

# LEVELMASTER<sup>®</sup> H8

Electro pneumatic level and draught gauging



## General Information

The new generation of Levelmaster is named H8 and is the successor of the well-known CALM system. Level gauging using the electro-pneumatic principle, so called 'bubble measuring', has always been known as a very robust and reliable method.

Kockum Sonics now release its fourth generation of the electro-pneumatic system concept. We have combined the latest and best sensors and microprocessors in order to produce an electro-pneumatic system that combines low cost and very high performance.

The heart of the system is the integrated sensor and control unit (SCU). It takes care of all data acquisition, calibration, control and transmission. The SCU is developed by Kockum Sonics and tailor made to suit electro-pneumatic tank and draught gauging. Each pressure sensor has been calibrated for non-linearity and temperature shift in order to provide optimal performance. While in operation the system auto calibrates at pre set intervals, which maintains the system accuracy. The SCU is adaptive and precisely adjusts the needed air output for each tank.

The system is designed to:

- Simplify operation
- Increase accuracy
- Reduce investment costs
- Reduce maintenance costs

## Features and Benefits:

The new Levelmaster H8 is packed with new and improved technology. First of all the system is fully modularised making for very easy service. Secondly the new Levelmaster H8 software driver makes integration with other systems easy and straightforward. All collected data can be made available over a standard TCP/IP network. The software driver is also used to monitor the status of the system. Diagnostics can be run from any connected computer with the driver installed.

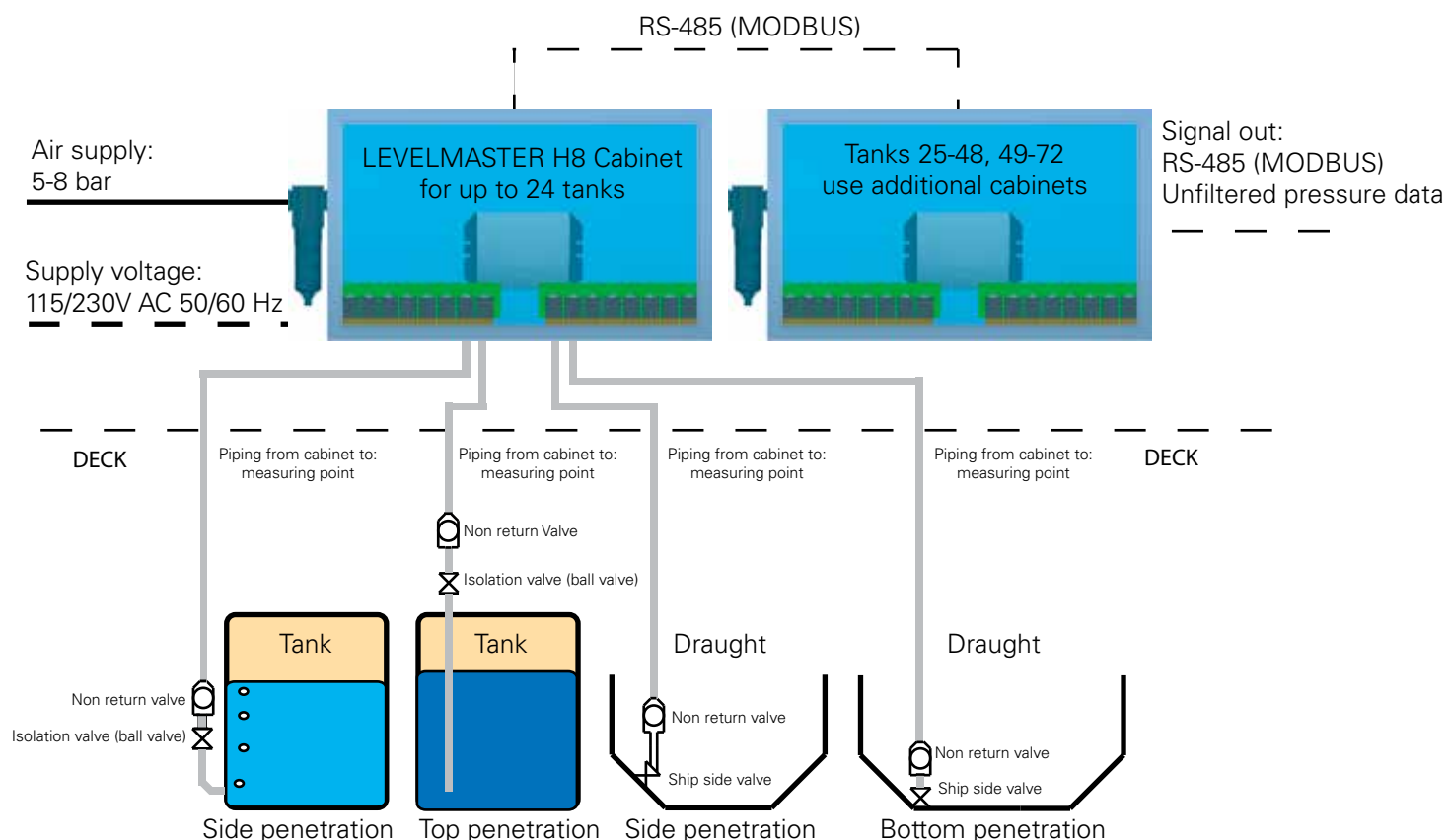
- High accuracy with automatic system calibration
- Adaptive level sensing
- Automatic purge
- High update speed
- Low air consumption
- No electrical parts in EX zone
- Small dimensions
- Low investment cost
- Easy installation
- Maintenance free

## Parts and Components:

### LEVELMASTER H8 cabinet

The Levelmaster H8 system will be delivered with all components mounted in a powder coated steel cabinet. Ready for connection to the main air supply, electric power and to the piping for the individual tanks or draughts.

# System Layout



## Measuring principle

The Levelmaster H8 system uses the electro pneumatic principle. This is a well proven and reliable method, it keeps the installation as well as the maintenance costs down. To obtain a higher cost efficiency, the system is designed in such a way that each pressure transmitter (needed for measuring of the hydrostatical pressure) is engaged for a number of tanks. One pressure transmitter can handle up to six tanks. A Digital Flow Controller adjusts the airflow by varying the main valve's duty cycle

## Calibrated and ready to go

For optimal performance each Sensor and Control Unit (SCU) is factory calibrated for nonlinearity and temperature shift. In addition to the precalibration the system auto calibrates while in operation in order to maintain its accuracy throughout its life cycle.

## Output

Tank level (pressure) data is available on two serial outputs RS-485 or optionally analogue outputs 4 - 20 mA.

## The following items are included:

The system is delivered with all components mounted in a powder coated steel cabinet (stainless steel optional). Up to 24 measuring points per cabinet;

- Cabinet in powder coated steel (stainless steel optional)
- Sensor and Control Unit, SCU
- Digital Flow Controller
- Valve Block and Internal piping
- Main Pressure Regulator with filter and auto drain
- Serial communication, 2x RS485
- Analogue input modules (optional)
- Analogue output modules (optional)
- Membrane air dryer (optional)

# Features and Benefits

## Adaptive Level Sensing

Levelmaster H8 is an intelligent system. It automatically senses and compares measured levels making the system adaptive. When the level in the tank increases, more air is given in order to ensure that the tank filling speed does not have an effect on the measurement.

## Automatic Leakage Detection

If the ship pipes to the tanks are not completely air tight, the Levelmaster H8 system will detect the leaks. At small leaks the system reacts by purging the tank with longer intervals in order to minimise the effect on the measurement. The error will be negligible. In addition, a warning signal is given.

## Automatic System Calibration

One very important feature of the system is the automatic system calibration. It dramatically improves the accuracy of the measurement. The complete system is calibrated every 10 minutes.

## Automatic System Purging (Cleaning)

Levelmaster H8 system automatically purges the pipes at preset intervals in order to keep them clean.

## LEVELMASTER H8 Software Driver

As an alternative, one of the RS-485 serial communication ports can be connected to a computer equipped with the LEVELMASTER H8 driver. The driver can re-transmit the data over a standard TCP/IP network making the level and draught data available on the ships network. Each and every measuring point can be examined for status.

## LEVELMASTER H8 Diagnostics

The status of the system can be monitored and checked by an application called LEVELMASTER Diagnostics (as a part of the software driver). Simply connect a computer to the USB port on the SCU and launch the application. The SCU (sensor and control unit) is equipped with LED's to give a quick overview of the system status.

## Density Measurement (optional)

Measuring of the liquids actual density by using two sounding pipes where the distance between the outlets is known and constant.

# Installation Components

## Non return valve

In order to increase the safety of the system it is strongly recommended that a non-return valve is installed as close to the tank as possible. The non-return valve, with very low pressure drop, is especially developed by Kockum Sonics for electro pneumatic level gauging. The non-return valve prevents the fluid in the tank from migrating in to the piping between the Levelmaster H8 cabinet and the sensing point if the cabinet should be turned off. (See the system layout on the opposite page.)

## Isolation valve (ball valve)

Kockum Sonics recommends that a isolation valve is installed close to the tank, making it easy to test the piping between the cabinet and the sensing point for air tightness. In the case of installing a sensing point in a tank with a side penetration, an isolation valve is necessary in order to make troubleshooting or service feasible without emptying the tank. (See system layout on the opposite page.)

## Piping from cabinet to sensing point

Kockum Sonics has gained broad experience in installing air pipes from the Levelmaster H8 cabinet to the sensing points in the tanks. We can provide solutions in stainless steel, copper or plastic piping. If this is of interest, please contact Kockum Sonics and we will provide you with a complete solution.



# Technical Data



## LEVELMASTER H8 Cabinet

### Dimensions (cabinet)

without Air Conditioning Package 300 x 500 x 230 mm (H x W x D)  
 with Air Conditioning Package 300 x 582 x 230 mm (H x W x D)  
 Weight 26 Kg  
 Enclosure IP 54

Power supply 115 / 230V 50 / 60Hz AC  
 (optional 24V DC, max 36 VA)

Air Supply: 5 – 8 bar dry and clean instrument air

### Environmental conditions

Temperature: -20°C to +70°C (Transport and storage)  
 0°C to +55°C Operating

### Pressure Sensors

Number of sensors 4 Gauge / differential  
 Pressure range 4 bar

### System performance

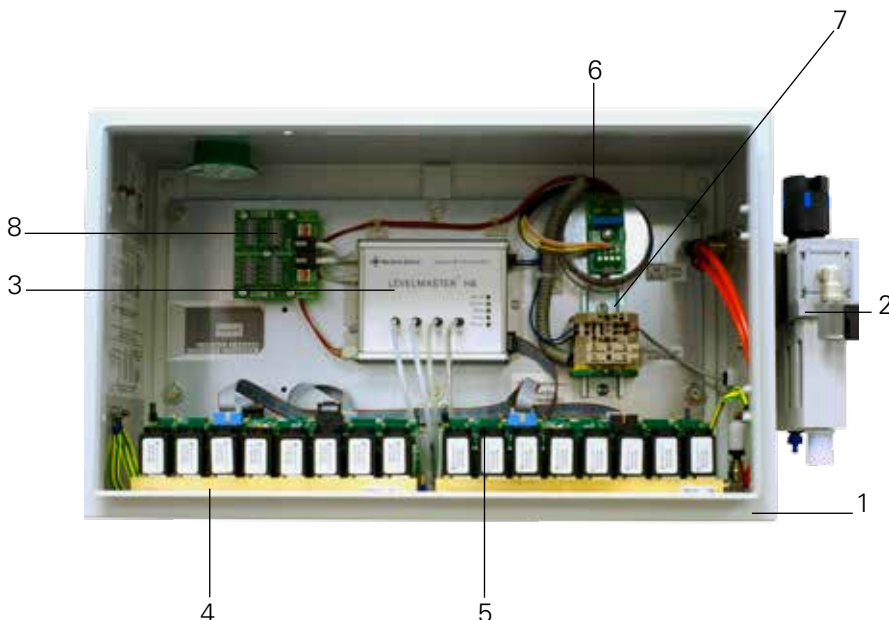
Max tank height 0-32m water column (standard), other range optional  
 Measurement points Max 24 per cabinet  
 Typical accuracy +/- 1.5 cm  
 Max total system error +/- 0.15 %FS +15°C to +45°C  
 +/- 0.25 %FS 0°C to +55°C  
 Updating time: 7 seconds  
 Analogue outputs (optional 24 x 4 – 20 mA)

### Serial communication

Com1 RS-485, MODBUS RTU protocol or ASCII  
 Com2 RS-485, MODBUS RTU protocol or ASCII  
 USB Service port for connection with laptop. Shared with COM1.  
 When a unit is connected to the USB port, it will disable the RS-485 interface on Com1.

## Module based system for easy service

Kockum Sonics had easy maintenance and service in mind when developing the Levelmaster H8 system. The system comprises of a total of five active modules. Each of them are easily dismantled and replaced if necessary. See below:



Item	Description
1	Cabinet
2	Air treatment unit
3	SCU (Sensor & control unit)
4	Valve block
5	Valve card
6	Power supply
7	Power terminal
8	Communication terminal

Subject to alteration without notice.