

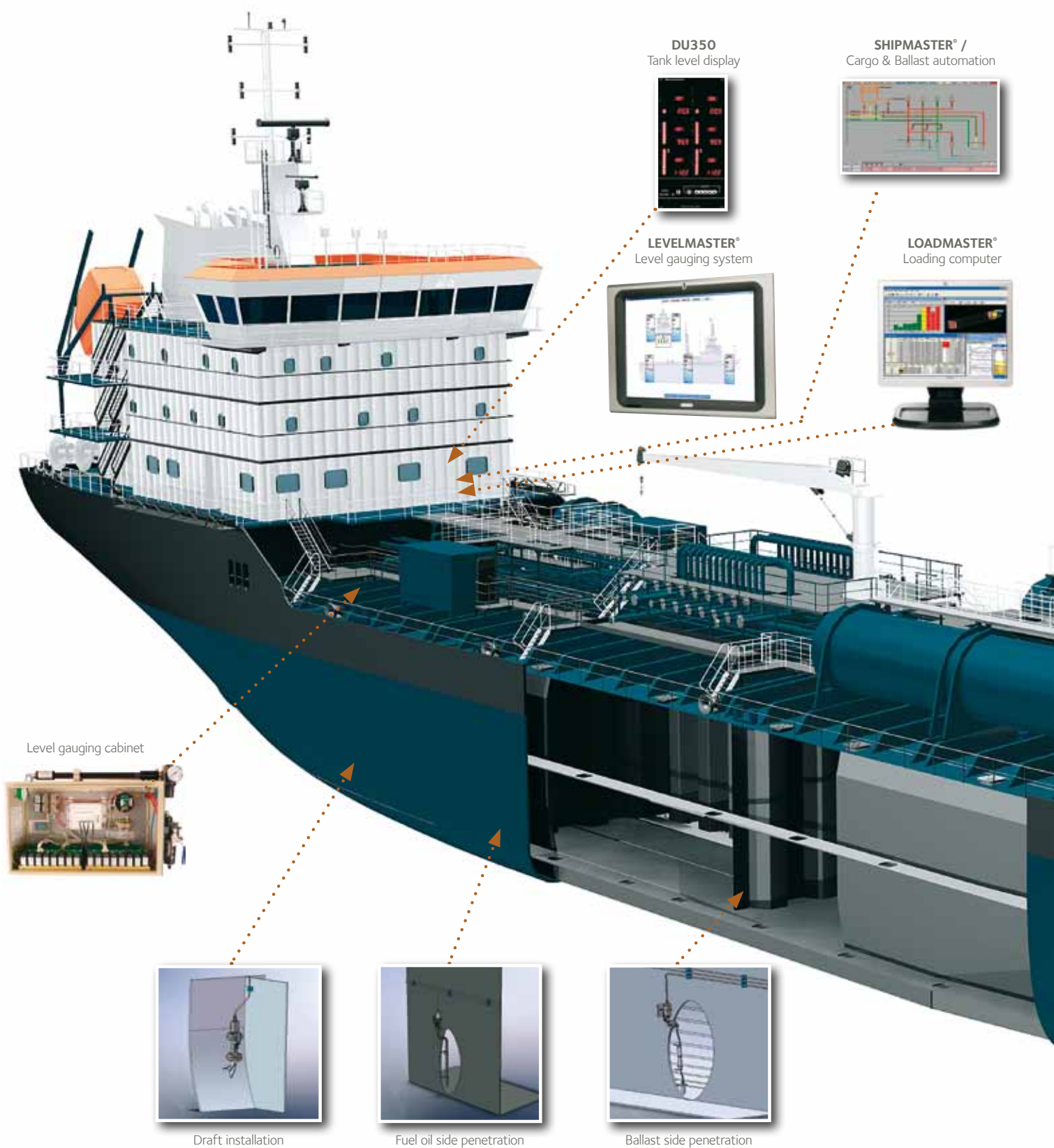
LEVELMASTER

LEVEL GAUGING SYSTEM

5

13M
9
6
4
2
12M
8
6



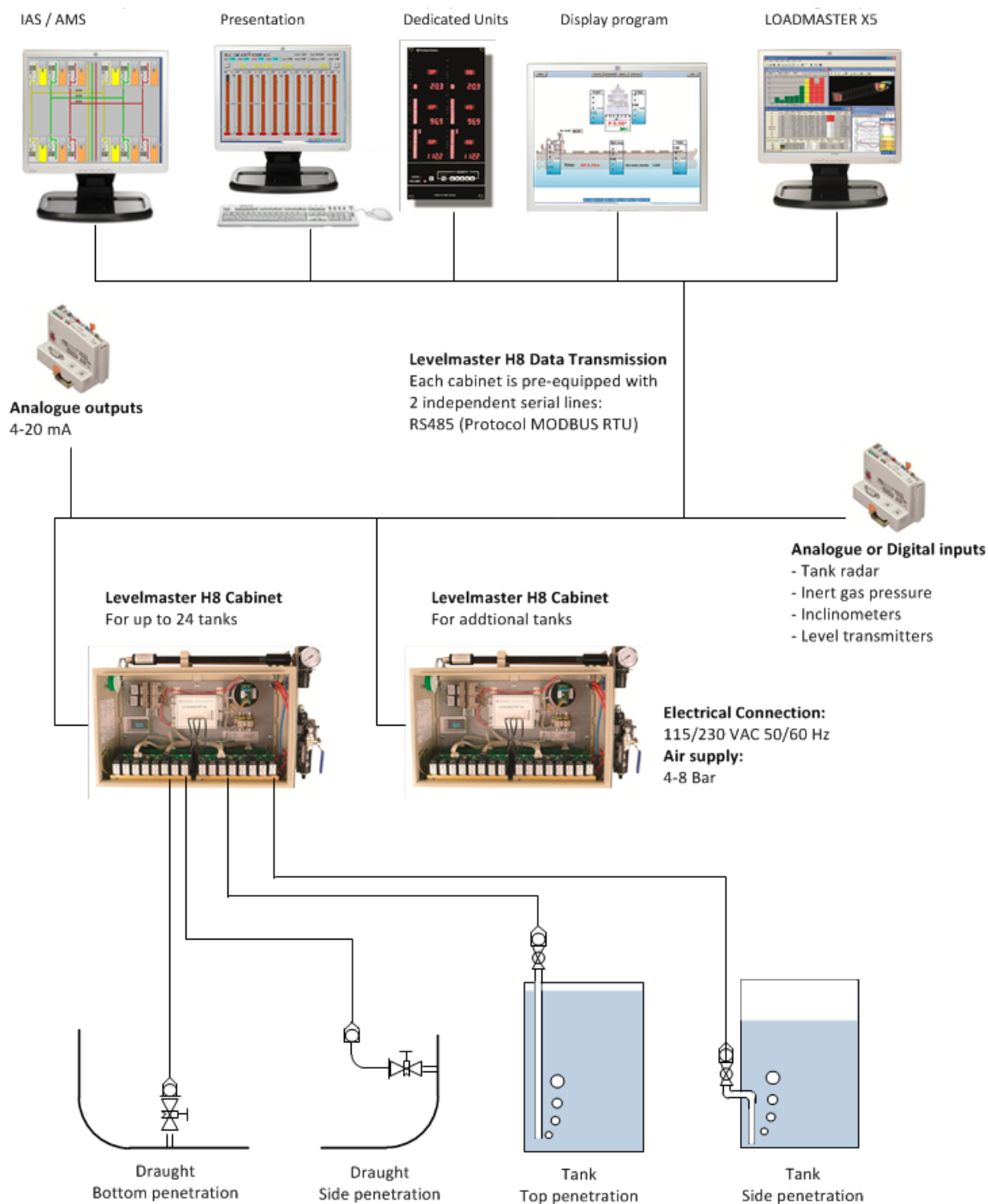


TOTAL SYSTEM FLEXIBILITY

The **LEVELMASTER®** system is very flexible. It can be equipped with small touch screens in the engine room and/or large panel PC's in the cargo control room. **LEVELMASTER®** is an advanced concept that is easily integrated to other 3rd party systems or within our own "Master-concept" including **LOADMASTER®** and the cargo and ballast system – **SHIPMASTER®**.



SYSTEM LAYOUT



ONBOARD OPERATION

NEW TECHNOLOGY

The **LEVELMASTER®** is packed with new technology and is the only system on the market with level sensing using an adaptive air pulse. The system, via a ship-specific mimic enables the crew to continuously monitor each tank's level, volume, temperature and weight whilst providing constant draught, trim and heel analysis. Such features make **LEVELMASTER®** the perfect, secure and accurate marine gauging system designed to provide:

- **High accuracy with automatic calibration**
- **Adaptive level sensing**
- **Automatic pipe purge**
- **Quick update time**
- **Low air consumption**
- **Low maintenance cost**



ADAPTIVE LEVEL SENSING

LEVELMASTER® is an intelligent sounding system that automatically scans and identifies any filling tanks providing them with more air to compensate for any tank filling speed errors that may be induced. This unique 'adaptive sensing' feature is also applied when the system detects any air leakage within the installation. Another big advantage with the H8 system is that it only measures the static pressure in the tank. When the tank is empty the reading will be 0 mm H₂O.

AUTOMATIC SYSTEM CALIBRATION AND PURGING

A key feature of **LEVELMASTER®** is that it self-calibrates and purges every 8 minutes ensuring high measurement accuracy at all times. This is opposed to traditional bubbler sounding systems with constant air-flow regulators that suffer dynamic pressure drops which must be calibrated and compensated in the software. These conventional systems require check-ups and adjustments of the air-flow regulators and pipe purging at frequent intervals to maintain accuracy. With **LEVELMASTER®** there is no need for calibration of a dynamic pressure drop or manual purge procedure!

DENSITY MEASUREMENT

Measuring the actual density of the liquid by using two sounding pipes is very useful, especially important for Fuel oil and Mud & Brine tanks, where density needs extra attention.

LEVELMASTER® UTILITY

An overview picture shows all the connected H8 cabinets with relevant status information. The user may also view all current pressure readings in raw mm H₂O format. If the user suspects that something is wrong with the piping, it is very easy to switch over a cabinet to service mode and test a connected pipe for leakage or block. All history is recorded in the **LEVELMASTER®** log. This feature is very useful during service and installation.



PRESENTATION SOFTWARE AND HARDWARE

LEVELMASTER® WORKSTATION

LEVELMASTER® workstation is our most advanced and flexible level presentation program that can be used within our own 'Master-concept' environment or as an interface to virtually any 3rd party system in use today. **LEVELMASTER®** workstation allows the user to view the full range of tank data such as volume, level, flow, level rate, temperature, IG pressure and full trim and heel correction. Additionally the interface can be tailor-made as required and provides for full on-screen sensor calibration.



LEVELMASTER® PANEL PC

The panel PC easily replaces dial type gauges. It can display an unlimited number of tanks and adds functionality such as adjustable alarm limits and density input. The panel PC easily integrates into a cargo control room console or engine room control console. The program is easy to operate by touch screen or mouse/keyboard. The panel PC comes in ranges from 8" up to 19" with many different mounting options like console mount, wall mount etc. Type approved panel PC for bridge mounting is also available.



DEDICATED DISPLAY UNITS

DU350

The DU350 is available in two versions for either Tank or Draught presentation. The Tank version provides level in units or percentage, four alarm limits (L/LL/H/HH) and as an option volume read-out. The Draught version can calculate and display readings at (fwd/aft/mid-port/mid-stbd) plus provide trim and heel values. Manual density adjustment is available for both types.



DEDICATED DISPLAY UNITS

WIM (WATER INGRESS MONITORING)

The WIM panel is a type approved (SOLAS XII/12) alarm annunciation panel providing all required features based upon alarm generation at pre and main alarm levels. The cabinet enclosed module is also equipped with a serial port for communication of alarm events to the vessel VDR.



H8 UTILITY PRESENTATION

The H8 utility software is distributed free with the **LEVELMASTER®** H8 hardware and in addition being a valuable service and maintenance tool it can also be used for basic tank level and draught presentation on a local laptop. The user simply enters pipe offset and density values to provide an auxiliary back-up.



SINGLE TANK DISPLAY

Single tank display units for remote display of tanks or draught when a full presentation is not needed.



PRESSURE GAUGE

It is possible to utilize individual 'manometer' style gauges one for each tank to provide a simple scaled indication of pressure wherever this may be required onboard.



ANALOGUE OUTPUT

The **LEVELMASTER®** system can convert readings to analogue outputs if required especially for retrofit systems where older style level indication equipment is being replaced.



WEB BROWSER

WPF and Silverlight are .NET technologies with WPF being used for desktop and browser programs. Silverlight as a subset of WPF is used for browser based clients where only a basic level of software is required to run the application. The web interface provides a flexible and secure feature to remotely view the tank level and draught status.



➤ TANK AND DRAUGHT APPLICATIONS

Kockum Sonics has over an extensive period of time built up a broad level of hands-on experience and consequent knowledge base relating to tank and draught gauging. Today we have all of the necessary components and solutions to meet just about any level gauging need.

BALLAST, BUNKER, MISC TANKS (LEVEL GAUGING)

Installation of the sounding tube is simple and in accordance with our comprehensive drawings. Penetrations can be through the tank top or side plate depending upon which scheme offers greater practicality.

POTABLE WATER TANKS (LEVEL GAUGING)

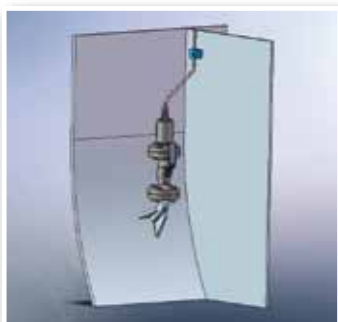
As Class regulations currently prohibit the entry of technical air into drinking water these tanks are sounded using an externally mounted DN20 pressure repeater diaphragm arrangement at the lowest point of the tank. An alternative solution is to use an in-line air filter in accordance with food grade microbial standards allowing the tank to be penetrated at the top if side access is impractical.

MUD/BRINE TANKS (TANK LEVEL AND DENSITY GAUGING)

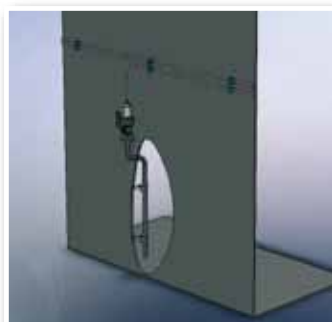
For tanks containing variable density products it is possible by the use of two sounding lines at a known split interval to gauge both the level and the density in a very cost effective and reliable way.

RAUGHT GAUGING (DRAUGHT AND TRIM/HEEL MEASUREMENTS)

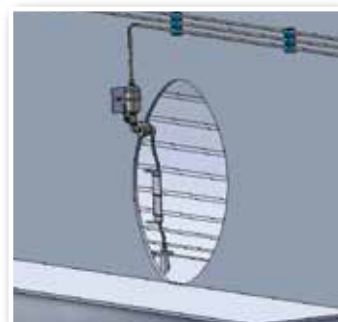
A high accuracy of measurements, makes **LEVELMASTER®** well suited for draught sensing. Our presentation also gives you direct response for changes in trim and heel with a very high resolution. For safe passage under bridges, the air draft for the highest point of the vessel will also be indicated on the screen. Using double pipes mid ships, the average sea water density between two vertical points can also be measured automatically.



Draft installation



Fuel oil side penetration



Ballast side penetration

INSTALLATION COMPONENTS

NON RETURN VALVE (WATER INGRESS MONITORING)

We strongly recommend the inclusion of the non-return and isolation valve arrangement for a number of reasons. They prevent ingress into the sounding line during a period of air inactivity such as service, shut down or damage to the pipe thus ensuring the electronics in the cabinet are kept dry. Such kits are available for both top and side plate entry.



PRESSURE REPEATER COMPLETE WITH ISOLATION VALVE

To prevent air ingressed into the fresh water tanks pressure repeaters shall be used. The pressure repeater is available as a stand alone unit for mounting on a flanged DN20 ball valve, or as a complete unit mounted on a ball valve.



DRAUGHT VALVE COMPLETE WITH NON RETURN VALVE

Draught valve in stainless steel (DN20 flanged) type approved by all major classification societies.



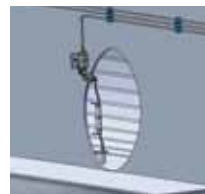
CABINET

The **LEVELMASTER® H8** system is delivered as one or several compact and easily mounted cabinets. The cabinet's house protect all electrical components and have connections available for all sounding lines. Incoming technical air is filtered for oil and water through the integrated air preparation system.



ADDITIONAL INSTALLATION COMPONENTS

Through our extensive experience Kockum Sonics can supply the complete scope of installation components. Sounding lines are available in stainless steel, copper or durable flexible polyamide according to the user's choice and appropriate piping rules. We can also supply tank penetrations, end pieces with brackets, compression fittings and push fit connectors as required.



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