

GESTRA

Special

15 ppm Oil Alarm for Bilge-Water Oil Separators on Seagoing Ships

IMO Resolution MEPC.107(49)

- *From pure transmitted light measurement to the transmitted/scattered light method with data storage and GPS positioning*
- *Approval as per IMO Resolution MEPC.107(49)*

The oil and turbidity detector OR 52-7 meets the new IMO MEPC.107(49) and offers even more

The stricter requirements for oil separators and their monitoring devices serve primarily to improve the level of environmental protection.

Besides the corresponding applications for land-based boiler plants, the safety equipment for steam boilers, condensate and bilge-water monitoring units on ships has been a major area of application of GESTRA industrial electronics for over 40 years now. Here our technical developments are continuing to set new standards.

A special focus is placed on the monitoring of the oil separation for bilge water, with the aim of protecting the oceans against pollution.

Since the advent of modern quality control methods, condensate and bilge-water monitoring has played an increasingly important role.

Today, condensate monitoring units with TÜV and GL type approval belong as much to our range

of standard products as the 15 ppm oil-content analysers with alarm function.

The basis for approval of the condensate monitoring units is provided by the VdTÜV bulletin "Water Monitoring 100", whereas the 15 ppm oil-content analysers with alarm function must meet the demands of IMO Resolution MEPC.107(49). This Resolution forms a part of the International Convention for the Prevention of Pollution from Ships (MARPOL).

What developmental steps were taken?

Early efforts in solving the problem of detecting foreign substances (such as oil, grease, petrol and dairy products) applied the principle of measuring the light refracted by the corresponding impurities in condensate or bilge water.

The first generation of devices of the type OR 34S were based on the measurement of transmitted light only.

In this arrangement, the light beam was emitted by a source mounted in a hanging DN 40 bypass, sent through two sightglasses and the medium being monitored, and then picked up by the receptor. Any ingress of foreign matter would deflect part of the light beam. This reduced the intensity of the received light and the unit would trigger an alarm.

However, in the course of the service life of these devices, it became evident that lamp ageing and impurities, which caused soiling of the glasses and discolouration of the medium, tended to trigger false alarms.

This situation was no longer acceptable!

In conjunction with the advancement of the monitoring units OR 52-3 (consisting of ORG 12 and ORT 5), and OR 52-5 (consisting of ORG 12 and ORT 6), a combination of the transmitted light and scattered light approaches was applied for the first time. This was an innovative technical solution that allowed the granting of a type approval for the oil and turbidity detectors used in land-based boiler plants as per VdTÜV bulletin "Water Monitoring 100" and GL and IMO approval by See-BG (Bilge Oil) for condensate and 15 ppm oil separators on seagoing ships.

A major difference to the old systems was that the former transmitted-light channel was used exclusively for the system self-check. Here the intensity of the light beam is adapted to the corresponding condition of the condensate being monitored.

Thanks to this feature, the system comes very close to being "self-monitoring", since any malfunctions are detected automatically. The scattered light channel is used for actually monitoring the medium for impurities and, in contrast to the first generation, makes it possible to display the level of contamination in ppm. The sensitivity range of these units already begins at 2 ppm.

Together with a redesign of the ORG sensor and the glass cylinder it contained, considerable savings were achieved in maintenance time, since the integrated cleaning device allowed flushing of the glass cylinders during normal operation.

For condensate monitoring in 72h operation with TÜV approval as per WÜ 100, there are hardly any other suppliers apart from GESTRA.

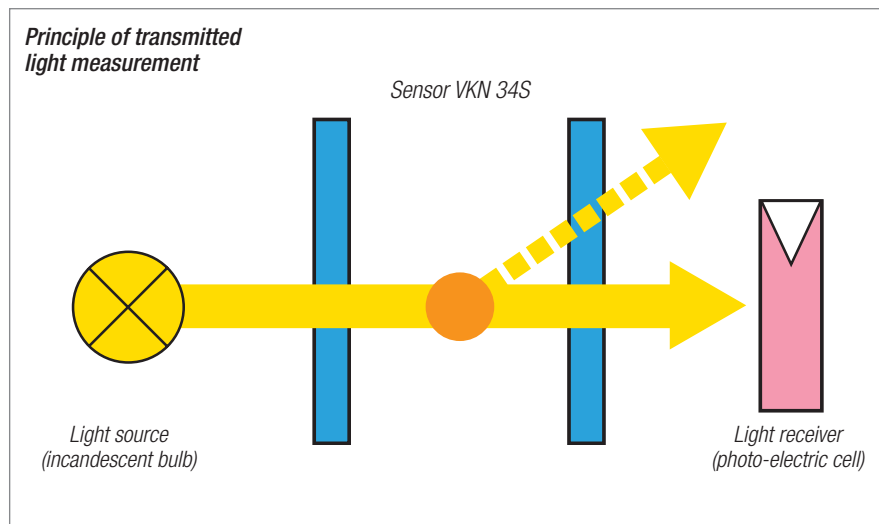
The first generation utilized the principle of transmitted light measurement.



Sensor VKN 34S



Measuring transducer VR 11S





Measuring transducer ORT 5 plus ORG 12



Sensor ORG 12



Measuring transducer ORT 6 plus ORG 12

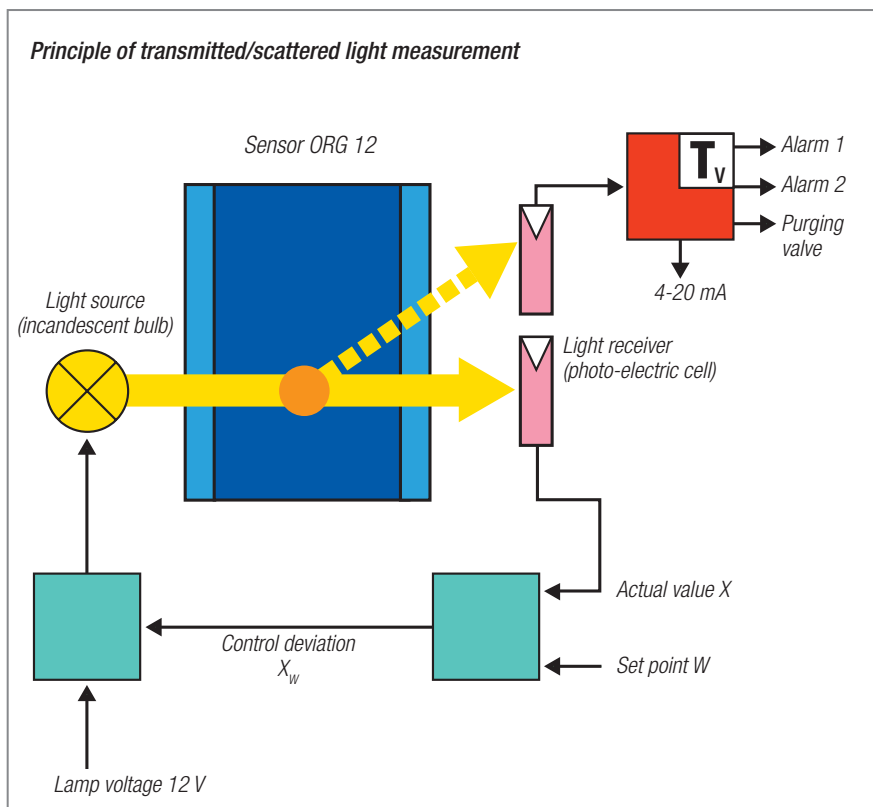
State of the Art

The new system OR 52-7 has arisen out of a symbiosis of the proven ORG 12 measurement technology and the demands set out in the Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilges of Ships (MEPC.107(49)). It consists of the sensor ORG 12 and the measuring transducer ORT 7. Approval 320.030 has been issued by the German maritime authority See-BG.

What are the main improvements offered by the system?

The table alongside gives you the main test requirements regarding the substances to be considered and the requirements for the evaluation and documentation of alarm and status messages.

The sensor ORG 12 has not been changed, i.e. the GL-approved version is still used. However, the measuring transducer ORT 7 has been re-engineered to cater for this special application. The optional GPS and PC interfaces offer completely new possibilities that meet the needs of our customers. The key features of the new development include not only the improved data logging, faster response time and the LCD display, but above all the extended possibilities for data storage.



Measuring transducer ORT 7



Sensor ORG 12

Test substances	Old	New
1. Residual oil	Density at 15 °C > 980 kg/m ³	Type RMG 35 as per ISO 8217
2. Distillate oil	Density at 15 °C > 830 kg/m ³	Type DMA as per ISO 8217
3. Emulsified mixture	—	Fresh water, oils as given in items 1. & 2. and Fe ₃ O ₄ (black magnetite) and a surfactant (tenside)
4. Colour test	Black ink	Fe ₃ O ₄
Requirements for the analysing unit		
Accuracy		+/- 5 ppm
Units serialized	—	yes
Data storage	—	18 months
Response time	—	5 sec.
Storage of	—	Date, time, alarm, malfunction, separator malfunction, purging ON/OFF (GPS data optional)
Optimization / options		
Display	3-digit 7-segment LED	7-row LCD display
PC interface	—	yes/optional
GPS interface	—	yes/optional

Example for the ORT 7 displays

FLOWERVE GESTRA	
Device:	ORT 7
Certif:	IMO MEPC.107(49)
Ser.-Nr.:	392358
Vers.:	311137.10

Oil Content:	
8	ppm
State:	ready
UTC:	10:46 2007-10-30

Oil Content:	
0	ppm
State:	Clear Water ON
UTC:	12:18 2007-10-30

Optional extension of functions



The memory card – an important building block of the new technology

The design of the memory card ensures that the recorded time, date, alarm, malfunction and status messages are stored for 18 months, as required by IMO Resolution MEPC.107(49).

Once the capacity limit of the card is reached, the oldest message will be overwritten, which means that the card does not have to be exchanged.

The memory card is encoded with the serial number of the associated oil and turbidity detector OR 52-7 and, as a consequence, only this particular device can write data on the card. All other measuring transducers of the type ORT 7 are only able to read the data stored on the card.

Display of the Data

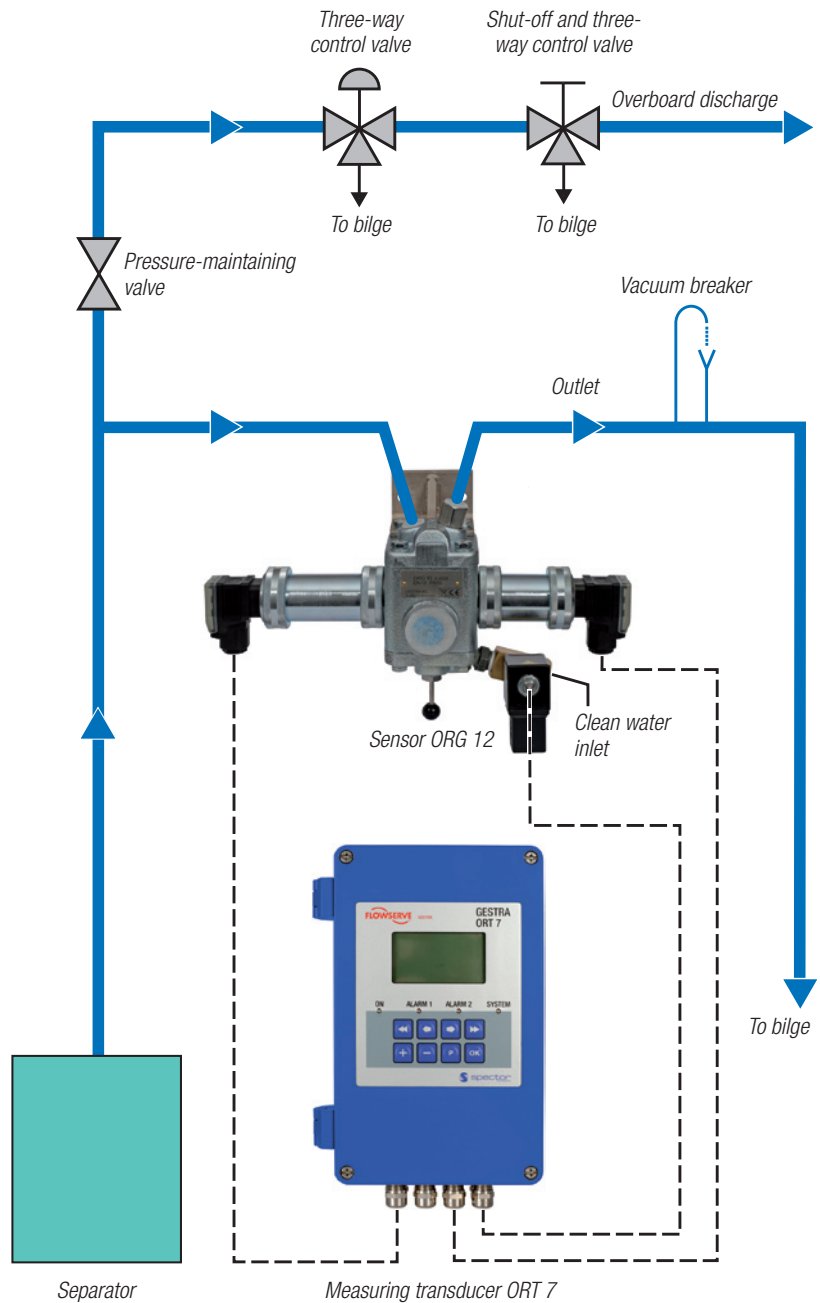
According to IMO Resolution MEPC.107(49), the time, date, alarm, malfunction and status messages must be stored. Every hour, the unit stores the status for Oil Content, Alarm 2, Clear Water and Separator and additionally also every change in status for ON/OFF Alarm 2, Geographic Position (with the optional GPS interface), ClearWater and Separator. Through the optional PC interface, there is also the possibility of reading out the data and thus implementing long-term storage and/or evaluation of the data in Excel format.

Data Logger	
Time:	UTC 10:43
Date:	08.05.2003
Pos.:	N 53° 5' 3"
Oil:	8 ppm Ala: Off
Clw:	Off Sep: On

Data Logger	
Time:	UTC 10:43
Date:	08.05.2003
Pos.:	N 53° 5' 3"
Oil:	8 ppm Ala: Off
Clw:	Off Sep: On
dT:	Month OK: back

Example of the data display with GPS coordinates

Installation example for ORT 7 and ORG 12





GESTRA AG

Münchener Strasse 77, D-28215 Bremen
P.O. Box 10 54 60, D-28054 Bremen
Telephone +49 (0) 421-35 03-0
Telefax +49 (0) 421-35 03-393
E-Mail gestra.ag@flowserve.com
Internet www.gestra.de

