



# ACTech Ltd

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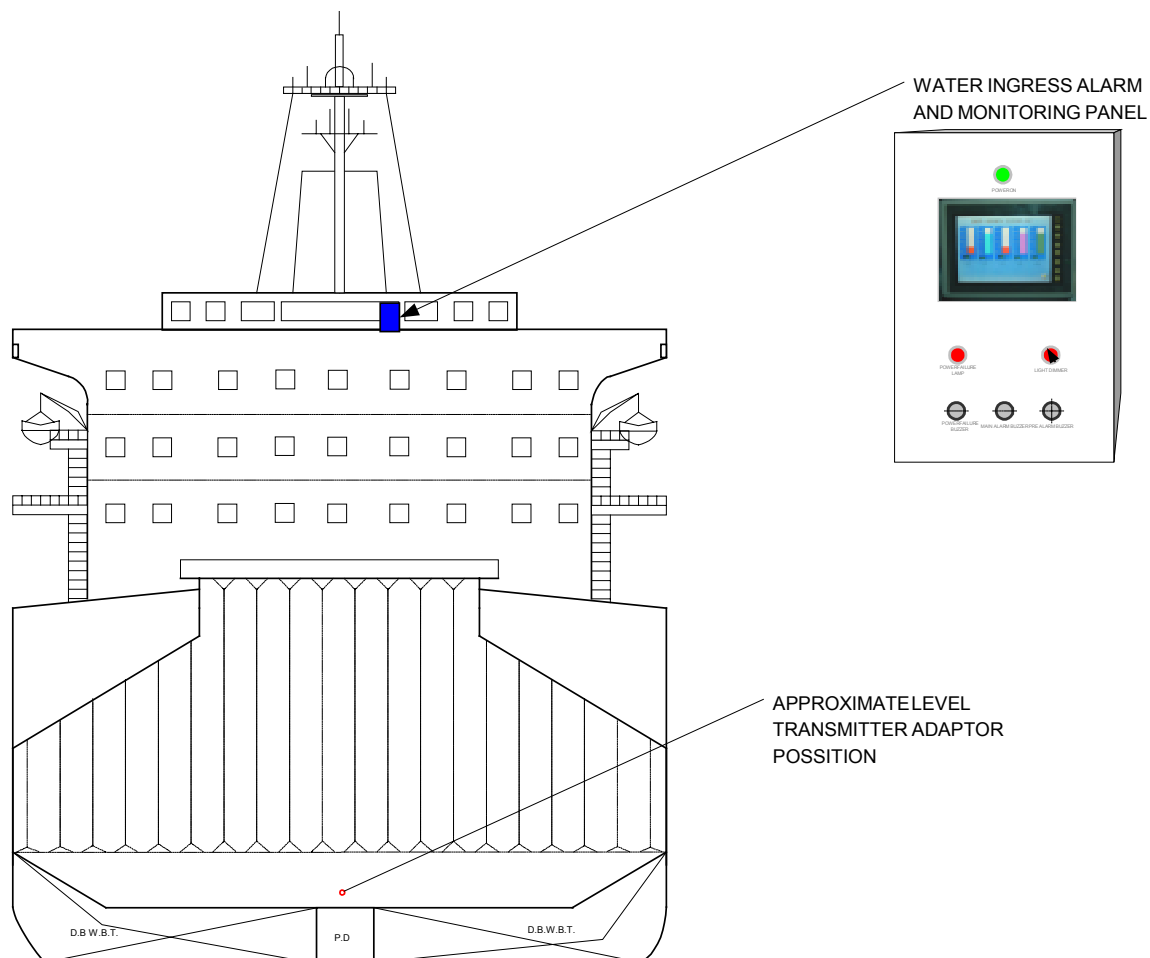
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## CARGO HOLDS WATER INGRESS DETECTION SYSTEM

With reference to new requirements of SOLAS Regulation XII the Performance Standards annexed to IMO Resolution MSC.145(77) and the updated IACS International interpretations SC180 published on September 2003, ACTech Ltd has finalized its new system version for the detection of water ingress in Cargo Holds of Bulk Carriers.

The principle for the water ingress detection but as well as water level measurement is achieved by using analogue pressure/level transmitter.

*“The main advantage is that the actual value can be monitored before and after an alarm. By doing that the operator can judge the actual status of the signal. It might be possible to see whether is a loose connection, absence of the signal, some kind of disturbances or even verify that the signal is stable but increasing (water ingress).”*  
FSA General Water Ingress Scenarios – IACS 04/2001.



## SYSTEM DESCRIPTION

The system comprises from a main alarm and monitoring panel which triggers the required alarms – at 0.5m and 2.0m – for each cargo hold as well as continues level measurement even for the forepeak tank regardless the height.

A Programmable Logic Controller (PLC) and a TFT touch screen are the core of the panel.

This technology used results to a high accuracy of the water ingress level measurement via digital meters and analogue bar graphs, distinguish alarms, easy override operations for ballasting holds and tanks all to a total friendly colored user environment.



## PANEL SPECIFICATIONS

- Continues water ingress level measurement for all Cargo Holds and Forepeak Tank,
- Visual and audible alarms for all system situations required by the regulations
  - ✓ Pre Alarm – High water Ingress level – with separate indication lamp and buzzer.
  - ✓ Main Alarm – High High water Ingress level – with separate indication lamp and buzzer.
  - ✓ Override visual indication for all cargo holds and Forepeak Tank used for ballasting either floodable or partial floodable for port use.
  - ✓ System failure Modes – covering:

Level Sensor cable break	PLC Input/Output cards failure
Level Sensor earth fault	PLC CPU failure
Earth Unit fault	Internal 24VDC Failure
Touch Screen-PLC communication failure and power failure	PLC Battery replace

- ✓ Main electrical power supply failure
- Manual Pre and Main Alarm override for all ballasting holds and tanks with automatic reactivation of the alarm after deballasting
- Time delays are incorporated to prevent spurious signals due to sloshing effects associated with ship movements
- Intrinsically safe inputs via appropriate Zener Barriers
- Two independent power supply sources
- Visual and audible test button for all alarm indicators and audible signals
- Suitable for location on the navigation Bridge - Screen saver mode, contrast/light touch increase/decrease buttons and dimmer for reducing the emitted light.

## LEVEL SENSOR

The principle of operation is based on direct / physical contact with water inside Cargo Holds, Forepeak Tank or Fore Castle space.

The Level Transmitter is marine approved, IP68 and Eex type. When water comes to a contact, an electric signal 4...20mA looped is generated and transmitted to the Monitoring panel. As the water level increases from zero-4mA the electric signal increases, up to its highest value-20mA which is the maximum height of the Cargo Hold or Forepeak tank.

The sensor is mostly located in the aft part of each Cargo Hold either inside the void space stool via a specially constructed adaptor or if this is not possible directly inside the Cargo Hold behind specially constructed (vessel requirement) metal protectors. The last applies to all installations for Forepeak Tank.

For the Forecastle space a marine approved level switch IP68 is installed in the aft part as close as possible.

## SPECIFICATIONS

- Material of Level Sensor: corrosion resistant INOX 316  
Input: Cargo Hold height dependant – usually 0...20mWG  
Output: 4...20mA  
Marine approval: GL  
Explosion – proof type Eex ia IICT4 (EN 50014/20)  
Operating temperature: -25...85°C  
Humidity: max. 95% relative  
Vibration: 6 g (25...2000Hz)  
Shock: 50g / 1ms  
EMC protection, IEC 61000  
Chemical resistant  
Filtering: two separate levels
- Specially constructed Inox 316 with 1mm hole
  - Specially constructed Inox 316 with less than 0.1mm hole

