Cecomp® DSG™ SaniGauge™ Loop Powered Digital Sanitary Pressure Transmitters DSGL3

- *±0.25% Test Gauge Accuracy*
- *316L Stainless Steel Wetted Parts*
- *1.5" or 2.0" Tri-Clamp®*
- *2-Wire Transmitter*
- *4-20 mA Output*
- *Output Test Function*

- *Food Processing*
- *Dairy and Breweries*
- *Pharmaceutical*

Specifications

Ranges and Resolution
See table below. Consult factory for special engineering units.
Resolution is fixed as indicated in table

Accuracy
Accuracy includes linearity, hysteresis, repeatability
Accuracy: ±0.25% of full scale ±1 least significant digit
Sensor hysteresis: ±0.015% FS, included in accuracy
Sensor repeatability: ±0.01% FS, included in accuracy

Display
4 readings per second nominal display update rate
4 digit LCD, 0.5" H and 5 character 0.25" H alphanumeric

Controls and Functions
TEST: When depressed sets loop current and display to output test level, independent of pressure input.
▲ Up: set test, pass code, and calibration values
▼ Down: set test, pass code, and calibration values

Calibration
User settable pass code required to enter calibration mode
Pressure and absolute models: zero, midpoint, span
Vacuum models: –span, –midpoint, zero
Vacuum/pressure models: –span, zero, +midpoint, +span
±15 psi models: –span, –midpoint, zero, +midpoint, +span

Loop Supply Voltage
8 to 32 VDC loop power supply
Gauge is reverse polarity protected
3 ft, 2-cond. 22 AWG cable with stripped and tinned wire ends
Use with **API 9046-24** loop power supply

Output Characteristics
4-20 mA output powered by current loop
Output drive (compliance) determined by power source
Updated approximately 16 times per second
12,000 counts over sensor range

Weight (approximate)
1.5" gauge: 2 lbs shipping: 3 lbs
2.0" gauge: 2.5 lbs shipping: 3.5 lbs

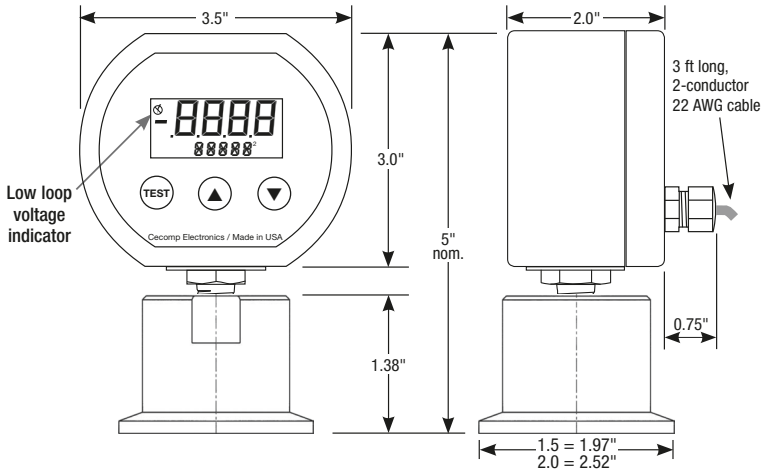
Housing and Materials
NEMA 4X ABS/polycarbonate case, polycarb. label, rear gasket
Conformal coating on circuit boards for moisture resistance.

Sanitary Seal
3-A certified Tri-Clamp flush diaphragm sanitary seal
NEOBEE® M-20 fill
All 316L stainless steel construction
Optional electropolish passivation

Maximum Working Pressure
1.5": 2 X pressure range
2.0": 2 X pressure range or 550 psi for 300 psi sensor
Maximum pressure dependent on type of clamping device
112.5% FS out-of-range display: I – – – or I –.–.–.–

Environmental
Storage temperature: –40 to 203°F (–40 to 95°C)
Operating temperature: –4 to 185°F (–20 to 85°C)
Compensated temperature: 32 to 158°F (0 to 70°C)
Thermal effect due to fill: Up to 1.2 psi from 0 to 70°C
Positional effect: Up to 0.14 psi

Quick Link: cecomp.com/san



PSI	Res	inHg	Res	cmH_2O	Res	g/cm^2	Res	kg/cm^2	Res
15PSIA	.01	30INHGA	.01	1000CMH2OA	1	1000GCMA	1	1KGCMA	.001
15PSIVAC	.01	30INHGVAC	.01	1000CMH2OVAC	1	1000GCMVAC	1	1KGCMVAC	.001
±15PSIG	.01	±30INHGG	.01	±1000CMH2OG	1	±1000GCMG	1	±1KGCMG	.001
15PSIG	.01	30INHGG	.01	1000CMH2OG	1	1000GCMG	1	1KGCMG	.001
30PSIA	.01	60INHGA	.01	2100CMH2OA	1	2100GCMA	1	2KGCMA	.001
30PSIG	.01	60INHGG	.01	2100CMH2OG	1	2100GCMG	1	2KGCMG	.001
60PSIG	.01	120INHGG	.1	kPa	Res	mbar	Res	4KGCMG	.001
100PSIA	.1	200INHGA	.1	100KPAA	.1	1000MBARA	1	7KGCMA	.001
–15V100PSIG	.1	–30V200INHGG	.1	100KPAVAC	.1	1000MBARVAC	1	7KGCMG	.001
100PSIG	.1	200INHGG	.1	±100KPAG	.1	±1000MBARG	1	–1V7KGCMG	.01
–15V200PSIG	.1	–30V400INHGG	.1	100KPAG	.1	1000MBARG	1	14KGCMG	.01
200PSIG	.1	400INHGG	.1	200KPAA	.1	2000MBARA	1	–1V14KGCMG	.01
300PSIG	.1	600INHGG	.1	200KPAG	.1	2000MBARG	1	20KGCMG	.01
inHg/PSI	Res	mmHg	Res	400KPAG	.1	bar	Res	atm	Res
–30V15PSIG	.1	760MMHGA	.1	700KPAA	.1	1BARA	.001	1ATMA	.001
–30V100PSIG	.1	760MMHGVAC	.1	700KPAG	.1	1BARVAC	.001	1ATMVAC	.001
–30V200PSIG	.1	±760MMHGG	1	–100V700KPAG	1	±1BARG	.001	±1ATMG	.001
oz/in^2	Res	760MMHGG	.1	1400KPAG	1	1BARG	.001	1ATMG	.001
240ZINA	.1	1600MMHGA	1	–100V1400KPAG	1	2BARA	.001	2ATMA	.001
240ZINVAC	.1	1600MMHGG	1	2000KPAG	1	2BARG	.001	2ATMG	.001
±240ZING	.1	inH_2O	Res	ftH_2O	Res	4BARG	.001	4ATMG	.001
240ZING	.1	400INH2OA	.1	35FTH2O	.1	7BARA	.001	7ATMA	.001
480ZINA	.1	400INH2OVAC	.1	70FTH2O	.1	7BARG	.001	7ATMG	.001
480ZING	.1	±400INH2OG	1	140FTH2O	.1	–1V7BARG	.01	–1V7ATMG	.01
Torr	Res	400INH2OG	.1	230FTH2O	.1	14BARG	.01	14ATMG	.01
760TORRA	.1	850INH2OA	1	480FTH2O	.1	–1V14BARG	.01	–1V14ATMG	.01
760TORRVAC	.1	850INH2OG	1	700FTH2O	.1	20BARG	.01	20ATMG	.01
1600TORRA	1								

How to Specify	Size
DSGL315N *range - options*	1.5" Tri-Clamp
DSGL320N *range - options*	2.0" Tri-Clamp

Range—see table at left

psi = PSI	mmHg = MMHG	MPa = MPA
inHg = INHG	torr = TORR	mbar = MBAR
oz/in^2 = ZIN	kg/cm^2 = KGCM	bar = BAR
inH_2O = INH2O	g/cm^2 = GCM	cmH_2O = CMH2O
ftH_2O = FTH2O	kPa = KPA	atm = ATM

G = gauge reference pressure
VAC = gauge reference vacuum
A = absolute reference

If vacuum gauge requires a minus sign, please specify.

If required, please state custom range for DSGL3 output, such as 3 psi = 4 mA, 15 psi = 20 mA.

Option—add to end of model number	
-E	Electropolished sanitary fitting
Calibration certificates—order separately	
CD	Calibration data, 5 test points, test date
NC	NIST certificate with traceability documentation, 5 test points and date

Maximum pressure dependent on type of clamping device

NEOBEE—Reg TM Stepan Specialty Products, LLC
Tri-Clamp—Reg TM Alfa Laval Inc.

Cecomp Electronics Division of Absolute Process Instruments, Inc.
1220 American Way Libertyville, IL 60048
Phone: 800-942-0315 Fax: 800-949-7502
cecomp.com

Installation Precautions

- ✔ Read these instructions before using the gauge. Configuration may be easier before installation. Contact the factory for assistance.
- ✔ These products do not contain user-serviceable parts. Contact us for repairs, service, or refurbishment.
- ✔ Gauges must be operated within specified ambient temperature ranges.
- ✔ Use a pressure or vacuum range appropriate for the application.
- ✔ Use clamp appropriate for the pressure range of the gauge.
- ✔ Remove system pressures before removing or installing gauge.
- ✔ Good design practice dictates that positive displacement liquid pumps include protection devices to prevent sensor damage from pressure spikes, acceleration head, and vacuum extremes.
- ✘ Avoid permanent sensor damage! Do not apply vacuum to non-vacuum gauges or hydraulic vacuum to any gauges.
- ✘ Avoid permanent damage! NEVER touch surface of diaphragm.
- ⚠ Gauges are not for oxygen service. Accidental rupture of sensor diaphragm may cause oil inside seal to react with oxygen.
- ✘ NEVER connect the gauge wires directly to 115 VAC or permanent damage will result.

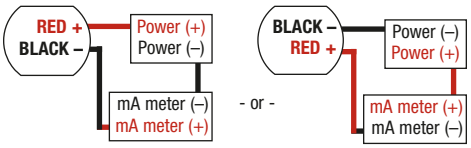
Electrical Connection

All operating power is supplied by the 4-20 mA current loop using the 2-wire cable at the gauge rear. The gauge can be used as an indicating transmitter or as a DC powered gauge. Reversing the connections will not harm the gauge but it will not operate with incorrect polarity.

Select a loop power supply voltage and total loop resistance so that when the loop current is 20 mA, the gauge will have at least 8 VDC at its terminals but not over 32 VDC.

For correct operation and to avoid erratic or erroneous readings, the gauge terminal voltage must not fall below 8 VDC. Too large a loop resistance will cause the gauge output to "limit" or saturate before reaching its full 20 mA output. The minimum loop supply voltage may be calculated from the formula:

$$V_{min} = 8V + (20mA \times \text{Total loop resistance})$$



To use the transmitter as a low voltage powered gauge connect it to any 8-32 VDC power supply.

Operation

The DSGL3 is designed for continuous operation. Warm-up time is negligible. When power is first applied, the gauge will set the loop current to maximum and check the voltage available. If there is sufficient voltage available to power the unit, all active segments will be displayed briefly.

Then the full scale pressure range and engineering units are displayed. All active segments will again displayed briefly. Then the display will show the system pressure, and the loop current will be linearly proportional to the pressure/vacuum.

The output is a 12,000 count analog 4-20 mA signal. The output is filtered to improve noise immunity and is updated approximately 16 times per second.

Sensor Range	Full vacuum	"0" on display	Full pressure
Gauge reference pressure	n/a	4 mA	20 mA
Gauge reference vacuum	20 mA	4 mA	n/a
Compound –30inHg/15psi	4 mA	12 mA	20 mA
Compound –30inHg/100psi	4 mA	5.5 mA	20 mA
Compound –30inHg/200psi	4 mA	4.8 mA	20 mA
Absolute reference	4 mA	4 mA	20 mA
Bipolar ±	4 mA	12 mA	20 mA

Test Function

When the TEST button is held depressed, the display and loop current are switched, independent of the actual pressure, to a level determined by the test setting. When the button is released, normal operation is resumed. This test mode will allow setup and testing of the current loop without having to alter the system pressure.

To set the test output level, press and hold the front-panel TEST button and press the up or down arrow buttons to adjust the test output to the desired pressure setting. When the TEST button is released the setting is stored in non-volatile memory.

Calibration Preparation

Gauges are calibrated at the factory using equipment traceable to NIST. Gauges are calibrated in an upright position at normal ambient temperatures (approx. 20°C). There is no need to calibrate the gauge before putting it into service unless the process temperature and gauge position deviate from normal.

Calibration should only be performed by qualified individuals using appropriate calibration standards and procedures. Calibration intervals depend on your quality control program requirements, although many customers calibrate annually.

The calibration system must be able to generate and measure pressure/vacuum over the full range of the gauge and should be at least four times more accurate than the gauge being calibrated.

A vacuum pump able to produce a vacuum of 100 microns (0.1 torr or 100 millitorr) or lower is required for vacuum gauges. Warning: application of vacuum to non-vacuum models will damage the sensor.

Allow the gauge to acclimate to the calibration temperature for at least 60 minutes. Calibrate the gauge at the same temperature as the process with the gauge oriented in the installation position.

Use a stable DC power supply and an accurate mA meter for calibration of the current output.

Calibration

A user-modifiable calibration pass code is used to enter the calibration mode. In the calibration mode, the gauge automatically recognizes the calibration region corresponding to the applied pressure. There are 3, 4, or 5 calibration regions depending upon the pressure range of the gauge. All gauges have Zero, +Midpoint, and +Span regions. Vacuum/pressure gauges will also have a –Span region, and a ±15 psig sensor will have a –Midpoint region as well.

Calibration of the loop output coordinates the 4-20 mA output to the display indication, and is performed independently of applied pressure. It requires a direct physical measurement of the output. Calibration of the output coordinates the loop output to the display indication, and normally does not need to be adjusted.

Entering the Calibration Mode

1. While pressing and holding the ▼ button, press the TEST button to enter the calibration mode. The upper section of the display will indicate CAL.
2. When all buttons are released, the upper section of the display will indicate _ _ _ _ with the left-most position blinking, and the lower section will indicate PASS. To exit and return to the normal operating mode, press and release the TEST button.
3. Enter the user-modifiable calibration pass code (3510 factory default)

   Use ▲ or ▼ to set the left-most digit to 3.

   Press and release the TEST button to move to the next position. The 3 will remain, and the second position will be blinking. Use ▲ or ▼ to select 5.

   Press and release TEST to move to the next position. 3 5 will remain, and the third position will be blinking. Use ▲ or ▼ to select 1.

   Press and release the TEST to move to the next position. 3 5 1 will remain, and the fourth position will be blinking. Use ▲ or ▼ to select 0.
4. Press and release the TEST button to proceed with calibration.

If an incorrect pass code was entered, the gauge will to exit to the normal operating mode.

Calibration

Upon successful calibration pass code entry, the upper display will indicate the applied pressure in the configured engineering units with the corresponding loop current.

The lower display will alternate between CAL and the calibration region corresponding to the applied pressure (ZERO, +MID, +SPAN, –MID, or –SPAN).

Note: To store the calibration parameters and exit calibration mode at any time, press and hold the TEST button until the display indicates – – – – .

Loop Current Calibration

Loop current calibration coordinates the loop current to the display indication, and is performed independently of applied pressure. It requires a direct physical measurement of the loop current.

Note: During any of the following calibration steps if the TEST button is held depressed for longer than 2 seconds, the display will change to indicate – – – – , and the gauge will exit the calibration mode when all buttons are released.

4 mA loop current

Press the TEST button and release it when the display indicates LCAL.

The upper display segments will indicate the pre-configured pressure corresponding to a 4 mA loop current.

The lower display segments will alternate between CAL and 4 MA.

Use ▲ or ▼ to adjust the actual loop current to 4 mA.

Calibration—continued

20 mA loop current

Press the TEST button and release it when the display indicates HCAL.

The upper display segments will indicate the preconfigured pressure corresponding to a 20 mA loop current.

The lower display segments will alternate between CAL and 20 MA.

Use ▲ or ▼ to adjust the actual loop current to 20 mA.

Pressure Calibration

The pressure calibration procedure simultaneously adjusts both the display indication and the loop current to correspond to the actual applied pressure.

Note: During any of the following calibration steps if the TEST button is held depressed for longer than 2 seconds, the display will change to indicate – – – – , and the gauge will exit the calibration mode when all buttons are released.

Zero calibration

Press the TEST button and release it when the display indicates CAL.

Apply zero pressure.

The lower display will alternate between CAL and ZERO.

Use ▲ or ▼ to adjust the upper display to indicate zero.

Span calibration

Apply full-scale pressure.

The lower display will alternate between CAL and +SPAN.

Use ▲ or ▼ to adjust the upper display to indicate the applied pressure.

Midpoint non-linearity calibration

Apply 50% full-scale positive pressure.

The lower display will alternate between CAL and +MID.

Use ▲ or ▼ to adjust the upper display to indicate the applied pressure.

Negative span calibration (bipolar and compound ranges only)

Apply full-scale negative pressure.

The lower display will alternate between CAL and –SPAN.

Use ▲ or ▼ to adjust the upper display to indicate the applied pressure.

Negative midpoint non-linearity calibration (±15 psi bipolar range)

Apply 50% full-scale negative pressure.

The lower display segments will alternate between CAL and –MID.

Use ▲ or ▼ to adjust the upper display to indicate the applied pressure.

Save and exit

To store the calibration parameters and exit calibration mode, press and hold the TEST button until the display indicates – – – – .

Calibration Pass Code

1. While pressing and holding the ▲ button, press the TEST button to enter the configuration mode. The upper section of the display will indicate CFG.
2. When all buttons are released, the upper section of the display will indicate _ _ _ _ with the left-most position blinking, and the lower section will indicate PASS. To exit and return to the normal operating mode, press and release the TEST button.
3. Enter factory pass code 1220

   Use ▲ or ▼ to set the left-most digit to 1.

   Press and release the TEST button to index to the next position. Use ▲ or ▼ to select 2.

   Press and release the TEST button to index to the next position. The third position will be blinking. Press use ▲ or ▼ to select 2.

   Press and release the TEST button to index to the next position. The fourth position will be blinking. Use ▲ or ▼ to select 0.
4. Press and release the TEST button to proceed to the configuration parameters. Note: If an incorrect pass code was entered, the gauge will exit to the normal operating mode.
5. The upper display section will indicate the calibration pass code. The lower section will display UDPCD.
6. To change the calibration pass code, press and release the ▲ or ▼ the button. The first character of the pass code will begin to blink.

   Use ▲ or ▼ to set the blinking character to the desired value, then press and release the TEST button to move to the next character. Repeat for each character position.
7. When the calibration pass code is displayed with no characters blinking, press and release the TEST button to save the new pass code and restart the gauge. Note: To make a correction to the new calibration pass code before saving and restarting, press either the ▲ or ▼ button to return to the UDPCD code entry sequence.