

# **KING-GAGE® Marine Systems**

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

## **Tank Level Indicator Model 7750**

- Easily Monitor Tank Level or Ship Draft
- Simple All Pneumatic Operation
- Rugged Marine Grade Construction

KING-GAGE Model 7750 Tank Level Indicator is a precision well type manometer gauge. It is designed for use with a downpipe level sensor to measure hydrostatic pressure due to liquid depth. This simple yet effective system indicates level in service tanks (fuel oil, ballast) or liquid cargo tanks. These systems are also used for ship's draft readings.

The KING-GAGE 7750 Indicator is an extremely durable unit well suited to the rigors of marine service. Acting as a frictionless force balance, its operating principle is inherently accurate and dependable. All pneumatic operation makes it compatible for use in explosion hazard zones. This gauge design is used in thousands of vessels, both freshwater marine and ocean going fleets.

User reads a graphic column display against a custom marked scale in one or two units of measurement (feet/inches, tons, barrels, etc.). The length of the indicator display can be selected based on range and desired resolution (minimum readable change in depth or capacity). Case construction is carbon steel with durable black polyurethane textured finish. It may be mounted remotely from the tank on a bulkhead or grouped with other indicators on a panel assembly.



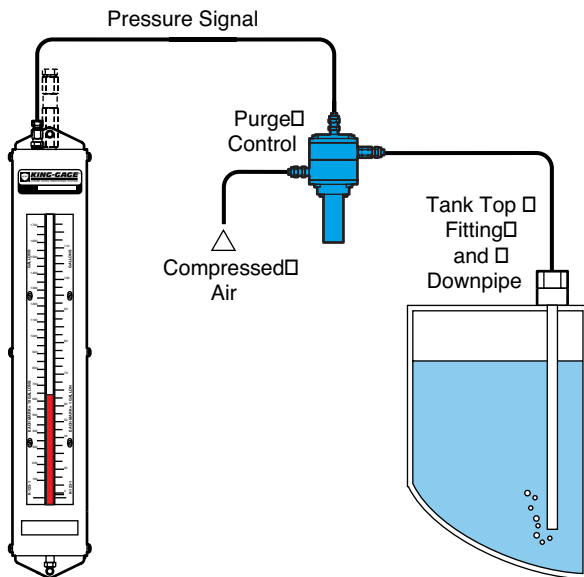
Model 7750

## Principles of Operation

The KING-GAGE 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 the volumetric capacity of the tank or compartment. For draft measurement, the only factors needed are pressure and density.

The KING-GAGE Model 7750 works as a frictionless hydrostatic force balance. Within the glass display tube, a liquid fill rises in direct proportion to the magnitude of pressure applied. The indicating liquid used determines the actual pressure range of this instrument (refer to Determining Scale Range).

Bubbler (Downpipe) System - uses compressed air to purge an open ended pipe extending down into the tank. A KING-GAGE Purge Control regulates a continuous flow of air into the downpipe. Pressure is created as liquid is purged from the downpipe, increasing until it reaches an equilibrium point (air pressure = hydrostatic pressure). Excess air escapes through the bottom of the downpipe (and bubbles up through the tank contents) to maintain equilibrium.



**Typical Downpipe Purge System**

The resulting downstream pressure (within the pipe) is directly proportional to liquid depth. As depth increases, the corresponding pressure increases as well. Conversely, as depth decreases, downstream pressure is equally reduced as excess air flows out the immersed end of the pipe. Tubing conveys this pressure to the indicator as the basis for the tank level reading.

## Indicator Scales

Each system scale is individually calibrated and custom marked in any specified unit of measurement (depth, total weight or volume). An optional 2nd scale unit can be included to combine different measurements such as depth and volume. Scales are manufactured for the individual tank geometry and specific gravity of tank contents. Due to the factory calibrated scale, the KING-GAGE Tank Level Indicator can be used for almost any kind and shape of tank.

## Determining Scale Range

Overall length of the scale can vary depending upon the range and degree of readability necessary for the application. This "readability" refers to the minimum readable change in liquid depth that can be observed at the indicator.

Three factors determine scale length:

- Maximum tank depth
- Specific gravity (density) of tank contents
- Type of indicating liquid (scale factor)

A simple calculation using these factors will yield the minimum scale length required:

$$D \text{ (depth)} \times G \text{ (sp.gr.)} \times L \text{ (liquid scale factor)} = \text{Scale Length}$$

The resulting value represents the scale length in inches. Refer to the scale sizes available for the indicator and select one that will accommodate the calculated length.

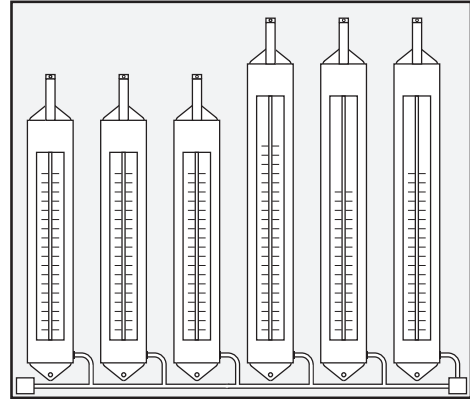
Liquid	Color	Specific Gravity	Liquid Scale Factor
<b>Mercury</b>	.....Silver	.....13.546	.....0.074
<b>No. 294</b>	.....Red	.....2.940	.....0.337
<b>No. 175</b>	.....Purple	.....1.750	.....0.566

## Tank Level and Draft Applications

The KING-GAGE indicators can be mounted directly to a panel, bulkhead or other rigid structural member. Depending upon the application, install these indicators in the engine room, control center or ship's bridge.

### Applications Include:

- Ship's draft measurement
- Ballast water tanks
- Fuel oil tanks
- Day tanks
- Bunker oil tanks
- Drill water tanks
- Liquid cargo tanks

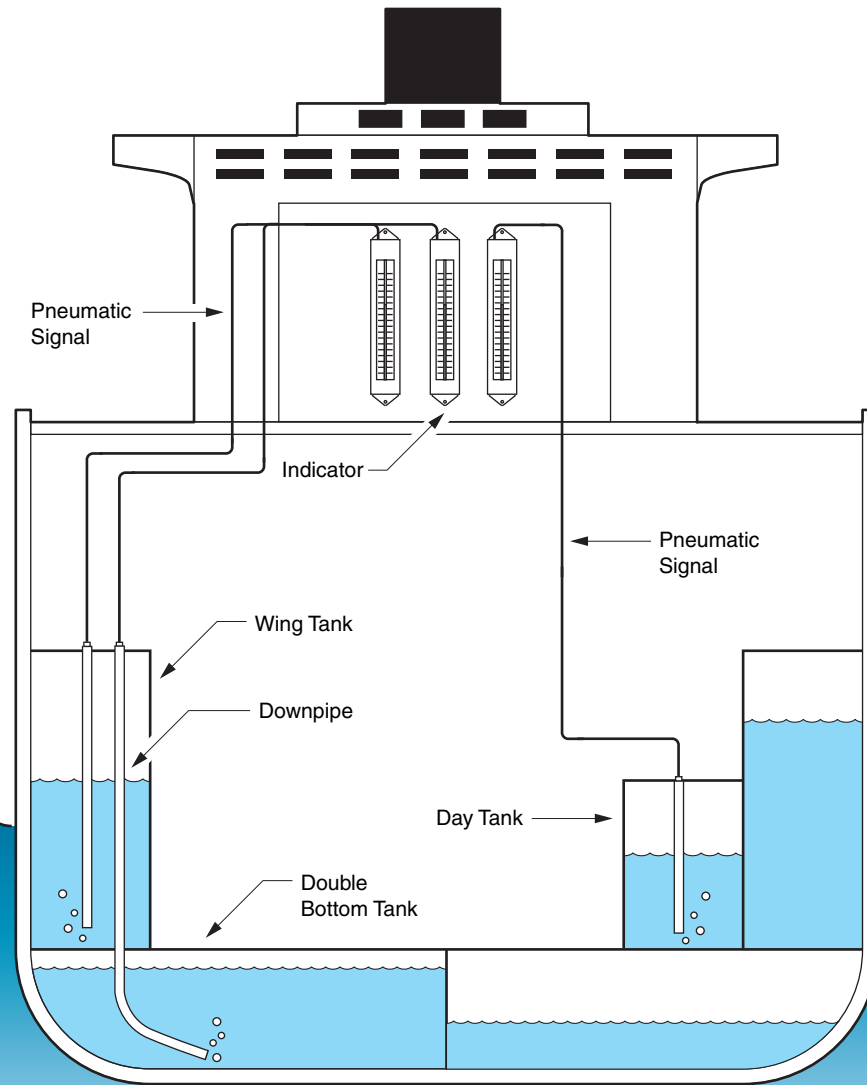


**Optional Gauge Panel Assemblies**

Multiple tank gauges can be special ordered mounted on a rigid steel panel to simplify installation.

### Typical Ballast Tank Indicating System

Purge Control supplies air to downpipe. Pneumatic pressure signal is transmitted through small bore tubing to the KING-GAGE indicator. This pressure is directly proportional to depth. The indicator displays the pressure reading against a scale corresponding to actual tank level.



### Draft Indicating System

Length of pipe penetrates hull a point below minimum water line. Purge control provides a continuous air flow to the draft pipe. Tubing (1/4-in. OD) conveys the pressure resulting from depth back to the gauge that displays draft reading.

**Model 7750 Tank Level Indicating Systems**

# KING-GAGE® Marine Systems

## KING-GAGE Marine Indicator

Single tank display surface mounts to bulkhead or other structural surface. Optional multiple gage panel assembly available on special order.

### Operating Principle

Well-type manometer acts as a frictionless hydrostatic force-balance. A liquid fill is raised in direct proportion to the magnitude of pressure applied. (Varies based on type of indicating liquid employed.)

### Resolution

Infinite based on type of indicating liquid employed.

### Input Connection(s)

1/4" NPT tapped connection for typical tube fittings.

### Materials of Construction

Formed channel indicator housing; carbon steel with durable black polyurethane textured finish. Heavy plate glass window; acrylic plastic window available as special order.

### Wetted Parts

316 stainless steel liquid well and tubing.

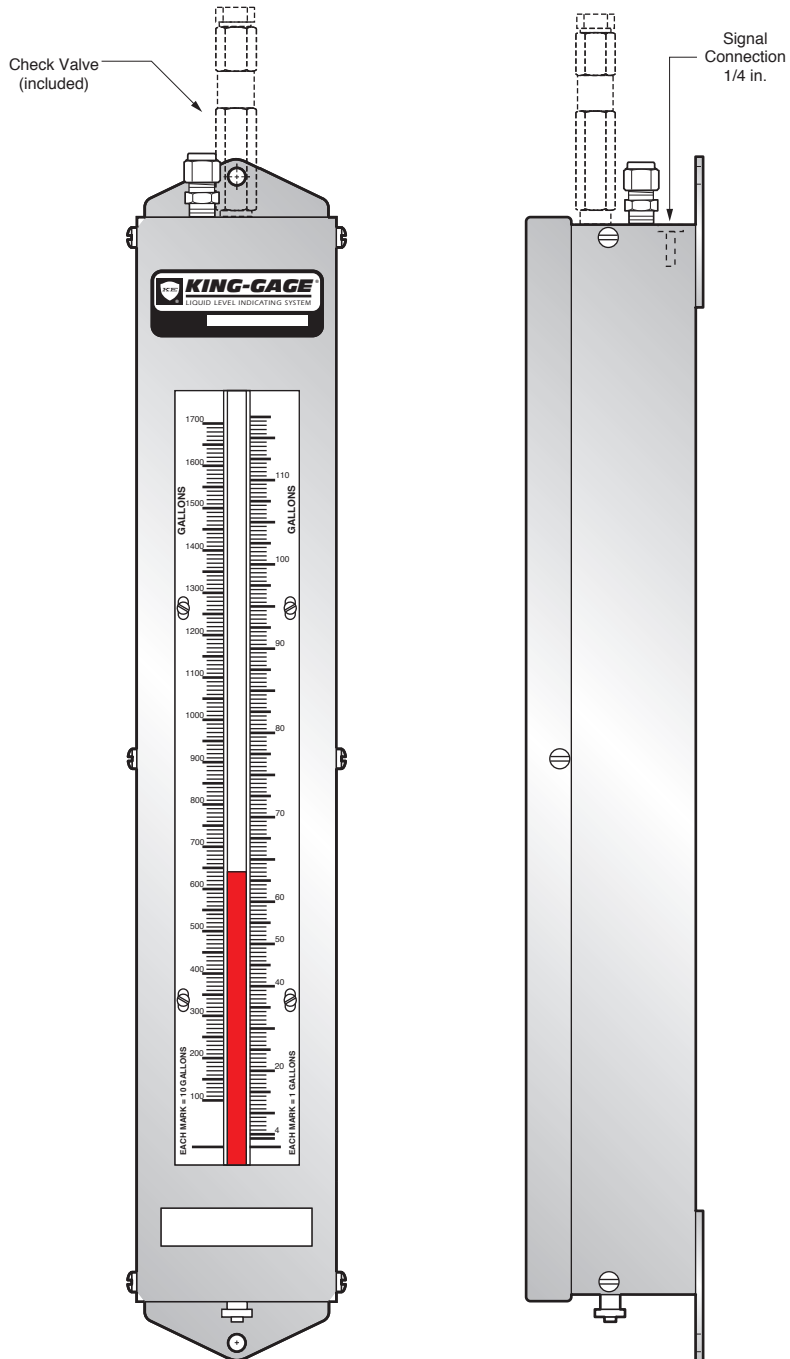
### Indicating Tube

High strength, fully annealed glass (Pyrex®)

### Range Overall

#### Dimensions (inches)

Range	Overall Dim. (H x W x D)
20	29" x 4-3/8" x 2-7/8"
35	45" x 4-3/8" x 2-7/8"
43	53" x 4-3/8" x 2-7/8"
51	61" x 4-3/8" x 2-7/8"
66	77" x 4-3/8" x 2-7/8"



Front View

Right Side View



3201 South State, Ann Arbor, Michigan 48108 U.S.A.  
PO Box 1228, Ann Arbor, Michigan 48106-1228  
Phone: 734-662-5691 • FAX: 734-662-6652



[www.king-gage.com](http://www.king-gage.com)

© KING-GAGE and the KE emblem are registered trademarks of King Engineering Corporation, Ann Arbor, Michigan U.S.A.

All specifications are subject to change without notice.  
© 2009 King Engineering Corporation, all rights reserved.