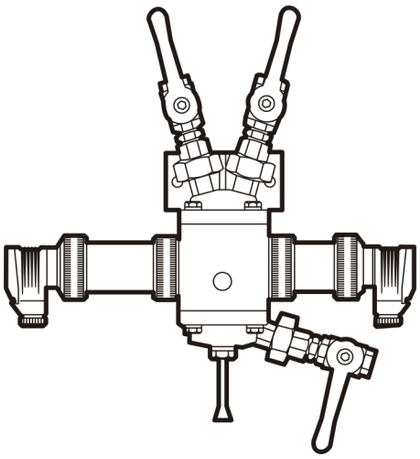
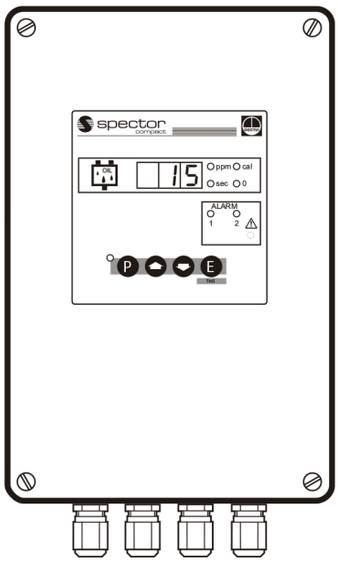
Turbiscopio OR52-6



Measuring sensor ORG 12, ORG 22



Measuring transducer ORT 6

Oil and Turbidity Detector TURBISCOPE
OR 52/5, OR 52/6

Description

Use oil and turbidity detector OR 52 only for monitoring transparent liquids to detect any ingress of light-scattering and insoluble foreign matter.

The oil and turbidity detector OR 52-5/-6 consists of a type ORG 12 or ORG 22 measuring sensor and type ORT 6 measuring transducer that acts as an operating and display unit. The correct measuring sensor is selected depending on the fluid used.

The oil and turbidity detector is used to detect impurities in transparent liquids. The equipment is mainly employed in industry and the food sector, in which high levels of reliability and ease of maintenance are essential.

Typical applications

- In steam boiler and hot water plants, the oil & turbidity detector can monitor any ingress of oil or grease into the condensate, the feed water or the water circuit (EN 12952-7, EN 12953-6, TRD 604 sheet 1). 2 devices are required for 72 hrs. operation.
- In addition, the oil & turbidity detector is suitable for monitoring untreated and treated water (gravel filters, demineralisation plants, reverse osmosis systems) as well as waste water..
- In the food sector, the oil & turbidity detector is used in the brewing and beverage industry (filtration, monitoring of flavouring, quality assurance, etc.) and for monitoring filtration in the production of cooking oil.

Function

The measuring sensor is a photometric measuring device. It consists of a light source (light emitter) and two photoelectric cells that make up a light receiver. A constantly maintained beam of light shines through the transparent liquid. Undissolved foreign particles scatter the beam, which is measured using the 15° forward-scattered light principle. This scattered light is then converted into an electrical current and analysed to determine the content of foreign matter.

The measuring transducer is the operating and display unit for actuating the measuring sensor and analysing the signals. It visually displays the measurement results and is used to set the measuring equipment. It displays the actual value, the triggering of ALARM 1 and ALARM 2 limit alarms and malfunctions in the measuring sensor. Limit values are set and displayed on the measuring transducer.

Directives and Standards

VdTÜV Bulletin "Wasserüberwachung 100" (= Water Monitoring 100)
The oil and turbidity detector OR 52-5/-6 is type-approved for condensate and feedwater monitoring in accordance with the VdTÜV Bulletin "Wasserüberwachung 100" (= Water Monitoring 100)
Type approval: TÜV · WÜF · XX-009.
The VdTÜV Bulletin "Water Monitoring 100" states the requirements made on water monitoring equipment.

LV (Low Voltage) Directive and EMC (Electromagnetic Compatibility)
The equipment conforms to the requirements of Low Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU.

Approvals for Marine Applications
The equipment is approved for monitoring condensate and feedwater systems on board of seagoing vessels.

ATEX (Hazardous Area)
According to the European Directive 2014/34/EU the equipment must **not** be used in potentially explosive areas. Application in Ex zones on request.

UL/cUL (CSA) Approval
The equipment complies with the requirements of the following standards: UL 508 and CSA C22.2 No. 14-13, Standards for Industrial Control Equipment. File E243189.

Technical Data

Measuring sensor ORG 12, ORG 22

Service pressure
PN 10, 10 bar at max.120°C

Mechanical connections
DN 10, screwed G 3/8 A, ISO 228

Flowrate
0.5 – 50 l/min

Pressure drop
5 [mbar] [1]

Fluids
Water, condensate, drinks, etc.

Max. pH value of the fluid [2]
10.5

Fluid temperature ranges
0°C – 60°C (with drying cartridge)
60°C – 120°C (with vent nipple)

Ambient temperature
0 – 60°C

Weight
approx. 6.8 kg

Materials of construction

Body
0.6025 galvanized

Cover
ORG 12: 0.6025 galvanized ORG 22: 1.4580

[1] At a flowrate of 2 l/min and V-shaped flow through the sensor with a pipe length of 1 m (DN 10), 4 bends and $\zeta = 6.1$.
[2] A pH value > 10.5 will lead to wear of the glass, depending on the temperature.

Oil and Turbidity Detector TURBISCOPE

OR 52-5
OR 52-6

Technical Data - continued -

Measuring sensor ORG 12, ORG 22 - continued -

Wetted parts
ORG 12: 0.6025 galvanized ORG 22: 1.4580

Ball valves
ORG 12: Brass 58 ORG 22: 1.4436

Screwed unions
ORG 12: Steel ORG 22: 1.4571

Glass cylinder
Duran 50

Gaskets
Silicone

Cleaning disc
EPDM

Light emitter
Glow lamp 12 V / 10 W BA 15s
Protection IP 65

Light receiver
2 Silicon photo-electric cells
Protection IP 65

Measuring transducer ORT 6

Inputs
Directly transmitted light (D), scattered light (S)

Outputs
1 Voltage output for light emitter /,
1 – 12 V pulse-amplitude modulated
3 Volt-free change-over contacts
(alarm 1 and 2, malfunction)
Contact material AgNi 0.15
Max. contact rating for switching voltages 24 AC/DC,
115 V and 230 V AC: resistive / inductive 4 A
1 Current output 4 – 20 mA, max. load 500 ohm

Measuring range
0 – 25 ppm (ppm = parts per million)
Other ranges available on request

Actual value output
4 mA ≙ 0 ppm, 20 mA ≙ 25 ppm

Adjustment range, limit value for alarms 1 and 2
Adjustable between 0 and 15 ppm

Indicators and adjustors
4 membrane keys
8 LEDs for indicating operating modes and dimensions
1 three-digit seven-segment display for actual value, limit value and fault indication
3 internal LEDs for monitoring system voltages

Adjustment range for time delays for alarm 1 and 2
0 to 20 seconds
Other ranges on request

Mains voltage
230 V +10 / –15 %, 50 – 60 Hz
115 V +10 / –15 %, 50 – 60 Hz (optional)
24 V +10 / –15 %, 50 – 60 Hz (optional)

Power consumption
25 VA

Fuse
Thermal fuse M 0.2 A 5 x 20 at 230 V
Thermal fuse M 0.4 A 5 x 20 at 115 V
Thermal fuse M 1.0 A 5 x 20 at 24 V

Housing
Field case for wall mounting

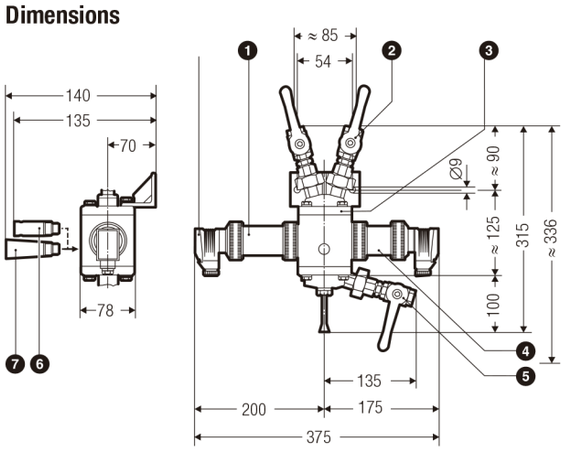
Housing material
Die-cast aluminium

Protection
IP 65 to EN 60529

Admissible ambient temperature
0 °C – 55 °C

Weight
approx. 3.6 kg

Dimensions



Key

1. Light emitter with tube (can be interchanged with 4)
2. G 3/8 A ISO 228
3. Upper flange with two connections can be interchanged with lower flange
4. Light receiver with tube (can be interchanged with 1)
5. G 3/8 A ISO 228
6. Vent nipple
7. Drying cartridge
8. Cable gland M 16 x 1.5
9. Body made from die-cast aluminium

Fig. 1 Measuring sensor ORG 12, ORG 22

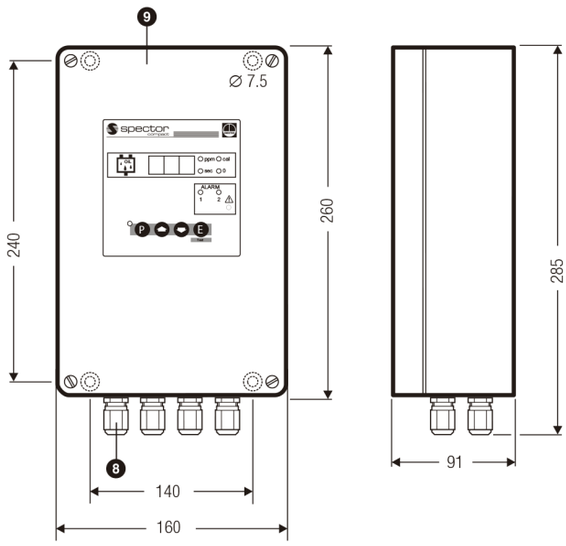


Fig. 2 Measuring transducer ORT 6 (field case for wall installation)

Scope of supply

Parts supplied	OR 52/5	OR 52/6	Ref. number (230 V)	Ref. number (115 V)
Measuring transducer	ORT 6	ORT 6	392 099	392 106
Measuring sensor incl.	ORG 12	ORG 22	385 193	385 195
Ball valves	3	3	077 135	077 135
Screwed unions	3	3	077 133	077 133
Drying cartridge (supplied but not fitted)	1	1	077 139	077 139
Vent nipple (screwed in)	1	1	077 213	077 213
Turbidity standard 20 ppm (supplied but not fitted)	1	1	387 369	387 369

Approvals
TÜV type approvals acc. to VdTÜV Bulletin "Wasserüberwachung 100": (= Water Monitoring 100) Requirements made on water level monitoring equipment Type approval: TÜV · WÜL · XX-009, on board of seagoing vessels: GL 94855-94 HH

Oil and Turbidity Detector TURBISCOPE
OR 52-5
OR 52-6

Oil/Turbidity curves

When the scattered light is measured, its intensity is used to determine the concentration of suspended solids in the fluid. However, where the concentration of solids is the same, the scattered light intensity or degree of turbidity depends on:

1. the size of the particles (degree of emulsification)
2. the shape and composition of the particles
3. the optical properties of the particles

When turbidity is caused by oil and grease, the degree of emulsification is a decisive factor.

For examples see the following chart.

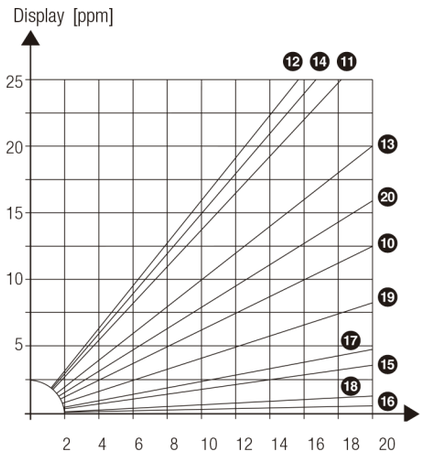


Fig. 3

⑩ Fuel oil EL, 15°C, coarse emulsification
⑪ Fuel oil EL, 15°C, fine emulsification
⑫ Fuel oil EL, 80°C, fine emulsification
⑬ Engine oil SAE15W40, 15°C, fine emulsification
⑭ Vegetable oil, 15°C, fine emulsification
⑮ Xylene, 20°C, fine emulsification
⑮ Xylene, 80°C, fine emulsification
⑰ Red berry juice, concentrated
⑰ Black berry juice, concentrated
⑲ Skimmed milk, fat content 0.1 %, based on fat concentration
⑳ Turbine oil T 68, gear oil M 68

Installation example of condensate monitoring in steam boiler systems

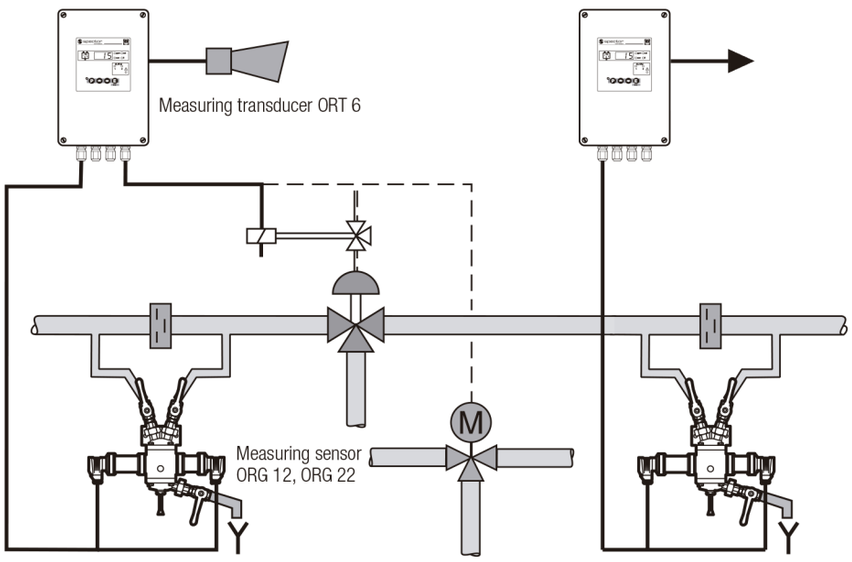


Fig. 4

Important Notes

Condensate monitoring

Installation

In steam boilers and hot-water plants the oil and turbidity detector can monitor water, condensate and feedwater systems for the ingress of oil and grease (EN 12952-7, EN 12953-6, TRD 604 sheet 1).

Fig. 4 shows a typical arrangement of the monitoring equipment with flow from left to right. If there is an ingress of oil or grease and the set limit value is exceeded, the first oil & turbidity detector actuates a three-way switch-over valve, to remove the contaminated water from the circuit.

In systems without continuous supervision (72 h operation), a second oil & turbidity detector monitors any continuing flow of water, and interrupts the system's safety circuit if the set limit value is exceeded.

Provide a throttling point in the main line, e.g. a non-return valve (GESTRA type RK 86 with special spring 20 mbar). Install the measuring sensor in a bypass at a lower level than the main line, so that any gas bubbles and flash steam are kept away from the sensor.

Tap the main line at the side from the bottom to prevent air and dirt particles from flowing into the bypass.

Live steam and flash steam affect measurements and must therefore be kept away from the sensor. For more information see installation instructions in the operating manual for the OR.

Oil and Turbidity Detector TURBISCOPE

OR 52/5
OR 52/6

Important Notes

Electrical connection

To connect the light emitter/receiver, please use a screened, multi-core control cable with a min. conductor size of 0.5 mm². For the light emitter e.g. 2 x 0.5 mm² and for the receiver e.g. 4 x 0.5 mm².

Connect the screen in the measuring transducer only once.

Max. line length between light emitter/receiver and measuring transducer 50 m.

To use alarm contact 1 for an initial alarm and alarm contact 2 for the main alarm, for instance, set two different limit values.

For condensate monitoring, alarm contact 1 can then be used to control a three-way valve, which will discharge the unusable condensate if the level of turbidity is too high (alarm caused by ingress of oil or start-up protection). Alarm contact 2 will then trigger the main alarm.

Note that alarm contacts 1 and 2 and the three-way switch-over valve will not be switched over in the event of a malfunction.

However, the malfunction can be included in the control of the three-way switch-over valve as shown in the wiring diagram **Fig. 6**.

Pneumatic valves can be actuated via solenoid valves.

Valves with a single-phase AC motor and max. power rating of 50 VA (see wiring diagram **Fig.5** or **Fig. 6**) can also be connected directly. Install a reversing contact in between in the case of three-phase actuators.

Order & Enquiry Specification

GESTRA Oil and Turbidity Detector TURBISCOPE, consisting of a measuring sensor with accessories and a measuring transducer.

- GESTRA Oil and Turbidity Detector OR 52/5, consisting of a measuring sensor ORG 12 (grey cast iron GG-25) and a measuring transducer ORT 6.
- GESTRA Oil and Turbidity Detector OR 52/6, consisting of a measuring sensor ORG 22 (stainless steel) and a measuring transducer ORT 6.

Supply voltage ..... V (230 V or 115 V).

Ancillaries

Three-way valve,
Pneumatic actuator, series 500 or
Three-way solenoid valve.
Electric actuator, series 200
Shut-off valve GAV
Non-return valve RK 86, 20 mbar opening pressure

Supply in accordance with our general terms of business.

Wiring diagram
Switch-over in the event of an alarm

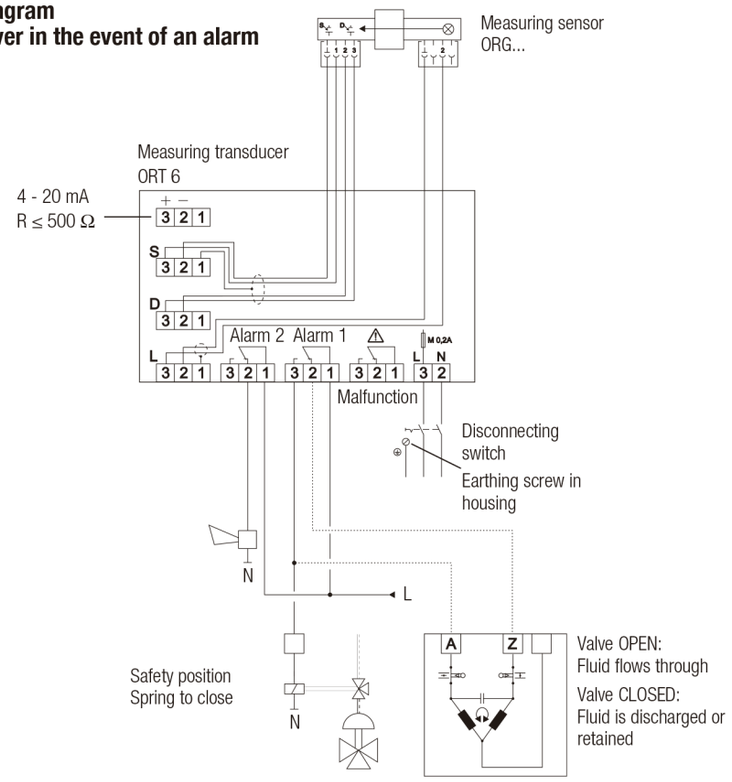


Fig. 5

Wiring diagram
Switch-over in the event of an alarm or malfunction

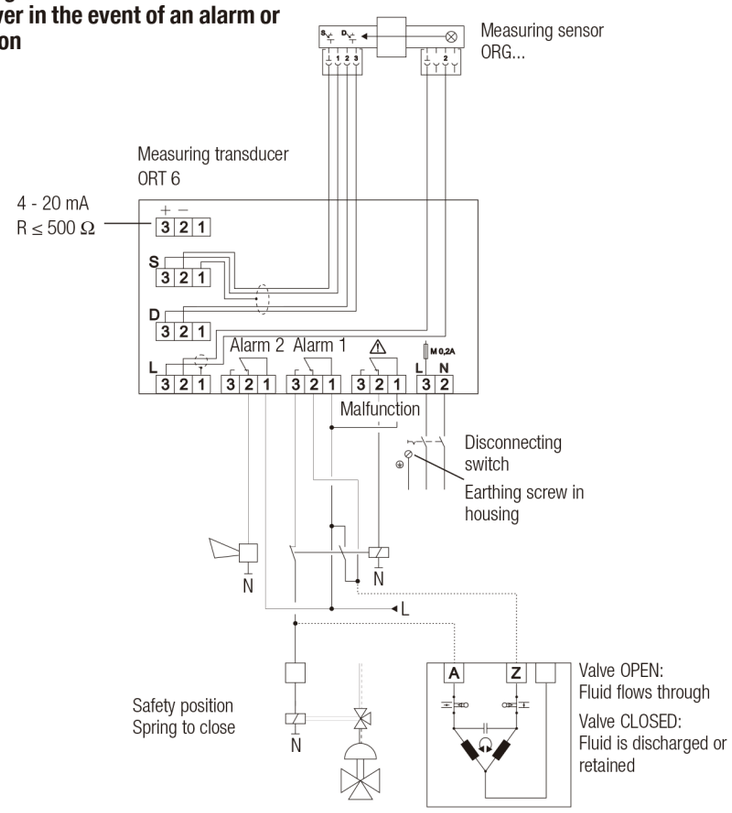


Fig. 6