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**SERIES 8700
MARINE
Tank Contents
Electronic Gauging
Systems**

**NB! Maximum
error now
± 0.5%**

- Models:**
8720 Clamped
8781 Pipe mounted
8782 Pipe mounted with
bobbin
8783 Pipe mounted with
DIN flange
8790 External mounting

FEATURES

- Accuracy ± 0.75%
- Good long-term stability
- Well-proven technology
- 4 to 20mA 2-wire transmission
- Intrinsically safe
- Classification societies approved

(See Leaflet 'Marine Approvals'
Ref: MA0020/11/84)

DESCRIPTION

This range of marine tank contents transmitters provides the solution to in-tank and environmentally aggressive applications.

Fittings are available to permit easy installation. Pipe-mounting fixtures and flange mounting options to meet user requirements.

Body material options of aluminium bronze or 316 stainless steel provide rugged protection. Cable entries are double sealed and standard or heavy duty cables are available. Fittings for tank bulkhead installation can be supplied.

The measuring system uses KDG's vast experience in capsule and LVDT technology to provide a small diameter sensor with excellent performance, capable of operating and surviving in arduous shipboard applications. Epoxy coated capsules provide protection from sea water corrosion.

Customer accessible range and zero controls are provided in the separate surface mounting transmitter enclosure, permitting easy on-site re-range and calibration.

Signal outputs may be conditioned by application of the ancillary items available, see leaflet Series 8000 and 8700 Ancillaries.

Operational data (reference conditions)

Service:

Liquid.

Ranges:

See ordering information.

Range adjustment:

Full output span can be for any proportion of input pressure range between 33% and 100%.

Zero adjustment:

± 5% by potentiometer.

Output:

4 to 20mA d.c. 2-wire. Max. output is dependent on S.G. of liquid (20mA for water). May be between 15.2 and 24.8mA.

Power supplies:

14V to 40V d.c.

Humidities:

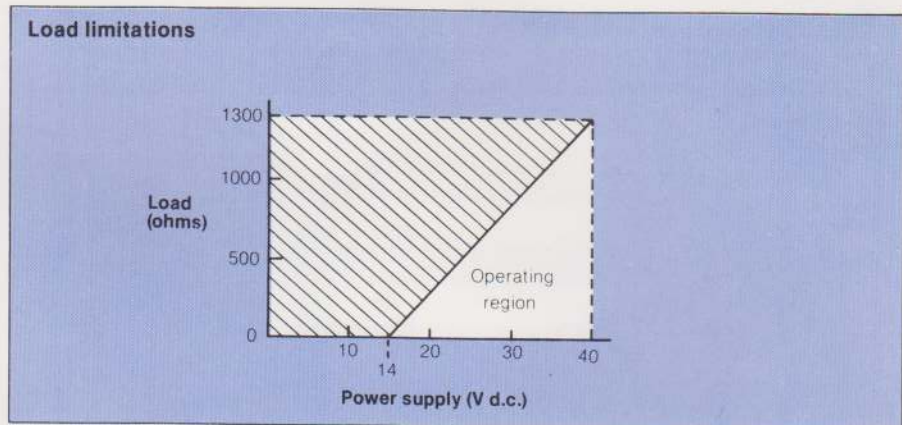
5% to 95% RH.

Intrinsic safety:

To BS5501: Part 1: 1977 EN50 014.
To BS5501: Part 7: 1977 EN50 020.
Approval certification EEx ia IIc T4.

Response time:

For 63% step change typically 15ms.
(Used with 8350/8360 Power Supply Unit, 150ms.)



Weatherproof protection:

Sensor unit — IP68 to BS5490.
Terminal box — IP65 to BS5490.

Operating temperature:

Transmitter: -10°C to +70°C ambient.
Sensor — Standard: -10°C to +75°C ambient.
Sensor — High temperature: -10°C to +100°C ambient.

Static and overpressure limits:

Maximum static pressure 690 kPa (100 lbf/in²), equivalent to 70 metres depth in water, without damage.

Performance data

Accuracy:

Max. error ± 0.75% of calibrated span including effects of linearity and hysteresis.

Repeatability:

< ± 0.05% of calibrated span.

Discrimination:

± 0.02% of calibrated span.

*Stability:

Drift < ± 0.25% of calibrated span per annum.

*Ambient temperature effects:

Zero will shift < ± 0.05% of nominal input range per °C (averaged between -10 and +60°C).

Span will change < ± 0.05% of output span per °C (averaged between -10 and +60°C).

* For epoxy coated beryllium copper models, these values are typical but may be exceeded.

Power supply effect:

< 0.004% of output span per volt change at terminals.

Mounting position effect:

< 0.011% of nominal input range per degree change from normal operating axis of transformer core.
(Model EI is vertical mounting, Model SI is horizontal mounting.)

Construction data

Materials:

Housing:

Sensor unit — stainless steel (316).

Sensor unit — aluminium bronze.

Terminal box — aluminium alloy (LM6).

Support pole (8781) — aluminium bronze or stainless steel.

Tank flanges — mild or stainless steel.

40mm DIN flange / aluminium bronze.

Sensing capsule — Inconel X750, beryllium copper or BeCu epoxy coated.

Sensor/terminal box connecting cable — Vented 4-core screened polyurethane sheathed (fire retardant to BS4066). Max. length 50 metres.

Weight:

Sensor unit 1.23 kg. excl. cable.

Terminal box 1.36 kg.

Standard accessories:

All models are shipped with suspension cable, clamp or pole, if applicable, and all fittings and one instruction manual per shipment.

Optional accessories:

8350 — Power supply will power one transmitter and correct for S.G.

8360 — Power supply will power up to three transmitters.

8200 — Analogue display, Polyrad cased 4 to 20mA, scaled as required.

8240 — Analogue display, DIN cased, 96 × 96mm 4 to 20mA, scaled as required.

Calibration:

As standard, instruments are calibrated to customers specified span at ambient temperature with unit mounted in operating position.

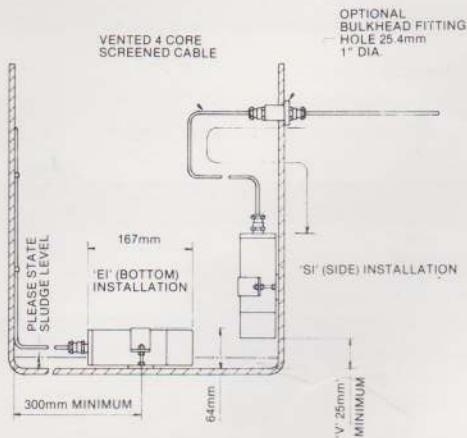
Electrical connections:

Terminal block in terminal box.

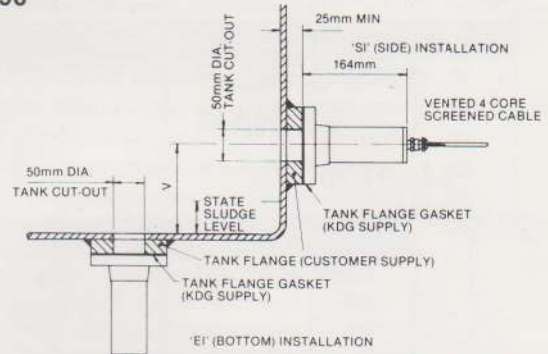
Two cable entry holes with compression cable glands.

Outline/Installation dimensions

8720



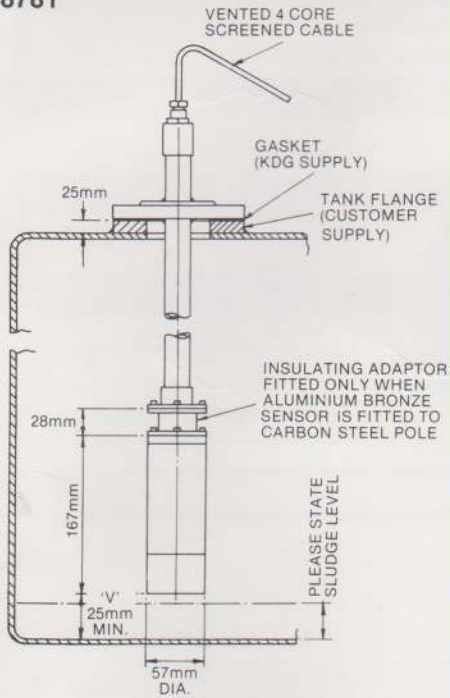
8790



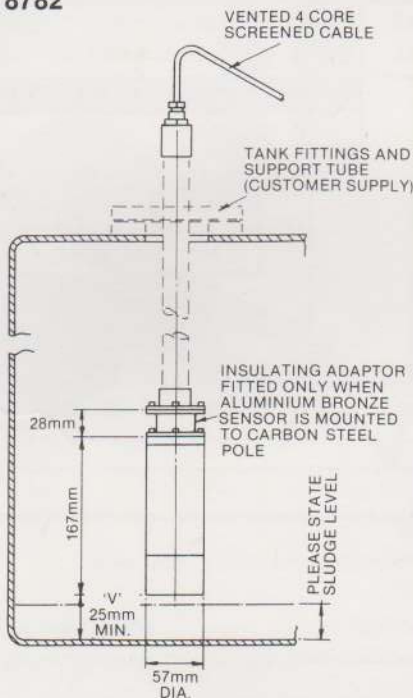
Series 8790 Flange Table

Standard	Outside Diameter	Bolt P.C. Dia	Dia. of Bolts	No. of Bolts
BS 1560 Pt 2 1970 ASA B16.5 1957 Class 150	127mm	98.4mm	1/2"	4
BS 4504 1969 (metric) Conforms to DIN 2569	150mm	110mm	M16	4

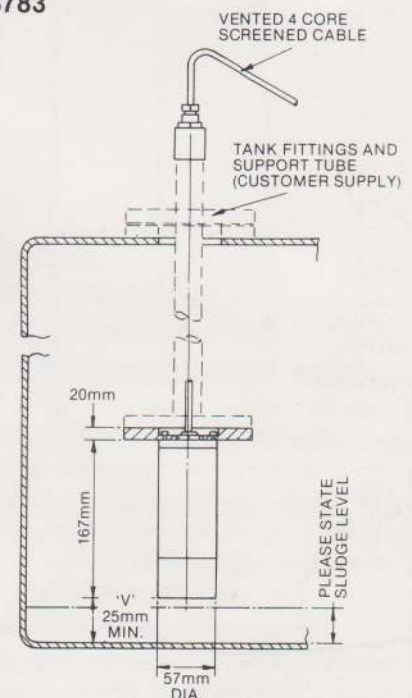
8781



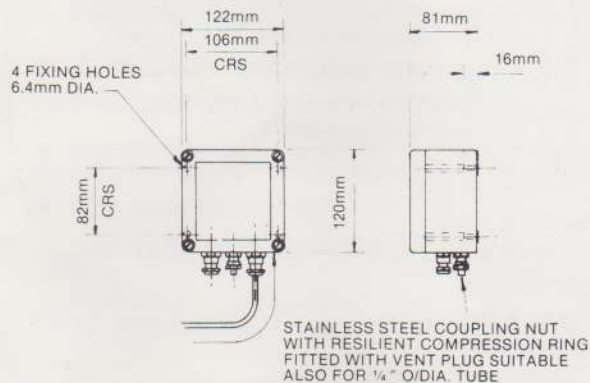
8782



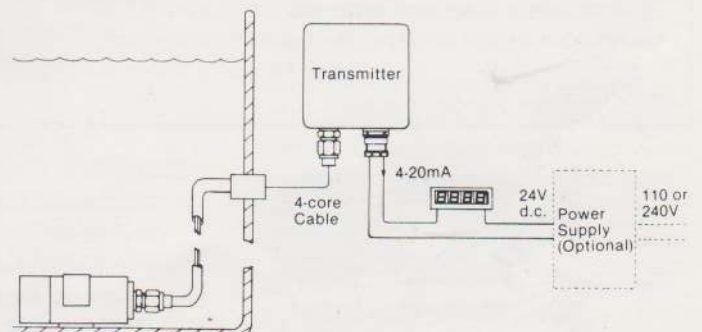
8783



Electronic Transmitter Enclosure



Typical System Wiring Diagram



Ordering information

Model	Electronic hydrostatic level transmitters (marine)							
87	Sensor plus 4 to 20mA transmitter (excluding cable)							
	Code	Mounting						
	20	Clamped in tank — including clamp						
	81	Pipe mounting — including weldneck fitting (tank flange and pipework extra)						
	82	Pipe mounting — including weldneck fitting and bobbin (pipework customer supply)						
	83	Pipe mounting — including 40mm DIN mild steel flange, epoxy coated (pipework customer supply)						
	90	External mounting — including 40mm DIN flange						
	Code	Body and capsule materials						
	SS	Stainless steel body — Inconel capsule						
	AB	Aluminium bronze body — Beryllium copper capsule						
	BE	Aluminium bronze body — Beryllium copper capsule epoxy coated						
	Code	Capsule range						
	02	Maximum measured head at SG 1.0 = 2 metres						
	04	Maximum measured head at SG 1.0 = 4 metres						
	08	Maximum measured head at SG 1.0 = 8 metres						
	16	Maximum measured head at SG 1.0 = 16 metres						
	32	Maximum measured head at SG 1.0 = 32 metres						
	Code	Temperature rating of sensor						
	NT	Operating temperature max. 75°C (occasional peaks of 90°C)						
	HT	Operating temperature max. 100°C (occasional peaks of 120°C)						
	Code	Sensor mounting attitude						
	SI	Horizontal						
	EI	Vertical						
	Code	Safety classification						
	IS	Intrinsically safe						
	NC	Not certified						
	Code	Test point						
	TP	Test pressure point in flange — 8790 only						
87	90	BE	08	HT	SI	NC	TP	← Typical ordering information

Extras

Model 8790 — If non standard flange required.

Model 8781 — Pipe work (max. length 2.5 metres). Stainless steel Mild steel

— Tank flange. Stainless steel

Vented cable — standard specification

Vented cable — heavy duty specification if required by classification society.

All models — Bulkhead fittings — mild steel.

— stainless steel.

If transmitter box require external mounting lugs.

Transmitters operate on 14 to 40V d.c. If individual power supplies required specify:

(a) 8350 — will power one transmitter and correct for specific gravity;

(b) 8360 — will power up to three transmitters.

To correct a 4 to 20mA loop for specific gravity specify 8355.

For analogue readout specify either (i) 8200 Polyrad (4 to 20)

or (ii) 8240 96 × 96mm (4 to 20).

Extra for double scaling either unit.

Other requirements for order:

1. What is height of sensor from tank bottom?
2. What is maximum head to be measured?
3. What classification society approvals are required?
4. Tank detail and calibration forms?

The Company reserves the right to modify this design without notification.



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