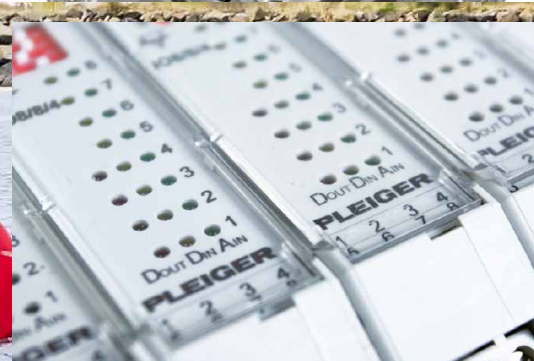


Tank Measuring Systems

for marine vessels and offshore installations



PLEIGER MASCHINENBAU

- _ Electronic Measuring Systems
- _ Electro Pneumatic Measuring Systems
- _ Radar Measuring Systems

System Solutions

Pleiger provides system solutions designed to match the individual needs of different types of vessels and offshore rigs. Pleiger offers a wide range of components for valve remote control, tank measuring systems and monitoring, covering all specific requirements. Complete system solutions made by Pleiger provide easy installation to the yards and reliability to the ship owners. Pleiger tank level measurement comprises electronic, electro pneumatic and radar-based solutions.

Supplier of **Complete** Valve Remote Control Systems and Customized Solutions
Process Control for Cargo, Ballast, Bilge, Fuel Oil
Black/Grey/Seawater, Anti-heeling, In Service Inclining Test Systems,
Deflection and Flooding Detection Systems
Tank Level Measuring Devices and Systems



KNOWLEDGE AND EXPERIENCE



Tank Measuring Systems

for all kind of purposes



Pleiger EL-F Sensors

Pleiger EL-T Sensors

Pleiger EL Sensors in flange type or for submerged installation offer long, well-proven and tested technology of the highest performance capability. With a diverse range of uses, resistant against high temperatures, aggressive liquids and seawater, they are the optimum solution for different types of vessels.

Electro Pneumatic Tank Level Systems

The work-horses of sensors – robust, simply structured, long life cycle and low maintenance – PEL-D2 and PEL-C without electronic components in direct contact to the medium.

Radar Measuring Systems for Tankers

The ideal solution for tankers – the contact-free system supplies very precise results of measurement, it has an extremely rugged structure. It offers the greatest level of resistance against highly-aggressive media, high temperature and pressure differences.

Multi Flange

The compact solution for the cargo tank content measurement – only one deck flange with several measuring systems.

Integrated Solutions

Integrated solutions from Pleiger offer well-proven and innovative Pleiger technology in one complete system – measurement, processing, visualization and control – all from a single source.



EL-F / EL-T Sensors

electronic tank measurement

Pleiger EL Sensors are the all-rounders of electronic tank measurement sensors. They combine the highest level of precision with a low-cost installation and very robust structuring, which can overcome any unforeseen factors which are always encountered at sea, because special sealing systems prevent intrusion of liquid into the sensor. Pleiger EL Sensors offer a long life cycle, well-proven and tested technology of the highest performance capability.

Pleiger EL-F Sensors

—Electronic Level Sensor for flange mounting at the tank side-wall

—Electronic Atmospheric Pressure Sensor for Reference



MAXIMUM SECURITY



The ceramic measurement cells with high purity of the EL Sensors are watertight protected and overload secure, as well as highly resistant against high temperatures and corrosive and other aggressive liquids. The sensor housing is made of duplex stainless steel.

- Features:
- _ Different flange size
 - _ Different cable length
 - _ ATEX approved
 - _ Absolute or relative pressure type
 - _ Type approved by all major classification societies
 - _ One type for nearly all kind of medium

Pleiger EL-T Sensors

- _ Electronic Level Sensor for submersible mounting with guiding tube or corresponding mounting clamps
- _ Bulkhead Flange DN50/PN10



Connection Boxes

- _ Relative Pressure Type
- _ Absolute Pressure Type



Pleiger Quality Features:

- _ Ceramic measurement cell of high purity offers optimum protection against sedimentation
- _ Doubled O-ring of very high quality materials protects against extreme heat and aggressive media
- _ Watertight
- _ Sensor case made of duplex stainless steel
- _ Special cabling with polyurethane cable, also for use directly in fuel oil



EL-F / EL-T Sensors special solutions

The most varied of individual customer requirements can also be easily handled with the EL Sensors. For special cases of application, special models are available which effortlessly master even the most difficult tasks.

Pleiger EL-T-HF0

_Electronic Level Sensor Submerged Type for Fuel Oil with temperatures up to 100°C.

Pleiger EL-T-PT100

_Electronic Level Sensor Submerged Type with internal PT100 temperature measuring element.

Pleiger EL-F.1-0.1%

_Electronic Level Sensor Flanged Type with high capability.



EASILY INTEGRATED



General Technical Details

electronic tank measuring sensors

Measuring Element:	Sapphire ceramic cell
Measuring Range:	1/2/4/6/10/16/20/25/40 mWC
Casing Material:	Stainless steel 1.4462 (Duplex)
Measuring Cell Sealing:	FFKM + FKM
Cable Material:	PUR (length 2/5/10/15...50m)
Protection:	IP68 (according classification)
Voltage Supply:	12...36 V DC
Output:	4...20mA, two-wire-system
Deviation in Characteristics:	< 0,25% full scale output
Vibration Resistance:	Mechanical vibrations with 4g and 5...100Hz
Working Temperature:	0...80°C (Type EL-T-HFO: 0...100°C)
Approvals:	ABS, BV, CCS, DNV-GL, LR, RINA,
ATEX:	ATEX II 2G EEx ia IIC T6 (optional)



EL-F

Electrical Connection:	PUR-cable 2 x 0,5 mm ² + shield (with air-venting-hose for relative type)
Mechanical Connection:	Flange DN25 / PN10 DIN 2501 (Option: Flange DN40 / PN10 DIN 2501)
Scope of Supply:	Sensor with 2 meter cable and separate connection box

EL-T

Electrical Connection:	PUR-cable 2 x 0,5 mm ² + shield (with air-venting-hose for relative type)
Mechanical Connection:	Installation with guiding-tube inside tank recommended
Alternative:	With corresponding mounting clamps, Bulkhead flange DN50 / PN40 DIN 2501
Scope of Supply:	Sensor with 2 meter cable and bulkhead flange and separate connection box



Radar Measuring for Tankers satisfies the highest demands on security and precision

The most varied liquids, some highly corrosive and with varying densities, changing temperatures and the unforeseen factors always encountered at sea, place the highest demands on the resistance and reliability of measurement systems. Radar-based, contact-free systems from Pleiger are the correct response to these challenges, particularly in case of use in oil tankers! The best materials, combined with state-of-the-art processing, guarantee long life cycle with the highest level of reliability!



Radar Sensor

The highest level of resistance to chemical reactions, due to the high-quality PTFE-coated antenna and completely rugged construction when faced with temperature and pressure variations, are the main characteristics of the contact-free Pleiger radar sensor.

Advantages:

- _Contactless
- _Highly accurate
- _One wetted material only
- _No additional sealing necessary
- _Additional focusing by conical design
- _Unaffected by temperature, pressure and product properties
- _High chemical resistance and easily cleanable antenna system due to PTFE-coating

HIGHEST RESISTANCE



Multi Flange

the 12" solution

Multi Flange Radar Sensor

Through the use of the world's smallest level radar unit, the installation of the entire cargo measurement technology becomes possible on a single ANSI 12" measurement flange. This means simpler project planning and installation, easier verification and simpler and lower-cost maintenance.

Consisting of:

- _ Compact 12" decks flange
- _ 95% / 98% alarm with vibration level switch
- _ Ullage measuring with radar sensor
- _ Tank pressure measurement with pressure sensor
- _ Optional UTI (ullage, temperature, interface) connection

Pleiger Quality Features:

- _ Multi function connection for cargo measurement
- _ Cost reduction installation and wiring
- _ Easy tank volume calibration
- _ Ship approved sensor connections for quick replacement



Electro Pneumatic Tank Level System

simple and robust

The electro pneumatic measurement units PEL-D2 and PEL-C are systems which are structured to be both simple and resistant against external influences. Tested over a long period, they perform their service reliably and with the lowest maintenance costs. The measurement can be implemented either decentralized in tank proximity (PEL-D2), or centrally in a transmitter cabinet (PEL-C). Any direct contact of the measuring element with the medium is prevented.

Pleiger PEL-D2

One measuring system – two system advantages!
The Type PEL-D2 combines the advantages of the electrical and the electro-pneumatic measuring.

- _Single and low-cost installation
- _Short measurement tube length
- _Connection in the design ring line to the utility supply air
- _Clean pneumatic filling level measurement

Components:

- _Diaphragm safety valve PEL-C-S with fine regulation valve
- _Electronic Level Sensor (IP68)

Pleiger PEL-C

The origin of remote tank measurement, equipped for the future. All measuring equipment units are collected together in a central transmitter cabinet. In this way, they are optimally protected against dirt accumulation and vibration, and are accessible for easy maintenance.

Components:

- _P/E-Transmitter PE12
- _Pneumatic control block with test function, fine regulation valve, control valve (for remote control)
- _Air flow meter
- _Diaphragm safety valve PEL-C-S



CUSTOMIZED SOLUTIONS



Integrated Solutions

complete systems from a single source

Extending from different measuring methods, through signal processing and the integration of alarm systems, up to the stage of visualization and control, Pleiger offers complete, integrated systems from a single source.

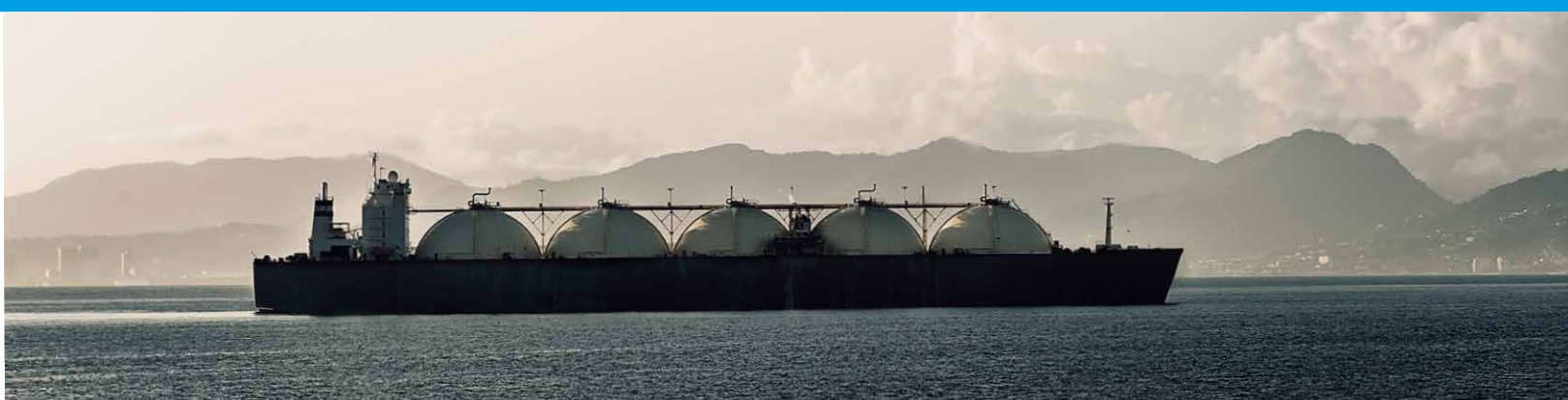
For shipyards and ship owners this means: One point of contact for all cases of application. Pleiger offers systems for special applications: Anti-heeling, tank measurement automation, In-Service Inclining Test. Deflection and Flooding Detection Systems.

Pleiger PCM for Tank Measuring Systems

The Pleiger Control Module (PCM) System combines several control and I/O modules, which are linked by means of field bus interface to a Supervisory Control And Data Acquisition (SCADA) system. Analogue signals of the level sensors, as well as digital alarm contacts of limit switches, can therefore be transmitted to the system directly.



- _Input/Output modules IO8/8/4 and IO/TII for the recording of level sensors, limit switches and temperature signals.
- _Interface bus modules BI for serial connection to SCADA systems and visualization systems
- _Profibus DP and Modbus RTU Data exchange protocol
- _Redundant data link together with additional bus interface bus modules possible
- _Short-circuit-proof outputs and overload resistant inputs prevent damage to the module
- _Displays and diagnostic functions facilitate commissioning and troubleshooting



Tradition and Experience

More than 7,000 vessels equipped by Pleiger prove that Pleiger is the experienced and reliable partner that shipyards and ship owners can depend on, anytime and anywhere. Pleiger combines the innovative power of a German high-tech manufacturer with the down-to-earth character of a tradition-conscious family-owned company with long-term prospects and its own training and research centre. As a member of the Pleiger Group, with over 650 employees worldwide, Pleiger stands for stability and sustainable growth.



INNOVATION AND QUALITY – MADE BY PLEIGER!

Pleiger Maschinenbau GmbH & Co. KG
Im Hammertal 51 | 58456 Witten | Germany
Tel.: +49 (0) 23 24 / 398 - 240
Fax: +49 (0) 23 24 / 398 - 380
Internet: www.pleiger-maschinenbau.de
E-Mail: pm@pleiger.de

Pleiger Far East LLC
19, No ksansandan 27-ro
Gang seo-gu
Busan | Korea
Phone: +82 (51) 9 74 54 00
Telefax: +82 (51) 8 31 69 83
Internet: www.pleiger.co.kr
E-Mail: sales@pleiger.co.kr

Pleiger Shanghai Representative Office
Room 102 Building 34
No. 2777 East Jinxiu RD
Pudong | Shanghai | China P.C. 201206
Phone: +86 (21) 60 13 63 74/5
Telefax: +86 (21) 60 13 63 73

**Pleiger Electronic Control Systems
(Shanghai) Co., Ltd.**
451 Yuanzhong Road | Building 12
Huinan Town | Pudong | Shanghai, 201300
P.R. China
Phone: +86 (21) 58 18 71 72
Telefax: +86 (21) 58 18 71 70
Internet: www.pleiger.cn
E-Mail: service@pleiger.cn