

process measurement solutions



water level sensor and system for bulk cargo carriers: SOLAS regulation XII/12

- ▶ Factory sealed 316L stainless steel construction
- ▶ Factory fitted and sealed marine grade connecting cable
- ▶ IP68 submersible to a depth of 30m
- ▶ Simple low cost fitting using mounting thread
- ▶ Integral magnetic test point simplifies system test
- ▶ International marine approvals
- ▶ Intrinsically safe ATEX certification
- ▶ System solution including IS barriers and alarm panel available





BUREAU
VERITAS



ATEX



Squing carries International Marine approvals from many of the world's leading authorities for use as a standard level switch or for use as part of a SOLAS XII/12 compliant water ingress detection system. Users can therefore purchase the Squing for integration into their own systems.

When the moisture content of certain cargoes, particularly coal or other mineral ores, rises too high, the cargo may start to liquify, forming a highly mobile slurry which can drastically affect weight distribution and hence stability of the vessel.

In recognition of this problem and in order to prevent marine accidents, the International Maritime Organisation SOLAS regulation XII/12 has been introduced requiring all bulk cargo carriers to be fitted with water level detection systems. The regulation states that water level detectors must be fitted in each cargo hold. Systems installed must give both audible and visual alarms when the water level above the inner bottom of any hold reaches a height of 0.5m. A second set of alarms should activate when the water level reaches a height not less than 15% of the depth of the cargo hold and not more than a height of 2m.

The Squing TD series water level detector

Solartron Mobrey has designed a tough marine approved water level detector for use in this critical application. The sensor is based on the internationally renowned Squing level switch which detects liquid or slurry presence using the vibrating fork principle. Constructed entirely in 316L grade stainless steel, the Squing has a tuning fork style sensor which vibrates at its natural frequency in air. As soon as liquid or slurry begins to cover the forks their frequency of vibration is damped and the integral detector electronics senses the frequency change, causing an alarm signal to be sent to a control panel.

This technique is particularly suitable where a high degree of fail-safety is required as, in a dry state, the Squing forks will vibrate normally. Any change in the frequency of vibration, for whatever reason, will cause an alarm state to be signalled. The Squing already carries the prestigious Overfilling approval required for high reliability switching.

The Squing is Intrinsically Safe certified, allowing safe use with hazardous materials when connected to the control system through a suitably certified isolation amplifier.

Specification

Sensor

Switch type	Tuning fork
Media	Liquids, slurries
S.G. range	0.6 to 2.0
Viscosity range	0.2 to 2.0
Wetside material	316L stainless steel
Enclosure material	316L stainless steel
Nameplate material	316L stainless steel
Cable support nut	Brass nickel plated
Cable	Marine grade, factory fitted and sealed (length see part no.)
Max. cable length	100m
Operating temp. range	-25°C to +80°C
Operating pressure	-0.25b to +3b
Ambient temp. range	-25°C to +80°C
Environmental	IP68 (30m for 20 days) IEC 60529
Operating voltage	8V dc nominal (from approved NAMUR isolation amplifier)
Output	Current switching $\leq 1\text{mA}$ / $\geq 2.2\text{mA}$ in accordance with DIN19234 and IEC60947-5-6
Factory setting	Dry = on (2.2mA)
Response time	1 Sec. dry to wet / wet to dry

Cable

Generic type	Single twisted pair 0.75mm ² with overall shield. SHF1 Polyolefin sheathing XLPE insulated. Nom. overall \varnothing 8.5mm
Acceptable manf.	DRAKA Norske Kabel AS
Type no.	TX01 250V
Attributes	Marine use, flame retardant, halogen free, low smoke
Certification	IEC 60092-3, 60332-3-22 60754-1/2, 61034-1/2
Certification auth.	Det Norske Veritas Cert. no. E-6367

System solution

Some users may wish to purchase a complete SOLAS compliant system from Solartron Mobrey or one of their approved International distributors. A system would comprise the required number of sensors, two per hold, a certified isolation amplifier per Squing and an indicator panel capable of giving the mandatory alarms for each individual hold.

The marine certified indicator panel offered by Solartron Mobrey conforms to the IMO Code on alarms and indicators and is available with 16 channels where each channel supports 1 sensor. 1 Channel will be allocated for barrier monitoring. Manufactured in aluminium and steel for wall mounting in the bridge or control room.

Common fault and programmable variable time delay SPCO relays are provided for alarm, sounder or signal purposes.

Power supply	198 to 264V ac
Inputs	Detectors: Up to 15 individual detectors via isolation amplifiers. 1 Dedicated barrier monitoring channel Auxilliary: 3 additional inputs for remote acknowledge, reset or other duties
Outputs	Alarm relays: 4 SPCO rated 1A at 24V Sounder circuits: 4 Fault relay : Normally energised 24V dc: 2 supplies rated 1A available to power external devices 16 relays for LED mimic or Zonal output (optional)
Visual	Multi-lingual LCD (English, Spanish, Italian, French, Portugese, Dutch) LEDs indicate alarm zones
Programming	Intuitive HMI using front panel keys
Testing	One man walk test facility

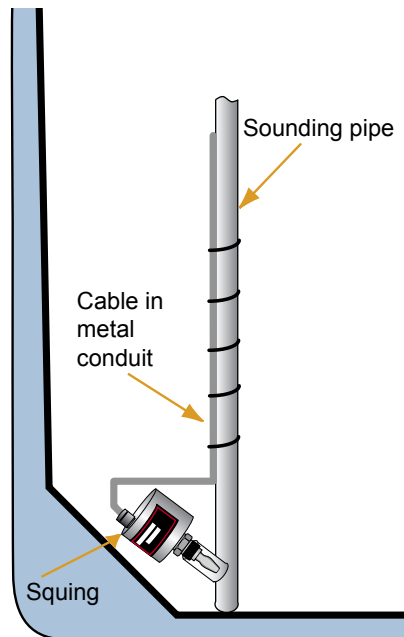
Request data sheet for full details of the Indicator panel.

Installation

The Squing is typically installed on the sounding pipe in each hold. The 1" thread mounting allows low cost installation on an easily fitted threaded boss or proprietary sounding pipe clamp at the appropriate level.

The tough metal construction is designed to survive in normal use in the hold.

The cable, available in 3 factory fitted lengths, is strapped to the sounding pipe and terminated in a junction box where connection to the indicator panel is made via a dedicated Intrinsically Safe isolation amplifier (in accordance with IEC 60947-5,6 & DIN 19234) located in the safe area. The isolation amplifier has the additional benefit of cable monitoring and is able to signal alarm on short or open circuit cable conditions.



Approvals

Hazardous area	Intrinsically safe ATEX II 1 GD, EEx ia IIC T5 SIRA 01ATEX 2121X
Water ingress detection	IMO SOLAS XII/12 MSC 145 (77) IACS UR SC180



Fig 1. Indicator panel



Fig 2. Squing water level detector

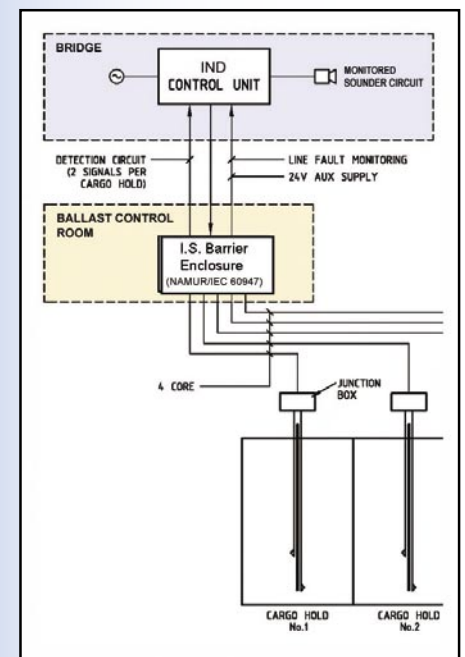
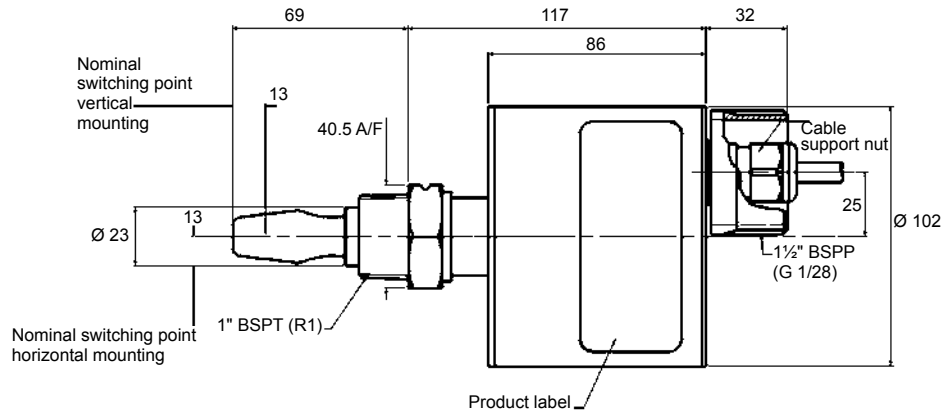


Fig 2. System line diagram

Dimensional diagram - sensor



Ordering information

Squing TD water level detector

TD	I.S. / Marine certified Squing water / slurry sensor		
	1	G1" (1" BSPT) mounting thread	
		ACB	316SS sealed IP68 enclosure
			15 15m factory fitted 2 core marine cable
			30 30m factory fitted 2 core marine cable
			50 50m factory fitted 2 core marine cable
TD	1	ACB	15
Typical part number			

System accessories

Indicator panel

Part no: **IND16** 16 Channel marine certified water ingress indicator alarm panel

Additional relay output option card

Part no: **INDRO** Provides 16 additional SPCO relays

Repeater panel

Part no: **INDRP** Optional 16 channel repeater panel

Sounding pipe clamp

Part no: **INDSP** A simple clamp eliminating the need for hot-working. Clamps around the sounding pipe and used with a sensor mounting fitting provides a 1" boss to mount the Squing. Simply drill the sounding pipe to suit. Full details on request – please state outside diameter of the sounding pipe.

Sensor mounting fitting

Part no: **INDSN** 1" Threaded mounting for use with sounding pipe clamp.

Suitable isolation amplifiers

Any Intrinsically Safe certified NAMUR / IEC 60947-5,6 & Din 19234 isolation amplifier may be used to power the Squing. Typical models include: MTL 5017 or 5018

Pepperl & Fuchs KHD2-SR/Ex1.1k

The isolation amplifiers must be mounted in the safe area in a suitable enclosure.

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