available	1K, 2K, 5K, 10K or 20K Ω

Manual Override

Type	Front panel, momentary pushbutton
Front panel pushbutton	50 mA @12 Vdc, N.O., SPST

Status LED Input

Signal Type	Active high, low or 2-wire, 5 V current limited standard
LED Colors	Yellow (Y), Red (R) or Green (G),
Power Supply	5 Vdc standard, 10 or 24 Vdc optional

Communication Jacks

Molex	4 Pin header to 4 pin terminal block. Requires HHTA - Hand Held Adapter

Fan Speed Switch

Type	Side mounted, 5 position slide switch
Designators	Off, Auto, Low, Medium, High
Signal	2 wire, resistance output - 0, 2, 4, 6, 8 KΩ Custom ranges available, contact Greystone

TXRC - ROOM TEMPERATURE TRANSMITTER:

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
TXRC	Room Temperature Transmitter

CODE	Sensor
2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film **(Standard)**

CODE	Transmitter Output
A	4-20 mA
D	0-5 Vdc
E	0-10 Vdc

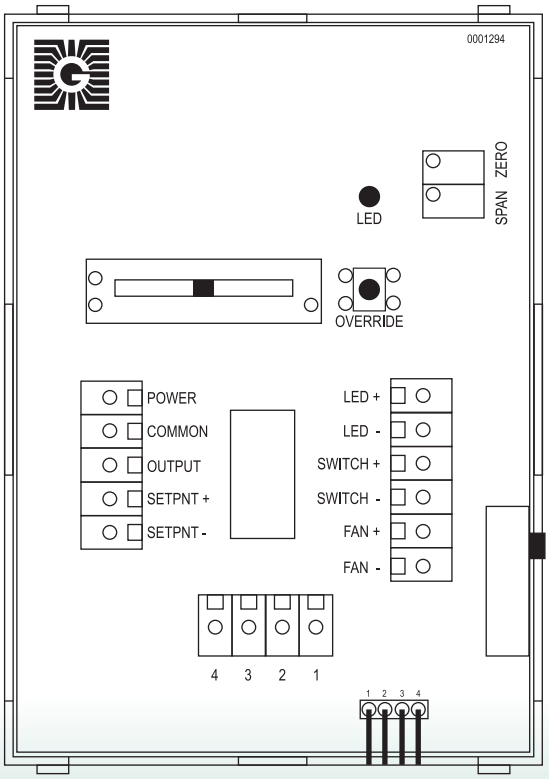
CODE	Scaled Transmitter Range
1	0˚C - 35˚C (32˚F - 95˚F)
2	0˚C - 50˚C (32˚F - 122˚F)

CODE	Options (Multiple selections can be made)
P	0-10K linear slide pot for set point control (Other ranges available, contact Greystone)
S	Front panel push button momentary switch (NO)
Y	Yellow LED
R	Red LED
G	Green LED
E	External jack for remote system access (4-pin header)
F	Fan Speed Switch, 5 position, (Off, Auto, Low, Mid, High)

TXRC	12	1A	2	P	S

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.
NOTE: Due to the many possible configurations, special part numbers may be required, please contact Greystone for more information.

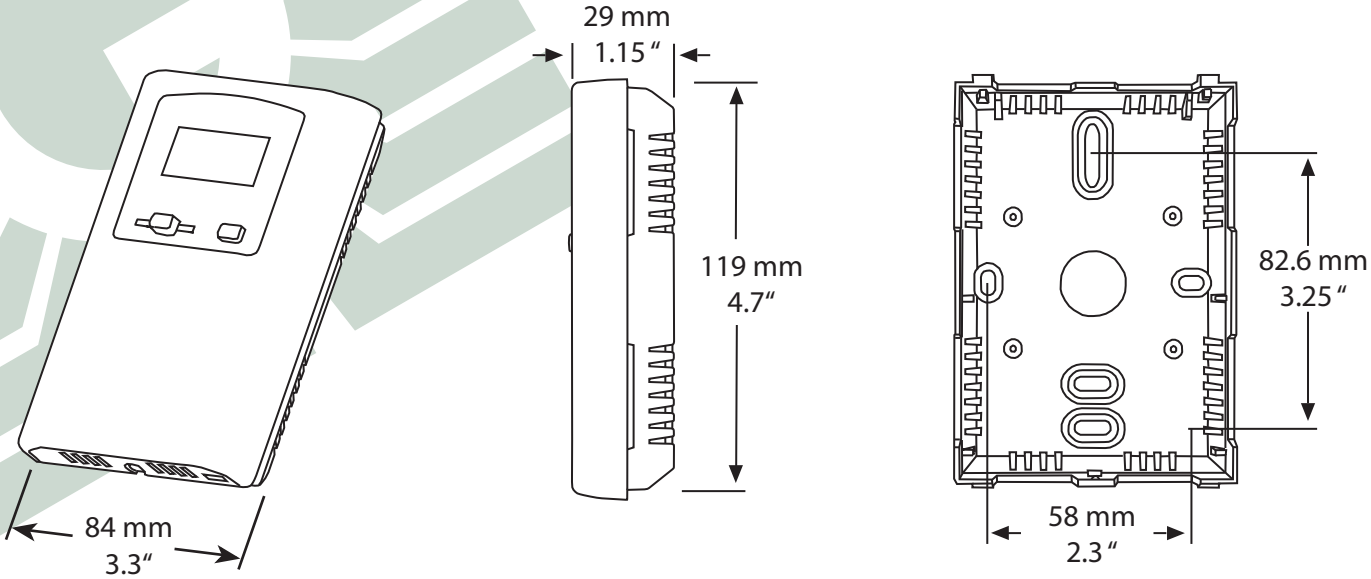
PCB/WIRING INFORMATION



Terminal	Function
POWER	Power input
COMMON	GND or COMMON
OUTPUT	Analog Output 4-20 mA, 0-5 or 0-10 Vdc
SETPNT +	Resistance Output
SETPNT -	GND or COMMON
LED +	Vdc input (5 Vdc standard)
LED -	GND or COMMON
SWITCH +	Digital output
SWITCH -	GND or COMMON
FAN +	Resistance output
FAN -	GND or COMMON
1	To External Jack PIN 1
2	To External Jack PIN 2
3	To External Jack PIN 3
4	To External Jack PIN 4

* Some models do not have all these features
**To save on number of connection wires, all GND or COMMON may connected together.
***Illustration shows standard wiring configuration. Custom configurations are available. Please contact Greystone.

DIMENSIONS:



ACCESSORIES:

HHTA-XXX
The HHTA - Handheld Adapter converts the Greystone standard 4 pin connector to the connector of choice such as a RJ12, phone jack. Several styles and configurations are available. Please contact Greystone.

A35R
A multi-purpose screw driver that includes a standard flat screwdriver and a 1/16” allen key, and can be used on all Greystone wall sensors.

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GREYSTONE ENERGY SYSTEMS INC

ROOM TEMPERATURE TRANSMITTERS
TE500 Series

AD) Designer – Features include a two-piece enclosure that mounts directly to a wall box or on any wall.

AS) Surface - A stainless steel plate which can be mounted to a wall box used where tamper- proof or protection is required. Optional tamperproof screws are available.

Precision temperature control/sensing

FEATURES:

- Precision RTD sensing element
- Choice of scaled ranges and outputs
- 2 enclosure styles
- Custom laser etching available

Peace of mind through reliable temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The TE500 is a precision current loop temperature transmitter. It utilizes the platinum RTD and is available in various configurations. The transmitter provides a high accuracy signal with excellent long term stability, low hysteresis and fast response while being virtually immune to power supply noise and input voltage fluctuations. All models operate on a AC or DC power supplies.

SPECIFICATIONS:

Sensor	1000 or 100 ohm Platinum RTD
Sensor Accuracy	±0.3˚C (±0.54˚F) @ 0˚C (32˚F)
Output Signal	4-20mA current loop, 0-5 vdc, 0-10 Vdc (factory configured)
Transmitter Accuracy	±0.1% of span, including linearity
4-20 mA loop Power Supply	15-35 Vdc or 22-32 Vac
Minimum Current Loop	2 mA nominal (occurs with shorted sensor)
Maximum Loop Current	22.5 mA nominal (occurs with open sensor)
Maximum Loop Load	>600 ohms
0-5 Vdc Power Supply	10-35 Vdc or 10-32 Vac
0-10 Vdc Power Supply	15-35 Vdc or 15-32 Vac
Maximum Current (Voltage)	5 mA nominal
Maximum Output (Voltage)	Limited to <5.5 Vdc for 0-5 Vdc, <10.5 for 0-10 vdc
Input Voltage Effect	Negligible over specified operating range
RFI Rejection	Good RFI rejection of normal frequencies
Protection Circuitry	Reverse voltage protected and output limited
Operating Conditions	0 - 70˚C (32 - 158˚F), 0-95% RH non-condensing
Enclosure	White ABS (AD) - IP20 (NEMA 1) Stainless Steel (AS) - IP50 (NEMA 1)
Wiring Connections	Screw terminal block (14 to 22 AWG)

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
TE500	Temperature Transmitter Series

CODE	Enclosure
AD	Designer
AS	Stainless Steel Plate

CODE	Sensor
2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film **(Standard)**

CODE	Transmitter Output
1A	Current 4-20mA
1D	Voltage 0-5 VDC
1E	Voltage 0-10 VDC

CODE	Scaled Transmitter Range
1	0˚C - 35˚C (32˚F - 95˚F)
2	0˚C - 50˚C (32˚F - 122˚F)

CODE	Options
TP	Tamperproof Screws **(AS only)**

TE500	AD	12	1A	2

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

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RoHS COMPLIANT

Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

PROBE TEMPERATURE TRANSMITTERS
TE500 Series

Precision temperature control/sensing

FEATURES:

- Precision RTD sensing element
- Choice of scaled ranges and outputs
- Various enclosure styles
- Various configurations
- Custom laser etching available

Peace of mind through reliable temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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TE500 - TEMPERATURE TRANSMITTER CONFIGURATIONS

FEATURES:

The TE500 temperature transmitters offer a platinum RTD's with transmitter which can be interfaced with a computerized monitoring or control system. A wide variety of configurations are available such as:

B) Duct Sensor – The B is for single point monitoring. It comes with a stainless steel probe which is available with various probe lengths and enclosures.

B)

C) Immersion Sensor – The C comes in two configurations. It has either spring loaded or non-spring loaded probes and has a 1/2" NPT fitting to be mounted into a thermowell. It is available in various lengths and enclosures.

C)

FD, D, DC & DR) Duct Averaging Sensor – The D, DR & FD models incorporate numerous sensors along the assembly and act as a single sensor averaging the temperature across the sensors. The DC is a continuous sensing element that senses a temperature change allong the entire proble length. They are available in various lengths. The FD probe is constructed of FT-6 rated plenum cable which allows for easy installation. The D & DC probes are constructed of bendable soft copper and the DR is a constructed of rigid stainless steel. Various enclosures are available.

FD)

D & DC)

DR)

E) & ES) Strap-on Sensor – The E comes with stainless steel probe and is available in several lengths and 1.5 m (5') of zip cable for remote mounting. The ES has an aluminum plate with an expandable 10" clamp assembly to strap directly to a pipe. Various enclosures are available.

E)

ES)

F) OSA Sensor – The F comes in a hinged weatherproof ABS enclosure and incorporates a sun/wind shield to protect the sensor.

F)

FL) Flying Lead – The FL comes with a 2" stainless steel probe and 1.8 m (6') of FT6 plenum rated cable for remote mounting. Various enclosures are available.

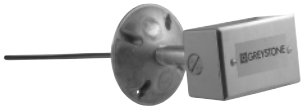
FL)

G) Glass – The sensor is encapsulated in a 1/2" square x 2" aluminum wafer that can be affixed to any surface. It comes with 5' of zip cable and various enclosures are available.

G)

H) Stack – Is designed for installation in an exhaust stack to measure flue gas temperature. Comes standard with a mounting flange and weatherproof enclosure

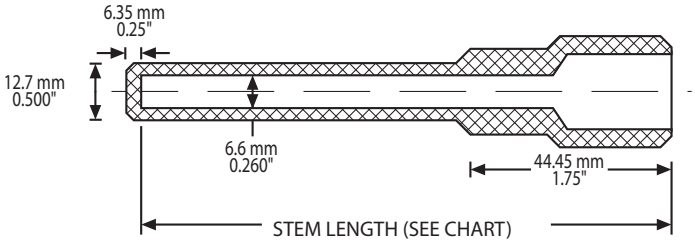
H)



SPECIFICATIONS:

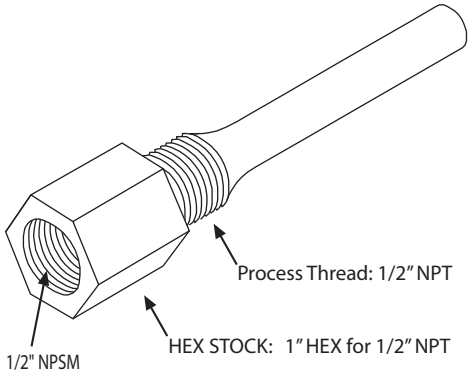
Sensor	**Type 2 -** 100 Ω Platinum, IEC 751, 385 Alpha, thin film **Type 12 -** 1000 Ω Platinum, IEC 751, 385 Alpha, thin film **(Standard)** ***Type 4 -** 100 Ω Platinum, IEC 751, 385 Alpha, wire wound ***Type 28 -** 1000 Ω Platinum, IEC 751, 385 Alpha, wire wound **(Standard)** ***Must use for applications above 400˚C (752˚F)**
Sensor Accuracy	±0.3˚C (±0.54˚F) @ 0˚C (32˚F)
Transmitter Output Signal	4-20mA current loop, 0-5 vdc, or 0-10 Vdc (factory configured)
Transmitter Accuracy	±0.1% of span, including linearity
4-20 mA loop Power Supply	15-35 Vdc or 22-32 Vac
Minimum Loop Current	2 mA nominal (occurs with shorted sensor)
Maximum Loop Current	22.5 mA nominal (occurs with open sensor)
Maximum Loop Load	>600 ohms
0-5 Vdc Power Supply	10-35 Vdc or 10-32 Vac
0-10 Vdc Power Supply	15-35 Vdc or 15-32 Vac
Maximum Current (Voltage)	5 mA nominal
Maximum Output (Voltage)	Limited to <5.5 Vdc for 0-5 Vdc, <10.5 for 0-10 vdc
Input Voltage Effect	Negligible over specified operating range
RFI rejection	Good RFI rejection of normal frequencies with standard installation
Protection Circuitry	Reverse voltage protected and output limited
Probe Sensing Range	**B, C, E, ES & G:** -20 - 105˚C (-4 - 221˚F) **D, DR & FD:** -20 - 60˚C (-4 - 140˚F) **DC**: -40 - 100˚C (-40 - 212˚F) **F:** -50 - 100˚C (-58 - 212˚F) **H**: -100 - 600˚C (-148 - 1112˚F)
Ambient Operating Range	-40 - 85˚C (-40 - 185˚F)
Operating Humidity	0-95% RH non-condensing
Probe Material	**B, C, DR, E, FL & H:** 6.35 mm (0.25") O.D., 304 series stainless steel **D & DC:** 7.94 mm **(**0.3125") O.D. soft copper **FD:** FT-6 rated plenum cable **ES:** 2" x 2" aluminum plate **G:** 0.5" x 0.5" x 2" aluminum wafer
Wire Material	**B, C, DR, E, ES & G:** PVC insulated, parallel bonded, 22 AWG **D, FD & FL:** FT-6 rated plenum cable, 22 AWG **DC:** PTFE insulated, 22 AWG **H:** Fiberglass insulated, 24 AWG
Enclosure	Standard - ABS - UL94-5VB - IP61 (NEMA2) Round (**E**) - ABS - UL94-5VB - IP65 (NEMA 4X) Metal (**M**) - Galvanized Steel - IP50 (NEMA 1) Weatherproof (**W**) - Cast Aluminum - IP64 (NEMA 3X) Hinged Weatherproof (**F**) - ABS UL94-5VB - IP65 (NEMA 4X)
Wiring Connections	Screw terminal block (14 to 22 AWG)

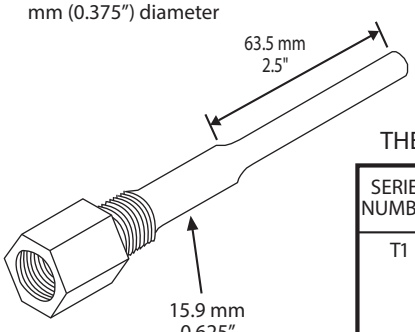
THERMOWELLS:



NOTE:

6" and up machined thermowells have a two step stem as shown. welded construction have a 9.5 mm (0.375") diameter





THERMOWELL PART NUMBERING SYSTEM

SERIES NUMBER	NPT THREAD SIZE	MATERIAL	STEM LENGTH	CONSTRUCTION
T1	1/2"	P - 304 SS R - 316 SS	2" 4" 6" 8" 12" 18"	- MACHINED W - WELDED (12" and up only)

EXAMPLE: T1 1/2 P 4
4" 304 STAINLESS THERMOWELL
WITH 1/2" NPT PROCESS THREAD

RoHS COMPLIANT

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
TE500	Temperature Transmitter Series

CODE	Style
B	Duct mount
C	Immersion
D	Duct average, flexible copper probe
DC	Duct average continuous, flexible copper probe
DR	Duct average, rigid stainless steel probe
E	Strap-on - 50 mm (2") probe assembly
ES	Strap-on - Assembly clamps around pipe with copper plate c/w 254 mm (10") stainless clamp
F	O.S.A. (Hinged ABS enclosure)
FD	Duct average, flexible plenum rated cable
FL	Flying lead
G	Glass
H	Stack **(Requires sensor code 4 or 28)**

CODE	Enclosure (N/A for F or H)
-	ABS enclosure, standard (no code required, leave blank)
E	Round ABS, w/ gasketed cover
M	Metal utility box
W	Aluminum weatherproof box

CODE	Flex Duct Only (FD)
B	ABS enclosure
C	Aluminum weatherproof box
D	Metal utility box
E	Round ABS, w/ gasketed cover

CODE	Sensor (Type 12 is standard)
2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film **(Standard)**
4	100 Ω Platinum, IEC 751, 385 Alpha, wire wound * **H Mounting Style (See below)**
28	1000 Ω Platinum, IEC 751, 385 Alpha, wire wound **(Standard)** * **H Mounting Style (See below)**

CODE	Probe Length (B, C, E, & H)
A2	50 mm (2")
B2	100 mm (4")
C2	150 mm (6")
D2	200 mm (8")
E2	300 mm (12")
F2	450 mm (18")

CODE	Averaging (D, DC & DR)
G3	1800 mm (6')-D/DC
H3	3600 mm (12')-D
I3	6100 mm (20')-D/DC
J3	7300 mm (24')-D
K2	450 mm (18")-DR
L2	600 mm (24"')-DR
M2	900 mm (36")-DR

CODE	Flex Duct Only (FD)
A	1800 mm (6')
B	3600 mm (12')
C	6100 mm (20')
D	7300 mm (24')

CODE	**Fitting** (only required for immersion "C")
A	Spring loaded 1/2 " NPT
E	Non-spring loaded 1/2 " NPT

CODE	Output Options
1A	4-20mA 2 or 3 wire
1D	0-5 VDC 3 wire
1E	0-10 VDC 3 wire

CODE	Transmitter Scaled Range
1	0˚C - 35˚C (32˚F - 95˚F)
2	0˚C - 50˚C (32 F - 122 F)
3	0˚C - 100˚C (32˚F - 212˚F)
4	50˚C - 150˚C (122˚F - 302˚F)
5	50˚C - 250˚C (122˚F - 482˚F)
6	-50˚C - 50˚C (-58˚F - 122˚F)

Custom ranges available upon request

TE500	B	-	12	E2	-	1A	2

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

EXAMPLE: Duct temperature transmitter, c/w 1000Ω RTD, 12" S/S Probe, ABS enclosure, 4-20mA output with a 0˚C-50˚C (32˚F-122˚F) range.

* must use for high temperature applications over 400˚C (752˚F)

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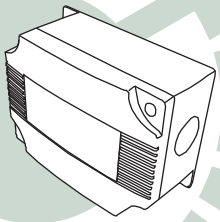
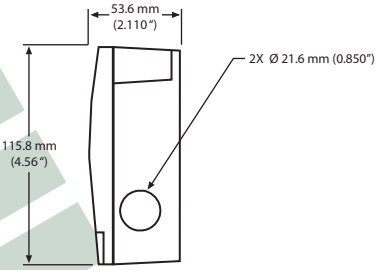
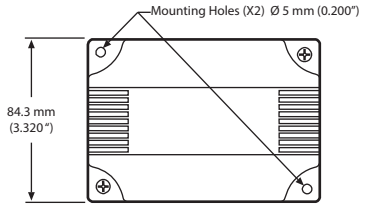
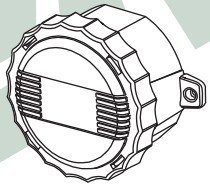
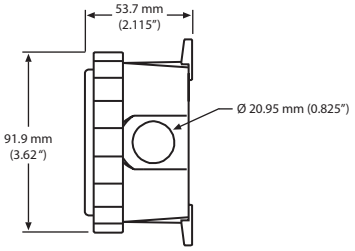


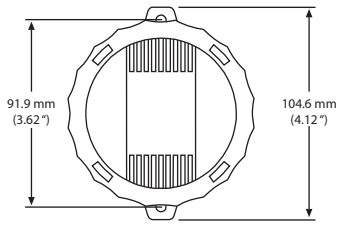




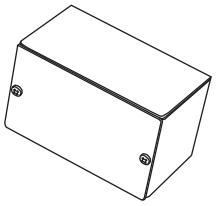
ABS Enclosure

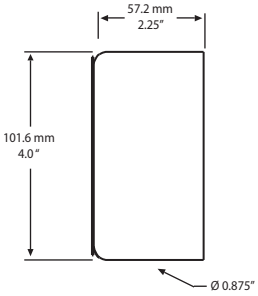


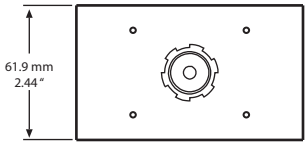




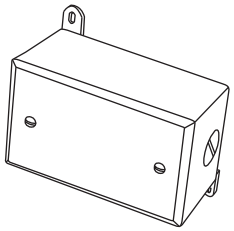
Round ABS Enclosure (E)

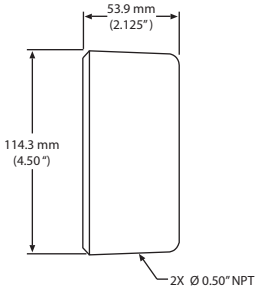


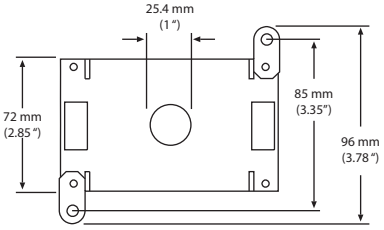




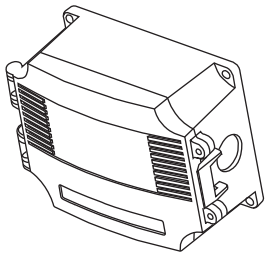
Metal Enclosure (M)

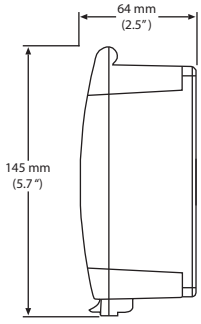


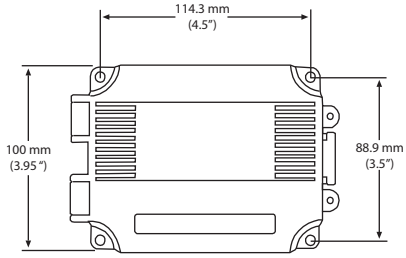




Weatherproof Enclosure (W)







ABS Hinged Weatherproof Enclosure (F Series Outside Air)

ACCESSORIES:

120-*) Thermal Compound – The 120- Thermal Conducting Compound is a zinc oxide-filled, dielectric, silicone oil-based compound that facilitates heat transfer by filling voids and gaps between mating surfaces. The operating temperature range is -40° to 200°C (-40° to 392°F). It is available in a 5 oz tube or 2 & 8 oz jars.

DC-01) Duct collar - The DC-01 is an adjustable collar for mounting the duct temperature sensor probes. it incorporates a foam backed mounting flange with 2 mounting holes. A compression type fitting accomodates a 1/4" probe and allows for an adjustable probe depth.

CC-1G) Averaging probe clip – The CC-1G is used to mount averaging sensors in duct applications. It can be used for probe diameters of 1/8",1/4" and 3/8". The bracket provides support and a smooth arc for direction reversal allowing for criss-crossing the duct. It eliminates kinking of the sensor and damaging the probe.

A fixed 1/4" probe may also be mounted as part of the bracket design using the scored break-off. It is made out of tough UL94V Nylon and limits heat/cold conduction to the probe and has multiple mounting holes to make mounting quick and easy.

TS17R-*) Probe clamp – The TS17R-* is a zinc plated, rubber coated tube clamp that can be used to secure a temperature probe. It is available in several sizes to fit a wide variety of probes.

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RoHS COMPLIANT

Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

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GREYSTONE ENERGY SYSTEMS INC

TEMPERATURE TRANSMITTERS C/W LCD DISPLAY TE511/512 Series

Precision temperature control/sensing

FEATURES:

- Precision RTD sensing element
- Choice of scaled ranges and outputs
- LCD available in either ˚C or ˚F
- Hinged ABS weatherproof enclosure

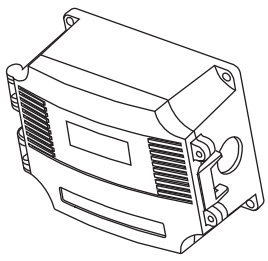
Peace of mind through reliable temperature monitoring

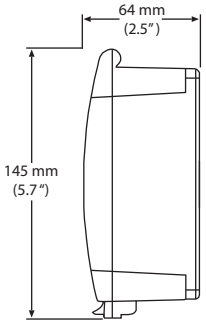
GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

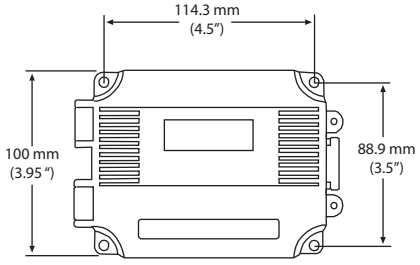
SPECIFICATIONS:

Sensor	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
Sensor Accuracy	±0.3˚C (±0.54˚F) @ 0˚C (32˚F)
Transmitter Output Signal	4-20mA current loop, 0-5 vdc, or 0-10 Vdc (factory configured)
Transmitter Accuracy	±0.1% of span, including linearity
4-20 mA loop Power Supply	15-35 Vdc or 22-32 Vac
Minimum Loop Current	2 mA nominal (occurs with shorted sensor)
Maximum Loop Current	22.5 mA nominal (occurs with open sensor)
Maximum Loop Load	>600 ohms
0-5 Vdc Power Supply	10-35 vdc or 10-32 Vac
0-10 Vdc Power Supply	15-35 Vdc or 15-32 Vac
Maximum Current (Voltage)	5 mA nominal
Maximum Output (Voltage)	Limited to <5.5 Vdc for 0-5 Vdc, <10.5 for 0-10 vdc
Input Voltage Effect	Negligible over specified operating range
RFI rejection	Good RFI rejection of normal frequencies with standard installation
Protection Circuitry	Reverse voltage protected and output limited
Probe Operating Temp	**B, C, E, ES & G:** -20 - 105˚C (-4 - 221˚F) **D, DR & FD:** -20 - 60˚C (-4 - 140˚F) **DC**: -40 - 100˚C (-40 - 212˚F) **F:** 0 - 70˚C (32 - 158˚F)
Ambient Operating Range	0 - 70˚C (32 - 158˚F)
Operating Humidity	0-95% RH non-condensing
Probe Material	**B, C, DR, E, & FL:** 6.35 mm (0.25") O.D., 304 series stainless steel **D & DC:** 7.94 mm **(**0.3125") O.D. soft copper **FD:** FT-6 rated plenum cable **ES:** 2" x 2" aluminum plate **G:** 0.5" x 0.5" x 2" aluminum wafer
Wire Material	**B, C, DR, E, ES & G:** PVC insulated, parallel bonded, 22 AWG **D, FD & FL:** FT-6 rated plenum cable, 22 AWG **DC:** PTFE insulated, 22 AWG
Wiring Connections	Screw terminal block (14 to 22 AWG)
Enclosure	Hinged Weatherproof - ABS - UL94-5VB - IP65 (NEMA 4X)
Display Units	˚C or ˚F (factory configured)
Display Range	3 Digit for -88.8 to 888 as necessary
Display Size	24 mm x 11 mm (0.95" x 0.45"), three digit.

ENCLOSURE DIMENSIONS:



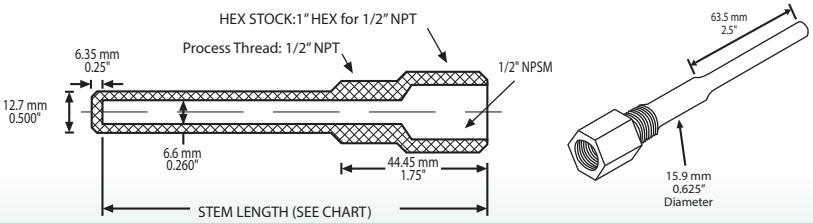




THERMOWELLS:

NOTE:

6" and up machined thermowells have a two step stem as shown. welded construction have a 9.5 mm (0.375") diameter



THERMOWELL PART NUMBERING SYSTEM

SERIES NUMBER	NPT THREAD SIZE	MATERIAL	STEM LENGTH	CONSTRUCTION
T1	1/2"	P - 304 SS R - 316 SS	2" 4" 6" 8" 12" 18"	- MACHINED W - WELDED (12" and up only)

EXAMPLE: T1 1/2 P 4
4" 304 STAINLESS THERMOWELL
WITH 1/2" NPT PROCESS THREAD

RoHS COMPLIANT

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
TE511	Sensor assembly c/w transmitter and LCD display ˚C
TE512	Sensor assembly c/w transmitter and LCD display ˚F

CODE	Style
B	Duct mount
C	Immersion
D	Duct average, flexible copper probe
DC	Duct average continuous, flexible copper probe
DR	Duct average, rigid stainless steel probe
E	Strap-on - Probe assembly
ES	Strap-on - Clamp Assembly c/w 254 mm (10") stainless clamp to around pipe
F	Heavy-duty wall mount enclosure
FDB	Duct average, flexible plenum rated cable
FL	Flying lead
G	Glass

CODE	Probe Length (B, C, & E)	CODE	Averaging (D, DC, & DR)	CODE	Flex Duct Only (FD)
A2	50 mm (2")	G3	1800 mm (6') - D & DC	A	1800 mm (6')
B2	100 mm (4")	H3	3600 mm (12') - D	B	3600 mm (12')
C2	150 mm (6")	I3	6100 mm (20') - D & DC	C	6100 mm (20')
D2	200 mm (8")	J3	7300 mm (24') - D	D	7300 mm (24')
E2	300 mm (12")	K2	450 mm (18") - DR		
F2	450 mm (18")	L2	600 mm (24") - DR		
		M2	900 mm (36") - DR		

CODE	Input/Output Options
A	24 VAC/VDC, 4-20mA 2 or 3 wire
D	24 VAC/VDC, 0-5 VDC 3 wire
E	24 VAC/VDC, 0-10 VDC 3 wire

CODE	Transmitter Scaled Range
1	0˚C - 35˚C (32˚F - 95˚F)
2	0˚C - 50˚C (32˚F - 122˚F)
3	0˚C - 100˚C (32˚F - 212˚F)
*	Custom range, please contact Greystone

TE511	B	E2	A	2

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

ACCESSORIES:

120-*) Thermal Compound – The 120- Thermal Conducting Compound is a zinc oxide-filled, dielectric, silicone oil-based compound that facilitates heat transfer by filling voids and gaps between mating surfaces. The operating temperature range is -40° to 200°C (-40° to 392°F). It is available in a 5 oz tube or 2 & 8 oz jars.

DC-01) Duct collar - The DC-01 is an adjustable collar for mounting the duct temperature sensor probes. it incorporates a foam backed mounting flange with 2 mounting holes. A compression type fitting accomodates a 1/4" probe and allows for an adjustable probe depth.

TS17R-*) Probe clamp – The TS17R-* is a zinc plated, rubber coated tube clamp that can be used to secure a temperature probe. It is available in several sizes to fit a wide variety of probes.

CC-1G) Averaging probe clip – The CC-1G is used to mount averaging sensors in duct applications. It can be used for probe diameters of 1/8",1/4" and 3/8". The bracket provides support and a smooth arc for direction reversal allowing for criss-crossing the duct. It eliminates kinking of the sensor and damaging the probe.

A fixed 1/4" probe may also be mounted as part of the bracket design using the scored break-off. It is made out of tough UL94V Nylon and limits heat/cold conduction to the probe and has multiple mounting holes to make mounting quick and easy.

FEATURES:

The TE511/512 series temperature transmitters offer a platinum RTD's with transmitter which can be interfaced with a computerized monitoring or control system. Each model incorporates a LCD in either ˚C or ˚F. A wide variety of configurations are available such as:

B) Duct Sensor – The B is for single point monitoring. It comes with a stainless steel probe which is available with various probe lengths.

B)

C) Immersion Sensor – The C comes in two configurations. It has either spring loaded or non-spring loaded probes and has a 1/2" NPT fitting to be mounted into a thermowell. It is available in various lengths.

C)

FD, D, DC & DR) Duct Averaging Sensor – The D, DR & FD models incorporate numerous sensors along the assembly and act as a single sensor averaging the temperature across the sensors. The DC is a continuous sensing element that senses a temperature change allong the entire proble length. They are available in various lengths. The FD probe is constructed of FT-6 rated plenum cable which allows for easy installation. The D & DC probes are constructed of bendable soft copper and the DR is a constructed of rigid stainless steel.

FD)

D & DC)

DR)

E) & ES) Strap-on Sensor – The E comes with stainless steel probe and is available in several lengths and 1.5 m (5') of zip cable for remote mounting. The ES has an aluminum plate with an expandable 10" clamp assembly to strap directly to a pipe.

E)

ES)

F) Heavy Duty Space Sensor – The F comes in a hinged weatherproof ABS enclosure and incorporates a shield to protect the sensor.

F)

FL) Flying Lead – The FL comes with a 2" stainless steel probe and 1.8 m (6') of FT6 plenum rated cable for remote mounting.

FL)

G) Glass – The sensor is encapsulated in a 1/2" square x 2" aluminum wafer that can be affixed to any surface. It comes with 5' of zip cable.

G)

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RoHS COMPLIANT

Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

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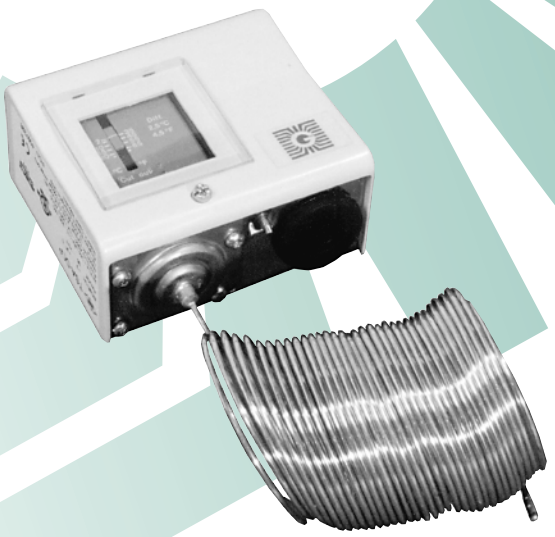
GREYSTONE ENERGY SYSTEMS INC

FROST PROTECTION THERMOSTAT
LLC Series



LLC-307 model shown above

FEATURES:

- SPDT or DPDT
- Auto or manual reset version
- 6 meter (20') capillary
- Optional capillary mounting clip

Peace of mind through reliable temperature switches

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DESCRIPTION:

The LLC series frost protection thermostats provide a switched output based on the average temperature detected along a six meter (20 foot) capillary sensor.

The unit is fixed across a duct using capillary mounting clips, downstream of the frost coil and is used to prevent the icing up of filters, fans and coils.

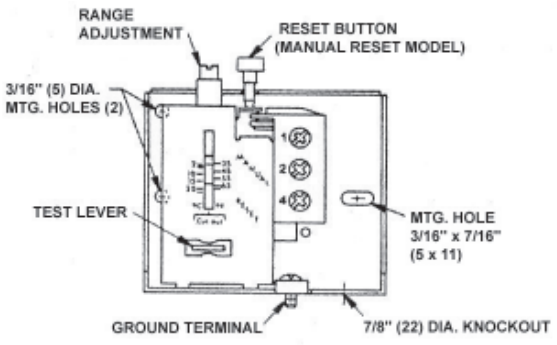
SPECIFICATIONS:

Sensor Type:.....Vapor-filled copper capillary, tin plated
Probe:.....2 mm (5/64") diameter , 6.1 m (20') length
Ambient Range:.....-51˚ to 71˚C (-60˚ to 160˚F), operating
149˚C (300˚F) maximum at sensing element
Response:.....To lowest temperature sensed by any 30 cm (1') section of capillary element
Control Range:.....**SPDT:** +1.7 to +20°C (35 to 68°F)
DPDT: +1.1 to + 21°C (34 to 70°F)
Differential:.....2.5°C (4.5°F)
Switch Action:.....SPDT or DPDT (two SPDT), snap acting
Electrical Ratings:.....**SPDT:** 24 F.L.A. inductive @ 120/240 VAC
144 L.R.A. inductive @ 120/240 VAC
2 HP @ 120 VAC, 3 HP @ 240 VAC
720 VA max pilot duty @ 120-600 VAC
144 VA max pilot duty @ 24 VAC

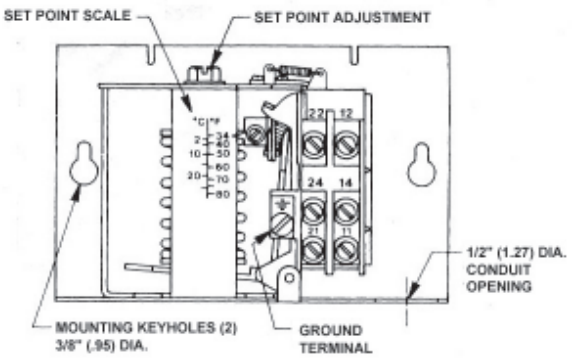
DPDT: 14 F.L.A. inductive @ 120 VAC
84 L.R.A. inductive @ 120 VAC
3/4 HP @ 120 VAC
12 F.L.A. inductive @ 240 VAC
72 L.R.A. inductive @ 240 VAC
2 HP @ 240 VAC
720 VA max pilot duty @ 120-600 VAC
144 VA max pilot duty @ 24 VAC

Enclosures:.....Plated steel case; plastic cover IP23 (NEMA 1)
Dimensions:.....**SPDT:** 75 x 85 x 40 mm (2.94"h x 3.35"w x 1.57"d)
DPDT: 92 x 140 x 67 mm (3.63"h x 5.5"w x 2.63"d)

SPDT:



DPDT:



ORDER INFORMATION:

LLC-306 - SPDT Auto reset frost protection thermostat
LLC-307 - SPDT Manual reset frost protection thermostat
LLC-316 - DPDT Auto reset frost protection thermostat c/w 5 mounting clips
LLC-317 - DPDT Manual reset frost protection thermostat c/w 5 mounting clips

LLC-CLIPS - Capillary mounting clips

* Greystone reserves the right to make design changes at any time.

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GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

HUMIDITY/TEMPERATURE TRANSMITTER c/w SETPOINT ADJUSTMENTS

SPC Series

Precision humidity/temperature control/sensing

FEATURES:

- Dual humidity and temperature outputs
- Humidity and/or temperature setpoint adjustment outputs
- Current and voltage models
- LCD indication
- Highly stable RH sensor element
- Attractive, low profile enclosure
- Installer friendly wiring access

Peace of mind through reliable humidity/temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The SPC Temperature/humidity transmitter incorporates two sensors in one attractive wall mount enclosure for the most efficient environmental monitoring and control system. It uses a field-proven RH sensor to monitor relative humidity and a curve-matched thermistor to measure temperature.

Two setpoint controls are also available for temperature and humidity adjustment. The device may also include an occupancy override button and an external communication jack. Both measurements and setpoint signals are available on separate outputs as linear 4-20 mA, 0-5 or 0-10 Vdc signals.

Several configurations of the device are available with one to four outputs as required. An LCD is included for configuration and local indication of all parameters. Several operating parameters can be programmed using a keypad for specific applications including four temperature ranges and C/F display.

SPECIFICATIONS:

General

Power Supply	24Vac/dc ±10% (non-isolated half-wave rectified)
Consumption	20 mA + (20ma x number of outputs) max @ 24 Vdc
Input Voltage Effect	Negligible over specified operating range
Protection Circuitry	Reverse voltage and MOV protected and output limited
Output Signals	4-20 mA active (sourcing) or 0-5 Vdc or 0-10 Vdc (specify when ordering)
Output Resolution	10 bit for all signals
Output Drive Capability	550 ohm max for current 10Kohm min for voltage
Programming and Selection	Via push buttons and on-screen menu
Operating Conditions	0˚-50˚C (32˚-122˚F) 0-95% RH non-condensing
Wiring Connections	Screw terminal block (14 to 22 AWG)
Enclosure	White ABS - IP30 (NEMA 1) 84mmW x 117mmH x 29mmD (3.3" x 4.6" x 1.15")

LCD Display

Display Size	38.1 x 16.5 mm (1.5" x 0.65")
Digit Height	11.43 mm (0.45")
Symbols	˚C, ˚F, %RH, OCC
Backlight	Enable or disable via menu

Temperature

Accuracy	± 0.2˚C (±0.4˚F)
Range	0˚ to 35˚C (32˚ to 95˚F) or 0˚ to 50˚C (32˚ to 122˚F) programmable
Offset	±9˚ F programmable
Display Units	˚C or ˚F programmable
Display Resolution	0.5˚ <100˚, 1˚ >100˚

Temperature Setpoint

Midpoint	18˚ to 27˚C or 65˚ to 80˚F programmable
Range	±2 to ±10˚C or ±5 to ±20˚F of the midpoint, programmable
Resolution	0.5 or 1.0˚C and 1.0 or 2˚F programmable

Humidity

Sensor	Thermoset polymer based capactive
Accuracy	±2, 3 or 5% RH
Range	0 to 100% RH
Temperature Compensation	0˚ to 50˚C (32˚ to 122˚F)
Hysteresis	± 3% RH
Response Time	15 seconds typical
Stability	±1.2% RH typical @ 50% RH in 5 years
Offset	±20% RH programmable

Humidity Setpoint

Midpoint	20 to 70% RH programmable
Range	±5, ±10 or ± 20% RH of the midpoint, programmable
Resolution	1% RH

Manual Override

Type	Front panel, momentary pushbutton
Ratings	50 mA @12 Vdc, N.O., SPST

Occupied Input

Signal Type	Digital input, 0/5 Vdc standard, active low
Action	Causes "OCC" segment to light on LCD

Fan Speed Switch

Type	Side mounted, 5 position slide switch
Designators	Off, Auto, Low, Medium, High
Signal	2 wire, resistance output - 0, 2, 4, 6, 8 KΩ Custom ranges available, contact Greystone

Communications

3.5mm phono jack	Ring/Mid/Tip connections to a 3-pin terminal block

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
SPC	Room Humidity/Temperature Transmitter

CODE	Product Parameters
01	Humidity transmitter c/w setpoint control
02	Temperature transmitter c/w setpoint control
04	Humidity and temperature transmitter c/w setpoint control for temperature only
05	Humidity and temperature transmitter c/w setpoint control for humidity only
06	Humidity and temperature transmitter c/w setpoint control for humidity and temperature

CODE	Outputs
I	4-20mA
V	0-5Vdc or 0-10 Vdc (Jumper selectable)

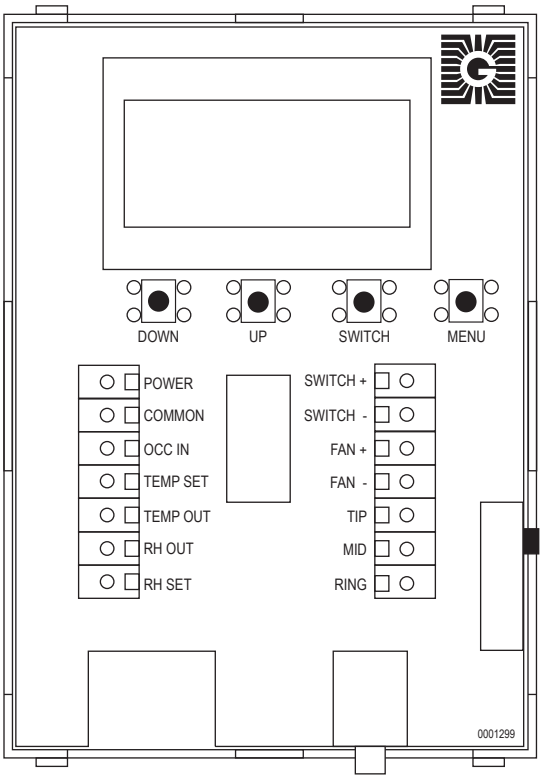
CODE	RH Accuracy (Not applicable on "02" model, leave blank)
02	2 %
03	3 %
05	5 %

CODE	Options (Multiple selections can be made)
S	Front panel push button momentary switch (NO)
J	External jack for remote system access (3.5 mm phono)
F	Fan Speed Switch, 5 position, (Off, Auto, Low, Mid, High)

SPC	06	I	03	S

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

PCB/WIRING INFORMATION



Terminal	Function
POWER	From +24 Vac/dc of controller or power supply
COMMON	To GND or COMMON of controller
OCC IN	To digital output of controller
TEMP Setpoint	To analog input of controller 4-20 mA or 0-5 Vdc or 0-10 Vdc
TEMP Output	To analog input of controller 4-20 mA or 0-5 Vdc or 0-10 Vdc
RH Output	To analog input of controller 4-20 mA or 0-5 Vdc or 0-10 Vdc
RH Setpoint	To analog input of controller 4-20 mA or 0-5 Vdc or 0-10 Vdc
SWITCH +	To digital input of controller
SWITCH -	To GND or COMMON of controller
FAN +	To analog input of controller Resistance input
FAN -	To GND or COMMON of controller
TIP	External Jack TIP (tip of plug) connection
MID	External Jack MID (middle of plug) connection
RING	External Jack RING (base of plug) connection

* Some models do not have all these features
**To save on number of connection wires, all GND or COMMON may connected together.
***Illustration shows standard wiring configuration. Custom configurations are available. Please contact Greystone.

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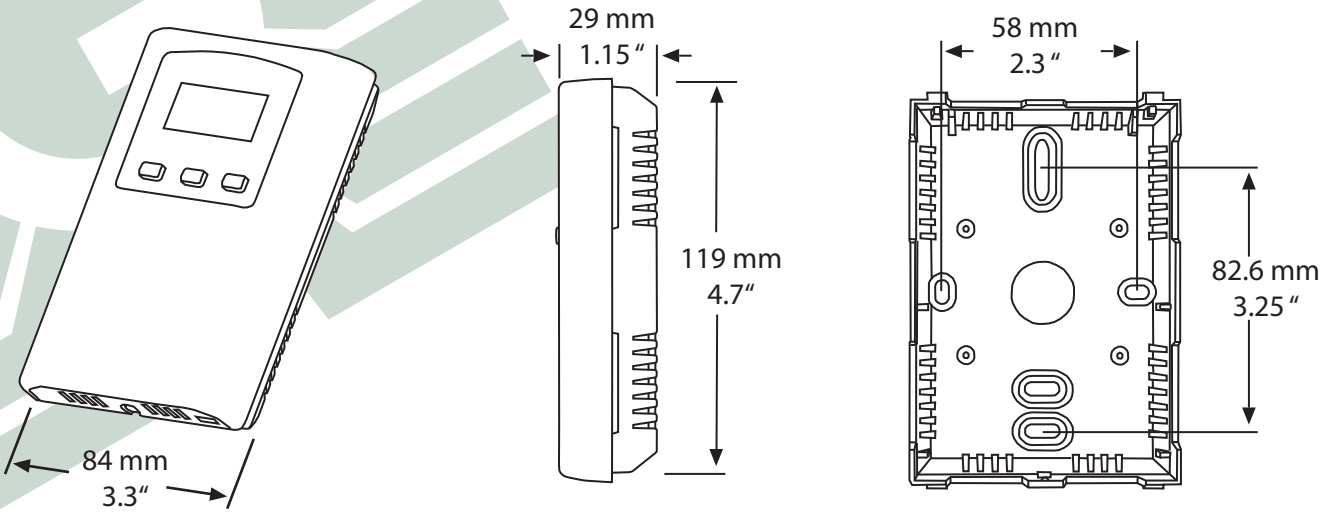
DIMENSIONS:



ACCESSORIES:

A35R
A multi-purpose screw driver that includes a standard flat screwdriver and a 1/16" allen key, and can be used on all Greystone wall sensors.

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RoHS COMPLIANT

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GREYSTONE ENERGY SYSTEMS INC

ROOM HUMIDITY TRANSMITTER
HRC Series

Precision humidity control/sensing

FEATURES:

- Highly stable RH sensor element
- Humidity range: 0-100%
- Accuracy available 2%, 3%, & 5%
- Choice of precision temperature sensors
- LCD display available
- Optional override, setpoint & fan speed control
- Field selectable outputs
- Custom logo available

Peace of mind through reliable humidity/temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The HRC Series room humidty transmitter uses a highly accurate and field-proven RH sensor in an attractive, low profile enclosure to monitor room relative humidity levels. Additional options include an occupancy override button, a communication jack, a fan speed switch, a slide-pot setpoint control, a resistive temperature sensor and a status LED or a LCD display. The RH output can be field selected as a linear 4-20 mA, 0-5 or 0-10 Vdc signal.

SPECIFICATIONS:

Sensor	Thermoset polymer based capactive
Accuracy	±2, 3 or 5% RH from 5 to 95% RH
Range	0 to 100% RH non-condensing
Hysteresis	± 3% RH
Response Time	15 seconds typical
Stability	±1.2% RH typical @ 50% RH in 5 years
Power Supply	24 Vac/dc ±10% (non-isolated half-wave rectified)
Consumption @ 24 Vdc	20 mA
Input Voltage Effect	Negligible over specified operating range
Output Signal	4-20 mA current loop, 0-5 Vdc or 0-10 Vdc - Jumper selectable
Output Drive @24 Vdc	550 ohm max. for current, 10K ohms min. for voltage
Output Resolution	10 bit PWM
Internal Adjustments	ZERO and SPAN pots
Protection Circuitry	Reverse voltage protected and output limited
Operating Conditions	0˚ to 50˚C (32˚-122˚F), 0-95% RH non-condensing
Enclosure	White ABS - IP30 (NEMA 1) 84mmW x 119mmH x 29mmD (3.3" x 4.7" x 1.15")
Wiring Connections	Screw terminal block (14 to 22 AWG)

OPTIONS:

Temperature

Sensor	Various Thermistors and RTD's available as 2 wire resistive output

Setpoint Adjustment

Type	Front panel slidepot, 2 wire resistance output
Range	0K to 10K Ω standard
Custom spans available	1K, 2K, 5K, 10K or 20K Ω

Manual Override

Type	Front panel, momentary pushbutton
Ratings	50 mA @12 Vdc, N.O., SPST

LCD DISPLAY

Display Range	00.0 to 99.9 %RH, 3 digit
Display Resolution	0.1˚ C/F
Display Size	38.1 mm W x 16.5 mm H (1.5" x 0.65")
Digit Height	11.43 mm (0.45")
Symbols	% RH

Status LED Input (N/A when LCD selected)

Signal Type	5 V current limited, 2-wire standard
LED Colors	Yellow (Y), Red (R) or Green (G),
Power Supply	5 Vdc standard, 10 or 24 Vdc optional

Communication Jacks

Molex	4 Pin header to 4 pin terminal block. Requires HHTA - Hand Held Adapter

Fan Speed Switch

Type	Side mounted, 5 position slide switch
Designators	Off, Auto, Low, Medium, High
Signal	2 wire, resistance output - 0, 2, 4, 6, 8 KΩ Custom ranges available, contact Greystone

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
HRC	Room Humidity Transmitter

CODE	RH Accuracy
2	2 %
3	3 %
5	5 %

CODE	Outputs
N	No LCD
L	LCD

CODE	Sensor
T2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
T5	1801 Ω, NTC Thermistor, ±0.2 C
T6	3000 Ω, NTC Thermistor, ±0.2 C
T7	10,000 Ω, type 3, NTC Thermistor, ±0.2 C
T8	2.252K Ω, NTC Thermistor, ±0.2 C
T12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
T13	1000 Ω Nickel, Class B, DIN 43760
T14	10,000 Ω, type 3, NTC Thermistor, ±0.2 C c/w 11K shunt resistor
T20	20,000 Ω, NTC Thermistor, ±0.2 C
T24	10,000 Ω, type 2, NTC Thermistor, ±0.2 C

CODE	Options (Multiple selections can be made)
P	0-10K linear slide pot for set point control (Other ranges available, contact Greystone)
S	Front panel push button momentary switch (NO)
Y	Yellow LED (n/a when LCD is selected)
R	Red LED (n/a when LCD is selected)
G	Green LED (n/a when LCD is selected)
E	External jack for remote system access (4-pin header)
F	Fan Speed Switch, 5 position, (Off, Auto, Low, Mid, High)

HRC	3	L	T7	P	S	← Typical Model Number

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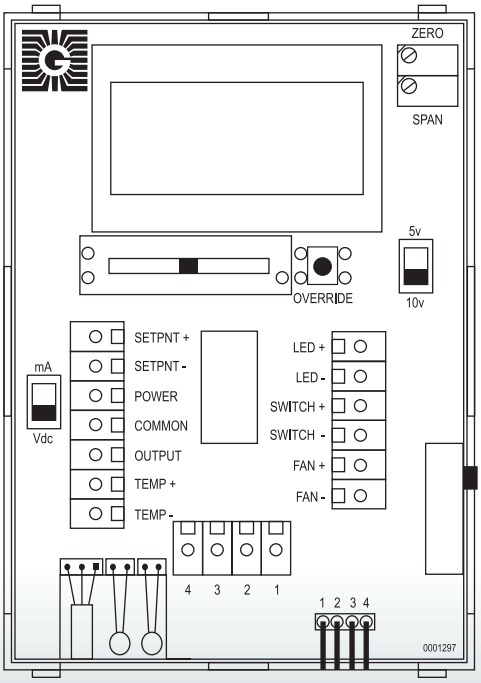
NOTE: Due to the many possible configurations, special part numbers may be required, please contact Greystone for more information.

PCB/WIRING INFORMATION



Terminal	Function
POWER	From +24 Vac/dc of controller or power supply
COMMON	To GND or COMMON of controller (for 24 Vac power or voltage output signal only)
OUTPUT	RH output to analog input of controller 4-20 mA or 0-5/0-10 Vdc
SETPNT + SETPNT -	Slide-pot output to analog input of controller (resistive output)
TEMP + TEMP -	Temperature sensor output to analog input of controller (resistive output)
LED + LED -	Positive input to LED (anode) from digital output Negative input to LED (cathode), 5Vdc standard
SWITCH + SWITCH -	Override switch + to digital input of controller Override switch - to COMMON of controller
FAN + FAN -	Fan speed switch + to analog input of controller Fan speed switch - to COMMON of controller
1	To External Jack PIN 1
2	To External Jack PIN 2
3	To External Jack PIN 3
4	To External Jack PIN 4

* Some models do not have all these features

**To save on number of connection wires, all GND or COMMON may connected together.

***Illustration shows standard wiring configuration. Custom configurations are available. Please contact Greystone.

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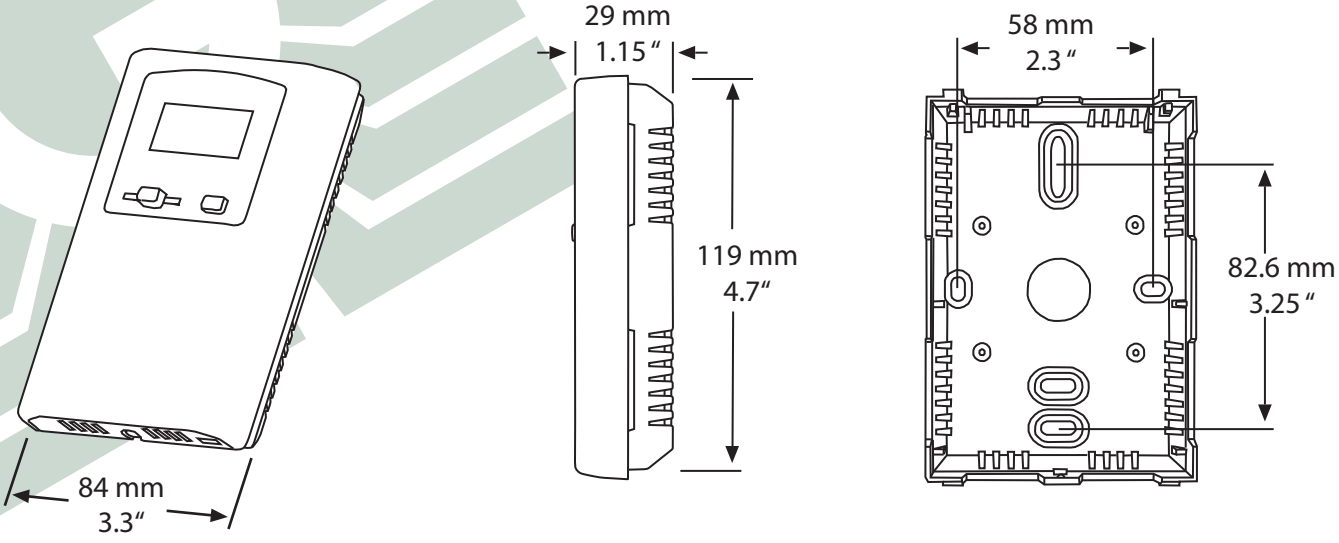
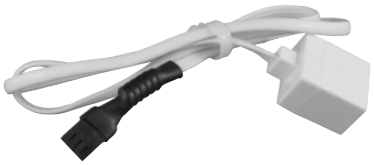
DIMENSIONS:



ACCESSORIES:



HHTA-XXX
The HHTA - Handheld Adapter converts the Greystone standard 4 pin connector to the connector of choice such as a RJ12, phone jack. Several styles and configurations are available. Please contact Greystone.

A35R
A multi-purpose screw driver that includes a standard flat screwdriver and a 1/16" allen key, and can be used on all Greystone wall sensors.

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GREYSTONE ENERGY SYSTEMS INC

RELATIVE HUMIDITY TRANSMITTER
RH Series

Precision humidity control/sensing

FEATURES:

- Highly stable RH sensor element
- Humidity range: 0-100%
- Accuracy available 2%, 3%, & 5%
- Choice of precision temperature sensors
- LCD display available
- Field selectable outputs
- AC/DC operation
- Custom logo available

Peace of mind through reliable humidity monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The RH series of humidity transmitters are designed for use in environmental monitoring and control systems where high performance and stability are demanded. It's state-of-the-art design combines digital linearization and temperature compensation with a world class capacitive sensor for reliability and accuracy in even the most critical applications. Various models cover many aspects of RH measurement and several optional features are available to meet virtually all HVAC applications.

SPECIFICATION:

Sensor Type:	Thermoset Polymer based capacitive
Accuracy at 25˚C:	±2, 3, or 5% RH, (5% to 95% RH)
Measurement Range:	0 to 100% RH
Temperature Dependence:	±0.05% RH/ ˚C
Hysteresis:	±1.5% RH maximum
Repeatability:	±0.5% RH typical
Linearity:	±0.5% RH typical
Sensor Response Time:	15 seconds typical
Stability:	±1% RH typical at 50% RH in 5 yrs.
Operating Temperature:	0˚ to 70˚C (32˚ to 158˚F) for RH100 -40˚ to 85˚C (-40˚ to 185˚F) for RH200/RH300
Operating Humidity:	0 to 95% RH non-condensing
Power Supply:	18 to 35 Vdc, 15 to 26 Vac
Consumption:	22 mA maximum
Input Voltage Effect:	Negligible over specified operating range
Protection Circuitry:	Reverse voltage protected and out limited
Output Signal:	4-20 mA current loop, 0-1, 0-5 or 0-10 Vdc (jumper-selectable)
Output Drive at 24 Vdc:	550 ohms max for current output 10K ohms min for voltage output
Internal Adjustments:	Clearly marked ZERO and SPAN pots
Wiring Connections:	Screw terminal block (14 to 22 AWG)
Optional LCD Display:	RH200A Only 3 digit for 00.0 to 99.9% RH, 24 x 11mm (0.95"w x 0.45"h)
Optional Temperature Sensor:	Various RTDs and thermistors available as two-wire resistance output (See Ordering Chart)
Enclosures:	RH100B (Designer), IP20 (Nema 1), 70x114x30mm, (2.75"w x 4.5"h x 1.2"d) RH200A (ABS), IP61 (Nema 2),114x84x53mm (4.5"w x 3.3"h x 2.1"d) RH200E (Round), IP65 (Nema 4X), 91mm (3.6") diameter x 53mm (2.1") deep RH200M (Metal), IP50 (Nema 1), 102x63x58mm (4"w x 3.3"h x 2.1"d) RH200W (Metal WP) IP64 (Nema 3X),115x72x56mm (4.5"w x 2.8"h x 2.5"d) RH300A (ABS WP) IP65 (Nema 4X),122x112x63mm (4.8"w x 4.8"h x 2.5"d)
RH200 Probe:	230 mm (9") probe length x 12.7 mm (1/2") diameter stainless steel with porous filter

PRODUCT ORDERING INFORMATION

MODEL	Product Description
RH100	Room
RH200	Duct
RH300	Outside Air

CODE	Style
A	ABS enclosure (RH200) and ABS hinged enclosure (RH300)
B	Designer room enclosure (RH100)
E	Round ABS enclosure c/w gasketed cover (RH200)
M	Metal box (RH200)
W	Aluminum weatherproof (RH200)

CODE	Accuracy
02	2%
03	3%
05	5%

CODE	Optional Temperature Sensor
L	100 Ω Platinum, IEC 751, 385 Alpha, thin film
C	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
F	1801Ω, NTC Thermistor, ±0.2˚C
E	3,000Ω, NTC Thermistor, ±0.2˚C
D	10,000Ω, Type 3, NTC Thermistor, ±0.2˚C
J	10,000Ω, Type 2, NTC Thermistor, ±0.2˚C
K	20,000Ω, NTC Thermistor, ±0.2˚C
M	1000 Ω Nickel, Class B, DIN 43760
B	10,000Ω Type 3, NTC Thermistor, ±0.2 C c/w 11K shunt Resistor
G	2.252KΩ Thermistor, ±0.2 C

CODE	Options
AC	LCD display (RH200A only)

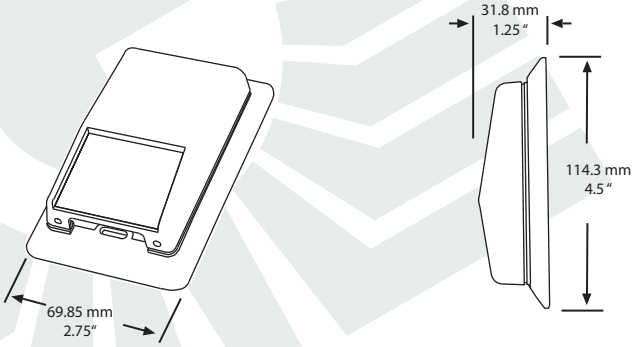
RH200	**A**	**03**	**C**	**-**

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

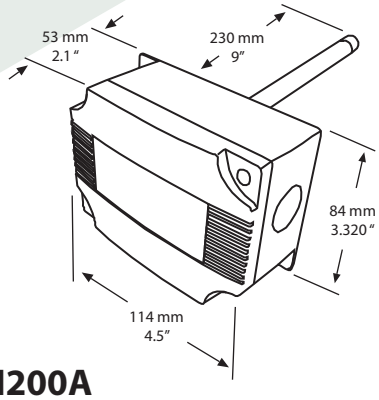
EXAMPLE:

RH200A03C - Duct humidity c/w ABS enclosure, 3% accuracy and 1000 Ω temperature sensor.

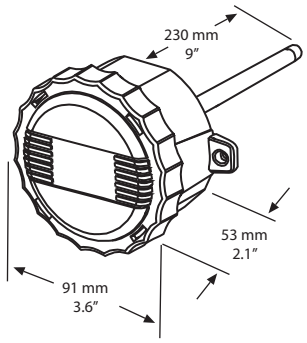
ENCLOSURE DIMENSIONS



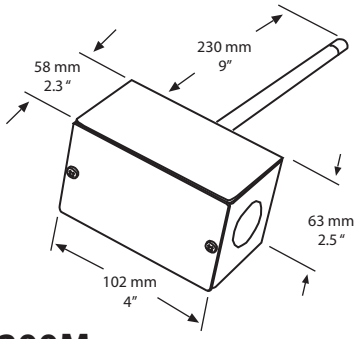
RH100B



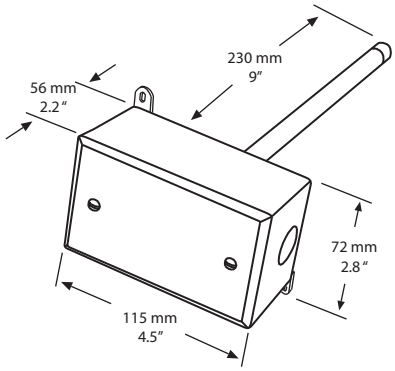
RH200A



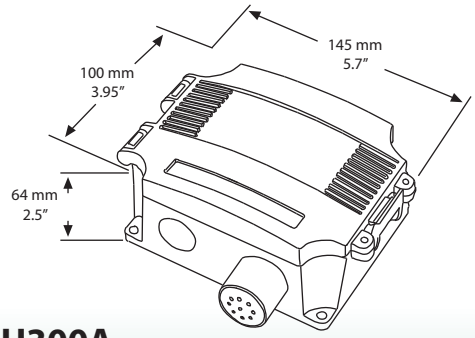
RH200E



RH200M



RH200W



RH300A

RH100S - S/S HUMIDITY TRANSMITTER

The RH100S Stainless Steel Wall Plate Relative Humidity unit uses a field-proven capacitive type humidity sensor and microprocessor temperature compensation for reliable, accurate measurement of indoor humidity.

The wall plate sensor is perfect for locations requiring periodic wipe down as it features a 304 stainless steel plate with a neoprene gasket. The sensor is protected by a 100 micron sintered stainless steel filter.

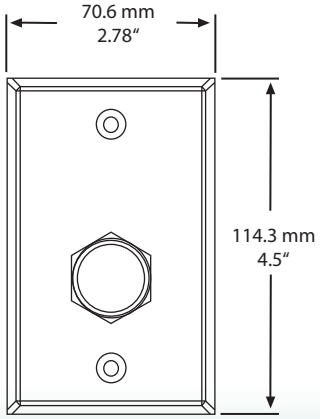
This product is available as a humidity sensor only or with various direct temperature sensors.

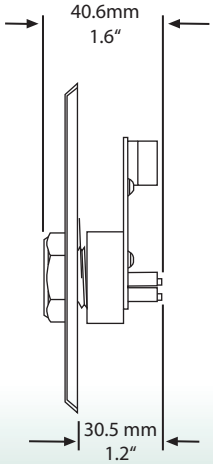
The plate sensor is available with either 4-20 mA or 0-5 Vdc or 0-10 Vdc output signal types and the transmitter is located on the back of the plate for ease of installation.

SPECIFICATION: RH100S

Sensor Type:	Thermoset Polymer based capacitive
Accuracy at 25˚C:	±3 or 5% RH, (5% to 95% RH)
Measurement Range:	0 to 100% RH
Hysteresis:	±3% RH maximum
Sensor Response Time:	15 seconds typical
Stability:	±1.2% RH typical
Operating Temperature:	0˚ to 70˚C (32˚ to 158˚F)
Operating Humidity:	0 to 95% RH non-condensing
Sensor Protection:	100 micron sintered filter
Power Supply:	18 to 35 Vdc, 20 to 26 Vac
Consumption:	22 mA maximum
Input Voltage Effect:	Negligible over specified operating range
Protection Circuitry:	Reverse voltage protected and output limited
Output Signal:	4-20 mA current loop, 0-5 or 0-10 Vdc
Output Drive at 24 Vdc:	550 ohms max for current output 10K ohms min for voltage output
Internal Adjustments:	Clearly marked ZERO and SPAN pots
Wiring Connections:	Screw terminal block (14 to 22 AWG)
Optional Temperature Sensor:	Various RTDs and thermistors available as two-wire resistance output (See Ordering Chart)
Enclosure:	Stainless Steel, IP50 (Nema 1), 70.6x114.3x41mm (2.8”w x 4.5”h x 1.6”d)

ENCLOSURE DIMENSIONS





RoHS COMPLIANT

RH100S PRODUCT ORDERING INFORMATION

MODEL	Product Description
RH100S	S/S Surface Humidity Transmitter

CODE	Accuracy
03	3%
05	5%

CODE	Output
I20	4-20mA output
V05	0-5Vdc output
V10	0-10Vdc output

CODE	Optional Temperature Sensor
L	100Ω Platinum, IEC 751, 385 Alpha, thin film
C	1000Ω Platinum, IEC 751, 385 Alpha, thin film
F	1801Ω, NTC Thermistor, ±0.2˚C
E	3,000Ω, NTC Thermistor, ±0.2˚C
D	10,000Ω, type 3, NTC Thermistor, ±0.2˚C
J	10,000Ω, type 2, NTC Thermistor, ±0.2˚C
K	20,000Ω, NTC Thermistor, ±0.2˚C
M	1000 Ω Nickel, Class B, DIN 43760
B	10,000Ω Type 3, NTC Thermistor, ±0.2 C c/w 11K shunt Resistor
G	2.252KΩ Thermistor, ±0.2 C

CODE	Options
TP	Tamperproof Screws

RH100S	03	I20	D	-

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ACCESSORIES:

A35R
A multi-purpose screw driver that includes a standard flat screwdriver and a 1/16" allen key, and can be used on all Greystone wall sensors.

94062A114
A No 6, Spanner screwdriver for use with the tamperproof screw option (TP) on RH100S series surface humidity sensors.

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RoHS COMPLIANT

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GREYSTONE ENERGY SYSTEMS INC

ROOM HUMIDITY/ TEMPERATURE TRANSMITTER HTRC Series

Precision humidity/temperature control/sensing

FEATURES:

- Highly stable RH sensor element
- Humidity range: 0-100%
- Accuracy available 2%, 3%, & 5%
- Choice of precision temperature sensors
- LCD display available
- Optional override, setpoint & fan speed control
- Field selectable outputs
- Custom logo available

Peace of mind through reliable humidity/temperature monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The HTRC Humidity/Temperature transmitter incorporates two sensors in one attractive wall mount enclosure for the most efficient environmental monitoring and control system. It uses a field-proven RH sensor to monitor relative humidity and a curve-matched thermistor to measure temperature and provides two analog outputs of either 4-20 mA, 0-5Vdc or 0-10 Vdc .

Additional options include an occupancy override button, a communication jack, a fan speed switch or a LCD display.

SPECIFICATIONS:

RH Sensor	Thermoset polymer based capactive
Accuracy	±2, 3 or 5% RH from 5 to 95% RH
Range	0 to 100% RH non-condensing
Temperature Compensation.	0˚ to 50˚C (32˚-122˚F)
Hysteresis	± 3% RH
Response Time	15 seconds typical
Stability	±1.2% RH typical @ 50% RH in 5 years
Offset	±20% RH, programmable
Temperature Sensor	Curve-matched thermistor
Accuracy	±0.2˚C (±0.4˚F)
Range	0˚ to 35˚C (32˚ to 95˚F) or 0˚ to 50˚C (32˚ to 122˚F), programmable
Power Supply	24 Vac/dc ±10% (non-isolated half-wave rectified)
Consumption	60 mA max @ 24 Vdc
Input Voltage Effect	Negligible over specified operating range
Output Signal	4-20 mA active (sourcing), 0-5 Vdc or 0-10 Vdc
Output Drive @24 Vdc	550 ohm max. for current, 10K ohms min. for voltage
Output Resolution	10 bit PWM
Protection Circuitry	Reverse voltage protected and output limited
Operating Conditions	0˚ to 50˚C (32˚-122˚F), 0-95% RH non-condensing
Programming/Selection	Via intenal push buttons and on-screen menu
Wiring Connections	Screw terminal block (14 to 22 AWG)
Enclosure Size	84mmW x 119mmH x 29mmD (3.3" x 4.7" x 1.15")

OPTIONS:

LCD DISPLAY

Range	00.0 to 99.9, 3 digit
Symbols	˚C, ˚F, %RH
Display Size	38.1 x 16.5 mm (1.5" x 0.65")
Digit Height	11.43 mm (0.45")
Backlight	Enable/disable via menu

OVERRIDE

Type	Front panel, momentary push-button, 2 wire dry contact
Switch ratings	N.O., SPST, 50 mA @12 Vdc

FAN SPEED SWITCH

Type	Side panel mount, 5 postion switch
Range	Off, Auto, Low, Medium, High
Signal	Resistance: 0, 2, 4, 6, 8 KΩ (Custom ranges available)

NETWORK COMMUNICATIONS

3.5mm phono jack	Ring/Mid/Tip connections to a 3-pin terminal block

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
HTRC	Room Humidity/Temperature Transmitter

CODE	RH Accuracy
2	2 %
3	3 %
5	5 %

CODE	LCD Display
N	Concealed
L	Viewable

CODE	Output
I	4-20 mA
V	0-5 Vdc or 0-10 Vdc (Jumper selectable)

CODE	Options (Multiple selections may be made)
S	Override switch (Includes occupied input)
C	Communication jack (3.5 mm phono)
F	Fan speed switch

HTRC	3	N	I	-	-	← Typical Model Number

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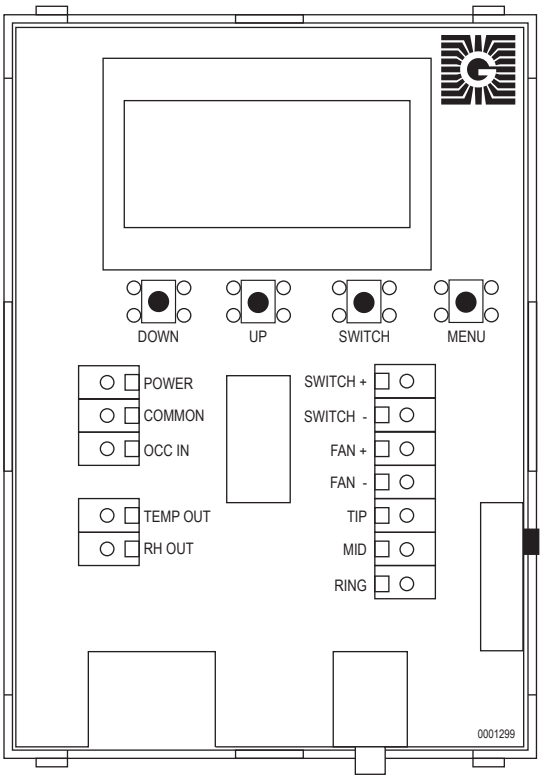
PCB/WIRING INFORMATION



Terminal	Function
POWER	From +24 Vac/dc of controller or power supply
COMMON	To GND or COMMON of controller
OCC IN	To digital output of controller
TEMP Output	To analog input of controller 4-20 mA or 0-5 Vdc or 0-10 Vdc
RH Output	To analog input of controller 4-20 mA or 0-5 Vdc or 0-10 Vdc
SWITCH +	To digital input of controller
SWITCH -	To GND or COMMON of controller
FAN +	To analog input of controller Resistance input
FAN -	To GND or COMMON of controller
TIP	External Jack TIP (tip of plug) connection
MID	External Jack MID (middle of plug) connection
RING	External Jack RING (base of plug) connection

* Some models do not have all these features
**To save on number of connection wires, all GND or COMMON may connected together.
***Illustration shows standard wiring configuration. Custom configurations are available. Please contact Greystone.

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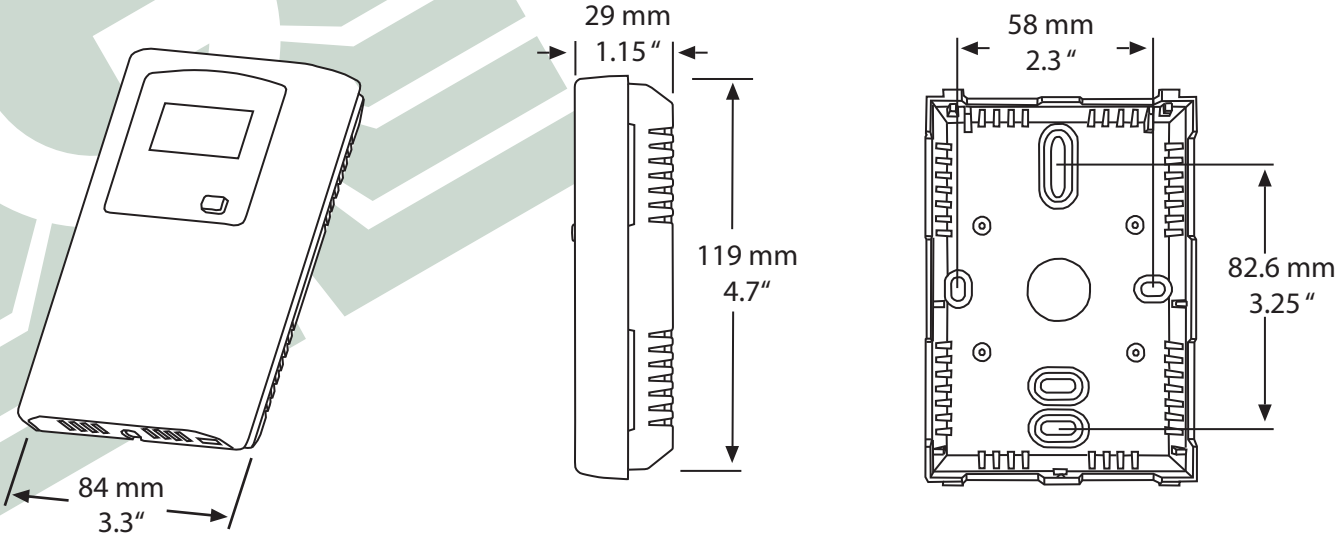
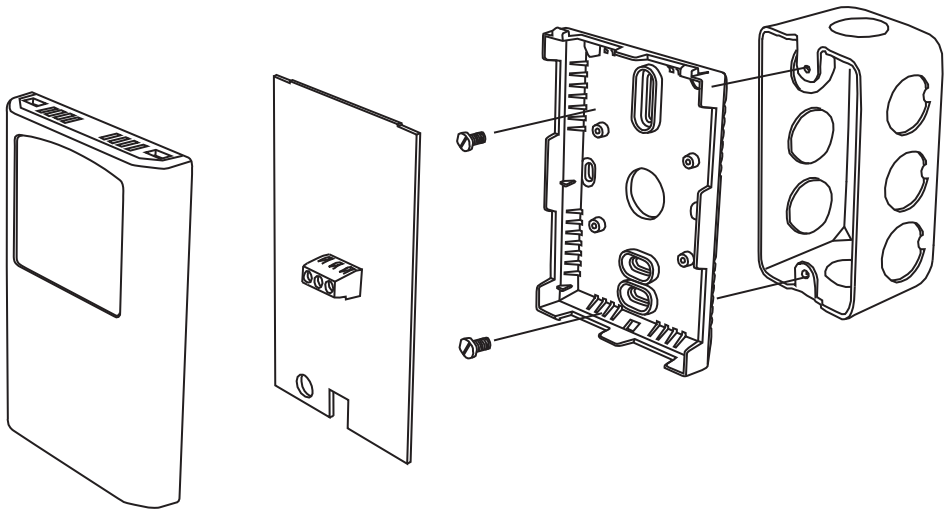
DIMENSIONS:





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RoHS COMPLIANT

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GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

HUMIDITY/TEMPERATURE TRANSMITTER
RH Series

Precision humidity/temperature control/sensing

FEATURES:

- Highly stable RH sensor element
- Humidity range: 0-100%
- Accuracy available 2%, 3%, & 5%
- Precision Platinum RTD for Temperature
- AC/DC operation
- Custom logo available

Peace of mind through reliable humidity monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The RH series of humidity/temperature transmitters are designed for use in environmental monitoring and control systems where high performance and stability are demanded. It's state-of-the-art design combines digital linearization and temperature compensation with a world class capacitive humidity sensor and platinum RTD for reliability and accuracy in even the most critical applications. Various models cover many aspects of RH and temperature measurement and several optional features are available to meet virtually all HVAC applications.

SPECIFICATION:

Humidity Sensor Type:	Thermoset Polymer based capacitive
Accuracy at 25˚C:	±2, 3, or 5% RH, (5% to 95% RH)
Measurement Range:	0 to 100% RH
Temperature Dependence:	±0.05% RH/ ˚C
Hysteresis:	±1.5% RH maximum
Repeatability:	±0.5% RH typical
Linearity:	±0.5% RH typical
Sensor Response Time:	15 seconds typical
Stability:	±1% RH typical at 50% RH in 5 yrs.
Temperature Sensor Type:	1000Ω Platinum, IEC 751, 385 Alpha, thin film
Accuracy:	±0.1% of span
Operating Temperature:	0˚ to 70˚C (32˚ to 158˚F) for RH110 -40˚ to 85˚C (-40˚ to 185˚F) for RH210/RH310
Operating Humidity:	0 to 95% RH non-condensing
Power Supply:	18 to 35 Vdc, 15 to 26 Vac (RH110B is Vdc only)
Consumption:	22 mA maximum
Input Voltage Effect:	Negligible over specified operating range
Protection Circuitry:	Reverse voltage protected and output limited
Output Signals:	**RH110B:** 4-20 mA output only **RH210A/RH310A:** 4-20 mA, 0-5 or 0-10 Vdc
Output Drive at 24 Vdc:	550 ohms max for current output 10K ohms min for voltage output
Internal Adjustments:	Clearly marked ZERO and SPAN pots
Wiring Connections:	Screw terminal block (14 to 22 AWG)
Enclosures:	RH110B (Designer), IP20 (Nema 1), 70x114x30mm, (2.75"w x 4.5"h x 1.25"d) RH210A (ABS), IP61 (Nema 2),114x84x53mm (4.5"w x 3.3"h x 2.1"d) RH310A (ABS WP) IP65 (Nema 4X),145x100x64mm (5.7"w x 3.95"h x 2.5"d)
RH210 Probe:	230 mm (9") probe length x 12.7 mm (1/2") diameter stainless steel with porous filter

RELATIVE HUMIDITY: PRODUCT ORDERING INFORMATION

MODEL	Product Description, Dual transmitter - Humidity and Temperature
RH110B	Designer Space
RH210A	Duct
RH310A	Outside Air

CODE	Accuracy
02C	2%
03C	3%
05C	5%

CODE	Power Supply
1	24 Vdc (RH110B)
2	24 Vac/Vdc (RH210A & RH310A)

CODE	Output Signals (RH and Temperature)
A	4 - 20 mA
D	0 - 5 Vdc (RH210A and RH310A only)
E	0 - 10 Vdc (RH210A and RH310A only)

CODE	Transmitter Span Range
1	0˚C - 35˚C (32˚F - 95˚F)
2	0˚C - 50˚C (32˚F - 122˚F)
3	0˚C - 100˚C (32˚F - 212˚F)
6	-50˚C - 50˚C (-58˚F - 122˚F)

RH110B	03C	1	A	1

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EXAMPLE:

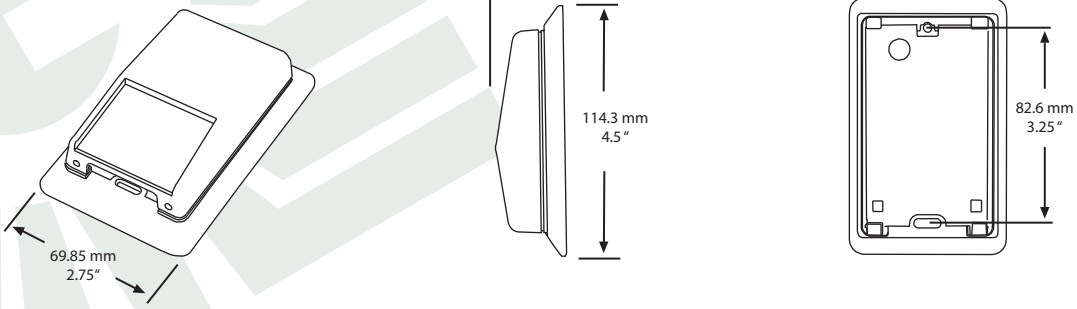
RH110B03C2A1

3% Space designer humidity c/w temperature transmitter with 1000Ω RTD, 24 Vdc power supply, 4 - 20mA output over 0˚C - 35˚C (32˚F - 95˚F).

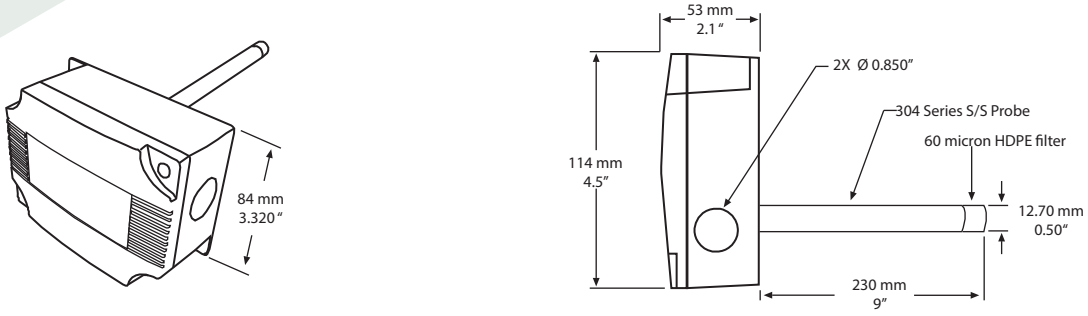
Note: Remote display option also available, see Miscellaneous Control Devices data sheet.

ENCLOSURE DIMENSIONS

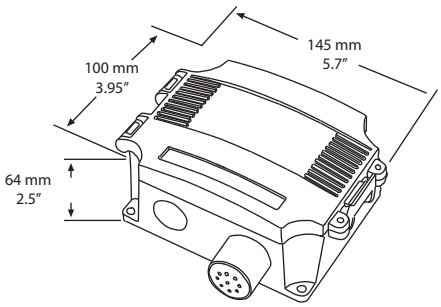
RH110B



RH210A



RH310A



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GREYSTONE ENERGY SYSTEMS INC

ROOM PRESSURE MONITOR
RPC Series

Precision room pressure control/sensing

FEATURES:

- Low pressure monitoring to -0.125"WC (30Pa)
- 4 selectable ranges per model
- Precision silicon sensor
- Selectable analog outputs
- Optional BACnet Communications
- Alarm functions with selectable trip point
- Easy set up via menu on LCD display

Peace of mind through reliable pressure monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The RPC Series room pressure monitor/transmitter is used to measure differential pressure in the range of 0.125 to 1"WC or 30 to 250 Pa and provide either an analog or BACnet compatible signal to a building automation system.

It combines precision high sensitivity silicon sensing capabilities and the latest ASIC technology to substantially reduce offset errors due to changes in temperature, stability to warm up, long term instability and position sensitivity.

It features an LCD to display the pressure value, several bi-directional pressure ranges and field-selectable output signal types for the most flexible application. The device has an on-board auto-zero function. It features an alarm output with a adjustable trip points for high and low alarm levels, an on-board buzzer, a remote buzzer output with silence switch and a flashing alarm LED.

SPECIFICATIONS:

Pressure Ranges	± 1" WC, ± 0.5" WC, ± 0.25" WC, ± 0.125" WC ± 250 Pa, ± 125 Pa, ± 60 Pa, ± 30 Pa
Accuracy	± 1% F.S.O. (±2% F.S.O. for 0.125"WC and 30 Pa ranges)
Stability	± 1% FS max (1 year)
Thermal Effects	< ± 3.5% FS max, 5 - 50˚C (41 - 122˚F)
Response Time	0 - 60 Sec (menu selectable)
Proof Pressure	100" WC (24.9 kPa)
Burst Pressure	200" WC (49.8 kPa)
Operating Conditions	0 - 60˚C (32 - 140˚F), 10 - 90% RH non-condensing
Storage Temperature	-40 - 70˚C (-40 - 158˚F)
Media Compatibility	Dry air and inert gas
Zero Adjustment	Pushbutton auto-zero
Power Supply	24 Vac/dc, ±10%
Power Consumption	70 mA max with alarms on (80 mA with BACnet option)
Output Signal	4-20 mA (3-wire), 0-5 Vdc or 0-10 Vdc (3-wire), field selectable
Output Drive	750 Ω max (4-20 mA), 2KΩ min (voltage)
Input Voltage Effect	Negligible over specified operating range
Protection Circuitry	Reverse voltage protected and output limited
Wiring Connections	Screw terminal block (14 to 22 AWG)
Pressure Connections	Ports for 1/16" ID tubing (1/8" ID Adapters included)
Enclosure	Wall mount, White ABS, IP30 (NEMA1)
Dimensions	84 W x 119 H x 29 D mm (3.3" x 4.7" x 1.15")
Weight	115 grams (4 oz)

LCD DISPLAY

Display Size	38.1 x 16.5 mm (1.5" x 0.65")
Digit Height	11.43 mm (0.45")
Symbols	" WC, Pa
Backlight	Enable/disable via menu

ALARM FUNCTIONS

Alarm Relay Output	N.O. contact, 2 Amps @ 120 Vac or 30 Vdc
Alarm Relay Trip Point	Upper and lower trip levels adjustable over the pressure range
Alarm Relay Delay	0 to 10 Minutes (menu selectable)
Alarm Visual Indication	Red flashing LED
Alarm Audible Indication	On-board buzzer, 85 db on high range (menu selectable)
Remote Buzzer Output	Output to control remote audible alarm. (Part Number AA-1)

OPTIONAL BACnet COMMUNICATIONS

Communications	2-wire RS-485, BACnet MS/TP protocol
Baud Rate	Locally set to 9600, 19200, 38400 or 76800
MAC Address Range	Locally set to 0-127 (factory default is 3)

BACnet® COMMUNICATION

BACnet® is a data communication protocol for building automation and control networks. The detector communicates on a standard 2-wire RS-485 MS/TP (master-slave/token-passing) network designed to run at speeds from 9600 to 76800 baud over twisted pair wiring.

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
RPC	Room Pressure Monitor\Transmitter

CODE	Range
1	±1 "WC, ±0.5 "WC, ± 250 Pa, ± 125 Pa
2	±0.25 "WC, ± 0.125 "WC, ± 60 Pa, ± 30 Pa

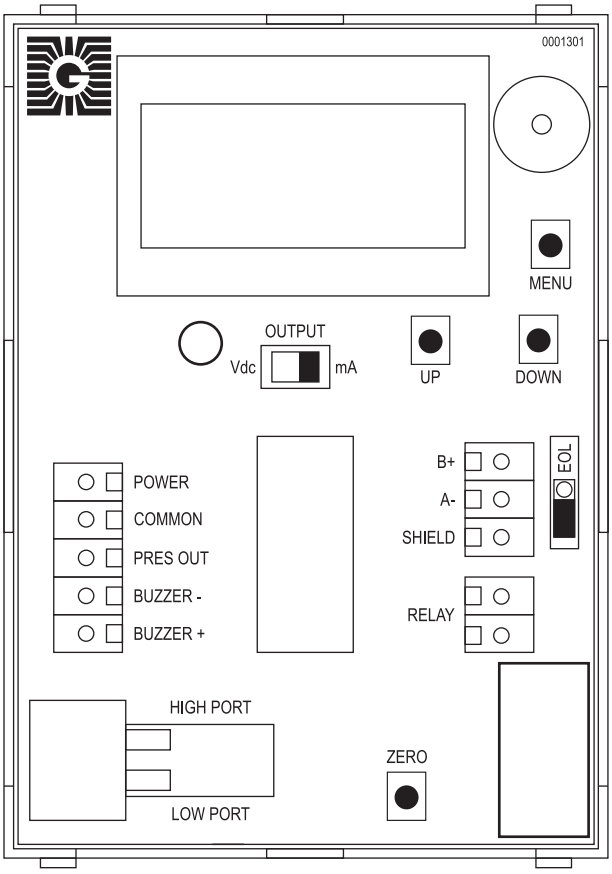
CODE	Communications
-	None (Leave blank)
BAC	BACnet Communications

CODE	Options
AC	Continental pick-up port
SP	Stainless plate pick-up port
OP	Outside pick-up port

RPC	1	BAC	AC

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

PCB/WIRING INFORMATION



Terminal	Function
POWER	From +24 Vac/dc of controller or power supply
COMMON	To GND or COMMON of controller
PRES OUT	To analog input of controller 4-20 mA or 0-5 Vdc or 0-10 Vdc
BUZZER -	To GND or COMMON of controller
BUZZER +	+24 Vac/dc to remote buzzer (Part # AA-1)
B +	To + of communications bus
A -	To - of communications bus
SHIELD	To communications bus shield
RELAY	To digital input of controller

* Some models do not have all these features

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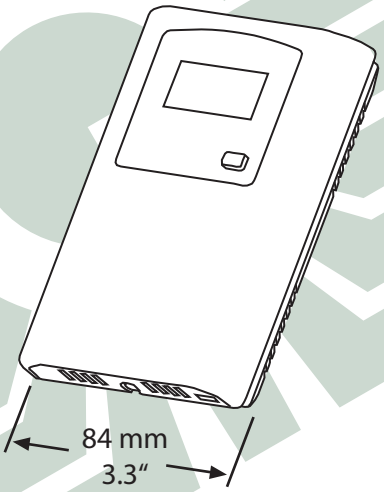
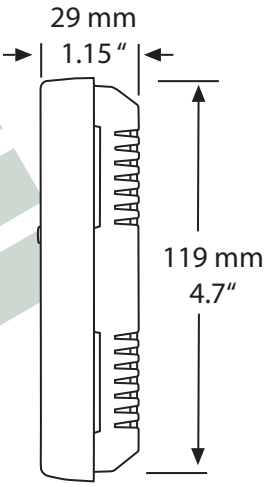
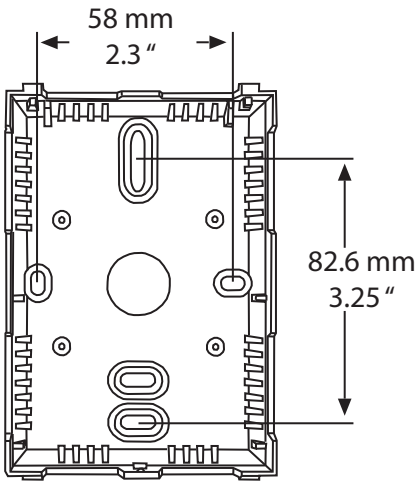
DIMENSIONS:







ACCESSORIES:

Continental (AC)
Pick-up Port
(AC Option)

Outside
Pick-up Port
(OP Option)

Stainless Plate
Pick-up Port
(SP Option)

Remote Audible Alarm
Part # AA-1
(to be ordered
separately)

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RoHS COMPLIANT

Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

V.12/13

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GREYSTONE ENERGY SYSTEMS INC

ULTRA LOW PRESSURE TRANSMITTERS
ULP Series

Precision low pressure control/sensing

FEATURES:

- Ranges between -0.125”WC and 1”WC (-30 Pa and 250 Pa)
- Analog output or BAC communications
- 8 switch selectable pressure ranges on analog model
- 2 selectable pressure ranges on BACnet model
- 3 switch selectable current or voltage outputs
- Optional LCD display (Standard on BACnet model)
- Optional alarm relay output (Standard on BACnet model)

Peace of mind through reliable pressure monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The ULP Series Ultra Low Pressure Transmitter is used to measure differential pressure in the range of -0.125 to 1"WC (-30 to 250 Pa) and is available in two models, analog output or BACnet communications. It combines precision high sensitivity silicon sensing capabilities and the latest ASIC technology to substantially reduce offset errors due to changes in temperature, stability to warmup, long term instability and position sensitivity.

It is ideal for monitoring pressure for air or other clean inert gas. It features several field selectable uni- or bi-directional pressure ranges for the most flexible application. The device has an on-board auto-zero function as well as a connection for remote zeroing.

Options include an LCD to display the pressure value and an alarm relay with a variable trip point. The LCD and alarm relay are standard on the BACnet model.

SPECIFICATIONS:

Pressure Ranges	**Analog Output Model**
	ULP(*)1 ±1" WC, 0-1" WC, ±0.5" WC, 0-0.5" WC, ±250 Pa, 0-250 Pa, ±125 Pa, 0-125 Pa
	ULP(*)2 ±0.25" WC, 0-0.25" WC, ±0.125" WC, 0-0.125" WC, ±60 Pa, 0-60 Pa, ±30 Pa, 0-30 Pa
	BACnet Communications Model
	ULP1BAC ±1" WC or ±250 Pa
	ULP2BAC ±0.25" WC or ±60 Pa
Accuracy	± 1% FS of selected range
Stability	± 1% FS (1 year)
Thermal Effect	± 2% FS max , 10 - 40˚C (50 - 104˚F)
Response Time	**Analog Model:** 5 or 30 Seconds, switch selectable
	BACnet Model: 1 to 60 Seconds, menu or BACnet selectable
Proof Pressure	100 "WC (24.9 kPa) for ULP1, 40 "WC (9.96 kPa) for ULP2
Burst Pressure	200 "WC (49.8 kPa) for ULP1, 80 "WC (19.9 kPa) for ULP2
Operating Conditions	0 - 60˚C (32 - 140˚F), 0 - 90 %RH non-condensing
Storage Temperature	-40 - 95˚C (-40 - 203˚F)
Media Compatibility	Dry air or inert gas
Zero Adjust	**Analog Model:** Pushbutton or digital input auto-zero
	BACnet Model: Pushbutton or via BACnet
Power Supply	24 Vac/dc ± 10%
Power Consumption	**Analog Model:** 55 mA max. with relay option
	BACnet Model: 50 mA max.
Input Voltage Effect	Negligible over specified operating range
Protection Circuitry	Reverse voltage protected and output limited
Wiring Connections	Screw terminal block (14 to 22 AWG)
Pressure Connections	Barbed ports for 1/8" to 3/16" ID tubing
Conduit Connection	Access hole for 1/2" NPT conduit or cable gland
Enclosure	Grey ABS with gasket, UL94-5VB
	145 W x 101 H x 63 D mm (5.7" x 4.0" x 2.5")
Weight	260 g (9.2 oz)
ANALOG OUTPUT	
Output Signal	4-20 mA (3-wire), 0-5 or 0-10 Vdc (3-wire), field selectable
Output Drive	750 Ω max (4-20 mA), 2 KΩ min (voltage)
BACnet COMMUNICATIONS	
Communications	2-wire RS-485, BACnet MS/TP protocol
Baud Rate	Locally set to 9600, 19200, 38400 or 76800
MAC Address Range	Locally set to 0-127 (factory default is 3)
LCD DISPLAY (Standard on BACnet Model)	
Display Size	38.1 x 16.5 mm (1.5" x 0.65")
Digit Height	11.43 mm (0.45")
Symbols	" WC, Pa
Backlight	Enable/disable (switch selectable)
ALARM FUNCTIONS (Standard on BACnet Model)	
Alarm Relay Output	N.O. contact, 2 Amps @ 120 Vac or 30 Vdc
Alarm Relay Trip Point	**Analog Model:** Adjustable over the pressure range (forward or reverse acting)
	BACnet Model: Upper and Lower alarms adjustable over the pressure range
Alarm Relay Delay	**Analog Model:** 10 or 60 Seconds, switch selectable
	BACnet Model: 0 to 10 Minutes, menu or BACnet selectable

ANALOG PRODUCT ORDERING INFORMATION:

MODEL	Product Description
ULP	Ultra Low Pressure Transmitter

CODE	Display
A	No display
B	LCD Display

CODE	Pressure Ranges - Switch Selectable
1	±1 "WC, 0-1 "WC, ±0.5 "WC, 0-0.5 "WC, ±250 Pa, 0-250 Pa, ±125 Pa, 0-125 Pa
2	±0.25 "WC, 0-0.25 "WC, ±0.125 "WC, 0-0.125 "WC, ±60 Pa, 0-60 Pa, ±30 Pa, 0-30 Pa

CODE	Alarm Relay Output
-	None (Leave blank)
R	Alarm relay, N.O. 2 Amps @ 120 Vac or 30 Vdc

ULP B 1 R ← **Typical Model Number**

Greystone Energy Systems Inc. reserves the right to make design modifications without prior notice.

BACnet PRODUCT ORDERING INFORMATION:

MODEL	Product Description
ULP	Ultra Low Pressure Transmitter

CODE	Pressure Ranges - Selectable
1	±1 "WC or ±250 Pa
2	±0.25 "WC or ±60 Pa

CODE	Communications
BAC	BACnet Communications

ULP 1 BAC ← **Typical Model Number**

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BACnet® COMMUNICATION

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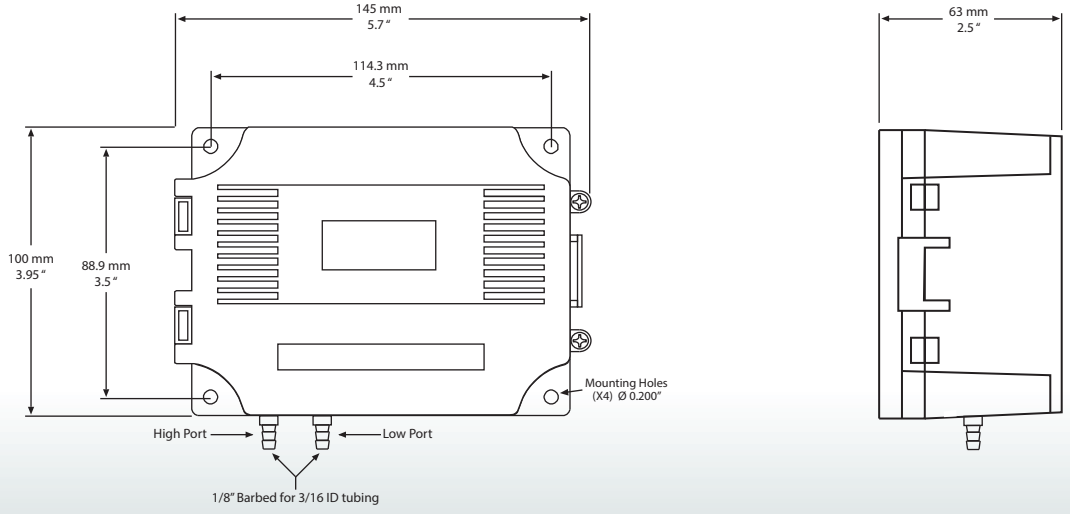
DIMENSIONS:



RoHS COMPLIANT

ACCESSORIES:

RPV
Stainless Steel Pick-up Port

The RPV is a stainless steel wall plate that incorporates a filtered port with a 1/8" barb connection for pneumatic tubing. It can be mounted on a standard junction box or directly to a wall or ceiling and used in conjunction with a low pressure transmitter to monitor room pressure.

CPV
Continental ABS Pick-up Port

The CPV is a low profile, decorative ABS enclosure that incorporates a port with a 3/16" barb fitting for connection of 0.17" ID pneumatic tubing. It can be mounted on a standard junction box or directly to a wall and used in conjunction with a low pressure transmitter to monitor room pressure.

OPV
Outside Pick-up Port

The OPV, is a weatherproof ABS enclosure with wind shield that incorporates a port with a 3/16" barb fitting for connection of 0.17" ID pneumatic tubing. It can be mounted on the side of a building and used in conjunction with a low pressure transmitter to monitor building pressure.

FPP & SPP Series
Pitot Tube

The FPP and SPP series are used to sense velocity pressure or static pressure respectively. Constructed of 304 stainless steel probes with an ABS mounting bracket, they available in 150 mm (6") or 300 mm (12") lengths. Kits are available for differential and static that are complete with pneumatic tubing.

DPFS Series
Differential Pressure Probe

The DPFS series Averaging Flow Sensor is ideal for sensing differential pressure in the inlet section of variable air volume terminal units and fan terminal units. Units can also be used to sense differential pressure at other locations in the main or branch duct systems. They are made of ABS/polycarbonate (UL94-5V) and available in lengths from 100 mm (4") to 560 mm (22")

MP Series
Differential Pressure Probes

The MP series Air Velocity Pitot Tubes are used in conjunction with a DP transmitter to calculate airflow in larger ducts or in areas of turbulent airflow. The units come in pairs in either ABS or 316 S/S and are available in various lengths from 610 mm (24") to 2000 mm (80"). Gasketed mounting collars for both probes are included.

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GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

LOW PRESSURE TRANSMITTERS
LP3 Series

LP3 c/w LCD

LP3 c/w integrated static probe

Precision low pressure control/sensing

FEATURES:

- Jumper selectable 2 wire current and 3 wire voltage outputs
- 24 Vac/dc power supply
- Six variable jumper selectable pressure ranges, W.C. & Pa.
- Available options include LCD display and integrated static probe

Peace of mind through reliable pressure monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

APPLICATIONS:

- HVAC/VAV
- Process Control
- Air Flow Monitoring
- Drop Across Air Filters
- Hydraulic Pressures
- Pneumatic Pressures

SPECIFICATION:

Accuracy:	±1% F.S.O.
Measurement Type:	Differential (two port)
Response Time:	250 ms
Stability:	< ±1% F.S.O. per year
Thermal Effects:	< ±3% over compensated range
Compensated Range:	0 - 50˚ C (32 - 122˚F)
Proof Pressure:	40" W.C. (100" for 12" and 20" models)
Burst Pressure:	60" W.C. (200" for 12" and 20" models)
Operating Conditions:	0 - 70˚C (32 - 158˚F), 10 - 90 %RH, non-condensing
Media Compatibility:	Non-corrosive, non-ionic fluids such as clean dry air or inert gases
Power Supply:	20 - 28 Vac/dc (non-isolated half-wave rectified)
Supply Current:	< 4 mA
Input Voltage Effect:	Negligible over specified operating range
Protection Circuitry:	Reverse voltage protected and out limited
Output Signal:	4-20 mA (2-wire), 0-5 or 0-10 Vdc (3-wire), switch selectable
Output Drive Capabilities:	Current: 400 ohms max @ 24 vdc Voltage: 10K ohms min
Zero Adjustments:	Pushbutton auto-zero
Wiring Connections:	Screw terminal block (14 to 22 AWG)
Pressure Connection:	Barbed ports for 5 mm (0.170") ID flexible tubing
Conduit Connection:	Access hole for ½" NPT conduit or cable gland
Optional Display:	3½ digit LCD, 0.4" digit height
Enclosures:	ABS, UL94-5VB, IP61 (NEMA 2) 127mm x 84mm x 53mm (5.00"W x 3.3" H x 2.1" D)
Weight:	159 grams (5.6 oz)

ACCESSORIES:

FPP & SPP Series Pitot Tube

The FPP and SPP series are used to sense velocity pressure or static pressure respectively. Constructed of 304 stainless steel probes with an ABS mounting bracket, they available in 150 mm (6") or 300 mm (12") lengths. Kits are available for differential and static that are complete with pneumatic tubing.

DPFS Series Differential Pressure Probe

The DPFS series Averaging Flow Sensor is ideal for sensing differential pressure in the inlet section of variable air volume terminal units and fan terminal units. Units can also be used to sense differential pressure at other locations in the main or branch duct systems. They are made of ABS/polycarbonate (UL94-5V) and available in lengths from 100 mm (4") to 560 mm (22")

MP Series Differential Pressure Probes

The MP series Air Velocity Pitot Tubes are used in conjunction with a DP transmitter to calculate airflow in larger ducts or in areas of turbulent airflow. The units come in pairs in either ABS or 316 S/S and are available in various lengths from 610mm (24") to 2000 mm (80"). Gasketed mounting collars for both probes are included.

DESCRIPTION:

The LP3 Low Pressure Transmitter can be used to measure positive, negative or differential pressure in the ranges of 1"W.C. to 20"W.C. (250 TO 2000Pa). The piezoresistive sensor is ideal for monitoring the pressure for air or other clean inert gas and is limited only to those media which will not attack polyetherimide, silicon, fluorosilicone, silicone, EPDM and neoprene seals.

The LP3 features field selectable pressure ranges and output signal types for the most flexible applications. Typical HVAC applications include monitoring of filter differential pressure or VAV applications. The output signal is factory calibrated and temperature compensated for highest startup accuracy and trouble-free operation. Available options include LCDs and integrated static pressure probe.

Please read the installation instructions carefully before installing and commissioning the pressure transducer. Failure to follow the instructions may result in product damage. A qualified technician must install this device.

The LP3 Pressure Transducer mounts on any surface using the two holes provided on the base of the unit. Make sure there is enough space around the unit to connect the pressure tubing without kinking and avoid locations where severe vibrations or excessive moisture are present. Mount the enclosure with two user-supplied screws but do not over-tighten.

The unit may be mounted in any position but typically is installed on a vertical surface with the pressure ports on the right and the cable entrance on the left. The enclosure has a standard opening for a 1/2" conduit and may be installed with either conduit and a conduit coupler or a cable gland type fitting. Do not use in an explosive or hazardous environment, with combustible or flammable gasses, as safety or emergency stop devices or in any other application where failure of the product could result in personal injury. Take electrostatic discharge precautions during installation and do not exceed the device ratings.

PRODUCT ORDERING INFORMATION

MODEL	Description
LP3	Low Pressure Transmitter w/ jumper selectable ranges & outputs

CODE	LCD Display
A	No Display
B	Display

CODE	Ranges
00	±1", ±2", ±4", 0-1", 0-2", 0-4"W.C.
01	±3", ±5", ±8", 0-3", 0-5", 0-8"W.C.
02	±6", ±10", ±12", 0-6", 0-10", 0-12"W.C.
03	±10", ±15", ±20", 0-10", 0-15", 0-20"W.C.
04	±250, ±500, ±1000, 0-250, 0-500, 0-1000 Pa
05	±500, ±1000, ±2000, 0-500, 0-1000, 0-2000 Pa

CODE	Options
S	Integrated Static Pressure Probe

LP3	B	00	S	← Typical Model Number

Example: LCD, ±1" to 0-4" W.C., Static Pressure Probe

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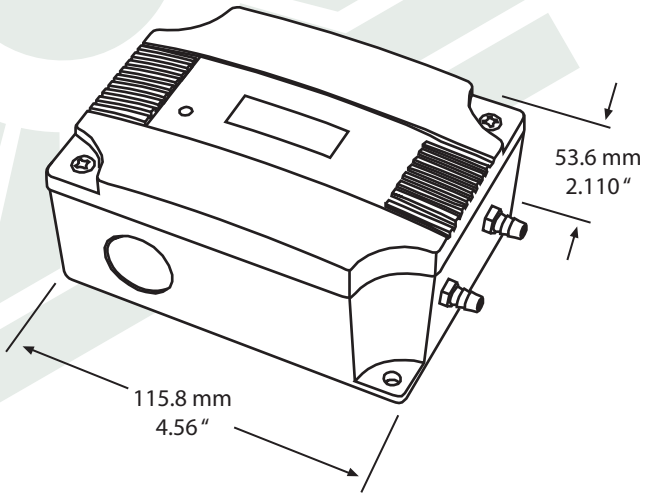
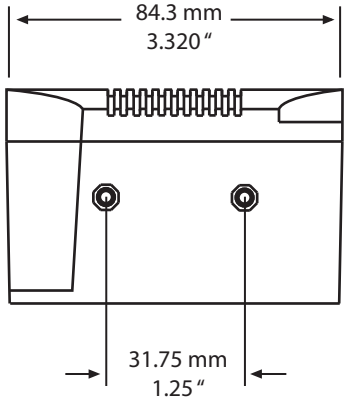
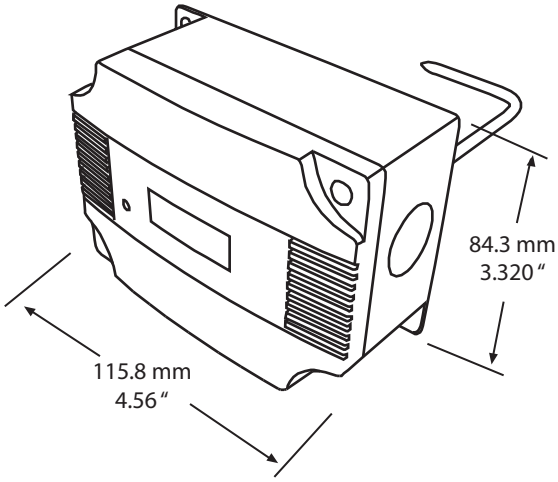
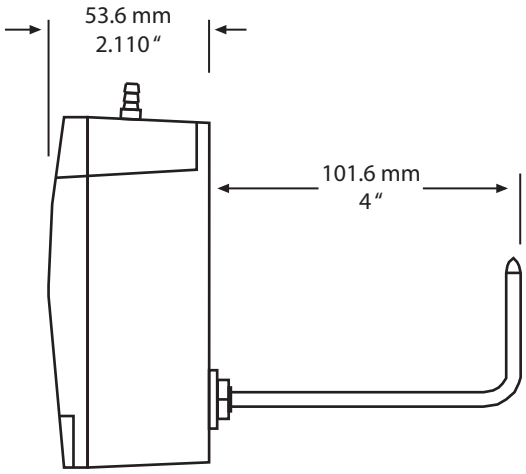
Note: 1"W.C. = 249.0Pa @ 40 F
1 bar = 10^5 Pa

DIMENSIONS:









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GREYSTONE ENERGY SYSTEMS INC

DIFFERENTIAL PRESSURE SWITCH
GFS Series

Precision pressure control/sensing

FEATURES:

- The housing contains a diaphragm, a snap-acting SPDT switch, range adjustment knob with increments
- The sample connections located on the side accept 6.35mm (0.25") OD tubing
- An enclosure cover guards against accidental contact with the live switch terminal screws and the set point adjusting knob with indication.
- Optional pressure ranges available.
- Includes 2 pick up tubes and 2 M (6.56') of PVC tubing

Peace of mind through reliable pressure switches

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

SPECIFICATIONS:

Adjustment Range.....See Product Ordering Information
Adjustment Knob Markings.....Scaled in Pascal and " WC
Switch Tolerance.....±15%
Maximum Operating Pressure...1.45 PSI (10 kPa) for all pressure ranges
Medium.....Air, non-combustible and non-aggressive gases
Temperature Range.....Medium and ambient temperature -20˚C to 60˚C (-4˚F to 140˚F)
Storage temperature -40˚C to 85˚C (-40˚F to 185˚F)
Diaphragm Material.....Silicone, tempered at 200˚C, free of gas emissions
Pressure Connections.....2 plastic pipe connections pieces (P1 and P2), external diameter 6.0 mm
P1 for connection to higher pressure
P2 for connection to lower pressure

Electrical Rating.....Max. 1.0A (0.4A) / 250 VAC, 50/60 Hz
Max. 0.1 A / 24 VDC
Electrical Connections.....AMP flat plug 6.3 mm x 0.8 mm
Push-on screw terminals
Cable conduit with cable relief
Mechanical Working Life.....Over 10 million switching operations
Housing Materials.....Switch body made of PA 6.6
Cover made of PC
Protection Category.....IP54 with cover (NEMA 13)
Weight.....With cover 160 g
Included Accessories.....2 meters of PVC hose and 2 plastic tubes
Set of 3 push-on screw terminals
Approvals.....UL508 & CSA 22.2

PRODUCT ORDERING INFORMATION

MODEL	Description
GFS	Adjustable Airflow Switch with Setpoint Indication

CODE	Range
80	0.08" to 1.20" w.c. (20 to 300 Pa), Switch differential 0.04" w.c. (10 Pa)
83	0.2" to 2.00" w.c. (50 to 500 Pa), Switch differential 0.08" w.c. (20 Pa)
86	2.00" to 10.00 " w.c. (500 to 2500 Pa), Switch differential 0.60" w.c. (150 Pa)

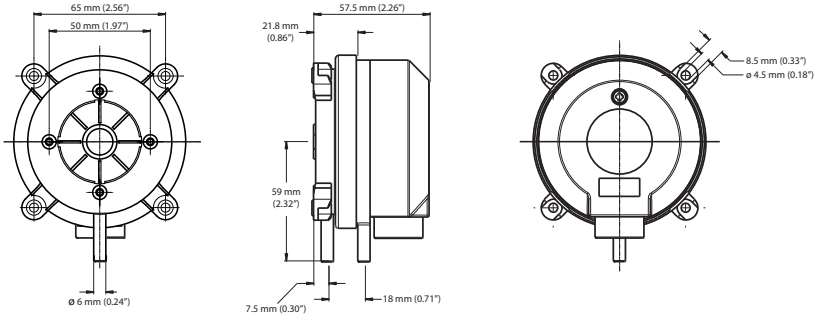
CODE	Electrical Connection
N-IK	1/2" NPT Connection
M-IK	M20 Connection

Greystone Energy Systems Inc. reserves the right to make design modifications without prior notice.

GFS	80	N-IK	← Typical Model Number

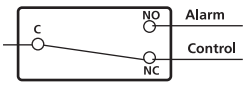
Example: 0.08" to 1.2" w.c., 1/2" NPT Connection

Dimensions in millimeters and (inches)

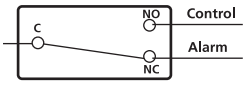


Alarm or Control

To prove excessive airflow or pressure



To prove insufficient airflow or pressure



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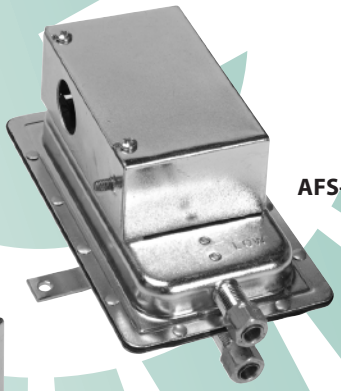
GREYSTONE ENERGY SYSTEMS INC

PRESSURE SWITCH
AFS Series



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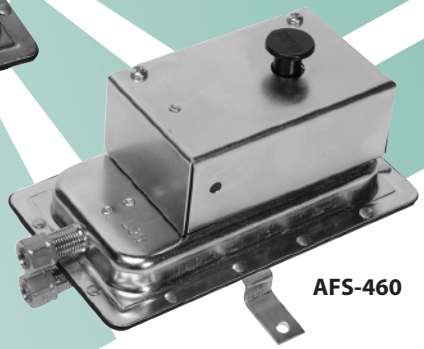


AFS-460

Precision pressure control/sensing

FEATURES:

- The plated housing contains a diaphragm, a calibration spring and a snap-acting SPDT switch.
- The sample connections located on each side of the diaphragm accept 6.35mm (0.25") OD tubing via the integral compression ferrule and nut or barbed fitting.
- An enclosure cover guards against accidental contact with the live switch terminal screws and the set point adjusting screw. The enclosure cover will accept a 12.7mm (0.5") conduit connection.
- Optional pressure ranges and manual resets available.

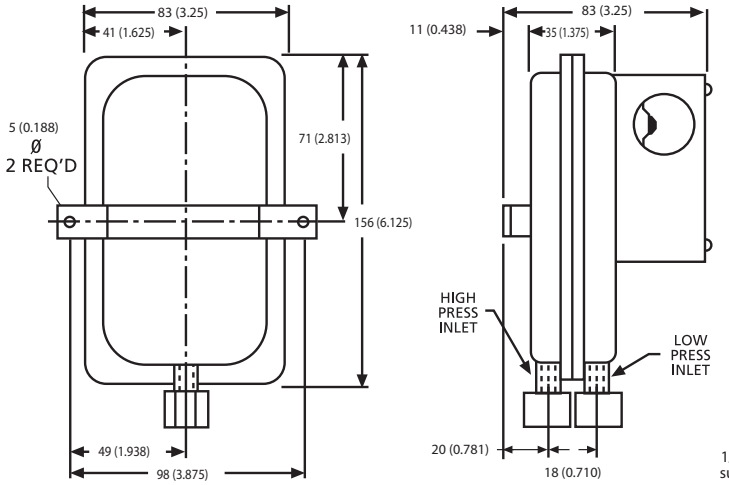
Peace of mind through reliable pressure switches

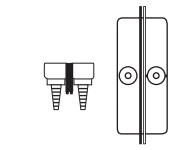
GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

SPECIFICATIONS:

MODEL	AFS-222/AFS-222-112	AFS-262/AFS-262-112	AFS-460/AFS460-112
Sample Media	Air	Air	Air
Mounting Position	Diaphragm in any vertical plane	Diaphragm in any vertical plane	Diaphragm in any vertical plane
Field Adjustable Range	0.05±, 0.02" w.c. to 12" w.c.	0.05±, 0.02" w.c. to 2" w.c.	0.40±, 0.06" w.c. to 12" w.c.
Switch Differential	Progressive, increasing from approx. 0.02± 0.01" w.c. at min. set point, to approx. 0.8" w.c. at max. set point	Progressive, increasing from 0.02± 0.01" w.c. at min. set point to approx. 0.1" w.c. at max. set point	Progressive, increasing from approx. 0.06± 0.01" w.c. at min. set point, to approx. 0.8" w.c. at max. set point
Maximum Pressure	0.5psi (0.03 bar)	0.5psi (0.03 bar)	0.5psi (0.03 bar)
Operating Temperature Range	-40˚C - 82˚C (-40˚F - 180˚F)	-40˚C - 82˚C (-40˚F - 180˚F)	-40˚C - 82˚C (-40˚F - 180˚F)
Life	100,000 cycles at 0.5psi max pressure each cycle and at max electrical load	100,000 cycles at 0.5psi max pressure each cycle and at max electrical load	6000 cycles at 0.5psi max pressure each cycle and at max. electrical load
Electrical Rating	300 va pilot duty at 115 - 277 VAC, 10 amp, non-inductive, 277 VAC, 60Hz	300 va pilot duty at 115 - 277 VAC, 10 amp, non-inductive, 277 VAC, 60Hz	300 va pilot duty at 115 - 277 VAC, 10 amp, non-inductive, 277 VAC, 60Hz
Contact Arrangement	SPDT	SPDT	SPST-NC
Electrical Connections	Screw top terminals with cup washers	Screw top terminals with cup washers	Screw top terminals with cup washers
Sample Line Connections	Ferrule and nut compression type connectors that accept 6.35mm (0.25") OD rigid tubing or 1/4" OD barbed connections (-112) that accept flexible tubing.	Ferrule and nut compression type connectors that accept 6.35mm (0.25") OD rigid tubing or 1/4" OD barbed connections (-112) that accept flexible tubing.	Ferrule and nut compression type connectors that accept 6.35mm (0.25") OD rigid tubing
Automatic/Manual Reset	Automatic	Automatic	Manual
Approvals	UL and CSA	UL and CSA	UL and CSA

Dimensions in millimeters and (inches)

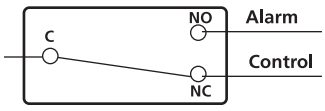




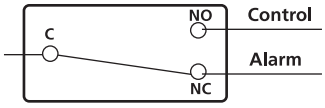
1/4" OD Barbed Connector suitable for flexible tubing.

Alarm or Control

To prove excessive airflow or pressure



To prove insufficient airflow or pressure



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Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

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GREYSTONE ENERGY SYSTEMS INC

GAUGE PRESSURE TRANSMITTERS
PGS Series

PGS100A

Precision pressure control/sensing

FEATURES:

- 1/4" NPT
- NIST traceable calibration
- Weather resistant for harsh environments
- Fast response time
- Capacitance sensing element
- Ranges -14.7 through 10,000 PSIG (-101.4 through 68947.6 kPa)
- Accuracy to ±0.25% FSO
- DC inputs, current output
- Compensated temperature range: -20˚C to 80˚C (-4˚F to 176˚F)
- Operating temperature range: -40˚C to 85˚C (-40˚F to 185˚F)
- 17-4PH Stainless Steel has excellent corrosion resistance (comparable to grade 304 stainless)

Peace of mind through reliable pressure transmitters

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

APPLICATIONS:

- HVAC Systems
- Energy Management Systems
- Steam Pressures
- Refrigerants and Ammonia
- Gas Chromatography
- Paint Spraying Systems
- Electronic Pressure Switch
- Heat Pumps
- Hydraulic Systems
- Irrigation Systems
- Compressor Control
- Propane

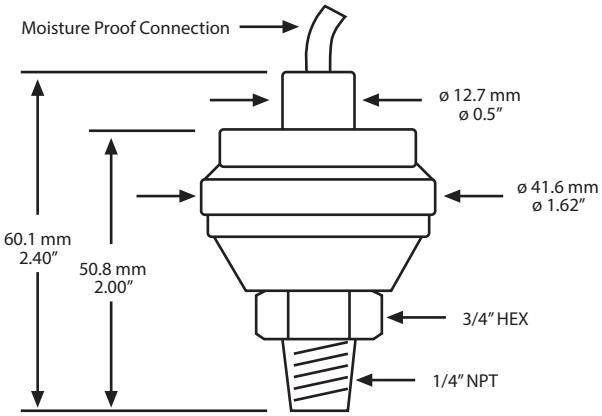
PRODUCT DESCRIPTION:

PGS100A is a compact gauge pressure transmitter complete with a 2 wire 4-20mA output, various pressure ranges, 1/4" NPT connecton and 2 foot cable for electrical termination.

SPECIFICATIONS:

Accuracy at Constant Temp:.....0.25% F.S.O.
Supply Voltage:.....Minimum supply voltage (VDC) =
9 + 0.02 x (Resistance of receiver plus line).
Maximum supply voltage (VDC) =
30 + 0.004 x (Resistance of receiver plus line).
Output:.....4 to 20 mA
External Load:.....0 to 800 ohms
Media Compatibility:.....17 - 4PH stainless steel
Pressure Port:.....1/4" - 18 NPT External
Operating Temp. Range (sensor):...-40˚ - 85˚C (-40˚ - 185˚F)
Compensated Temp. Range:.....-20˚ to 80˚C (-4˚ to 176˚F)
Zero Thermal Shift:.....<±2% of F.S.
Span Thermal Shift:.....<±1.5% of F.S.
Pressure Overload:.....See product ordering chart

OUTLINE DRAWING:



MEDIA COMPATIBILITY:

The PGS100 Series transmitters are designed to be used with any gases or liquids compatible with 17-4PH stainless steel. The 17-4PH stainless has excellent corrosion resistance. Corrosion tests and service experience have shown that in all aged conditions it is superior to standard hardenable stainless grades such as 420, 431 and 410 stainless. This corrosion resistance is comparable to 304 stainless. Note it is not recommended for hydrogen applications.

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
PGS100A	Gage Pressure Transmitter

CODE	Pressure Ranges	Proof Pressure (PSI)	Burst Pressure (PSI)
4A1A	-14.7-15 PSIG (-101.4-103.4 kPa)	20	500
5A1A	-14.7-30 PSIG (-101.4-206.8 kPa)	50	500
6A1A	-14.7-60 PSIG (-101.4-413.7 kPa)	100	750
7A1a	-14.7-100 PSIG (-101.4-689.5 kPa)	200	1000
8A1A	-14.7-150 PSIG (-101.4-1034.2 kPa)	400	2000
9A1A	0-10 PSIG (0-68.95 kPa)	20	500
10A1A	0-25 PSIG (0-172.4 kPa)	50	500
11A1A	0-50 PSIG (0-344.7 kPa)	100	750
12A1A	0-100 PSIG (0-689.5 kPa)	200	1000
13A1A	0-150 PSIG (0-1034.2 kPa)	400	2000
14A1A	0-200 PSIG (0-1379 kPa)	400	2000
15A1A	0-250 PSIG (0-1723.2 kPa)	500	2000
16A1A	0-300 PSIG (0-2068.4 kPa)	500	2000
17A1A	0-500 PSIG (0-3447.4 kPa)	1000	3000
18A1A	0-1000 PSIG (0-6894.8 kPa)	2000	5000
19A1A	0-5000 PSIG (0-34473.8 kPa)	7500	10,000
20A1A	0-10,000 PSIG (0-68947.6 kPa)	12,500	20,000

PGS100 4A1A

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

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GREYSTONE ENERGY SYSTEMS INC

LIQUID PRESSURE TRANSMITTERS
WP Series

Precision pressure control/sensing

FEATURES:

- Differential and gauge pressure models
- Four, switch selectable, ranges per model
- Jumper selectable outputs: 4-20mA, 0-5 Vdc or 0-10 Vdc
- Optional backlit (jumper-selectable) LCD
- All stainless steel sensor construction
- Port swap switch to correct incorrect plumbing
- Switch selectable uni or bi-directional
- IP65 (Nema 4X) hinged enclosure

Peace of mind through reliable pressure monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

APPLICATIONS:

- Pump Monitoring
- Filter Monitoring
- Chiller Monitoring
- HVAC Systems

SPECIFICATIONS:

Media Compatibility:	17-4 PH stainless steel
Pressure Ranges:	4 ranges per model - Switch selectable 0-5/10/25/50 psig/d 0-.5/1/2.5/5 Bar 0-50/100/250/500 kPa 0-10/20/50/100 psig/d 0-.75/1.5/3.75/7.5 Bar 0-75/150/375/750 kPa 0-20/40/100/200 psig/d 0-1/2/5/10 Bar 0-100/200/500/1000 kPa 0-50/100/250/500 psig/d 0-3/6/15/30 Bar 0-300/600/1500/3000 kPa
Line Pressure:	Max. line pressure is the highest of the selectable ranges on each model i.e.: WP-D-101 has a maximum line pressure of 50 psi
Proof Pressure:	Max. 2X highest range per model
Burst Pressure:	Max. 5X highest range per model
Accuracy:	± 1% F.S. of range selected with combined linearity, hysteresis, and repeatability
Pressure Cycles:	>100 million
Surge Damping:	Normal: 4 second averaging Slow: 8 second averaging, switch selectable
Sensor Operating Range:	-40˚ to 85˚C (-40˚ to 185˚F)
Compensated Range:	0˚ to 55˚C (32˚ to 130˚F)
Operating Environment:	0˚ to 50˚C (32˚ to 122˚F), 10-90% RH condensing
Stability:	±0.25% typical (1 year)
Zero Adjust:	Puch-button auto-zero and digital input
Operating Humidity:	0 to 95% RH non-condensing
Power Supply:	18 to 28 Vac/Vdc (non-isolated half-wave rectified)
Consumption:	100 mA max @ 24 Vdc with LCD backlight, 35 mA with backlight disabled
Output Signal:	3-wire transmitter; user selectable 4-20mA active(sourcing), 0-5V and 0-10V
Pressure Connections:	1/8" NPT female
Enclosure:	ABS, hinged lid with gasket, IP65 (Nema 4X) 145 X 100 X 64 mm (5.7" X 3.95" X 2.5")
Shock:	100G, 11 mSec, 1/2 sine
Vibration:	10G peak 20 to 2000 Hz
	10K ohms min for voltage output
Wiring Connections:	Screw terminal block (14 to 22 AWG)
Optional LCD Display:	35 mm x 15 mm (1.4" w x 0.6" h) alpha-numeric 2 line x 8 character Resolution - 1 psi Backlight - Enable or disable via jumper

WP-G

WP-D

DESCRIPTION:

The Wet-Wet pressure transmitter is designed with dual sensors that enable it to accept high differential pressure ranges. The gauge pressure transmitter is designed with a single sensor that enables it to accept high pressures ranges.

Both transmitters can accept ranges from 5 PSI to 500 PSI. All models can handle overload pressure 2X the maximum full scale range and burst pressure is 5X the maximum full scale range. Features include field selectable pressure ranges and output signal types for the most flexible applications. Typical HVAC applications include monitoring of liquid differential and gauge pressure. The output signal is factory calibrated and temperature compensated for the highest start-up accuracy.

NOTE: When choosing pressure range ensure that the maximum individual port pressure does not exceed the maximum pressure range of the unit. For example, the maximum individual port pressure of the WP-D-102 is 100 PSI. Exceeding this may cause damage to the sensors and will give erroneus readings.

PRODUCT ORDERING INFORMATION:

MODEL	Description
WP-D	Wet/Wet differential pressure transmitter, jumper selectable outputs
WP-G	Gauge pressure transmitter, jumper selectable outputs

CODE	Pressure ranges
101	5, 10, 25 and 50 PSI ranges
102	10, 20, 50 and 100 PSI ranges
103	20, 40, 100 and 200 PSI ranges
104	50, 100, 250 and 500 PSI ranges
105	0.5, 1.0, 2.5 and 5.0 Bar
106	0.75, 1.50, 3.75 and 7.50 Bar
107	1, 2, 5 and 10 Bar
108	3, 6, 15 and 30 Bar
109	50, 100, 250 and 500 kPa
110	75, 150, 375 and 750 kPa
111	100, 200, 500 and 1000 kPa
112	300, 600, 1500 and 3000 kPa

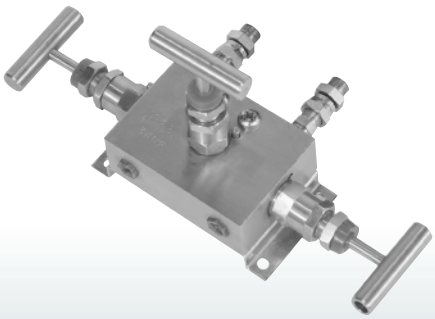
CODE	Option
LCD	Backlit LCD option
VB	Valve and bracket Assembly **(Not available in the USA)**

WP-D - 101 - LCD ← **Typical Model Number**

Example: Wet to Wet differential, 5 thru 50 PSI ranges c/w LCD (WP-D-101-LCD)

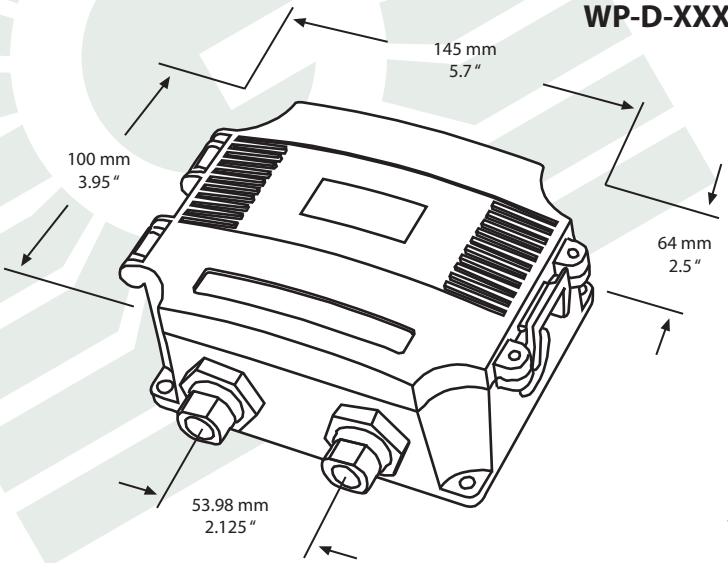
ACCESSORIES:

VB Option
3 Way Valve for WP-D
Not Available in the USA

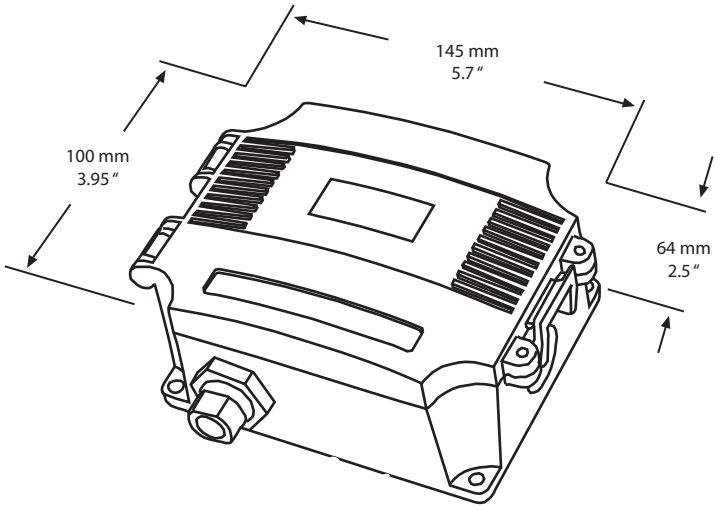


DIMENSIONS:

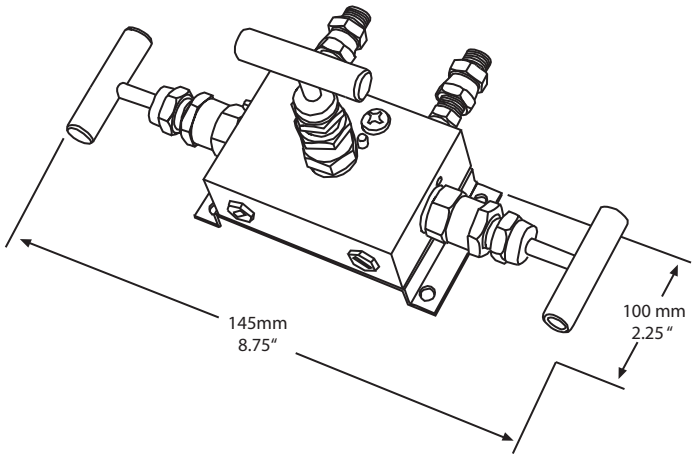
WP-D-XXX-LCD

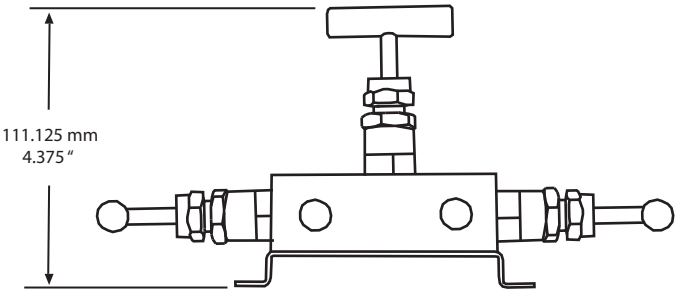


WP-G-XXX-LCD



-VB Option
3 Way Valve for WP-D
Not Available in the USA





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RoHS COMPLIANT

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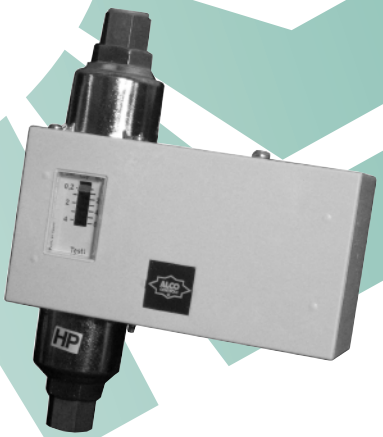
GREYSTONE ENERGY SYSTEMS INC

LIQUID PRESSURE SWTCHES
WPS Series



Precision pressure control / sensing

FEATURES:

- High rated SPDT contacts
- Adjustable setpoint
- Adjustable differential
- Direct switching of 240 Vac loads
- Full mechancial switching

Peace of mind through reliable pressure monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

WPS-G-PS3
Liquid Static Pressure Switch

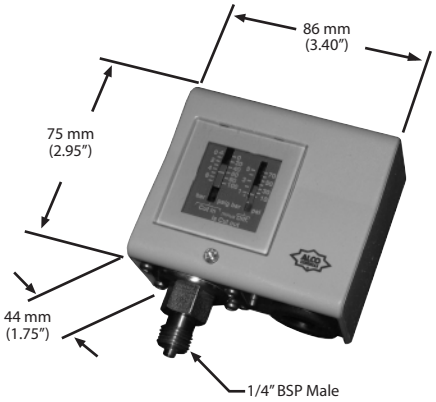
DESCRIPTION:

The WPS-G-PS3 pressure switch is a cost effective pressure monitoring solutions for liquids and non aggressive gases.

The compact design and rugged construction makes the WPS-G suitable for monitoring pumps, chillers, valves, etc. The unit has an adjustable setpoint with adjustable differential and comes complete with a dial to show the liquid pressure.

SPECIFICATIONS:

Range	-0.5 to 7 Bar (-7.25 to 101.5 Psi)
Max. Operating Pressure	22 Bar (319 PSI)
Max. Leak Test Pressure	25 Bar (363 PSI)
Pressure Connection	1/4" BSP Male
Electrical Connection	Screw terminals suitable for 1.5 mm conductors max.
Contact Rating	24 Amp@ 230 Vac resistive 10 Amp Inductive
Protection	IP44 (NEMA 2)
Ambient Temperature	-50˚ to 70˚C (-58˚ to 158˚F)
Fluid Temperature	-50˚ to 170˚C (-58˚ to 338˚F)
Dimensions	42 x 85 x 75 mm
Weight	346 gms (12.2 oz)
Approvals	ULC #E85974



WPS-D-FD113
Liquid Differential Pressure Switch

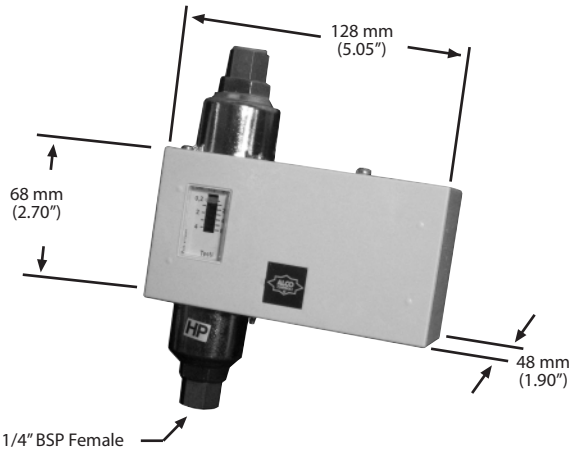
DESCRIPTION:

The WPS-D-FD113 differential pressure switch is a low cost effective pressure monitoring solutions for liquids and non aggressive gases.

The unit is designed for both flow proving and flow failure detection to cover the range of 0.3 to 4.5 Bar (4.35 to 65.25 PSI). Approxiamate setpoint can be viewed on the dial at the front of the unit.

SPECIFICATIONS:

Range	0.2 to 4.5 Bar (2.9 to 65.25 PSI)
Differential	0.2 Bar (2.9 PSI)
Factory Setting	0.7 Bar (10.15 PSI)
Max. Operating Pressure	12 Bar (174 PSI)
Max. Leak Test Pressure	23 Bar (334 PSI)
Pressure Connection	1/4" BSP Female
Electrical Connection	Screw terminals suitable for 1.5 mm conductors max.
Contact Rating	3 Amp @ 230 Vac Inductive 0.1 Amp @ 230 Vdc
Ambient Temperature	-20˚ to 70˚C (-4˚ to 158˚F)
Fluid Temperature	Max. 70˚C (158˚F)
Materials	Fittings - Brass Wetted Parts - Phosphor bronze Switch Back plate - Zinc plated mild steel Housing cover - Flame resistant polycarbonate
Protection	IP30 (NEMA 2)
Dimensions	48 x 128 x 175 mm
Weight	790 gms (1.75 lbs)
Approvals	ULC #E85974



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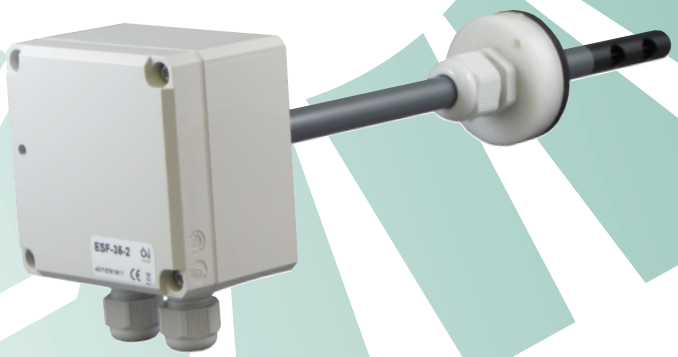
GREYSTONE ENERGY SYSTEMS INC

AIR FLOW TRANSMITTER ESF-35-2



Precision airflow control/sensing

FEATURES:

- Converts airspeed into a 4 - 20mA or a 0 - 10 VDC signal
- Linear output signal
- Made with corrosion resistant material
- Fully electronic registration of airflow speed
- AC or DC voltage supply
- Compensates for changes of air temperature
- Telescopic sensor facilitates installation
- Temperature output signal 0 - 10 VDC
- Fuse protected

Peace of mind through reliable air velocity monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

APPLICATION:

The ESF-35-2 airflow transmitter can be used in a wide range of applications such as:

- Measurements of airflow speed via PLC/outstation/EMS
- Regulation of airflow speed
- Monitoring of airflow speed

FUNCTION:

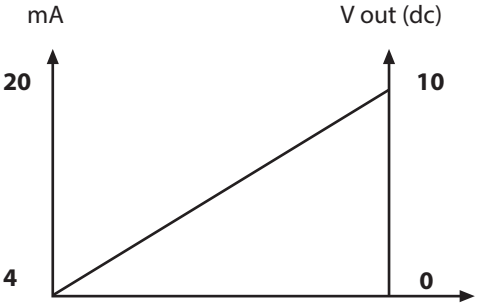
The ESF-35-2 transmitter registers the airflow speed according to a thermal principle based on the fact that the cooling action of air increases with airspeed. The action is measured and converted to a 4 - 20 mA or a 0 - 10 V signal corresponding to airflow speeds from 0 - 8 m/s (0 - 1575 ft/min) or 0 - 16 m/s (0 - 3150 ft/min).

TECHNICAL DATA:

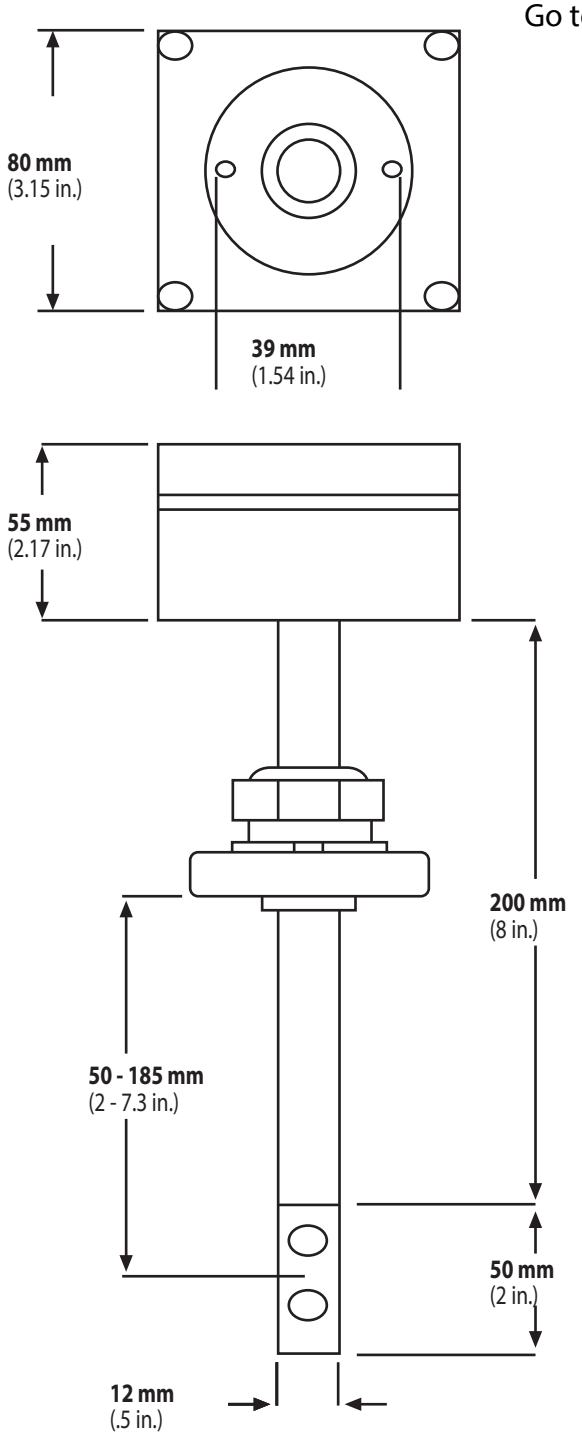
Airflow speed	0 - 16 m/s (3150 ft/min),
(jumper selectable)	0 - 8 m/s (1575 ft/min)
Output signal (flow)	4 - 20mA, 0 - 10 VDC
Output signal (temperature)	0 - 10 VDC
Temperature range	0 - 50˚C (32˚F - 122˚F)
Air temperature	-10˚C - 60˚C (14˚F - 140˚F)
Ambient temperature	-20˚C - 50˚C (-4˚F - 122˚F)
AC voltage supply	24 VAC (120mA)
DC voltage supply	16 - 30 VDC (80mA)
Absolute accuracy	±5 %
Rise time	20 sec
Time constant	5 sec
Depth of insertion in channel	50 - 200 mm (2 - 8 in.)
Dimensions (H x W x D)	80 x 80 x 55 mm (3.15 x 3.15 x 2.17 in.)
Enclosure rating	IP54

INSTALLATION:

The ESF-35-2 is installed in such a way that the current of air passes through the gap of the sensor head. Conductors to and from the transducer should be kept isolated from high-power conductors where powerful transient voltage spikes may appear.



0 ---------- **16 m/s** (3150 ft/min)
0 ---------- **8 m/s** (1575 ft/min)



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Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

V.12/13

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GREYSTONE ENERGY SYSTEMS INC

ULTRASONIC LIQUID FLOW TRANSMITTER
Models CSLF

Precision flow control/sensing

FEATURES:

- Dual Sensor, Bi-directional
- 2 Selectable ranges per model
- Loop-powered 4-20mA output
- Zero pressure drop
- Several pipe sizes available
- Choice of connection type
- No moving parts
- Plug 'n Play

Peace of mind through reliable flow monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

DESCRIPTION:

The CSLF series of ultrasonic liquid flow transmitters are designed for use with building automation, energy management, and process control systems. Models include various sizes and connection types for liquid flow measurement.

The CSLF series ultrasonic liquid flow transmitters are ideal for the measurement of flow rates of acoustically conductive liquids including most clean liquids and many liquids with entrained solids.

Main advantages include excellent long term stability, no pressure drop, broad fluid compatibility, high accuracy and low cost. Also, there are no moving parts.

At the heart of the transmitter is a proprietary mixed signal ASIC which allows sophisticated timing, control and transducer drive circuitry to be combined on a single integrated circuit. The ASIC uses a special algorithm that is an improvement upon the standard single-path measurement technique. Using the "sing around" method, the ultrasonic transducer alternates between transmitting and receiving to measure differences in flight time between upstream and downstream transmissions. A sound pulse is transmitted from an upstream transmitter towards a downstream transmitter like a traditional time-of-flight measurement. However, the received sound pulse then triggers a second downstream transmission that then triggers a third and so on for a specfic number of cycles. This process is repeated in the upstream direction.

Because it takes an average flight time over multiple cycles to compute the difference in flight times, the approach yields a significant improvement in timing accuracy when compared with the time-of-flight difference of a single pulse in each direction. This algorithm, combined with the pico-second timing resolution of the ASIC, provides the precise time measurement capability necessary for compact, small diameter ultrasonic meters.

The output of the transmitter is unaffected by changes in fluid temperature, density and viscosity as the flow calculation is independent of the speed of sound.

Wetted materials include ULTEM® encapsulated ultrasonic transmitters with a choice of elastomer seals and epoxy coated carbon steel body material.

CSLFB

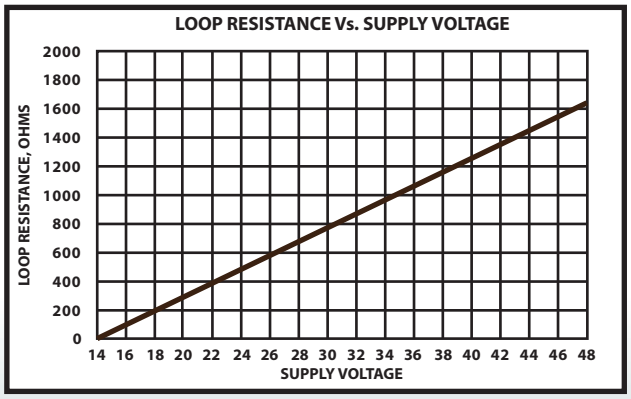
CSLFC

DESCRIPTION:

Flow Range..... Bi-directional, field selectable per table (Standard Models)
Accuracy..... ±0.75% of full scale
Media Operating Range..... -20˚ to 87.8˚ C (-4˚ to 190˚F)
Ambient Operating Range..... -40˚ to 87.8˚ C (-40˚ to 190˚F)
Response Time..... User selectable, 2 or 10 seconds
Viscosity Range..... 0.2 to 150 sCt (0.2 to 150 mPas)
Liquid Density..... 30.6 to 74.9 lb/cu.ft. (490 to 1200 kg/m^3)
Max. Working Pressure..... CSLFB - 3/4" to 2": 250 PSI (17.2 bars)
CSLFC - 3" to 10": 200 PSI (13.8 bars)
Pipe Sizes..... 3/4", 1", 1.5", 2", 3", 4", 6", 8", 10"
Pipe Connections..... 3/4" to 2" - Female NPT or BSP
3" to 10" - ASME Class 150 Flange
Electrical Enclosure..... Integral to body casting with gasketed cover; One 1/2" NPT conduit connection (plugged when model ordered with metric threads) and one M16 x 1.5 connection (plugged when model ordered with NPT threads)
Electrical Connections..... Screw Terminal connections on PC board or optional factory installed connectors
Enclosure Rating..... IP65 (NEMA 4)
Power Supply..... 18 to 36 Vdc
Ultrasonic Transducers..... ULTEM® Encapsulated
Seals..... EPDM, Buna-N, Neoprene®, FKM or other
Body Material..... CSLFB - Brass (UNS C83600)
CSLFC - Schedule 40, epoxy coated, carbon steel
Output Signal..... Analog, 2 wire, 4-20 mA; Output is 4 mA from zero to min. flow (see Standard Model table)
Error Detection..... An optically isolated sink output is activated under certain detectable fault conditions, such as transducer failure or overly noisy output due to flow stream anomalies, as might be seen due to excessive bubble entertainment. The optional fault output is an optically isolated NPN transistor capable of sinking up to 10 mA from a voltage source of no more than 48 Vdc.
Frequency..... Output is an optically isolated NPN transistor capable of sinking 25 mA from a voltage source of no more than 48 Vdc. Frequency outputis from 400 to 1200 pulses/gallon depending on range. (see Standard Model table). Lower frequency can be provided on request.
Direction of Flow..... Optional output to indicate direction of flow is available. Activation or deactivation of an optically isolated 25 mA sink output indicates flow direction. Error detection is not available when this option is ordered.
Optional Temp. Sensor..... 3 wire RTD, 100 Ω, Platinum, 0.06% accuracy. Built into transducer shell for monitoring process temperature. Optional 8 pin electrical connector standardly recommended with this option.

DP/DS Panel Meter/Display Option:

Power Supply..... Loop-powered
Display Size..... 4½ Digit LED, 0.6"
Case..... IP65 (NEMA 4X)
Versions..... DP Option: Displays 0-100% F.S.
DS Option: Scaled to customer requirement



PRODUCT ORDERING INFORMATION

MODEL	Product Description
CSLFB34	3/4" Pipe Size, Flow Transducer, 2 selectable ranges
CSLFB10	1" Pipe Size, Flow Transducer, 2 selectable ranges
CSLFB15	1.5" Pipe Size, Flow Transducer, 2 selectable ranges
CSLFB20	2" Pipe Size, Flow Transducer, 2 selectable ranges

CODE	Pipe Thread
NPT	Female National Pipe Thread
BSP	Female British Standard Pipe Thread (G)

CODE	Units of measure
G	Gallons per Minute (U.S.)
L	Liters per Minute

CODE	Transducer Seal
E	EPDM (Ethylene propylene diene M-class rubber)
B	Buna-N
N	Neoprene®
V	FKM (Fluorinated elastomers)

CODE	NPN Transistor Output
-	Error Detection (Default)
F	Frequency
DF	Direction of Flow Output

CODE	Options
-	None
R	100 Ω Platinum RTD
DP	Display % F.S.
DS	Display in Engineering units - Specify

CODE	Transmitter Connector Option
-	1/2" NPTF
4H	Hirschman 4-conductor Receptacle & 1/2" NPTF Conduit Connector Set
4R	4-Pin Male Circular Receptacle
8R	8-Pin Male Circular Receptacle
4C	4-Pin Female Circular Connector
8C	8-Pin Female Circular Connector

CSLFB34	NPT	G	B	-	-	-

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

Model	PipeSize/ Thread Size		*Field Selectable Full Scale Ranges (GPM) Min.	Max.	*Field Selectable Full Scale Ranges (LPM) Min.	Max.	Frequency Output Pulses/Gallon	Flow Constant (Gallons) Gal/Min=FC*Freq.	Frequency Output Pulses/Liter	Flow Constant (Liters) L/Min=FC*Freq.
CSLFB34	3/4" NPT or BSP	L	0.23	15	0.90	60	1200	0.25	300	0.2
		H	0.38	25	1.50	100				
CSLFB10	1" NPT or BSP	L	0.45	30	1.70	115	600	0.1	150	0.4
		H	0.75	50	3.00	200				
CSLFB15	1.50" NPT or BSP	L	0.60	40	2.30	150	360	0.167	96	0.625
		H	1.20	80	4.50	300				
CSLFB20	2.0" NPT or BSP	L	0.90	60	3.40	225	240	0.25	60	1
		H	1.80	120	6.80	455				

* Other F.S. ranges can be specified

PRODUCT ORDERING INFORMATION

MODEL	Product Description
CSLFC	Flow Transducer, 2 selectable ranges

CODE	Pipe Size
3	3″
4	4″
6	6“
8	8″
10	10″

CODE	Units of measure
G	Gallons per Minute (U.S)
L	Liters per Minute

CODE	Transducer Seal
E	EPDM (Ethylene propylene diene M-class rubber)
B	Buna-N
N	Neoprene®
V	FKM (Fluorinated elastomers)

CODE	NPN Transistor Output
-	Error Detection (Default)
F	Frequency
DF	Direction of Flow Output

CODE	Options
-	None
R	100 Ω Platinum RTD
DP	Display % F.S.
DS	Display in Engineering units - Specify

CODE	Transmitter Connector Option
-	1/2″ NPTF
4H	Hirschman 4-conductor Receptacle & 1/2″ NPTF Conduit Connector Set
4R	4-Pin Male Circular Receptacle
8R	8-Pin Male Circular Receptacle
4C	4-Pin Female Circular Connector
8C	8-Pin Female Circular Connector

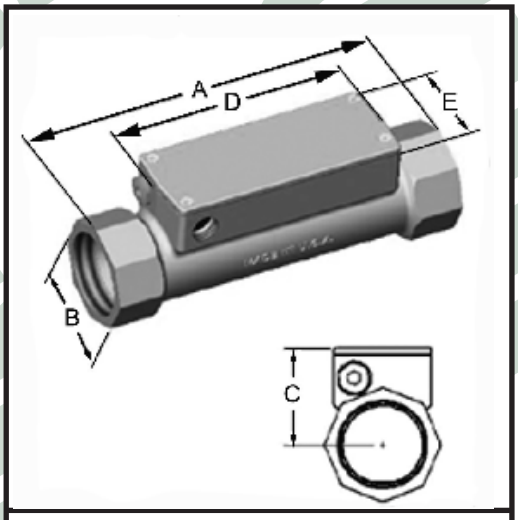
CSLFC	8	G	B	-	-	-

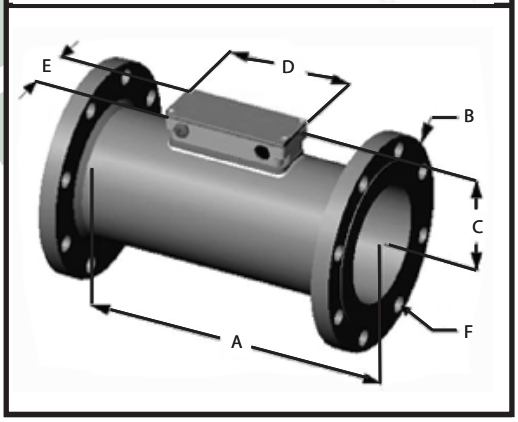
Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

Model	Pipe Size		*Field Selectable Full Scale Ranges (GPM) Min.	Max.	*Field Selectable Full Scale Ranges (LPM) Min.	Max.	Frequency Output Pulses/Gallon	Flow Constant (Gallons) Gal/Min=FC*Freq.	Frequency Output Pulses/Liter	Flow Constant (Liters) L/Min=FC*Freq.
CSLFC3	3″	L	3.0	200	11.0	750	72	0.833	18	3.33
		H	6.0	400	23.0	1500				
CSLFC4	4″	L	4.5	300	17.0	1150	60	1	15	4
		H	7.5	500	29.0	1900				
CSLFC6	6″	L	9.0	600	35.0	2300	30	2	6	10
		H	18.0	1200	68.0	4500				
CSLFC8	8“	L	15.0	1000	57.0	3800	15	4	3	20
		H	30.0	2000	114	7600				
CSLFC10	10″	L	22.5	1500	86.0	5700	12	5	3	20
		H	45.0	3000	165	11000				

* F.S. ranges can be specified can be user specified to 125% of each stated high (H) range with no change to specifications and to 25% of each low (L) range with some specification modification. Consult factory.

ENCLOSURE DIMENSIONS:





CSLFB Dimensions (3/4" - 2")

Size/Connection	A		B		C		D		E	
	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
3/4" & 1"	9.20	234	1.62	41.10	2.06	52.30	6.40	163	2.40	61.00
1-1/2" & 2"	9.88	251	2.75	69.90	2.51	63.80	6.40	163	2.40	61.00

CSLFC Dimensions (3" - 10")

Pipe Size	Dimensions (Inches)							
	A	B	C	D	E	F	Bolt Circle Diameter	No. of Holes
3"	11.00	7.50	3.50	6.54	2.62	0.75	6.00	4
4"	13.00	9.00	4.00	6.54	2.62	0.75	7.50	8
6"	16.00	11.00	5.09	6.54	2.62	0.88	9.5	8
8"	18.00	13.50	6.11	6.54	2.62	0.88	11.75	8
10"	22.00	16.00	7.18	6.54	2.62	1.00	14.25	12

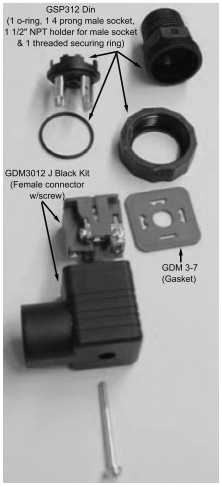
ELECTRICAL CONNECTORS:

NEMA 4 four or eight-pin receptacles installed in transmitter conduit connection factory wired and shipped withmating connector simplify field installation.

4H-Hirschmann 1/2" NPTF Connector

Terminal	Hirschmann Connector Wiring
⊣|||	(-) V_{in} Return, 4-20 mA
1	(+) V_{in} Supply, 18-36 VDC, 4-20 mA
2	C Alarm (Collector)
3	E Alarm (Emmitter)

GSP 312 installed and wired at factory
GDM3012 installed in field



4R/8R installed and wired at factory
4C/8C installed in field

Transmitter Connection Terminal	8-Pin (8C) Connector	*8-pin Connector Cable	4-Pin (4C) Connector	4-pin Connector Cable
+	1	Brown	1	Red
-	2	White/Brown	2	Black
C (Collector)	3	Green	3	White
E (Emmiter)	4	White/Green	4	Green
RTD Red	5	Orange		
RTD Red	6	White/Blue		
RTD White	7	Blue		
*When factory supplies a length of connector cable pre-wired to 4C/8C				

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GREYSTONE ENERGY SYSTEMS INC

MINI-CURRENT SWITCH
CS Series

Precision power control/sensing

FEATURES:

- Solid Core
- Go/No Go or Field Adjustable Models
- Up to 100 amps input current (CS-GnG-100)
- Up to 75 amps input current (CS-610-75)
- Small, Compact Design

Peace of mind through reliable current switches

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

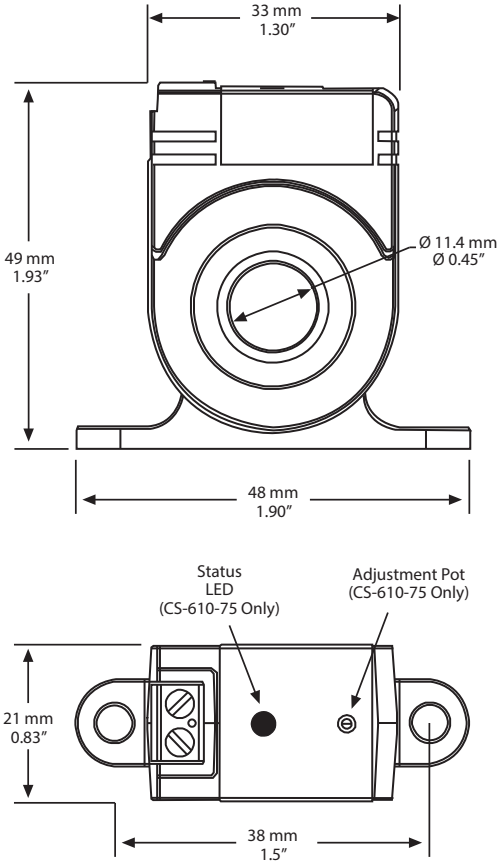
DESCRIPTION:

The CS Series mini current switches monitor line current for electrical loads such as pumps, conveyors, lighting, heaters or fans and closes the output contacts when the trip point is exceeded. The CS-GnG-100 has a factory set trip point of 0.5 Amps to provide Go/No Go status operation. The CS-610-75 has a trip setpoint that is adjustable between 0.75 to 75 Amps by rotating the adjustment pot.

The sensor requires no external power as it is totally powered by induction from the AC line being monitored. The switch output is normally open and when the input current exceeds the trip setpoint the switch closes to provide an on/off digital signal to the controller

SPECIFICATION:

Current Setpoint:	Fixed at 0.5 Amps (CS-GnG-100) 0.75 to 75 Amps (CS-610-75)
Maximum Input Current:	100 Amps continuous (CS-GnG-100) 75 Amps continuous (CS-610-75)
Sensor Power:	Self-powered
Output Type:	Solid-state mosfet
Output Switch Action:	Normally open
Output Switch Ratings:	30 Vac/dc, 500 mA Max.
Indication:	Status LED (CS-610-75 Only)
Von @ 24 Vdc at 500mA:	< 50 mV
Frequency:	50/60 Hz
Response Time:	200 mS Typical
Insulation Class:	600 Vac, insulated conductors
Operating Temperature:	-15 to 60 °C (5 to 140 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	48 x 49 x 21 mm (1.9 x 1.93 x 0.83 in)
Sensor Aperture:	11.4 mm (0.45 in)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed



ORDER INFORMATION:

CS-GnG-100	Go/No Go
CS-610-75	Adjustable

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GREYSTONE ENERGY SYSTEMS INC

CURRENT SWITCH
CS Series

Precision power control/sensing

FEATURES:

- Solid Core
- Go/No Go or Field adjustable models
- Adjustable setpoint (CS-610-200) potentiometer
- Up to 200 amps input current
- Self-powered
- Add-on Command relay option

Piece of mind through reliable current switches

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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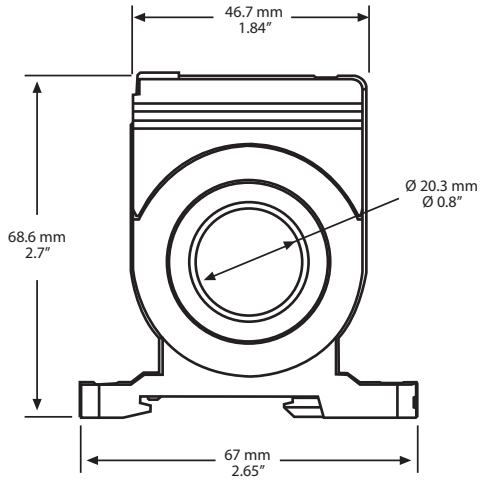
DESCRIPTION:

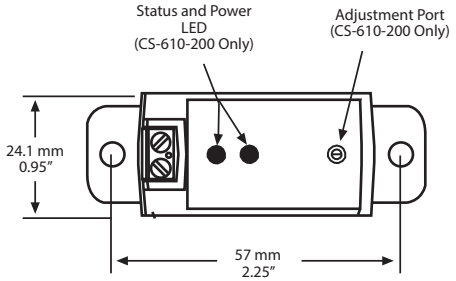
The CS series current switch monitors line current for electrical loads such as pumps, conveyors, lighting, heating or fan and closes the output contacts when the trip point is exceeded. The CS-GnG-200 has a factory set trip point of 0.75 Amps to provide Go/No Go status operation. The CS-610-75 has trip setpoint est ajustable that is adjustable between 1 to 200 Amps by rotating the adjustment potentiometer.

The sensor requires no external power as it is totally powered by induction of the AC line being monitered. The switch output is normally open and when the input current exceeds the trip setpoint, the switch closes to provide an on/off digital signal to the controller.

SPECIFICATION:

Current Setpoint:	Fixed at 0.75 Amps (CS-GnG-200) 1 to 200 Amps (CS-610-200)
Maximum Input Current:	200 Amps continuous
Sensor Power:	Self-powered
Output Type:	Solid-state mosfet
Output Switch Action:	Normally open
Outout Switch Ratings:	30 Vac/dc, 500 mA Max.
Indication:	Power and Status LED (CS-610-200 Only)
Von @ 24 Vdc to 500mA:	< 50 mV
Frequency:	50/60 Hz
Response Time:	200 mS Typical
Insulation Class:	600 Vac, insulated conductors
Operating Temperature:	-15 to 60 °C (5 to 140 °F) - (CS-GnG-200) -15 to 50 °C (5 à 122 °F) - (CS-610-200)
Operating Humidity:	5 to 90% RT non-condensing
Terminal Bolck:	14 to 22 AWG
Dimensions:	68.6 x 67 x 24.9 mm (2.7 x 2.65 x 0.95 in)
Sensor Aperture:	0.8 in (20.3 mm)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus listed





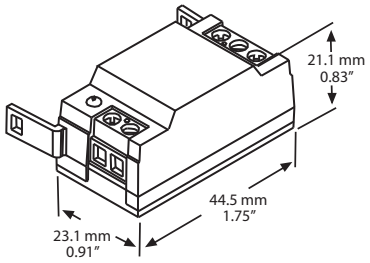
ORDER INFORMATION:

CS-GnG-200	Go/No Go
CS-610-200	Adjustable

ACCESSORIES: CSR Series Command Relay

(See CSR brochure for complete specifications)
(Order separately)

CSR-112	12 Vdc
CSR-124	24 Vac/dc



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GREYSTONE ENERGY SYSTEMS INC

SPLIT-CORE CURRENT SWITCH
SC Series

Precision power control/sensing

FEATURES:

- Split-Core
- Go/No Go or field adjustable models
- Setpoint adjustment potentiometer (SC-610-200)
- Up to 200 amps input current
- Self-powered
- Add-on Command relay option

Peace of mind through reliable current switches

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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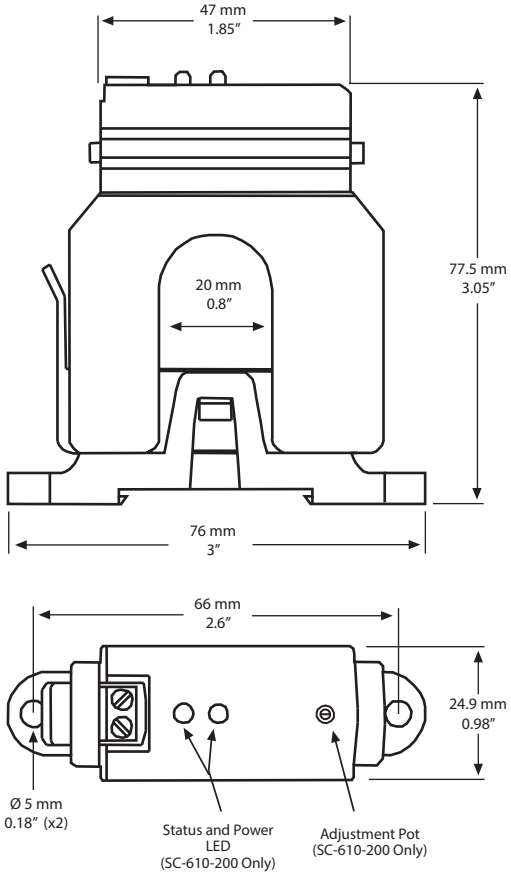
DESCRIPTION:

The SC Series current switch monitors line current for electrical loads such as pumps, conveyors, lighting, heaters or fans and closes the output contacts when the trip point is exceeded. The SC-GnG-200 has a factory set trip point of 2 Amps to provide Go/No Go status operation. The SC-610-200 has a trip setpoint that is adjustable between 2 to 200 Amps by rotating the adjustment potentiometer.

The sensor requires no external power as it is totally powered by induction from the AC line being monitored. The switch output is normally open and when the input current exceeds the trip setpoint the switch closes to provide an on/off digital signal to the controller

SPECIFICATION:

Current Setpoint:	Fixed at 2 Amps (SC-GnG-200) 2 to 200 Amps (SC-610-200)
Maximum Input Current:	200 Amps continuous
Sensor Power:	Self-powered
Output Type:	Solid-state mosfet
Output Switch Action:	Normally open
Output Switch Ratings:	30 Vac/Vdc, 500 mA Max.
Indication:	Power and Status LED (SC-610-200 Only)
Von @ 24 Vdc at 150mA:	< 50 mV
Frequency:	50/60 Hz
Response Time:	200 mS Typical
Insulation Class:	600 Vac, insulated conductors
Operating Temperature:	-15 to 50 °C (5 to 122 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	77.5 x 76 x 24.9 mm (3.05 x 3 x 0.98 in)
Sensor Aperture:	20.3 mm (0.8")
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed



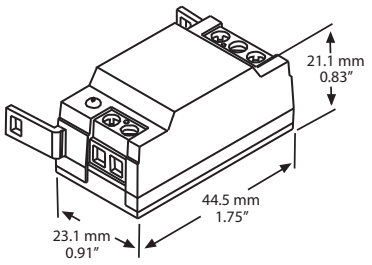
ORDER INFORMATION:

SC-GnG-200	Go/No Go
SC-610-200	Adjustable

ACCESSORIES: CSR Series Command Relays

(See CSR brochure for complete specifications)
(Order Separately)

CSR-112	12 Vac/dc
CSR-124	24 Vac/dc



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GREYSTONE ENERGY SYSTEMS INC

CURRENT SWITCHES HIGH OUTPUT

Precision power control/sensing

FEATURES:

- Solid Core
- Adjustable trip levels
- Up to 200 amps input current
- High current output

Peace of mind through reliable current switches

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

AC CURRENT SWITCHES
CS-325

ADJUSTABLE CURRENT-OPERATED SOLID-STATE RELAYS FOR SWITCHING AC CIRCUITS

FEATURES:

- Self-powered and no insertion loss
- True digital switching and no leakage
- Small compact size
- Jumper-selectable ranges
- Easy field adjustment
- Input / Output isolation via current transformer
- Solid-state reliability
- Solid, reliable mounting method

DESCRIPTION:

The CS-325 series of AC current switches are solid-state switches that activate a contact closure whenever the monitored primary circuit current exceeds a pre-set level. Models are available to switch various load types as indicated in the Product Ordering Chart. All models include a multi-turn adjustment to set the trip threshold to the desired value. They monitor up to 200 Amps and feature jumper selectable ranges. All models are CSA certified or UL approved and CE compliant.

SPECIFICATIONS:

Setpoint Range	1-200 Amps Jumper / CS-325 Amp-Turns Low (none) 1-6 Medium 6-40 High 40-200	**Enclosure Size (H x W x D)**	Solid Core - 49 x 87 x 25 mm (1.95 x 3.45 x 1.0")
Wiring Connections	Solid Core - Barrier strip	**Enclosure Material**	UL 94V-0 flammability rated ABS Insulation Class 600V
Hysteresis	< 2% FS max.	**Certification**	CSA or UL (see below table), CE
Operating Temperature	0 to 40˚C (32 to 104˚F)	**Power Supply**	None - Self-powered
Response Time	< 200 mS	**AC Conductors Hole**	Solid Core - 20mm (0.8") diameter

CURRENT SWITCH: PRODUCT ORDERING INFORMATION

Model	Output Type	Switch V Max	I Max	Von @ 24Vdc @ 150 mA	Leakage Current	Power LED	Status LED	Auto Range	Input I Min	Input I Max	Approval
CS-325*	Triac	250Vac	1 Amp	n/a	<5 mA	No	No	No	1.25A	200A	cCSAus
CS-325-NS*	Triac	250Vac	1 Amp	n/a	<1 mA	No	No	No	1.25A	200A	cCSAus

* The CS-325 with the snubber circuit is best used to switch high-current inductive loads such as small fan motors. The CS-325-NS is best used to switch resistive or low-current inductive loads such as relays or lights.

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AC CURRENT SWITCH
CS-425-HC Series

CURRENT-OPERATED SOLID-STATE RELAYS FOR SWITCHING AC CIRCUITS WITH TIME DELAY

FEATURES:

- Self-powered and no insertion loss
- True digital switching and no leakage
- Small compact size
- 0, 5, 10, or 15 minutes time delay models
- Input / Output isolation via current transformer
- Solid-state reliability
- Solid, reliable mounting method

APPLICATIONS:

Direct control of AC loads, such as dryer booster fans, in response to the current of a monitored AC circuit

DESCRIPTION:

The CS-425-HC products are solid-state current switches with N.O. triac outputs to control high-current line-voltage AC loads. All models have a factory set trip level of approximately 1 Amp and require no field adjustment for easy installation. Internal circuits are powered by induction from the line being monitored and all models are cULu certified.

SPECIFICATIONS:

Maximum Core Current	50 Amps	**Turn on time** **Turn off time**	<200 mS 0, 5, 10 or 15 minutes (factory set)
Operating Temperature	0 to 40˚C (32 to 104˚F)	**Operating Humidity**	0 - 95% RH non-condensing
Trip Set-Point	Approximately 1 Amps	**Material**	UL 94V-0 flammability rated ABS Insulation Class 600V
Enclosure Size (H x W x D)	49 x 87 x 25 mm (1.95" x 3.45" x 1")	**Mounting Holes**	2 x 5 mm holes spaced 76 mm on base (2 x 0.19" holes spaced 3" on base)
AC Conductor Hole	20 mm (0.8") Diameter	**Switch Type**	Solid-state triac
Switch Rating	120 Vac @ 2.5 Amps Max.	**Off-state Leakage**	<1 mA

DRYER BOOSTER FAN OPERATION:

The CS-425-HC series can operate a dryer booster fan directly. These devices sense when a clothes dryer is drawing 1 Amp of current and then closes the output switch to activate the dryer vent booster fan. When the dryer cycle is complete and the current drops below the threshold, the output switch will remain closed for a pre-set delay time to allow heat to be removed from the vent before the switch is opened again. The device output can switch 120 Vac loads up to 2.5 Amps.

CURRENT SWITCH: PRODUCT ORDERING INFORMATION

Model	Output Type	Switch V Max.	Switch I Max.	Leakage Current	Input I Min.	Input I† Max.	Time Delay (off)	Approval
CS-425-HC-0	Triac	120 VAC	2.5 Amp	<1 mA	~1 Amp	50 Amps	none	cULus
CS-425-HC-5	Triac	120 VAC	2.5 Amp	<1 mA	~1 Amp	50 Amps	5 minutes	cULus
CS-425-HC-10	Triac	120 VAC	2.5 Amp	<1 mA	~1 Amp	50 Amps	10 minutes	cULus
CS-425-HC-15	Triac	120 VAC	2.5 Amp	<1 mA	~1 Amp	50 Amps	15 minutes	cULus

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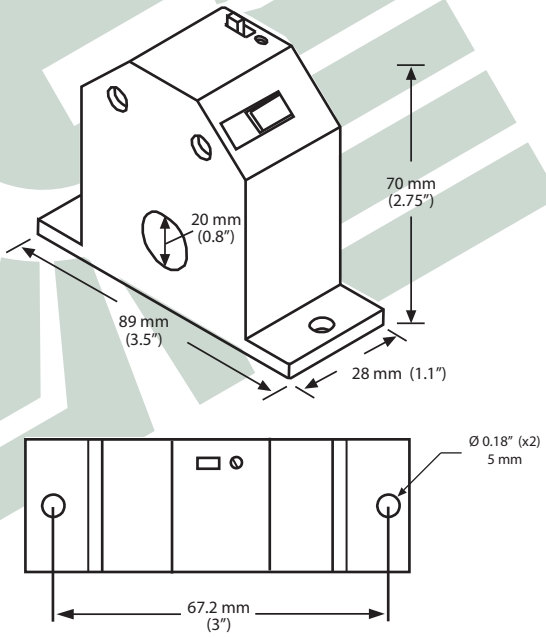
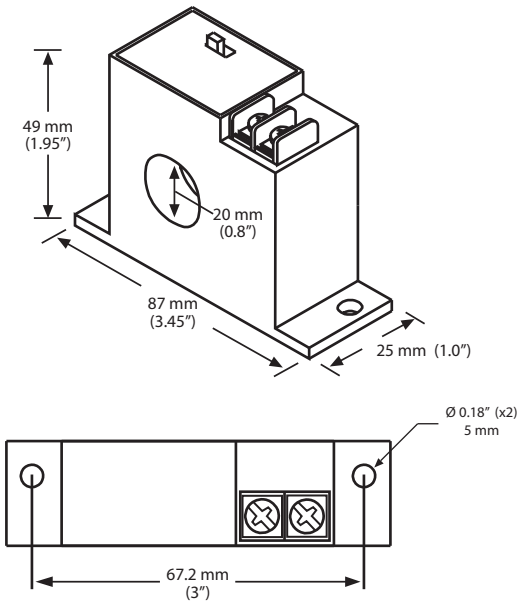
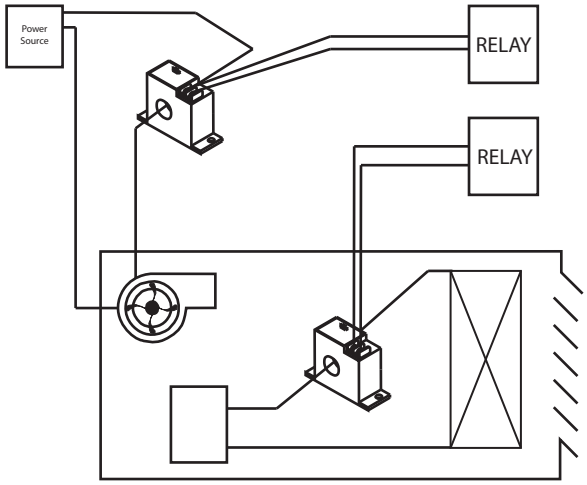
Solid Core CS-325 Series Current Switch



Solid Core CS-425 Series Current Switch



Typical Installation



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Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

MINI-CURRENT SENSOR
CS-6XX Series

Precision power control/sensing

FEATURES:

- Solid Core
- Analog Output
- Up to 100 amps input current
- Small, Compact Design

Peace of mind through reliable current sensors

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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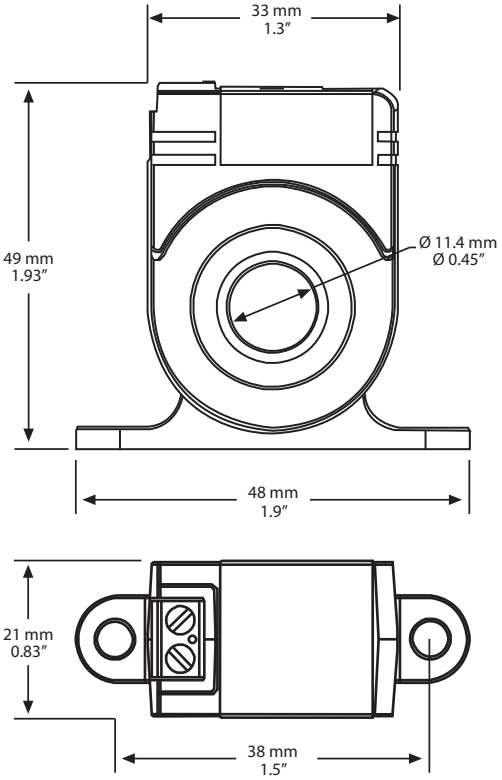
DESCRIPTION:

The CS-6XX-XX series of current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools or fans and provide an output of 4-20 mA, 0-5 Vdc or 0-10 Vdc (Model specific) to represent the load current.

The CS-650 & CS-651 series require no external power supply as they are totally powered by induction from the AC line being monitored. The CS-652 series is loop-powered and require an external 15-30 Vdc power supply.

SPECIFICATION:

Measurement Range:	10/20/50 Amps (Model specific)
Maximum Input Current:	100 Amps continuous
Accuracy:	± 1% FSO
Sensor Power:	Self-powered (CS-650 & CS-651) 15-30 Vdc, Loop-powered (CS-652)
Output Type:	0-5 Vdc, 0-10 Vdc or 4-20 mA
Output Load:	1 MΩ Typical (CS-650 & CS-651) 250 Ω Typical (CS-652)
Loading Error:	Add 1.2% error with 100 KΩ (CS-650 & CS-651 Only)
Frequency:	50/60 Hz
Response Time:	<250 mS Typical (0-90%)
Insulation Class:	600 Vac, insulated conductors
Operating Temperature:	-15 to 60 °C (5 to 140 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	48 x 49 x 21 mm 1.9x 1.93 x 0.83 in
Sensor Aperture:	0.45 in (11.4 mm)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed



PRODUCT ORDERING INFORMATION

MODEL	Output Signal
CS-650	0-5 Vdc, Self-powered
CS-651	0-10 Vdc, Self-powered
CS-652	4-20 mA, Loop-powered

CODE	Input Range
10	0-10 Amps
20	0-20 Amps
50	0-50 Amps

CS650 - 10 **Current Sensor, 0-5 Vdc Output, 0-10 Amp Input**

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

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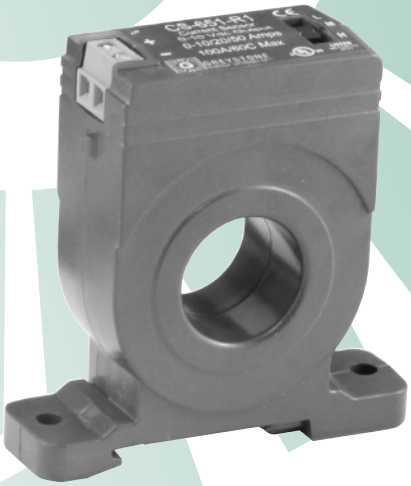
GREYSTONE ENERGY SYSTEMS INC

SOLID CORE CURRENT SENSOR
CS-6XX Series



Precision Power control/sensing

FEATURES:

- Solid Core
- 0-5, 0-10 Vdc or 4-20 mA Output
- Selectable or Fixed Range Models
- Self-powered and Loop-powered Models
- Up to 200 amps Input Current
- Small Compact Size

Peace of mind through reliable power monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

AC CURRENT SENSORS
CS-650 Series

DESCRIPTION:

The CS-650 Series current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools, or fans and output a 0-5 Vdc signal to represent the load current.

The CS-650 require no external power as they are totally powered by induction from the AC line being monitored.

The sensors are typically used to monitor motor operation and can be used to determine motor failure, belt loss, machine feed rates or tool wear.

SPECIFICATION:

Measurement Range:	Up to 200 Amps - See ordering information
Maximum Input Current:	**CS-650-R1:** 100 Amps Continuous **CS-650-R2:** 150 Amps Continuous **CS-650-200:** 250 Amps Continuous
Accuracy:	± 2% FSO (5-100% of range)
Signal Output:	0-5 Vdc
Sensor Power:	Self-powered
Insulation Class:	600 Vac, insulated conductors
Frequency:	50/60 Hz
Response Time:	200 mS Typical, 0-90 %
Output Load:	1 MΩ typical
Loading Error:	add 5% error with 100KΩ
Operating Temperature:	-15 to 60 ℃ (5 to 140 ℉)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	67 x 68.6 x 24.1 mm (2.65 x 2.7 x 0.95 in)
Sensor Aperture:	20.3 mm (0.8 in)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed

FEATURES:

- No field adjustment necessary, factory calibrated
- Input / Output isolation via current transformer
- Solid-state reliability
- Small compact size
- Solid, reliable mounting method

PRODUCT ORDERING INFORMATION

MODEL	Output Signal
CS-650	0-5 Vdc, Self-powered

CODE	Sensing Range	Maximum Input Current
R1	0-10/20/50 Amps - Switch Selectable	100 Amps Continuous
R2	0-50/100/150 Amps - Switch Selectable	150 Amps Continuous
200	0-200 Amps	250 Amps Continuous

CS-650 - R1 **Current Sensor, 0-5 Vdc Output, 0-10/20/50 Amp Input**

AC CURRENT SENSORS
CS-651 Series

DESCRIPTION:

The CS-651 Series current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools, or fans and output a 0-10 Vdc signal to represent the load current.

The CS-651 require no external power as they are totally powered by induction from the AC line being monitored.

The sensors are typically used to monitor motor operation and can be used to determine motor failure, belt loss, machine feed rates or tool wear.

SPECIFICATION:

Measurement Range:	Up to 200 Amps - See ordering information
Maximum Input Current:	**CS-651-R1:** 100 Amps Continuous **CS-651-100:** 150 Amps Continuous **CS-651-200:** 225 Amps Continuous
Accuracy:	± 2% FSO (5-100% of range)
Signal Output:	0-10 Vdc
Sensor Power:	Self-powered
Insulation Class:	600 Vac, insulated conductors
Frequency:	50/60 Hz
Response Time:	200 mS Typical, 0-90 %
Output Load:	1 MΩ typical
Loading Error:	add 5% error with 100KΩ
Operating Temperature:	-15 to 60 °C (5 to 140 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	67 x 68.6 x 24.1 mm (2.65 x 2.7 x 0.95 in)
Sensor Aperture:	20.3 mm (0.8 in)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed

FEATURES:

- No field adjustment necessary, factory calibrated
- Input / Output isolation via current transformer
- Solid-state reliability
- Small compact size
- Solid, reliable mounting method

PRODUCT ORDERING INFORMATION

MODEL	Output Signal
CS-651	0-10 Vdc, Self-powered

CODE	Sensing Range	Maximum Input Current
R1	0-10/20/50 Amps - Switch Selectable	100 Amps Continuous
100	0-100 Amps	150 Amps Continuous
200	0-200 Amps	225 Amps Continuous

CS-651 - R1 **Current Sensor, 0-10 Vdc Output, 0-10/20/50 Amp Input**

AC CURRENT SENSORS
CS-652 Series

DESCRIPTION:

The CS-652 Series current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools, or fans and output a 4-20 mA Vdc signal to represent the load current.

The CS-652 is loop-powered and requires a 15-30 Vdc supply.

The sensors are typically used to monitor motor operation and can be used to determine motor failure, belt loss, machine feed rates or tool wear.

SPECIFICATION:

Measurement Range:	Up to 200 Amps - See ordering information
Maximum Input Current:	**CS-652-R1:** 100 Amps Continuous **CS-652-R2:** 150 Amps Continuous **CS-652-200:** 250 Amps Continuous
Accuracy:	± 2% FSO (5-100% of range)
Signal Output:	4-20 mA
Sensor Power:	15 to 30 Vdc (Loop-powered)
Insulation Class:	600 Vac, insulated conductors
Frequency:	50/60 Hz
Response Time:	250 mS Typical, 0-90 %
Output Load:	250 Ω typical
Maximum Load:	<600 Ω at 24 Vdc
Operating Temperature:	-15 to 60 °C (5 to 140 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	67 x 68.6 x 24.1 mm (2.65 x 2.7 x 0.95 in)
Sensor Aperture:	20.3 mm (0.8 in)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed

FEATURES:

- No field adjustment necessary, factory calibrated
- Average measurement is equivalent to True RMS for pure sine waves
- Input / Output isolation via current transformer
- Solid-state reliability
- Small compact size
- Solid, reliable mounting method

PRODUCT ORDERING INFORMATION

MODEL	Output Signal
CS-652	4-20 mA , Loop-powered

CODE	Sensing Range	Maximum Input Current
R1	0-10/20/50 Amps - Switch Selectable	100 Amps Continuous
R2	0-50/100/150 Amps - Switch Selectable	150 Amps Continuous
200	0-200 Amps	250 Amps Continuous

CS-652 - R1 **Current Sensor, 4-20 mA Output, 0-10/20/50 Amp Input**

AC CURRENT SENSORS
CS-675 Series

DESCRIPTION:

The CS-675 Series current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools, or fans and output an analog signal to represent the load current. The CS-675 is loop-powered and requires 15 to 30 Vdc to power the device

The CS-675 series features True RMS current measurement suitable to measure complex waveforms such as those found in VFD controlled loads. They are also suitable for accurate measurement of phase angled controlled or time proportional SCR controlled load currents. The CS-675 Series contain a precision RMS-to-DC converter circuit which will measure load current accurately for complex, distorted or noisy waveforms as opposed to "average reading" devices that will only accurately measure pure sine waveforms .

SPECIFICATION:

Measurement Range:	See Ordering Information below
Maximum Input Current:	See Ordering Information below
Accuracy:	± 2% FSO (5-100% of range)
Signal Output:	4-20 mA
Sensor Power:	15 to 30 Vdc (Loop -powered)
Insulation Class:	600 Vac, insulated conductors
Frequency:	20-400 Hz
Response Time:	500 mS Typical, 0-90 %
Output Load:	250 Ω typical
Maximum Load:	>600 Ω Max. @ 24 Vdc
Operating Temperature:	-15 to 50 °C (5 to 122 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	66 x 67.3 x 24.9 mm (2.6 x 2.65 x 0.98 in)
Sensor Aperture:	0.8 in (20.3 mm)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed

FEATURES:

- True RMS for complex waves
- Input / Output isolation via current transformer
- Solid-state reliability
- Small compact size
- Solid, reliable mounting method

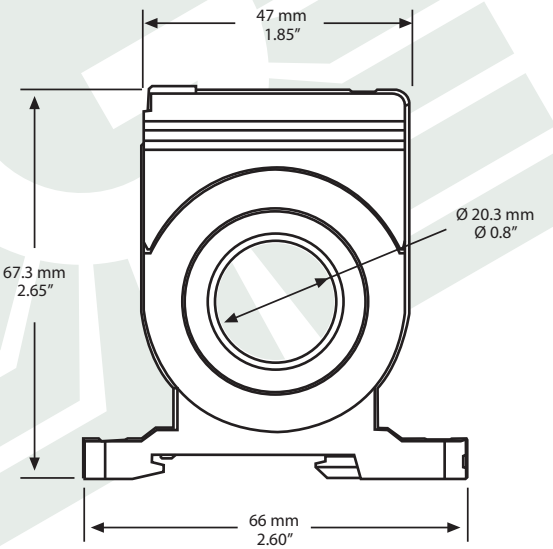
PRODUCT ORDERING INFORMATION

MODEL	Output Signal
CS-675	4-20 mA, Loop-powered

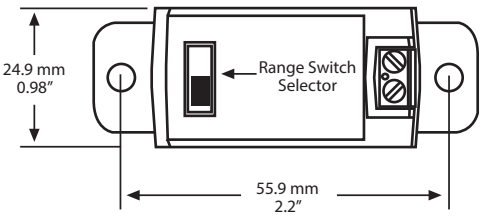
CODE	Sensing Range	Maximum Input Current
2	0-2 Amps	10 Amps Continuous
5	0-5 Amps	15 Amps Continuous
R1	0-10/20/50 Amps - Jumper Selectable	100 Amps Continuous
R2	0-50/100/150 Amps - Jumper Selectable	150 Amps Continuous
200	0-200 Amps	250 Amps Continuous

CS-675 - R1 **Current Sensor, 4-20mA Output, 0-10/20/50 Amp Input**

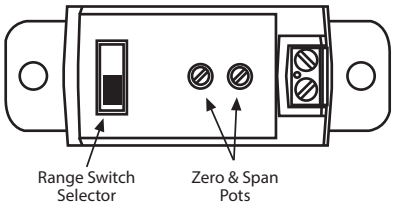
DIMENSIONS



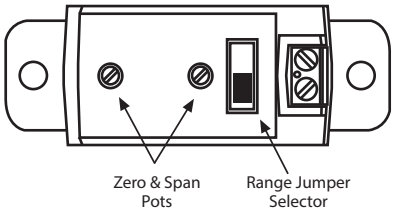
CS-650/651



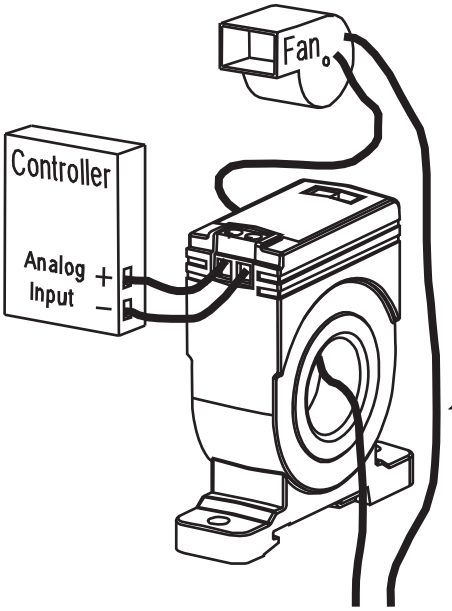
CS-652



CS-675



NOTE: The range switch/jumper is not applicable for models with 1 fixed range.



Insulated Conductors Only

600 Vac max
200 Amps max

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GREYSTONE ENERGY SYSTEMS INC

SPLIT CORE CURRENT SENSOR
SC-6XX Series

Precision Power control/sensing

FEATURES:

- Split Core
- 0-5, 0-10 Vdc or 4-20 mA Output
- Selectable or Fixed Range Models
- Self-powered and Loop-powered Models
- Up to 200 amps Input Current
- Small Compact Size

Peace of mind through reliable power monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

AC CURRENT SENSORS
SC-650 Series

DESCRIPTION:

The SC-650 Series current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools, or fans and output a 0-5 Vdc signal to represent the load current.

The SC-650 require no external power as they are totally powered by induction from the AC line being monitored.

The sensors are typically used to monitor motor operation and can be used to determine motor failure, belt loss, machine feed rates or tool wear.

SPECIFICATION:

Measurement Range:	Up to 200 Amps - See ordering information
Maximum Input Current:	**SC-650-R1:** 100 Amps Continuous **SC-650-R2:** 150 Amps Continuous **SC-650-200:** 250 Amps Continuous
Accuracy:	± 2% FSO (10-100% of range)
Signal Output:	0-5 Vdc
Sensor Power:	Self-powered
Insulation Class:	600 Vac, insulated conductors
Frequency:	50/60 Hz
Response Time:	200 mS Typical, 0-90 %
Output Load:	1 MΩ typical
Loading Error:	add 0.5% error with 100KΩ
Operating Temperature:	-15 to 60 °C (5 to 140 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	76 x 79 x 24.9 mm (3.0 x 3.1 x 0.98 in)
Sensor Aperture:	20.3 mm (0.8 in)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed

FEATURES:

- No field adjustment necessary factory calibrated
- Input / Output isolation via current transformer
- Solid-state reliability
- Small compact size
- Solid, reliable mounting method

PRODUCT ORDERING INFORMATION

MODEL	Output Signal
SC-650	0-5 Vdc, Self-powered

CODE	Sensing Range	Maximum Input Current
R1	0-10/20/50 Amps - Switch Selectable	100 Amps Continuous
R2	0-50/100/150 Amps - Switch Selectable	150 Amps Continuous
200	0-200 Amps	250 Amps Continuous

SC-650 - R1 **Split Core Current Sensor, 0-5 Vdc Output, 0-10/20/50 Amp Input**

AC CURRENT SENSORS
SC-651 Series

DESCRIPTION:

The SC-651 Series current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools, or fans and output a 0-10 Vdc signal to represent the load current.

The SC-651 require no external power as they are totally powered by induction from the AC line being monitored. SChe sensors are typically used to monitor motor operation and can be used to determine motor failure, belt loss, machine feed rates or tool wear.

SPECIFICATION:

Measurement Range:	Up to 200 Amps - See ordering information
Maximum Input Current:	**SC-651-R1:** 100 Amps Continuous **SC-651-R2:** 150 Amps Continuous **SC-651-200:** 225 Amps Continuous
Accuracy:	± 2% FSO (5-100% of range)
Signal Output:	0-10 Vdc
Sensor Power:	Self-powered
Insulation Class:	600 Vac, insulated conductors
Frequency:	50/60 Hz
Response Time:	200 mS Typical, 0-90 %
Output Load:	1 MΩ typical
Loading Error:	add 5% error with 100KΩ
Operating Temperature:	-15 to 60 °C (5 to 140 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	67 x 68.6 x 24.1 mm (2.65 x 2.7 x 0.95 in)
Sensor Aperture:	20.3 mm (0.8 in)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed

FEATURES:

- No field adjustment necessary factory calibrated
- Input / Output isolation via current transformer
- Solid-state reliability
- Small compact size
- Solid, reliable mounting method

PRODUCT ORDERING INFORMATION

MODEL	Output Signal
SC-651	0-10 Vdc, Self-powered

CODE	Sensing Range	Maximum Input Current
R1	0-20/40/60 Amps - Switch Selectable	100 Amps Continuous
R2	0-50/100/150 Amps - Switch Selectable	150 Amps Continuous
200	0-200 Amps	225 Amps Continuous

SC-651 - R1 **Current Sensor, 0-10 Vdc Output, 0-20/40/60 Amp Input**

AC CURRENT SENSORS
SC-652 Series

DESCRIPTION:

The SC-652 Series current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools, or fans and output a 4-20 mA Vdc signal to represent the load current.

The SC-652 is loop-powered and requires a 15-30 Vdc supply.

The sensors are typically used to monitor motor operation and can be used to determine motor failure, belt loss, machine feed rates or tool wear.

SPECIFICATION:

Measurement Range:	Up to 200 Amps - See ordering information
Maximum Input Current:	**SC-652-R1:** 100 Amps Continuous **SC-652-R2:** 150 Amps Continuous **SC-652-200:** 250 Amps Continuous
Accuracy:	± 2% FSO (5-100% of range)
Signal Output:	4-20 mA
Sensor Power:	15 to 30 Vdc (Loop-powered)
Insulation Class:	600 Vac, insulated conductors
Frequency:	50/60 Hz
Response Time:	250 mS Typical, 0-90 %
Output Load:	250 Ω typical
Maximum Load:	<600 Ω at 24 Vdc
Operating Temperature:	-15 to 60 °C (5 to 140 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	67 x 68.6 x 24.1 mm (2.65 x 2.7 x 0.95 in)
Sensor Aperture:	20.3 mm (0.8 in)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed

FEATURES:

- No field adjustment necessary factory calibrated
- Average measurement is equivalent to True RMS for pure sine waves
- Input / Output isolation via current transformer
- Solid-state reliability
- Small compact size
- Solid, reliable mounting method

PRODUCT ORDERING INFORMATION

MODEL	Output Signal
SC-652	4-20 mA , Loop-powered

CODE	Sensing range	Maximum Input Current
R1	0-20/40/60 Amps - Switch Selectable	100 Amps Continuous
R2	0-50/100/150 Amps - Switch Selectable	150 Amps Continuous
200	0-200 Amps	250 Amps Continuous

SC-652 - R1 **Current Sensor, 4-20 mA Output, 0-20/40/60 Amp Input**

AC CURRENT SENSORS
SC-675 Series

DESCRIPTION:

The SC-675 Series current sensors monitor line current for electrical loads such as pumps, conveyors, machine tools, or fans and output an analog signal to represent the load current. The SC-675 is loop-powered and requires 15 to 30 Vdc to power the device

The SC-675 series features True RMS current measurement suitable to measure complex waveforms such as those found in VFD controlled loads. They are also suitable for accurate measurement of phase angled controlled or time proportional SCR controlled load currents. The SC-675 Series contain a precision RMS-to-DC converter circuit which will measure load current accurately for complex, distorted or noisy waveforms as opposed to "average reading" devices that will only accurately measure pure sine waveforms.

SPECIFICATION:

Measurement Range:	See Ordering Information below
Maximum Input Current:	See Ordering Information below
Accuracy:	± 2% FSO (5-100% of range)
Signal Output:	4-20 mA
Sensor Power:	15 to 30 Vdc (Loop -powered)
Insulation Class:	600 Vac, insulated conductors
Frequency:	20-400 Hz
Response Time:	500 mS Typical, 0-90 %
Output Load:	250 Ω typical
Maximum Load:	>600 Ω Max. @ 24 Vdc
Operating Temperature:	-15 to 50 °C (5 to 122 °F)
Operating Humidity:	5 to 90% RH non-condensing
Terminal Block:	14 to 22 AWG
Dimensions:	66 x 67.3 x 24.9 mm (2.6 x 2.65 x 0.98 in)
Sensor Aperture:	0.8 in (20.3 mm)
Enclosure Material:	ABS/PC, UL94 V-0
Agency Approvals:	cULus Listed

FEATURES:

- True RMS for pure sine waves
- Input / Output isolation via current transformer
- Solid-state reliability
- Small compact size
- Solid, reliable mounting method

PRODUCT ORDERING INFORMATION

MODEL	Output Signal
SC-675	4-20 mA, Loop-powered

CODE	Sensing Range	Maximum Input Current
2	0-2 Amps	10 Amps Continuous
5	0-5 Amps	15 Amps Continuous
R1	0-10/20/50 Amps - Jumper Selectable	3X Range Selected Continuous
R2	0-50/100/150 Amps - Jumper Selectable	2X Range Selected Continuous
200	0-200 Amps	300 Amps Continuous

SC-675 - R1 **Current Sensor, 4-20mA Output, 0-10/20/50 Amp Input**

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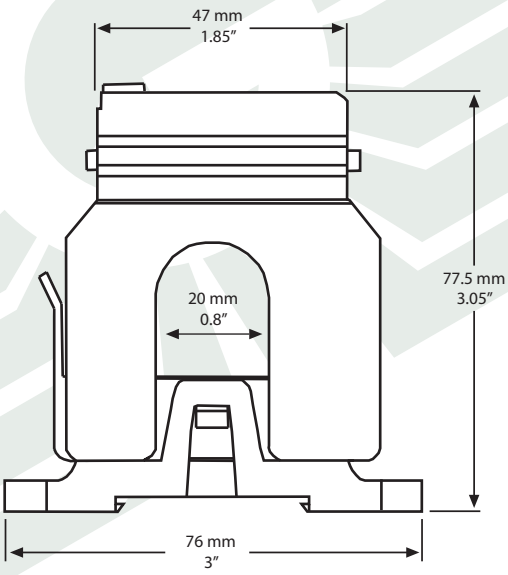
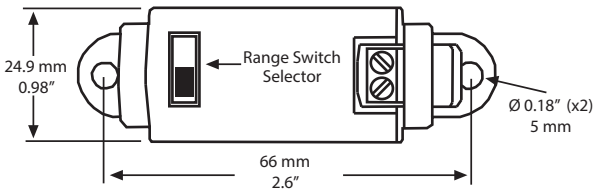
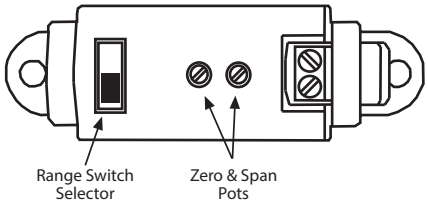
DIMENSIONS



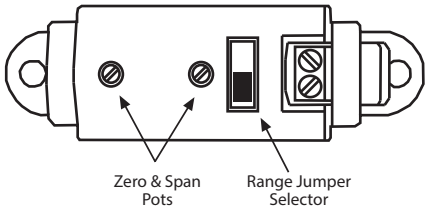
SC-650/651



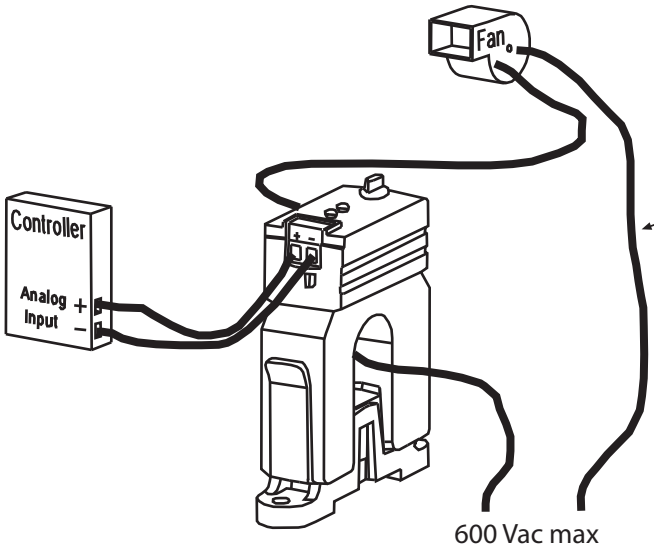
SC-652



SC-675



NOTE: The range switch/jumper is not applicable for models with 1 fixed range.



600 Vac max
250 Amps max
(Depending on range Selected)

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c UL us LISTED RoHS COMPLIANT 5 Year Warranty MADE IN CANADA ISO9001 CE

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COMMAND RELAY
CSR-112 / CSR-124

DESCRIPTION:

The **CSR-112** and **CSR-124** command relay attaches to the side of any full-size CS or SC type sensor or switch and adds a form C relay function. It provides line voltage switching with control either from an automation system digital output or from a CS/SC current switch. A status LED indicates the relay state and the relay output features both a normally-open and a normally-closed contact.

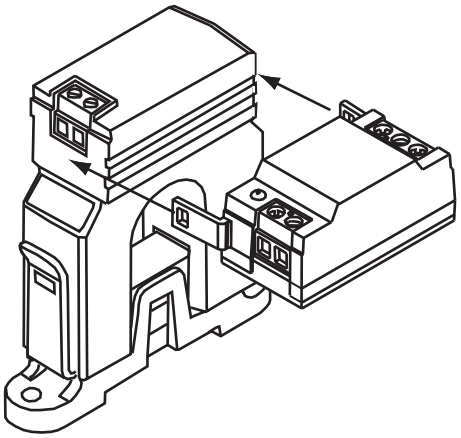
The CSR-CS/SC combination provides a convenient solution when status indication and motor control are needed at a single location. The CSR can accept a digital control signal from the controller to activate the relay contacts which can be used to provide power to the motor contactor to start the motor. The CS/SC switch will then provide a digital proof-of-flow signal to the controller to indicate motor status

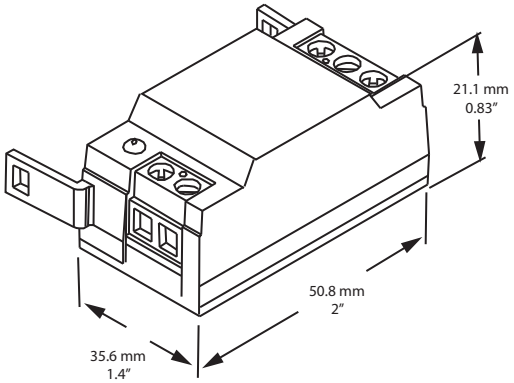
SPECIFICATIONS:

Coil Voltage:	**CSR-112:** 12 Vdc ±10% **CSR-124:** 24 Vac/dc ±10%
Coil Current:	**CSR-112:** 25 mA maximum **CSR-124:** 13 mA maximum
Relay Contacts:	SPDT Form C (NO + NC)
Contact Rating:	5A @ 250 Vac/30 Vdc Resistive 2A @ 250 Vac/30 Vdc Inductive
Contact Resistance:	30 mΩ maximum
Operating Temperature:	-15 to 60 ˚C (5 to 140 ˚F)
Operating Humidity:	5 to 90 % RH, non-condensing
Wiring Connection:	Terminal block (14 to 22 AWG)
Dimensions:	50.8 x 35.6 x 21.1 mm (2 x 1.4 x 0.83")
Enclosure Material:	ABS/PC, UL94 V-0

FEATURES:

- Can be mounted to any CS or SC product for easier installation
- Convenient Relay Status LED
- Can be factory assembled with any CS or SC product
- SPDT Form C relay contacts
- Environmentally-friendly cadmium-free contacts
- Ideal for switching contactors, solenoids and motors
- Small compact size





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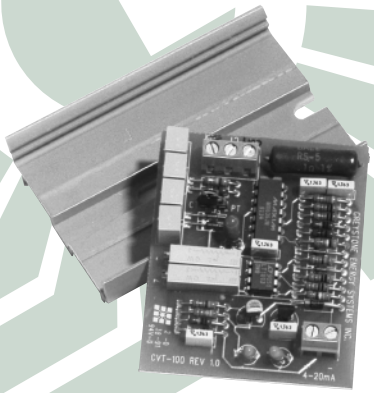
CT/PT INPUT TRANSDUCER
CVT-100



FEATURES:

- True RMS-DC conversion
- CT or PT input (pin selectable)
- Loop Powered
- Reverse voltage protection
- CSA NRTL/C approval (Canada / USA)

APPLICATIONS:

- Power consumption monitoring
- Overload detection

The CVT-100 accepts a 0 to 5 Amp RMS current from a CT, or a 0 to 20 Volt RMS voltage from a PT, and converts it to a proportional DC current loop. The CVT-100 incorporates a true RMS conversion which is corrected to all types of waveforms, and therefore can be used with a wide variety of load types: SCR, TRIAC, Inductive motors, etc.

NOTE: PT option includes 115/20 Vac transformer. For other potential transformers, contact Greystone

SPECIFICATIONS:

Power Supply:	10 - 32 Vdc
Current Consumption:	26 mA (max.)
Input Signal:	0 - 5 Amp RMS (CT) 0 - 20 Volt RMS (PT)
Input Impedance	0.1 ohm(CT) 15k ohm(PT)
Accuracy:	±1% Full Scale Output
Operating Temperature:	0 to 70˚C (32 to 158˚F)
Operating Humidity:	0 - 95% RH non-condensing
H x W x D:	19 x 57 x 70 mm (0.75 x 2.25 x 2.75")
Mounting:	Snap Track (factory supplied)

CVT-100: PRODUCT ORDERING INFORMATION

CODE	Enclosure Options
A	Snap Track

CODE	Input Options
1	CT (0-5) AMP
4	PT

ORDER EXAMPLE:

To order a:

CVT-100 with Snaptrack, CT input - 0-5 Amps

The following order number would apply

CVT-100-A-1

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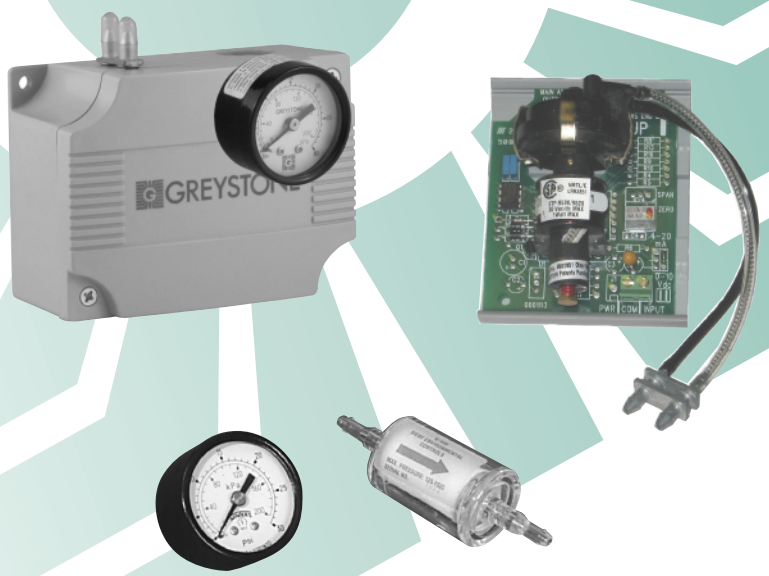
GREYSTONE ENERGY SYSTEMS INC

ELECTRONIC TO PNEUMATIC TRANSDUCER
ETP Series



Precision pneumatic control

FEATURES:

- Direct connection to PCs for pneumatic control
- Two-wire loop powered or three-wire voltage models
- Easily accessible wiring terminal blocks
- Quick panel mounting with supplied snap-track
- High accuracy with low hysteresis
- Driftless operation with high repeatability
- AC/DC operation

Peace of mind through reliable pneumatic transducers

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

APPLICATIONS:

The ETP-9500 Series transducers convert an electrical input signal to a pneumatic output signal to position pneumatic damper and valve actuators in HVAC systems. The ETP-9520 accepts an industry standard 4 - 20mA current input signal and produces a proportional 21 - 103 kPa (3 - 15 psig) pneumatic output. The ETP-9500 offers more flexibility as it is field selectable to accept either a 4 - 20mA or a 0 - 10 VDC input signal to control the 21 - 103 kPa (3 - 15 psig) pneumatic output.

The ETP-9520-PW accepts a field selectable pulse width signal to control the pneumatic output.

The ETP-9520 is powered by the process loop signal and requires no power supply. The ETP-9500 is also loop powered in the 4 - 20mA configuration and will accept a wide range of AC or DC power supply voltages in the 0 - 10 VDC mode. The ETP-9520-PW requires a 24 VDC or 22 to 28 VAC power supply.

SPECIFICATIONS: ETP-9500 / 9510 / 9520

Input Signal.....	**ETP-9500,** 4-20 mA or 0-10 Vdc, jumper selectable **ETP-9510,** 2-10 Vdc, 2 wire **ETP-9520,** 4-20 mA, 2 wire **ETP-9500-PW,** Dry contact to common, 5 to 24 Vdc or 24 Vac ±10%
Input Impedance.....	4-20 mA input, 400 Ω minimum, 550 Ω maximum 0-10 Vdc input, >100 KΩ
PWM Input Signal.....	Time between pulses: 1 millisecond min, Pulse Duration: .02 to 5 Sec.; 0.59 to 2.93 sec.; 0.1 to 10 sec.; 0.1 to 25.5 sec. Accuracy: ±3% of span for all ranges
Power Supply.....	4-20 mA input, Loop powered, 2-10 Vdc input, 24-30 Vac.\Vdc, 1.0 watt max. ETP-9500-PW - Regulated 24 Vdc min, 35 Vdc max, Regulated 22-28 Vac
Air Supply.....	138 kPa (20 psig) nominal, 207 kPa (30 psig) maximum. Clean, dry, oil-free air required
Air Consumption.....	5.66 ml/s (0.012 scfm) @ 138 kPa (20 psig) supply, maximum
Output Air Capacity.....	141 ml/s (515 scim) maximum @ 138 kPa (20 psig) supply
Max/Min Span.....	97 kPa (14 psig) / 55kPa (8 psig)
Lowest/Highest Offset.....	7 kPa (1 psig) / 41 kPa (6 psig)
Air Connections.....	Male barbed fittings for flexible 1/4" OD pneumatic tubing
Wiring Connections.....	Screw terminals for 14-22 AWG wire
Output Signal.....	21 - 103 lPa (3 - 15 psig) nominal, direct acting
Linearity.....	±1% of span
Hysteresis.....	±1% of span
Adjustments.....	Zero and span potentiometers
Operating Conditions.....	0˚ to 60˚C (32˚-140˚F), 5-95% RH non-condensing
Dimensions (H x W x D).....	83 x 70 x 50 mm (3.25 x 2.75 x 2") PW Option: 83x165x50 mm (3.25x7x2") E Option: 116 x 84 x 54 mm (4.56 x 3.32 x 2.11")

PRODUCT ORDERING INFORMATION:

MODEL	Product Description
ETP	Electronic to pneumatic transducer

CODE	Input Signal
9500	Field selectable 0 - 10 Vdc or 4 - 20 mA
9510	2 - 10 Vdc, loop-powered
9520	4 - 20 mA, loop-powered

CODE	Options
E	Enclosure (Not available with PW option)
EG	Enclosure c/w 0 to 30 psi Gage (Not available with PW option)
PW	PWM input (9500 series only)

Greystone Energy Systems Inc. reserves the right to make design modifications without prior notice.

ETP 9510 EG

OPTIONS:

- Pressure gauge (not mounted) **PG-100-30**, 0-30 psig
- Pneumatic air filter (not mounted) **K-335**, 0.5 micron

RoHS COMPLIANT

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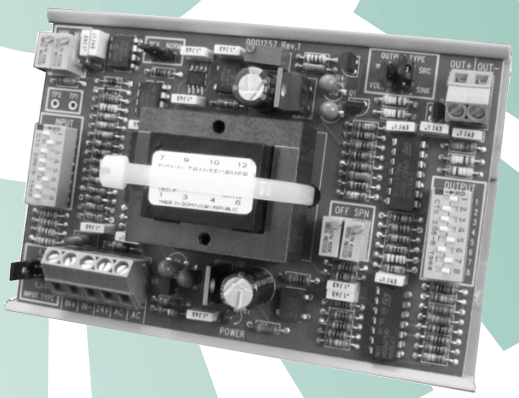
GREYSTONE ENERGY SYSTEMS INC

ANALOG ISOLATION MODULE
Model GT-AI



Precision Signal Conditioning

FEATURES:

- Input/Output Signal Isolation
- Field Selectable Input/Output Ranges
- Direct or reverse acting
- Regulated power supply output
- Compact and Economical
- Snap Track Mounted

Peace of mind through reliable signal interfaces

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

APPLICATIONS:

- Isolated signal conversion or reversal
- Eliminate ground loop wiring problems
- Variable frequency motor drive signal isolation
- Electric actuator isolation
- Easily interface recorders, data loggers and controllers
- Interface and isolate DDC, EMS and HVAC panels

PRODUCT DESCRIPTION:

The GT-AI analog isolation module is a 3-way isolating analog signal re-scaling module with one input/output channel. It will accept one analog voltage or current input signal, isolate it and re-scale it to another voltage or current output signal. The I/O signals have several pre-calibrated, fixed ranges or may be custom calibrated for various offsets and spans and can be direct or reverse acting to provide signal inversion.

The device has an on-board transformer that provides power supply isolation and also input/output signal isolation.

The GT-AI also includes a regulated +24 Vdc power output that can be used to power a transducer or a resistance input. It features top-adjust trim-pots for offset and gain control, source or sink capabilities and an LED power indicator. Various I/O signal types are easily selected with DIP switches.

SPECIFICATIONS:

General Specifications

Power Supply . . . . . .24Vac ± 10%
Consumption . . . . . .150 mA max.
Operating Conditions . . . . . .0 to 50 °C (32 to 122 °F)
5 to 95 %RH, Non-condensing
Storage Conditions . . . . . .-30 to 70 °C (-22 to 158 °F)
5 to 95 %RH, Non-condensing
Wiring Connections . . . . . .Screw terminal block 14 to 22 AWG
Enclosure . . . . . .Snap track mounting
5.0″ L x 3.25″ W x 1.85″ H
127 x 82.5 x 47 mm
Weight . . . . . 285 gm (10 oz)

Power Output

Regulated Power Output. . . . .24Vdc ± 10% @ 30 mA maximum
(use to power an external sensor)

Input Signal

Preset Voltage Range 0-1, 0-5, 0-10, 0-15, 0-20
1-5, 2-10, 3-15 and 4-20 Vdc
Adjustable Voltage Offset. . . .0-20 Vdc
Adjustable Voltage Span. . . . .1-20 Vdc
Voltage Impedance . . . . . > 10 KΩ

Preset Current Range. . . . . .0-1, 0-20 and 4-20 mA
Adjustable Current Offset. . . .0-15 mA
Adjustable Current Span. . . . .4-20 mA
Current Impedance . . . . . .250 Ω (1 KΩ for 0-1 mA range)

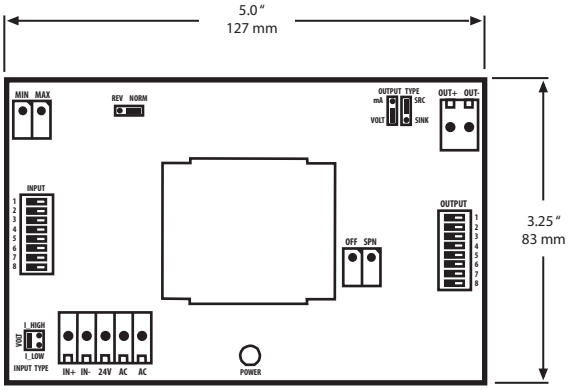
Output Signal

Preset Voltage Range . . . . . .0-5, 1-5, 0-10 and 0-20 Vdc
Preset Voltage Offset. . . . . .0, 1 and 2 Vdc
Preset Voltage Spans. . . . . .1, 3, 4, 5, 6, 7, 8 and 10 vdc
Adjustable Voltage Offset. . . .0-10 Vdc
Adjustable Voltage Span. . . . .1-20 Vdc
Voltage Impedance . . . . . > 10 KΩ

Preset Current Range. . . . . .0-20 and 4-20 mA
Preset Current Offset . . . . . .0, 4 and 8 mA
Preset Current Spans. . . . . .4, 12, 16 and 20 mA
Adjustable Current Offset. . . .0-12 mA
Adjustable Current Span. . . . .4-20 mA
Current Impedance . . . . . .750 Ω

Current Signal Type. . . . . .Source or Sink (jumper selectable)
Signal Direction. . . . . .Normal/Reversible via single jumper
Accuracy. . . . . .±1% typical

DIMENSIONS:



ORDERING INFO:

GT-AI

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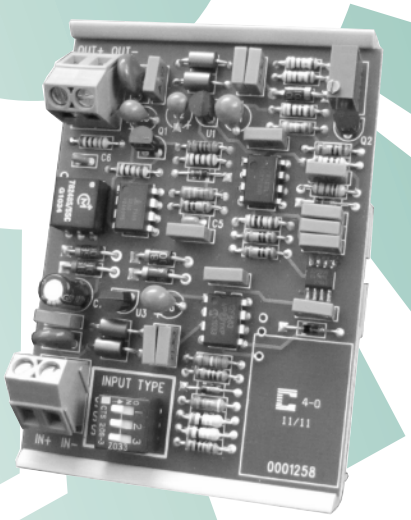
GREYSTONE ENERGY SYSTEMS INC

ANALOG ISOLATION MODULE
Model GT-AI420



Precision Signal Conditioning

FEATURES:

- Input Output Signal Isolation
- Field Selectable Input Ranges
- Selection Current Outputs
- Loop-powered
- Compact and Economical
- Snap Track Mounted

Peace of mind through reliable signal interfaces

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

APPLICATIONS:

- Isolated signal conversion
- Eliminate ground loop wiring problems
- Variable frequency motor drive signal isolation
- Electric actuator isolation
- Easily interface recorders, data loggers and controllers
- Interface and isolate DDC, EMS and HVAC panels

PRODUCT DESCRIPTION:

The GT-AI420 analog isolation module is a 2-wire loop-powered 4-20 mA signal isolator with one input/output channel. It will accept one analog, current or voltage, input signal, isolate it and sink a current output signal. The input has several fixed ranges for various applications.

The devices derives it's operating power from the output current loop that is provided by the receiving device and has an on-board transformer that provides complete input/output isolation.

Both the input and output are sinking type and the input signal types are easily selected with DIP switches.

SPECIFICATIONS:

General Specifications

Power Supply . . . . . .Powered by output-loop current (15-30 Vdc)
Isolation . . . . . .1000Vrms input to output
Accuracy. . . . . .± 0.1% typical
Operating Conditions . . . . . .0 to 50 °C (32 to 122 °F)
5 to 95 %RH, Non-condensing
Storage Conditions . . . . . .-30 to 70 °C (-22 to 158 °F)
5 to 95 %RH, Non-condensing
Wiring Connections . . . . . .Screw terminal block 14 to 22 AWG
Enclosure . . . . . .Snap track mounting
2.4" L x 3.25"W
61 x 83 mm
Weight . . . . . .56 gm (1.98 oz)

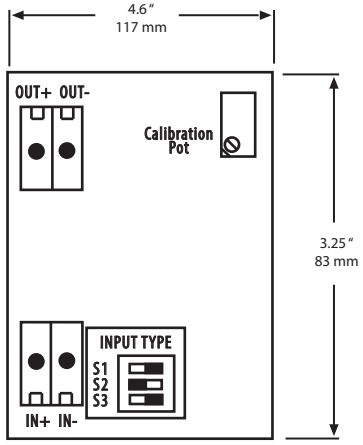
Input Signal

Voltage Range . . . . . .0-5, 0-10, 1-5, or 2-10 Vdc (Switch selectable)
Voltage Impedance . . . . . .> 10 KΩ
Current Range . . . . . .0 to 20 or 4-20 mA (switch selectable)
Current Impedance . . . . . 250 Ω
Current Signal Type. . . . . Sink (external transducer generates 4-20 mA)

Output Signal

Current Range. . . . . .4-20 mA
Current Imperance. . . . . 750 Ω max with 24 Vdc supply
Resistance Accuracy. . . . . ± 5%
Current Signal Type. . . . . Sink (requires a loop power supply)

DIMENSIONS:



ORDERING INFO:

GT-AI420

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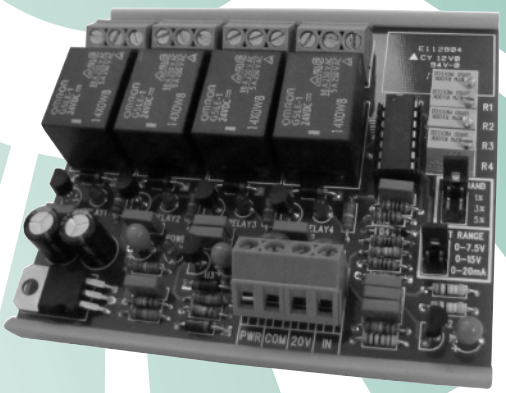
GREYSTONE ENERGY SYSTEMS INC

ANALOG RELAY MODULE
GT-AR Series



Precision Signal Conditioning

FEATURES:

- Two or Four Form-C Relay Outputs
- Field Adjustable Trip Levels
- 3 Jumper Selectable Deadbands
- LED Status Indicator for Each Relay
- 3 Jumper Selectable Input Ranges
- Regulated 20 Vdc Power Output
- Compact and Economical
- Snap Track Mounted

Peace of mind through reliable signal interfaces

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APPLICATIONS:

- Analog Signal Alarms
- Staging and Sequencing
- Analog to Digital Conversion
- Level Indication

PRODUCT DESCRIPTION:

The GT-AR series analog to relay module accepts an analog voltage or current signal and controls either 2 relays (GT-AR-2) or 4 relays (GT-AR-4). The input signal has three jumper selectable ranges for either 0-7.5 Vdc, 0-15 Vdc or 0-20 mA. Each relay has an independently adjustable setpoint which is set with a multi-turn pot.

Each form-C relay activates when the input signal is equal to the trip setpoint and deactivates when the input signal falls below the setpoint by a deadband amount. The deadband is also jumper selectable for 1, 3, or 5% of the range.

Features include a regulated power output that can be used to power a transducer or a resistance input, top-adjust trim-pots for setpoint adjustment, an LED power indicator, status LEDs for each relay and 10 Amp form-C relays. The product comes with standard snap-track for easy mounting.

SPECIFICATIONS:

General Specifications

Power Supply . . . . . .23 to 30 Vdc, 22 to 27 Vac
Consumption . . . . . .**GT-AR-2 -** 80 mA max. at 24 Vdc
GT-AR-4 - 110 mA max. at 24 Vdc
Protection Circuitry . . . . . .Reverse voltage protected
Overvoltage protected
Operating Conditions . . . . . 0 to 50 °C (32 to 122 °F)
5 to 95 %RH, Non-condensing
Storage Conditions . . . . . .-30 to 70 °C (-22 to 158 °F)
5 to 95 %RH, Non-condensing
Wiring Connections . . . . . .Screw terminal block 12 to 24 AWG
Enclosure . . . . . .Snap track mounting
3.9" L x 3.25" W x 1.25" H
99 x 82.5 x 32 mm
Weight . . . . . .**GT-AR-2 -** 110 gm (3.88 oz)
GT-AR-4 - 144 gm (5.08 oz)

Power Output

Regulated Power . . . . . .20 Vdc ± 10% @ 30 mA max
Output to power an external sensor

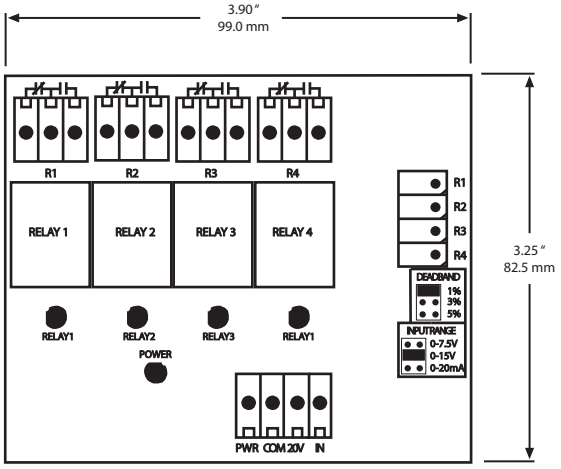
Input Signal

Input Voltage Range . . . . . .0 to 7.5 or 0 to 15 Vdc
Input Voltage Impedance . .> 15 KΩ
Input Current Range . . . . . .0 to 20 mA
Input Current Impedance . .250 Ω

Output Relays

Type . . . . . .SPDT Form C
Contact Rating . . . . . .10 Amps at 125 Vac
Contact Resistance . . . . . .100 mΩ maximum
Electrical Life . . . . . .100,000 operations
Mechanical Life . . . . . .10,000,000 operations

DIMENSIONS:



ORDERING INFO:

GT-AR-2	2 Adjustable Relay Output
GT-AR-4	4 Adjustable Relay Output

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RoHS COMPLIANT

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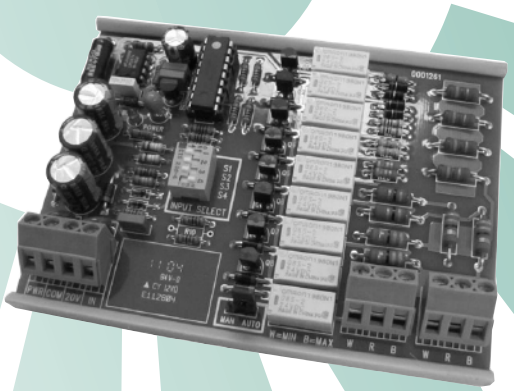
GREYSTONE ENERGY SYSTEMS INC

ANALOG RESISTANCE MODULE
Model GT-ARES



Precision Signal Conditioning

FEATURES:

- Field Selectable Input Ranges
- Several Resistance Output Ranges
- LED Power Indicator
- Regulated 20 Vdc Power Output
- Compact and Economical
- Snap Track Mounted

Peace of mind through reliable signal interfaces

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APPLICATIONS:

- Electric Actuator Control
- Electronic potentiometer
- Resistive sensor simulation

PRODUCT DESCRIPTION:

The GT-ARES analog to resistance module is an interface that accepts a DIP switch selectable analog input (voltage or current) and uses that signal to proportionally control a variable resistance output. The device output simulates a three-wire slide wire or rotary potentiometer and has both ends of the potentiometer and the wiper availble on terminal connector. The resistive output is electrically isolated from the input signal.

The GT--ARES includes a regulated power output that can be used to power a current-loop transducer and also features a failsafe input that will connect to the output terminals in case of a power loss or for manual output control. There is an LED power indicator and manual override jumper for failsafe operation.

SPECIFICATIONS:

General Specifications

Power Supply . . . . . 23 to 30 Vdc, 22 to 27 Vac
Half-wave rectified
Consumption . . . . . 110 mA max.
Input Voltage Effect. . . . . Negligible over specified
operating range
Protection Circuitry . . . . . Reverse voltage protected
Overvoltage protected
Operating Conditions . . . . . 0 to 50 °C (32 to 122 °F)
5 to 95 %RH, Non-condensing
Storage Conditions . . . . . -30 to 70 °C (-22 to 158 °F)
5 to 95 %RH, Non-condensing
Wiring Connections . . . . . Screw terminal block 14 to 22 AWG
Enclosure . . . . . Snap track mounting
4.6" L x 3.25" W
117 x 83 mm
Weight . . . . . 131 gm (4.6 oz)

Power Output

Regulated Power . . . . . 20 Vdc ± 10% @ 30 mA max
Output to power an external sensor
Power Output Drive . . . . . 30 mA maximum

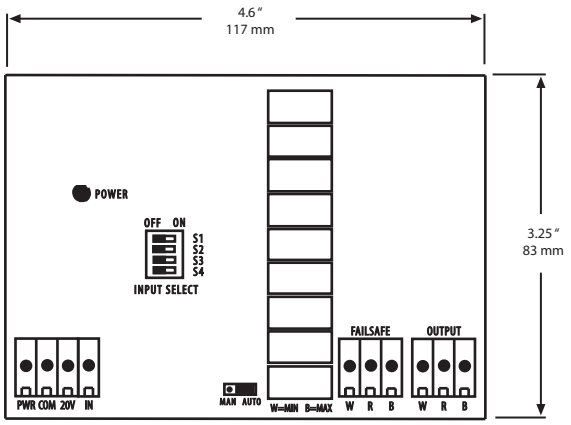
Input Signal

Voltage Range . . . . . 0-5, 0-10, 0-15, 1-5, 2-10 or 3-15 Vdc
(Switch selectable)
Voltage Impedance . . . . . > 10 KΩ
Current Range . . . . . 0 to 20 or 4-20 mA (switch selectable)
Current Impedance . . . . . 250 Ω

Output Signal

Signal Type . . . . . Simulated potentiometer resistance (3-wire)
Resolution. . . . . 256 steps (no wrap around)
Resistance Accuracy. . . . . ± 5%
Standard Values . . . . . 0-135 Ω, 4.5 watts
0-270 Ω, 3.0 watts
0-500 Ω, 3.0 watts
0-1000 Ω, 1.0 watts

DIMENSIONS:



ORDERING INFO:

GT-ARES - ____

135	0-135 Ω, 4.5 watts
270	0-270 Ω, 3.0 watts
500	0-500 Ω, 3.0 watts
1000	0-1000 Ω, 1.0 watts

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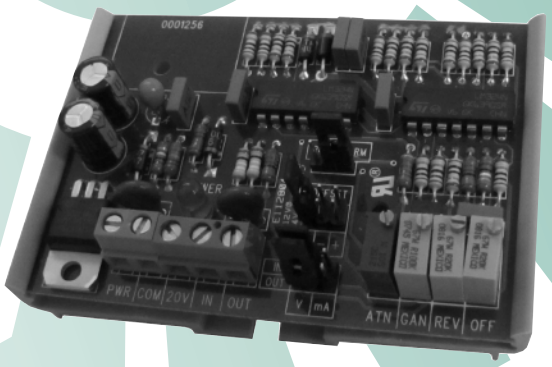
GREYSTONE ENERGY SYSTEMS INC

ANALOG SCALING MODULE
Model GT-ASM



Precision Signal Conditioning

FEATURES:

- Field Selectable Input & Output Ranges
- Direct or Reverse Acting Output
- LED Power Indicator
- Regulated 20 Vdc Power Output
- Compact and Economical
- Snap Track Mounted

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APPLICATIONS:

- Resistance to voltage or current conversion
- Voltage to voltage or current conversion
- Current to voltage or current conversion
- Voltage or current signal reversal

PRODUCT DESCRIPTION:

The GT-ASM analog scaling module is used for analog signal conversion or re-scaling. It will accept one DC voltage, current or resistive input signal and output a non-isolated voltage or current signal. The output signal is easily calibrated for various offsets and spans and can be direct or reverse acting to provide signal inversion.

The GT-ASM also includes a regulated power output that can be used to power a transducer or resistance input. It features top-adjust trim-pots for offset, gain, input attenuation and reverse-offset calibration. There is also an LED power indicator.

The product comes with standard snap-track for easy mounting or is also available mounted in a hinged ABS enclosure.

SPECIFICATIONS:

General Specifications

Power Supply . . . . . .23 to 28 Vdc, 22 to 26 Vac
Half-wave rectified
Consumption . . . . . .100 mA max.
Protection Circuitry . . . . . .Reverse voltage protected
Overvoltage protected
Operating Conditions . . . . . .0 to 50 °C (32 to 122 °F)
5 to 95 %RH, Non-condensing
Storage Conditions . . . . . .-30 to 70 °C (-22 to 158 °F)
5 to 95 %RH, Non-condensing
Wiring Connections . . . . . .Screw terminal block 14 to 22 AWG
Enclosure . . . . . .Snap track mounting
2.35" L x 3.25" W
59.7 x 82.5 mm
ABS Hinged Enclosure
5.7" L x 3.95" W x 2.5" D
145 x 100 x 63 mm

Power Output

Regulated Power . . . . . .20 Vdc ± 10% @ 30 mA max
Output to power an external sensor

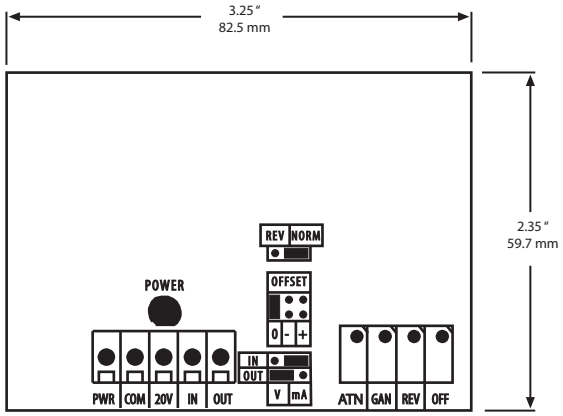
Input Signal

Input Voltage Range . . . . . .0 to 17.5 Vdc
Input Voltage Impedance . . . .> 100 KΩ
Input Current Range . . . . . .0 to 30 mA
Input Current Impedance . . . .250 Ω

Output Signal

Output Voltage Range . . . . . .0 to 17.5 Vdc
Output Voltage Impedance . 3 KΩ at 17.5 Vdc
Output Current Range . . . . . .0 to 30 mA
Output Current Impedance . .650 Ω at 20 mA
Accuracy . . . . . .± 1%

DIMENSIONS:



ORDERING INFO:

GT-ASM Analog Scaling Module

GREYSTONE
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GREYSTONE ENERGY SYSTEMS INC

CARBON MONOXIDE (CO) DETECTORS
CMD Series

Precision gas control/sensing

FEATURES:

- Space or duct mount models
- Long-life electrochemical sensor
- Various analog outputs
- LCD display
- Optional relay outputs & audible alarm
- BACnet or Modbus communication

Peace of mind through reliable gas monitoring

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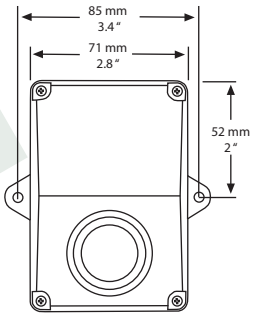
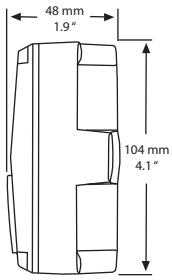
DESCRIPTION:

The CMD5B1 Series carbon monoxide detector uses a superior electrochemical sensor for reliability and accuracy in even the most critical applications. The standard product features a 2-wire loop-powered output. Optionally, the device may configured with an alarm relay which operates in 3-wire sourcing mode and/or with Modbus communications.





SPECIFICATION:

Sensor Type:	Electrochemical
Sensor Agency Approvals:	Sensor is a UL Recognized Component for ANSI/UL-2034, UL-2075, E240671
Measurement Range:	**Analog:** 0-300 PPM **Modbus:** 0-500 PPM
Accuracy:	±5 PPM or 5% of reading for 0-300 PPM (whichever is greater)
Accuracy rated:	0˚ to 50˚C (32˚ to 122˚F), 15 to 95%
Life Expectancy:	5-7 years in air
Typical Coverage Area:	700 m^2 (7500 ft^2) or 15m (50ft) radius
Operating Conditions:	-20˚ to 50˚C (-4˚ to 122˚F), 15 to 95% RH
Sample Method:	Diffusion
Stability:	<5% signal loss/year
Response Time:	<35 seconds for 90% step change
Power Supply:	24 Vdc ±20% or 24 Vac ±10% (non-isolated half-wave rectifed) **Modbus:** 24 Vdc ±20%
Consumption:	20 mA max. **with Relay option:** 50 mA max. **Modbus:** 35 mA max.
Input Voltage Effect:	Negligible over specified operating range
Protection Circuitry:	Reverse voltage protected and output limited
Output Signal:	4-20 mA loop-powered, 4-20 mA sourcing with relay option
Output Drive at Capability:	550 ohms max. @ 24 Vac/Vdc
Optional Relay Output:	Form C contact (N.O. and N.C.) - **Not available with Modbus Communications** 5 amps @ 250 Vac, 5 amps @ 30 Vdc, p.f. = 1 Trip Point - 25, 60 or 150 PPM, jumper selectable Hysteresis - 3% or 9 ppm
Optional Modbus:	Hardware ..... 2-wire RS-485 Software ..... Native ModBus MS/TP protocol (RTU) Baud Rate ..... 9600 Slave Address Range ..... Locally set to 1-255 Parity ..... None Stop Bits ..... 1 CRC ..... A001 (CRC-16 reverse)
Wiring Connections:	Screw terminal block (14 to 22 AWG)
External Dimensions:	71 x 104 x 48 mm (2.8" w x 4.1" h x 1.9"d)
Enclosure Ratings:	ABS - UL94-V - IP65, (NEMA 4X)
Field Calibration:	By applying calibration gas standards (Contact Greystone for calibration kit)
Accessories:	Calibration kit, model# CMD-CALKIT-GS

PRODUCT ORDERING INFORMATION:

MODEL	Description
CMD5B1	Carbon Monoxide Detector (CO), Electrochemical, Loop-powered

CODE	Relay
000	No Relay
100	Relay **(Not available with Modbus Communications)**

CODE	Options
MOD	Modbus Communications

CMD5B1 100 - ← **Typical Model Number**

Greystone Energy Systems Inc. reserves the right to make design modifications without prior notice.

RoHS COMPLIANT

DESCRIPTION:

The CMD5B4 & 5 Series carbon monoxide detector uses an electrochemical sensor to monitor the carbon monoxide level and outputs a field-selectable 4-20 mA or voltage signal. The voltage signal may be set to 0-5 or 0-10 Vdc. The sensing range and output may be scaled to either 100, 150, 300, 400 or 500 ppm via the on-board menu. A front panel LCD is standard to ensure easy setup and operation. It is available in either wall/surface or duct mount configurations.

Other standard features include a back light for the LCD, a front panel test switch, status indication and an alarm buzzer. The test function may also be controlled remotely with a digital input signal. The on-board menu allows local configuration of all device parameters.

Optional features include one or two alarm relays and/or RS-485 network communication configured for either ModBus or BACnet protocol.

SPECIFICATION:

Sensor Type:	Electrochemical
Sensor Agency Approvals:	Sensor is UL Recognized Component for ANSI/UL-2034, UL-2075, E240671
Measurement Range:	0-100, 150, 300, 400, or 500 PPM (Selectable)
Accuracy:	±5 PPM or 5% of reading (whichever is greater)
Accuracy rated:	0˚ to 50˚C (32˚ to 122˚F), 15 to 95%
Life Expectancy:	5-7 years in air
Typical Coverage Area:	700 m^2 (7500 ft^2) or 15 m (50 ft) radius
Operating Conditions:	-20˚ to 50˚C (-4˚ to 122˚F), 15 to 95% RH, 0.9 to 1.1 atm
Sample Method:	Diffusion or flow through sample tube for duct mounted models
Stability:	<5% signal loss/year
Response Time:	<35 seconds for 90% step change
Power Supply:	24 Vdc ± 20% or 24 Vac ± 10% (non-isolated half-wave rectified)
Consumption:	100 mA max. with all options on
Protection Circuitry:	Reverse voltage protected and output limited
Output Signal:	4-20 mA active (Active), 0-5 or 0-10 Vdc (Selectable)
Output Drive at Capability:	450 ohms max for current output, 10 Kohms min for voltage output
Output Resolution:	10 bit PWM (±0.4 ppm)
LCD Display:	Displays PPM and menu parameters 1 PPM resolution, 35 mmW x 15 mm H (1.4" x 0.6") Alpha-numeric 2 line X 8 character with backlight
Status LED:	Two color (red/green) on front panel
Test Switch:	Performs I/O tests, front panel and remote connection
Buzzer Alarm:	85 db @ 10 feet
Buzzer trip Point:	Programmable 20-500 ppm in 10 ppm increments
Buzzer Delay:	Programmable 0-10 minutes in 1 minute increments
Optional Relay Output:	One or two Form C contact (N.O. and N.C.) 5 amps @ 250 Vac, 5 amps @ 30 Vdc, p.f. = 1 Relay 1 Trip Point - Programmable 20-500 PPM in 10 PPM increments Relay 2 Trip Point - Programmable 20-500 PPM in 10 PPM increments Relay Hysteresis - Programmable 10-100 PPM in 5 PPM increments Relay Delay - Programmable 0-10 minutes in 1 minute increments
Optional Communications:	BACNet or Modbus (Refer to installation instructions for full details)
Wiring Connections:	Screw terminal block (14 to 22 AWG)
External Dimensions:	Space, 145 x 101 x 64mm (5.7"w x 4"h x 2.5"d) Duct, 145 x 101 x 240mm, (5.7"w x 4"h x 9.5"d) includes probe
Enclosure Ratings:	Space (4) - ABS - UL94-V - IP65, NEMA 4X Duct (5) - ABS - UL94-V - IP65, NEMA 4X
Field Calibration:	By applying calibration gas standards (Contact Greystone for calibration kit)
Accessories:	Calibration kit, model# CMD-CALKIT-GS

PRODUCT ORDERING INFORMATION:

MODEL	Description
CMD5B	Carbon Monoxide Detector (CO), Electrochemical

CODE	Enclosure
4	Space Gray ABS
5	Duct Gray ABS

CODE	Relay (s)
000	No Relay
100	One Relay
110	Two Relays

CODE	Options
BAC	BACNet Communications
MOD	Modbus Communications

CMD5B	4	00	-	← Typical Model Number

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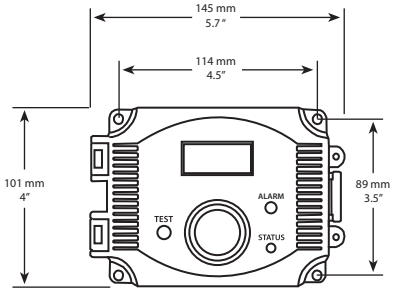
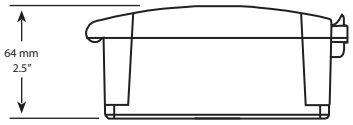
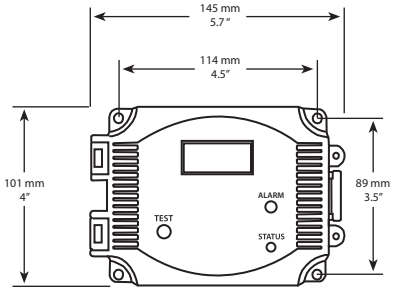
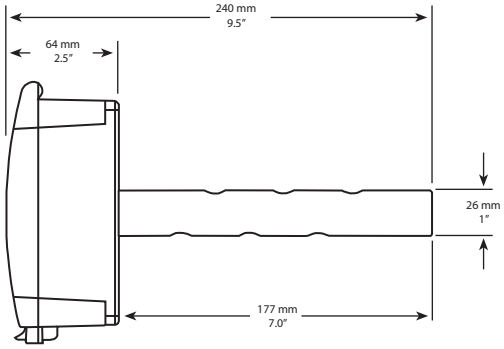
DIMENSIONS:









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GREYSTONE ENERGY SYSTEMS INC

CARBON DIOXIDE (CO_2) DETECTORS w/ BACnet® or ModBus Communications CDD3 Series

Precision carbon dioxide control/sensing

FEATURES:

- BACnet® or ModBus Communication
- BTL Listed (B-ASC)
- Optional RH and/or Temperature
- Optional Setpoint and/or Override
- Optional on-board relay
- Optional LCD display
- Custom logos available

Peace of mind through reliable gas monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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CO_2 DETECTOR w/ BACnet® or ModBus Communications

SPECIFICATIONS:

General Specifications:

Power Supply	20-28 Vac/dc (non-isolated half-wave rectified)
Consumption	80 mA max @ 24Vdc, 140 mA max @ 24Vac with all options
Protection Circuitry	Reverse voltage protected, overvoltage protected
Operation Conditions	0˚-50°C (32˚-122°F), 0-95% RH non-condensing.
Sensor Coverage Area	100 m^2 (1000 ft^2) typical
Wiring Connections	Screw terminal block (14 to 22 AWG)
External Dimensions	Space: 84mm W x 119mm H x 29mm D (3.3" x 4.7" x 1.15") Duct: 145mm W x 100mm H x 63mm D (5.7" x 3.95" x 2.5") Duct Probe: 177mm (7") long x 25.4mm (1") diameter
Enclosure Ratings	**Space:** IP30 (NEMA 1) **Duct:** IP65 (NEMA 4X)

CO2 Signal:

Measurement Type	Non-Dispersive Infrared (NDIR), diffusion sampling
Range	0 - 2000 ppm
Standard Accuracy	±75 PPM @ 1000 ppm @ 22°C (72°F) when compared to certified calibration gas
Temperature Dependence	0.2% FS per °C
Stability	< 2 % FS over life of sensor (15 years typical)
Pressure Dependence	0.13% of reading per mm Hg
Altitude Correction	Programmable from 0-5000 ft via BACnet® or ModBus
Response Time	<2 minutes for 90% step change typical
Warm-up Time	<2 minutes

BACnet® Interface:

Hardware	2-wire RS-485
Software	Native BACnet® MS/TP protocol
Baud Rate	Locally set to 9600, 19200, 38400 or 76800
MAC Address Range	Locally set to 0-127 (factory default is 3), (63 devices max on one daisy chain)

ModBus Interface:

Hardware	2-wire RS-485
Software	Native ModBus MS/TP protocol (RTU or ASCII)
Baud Rate	Locally set to 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800 or 115200
Slave Address Range	Locally set to 0-64 (factory default is 1), (32 devices max on one daisy chain)

Optional Temperature Signal:

Sensing Element	10K thermistor, ±0.2˚C (±0.4˚F)
Resolution	0.1˚C (0.2˚F)
Range	0˚ to 35˚C (32˚ to 95˚F)

Optional RH Signal:

Sensing Element	Thermoset polymer based capacitive
Accuracy	± 2% RH
Range	0 - 100% RH, non-condensing
Resolution	1% RH
Hysteresis	± 3% RH
Response Time	15 seconds typical
Stability	± 1.2% RH typical @ 50% RH in 5 years

Optional Relay Output:

Contact Ratings	Form A contact (N.O.), 2 Amps @ 140 Vac, 2 Amps @ 30 Vdc
Relay Trip Point	Programmable 500-1500 ppm via BACnet® or ModBus
Relay Hysteresis	Programmable 25-200 ppm via BACnet® or ModBus

Optional LCD Display:

Resolution	1 ppm CO2, 1% RH, 1˚C (1˚F)
Size	1.4" w x 0.6" h (35 mm x 15 mm) alpha-numeric 2 line x 8 character
Backlight	Enable or disable via keypad

Optional Override Switch.....Front panel push-button available as BACnet® object or ModBus register

Optional Setpoint Control.....Front panel push-buttons available as 0 to 100% as BACnet® object or ModBus register

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FEATURES:

- Menu driven set-up
- 0-2000 PPM CO_2 range
- BACnet® or Modbus Communication
- Patented self-calibration algorithm
- Guaranteed 5 year calibration interval
- Easily field calibrated
- Accepts AC/DC power

OPTIONS:

- LCD
- Humidity and/or Temperature
- Setpoint Adjustment
- Override Switch
- Control relay
- Custom Logos

PRODUCT ORDERING INFORMATION:

MODEL	Description
CDD3A	Carbon Dioxide Detector (CO_2), Non-Dispersive Infrared (NDIR) sensor w/ BACnet® Communications
CDD3B	Carbon Dioxide Detector (CO_2), Non-Dispersive Infrared (NDIR) sensor w/ Modbus Communications

CODE	Enclosure
10	Space
20	Duct

CODE	LCD Display
0	Concealed
1	Viewable

CODE	Configurations
-	CO2 Only
RH	CO2, Humidity and Temperature
T	CO2 and Temperature

CODE	Setpoint Adjustment (Available on Space only)
-	No Setpoint Adjustment
P	Setpoint Adjustment

CODE	Momentary Override (Available on Space only)
-	No Override
S	Override Switch

CODE	Relay Output
-	No Relay
R	Relay

CDD3A	**10**	**1**	**RH**	**P**	**S**	**-**	← **Typical Model Number**

Example: Space CO2, 0-2000 ppm w/ BACnet®, LCD, Setpoint Adjustment, & Override Switch

Greystone Energy Systems Inc. reserves the right to make design modifications without prior notice.

BACnet® COMMUNICATION

BACnet® is a data communication protocol for building automation and control networks. The detector communicates on a standard 2-wire RS-485 MS/TP (master-slave/token-passing) network designed to run at speeds from 9600 to 76800 baud over twisted pair wiring.

BACnet is a registered trademark of ASHRAE. ASHRAE does not endorse, approve or test products for compliance with ASHRAE standards. Compliance of listed products to the requirements of ASHRAE Standard 135 is the responsibility of BACnet International (BI). BTL is a registered trademark of BI.

MODBUS COMMUNICATION

Modbus is a network protocol for industrial manufacturing environments. The detector communicates on a standard Modbus network using either of two transmission modes: RTU (Remote Terminal Unit) or ASCII (American Standard Code for Information Interchange). The hardware interface is RS-485. Select the desired mode along with the other parameters using the Configuration Menu.

ACLP SOFTWARE AND 5-YEAR CALIBRATION GUARANTEE

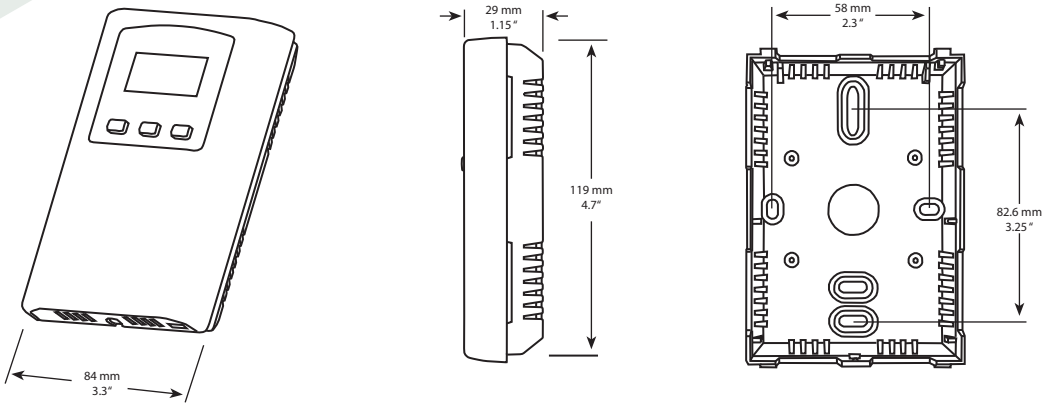
ACLP SOFTWARE

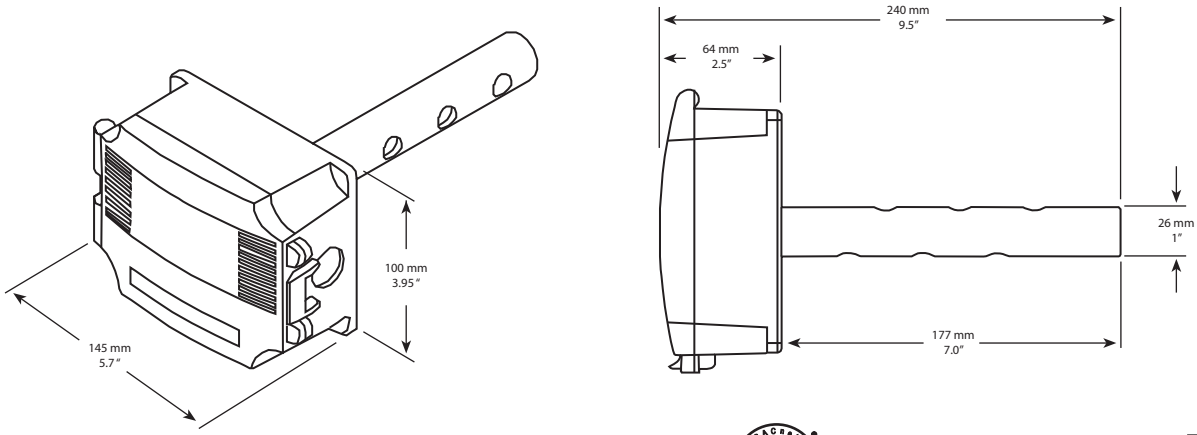
ACLP (Automatic Calibration Logic Program) software utilizes the computing power in the sensor's on-board microprocessor to remember the lowest CO_2 concentration that takes place every 24 hours. The sensor assumes this low point is at outside levels. The sensor is also smart enough to discount periodic elevated readings that might occur if for example a space was used 24 hours per day over a few days. Once the sensor has collected 14 days worth of low concentration points, it performs a statistical analysis to see if there has been any small changes in the sensor reading over background levels that could be attributable to sensor drift. If the analysis concludes there is drift, a small correction factor is made to the sensor calibration to adjust for this change.

5-YEAR CALIBRATION GUARANTEE

Based on the results of years of testing of ACLP software, Greystone now offers a 5-year calibration guarantee on all its CDD series wall and duct mount sensors used for CO_2 based ventilation control when operated in an environment that can utilize ACLP software. If the sensor is found to be out of calibration more than 150 PPM as compared to a calibration gas or recently calibrated reference, Greystone will provide a free factory calibration of the sensor if returned to Greystone. This guarantee only applies if the sensor is operated in an environment where inside levels periodically drop to outside concentrations (i.e. during evenings or weekends when there is no occupancy) as is required by ACLP software. If a space does not experience a periodic drop to outside levels (i.e. where occupancy is 24 hours, 7 days/week), ACLP software should be deactivated. With ACLP deactivated, calibration may be required every 2 to 3 years.

DIMENSIONS





GREYSTONE
ENERGY SYSTEMS INC

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RoHS COMPLIANT

Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

CARBON DIOXIDE & TEMPERATURE DETECTORS
CDD4 Series

Space w/Setpoint, Override & LCD

Space w/ No Options

Duct

Outside

Precision carbon dioxide control/sensing

FEATURES:

- Space, Duct & Outside Models
- 2 Available Ranges
- CO2, Temperature Outputs
- Optional Slidepot and/or Override
- Optional On-board Relay
- Optional LCD Display
- Custom Logos Available

Peace of mind through reliable gas monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

CO_2 DETECTOR w/ Optional Temperature Sensor

SPECIFICATIONS:

General Specifications:

Power Supply.....20-28 Vac/dc (non-isolated half-wave rectified)
Output Signals.....4-20 mA active (sourcing), 0-5 Vdc or 0-10 Vdc (field selectable)
Consumption.....**Space/Duct/Outside:** 100 mA max @ 24 Vdc,
185 mA max @ 24 Vac (with all options)
Outside w/ Heater: 140 mA @ 24V max
Output Drive Capability.....**Current:** 550 ohms max **Voltage:** 10 Kohm min
Output Resolution.....10 bit PWM
Protection Circuitry.....Reverse voltage protected, overvoltage protected
Operation Conditions.....**Space (10), Duct (20) and Outside (40):** 0˚- 50°C (32˚-122°F), 0-95% RH non-condensing.
Outside w/ Heater (30): -40˚- 50°C (-40˚- 122°F), 0-95% RH non-condensing.
Sensor Coverage Area.....100 m^2 (1000 ft^2) typical
Wiring Connections.....Screw terminal block (14 to 22 AWG)
External Dimensions.....**Space:** 84mm W x 119mm H x 29mm D (3.3" x 4.7" x 1.15")
Duct: 145mm W x 100mm H x 63mm D (5.7" x 3.95" x 2.5")
Duct Probe: 177mm (7") long x 25.4mm (1") diameter
Outside: 110mm W X 180mm H X 89mm D (7.125" X 4.33" X 3.5")
Enclosure Ratings.....**Space:** IP30 (NEMA 1)
Duct: IP65 (NEMA 4X)
Outside: IP65 (NEMA 4X)

CO2 Specifications:

Measurement Type.....**CDD4A:** Non-Dispersive Infrared (NDIR), diffusion sampling
CDD4B: Dual Channel Non-Dispersive Infrared (NDIR), diffusion sampling
Measurement Range.....**CDD4A:** 0 - 2000 ppm
CDD4B: 0 - 20,000 ppm, programmable span from 2000 to 20,000 ppm
Standard Accuracy.....**CDD4A:** ±30 PPM + 3% of reading with Auto Cal on.
CDD4B: ±75 PPM or 10% of reading (whichever is greater)
Temperature Dependence.....0.2% FS per °C
Stability.....**CDD4A:** < 2 % FS over life of sensor (15 years typical)
CDD4B: < 5 % FS over life of sensor (15 years typical)
Pressure Dependence.....0.13% of reading per mm Hg
Altitude Correction.....Programmable from 0-5000 ft via keypad
Response Time.....<2 minutes for 90% step change typical
Warm-up Time.....<2 minutes

LCD Display:

Resolution.....1 ppm CO2
Size.....1.4" w x 0.6" h (35 mm x 15 mm) alpha-numeric 2 line x 8 character
Backlight.....Enable or disable via keypad

Optional Temperature Signal:

Sensing Element.....Various RTDs or thermistors as a 2-wire resistance output (See ordering chart)

Optional Setpoint Adjustment

Type .....Front panel slidepot, 2 wire resistance output
Range .....0K to 10K Ω standard
Custom spans available.....1K, 2K, 5K, 10K or 20K Ω

Optional Manual Override

Type .....Front panel, momentary pushbutton
Ratings .....50 mA @12 Vdc, N.O., SPST

Optional Relay Output:

Contact Ratings.....Form A contact (N.O.), 2 Amps @ 140 Vac, 2 Amps @ 30 Vdc
Relay Trip Point.....**CDD4A:** Programmable 500-2000 ppm via keypad
CDD4B: Programmable 500-15,000 ppm via keypad
Relay Hysteresis.....**CDD4A:** Programmable 25-200 ppm via keypad
CDD4B: Programmable 25-500 ppm via keypad

FEATURES:

- Menu driven set-up
- 0-2000 or 20,000 PPM CO_2 ranges
- Patented self-calibration algorithm
- Guaranteed 5 year calibration interval
- Easily field calibrated
- Accepts AC/DC power

OPTIONS:

- Temperature sensor output
- LCD
- Slidepot
- Override switch
- Control relay
- Custom logos

PRODUCT ORDERING INFORMATION:

MODEL	Description
CDD4A	Carbon Dioxide Detector (CO_2), 0-2000 ppm, Field Selectable Output w/ Optional Temperature Sensor
CDD4B	Carbon Dioxide Detector (CO_2), 0-20,000 ppm, Field Selectable Output w/ Optional Temperature Sensor

CODE	Enclosure
10	Space
20	Duct
30	Outside Air w/ heated enclosure
40	Outside Air

CODE	LCD Display
0	Concealed
1	Viewable (Not available on Outside enclosure)

CODE	Temperature Sensor
T2	100 Ω Platinum, IEC 751, 385 Alpha, thin film
T5	1801 Ω, NTC Thermistor, ±0.2 C
T6	3000 Ω, NTC Thermistor, ±0.2 C
T7	10,000 Ω, type 3, NTC Thermistor, ±0.2 C
T8	2.252K Ω, NTC Thermistor, ±0.2 C
T12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
T13	1000 Ω Nickel, Class B, DIN 43760
T14	10,000 Ω, type 3, NTC Thermistor, ±0.2 C c/w 11K shunt resistor
T20	20,000 Ω, NTC Thermistor, ±0.2 C
T24	10,000 Ω, type 2, NTC Thermistor, ±0.2 C

CODE	Setpoint Adjustment (Available on Space only)
-	No Setpoint Adjustment
P	0-10K linear slide pot for set point control (Other ranges available, contact Greystone)

CODE	Momentary Override (Available on Space only)
-	No Override
S	Front panel push button momentary switch (NO)

CODE	Relay Output
-	No Relay
R	Relay

CDD4A	10	1	T7	P	S	-	← Typical Model Number

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ACLP SOFTWARE

ACLP (Automatic Calibration Logic Program) software utilizes the computing power in the sensor's on-board microprocessor to remember the lowest CO_2 concentration that takes place every 24 hours. The sensor assumes this low point is at outside levels. The sensor is also smart enough to discount periodic elevated readings that might occur if for example a space was used 24 hours per day over a few days. Once the sensor has collected 14 days worth of low concentration points, it performs a statistical analysis to see if there has been any small changes in the sensor reading over background levels that could be attributable to sensor drift. If the analysis concludes there is drift, a small correction factor is made to the sensor calibration to adjust for this change.

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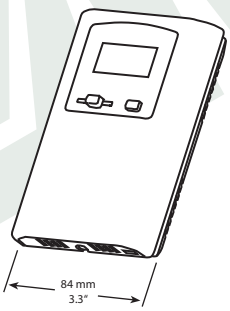
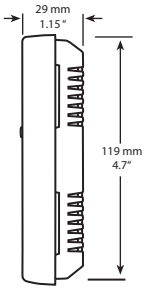
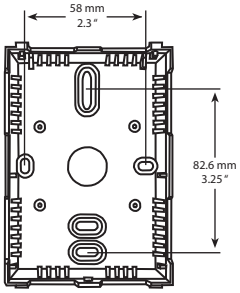
5-YEAR CALIBRATION GUARANTEE

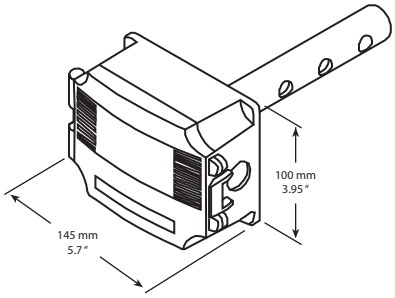
Based on the results of years of testing of ACLP software, Greystone now offers a 5-year calibration guarantee on all its CDD series wall and duct mount sensors used for CO_2 based ventilation control when operated in an environment that can utilize ACLP software. If the sensor is found to be out of calibration more than 150 PPM as compared to a calibration gas or recently calibrated reference, Greystone will provide a free factory calibration of the sensor if returned to Greystone. This guarantee only applies if the sensor is operated in an environment where inside levels periodically drop to outside concentrations (i.e. during evenings or weekends when there is no occupancy) as is required by ACLP software. If a space does not experience a periodic drop to outside levels (i.e. where occupancy is 24 hours, 7 days/week), ACLP software should be deactivated. With ACLP deactivated (via menu buttons), calibration may be required every 2 to 3 years.

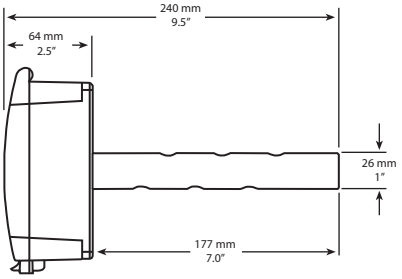
DIMENSIONS:

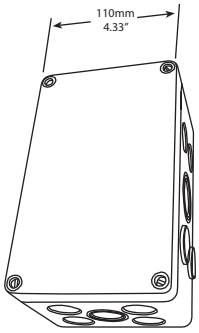


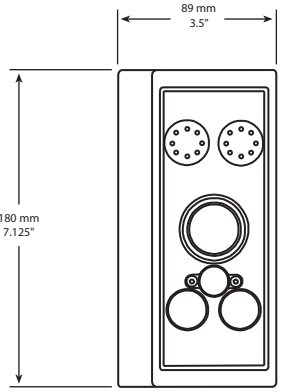












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RoHS COMPLIANT

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GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

CARBON DIOXIDE, TEMPERATURE & HUMIDITY DETECTORS

CDD5 Series

Space w/Setpoint, Override & LCD

Space w/ No Options

Duct

Precision carbon dioxide control/sensing

FEATURES:

- Space or Duct Models
- 2 Available Ranges
- CO2, Temperature & Humidity Outputs
- Optional Slidepot and/or Override
- Optional On-board Relay
- Optional LCD Display
- Custom Logos Available

Peace of mind through reliable gas monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

CO_2, TEMPERATURE & HUMIDITY DETECTOR

SPECIFICATIONS:

General Specifications:

Power Supply	20-28 Vac/dc (non-isolated half-wave rectified)
Output Signals	**Current** 4-20mA (Model CDD5A & C) or **Voltage** 0-5 Vdc or 0-10 Vdc (Model CDD5B & D)
Consumption	**Current:** 145 mA max @ 24Vdc, 260 mA max @24 Vac (with all options) **Voltage:** 85 mA max @ 24 Vdc, 150 mA max @ 24 Vac (with all options)
Output Drive Capability	**Current:** 550 ohms max **Voltage:** 10 Kohm min
Output Resolution	10 bit PWM
Protection Circuitry	Reverse voltage protected and output limited
Operation Conditions	0˚-50°C (32˚-122°F), 0-95% RH non-condensing.
Sensor Coverage Area	100 m^2 (1000 ft^2) typical
Wiring Connections	Screw terminal block (14 to 22 AWG)
External Dimensions	**Space:** 84mm W x 119mm H x 29mm D (3.3" x 4.7" x 1.15") **Duct:** 145mm W x 100mm H x 63mm D (5.7" x 3.95" x 2.5") **Duct Probe:** 177mm (7") long x 25.4mm (1") diameter
Enclosure Ratings	**Space:** IP30 (NEMA 1) **Duct:** IP65 (NEMA 4X)

CO2 Specifications:

Measurement Type	**CDD5A & B:** Non-Dispersive Infrared (NDIR), diffusion sampling **CDD5C & D:** Dual Channel Non-Dispersive Infrared (NDIR), diffusion sampling
Measurement Range	**CDD5A & B:** 0 - 2000 ppm **CDD5C & D:** 0 - 20,000 ppm, programmable span from 2000 to 20,000 ppm
Standard Accuracy	**CDD5A & B:** ±30 PPM + 3% of reading with Auto Cal on **CDD5C & D:** ±75 PPM or 10% of reading (whichever is greater)
Temperature Dependence	0.2% FS per °C
Stability	**CDD5A & B:** < 2 % FS over life of sensor (15 years typical) **CDD5C & D:** < 5 % FS over life of sensor (15 years typical)
Pressure Dependence	0.13% of reading per mm Hg
Altitude Correction	Programmable from 0-5000 ft via keypad
Response Time	<2 minutes for 90% step change typical
Warm-up Time	<2 minutes

Temperature Specifications:

Sensing Element	10K thermistor, ±0.2˚C (±0.2 °C)
Range	0˚ to 35˚C (32˚ to 95˚F) or 0˚ to 50˚C (32˚ to 122˚F) selectable via keypad

Humidity Specifications:

Sensing Element	Thermoset polymer based capacitive
Accuracy	± 2% RH
Range	0 - 100% RH, non-condensing
Hysteresis	± 3% RH
Response Time	15 seconds typical
Stability	± 1.2% RH typical @ 50% RH in 5 years

LCD Display:

Resolution	1 ppm CO2, 1% RH, 1˚C (1˚F)
Size	1.4" w x 0.6" h (35 mm x 15 mm) alpha-numeric 2 line x 8 character
Backlight	Enable or disable via keypad

Optional Setpoint Adjustment

Type	Front panel slidepot, 2 wire resistance output
Range	0K to 10K Ω standard
Custom spans available	1K, 2K, 5K, 10K or 20K Ω

Optional Manual Override

Type	Front panel, momentary pushbutton
Ratings	50 mA @12 Vdc, N.O., SPST

Optional Relay Output:

Contact Ratings	Form A contact (N.O.), 2 Amps @ 140 Vac, 2 Amps @ 30 Vdc
Relay Trip Point	**CDD5A & B:** Programmable 500-2000 ppm via keypad **CDD5C & D:** Programmable 500-15,000 ppm via keypad
Relay Hysteresis	**CDD5A & B:** Programmable 25-200 ppm via keypad **CDD5C & D:** Programmable 25-500 ppm via keypad

CO_2 , TEMPERATURE & HUMIDITY DETECTOR

FEATURES:

- Menu driven set-up
- 0-2000 or0-20,000 ppm CO_2 ranges
- Patented self-calibration algorithm
- Guaranteed 5 year calibration interval
- Temperature & Humidity Outputs
- Easily field calibrated
- Accepts AC/DC power

OPTIONS:

- LCD
- Slidepot
- Override Switch
- Control relay
- Custom Logos

PRODUCT ORDERING INFORMATION:

MODEL	Description
CDD5A	Carbon Dioxide Detector (CO_2), 0-2000 ppm, Temperature & Humidity sensor w/4-20 mA Outputs
CDD5B	Carbon Dioxide Detector (CO_2), 0-2000 ppm, Temperature & Humidity sensor w/ 0-10 Vdc or 0-5 Vdc outputs
CDD5C	Carbon Dioxide Detector (CO_2), 0-20,000 ppm, Temperature & Humidity sensor w/4-20 mA Outputs
CDD5D	Carbon Dioxide Detector (CO_2), 0-20,000 ppm, Temperature & Humidity sensor w/ 0-10 Vdc or 0-5 Vdc outputs

CODE	Enclosure
10	Space
20	Duct

CODE	LCD Display
0	Concealed
1	Viewable

CODE	Setpoint Adjustment (Available on Space only)
-	No Setpoint Adjustment
P	0-10K linear slide pot for set point control (Other ranges available, contact Greystone)

CODE	Momentary Override (Available on Space only)
-	No Override
S	Front panel push button momentary switch (NO)

CODE	Relay Output
-	No Relay
R	Relay

CDD5A	**10**	**1**	**P**	**S**	**-**	← **Typical Model Number**

Example: Space CO2, 0-2000 ppm, Temperature & RH, 4-20 mA, w/ LCD, Setpoint Adjustment, & Override Switch

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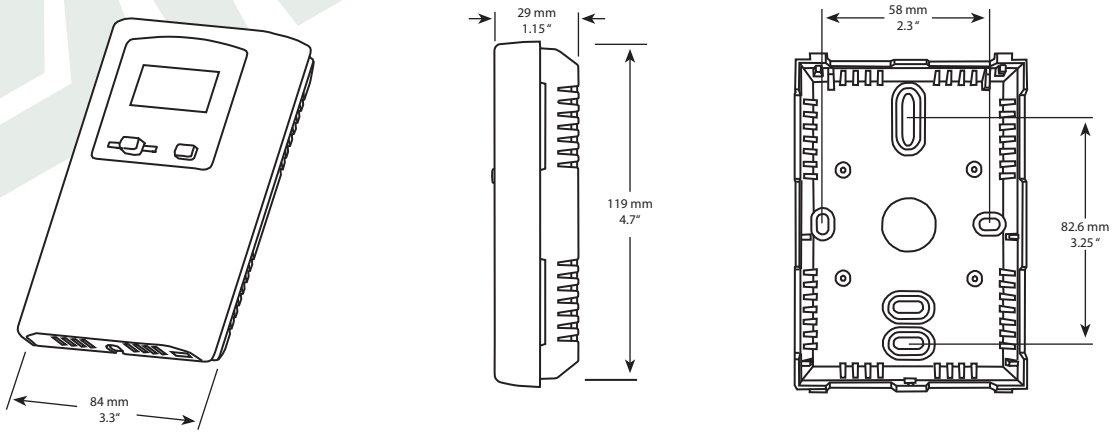
ACLP SOFTWARE

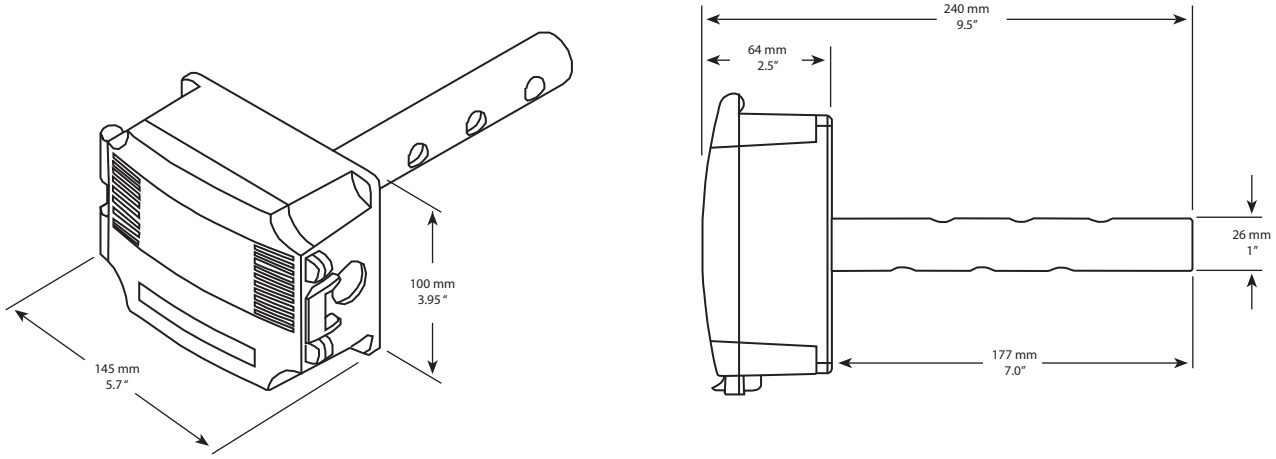
ACLP (Automatic Calibration Logic Program) software utilizes the computing power in the sensor's on-board microprocessor to remember the lowest CO_2 concentration that takes place every 24 hours. The sensor assumes this low point is at outside levels. The sensor is also smart enough to discount periodic elevated readings that might occur if for example a space was used 24 hours per day over a few days. Once the sensor has collected 14 days worth of low concentration points, it performs a statistical analysis to see if there has been any small changes in the sensor reading over background levels that could be attributable to sensor drift. If the analysis concludes there is drift, a small correction factor is made to the sensor calibration to adjust for this change.

5-YEAR CALIBRATION GUARANTEE

Based on the results of years of testing of ACLP software, Greystone now offers a 5-year calibration guarantee on all its CDD series wall and duct mount sensors used for CO_2 based ventilation control when operated in an environment that can utilize ACLP software. If the sensor is found to be out of calibration more than 150 PPM as compared to a calibration gas or recently calibrated reference, Greystone will provide a free factory calibration of the sensor if returned to Greystone. This guarantee only applies if the sensor is operated in an environment where inside levels periodically drop to outside concentrations (i.e. during evenings or weekends when there is no occupancy) as is required by ACLP software. If a space does not experience a periodic drop to outside levels (i.e. where occupancy is 24 hours, 7 days/week), ACLP software should be deactivated. With ACLP deactivated (via menu buttons), calibration may be required every 2 to 3 years.

DIMENSIONS:





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GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

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GREYSTONE ENERGY SYSTEMS INC

AIR QUALITY CONTROLLER-MONITOR
AIR300 Series

Executive Space Enclosure (AE)

Duct Enclosure (D)

Precision air quality control / sensing

FEATURES:

- True Air Quality Monitor
- Microprocessor based controller
- Analog, stepped & relay output options
- Able to detect one cigarette in 15 m^3 (540 cu. ft.) room
- Wall or duct mount versions
- Visual indication of air quality (Internal)

Peace of mind through reliable gas monitoring

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

AIR QUALITY MONITOR / CONTROLLER

OPERATION

The AIR-300 Air Quality Monitor uses a tin dioxide semiconductor sensor to detect oxidizable gases and is specifically designed to have high sensitivity to gaseous organic materials which are components of indoor air pollutants. These air contaminants include cigarette smoke, smoke from cooking, exhaust gases from automobiles, solvents and many others.

Air quality is a term covering a very broad spectrum of definitions and factors. Temperature, humidity, air flow, occupancy and where the air is used all come into play when determining air quality. The air that is considered to be acceptable in a mechanical workshop may be quite unacceptable in an office environment.

A reliable method of measurement for air quality is found in a gas sensor based on the Taguchi Gas principle. This gas sensor is essentially a heated element inside a porous semiconductive tube. The tube has a large surface area and is able to freely absorb gas molecules on the semiconductor surface. Electron transfer occurs between the gas molecules and the already absorbed oxygen molecules. This causes a relatively large increase in conductivity for a small change in gas concentration. This change occurs quite quickly (within a few seconds) and is completely reversible. Since the element is a semiconductor Tagushi Gas Sensor and has no moving parts, it will operate reliably for many years. The sensor responds with varying degrees of sensitivity to a wide variety of gasses which include hydrogen, hydrocarbons, alcohols, carbon monoxide, benzene, etc.

It is readily apparent that this sensor works well in the detection of contaminants such as solvents, but what about carbon dioxide? Although the sensor does not detect carbon dioxide, it is still quite useful in human environments. As well as carbon dioxide, hydrocarbons, body odours and water vapors are emitted by breathing and perspiration. The levels of these other contaminants change at roughly the same rate as the carbon dioxide and the sensor will track these other contaminants at approximately the same rate as the carbon dioxide in occupied spaces.

The AIR-300 may be used as either a stand-alone controller to detect levels of pollution and operate a clean-air damper directly, or it may be used as a monitor where the analog output signal is transmitted to the Building Automation System for further processing.

Many different environments can be controlled with careful adjustment of the device parameters. This allows the AIR-300 to function equally well in a school room where the air is to be kept very clean, or a utility room where the fresh air requirements are not as stringent. The Air Quality Monitor can be used to control intake dampers at an airport where jet fumes are periodic contaminants, automatically control exhaust air on an assembly line where epoxies are used, or a multitude of other applicants.

Below is a list of common pollutants in decreasing order of sensitivity, detectable by the AIR-300. Most of these chemicals are easily detectable in quantities of 20 PPM or less.

CHEMICAL	SYMBOL	COMMON SOURCE
Methyl Ethyl Ketone	C_4H_8O	Solvents and cleaning products
Acetone	C_3H_6O	Solvents and organic synthesis
Ethyl Alcohol	C_2H_6O	Solvents and liquor fermentation
Formaldehyde	CH_2O	Disinfectants and preservatives
Hydrogen	H_2	Used in synthetics
Methyl Alcohol	CH_4O	Solvents, antifreeze and synthetics
Vinyl Chloride	C_2HCl	Textiles and polymers
Hydrogen Sulfide	H_2S	Water and putrefying matter
Methyl Chloride	CH_3Cl	Solvents, paints and refrigerant
Benzene, Toluene, Xylene	C_6H_6, C_7H_8, C_8H_{10}	Solvents and motor fuels
Trichloroethylene	C_2HCl_3	Solvents and cleaning agents
Propane	C_3H_8	Fuels and chemical synthesis
Carbon Monoxide	CO	Combustion of carbon
Freon-22	$CHClF_2$	Refrigerants and aerosols
Ammonia	NH_3	Solvents and refrigerants
Methane	CH_4	Decomposition and synthesis

APPLICATION:

Environmental, industrial and commercial indoor Air Quality detector. Available in both space and duct mount versions.

- Schoolrooms
- Office buildings
- Parking garages
- Washroom ventilation fans
- Cigarette smoke detectors

FEATURES:

- True Air Quality Monitor
- Microprocessor based controller
- Analog, Stepped & Relay Output options
- 10 bit resolution
- Able to detect one cigarette in 15 m^3 (530 cu. ft.) room
- Integral sensitivity adjustment
- Ability to directly control air handling unit
- Visual indication of air quality (internal)
- No calibration required

SPECIFICATION:

Sensor Type:	Solid State TGS-800 VOC sensor
Sample Method:	Diffusion or flow through sample tube for duct mounted models
Power Supply:	20 to 30 Vac/dc
Consumption:	100 mA max @ 24 Vdc, 220 mA @ 24 Vac, 6VA max.
Input Voltage Effect:	Negligible over specified operating range
Protection Circuitry:	Reverse voltage protected and output limited
Operating Temperature:	0˚ to 40˚C (32˚ to 104˚F)
Operating Humidity:	0 to 95% RH non-condensing
Standard Output Signal:	Analog Stepped Output (ASO) in four steps representing OK, Low, Medium and High pollution levels (each step is independently adjustable from 0-10 Vdc)
Optional Output Signal:	Linear output representing 0-100% pollution level, jumper selectable for either 0-5 or 0-10 Vdc or 4-20 mA, the current signal is generated by the sensor (active)
Output Drive at Capability:	550 ohms max for current output 10K ohms min for voltage output
Optional Relay Output:	One Form C contact (N.O. and N.C.) , status LED, 5 amps @ 250 Vac, 5 amps @ 30 vdc, p.f. = 1
Display:	5 LED's indicating pollution level, opertional mode and programming values
Programming and Selection:	Via internal push-buttons and jumpers
Wiring Connections:	Screw terminal block (14 to 22 AWG)
External Dimensions:	Executive Space, 70 mm W x 118 mm H x 32 mm D (2.75" x 4.65" x 1.25") Duct, 124.5 mm W x 183.5 mm H x 250.5 mm D, (7.2" x 4.9" x 9.9") includes probe
Enclosure Ratings:	Executive Space - IP30, NEMA 1 Duct - IP20, NEMA 2

PRODUCT ORDERING INFORMATION

MODEL	Description
AIR300	Air Quality Monitor / Controller

CODE	Enclosure
AE	Executive Space
D	Duct

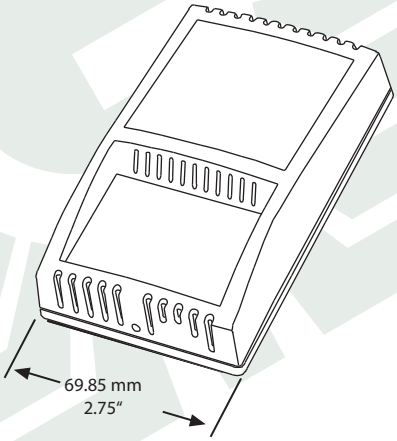
CODE	Output Option
-	Analog Stepped Output Only (no designation)
R	ASO and Relay Outputs
A	ASO and Analog Outputs
AR	ASO, Analog and Relay Outputs

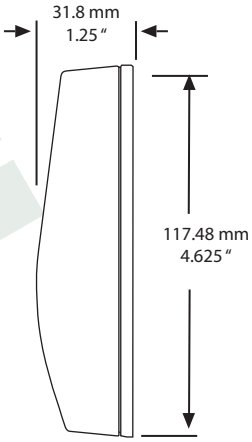
AIR300	D	AR	← Typical Model Number

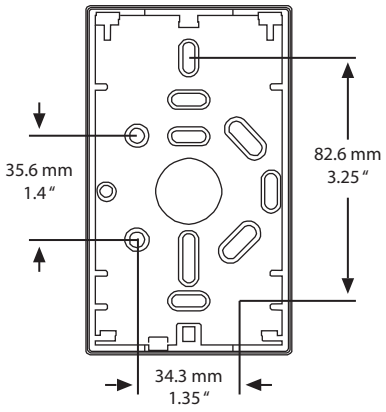
Example: Air Quality Duct c/w ASO, analog and relay outputs

Greystone Energy Systems Inc. reserves the right to make design modifications without prior notice.

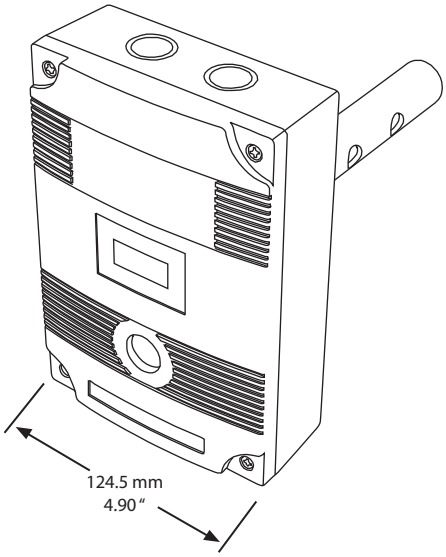
ENCLOSURE DIMENSIONS:

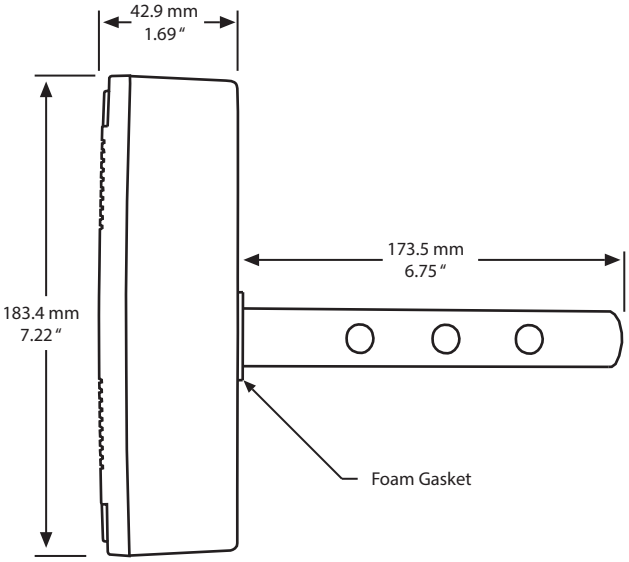






Executive Enclosure





Duct ABS Enclosure

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RoHS COMPLIANT

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GREYSTONE HAS AN ISO **9001** REGISTERED QUALITY SYSTEM

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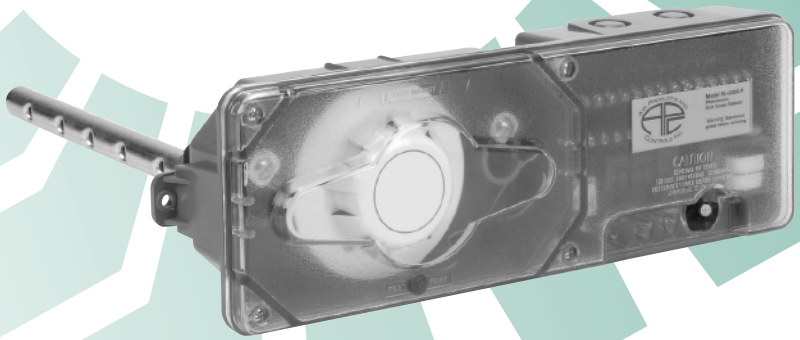
GREYSTONE ENERGY SYSTEMS INC

DUCT SMOKE DETECTOR
Model SL2000



Precision duct smoke detection

FEATURES:

- 24 VAC/DC or 120/240 VAC operation
- Simple change-out of photo or ion detector heads
- Low flow air velocity rating from 100 to 4000 FPM
- UL, CSFM amd MEA Listed
- Two (2) sets of 10A form "C" alarm contacts
- One (1) set of 10A form "C" trouble contacts
- Easy and quick mounting to round or rectangular ducts from 1' - 12' wide
- Clear cover for convenient visual inspection
- Built-in reset switch that is also an alarm test switch

Peace of mind through reliable smoke detectors

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

PRODUCT APPLICATION / DESCRIPTION:

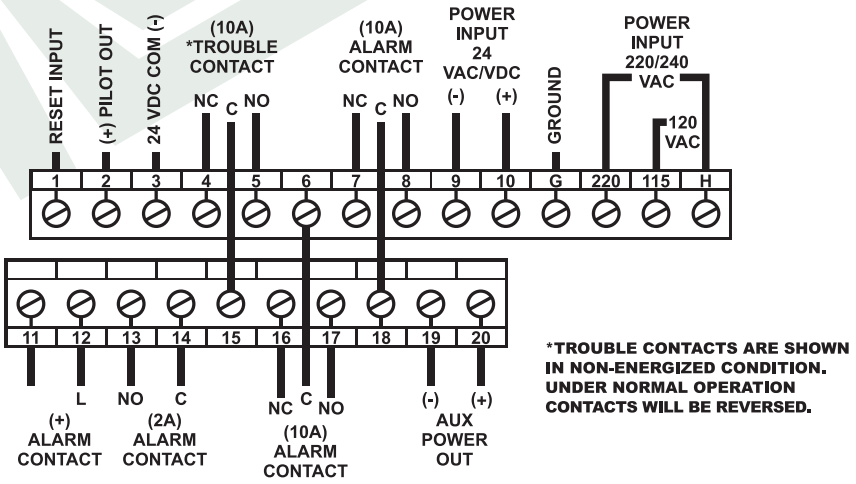
The SL-2000 Series Smoke Detector is the latest innovation for early detection of smoke and products of combustion present in air moving through HVAC ducts in Commercial, Industrial and Residential application. The SL-2000 Series, 4-wire duct housing will accommodate either the ionization sensor or the photoelectronic sensor. The interchangeable detector heads allow easy removal for quick cleaning and maintenance, or a change in application without removing the duct housing. The SL-2000 samples air currents passing through a duct and gives dependable performance for management of fans, blowers, and air conditioning systems.

Output terminals are provided for remote accessories such as horns, strobes, remote status indicators and test/reset key switches or push buttons.

The SL-2000 includes many features that represent true innovations from current generation duct smoke detectors. It is designed and built to meet all local requirements, as well as the NFPA regarding duct smoke detectors.

All detectors must be used with a metal sampling tube, model STN series.

WIRING:



***TROUBLE CONTACTS ARE SHOWN IN NON-ENERGIZED CONDITION. UNDER NORMAL OPERATION CONTACTS WILL BE REVERSED.**

PRODUCT SPECIFICATIONS:

Models SL-2000-N and SL-2000-P	
Power Requirements	Stand By: 230 VAC-7.9 mA 115 VAC-13.8 mA 24 VAC-39.4 mA 24 VDC-13.5 mA Alarm Current: 230 VAC-16.0 mA 115 VAC-27.0 mA 24 VAC-59.3 mA 24 VDC-128.7 mA
Relay Contact Rating	Alarm Contacts: 2 sets form "C" rated at 10 amps @115 VAC resistive 1 set form "A" rated at 2 amps Trouble Contacts: 1 set form "C" rated at 10 amps @ 115 VAC resistive
Air Velocity	.50 to 20 M/S (100 to 4000 FPM)
Ambient Temperature	SL-2000-N 0 to 70°C (32 to 158°F) SL-2000-P 0 to 60°C (32 to 140°F)
Humidity	10% to 85% R.H. No Condensation
Wiring	#14 to #22 AWG
Approvals	Underwriters Laboratories Listed: (UL268A;UROX.S2829) CSFM Listed: (3240-1004:105) MEA Listed: (73-92E;VOL.27)
Material	Grey plastic backbox, clear plastic cover
Dimensions	343 mm L x 115 mm H x 58 mm D (13.5" x 4.5" x 2.25")
Max. Net Wt.	1.14 KG (2.5 lbs.)
Manufacturer	Built for Greystone by Air Products and Controls, Inc.

ORDERING INFORMATION:

Part No.	Description
SL-2000-N	4-wire ionization duct detector, high temperature applications
SL-2000-P	4-wire photoelectric duct detector

ACCESSORIES

Part No.	Description
STN-1.0	Metal sampling tube, duct widths up to 12"
STN-2.5	Metal sampling tube, duct, widths 6" - 2.5'
STN-5.0	Metal sampling tube, duct widths 2.5' - 5'
STN-10.0	Metal sampling tube duct widths 5' - 10'
MS-RA/R	Remote Alarm LED (Red) and Push-Button Test/Reset Switch
MS-KA/R	Remote Alarm LED (Red) and Key-Operated Test/Reset Switch
MS-RH/KA/P/R	Remote Alarm Horn, Alarm LED (Red), Pilot LED (Green) and Key-Operated Test/Reset Switch

CSFM LISTED

c UL us LISTED

ISO9001

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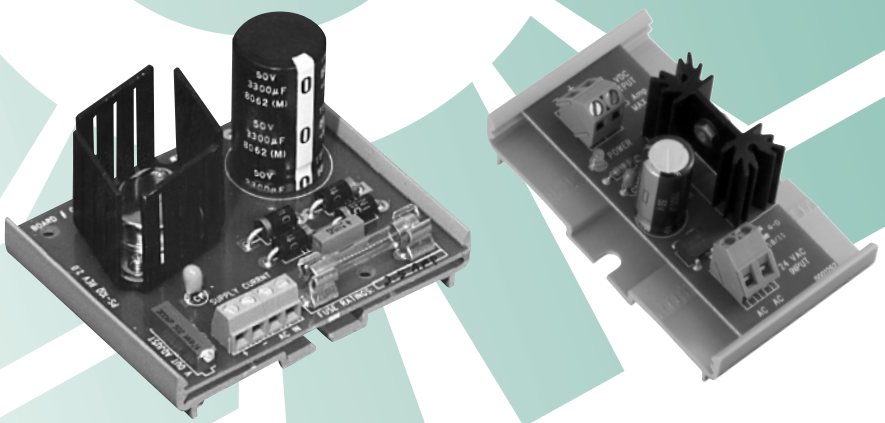
GREYSTONE ENERGY SYSTEMS INC

REGULATED DC POWER SUPPLIES
PS Series



Precision power supplies

FEATURES:

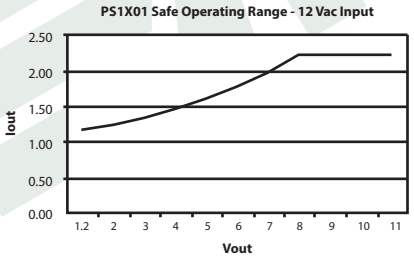
- 24 VAC input/DC output
- Adjustable/fixed voltage output
- Full or half wave rectified
- Snap track mounted
- Over-current protected

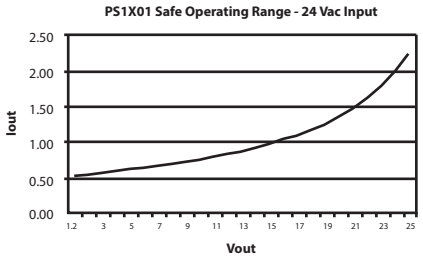
Peace of mind through reliable power supplies

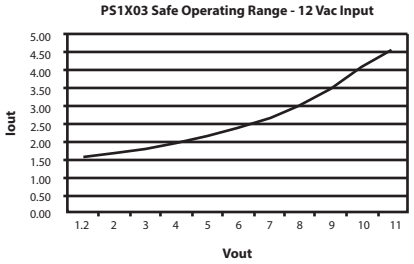
GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

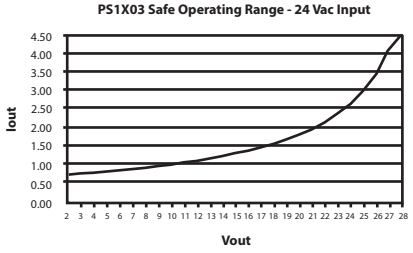
SPECIFICATIONS:

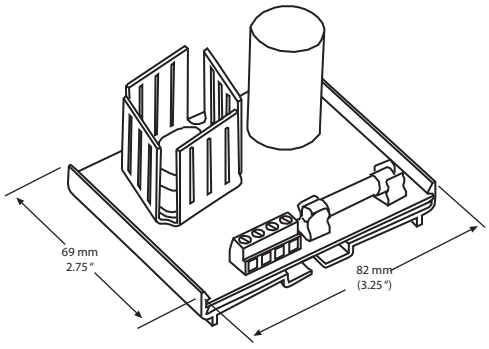
MODEL	PS1X0X	PS124F
Input Voltage	5 - 30 Vac	24 Vac ± 10%, 50/60 Hz
Output Voltage	Factory set to 24 Vdc, Field Adjustable 2 - 27 Vdc	24 Vdc, Fixed (full wave rectified)
Output Current: (max)	1.5A (PS1001) and (PS1101) 3.0A (PS1003) and (PS1103)	0.5 amp maximum (0-40 °C) 0.35 amp max (40-50 °C)
Supply Regulation	2%	1% at full-rated current
Overcurrent Protection	2.5A Fuse (PS1001) and (PS1101) 5.0A Fuse (PS1003) and (PS1103)	Regulated thermal shutdown
Operating Temperature	0˚ - 70˚C (32˚ - 158˚F)	0˚ - 50˚C (32˚ - 122˚F)
Dimensions: **L x W x H**	82 mm x 69 mm x 48 mm (3.25" x 2.75" x 1.90")	82 mm x 32 mm x 28 mm (3.25" x 1.26" x 1.1")



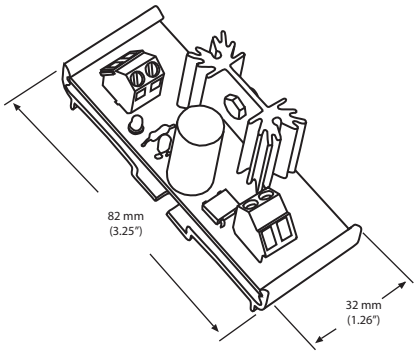








PS1X0



PS124F

PRODUCT ORDERING INFORMATION

☐ **PS1001**	24 Vac/24 Vdc @ 1.5 Amps, Adjustable full wave rectified
☐ **PS1101**	24 Vac/24 Vdc @ 1.5 Amps, Adjustable half wave rectified
☐ **PS1003**	24 Vac/24 Vdc @ 3.0 Amps, Adjustable full wave rectified
☐ **PS1103**	24 Vac/24 Vdc @ 3.0 Amps, Adjustable half wave rectified
☐ **PS124F**	24 Vac/24 Vdc @ 0.5 Amps, Fixed, full wave rectified

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RoHS COMPLIANT

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GREYSTONE ENERGY SYSTEMS INC

WATER DETECTOR
WD-100 Series

WD-100 - Water Detector Standalone

WD-102 - Water Detector c/w Remote Sensor

WD-100-XX - Water Detector c/w Conductivity Cable

Precision Water Detection

FEATURES:

- Monitors Variety of Liquids
- Single-point or Conductivity Cable
- Fail-safe Circuitry
- Form C, Relay Output
- Weatherproof Enclosure

Peace of mind through reliable water detection

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

WATER DETECTOR - WD100 SERIES

DESCRIPTION:

The WD100 is a microchip-based device that uses gold-plated sensing probes to detect the presence of water or other conductive liquid. The WD100 is powered by an AC or DC source, 14 - 30 volts. It features normally open and normally closed (form C) relay contacts rated at 5A @ 120 VAC/30 VDC for connection to a monitoring system, or direct control of another device. The mounting legs will allow a sensing height adjustment from 0" to 1/2". The WD100 is designed to signal an alarm if one or more of three conditions are met: water is detected, power is lost to the unit, or if there is an internal failure. The WD100 provides the highest level of water detection confidence.

The WD-102 operates on the same principle as the WD-100 but comes with a 5 ft. remote probe. For custom lead lengths please contact Greystone.

The WD-100-xx Series c/w the specified length of conductivity cable. See ordering information for available lengths.

APPLICATIONS:

The following chart gives examples of what types of fluids the WD100 can and can not be used to detect.

Fluids that can be detected	Fluids that can't be detected
City water	Pure water
Sea water	Gasoline
Copper sulfate solution	Oil
Weak acid	Brake fluid
Weak base	Alcohol
Household ammonia	Ethylene glycol
Water & glycol mixture	Paraffin
Wet soil	Dry soil
Coffee	Whiskey

SPECIFICATIONS:

Power supply:	14 - 30 VAC/DC
Supply current	60mA max @ 24 VDC, (no water)
Operating temperature:	-40˚C - 85˚C (-40˚F - 185˚F)
Enclosure:	ABS with hinged lid and gasket IP65 (NEMA 4X)
Dimensions (LxWxH):	145 x 100 x 64 mm 5.7" x 3.95" x 2.5"
Height with mounting legs (WD100)	98.43 mm (3.875") Max 88.90 mm (3.25") Min
Alarm output:	Form C relay, rated @ 5 amps @ 120 VAC / 30 VDC (resistive load)

OTHER FEATURES:

Fail-safe circuitry
Reverse acting contacts
Reverse voltage protection
RFI/EMI noise immunity

ORDERING INFORMATION:

WD-100 - Stand Alone
WD-102 - Remote Probe (5')
WD-100-5 - c/w 5' conductivity cable
WD-100-10 - c/w 10' conductivity cable
WD-100-25 - c/w 25' conductivity cable
WD-100-50 - c/w 50' conductivity cable
WD-100-100 - c/w 100' conductivity cable

Custom lengths available upon request

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GREYSTONE
ENERGY SYSTEMS INC

MISCELLANEOUS CONTROL DEVICES

PRODUCTS:

- Light sensor/transducer - PSR series
- Loop powered indicator - Executive Enclosure
- Loop powered indicator - LPI series
- Damper end switch - DES-100 series
- General purpose relays - LY & MY & MK series

Peace of mind through reliable control devices

GREYSTONE HAS AN **ISO 9001** REGISTERED QUALITY SYSTEM

LIGHT SENSOR - PSR SERIES

DESCRIPTION:

The PSR-1 is a Light Sensitive Resistor that may be used as an input to indicate the presence of light at the sensor location. The PSR-1-T is a PSR-1 coupled with a B420-P transmitter. The PSR-1-T produces a 4 - 20mA output signal. The sensor is designed to be mounted in the end of a weatherproof conduit box.

APPLICATION:

The PSR-1 has a resistance in darkness in excess of 1 MΩ and resistance in bright light of less than 1.5 kΩ.

The PSR-1 and PSR-1-T indicate the presence or absence of light. They should not be used for foot-candle control of occupied spaces. The PSR-1-T is calibrated for 4mA in bright light > 100 foot-candles and 20mA in darkness < 0.1 foot-candles.

SPECIFICATIONS:

PSR-1

Output (non-linear)	>1 MΩ in dark <1.5 kΩ in bright light
Temperature	-25˚C to 75˚C (-13˚F to 167˚F)

PSR-1-T

Power	12 - 35 VDC
Max current draw	22mA
Output (linear)	4 - 20mA (current limited to 22mA)
Temperature	-25˚C to 75˚C (-13˚F to 167˚F)

PSR: PRODUCT ORDERING INFORMATION

MODEL	PRODUCT DESCRIPTION
PSR	RESISTIVE LIGHT SENSOR

CODE	OPTIONS
1	Sensor only
T	4 - 20mA Transmitter
E	Weatherproof Enclosure

EXAMPLE:

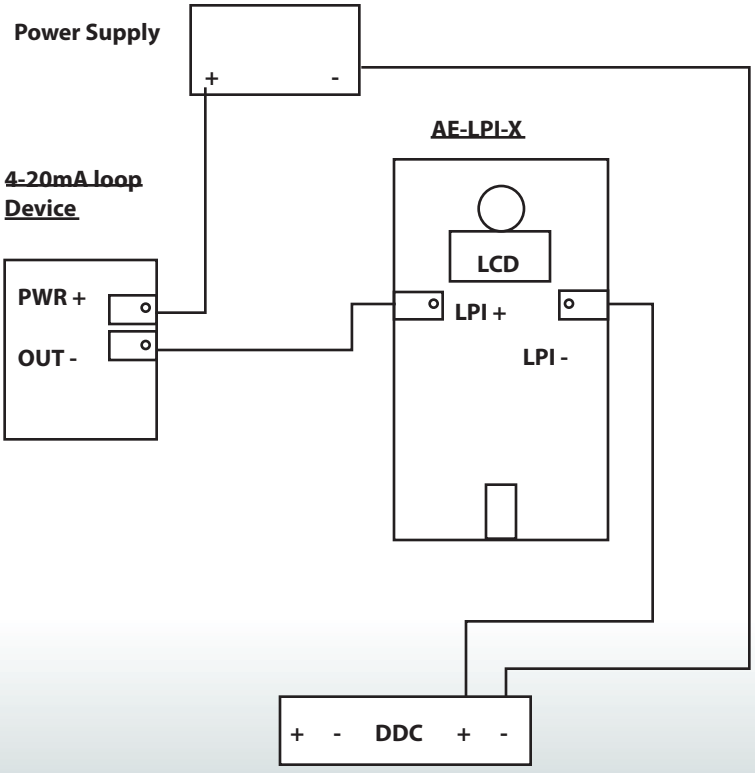
Light sensor c/w 4 - 20mA output in weatherproof enclosure

PSR-1-T-E

LOOP POWERED INDICATOR-EXECUTIVE ENCLOSURE SERIES

DESCRIPTION:

The AE-LPI-X is a loop powered indicator in an executive space enclosure. The indicator is factory calibrated for a specific temperature range or 0-100% RH.



SPECIFICATIONS:

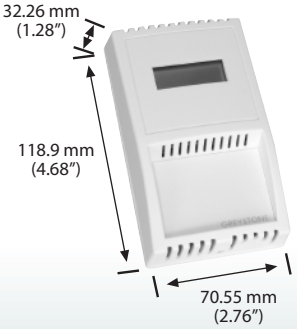
Power Supply	12 to 30 Vdc loop powered
Display Units	C or F (Factory set)
Display Range	As per order
Display Resolution	0.1 C or 0.1 F for display of 00.0 to 99.9
Display Size	24 mm W x 11 mm H (0.95" x 0.45") three digit
PCB Operating Temperature	0 to 70 C (32 to 158 F)
PCB Operating Humidity	0 to 95% RH (non-condensing)
Wiring Connections	Two wires,screw terminal block, (14 to 22 AWG)
Manufacturing Process	ISO 9001 Certified
Internal Adjustments	Clearly marked ZERO and SPAN pots

ORDERING:

AE-LPI-X

X– Suffix Equals

1-	0-35 C
2-	0-50 C
3-	0-100 C
7F-	0-50 F
7K-	0-100 F
RH-	0 to 100% RH



DAMPER END SWITCH - DES-100 SERIES

DESCRIPTION:

The damper position switch is a mechanically activated electrical switch which provides accurate and reliable indication of damper blade position. Unlike standard limit switches which only indicate damper drive linkage position, the position switch is mounted directly on the main damper drive axle or on an auxiliary axle off of an indirectly driven blade. This assures true damper blade position indication.

ORDERING:

DES-100 - Provides two output signals to indicate a fully open and fully closed position.

DES-101 - Provides two output signals that act as a double pole switch.

DESIGN FEATURES:

- Adjustable axle mounted collar provides for easy set-up and adjustment minimizing labour costs.
- Electrical enclosure has a 1/2" knockout which allows for quick and easy installation.
- Dual, opposed switches in the same enclosure provide for indication of fully open or closed.
- Switches can be set by user as NC or NO (form A or B)
- Fits 1/2" shaft only

SWITCH RATINGS:

- 4A at 125 VAC

LOOP POWERED INDICATOR LPI-1 - 4-20mA

DESCRIPTION:

LPI-1 loop powered indicators with large 3-1/2 digit LCD are designed to display any 4 to 20mA signal directly in the engineering units of the measured media. The display is powered directly by the measured 4 to 20mA signal so there is no need for a power supply.

SPECIFICATIONS:

Supply voltage	• Powered by milliamp control loop
Input	• 4 - 20mA dc
Impedance	• 300 ohms nominal
Accuracy	• ±0.1% of scale
Adjustments	• SPAN (GAIN) and ZERO (OFFSET)
Decimal point	• 3 positions or none (user selectable)
Range	• -1999 to +1999
Operating temp.	• 0˚C to 50˚C (32˚F to 122˚F)
Humidity	• 95% Non-condensing
Connection	• 2 pin screw terminal
Cutout required	• 25.1 mm (0.988") x 55.5 mm (2.19")
Panel clearance	• 40 mm (1.6")
Display	• 3-1/2 digit
Digits size	• 11.43 mm (0.45") LCD
Dimensions	• 35.5 mm (1.4") H x 58.67 mm (2.31") W

APPLICATIONS:

- Temperature indication
- Pressure indication
- Kilowatt demand
- Voltage indication
- Humidity indication
- Differential or static pressure
- Gallons per minute flow
- Current indication
- Other 4 - 20mA indications

FEATURES:

- Snap in panel mounting
- Large easy to read LCD display
- Optional NEMA 4X enclosure
- Pre-calibrated for desired range (optional)
- Optional selector switch for multiple indicators on one display unit

NOTE:

Impedance is rated at 24 VDC and 20mA. Exercise caution to avoid too much impedance in the current loop. Most transmitters are rated 500 to 750 ohms.

GENERAL PURPOSE RELAYS

PRODUCT ORDERING INFORMATION:

SERIES	DESCRIPTION
LY2N	10 amp contacts, DPDT w/ Neon Light

CODE	COIL VOLTAGE
12 VDC	Low voltage DC, 12 VDC
24 VDC	Low voltage DC, 24 VDC
24 VAC	Low Voltage AC, 24 VAC
120 VAC	High voltage AC, 120 VAC

LY2N 24 VDC

Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

EXAMPLE:

For a 10 amp relay c/w DPDT contacts, LED and 24 VDC supply.

NOTE:

For other relay types, detailed specifications, or for more options to above relays, please contact Greystone.

RELAY BASES (required for above):

PTF08A-E • Base for LY2

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Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems. We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

GREYSTONE
ENERGY SYSTEMS INC

Greystone's head office and factory is located on the east coast of Canada, in Moncton NB. Over the past 10 years, we have strategically opened offices throughout the world to better serve our customers. Additionally, we have created partnerships in specific areas for distribution of Greystone products. For more information on our products or to check for a distributor in your area, please contact the closest office from the list below. If you are interested in becoming a distributor in an open territory, please contact the Area Manager as listed on our website.

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