



8in1

Technical Manual

Gauging Solution for Barges Technical Manual

8in1

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INTRODUCTION

This manual is issued specifically for the Barge system. It contains instructions detailed for functioning and operation of this system.



To use it in an optimal way, we advise you **TO READ CAREFULLY THESE INSTRUCTIONS** and to respect them throughout the life of the equipment.

Keep this manual to hand so that you can refer to it at any time. Ensure that it is complete and kept close to the equipment.

The Alarm Cabinet, OPTILEVEL probe, PL3700 pressure transmitter, LIDEC level switch are integrated in the system for processing the barges/inland vessels liquid cargo. This system is intended for professional use, it must be used by operators who are qualified and well-versed in the operating rules and safety instructions set out in this manual.

We also draw your attention to the fact that the connection of equipments or the use of products other than those recommended by **Honeywell Marine** may present risks for which we will not be liable.

This manual must not be reproduced in any form whatsoever without the prior written approval of **Honeywell Marine** who cannot be held responsible for any use of the information contained in this manual.



As we want you to take advantage of the most of the latest technology and new equipment, as well as to benefit from our experience, our equipments may undergo technical or design changes. As a result, some of the features and information in this manual may change without prior notice and without any obligation to up-date it.



Pictures of this document are not contractual.

Should you encounter any problems or have any questions about this Barge system, please do not hesitate to contact your nearest **Honeywell Marine** customer service.

Other documents

-  The description and operation of the OPTILEVEL probe and Supply are described in the MT5025E technical manual.
-  The description and operation of the LIDEC level switch is described in the NT406 technical manual.



SAFETY PRECAUTIONS:

Current regulations and legislation applicable to hazardous areas must imperatively be known and followed by personnel responsible for commissioning and operating intrinsically safe equipment.

Take care to switch the power off before proceeding to any disconnection or removal of the transmitters.

**Warning:**

Our equipments are designed and manufactured in accordance with local safety regulations, and in particular European directives relative to reconciling member states' legislation:

- 89/336/EEC and 2004/108/EC "Electromagnetic compatibility",
- ATEX 94/9/EC "Equipment and protective systems intended for use in potentially explosive atmospheres",
- 96/98/EC "Marine equipment".

The OPTILEVEL HLS 6010 / OPTILEVEL Supply, PL3700 pressure transmitter, LIDEC level switch and associated transmitters are certified for use in hazardous area according to the intrinsic safety protection type.

They are intended for professional use and must be installed, used and maintained by competent staffs that are qualified in this type of equipment.

In particular we wish to draw your attention to the fact that we cannot be held responsible if:

- Any technical alterations are made to our appliances without our written authorization,
- Our equipments are damaged by being operated in conditions other than the intended usage of their technical classification (power supply, temperature, environment, etc.).

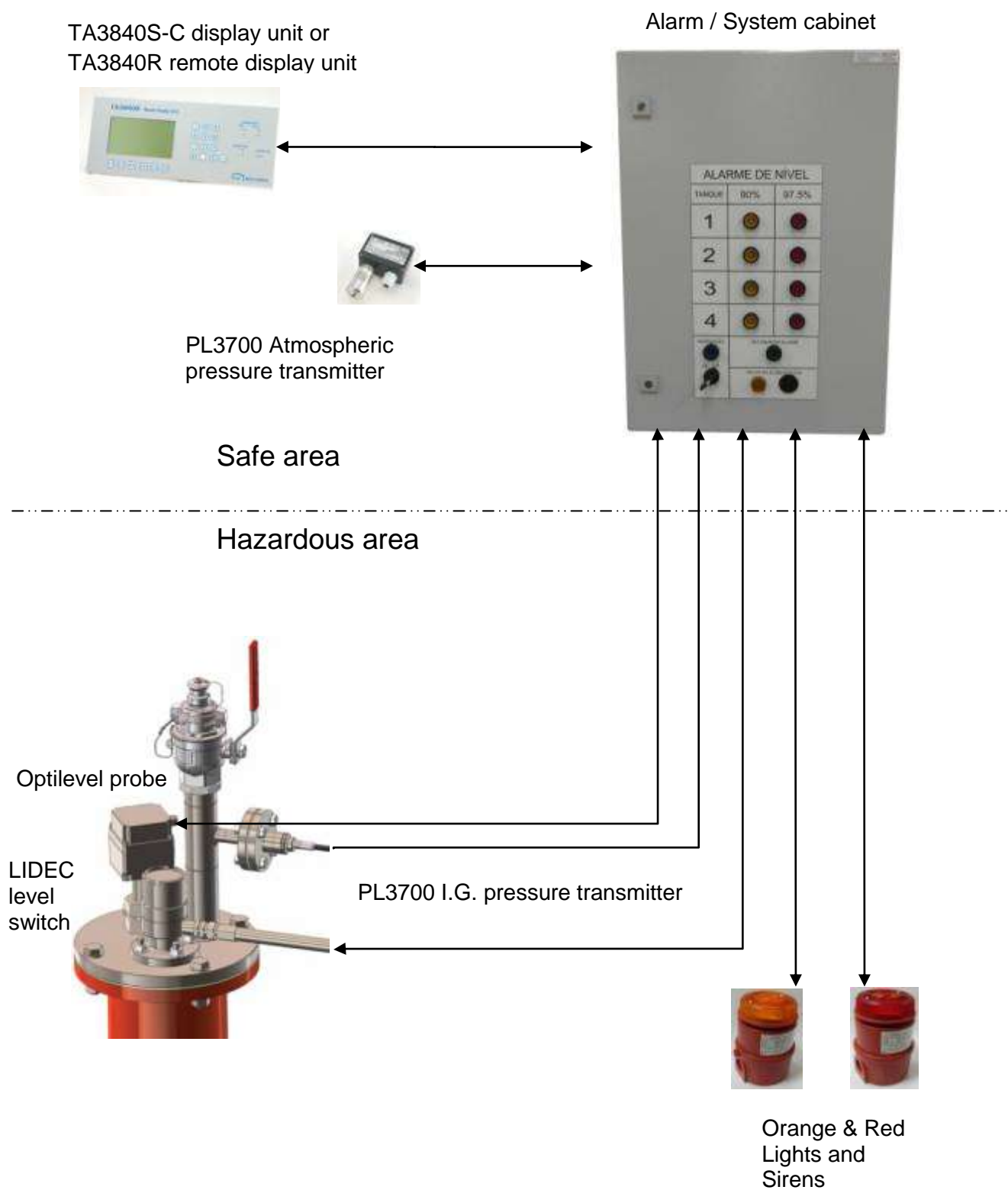
The safety instructions given in this manual are merely given for guidance purposes to protect you and all those using and working on our equipments. **Honeywell Marine** cannot foresee all dangerous situations that might arise. This is why the owner and/or the operator is responsible for the operating safety of the system.

Regulations of the ship classification society may impose procedures (health and safety, fire prevention, handling of hazardous substances, etc.) which are stricter than those given in this manual. In this case, the regulations must be followed.

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1. GENERAL DESCRIPTION



2. SYSTEM DESCRIPTION

The system is composed of Optilevel probes measuring level, temperature and oil/water interface, PL3700 I.G. pressure transmitters (for inert gas pressure measurement), PL3700 Atmospheric pressure transmitter, LIDEC L92 level switch (for High and Overfill level alarms), Valve to connect UTI meter (for manual sounding and sampling), a cabinet, Orange and Red Light/Siren and TA3840S-C display (or TA3840R remote display).

The cabinet concentrates:

- TA3840S-C control & display unit (in option)
- I/O signals for LIDEC L92B (High and Overfill alarms) with zener barrier
- Independent alarm central units with alarm sequence for High and Overfill levels
- Optilevel Supply unit (to supply Optilevel probes in hazardous area)
- High and Overfill Light and Siren outputs with zener barrier (relay outputs in option)
- 4-20mA inputs for I.G. pressure transmitters with zener barrier (for hazardous area)
- 4-20mA input for atmospheric pressure transmitter
- 4-20mA inputs for Trim / Heel inclinometer (in option)
- 4-20mA inputs for Draft measurements (in option)

The 8" flange is supporting:

- Optilevel probe
- PL3700 I.G. pressure sensor
- LIDEC L92 double level switch
- 2" valve for manual gauging and sampling.

The shipyards then benefits from a single solution for all cargo control needs ; Two level alarms, Inert Gas pressure, level, temperature, oil/water interface, manual gauging, sampling. This needs only one 8" hole in the tank.

The manual gauging allows closed gauging and sampling operations for inspection and custody transfer - refer to the Tanksystem documentation for more information.

The TA3840S-C control & display unit reads and processes data from Optilevel probes, I.G. pressure transmitters and Atmospheric pressure transmitter.

This TA3840S-C unit is inside the cabinet (with TA3840R remote display in option) or on a console.

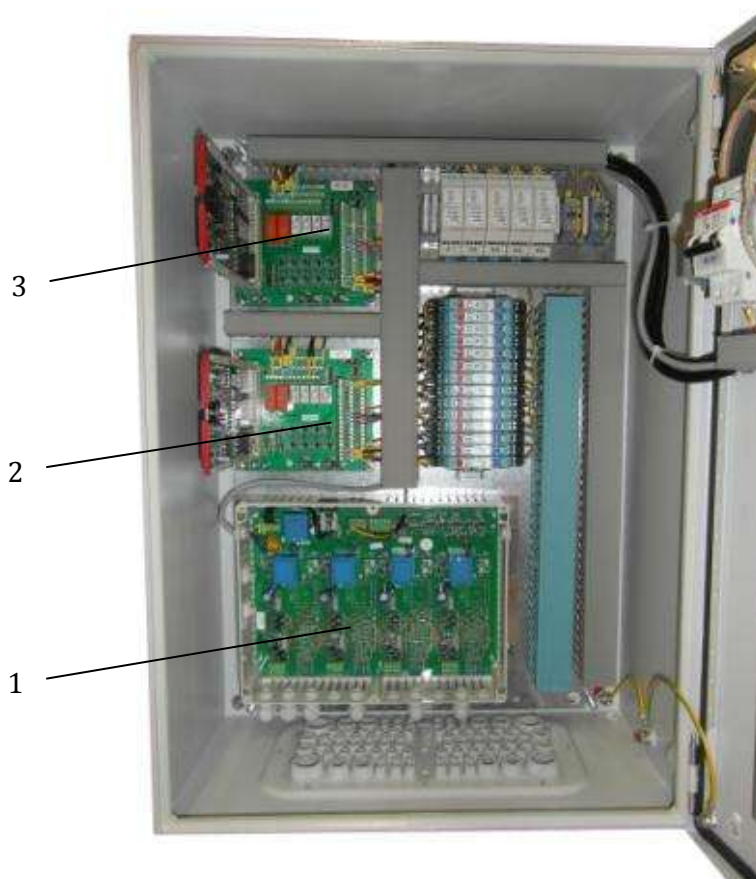
2.1 Alarm / System cabinet

This cabinet is designed for barge and inland tanker and includes the 2 mains systems:

- Cargo Tank (Level, Temperature, I.G. pressure and oil/water interface measurement)
- Cargo Tank Alarm (High and Overfill level)

The cabinet is powered by 24Vdc coming from the barge (other supplied voltage can be applied as option).

A 24Vdc/230Vac converter delivers the 230Vac voltage for the entire system.



Cargo Tank System measurement:

The Optilevel supply (*Item 1*) is supplying the Optilevel probes from Safe area to Hazardous area (ATEX and IECEx approved). It can supply up to 8 probes. If there is more tanks onboard vessel/Barge, several Optilevel supplies can be assembled in parallel.

The digital signals coming from the Optilevel probes are converted from RS232 to RS485 on the HLA main board and the values are processed by the TA3840S-C control & display unit.

This TA3840S-C can be mounted on the front panel of the cabinet or on a console.

In addition, a TA3840R (display repeater) can be connected to the TA3840S-C if more than 1 display is required.

See cabinet drawing for detail wiring and customer connections.

Cargo Tank Alarm (High Level and Overfill):

High Level Alarm (HLA) and Overfill Alarm (OFA) are completely independent to fulfill marine requirements.

Each main electronic board (*Item 2 and item 3*) is supplied by 230Vac/24Vdc and 230Vac/5Vdc power supplies.

Up to 10 LIDEC Level switches can be connected to this main board. The alarm sequence is as follow:

- 1st alarm on: starting buzzer, klaxon/Light, low flashing on alarm light
- Klaxon/Light acknowledgement: stop buzzer, klaxon/Light, alarm light on.
- 2nd alarm on: low flashing on alarm light
- 3rd alarm on: fast flashing on alarm light
- Klaxon/Light acknowledgement: stop buzzer, klaxon/Light, all alarm light on.
- 1st or 2nd or 3rd alarm off: alarm light off

If during Klaxon/Light acknowledgement one alarm is off, alarm light will be off.

A Loading/Navigation switch inhibits all alarms in navigation mode to prevent false alarm. A blue light is on in navigation mode.

2.2 TA3840S-C control & display unit



The TA3840S-C Communication Unit questions successively the digital transmitters (Optilevel probe), receives the measurements from the analog transmitters (4-20 mA) and on/off sensors, displays the processed data, transmits these data on a serial port, monitors system and data alarms, and manage on/off outputs. The TA3840S-C provides also some maintenance functions.

The TA3840S-C communication unit performs the following functions:

- Collection of the raw measurements from:
 - The Optilevel probe connected to the Optilevel Supply (in the cabinet). Each Optilevel concentrates measurements of level, temperature and water interface.
 - The analog 4-20 mA transmitters from PL3700 I.G. pressure transmitters, PL3700 Atmospheric pressure transmitter, Trim/Heel inclinometer (in option), Drafts (in option),
 - The on/off transmitters (in option),
- Measurement scaling and processing,
- Communication and data validity control, monitoring a "System Fault" alarm sequence,
- Final data display on a LCD screen,
- Final data control by two alarm limits per channel monitoring a "data alarm" sequence,
- Data transmission on one serial link toward a monitoring system, loading software, the TA3840R remote display unit, other special applications including the utilities software. The communications use the MODBUS RTU protocol,
- On/off outputs management,
- Data transmission on LOG3840 deck indicator (in Option),

The TA3840S-C communication unit is installed in a console. The front panel includes:

- A LCD screen for data and alarms display,
- Status lamps,
- A keypad menu for function selection,
- A numeric keypad for configuration and maintenance parameters key in.

The use of the keypads is intuitive and does not require a specific training.

The large LCD screen increases the data availability and the man-machine interface is simplified for easy access to functions and configuration using scrolling menus.

For more detail, see MT5008E Technical manual

2.3 Optilevel HLS 6010 probe



The probe consists of the head housing with the electronics, a screw thread to fasten it to the tank and the measuring tube. The measuring tube varies in length depending on the tank diameter. It is ATEX/IECEX approved (Ex ia IIB T4 Ga/Gb)

The probe measures the level, the temperature and the water at the bottom (if any from 0 to 250mm).

It is supplied by the Optilevel Supply module ATEX/IECEX approved ([Ex ia Ga]).

The OPTILEVEL HLS 6010 probe is already Type Approved by all major Classification Societies.

For more detail, see MT5025E Technical manual

2.4 LIDEC L92 level switch



The operating principle is based on absorption of portion of the "mechanical" waves inside the probe (sensible part in contact with the liquid), generated and detected by piezo-electric- sensing element.

The LIDEC detector is already Type Approved by all major Classification Societies.

The LIDEC L92 integrates 2 independents probes and electronics to fulfill marine requirement. It is ATEX/IECEX approved (Ex ia IIB T4, T5, T6 Ga)

For more detail, see MT5003E Technical manual

2.5 PL3700 pressure transmitter

The PL 3700 series is a 2-wires 4-20 mA level and pressure transmitter consisting of a transducer and an amplifier connected via a 3-core shielded / vented cable.

The transducer is fully welded and it is submersible (IP68), housed in stainless steel AISI 316L or composite material for PL3700 C model, using a capacitive Ceramic diaphragm.

The amplifier is housed inside sea water-resistant polyester casing (IP 66) which can be installed inside area protected against wave effect damage, or inside sea water-resistant stainless steel AISI 316L casing (IP66/67) with adapting flexible pipe in stainless steel which can be installed on deck.

The PL 3700 can be manufactured with different programmable ranges for level and pressure application, absolute or gauge type.

The PL 3700's transducer can be immersed and mounted inside tank using adapted bracket or on side mounting using adapted flange.

2.5.1 PL3700 I.G. pressure transmitter



The PL 3700 I.G. is especially design for inert gas pressure measurement.

It measures absolute value from 800 mbar up to 2000 mbar and is compensated by the PL3700 Atmospheric pressure transmitter.

Absolute pressure transmitters are used (instead of gauge pressure transmitter) to avoid any water ingress due to vent pipe needed for gauge pressure transmitter.

It is ATEX/IECEx approved (Ex ia IIB T6 Ga)

For more detail, see NT5090E Technical manual

2.5.2 PL3700 atmospheric pressure transmitter



The PL 3700 Atmo is especially design to measure atmospheric pressure from 900 mbar up to 1100 mbar and it compensates the PL3700 I.G. pressure transmitters.

It is ATEX/IECEx approved (Ex ia IIB T6 Ga)

For more detail, see NT5090E Technical manual

2.6 HERMetric UTImeter (optional)



The HERMetric UTImeter Gtex is a portable gas tight liquid level gauge designed for closed gauging of hydrocarbons and chemicals. These units are used for custody transfer, inventory control measurement and free water detection on barges, marine vessels and shore tanks. The HERMetric UTImeter has to be connected to a HERMetric vapour control valve fixed on the 8" flange.

These units enable 3, optionally 4 measurements in one single operation:

- Ullage
- Temperature
- Oil-Water interface level
- Innage, Reference height (Visc version)

It is ATEX approved (II 1 G Ex ia IIB T4)

For more detail, see Gtex-HM-10-12-ENG datasheet

2.7 HERMetric Sampler (optional)



The HERMetric Sampler GTX Chem is designed for closed sampling of liquids or chemicals, which present a fire, health or air pollution hazard. The gas tight construction of these units avoids a pressure release from the tank and exposure to fumes during operation.

It is ATEX approved (II 1 G c IIB T6)

For more detail, see HM-09-08-ENG brochure

3. INSTALLATION / CONFIGURATION

3.1 Cabinet

The cabinet (IP52 certified) must be installed in safe area and must be protected from the weather. The validation of LIDEC level switch is set by the switches (SW1 to SW10) located on the main board.

Switch: On if LIDEC connected
Off if not connected

SW1 (for LIDEC1) at bottom
SW10 (for LIDEC10) at top

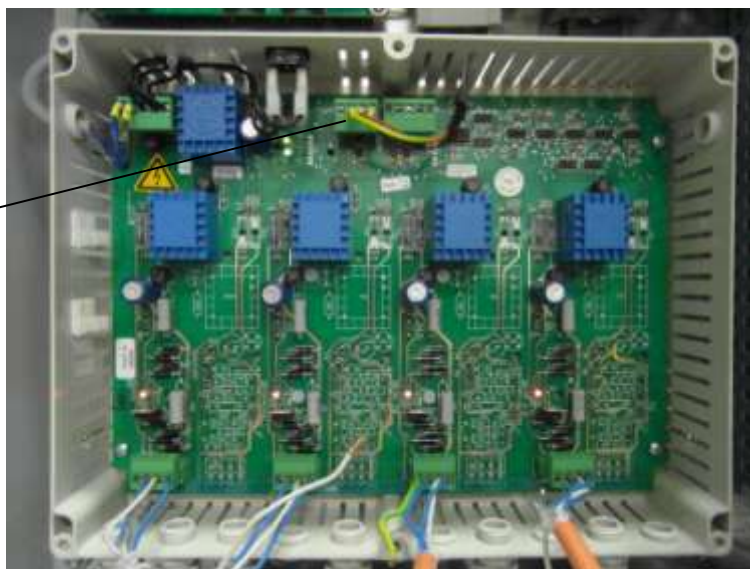


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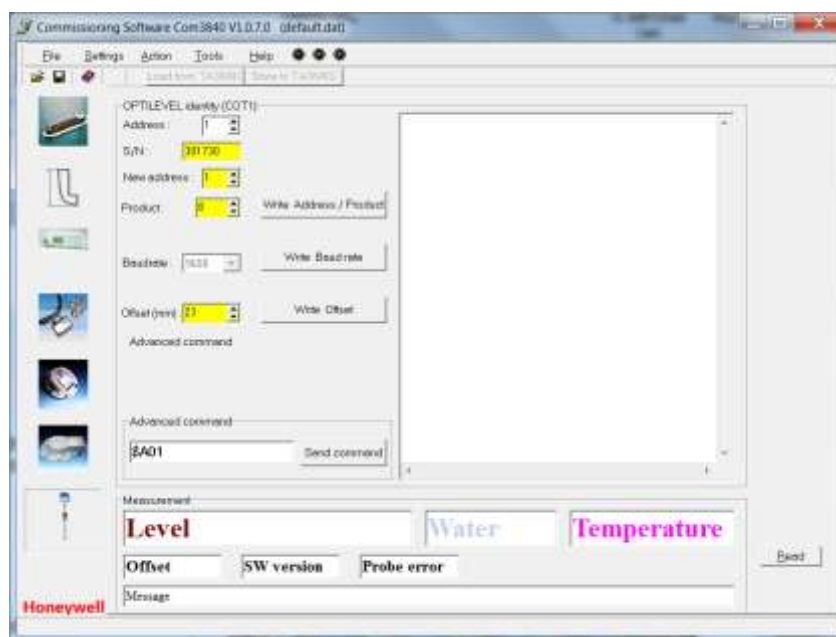
The configuration of the Optilevel probe is done by the Com3840 software. The serial line must be connected to the Comport of the computer and to the Optilevel Supply.

RS 232 terminal

Supply	Laptop (9-pole D-Sub)
RES	Reserve
GND	GND (Pin 5)
RxD	TxD (Pin 3)
TxD	RxD (Pin 2)



COM3840 commissioning software (OPTILEVEL page configuration)



Optilevel probes are working at 9600 bauds but if they have never been configured, they are at 300 bauds (use settings/communication menu to set the correct bauds rate).

- Optilevel probe serial number (S/N written on the housing) must be filled to configure the probe with new address and product (8 for any product).
- Push **“Write Address / Product”** button. You must see the answer from the probe on the right memo.
- If bauds rate is not 9600, push **“Write Baud rate”** button
- According to distance from bottom to the end of the probe, set the offset (mm) and push **“Write Offset”** button
- You can push **“Read”** button to confirm that probe is answering at the correct address.

3.2 Equipments

See the appropriate manual for each equipment,:

- OPTILEVEL probe: MT5025E Technical manual
- LIDEC L92 level switch: NT401 Installation manual
- PL3700 pressure transmitter: MI5090 Installation manual
- TA3840S-C display: MI5008E Installation manual and Com3840 commissioning software to set all data

4. MAINTENANCE

See the appropriate manual for each equipment,:

- OPTILEVEL probe: MT5025E Technical manual
- LIDEC L92 level switch: NT401 Maintenance manual
- PL3700 pressure transmitter: MM5090 Maintenance manual
- TA3840S-C display: MM5008E Maintenance manual

5. COMMUNICATION

A MODBUS RTU RS232 or RS485 serial line is dedicated for data transmission to monitoring software (CargoBoss software from **Honeywell Marine** or any other software) or loading software.

See ST1128 communication protocol.

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