

KING-GAGE® Marine Systems

Tank Level and Draft Indicating Systems for the Marine and Offshore Industries

LevelBAR™ Tank Level Indicator

- Direct Replacement for Manometer Gauges
- Rugged Corrosion Resistant Housing
- Individually Calibrated Indicator Scales
- Easily Monitor Draft or Tank Levels

KING-GAGE LevelBAR system is designed specifically for liquid level measurement. This unique analog column indicator works as a stand-alone system or auxiliary remote display in new or retrofit marine applications. The multi-segment LED column provides graphic indication of level for shipboard tanks or draft monitoring applications.

This self contained indicating system is well adapted for service on board ships and offshore rigs. A rugged stainless housing resists corrosion and affords maximum protection for the internal electronics. Indicating systems are available in both electronic input (4-20 mA) or direct pneumatic pressure input versions. Each LevelBAR includes an individually calibrated scale marked in any specified measurement units (volume, weight, depth, % full).

Pneumatic Input

Using an on-board differential pressure (D/P) transducer, it can be used as a direct replacement for mercury tank gauges or other fluid-filled manometers. The internal piezoresistive transducer provides pneumatic-to-current (P/I) conversion to generate a proportional electronic output. A scale ranging adjustment allows for setting full scale display for most applications.

Electronic Input

The LevelBAR electronic input models are designed to work as tank level monitors. Instead of the internal transducer, this system accepts an external 4-20 mA proportional signal from typical two wire liquid level transmitters/sensors. It will provide full scale display even if the transmitter does not provide full scale (20 mA) output. This eliminates the need to calculate and adjust transmitter span settings to anything other than nominal.



Principles of Operation

The LevelBAR system uses hydrostatic pressure measurement to determine liquid level. This pressure is created by the actual depth of liquid above the measurement point. Individual indicator scales are calibrated to the pressure range (depth), density (specific gravity) of the liquid and volumetric capacity of the tank or compartment. This latter element does not apply to draft measurement applications.

When used with either an air-driven sensor or downpipe, the pressure signal is directed into the LevelBAR (with D/P option). The internal transducer generates a milliamp output in response to the applied pressure. Individual LED segments on the scale illuminate as the signal (e.g., tank depth or draft) increases.

Bubbler (Downpipe) System - uses compressed air to purge an open ended pipe extending down into the tank. A regulator or purge control supplies the air which fills the pipe. The resulting downstream pressure (within the pipe) is directly proportional to liquid depth. As depth increases, so does pressure. Conversely, as depth decreases, downstream pressure is equally reduced as excess air flows out the immersed end of the pipe.

Systems such as these can use pneumatic air purge regulators such as the KING-GAGE LiquiSeal Control or 780 Purge Control for automatic continuous purging of the downpipe.



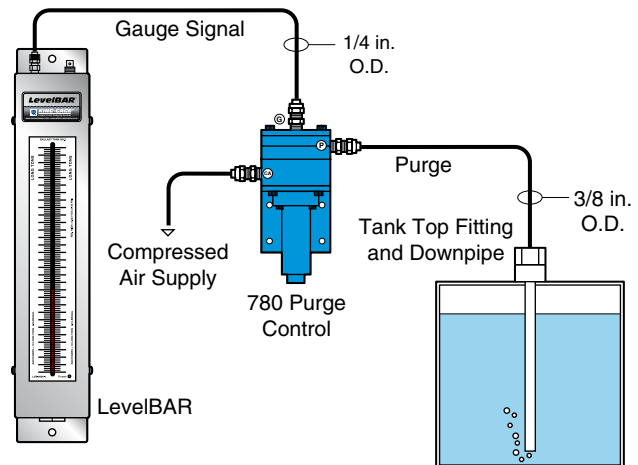
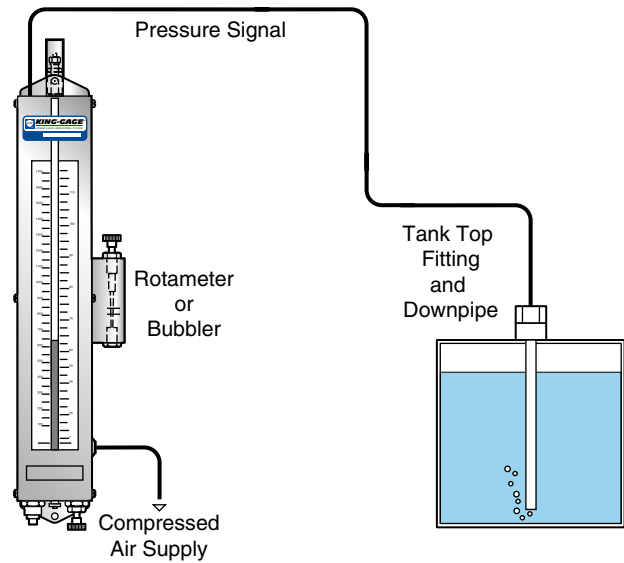
LevelBAR Custom Scale

The LevelBAR scale is individually calibrated and custom marked in any specified unit of measurement (pounds, gallons, barrels, feet, etc.). An optional 2nd scale unit can be included to combine different measurements such as volume and depth. Scales are manufactured for the individual tank geometry and product specific gravity. Due to the factory-calibrated scale, the LevelBAR system can be used for almost any kind and shape of tank.

LevelBAR stainless steel housing for bulkhead mounting (flush panel mount version available)

Tank Gauge Retrofits

The LevelBAR can be combined with the KING-GAGE Purge Control when replacing older gauges with oil-filled bubbler or rotameter air flow controls. The 780-series Purge Control is a differential pressure air flow regulator that produces a constant 1 cfh purge rate to the downpipe in the tank.



Mercury and other fluid filled tank level gauges can be directly replaced by the LevelBAR indicator. Regardless of tank depth, each indicator measures only 17" high and takes up less space than most conventional fluid filled gauges. The LED column has a scaling adjustment that permits using the full height of the display, even when depths vary greatly from tank to tank. Or it can be used for elevating the zero setting of the indicator for special applications.

Simple Installation

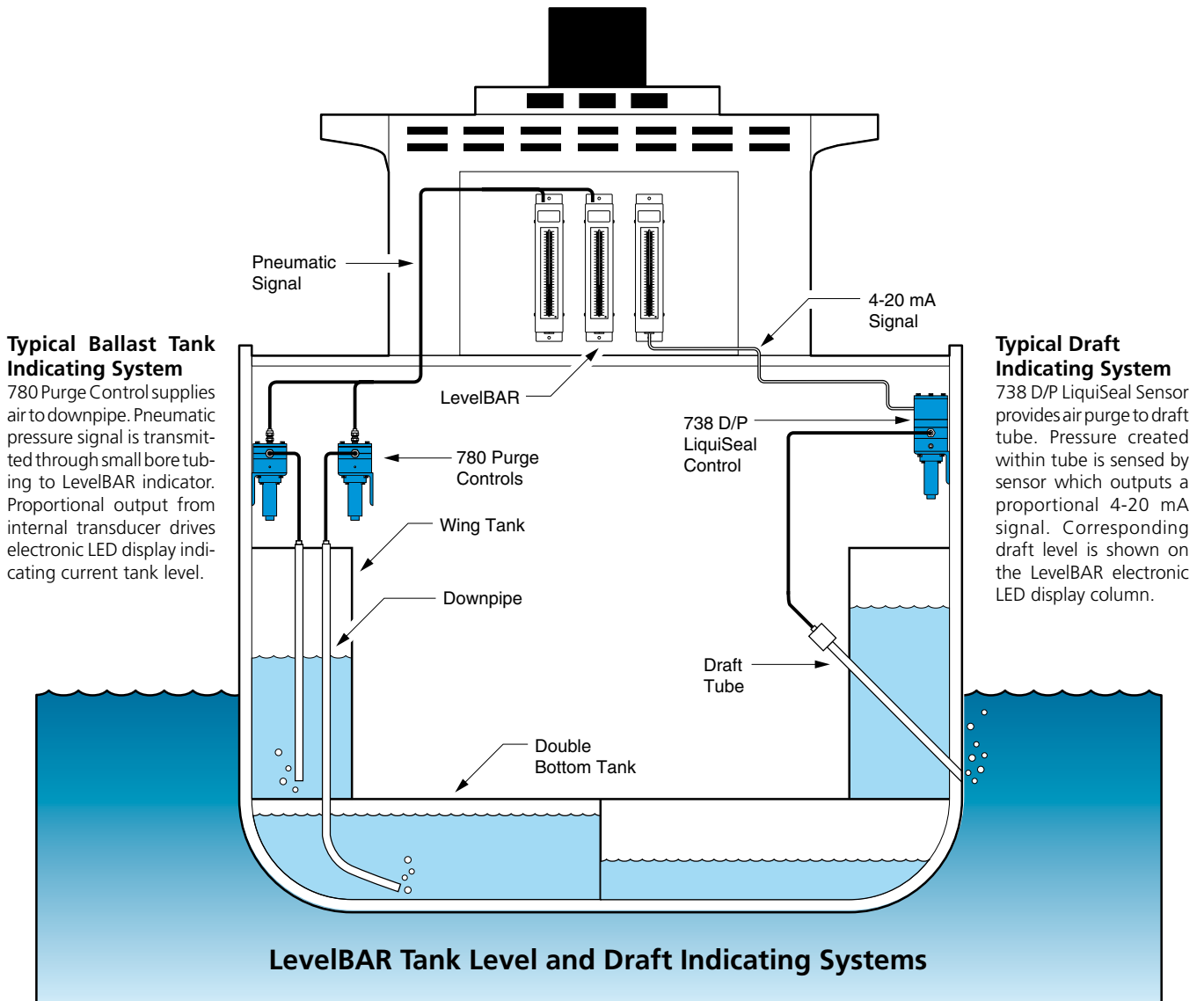
Installation of the LevelBAR system is quick and easy. There are no extensive adjustments or calculations to perform. Simply connect power and signal input to make the system operational. The housing can be mounted directly to a panel, bulkhead or other rigid structural member.

Applications Include:

- Ship's Draft
- Ballast Water Tanks
- Fuel Oil Tanks
- Day Tanks
- Bunker Oil Tanks
- Drill Water Tanks
- Lube Oil Sump Tanks
- Inner Bottom Tanks
- Liquid Cargo Tanks

Tank Depth Model Selection

Model No.	Maximum Measurement Depths (Fresh & Salt Water)
5110-20/5120-20 Input Range 0-5 psid	138 in./3.5 m fresh 134 in./3.4 m salt water
5110-21/5120-21 Input Range 0-10 psid	276 in./7.0 m fresh 268 in./6.8 m salt water
5110-22/5120-22 Input Range 0-15 psid	415 in./10.5 m fresh 403 in./10.2 m salt water
5110-23/5120-23 Input Range 0-30 psid	830 in./21.0 m fresh 806 in./20.4 m salt water
5110-24/5120-24 Input Range 0-50 psid	1384 in./35.1 m fresh 1343 in./34.1 m salt water
5110-10/5120-10 Electronic Input 4-20 mAdc	Maximum depth depends upon transmitter range.



Typical Ballast Tank Indicating System

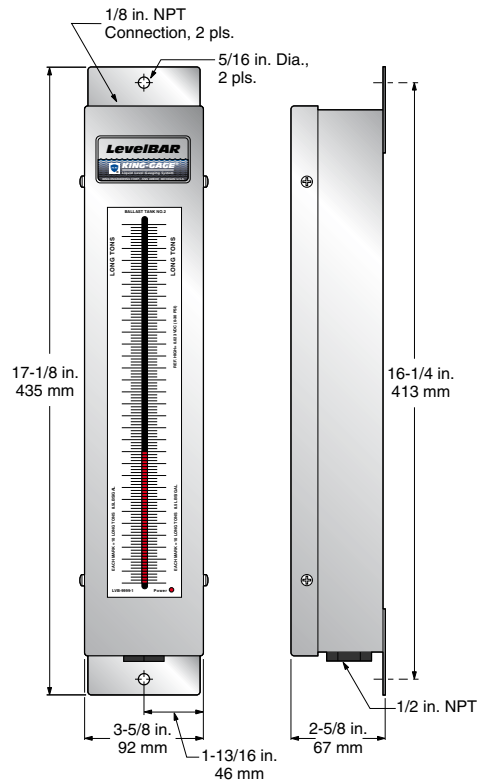
780 Purge Control supplies air to downpipe. Pneumatic pressure signal is transmitted through small bore tubing to LevelBAR indicator. Proportional output from internal transducer drives electronic LED display indicating current tank level.

Typical Draft Indicating System

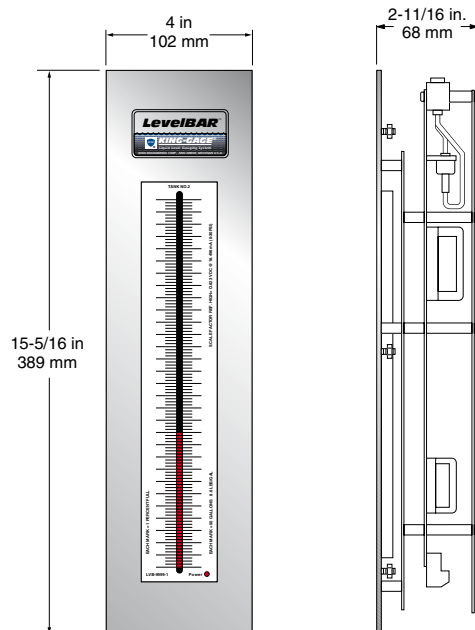
738 D/P LiquiSeal Sensor provides air purge to draft tube. Pressure created within tube is sensed by sensor which outputs a proportional 4-20 mA signal. Corresponding draft level is shown on the LevelBAR electronic LED display column.

KING-GAGE® Marine Systems

**Model 5110-xx
Wall Mount**



**Model 5120-xx
Flush Mount**



Specifications

Display Accuracy/Resolution
1%

Display Type
Vertical 100-segment LED (light emitting diode) array

Display (Scale) Length
10 in./ 254 mm

***Pressure Ranges**
0-5, -10, -15, -30, -50 psid fixed range transmitter element (accepts clean, dry air/ gas pressure input). Maximum pressure rating is 300% FS. Minimum pressure range for proper operation is 50% of nominal. The lowest acceptable input pressure range is 0-2.5 psid using the 0-5 psid transducer element.

***Input Pressure Connections**
Two (2), high and low pressure, 1/8" NPT-F connections.

Electrical Connections
1/2" NPT-F threaded lower connection for conduit or cable fitting. Internal plug and socket type terminals HOT/NEU/GND for 3-line source grounded Vac power.

Input Power
115 Vac 50/60 Hz nominal

***Transmitter Accuracy**
0.5% FS

***Output**
4-20 mAdc (assumes FSO)

Physical Data

5110-xx - 304 stainless steel housing and cover with gasket seal, transparent polycarbonate display window. Intended to meet splash proof requirements. The use of waterproof conduit hubs or fittings may be required during installation. Not rated for continuous explosion hazard areas.

5120-xx - Flush mounting brushed stainless steel bezel for console, instrument panel, or customer furnished enclosure.

*Specifications not applicable to electronic input versions (Model No. 5110-10 & 5120-10)



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