LEVEL GAUGES AND VALVES FOR FLUIDS

DIESSE S.r.l. Fluid Control

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GLASS LEVEL GAUGES

- WITH REFLEX GLASSES
- WITH TRANSPARENT GLASSES
- WELD-ON TYPE
- WITH GLASS TUBE
- WITH MICROWAVE TRANSMITTER

Reflex level gauge with monolithic shut-off cocks
type DS LG - RTR MT18

Reflex level gauge
with ball valves
type DS LG - RTF SBB

Transparent level gauge with illumination lamp EEx d
type DS LG - TPF GR18

Level gauge with glass tube and protection type
DS LG - TVR GR18

Reflex level gauge
type DS LG - RDR GR18

Reflex level gauge
type DS LG - RBR GR18

Reflex level gauge
type DS LG - RBF GR18

Reflex level gauge
type DS LG - RTR MT18
GLASS LEVEL GAUGES

Glass level gauges give very accurate level readings, making them the ideal product for calibrating other instruments as well. They play a crucial role during system start-up.

![Diagram of a tank with glass level gauges]

So we can recommend the most suitable level gauge for a particular purpose, please provide the following data when asking for advice or a quote.

* essential data
- CENTRE-TO-CENTRE DISTANCE (distance between process connections)
- MINIMUM VISIBLE LENGTH REQUIRED
- TYPE OF CONNECTIONS (flanged-threaded-weld-on) and related STANDARDS (UNI-ANSI-DIN...)
- POSITION OF PROCESS CONNECTIONS
- POSITION OF THE VALVE HANDLING
- REQUIRED MATERIAL (wetted and non-wetted parts)
- TYPE OF FLUID
- DESIGN AND MAXIMUM OPERATING PRESSURES
- DESIGN AND MAXIMUM OPERATING TEMPERATURES
- ANY ADDITIONAL ACCESSORIES

TIPI DI LETTURA

The required visible length depends on the type of fluid and the shape of the tank. The visible length with a single glass varies from 95 mm to 320 mm. If the required visible length exceeds these measurements, additional glasses of the same length are joined together and mounted on a single bar.

To ensure continuous reading along a housing consisting of numerous glasses, one or more housings can be placed on the side at the points where the reading is interrupted.

![Diagram of single and multiple housings]

Single housing     Multiple housing     Multiple housing with continuous reading
GLASS LEVEL GAUGES

REFLEX LEVEL GAUGES

The level is ascertained using a glass which has a smooth side and a wetted prismatic side. The level of the fluid inside the level gauge is shown by using the optical principles of refraction: the wetted part fully absorbs light and so the fluid appears to be black. The part in contact with the gas, on the other hand, fully reflects light and so the gas appears to be of a very light colour.

The product line includes level gauges suitable for pressure ratings from PN10 to PN160 and a huge number of industrial process applications.

This type of gauge is recommended:
- for taking clear and simple readings (see counter-indications below)
- if you are looking for an inexpensive gauge which will also save you money on maintenance costs

Operating limits / Conditions:

Process:
Max. pressure: 160 bar @ 38°C (with GR18, MT18 or SHV type valves)
Max. temperature: 300°C (max. temperature allowed by borosilicate glasses as per the DIN 7061 standard - see page 1.69)

Steam: (see page 1.59)
Max. pressure: 22 bar (with GR18, MT18 or SHV type valves)
Max. temperature: 216°C (saturated steam @ 22 bar)

For saturated steam values > 20 bar, a low-maintenance transparent level gauge with mica shield protection should be used (see graph "glass loss caused by boiler water" for the estimated glass life). Not only does the glass life depend on the temperature, it depends on the pH of the water (the higher the value, the shorter the glass life).

The product is NOT suitable for use in the following instances:
- if exposed to corrosive fluid (e.g. caustic soda, hydrofluoric acid, citric acid ...)
- if exposed to high pressure steam
- if subjected to repeated thermal shocks
  - In the scenarios listed above, the glass must be protected with MICA or PCTFE shields, so a transparent level gauge is necessary
- for checking the level of separation between two immiscible fluids (interface)
- for checking the colour of a fluid (all fluids look very dark)
- in cases where the fluid is particularly viscous (a film may form on the glass which prevents you from taking an accurate reading)
- in cases where the fluid is particularly dark (the reflex principle is rendered ineffective)

Types:

<table>
<thead>
<tr>
<th>PN16</th>
<th>PN25/40</th>
<th>PN40/64</th>
<th>PN40/64</th>
<th>PN100/160</th>
<th>PN160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 150</td>
<td>Class 300</td>
<td>Class 300</td>
<td>Class 300</td>
<td>Class 600/900</td>
<td>Class 900</td>
</tr>
</tbody>
</table>
**REFLEX LEVEL GAUGES**

**Materials / Specifications:**

- **Connections between housing and cocks:**
  - with grinded pipes and stuffing box (view can be turned by the customer during installation)
  - fixed centre-to-centre distance with metal seal (view can be turned during manufacture)

- **Wetted parts:**
  - standard: galvanized ASTM A105 or A105 LF2 carbon steel, ASTM A182 F316L stainless steel
  - additional options: on request

- **Non-wetted parts:**
  - standard: galvanized carbon steel, AISI 316/316L stainless steel
  - additional options: on request

- **Gaskets:** (see page 1.71)
  - standard: graphite/copper (ASTM A105), graphite/AISI 316 (A105 LF2 and ASTM A182 F316L)
  - additional options: PTFE; other extras on request

- **Glasses:** (see page 1.69)
  - reflex borosilicate glasses, thermally pre-stressed and extra hard as per the DIN 7081 standard

- **Shut-off:** (see page 1.49)
  - standard: upper valve and lower valve (side/side)
  - additional options: on request

- **Drain:** (see page 1.50)
  - standard: threaded valve
  - additional options: on request

- **Vent:** (see page 1.50)
  - standard: blind (for grinded pipes version)
  - threaded with plug (for fixed centre-to-centre version)
  - additional options: on request

- **Tank connections:**

  - Flanged:
    - UNI standard: PN40 DN15 / DN20 / DN25
    - ANSI standard: #150 / #300 / #600 DN ½” / ¾” / 1”
    - additional options: on request

  - Threaded:
    - BSP (GAS) standard: ½”-M / ¾”-M
    - NPT standard: ½”-M / ¾”-M

  - Weld-on: from ½” to 1” BW or SW

- **Option:** further connections type or direct connections to the process without shut-off cocks (see page 1.49 for more details)

- **Drain, shut-off cocks, drain cock and vent cock:**
  - Cylindrical plug cocks (type GR18 or MT18 - see page 1.47)
  - Globe valves (type SHV - see page 1.48)
  - Push-button valves (type NPV - see page 1.48)
  - Ball valves (type SBB)

- **Spare parts:**
  - Our spare parts are interchangeable with those of major international manufacturers.

  For the full range of complete sets, turn to the spares section on page 1.69.

- **Accessories:**
  - Lower and/or upper safety ball, pusher for safety ball, calibrated scale, non-frosting extension, minimum level arrow, continuous reading, cocks handles lock (see page 1.55 for details)

- **Certifications (On request):**
  - ATEX
  - Tests and inspection by Notified Bodies
  - NACE MR0175
  - Others on request

**All Diesse products are individually checked and tested in accordance with company quality procedures and the industry regulations currently in effect.**

**Certificates can be issued on request.**
### Transparent Level Gauges

In this kind of level gauge, the fluid is held between two smooth glasses. The level can be identified as the fluid has a different level of transparency compared to gases and steam.

The transparent level gauge is particularly recommended for applications where the glass needs to be protected from corrosive fluids and high temperatures. A lamp can also be fitted behind the gauge to improve visibility in special operating conditions.

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#### This type of gauge is recommended:
- for use with corrosive fluids (protective shield for the glass is required)
- for steam with an operating pressure > 20 bar (protective shield for the glass is required)
- if repeated thermal shocks are likely (protective shield for the glass is required)
- for checking the interface (level of separation between two immiscible fluids)
- for checking the colour of a fluid
- for dirty / oily fluids

#### Operating limits / Conditions:

**Process:**
- Max. pressure: 160 bar @ 38°C (with cylindrical plug cocks or globe valves)
- Max. temperature: 300°C (max. temperature allowed by borosilicate glasses as per the DIN 7081 standard - see page 1.69)

**Steam:** (see page 1.59)
- Max. pressure: 70 bar (with cylindrical plug cocks or globe valves)
- Max. temperature: 280°C

#### Types:

<table>
<thead>
<tr>
<th>Type</th>
<th>PN25/40</th>
<th>PN40/64</th>
<th>PN64/100</th>
<th>PN100/160</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class 150/300</td>
<td>Class 300</td>
<td>Class 600</td>
<td>Class 600/900</td>
</tr>
</tbody>
</table>

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TRANSPARENT LEVEL GAUGES

Materials / Specifications:

<table>
<thead>
<tr>
<th>Connections between housing and cocks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- with grinded pipes and stuffing box (turned can be positioned by the customer during installation)</td>
</tr>
<tr>
<td>- fixed centre-to-centre distance with metal seal (turned can be positioned during manufacture)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wetted parts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- standard: galvanized ASTM A105 or A105 LF2 carbon steel, ASTM A182 F316L stainless steel</td>
</tr>
<tr>
<td>- additional options: on request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-wetted parts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- standard: galvanized carbon steel, AISI 316/316L stainless steel</td>
</tr>
<tr>
<td>- additional options: on request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gaskets: (see page 1.71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- standard: graphite/copper (ASTM A105), graphite/AISI 316 (A105 LF2 and ASTM A182 F316L)</td>
</tr>
<tr>
<td>- additional options: PTFE; other extras on request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Glasses: (see page 1.69)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- transparent borosilicate glasses, thermally pre-stressed and extra hard as per the DIN 7081 standard</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shut-off: (see page 1.49)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- standard: upper valve and lower valve (side/side)</td>
</tr>
<tr>
<td>- additional options: on request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drain: (see page 1.50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- standard: threaded valve</td>
</tr>
<tr>
<td>- additional options: on request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vent: (see page 1.50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- standard: blind (for grinded pipes version)</td>
</tr>
<tr>
<td>- threaded with plug (for fixed centre-to-centre version)</td>
</tr>
<tr>
<td>- additional options: on request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tank connections:</th>
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</thead>
<tbody>
<tr>
<td>Flanged:</td>
</tr>
<tr>
<td>- UNI standard: PN40 DN15 / DN20 / DN25</td>
</tr>
<tr>
<td>- ANSI standard: #150 / #300 / #600 DN ½&quot; / ¾&quot; / 1&quot;</td>
</tr>
<tr>
<td>- additional options: on request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Threaded:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- BSP (GAS) standard: ½&quot;-M / ¾&quot;-M</td>
</tr>
<tr>
<td>- NPT standard: ½&quot;-M / ¾&quot;-M</td>
</tr>
</tbody>
</table>

Weld-on: from ½" to 1" BW or SW
Option: further connections type or direct connections to the process without shut-off cocks (see page 1.49 for more details)

<table>
<thead>
<tr>
<th>Shut-off cocks, drain cock and vent cock:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Cylindrical plug cocks (type GR18 or MT18 - see page 1.47)</td>
</tr>
<tr>
<td>- Globe valves (type SHV - see page 1.48)</td>
</tr>
<tr>
<td>- Push-button valves (type NPV - see page 1.48)</td>
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<tr>
<td>- Ball valves (type SBB)</td>
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</tbody>
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<thead>
<tr>
<th>Spare parts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our spare parts are interchangeable with those of major international manufacturers.</td>
</tr>
<tr>
<td>For the full range of complete sets, turn to the spares section on page 1.69.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mica or PCTFE protective shield for the glass, flameproof and watertight illumination lamp (ATEX approved), lower and/or upper safety ball, pusher for safety ball, calibrated scale, non-frosting extension, minimum level arrow, continuous reading, cocks handles lock (see page 1.55 for details)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Certifications (On request):</th>
</tr>
</thead>
<tbody>
<tr>
<td>- ATEX</td>
</tr>
<tr>
<td>- Tests and inspection by Notified Bodies</td>
</tr>
<tr>
<td>- NACE MR0175</td>
</tr>
<tr>
<td>- Others on request</td>
</tr>
</tbody>
</table>

All Diesse products are individually checked and tested in accordance with company quality procedures and the industry regulations currently in effect.
Certificates can be issued on request.
This type of level gauge is designed to be welded onto the tank and withstand the pressure inside it.

It is made from both carbon steel and stainless steel and can take reflex and transparent glasses. Reflex glasses are recommended as they improve visibility.

In order to prevent warping or distortions while the level gauge is in service, the technician tasked with installing the product must reinforce the wall of the tank where the gauge is to be welded on.

For visible lengths exceeding 320 mm, we recommend welding additional gauges on different axes to avoid weakening the tank structure.

During welding operations (which must only be carried out prior to gauge assembly), special care must be taken to avoid exposing the weld-on base to high temperatures for long periods of time as this may comprise the resistance of the gauge when in operation.

**Operating limits / Conditions:**

**Process:**
- Max. pressure: ANSI 300 rating (A105: 51 bar; AISI 316L: 49.6 bar) @ 38°C
- Max. temperature: 300°C (max. temperature allowed by borosilicate glasses as per the DIN 7081 standard - see page 1.69)

On request: ANSI 600 rating (A105: 102 bar; AISI 316L: 99.3 bar) @ 38°C

**Materials / Specifications**

**Weld-on base:**
- standard: flat with a hole running along the whole visible length
- additional options: with radius (state the tank radius); with 2 holes (Ø: 15 mm) at the far ends of the visible length

**Wetted parts:**
- standard: galvanized ASTM A105 or A105 LF2 carbon steel, ASTM A182 F316L stainless steel
- additional options: on request

**Non-wetted parts:**
- standard: galvanized carbon steel, AISI 316L stainless steel
- additional options: on request

**Gaskets:** (see page 1.71)
- standard: graphite
- additional options: PTFE; other extras on request

**Glasses:** (see page 1.69)
- reflex or transparent borosilicate glasses, thermally pre-stressed and extra hard as per the DIN 7081 standard

**Spare parts:**
Our spare parts are interchangeable with those of major international manufacturers.

For the full range of complete sets, turn to the spares section on page 1.69.

**Accessories:**
Mica or PCTFE protective shield (for transparent glass only), calibrated scale, non-frosting extension, minimum level arrow (see page 1.55 for details)

**Certifications (on request):**
- NACE MR0175
- Others on request

This kind of level gauge can only be tested once it has been welded on to the tank in question.

All Diesse components are individually checked and tested in accordance with company quality procedures and the industry regulations currently in effect.

Certificates can be issued on request.
Level gauges with a glass tube are an inexpensive but valid option for checking the level of non-hazardous or non-reactive fluids in unpressurised tanks.

An external metal protection of the glass tube is recommended.

Available configurations:

Borosilicate glass tube. Diameter: 16 mm; thickness: 2.5 mm.

Centre-to-centre distance with a single tube: 3000 mm.
Visible length (without protection): centre-to-centre distance - 95 mm.
Visible length (with protection): centre-to-centre distance - 135 mm.
Spare glass tube: centre-to-centre distance - 30 mm.
Spare protection: centre-to-centre distance - 100 mm.

In the event of greater centre-to-centre distances, additional pipes can be connected up via middle terminals for glass tube.

Operating limits / Conditions:

Process:
Max. pressure: 5 bar @ 38°C (the max. pressure also depends on the length and temperature)
Max. temperature: 120°C

The product is NOT suitable for use in the following instances:
- if it is likely to be exposed to vibrations (glass tube will break)
- if the installation is situated by a walkway (possibility of blows/impact)
- if exposed to steam (shortens glass tube life)
LEVEL GAUGES WITH GLASS TUBE

Materials / Specifications
Transparent tube: grade 3.3 borosilicate glass
Glass protection (optional): AISI 304 stainless steel
Wetted parts:
- standard: galvanized ASTM A105 or A105 LF2 carbon steel, ASTM A182 F316L stainless steel
- additional options: on request
Non-wetted parts:
- standard: galvanized carbon steel, AISI 316/316L stainless steel
- additional options: on request
Gaskets: (see page 1.72)
Cocks:
- standard: graphite/copper (ASTM A105), graphite/AISI 316 (A105 LF2 and ASTM A182 F316L)
- additional options: PTFE; other extras on request
Sealing gasket:
- standard: EPDM
- additional options: graphite or PTFE; other extras on request
Shut-off: (see page 1.49)
- standard: upper valve and lower valve (side/side)
- additional options: on request
Drain: (see page 1.50)
- standard: threaded valve
- additional options: on request
Vent: (see page 1.50)
- standard: blind
- additional options: threaded with plug; other extras on request

Tank connections:
Flanged:
- UNI standard: PN40 DN15 / DN20 / DN25
- ANSI standard: #150 DN ½" / ¾" / 1"
- additional options: on request
Threaded:
- BSP (GAS) standard: ½"-M / ¾"-M
- NPT standard: ½"-M / ¾"-M
Weld-on: from ½" to 1" BW or SW
Option: further connections type or direct connections to the process without shut-off cocks (see page 1.49 for more details)

Shut-off cocks, drain cock and vent cock:
- Cylindrical plug cocks

Spares:
Our spare parts are interchangeable with those of major international manufacturers.
For the full range of complete sets, turn to the spares section on page 1.69.

Accessories:
Stainless steel "U" protection, lower and/or upper safety ball, pusher for safety ball, calibrated, non-frosting extension, minimum level arrow, continuous reading, cocks handles lock (see page 1.55 for details)

Certifications (on request):
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For this kind of gauge the pressure test can be performed only on the cocks (on request), glass tubes cannot be tested due to their fragility.
All Diesse components are individually checked and tested in accordance with company quality procedures and the industry regulations currently in effect.
Certificates can be issued on request.
Diesse has been granted a European patent for the glass level gauge equipped with a microwave transmitter, which allows to get, with 2/4-wire, 4-20mA, Hart-Profield PA or Foundation fieldbus output signal. Traditional visual readings can also be taken by glasses.

The equipment is suitable for use with most liquids and can be installed in both non-explosive and in potentially explosive atmospheres (ATEX certified).

In addition, it can be used as an overflow safety device thanks to the SIL (safety integrity level) of the microwave transmitter.

The standout features of this type of gauge are as follows:

- Remote and in situ indication/transmission of liquid level
- Ability to programme adjustable thresholds (alarm and/or control signals) in proportion to the gauge length
- Automatic analogue/digital control via system accessories (relays, regulators etc.)
- Actual/visible level readings appear in real time with the process management analogue/digital parameters. No risk of discordance.
- Two types of parameters on a single process connection: visual mechanical parameters and analogue/digital control parameters
- Pressure and temperature readings can be taken in addition to the usual metric level readings and are shown on one or more displays
- Control and alarm signals can be remotely transmitted

**HOW DOES IT WORK?**

High frequency microwave pulses are 'guided' along a cable positioned in the centre of the level gauge housing. When the pulses reach the surface of the fluid, they are reflected back up the guide to electronic processors. A microcontroller then processes the reflected microwaves, converting them into legible level or volume data.
LEVEL GAUGE WITH MICROWAVE TRANSMITTER

TECHNICAL SPECIFICATIONS:

MATERIALS:
Cable: 316 stainless steel; diameter: 1 mm
Gasket: FPM (Viton), EPDM or Kalrez 6375
Process connection: 316L stainless steel, ¾” BSP (GAS); other materials available on request

COVER/PROTECTION:
Resin, aluminium or 316L stainless steel

ELECTRICAL CONNECTION:
M20 x 1.5 mm or ½” NPT

OPERATING CONDITIONS (*):
Pressure: up to 400 bar
Operating temperature: -200 + 400°C
Ambient temperature: -20 + 80°C

OUTPUT SIGNAL:
Standard: 4…20mA, Hart-Profibus PA or Foundation fieldbus

ACCURACY:
+/- 5 mm

ELECTRONIC POWER SUPPLY:
(4…20mA/Hart loop powered)
Standard (non Ex): 14-36 VDC
EEEx ia version: 10-30 VDC
EEEx d version: 20-36 VDC

OPTIONAL ACCESSORIES:
Integrated or remote display and calibration module

INGRESS PROTECTION:
IP 67

EXPLOSION PROTECTION:
ATEX II 1G, 1/2G, 2G EEEx ia IIC T6
(EEEx ia version: ATEX II 1/2G, 2G EEEx ia IIC T6)

(*) the operating limits of the glass level gauge with microwave transmitter are the same as those listed in relevant sections of the reflex and transparent level gauge pages

Accessories / Certifications:
Please refer to the reflex/transparent glass level gauge sections.
Magnetic level gauge indicates the level of fluid inside a tank by using the magnetic properties of its elements.

A by-pass (which mainly consists of a tube longer than the fluid range) is connected to the tank containing the fluid whose level is to be measured. A float containing a magnet moves up and down the tube, and its position determines the tank fluid level (the level is clearly indicated by red and white markers).

Variation in fluid level causes the float to move and the float magnet then makes the roller display (which also contains a magnet) rotate. Red markers are normally shown in the part of the tank holding the fluid and white markers in the part containing the gas/steam.
MAGNETIC LEVEL GAUGES

Magnetic level gauges are built exclusively according to the centre-to-centre distance specified by the customer. The reading length usually matches the centre-to-centre distance.

The roller display reading point and the height of the level switches can be adjusted quickly and easily thanks to specially designed clamping brackets. The simple mounting principle means that electronic accessories can be fitted to the gauge at a later stage.

The materials used to manufacture the gauges differ depending on their intended use. Given that the level gauge works as a result of its magnetic properties, no ferromagnetic materials have been used in its construction. The standard model features an AISI 316L stainless steel tube and float, but there are various alternatives: synthetic polymer, special alloy or PTFE lined tubes, as well as titanium, PVDF, PVC, PTFE or PP floats.

Diesse also offers a wide range of optional accessories, including: shut-off valves, drain valves, vent valves, calibrated scale, bistable switches and level transmitters (described later on in the catalogue).

We can recommend the most suitable level gauge for a particular purpose, but please provide the following data when asking for advice or a quote.

* essential data
  * CENTRE-TO-CENTRE DISTANCE (distance between process connections)
  * TYPE OF CONNECTIONS (flanged-threaded-weld-on) and related STANDARDS (UNI-ANSI-DIN...)
  * POSITION OF PROCESS CONNECTIONS
  * POSITION OF THE VALVE HANDLING
  * TYPE OF FLUID
  * SPECIFIC WEIGHT OF FLUID
  * DESIGN AND MAXIMUM OPERATING PRESSURES
  * DESIGN AND MAXIMUM OPERATING TEMPERATURES
  * ANY ADDITIONAL ACCESSORIES

Magnetic level gauges are suitable for a wide range of applications and are a perfect alternative to glass level gauges if the latter cannot be used safely. They are particularly recommended:

- in cases where a particularly accurate fluid level reading is not necessary
- in cases where the maximum pressure and temperature values exceed those listed in the technical specifications of the glasses
- if remote readings have to be taken (e.g. if the level gauge is positioned above or a considerable distance away from the observer’s position)
- if continuous readings using a remote gauge situated some distance away from the system are necessary
- if one or more signals (i.e. alarm signals) are required to indicate various tank liquid levels
- if the centre-to-centre distance exceeds 3 metres
MAGNETIC LEVEL GAUGES

DIESSE magnetic level gauges are manufactured and certified in accordance with the strictest international standards.

Aside from the type of fluid in the tank, the choice of level gauge mainly depends on the operating and design temperature/pressure values. These must always be clearly specified when asking for a quote or placing an order.

Magnetic level gauges differ in terms of their pressure ratings under operating conditions: low, medium and high.
MAGNETIC LEVEL GAUGES

Materials / Specifications:

The different versions available are as follows:

<table>
<thead>
<tr>
<th>Class</th>
<th>Chamber</th>
<th>Float</th>
<th>Housing / Rollers</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN 6 - PN 25</td>
<td>Stainless steel 316L</td>
<td>Stainless steel 316L</td>
<td>Aluminium / Brass epoxy painted</td>
</tr>
<tr>
<td>PN 25 - PN 40</td>
<td>Stainless steel 316Ti</td>
<td>Stainless steel 316Ti</td>
<td>Aluminium / Plastic (PBT)</td>
</tr>
<tr>
<td>PN 64 - PN 100</td>
<td>Stainless steel electro-polished</td>
<td>Titanium Grade 2</td>
<td>Aluminium / Ceramic</td>
</tr>
<tr>
<td>PN 160 - PN 250</td>
<td>Stainless steel PTFE-lined</td>
<td>Hastelloy B</td>
<td>With stainless steel cover /</td>
</tr>
<tr>
<td>PN 400</td>
<td>Stainless steel E-CTFE-coated</td>
<td>Hastelloy A</td>
<td>Plastic (PBT)</td>
</tr>
<tr>
<td></td>
<td>Titanium Grade 2</td>
<td>CF340</td>
<td>With stainless steel cover /</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PVC</td>
<td>Ceramic</td>
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</tbody>
</table>

Execution:

<table>
<thead>
<tr>
<th>With heating jacket</th>
<th>Hastelloy B</th>
<th>Hastelloy C</th>
<th>Stainless steel (6Mo) 1.4529</th>
<th>Polypropylene</th>
<th>PTFE</th>
<th>Borosilicate glass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid gas design</td>
<td></td>
<td></td>
<td>PTFE-lined</td>
<td>PVC</td>
<td>PVDF</td>
<td></td>
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<tr>
<td>E-CTFE-coated</td>
<td></td>
<td></td>
<td></td>
<td>Polypropylene</td>
<td></td>
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<tr>
<td>E-TFE-coated</td>
<td></td>
<td></td>
<td></td>
<td>PTFE</td>
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<tr>
<td>PVDF</td>
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<td>PP</td>
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<tr>
<td>PVC</td>
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<tr>
<td>Top mounted</td>
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</tbody>
</table>

Process connections position:
- Standard: side/side
- Additional options: side/bottom; top/side; top/bottom

Process connections type:
- Standard: with flanges, threaded tubes and butt weld tubes
- Additional options: shut off cocks (side/side) on request

Drain:
- Standard: threaded 1/2” with plug
- Additional options: threaded cock; other extras on request

Vent:
- Standard: threaded 1/2” with plug
- Additional options: threaded cock; other extras on request

Gaskets:
- Standard: graphite/AISI 316
- Additional options: PTFE/AISI 316, other extras on request

All Diesse products are individually checked and tested in accordance with company quality procedures and the industry regulations currently in effect.
Certificates can be issued on request.

Accessories:
Magnetic switch, Level transmitter, Control unit, Calibrated scale, Non-frosting extension, Minimum level arrow, Cut off cocks, Drain cock, Vent cock, Cocks handles lock (see from page 2.13)

Certifications (on request):
- ATEX
- Tests and inspection by Notified Bodies
- Others on request
Magnetic float switches are used to control distinct levels of a fluid. A float with a built-in magnetic system actuates a small reed contact through the wall of the guide tube. Therefore the switching operation is without direct contact to the fluid, free of wear and tear, and does not require any power supply. Contact denomination always refers to rising level of the fluid:
- S = Closing on rising level
- O = Opening on rising level
- U = Change-over

By using one float up to a maximum of 2 switch points the switching behaviour is bistable i.e. the switching state will remain the same even when the fluid moves further up and down. Contact are volt-free.
MAGNETIC FLOAT SWITCHES

TECHNICAL ADVANTAGES:

- The simple operating principle is suitable for a wide variety of applications
- Suitable for virtually all fluids
- Measurement of fluid levels independent of physical or chemical changes of the fluid (e.g. foam, conductivity, dielectric constant, S.G., pressure, vacuum, temperature, vapour, condensation, bubbles, boiling effects)
- Universal signal processing with PLC; Initiator circuit (NAMUR)
- Multiple switch points in one unit (up to 8)
- AS-Interface available, Ex / non-Ex
- Interface and product level measurement possible at Δ P.S. ≥ 50 Kg/m³
- Simple installation and commissioning, maintenance-free
- Application limits:
  - P = vacuum to 100 bar
  - T = -196°C to + 300°C
  - S.G. ≥ 400 Kg/m³
- High availability of corrosion resistant materials for applications in all industries: chemical, petrochemical and pharmaceutical industry, liquid natural gas, off-shore, ship-building, power plants, manufacturing industry, water treatment, food and beverages
- Application specific and explosion-proof designs available
- Float switches are simple devices without certification according EN50020/5.4
  As such, they are allowed to be used in Ex-area Zone 1, on condition, that they work with a certified intrinsically safe circuit in protection class EEx iib or higher

APPLICATIONS:

- Magnetic float switch with multiple switch points
- Magnetic float switch for 2-point control (min./max.)
- Magnetic float switch for high alarm (EEx i)
Magnetic float transmitters are used to measure and transmit the level of fluids in conjunction with a control unit. It is based on the float principle with magnetic transmission in a 3-wire potentiometer circuit.

A float with a built-in magnetic system actuates small reed contacts through the wall of the guide tube. These reed switches form a resistance measuring chain that continuously generates a voltage proportional to the height of the level.

Depending on requirements and design different contact separations from 5 mm to 18 mm are available.

Accuracy of level sensors / transmitters:
MAGNETIC FLOAT TRANSMITTERS

TECHNICAL ADVANTAGES:

- The simple operating principle is suitable for a wide variety of applications
- Continuous measurement of liquid levels independent of physical or chemical changes of the fluid (e.g., foam, conductivity, dielectric constant, S.G., pressure, vacuum, temperature, vapour, condensation, bubbles, boiling effects)
- Signal transmission over large distances
- Simple installation and commissioning, one-time calibration only, no re-calibration necessary
- Interface and product level measurement possible at Δ-S.G. ≥ 50 Kg/m³
- Application limits:
  - P = vacuum to 100 bar
  - T = -80°C to + 200°C
  - S.G. ≥ 400 Kg/m³
- High availability of corrosion resistant materials for applications in all industries: chemical, petrochemical and pharmaceutical industry, liquid natural gas, off-shore, ship-building, power plants, manufacturing industry, water treatment, food and beverages
- Application specific and explosion-proof designs available
- Programmable converter 4 mA ... 20 mA available (see from page 2.25)

APPLICATIONS:

Standard

Fieldbus

Ex - Zona 0

Ex - Zona 1, 2
The Diesse cylindrical plug cock is suitable for all kinds of applications in a number of different sectors. The seal is soft and is achieved by fitting a case between the vessel and the plug cock. 6 mm (type DS D12) and 8 mm (type DS D18) nominal passageway diameters are available. The three ways cylindrical plug manometer setting valve with control flange (type DS PM18) is soft sealing and the ideal product for securely fitting a manometer. The cock has a flanged connection for this purpose, which must be screwed in so that no loss occurs as a result of incorrect operation (when a control manometer is not connected).

**Code**

1. **Type**
   - DS D12: Two ways cylindrical plug cock with 6 mm bore
   - DS D18: Two ways cylindrical plug cock with 8 mm bore
   - DS PM18: Three ways cylindrical plug manometer setting valve with control flange

2. **Process connections**
   - Pos. 1: Nominal size
   - Pos. 2: Thread type
   - Pos. 3: Nominal pressure
   - 1/4" or 3/8" or 1/2"
   - BSP (GAS) or NPT
   - PN40 or PN160

3. **Materials**
   - Pos. 1: Wetted parts
   - CS Carbon steel ASTM A105 galvanized
   - LF2 Carbon steel A105 LF2 galvanized
   - SS Stainless steel AISI 316L
   - Pos. 2: Non-wetted parts
   - CS Carbon steel galvanized
   - SS Stainless steel AISI 316
   - Pos. 3: Gaskets
   - Standard Grafite
   - PF PTFE

**e.g.**
- DS D12 - 1/2"/BSP/MM/40 - CS/CS
The main function of these valves is to drain mud in hydraulic circuits. Diesse blow down valves must be installed downstream of a shut-off globe valve suitable for the intended use of the system. The seal is metal and, thanks to the tempered disc and stellited seat, the valve can be used with high temperature steam.