

# KING-GAGE® Marine Systems

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

## LP3™ System Tank Level & Draft Monitoring

- **Graphic 10.4" Color LCD Touch Screen Terminal**
- **8-Tank, 16-Tank, 24-Tank, 32-Tank System Options**
- **Ethernet and Serial Digital Communications Ports**
- **Monitor Service Tanks, Ballast Water and/or Draft**



### Complete level monitoring system

The new KING-GAGE® LP3 tank level system is designed for greater flexibility for marine applications. Combining data acquisition with a complete HMI display and integration solution, KING-GAGE LP3 systems are designed for use in vessel management environments to monitor multiple tanks and/or vessel draft measurement.

### Multiple Tank Configurations

These multiple tank systems are available in 8-tank, 16-tank, 24-tank and 32-tank configurations. Factory installed hardware (Vdc loop power, analog input modules) provide for virtual plug and play installation. Plus, the LP3 operating system makes it easy for your personnel to set display preferences.

The analog input module(s) provide complete processing of the transmitter signal loops (4-20mA) when used with two wire level sensors or D/P transmitters. The input module scales the transmitter signal for specific tank geometry to calculate a volumetric (or mass) measurement.

### Operator Interface HMI

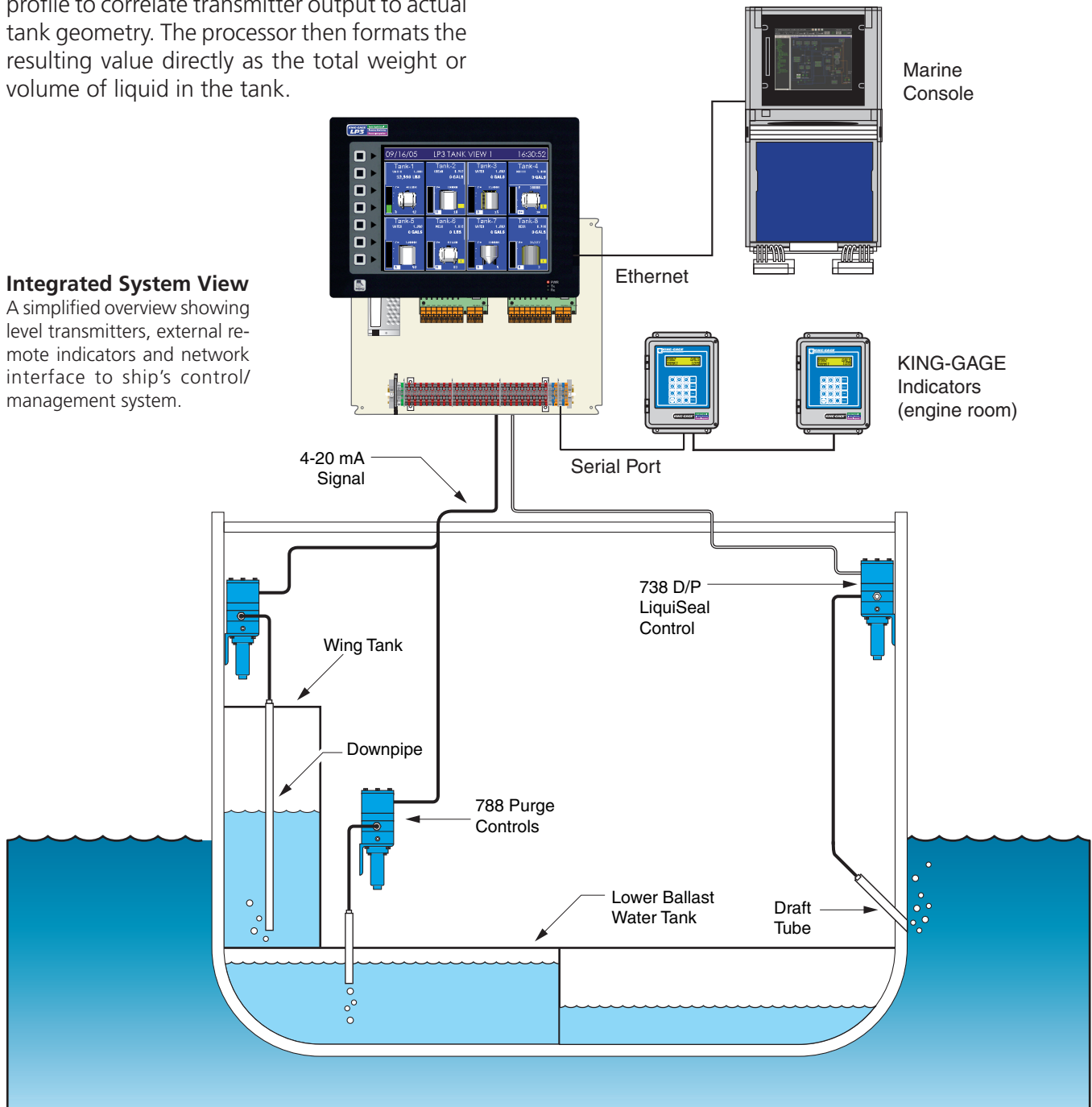
An intuitive operator display panel depicts tank levels including tank designation, content, and specific gravity. Change to the spreadsheet view for product scheduling or inventory reporting. Specific tank status details are available in a simple drill-down page for commissioning or troubleshooting. The 10.4-in TFT color touch screen display is mounted within a stainless steel enclosure or as a flush mounting remote panel.

LP3 Marine System provides continuous measurement of level in service or ballast tanks. Calculating level on the basis of hydrostatic pressure created by liquid depth, the system measures total product mass for more precise material accounting. The actual sensor used to detect hydrostatic pressure (created by liquid depth) combines pneumatic operation with an electronic pressure transmitter to convert the sensor's pneumatic signal into 4-20 mA output. The processor references a capacity profile to correlate transmitter output to actual tank geometry. The processor then formats the resulting value directly as the total weight or volume of liquid in the tank.

LP3 system software affords a high degree of accuracy and security. System display configurations are stored in FLASH memory while application data is further isolated within an iButton datapack (non-volatile RAM). The LP3 can also receive tank level data from remote KING-GAGE LP2 digital indicators via RS485 serial port. This can provide both local readout (in the engine room, for example) and result in less cabling using the two wire multidrop communications scheme.

**Integrated System View**

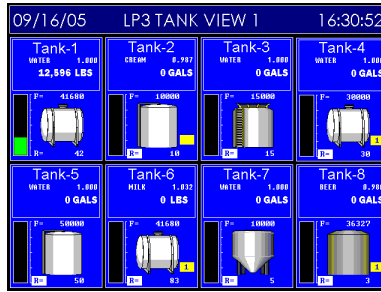
A simplified overview showing level transmitters, external remote indicators and network interface to ship's control/management system.



## Display Modes and User Menus

The LP3 system has been designed for ease of use by ship's personnel while providing a necessary level of data security. There are three (3) available levels of password access to permit local or remote administrative functions.

Network access extends the functionality of the LP3 system which is simplified due to its built-in web server. Distribute remote monitoring and/or administrative control via Ethernet using any standard computer and web browsing software (e.g., Internet Explorer, Firefox, Opera, Safari).



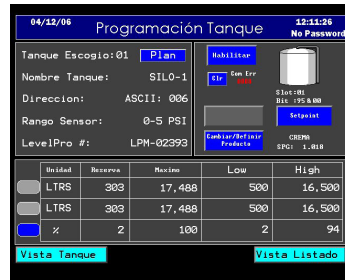
### LP3 Tank View Display

Up to 8 graphic tank representations may be displayed concurrently on each screen. (Scroll multiple display pages to view additional tanks.) A simple bar graph icon conveys tank level status at a glance, while total volumetric or mass is digitally displayed.



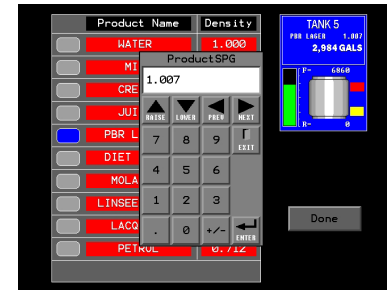
### LP3 Inventory Status Display

Simultaneously view levels for up to 24 tanks with dynamic horizontal bar graph (representing % full status). The concise listing by tank name, service designation, and current level affords quick status review especially during loading or refueling operations.



### LP3 Drill Down Detail

The color touch screen allows quick access to details including engineering units selections, tank capacity and communications status. Configuration settings are readily visible from each tank detail screen. (Access to these settings is password-protected to ensure data integrity.)



### Change/Update Density

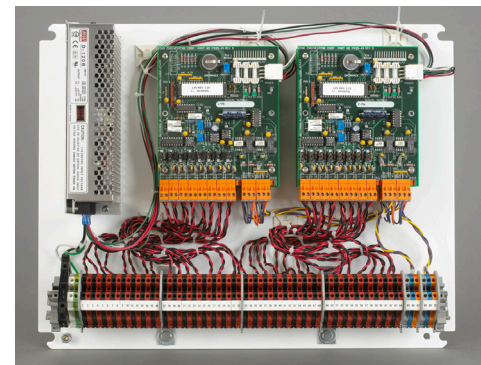
With hydrostatic based gauging, it is critical to update the system listing for the specific gravity of the tank contents. During bunker fueling, this menu allows for entry of the certified density of fuel received.

## Complete System Package

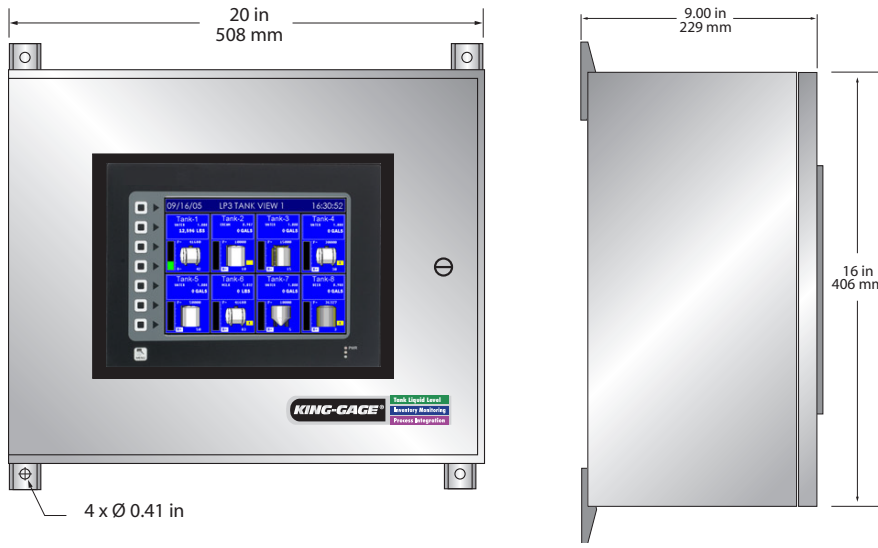
The LP3 system is a complete tank liquid level measurement solution that includes signal conditioning, data acquisition and network communications link(s). The analog input module(s) provide complete processing of the transmitter signal loops (4-20 mA) when used with hydrostatic pressure transmitters.

System power and external excitation for the signal loops, analog input modules (signal conditioning and data processing) and HMI color touch screen terminal are furnished within a NEMA rated brushed stainless steel enclosure.

*HMI is the acronym for human machine interface or more commonly, the operator interface terminal. This is the part of the system the user interacts with directly by viewing the tank displays or selecting menu options via the touch screen.*

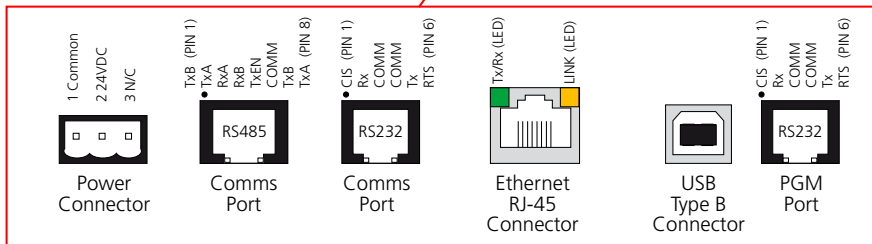
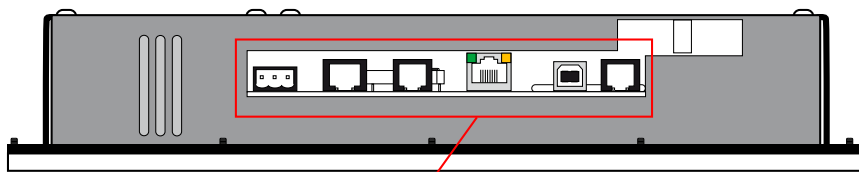


# KING-GAGE® Marine Systems



Front View

Side View



## Networking Capabilities

Take advantage of the built-in digital communications capability of the LP3 system to simplify vessel management integration. Standard configuration of the system includes Ethernet, RS485, and RS232C serial ports that can be supported simultaneously using multiple protocols. Programming can be loaded via USB and RS232C, or alternatively via the CF (Compact Flash) slot. Factory configuration files are supplied on CF memory card which also serves to provide backup of configuration modifications by the user.

Built-in web server enables HTTP access to tank monitoring data by mimicking the LP3 screen displays on any standard computer using vessel's onboard network (LAN) or remotely via an Internet connection.

## Specifications

### HMI Display Panel

Color 10.4-in. LCD, active matrix (TFT), 640 x 480 VGA (256 colors), resistive analog touch screen

### External Memory

CompactFlash Type II slot

### Network Drivers

Ethernet/IP  
Modbus TCP/IP  
Kingbus ASCII  
HTTP (built-in web server)

### Serial Ports

Ethernet 10 Base-T/100 Base-TX (RJ45)  
RS485 (RJ12)  
RS232 (RJ12)  
USB 1.1 (Type B)

### External Power Requirements

110-120 VAC, 50/60 Hz, 2.8 Amperes (internally fused at 6.3 A)

### Signal Inputs

4-20 mA, two wire (w/ 24 VDC excitation option);  
8-32 input channels

### Operating Temperature Range

0°C to 50°C (32°F to 125°F)

### Enclosure

Type 4X (UL50), IP 66, 304 stainless steel, hinged latching cover

### Standard Configurations

8-tank system; 16-tank system; 24-tank system; 32-tank system (includes HMI, analog input modules, power supply)

### Optional Configurations

Console flush mount touch screen terminal with separate enclosure for input modules and power supply (includes interconnecting cable); additional networked display terminals.



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

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