

# ZEI-1 Electronic Inclinometer ZEI-1T Elektronik Inclinometer for Escort Tug Boats

IMO performance standard MSC.363(92) fully approved by BSH

ZEI-1 and ZEI-1T are a heel and pitch measuring system, which is not affected by horizontal and vertical accelerations, due to sophisticated MEMS technology.

Hence it displays true inclination and roll period in high accuracy. The standard inclinometer system ZEI-1 displays actual heel angles at port- and starboard side in red & green, whereas the tug boat version ZEI-1T uses a so-called traffic light indication for safe, cautious & dangerous operating situation. The thresholds are freely adjustable according to the stability conditions of the tug boat. This may considerably enhance the safety of escort tug operation.

The tug boat version ZEI-1T is especially designed to meet the stringent requirements of escort operation, to generate audible and visible warnings and alarms, when permissible heeling angle limits are exceeded.

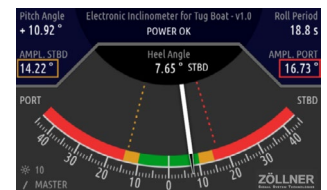
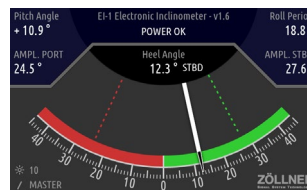
ZEI-1T Electronic Inclinometer for Escort Tug Boats is designed to meet BV rules NR 467 - July 2017

Electronic Inclinometer ZEI-1(T) measures and displays:

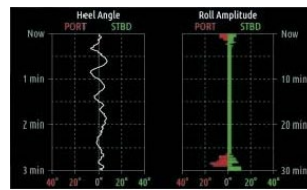
- » Pitch Angle
- » Heel Angle
- » Roll Period
- » Amplitude (port and starboard)
- » acceleration indication on three axes: surge, sway and heave (x,y,z)
- » Additional trend plots display heel angle for the last 3 minutes and roll amplitude for last the 30 minutes

Support of slave displays when using Ethernet connection. ZEI-1 (ZEI-1T) is supplied with all necessary components and can be easily installed and commissioned by the ship's personnel.

Measuring range	±180° for heel, ±90° for pitch angle
Digital display resolution	0.01° for angle, 0.1s for time measurements
Analog display range for heel	±45°
Roll period display range	4...60s
Angular accuracy	±5% of measured value or ±1°
Time accuracy	±5% of measured value or ±1s
Trend plot	3min for heel angle and 30min for roll amplitude
Display	7 inch color LCD with 800x480 resolution
Communication interface	IEC61162-1/-2 and Ethernet (supporting IEC61162-450)
Supported sentences	T: HRM, ALF, ALC, HBT L: ACN, HBT, DDC, RMC
Main/emergency supply voltage	24 VDC, 1 A max (24 VA max)
Operating temperatur	-15...+55°C°
Net weight	1,5kg (display unit), 0,2kg (sensor unit)



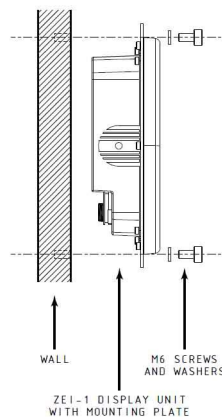
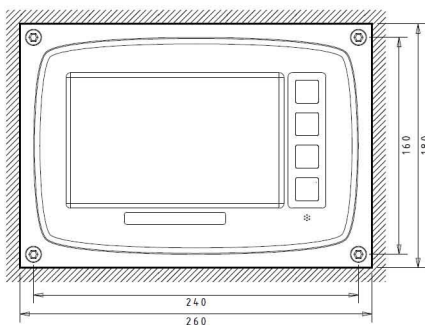
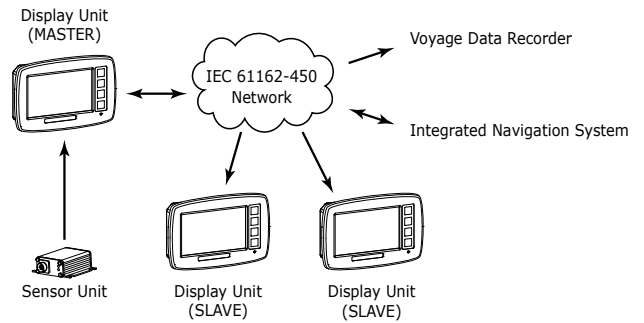
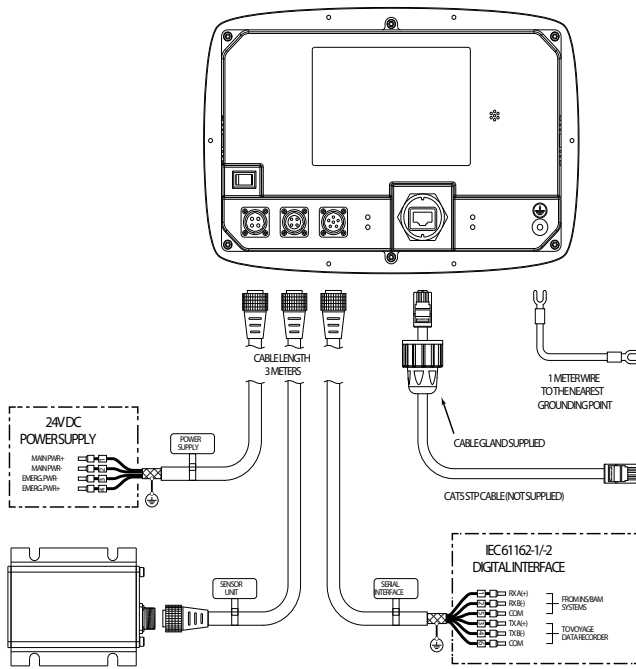
Current heel angle (graphic and numeric), current pitch angle, max port and starboard heel ZEI-1 & ZEI-1T



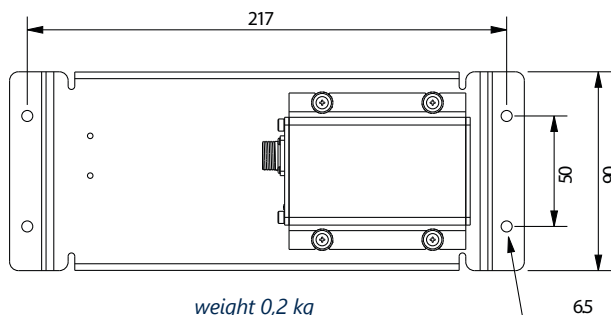
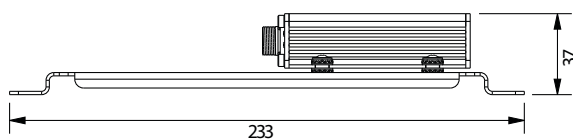
Three min trend plot of heel angle (left) and 30 min of roll amplitudes (right)



## ZEI-1 (ZEI-1T) Electronic Inclinometer



weight 1,5 kg



weight 0,2 kg

### Scope of supply

display unit configured as MASTER

desktop mounting kit and flush mount frame

sensor unit with mounting kit

4-pin shielded power supply cable, 3m

6-pin shielded serial interface cable, 3m

sensor cable, 3m

grounding cable, 1m

RJ45 cable gland (note: Ethernet cable to be customer provided.)

operation and service manual

### Approvals

IMO Resolution MSC.363(92)  
Performance standards for electronic inclinometers - maritime navigation and radio communication equipment and systems:

IEC 60945,  
environmental tests

IEC 61162-1, -2, -450,  
data interchange

IEC 62288, presentation of information