

Models 5501, 5502, 5503

Effective: January, 2013

DATA SHEET 1100-34

ES2 Slimline Transmitter

- **Robust protection in washdown environments**
- **Continuous liquid level measurement**
- **Two Wire Loop Powered (4–20 mA)**

KING-GAGE ES2 transmitters provide liquid level measurement for inventory monitoring. Add to their rugged reliability the major benefits of simplified service and maintenance. Performance characteristics of these transmitters include excellent stability and repeatability (better than 0.02% FS). Transmitter span accommodates a 3:1 turndown ratio* to match the application pressure range (i.e. tank depth) and the 4-20 mA_{dc} output is compatible with PLCs or other control architecture using analog I/O.

KING-GAGE ES2 transmitters are applicable to most tanks or process vessels whose contents remain at normal atmospheric pressure. They measure hydrostatic head pressure created by liquid depth in the tank and are unaffected by foaming or internal obstructions such as agitators. Unlike load cells, pressure based measurement has lower installation cost and is far simpler to maintain thus ensuring more reliable readings.

Transmitters used in sanitary processing must often endure cycles of rapid temperature fluctuation. Wash-down environments produce significant condensation on metallic surfaces that coupled with aggressive cleansing agents demand robust protection for these instruments. The ES2 transmitter's enhanced design uses encapsulation for full isolation of the internal electronics. This extends to the IP68 grade M12 signal connector that ensure integrity and long term reliability. You can be assured of a transmitter truly built for the demands and expectations of today's processing environment.

Sanitary Configurations

These sensors are especially suited to a wide range of sanitary applications on storage or continuous processing vessels. The 316 stainless diaphragm is appropriate



for flush mount, clean-in-place installation employing an FDA-approved silicone rubber O-ring seal to achieve the crevice-free, positive compression seal between diaphragm and tank liner. Sanitary tank mountings include flush weld mountings with product contact surfaces of 316L stainless. (Quick disconnect sanitary adapters are also available for sensor mounting.)

*3:1 turndown ratio is applicable to 0–10 and 0–30 nominal range, refer to specifications for detailed span adjustment available on specific range models.

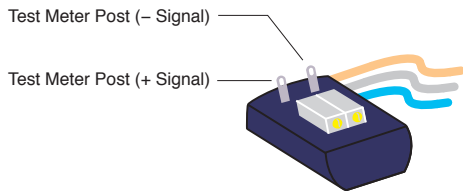
You can choose from a number of KING-GAGE display options to complement the ES2 for a complete tank level gauging system. These include digital indicators, HMI touch panels, and integrated networking solutions. Accurate tank gauging can be achieved using KING-GAGE indicators that convert the proportional output into a volumetric measurement of tank level.

Performance and Reliability

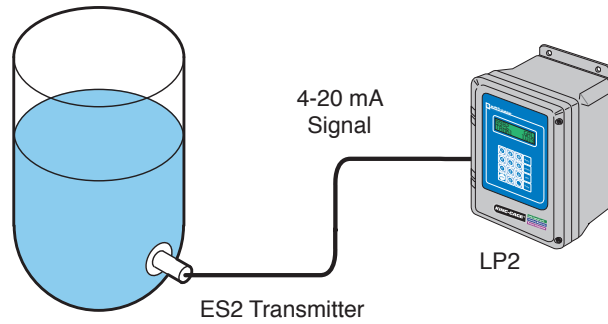
Unlike some other transmitters, ES2 has virtually no position sensitivity and its fast thermal recovery accommodates sanitary process environments. The ES2 transmitter’s smaller diameter diaphragm face minimizes exposure to accidental impact and permits retrofit installation in many existing tank level fittings. Isolated meter terminals simplify accurate calibration of span and zero. Generous load capacity (up to 1300 ohms @ 40 Vdc) can support extended cable runs or multiple loop receivers.

Load Capacity at Supplied Voltage

20 Vdc	24 Vdc	28 Vdc	32 Vdc
300 ohms	500 ohms	700 ohms	900 ohms



Internal View of Transmitter



KING-GAGE ES2 transmitters provide 4–20 mA_{dc} output that is compatible with PLCs or other control/monitoring devices. LP2 multiple tank indicators shown in the diagram above also provide loop power to the ES2 transmitters.

We’ve provided ES2 transmitters with additional isolation from both moisture and corrosive potentials. The internal electronics are environmentally encapsulated, plus the external signal connection is hermetically sealed at the transmitter housing to reduce the opportunity for infiltration. These measures significantly add to the durability of our KING-GAGE ES2 transmitter.

ES2 Signal Connection

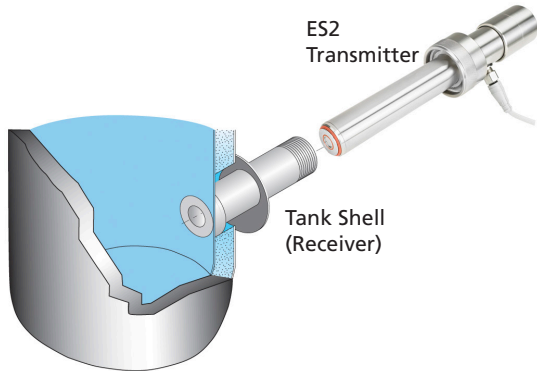
The external connector of the ES2 transmitter affords an impermeable barrier against moisture infiltration of the transmitter housing. This connector receptacle has a metric M12 screw collar and is intended for plug type molded cable assemblies designed for 4-pole signal termination. Our ES2 transmitter package also includes a molded M12 cable (32 ft/10 m) to simplify installation and ensure a sealed connection at the unit – this molded cable meets IP68 standards for ingress protection.



Molded M12 Cable



ES2 Slimline Transmitter in Washdown Environment



Mounting Options

Flush-mounting configurations are intended to meet the 3-A Sanitary Standards for clean-in-place applications. The ES2 transmitter fits directly into KING-GAGE tank shells or with an adapter on other manufacturers' mounting shells.



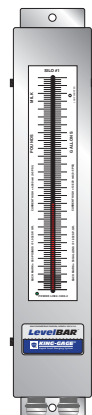
Available Retrofit Adapters

- Cherry-Burrell LevelMatic
- Anderson Instrument
- Rosemount/Foxboro
- Tank Mate
- Wizard

Tank Level Display Options

Output from the ES2 transmitter can be monitored on KING-GAGE indicators and multiple tank displays. Each of these display options also provide excitation power (24Vdc) to the transmitter through the signal loop cable.

KING-GAGE indicators enable tank level to be represented as total volume, weight or depth of contents. Options include network connectivity including Ethernet.



LevelBAR Electronic Column Indicator

Specifications

Span Adjustment Range

Transmitter turndown ratio is 3:1 for the 0–15 psig, 0–30 psig and 0–50 psig nominal ranges.

Nominal Minimum Range of Adjustment

0–5 psig	0–3 psig	0–83 in. thru 0–138 in. water / 0–2.1 m thru 0–3.5 m water
0–10 psig	0–3 psig	0–83 in. thru 0–277 in. water / 0–2.1 m thru 0–7.0 m water
0–15 psig	0–3 psig	0–83 in. thru 0–415 in. water / 0–2.1 m thru 0–10.5 m water
0–30 psig	0–10 psig	0–277 in. thru 0–830 in. water / 0–7.0 m thru 0–21.0 m water
0–50 psig	0–15 psig	0–415 in. thru 0–1384 in. water / 0–10.5 m thru 0–35.1 m water

IMPORTANT! Accuracy, linearity, and non-repeatability values are based on nominal range.

Operating Limit (Maximum Pressure)

Pressure above 300% nominal range (overrange) will result in damage to the transmitter (200% may cause a shift in calibration).

Accuracy

Less than ±0.20% FS
Includes linearity, hysteresis, non-repeatability errors.

Pressure Media

Gas or Liquids compatible with 316 stainless steel (diaphragm); silicone rubber (O-ring). All other wetted parts 316L.

Electrical

Input (excitation): 14–40 Vdc
Output (mAdc): 4–20 milliamperes

Linearity (Worst Case)

Less than ±0.13% FS
Hysteresis (Worst Case)
Less than 0.05% FS

Non-Repeatability (Worst Case)

Less than 0.02% FS

Operating Temperature Range

0°F to 175°F / -17°C to 79°C

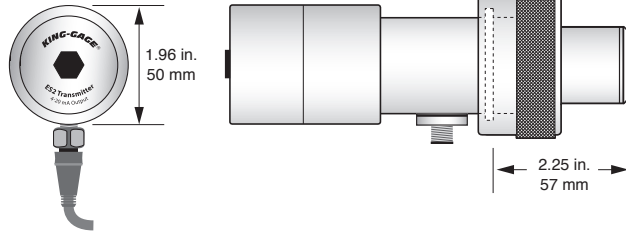
LP2 Multiple Tank Digital Display



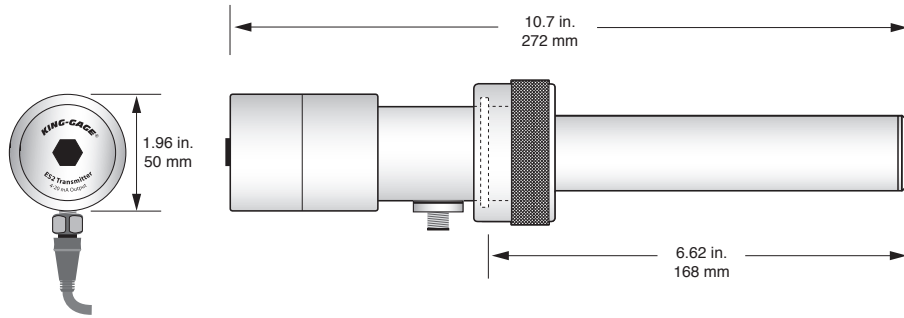
LP3 Color Touch Screen Display



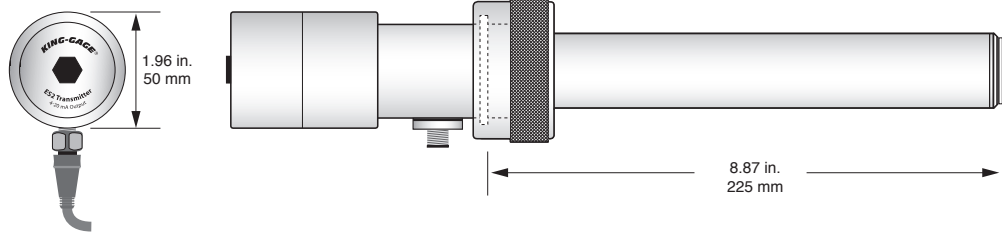
ES2 Slimline Model 5501
(Short Mount)



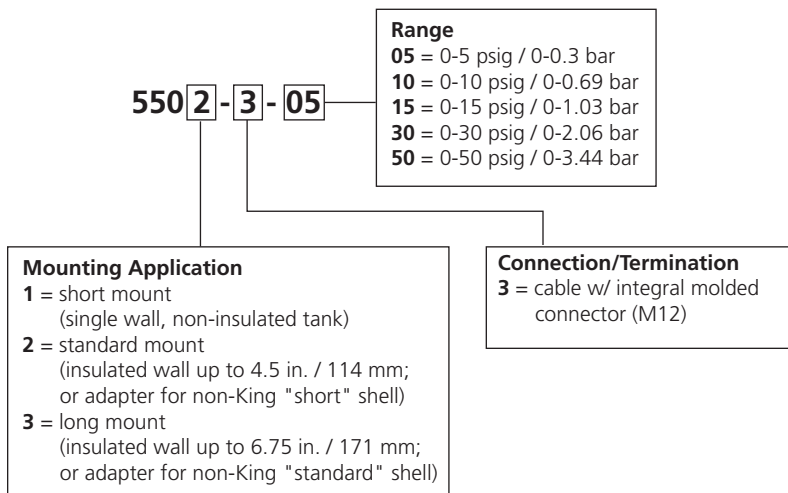
ES2 Slimline Model 5502
(Standard Mount)



ES2 Slimline Model 5503
(Long Mount)



Model No. Designations



Installation Options

The KING-GAGE ES2 transmitter offers a choice of configurations to match your application needs. The integral stainless steel housing shown here includes a watertight connector for signal cable installation. Mounting lengths offered are intended to mate with tank fittings on non-insulated (single-wall) or insulated wall tanks. Adapters provide additional mounting options when retrofitting systems from other manufacturers.