A Higher Level of Performance

Data Sheet

HAWK Magnetic Level Gauge

For more information, please visit www.hawkmeasure.com
Product overview

The HAWK Magnetic Level Gauge (MLG) is widely applied in the monitoring and process control of liquid level and interface for many industries; such as petroleum, chemical, power, paper, metallurgy, water treatment etc.

The SPI and TBI are the standard and special magnetic level gauges of HAWK. The products are suitable for real time, precise, safe and reliable continuous measurement of process level. The design adopts a 360° magnetic ring which is hermetically sealed and incompressible. The indicator uses hermetical sealed glass tube technology to clearly indicate the level, which eliminates the common problems of glass gauges, such as vapour, condensation and liquid leakage etc.

Why Choose HAWK?

• Global support and service
• Fast quotations and deliveries
• Innovative solutions for oil & gas applications
• Support of all major communication protocols
• Commissioning services - Remotely and on-site

Principle

Based on the principle of magnetic coupling and buoyancy, the magnetic level gauge provides real-time measurement for level and interface.

HAWK’s Magnetic Level Gauge (MLG) is connected to a process vessel. Within the chamber is a float containing a 360° magnetic ring. Outside of the chamber is an indicator equipped with a vacuum glass tube, which contains a bicoloured two-face magnetic bargraph. In response to the level movement, the float moves accordingly, forcing the magnetic bargraph to turn and change color. True liquid level is indicated or “read” from the corresponding point on the measuring scale.
**Product structure and features**

HAWK magnetic level has a simple modular design, composed of a main chamber and a float.

**Main Chamber**
- ANSI standard design or special manufacture
- Multi-forms installation and process connection
- Chamber Material: 304/304LSS, 316/316LSS, 317SS, 321SS, 347SS, Ti2, Hastelloy C-276, Zr-702, Nickel-6, 304+PTFE, CPVC and PP.

**Float**

The float is the key component of the level gauge, which magnetically couples to the outside indicator, liquid level switch and transmitter.

- Hermetically sealed incompressible
- 360° magnetic ring
- 316LSS, Hastelloy C-276, Zr-702, Nickel 6, Ti2, 304SS+PFA, grade V aviation titanium alloy and other materials
- Special structure and precision manufacturing technology of pulse TiG and laser weld
- Range of temperature: -320 to 1000°F (-196 to 538°C)
- Range of pressure: vacuum to 600 psig (vacuum to 42MPa)
- Suitable for harsh working conditions, such as HTHP, cryogenics and strong corrosion.
Product structure and features

Indicator
The indicator is composed of:

• 316SS or aluminium ruler
• Hermetically sealed glass tube with no contact with medium
• Magnetic bargraph is made from special high and low temperature - resistant materials
• Magnetic bargraph is mechanically interlocked to avoid random rotating
• Selectable engineering units
• Immune to oxidation, corrosion and the effects of dust

Applications

• Boiler: Steam drum liquid level
• Power generation: Auxiliary machinery liquid level (HP reheater, LP reheater, deaerator, condenser and heating network heater etc), chemical water
• Coal Chemical: Methanol, dimethyl ether, synthesis ammonia/urea, MTO, CTL, SNG
• Silicon industry: Organic silicon, polycrystalline silicon
• Petroleum and petrochemical: Oil and gas, ethylene, trimerization and etc.
• Fine Chemicals: Methane oxide, epoxy ethane, aniline, PTMEG, BDO, carbon fiber, POM,acetic acid, styrene, rubber, crude benzol refining
• Others: Metallurgy, paper-making, water treatment, biological, pharmaceutical, food and beverage etc.
Application I: High Temperature and High Pressure (HTHP) Application
- Designed for HTHP, all components are incompressible
- Maximum process temperature: 1000°F or 538°C
- Maximum process pressure: 6000 psig or 42MPa
- Suitable for boiler steam drums, power plant auxiliary machinery, hydrogenation and other HTHP working conditions

Application II: Low temperature / Ultra-low temperature application
- Designed for low temperature and frost prevention, all components hard and anti-compression
- Minimum process temperature: -320°F (-196°C)
- Absolutely avoids condensation, frost, freezing and etc.
- Suitable for ethylene, Rectisol and other low temperature/ultra-low temperature working conditions

Application III: Special Materials
- 304SS+PTEF, Hastelloy C-276, Zr 702, Ni-6 and etc.
- Wide range of temperature, pressure and corrosion resistance
- Acetic acid, acetic anhydride, chlor-alkali suitable for chemical industry and other corrosive working conditions

Application IV: Integrated Application
- Integrated application with level transmitters/switches
- Local indication and remote signal simultaneously
- Measure multiple process interfaces
- Reduced costs of product and maintenance
Product Application

HLG - Magnetic Level Gauge

- Single-chamber
- Multiple special materials available
- Chamber size: ANSI 2”/ 2.5”/ 3”
- Maximum pressure rating: ANSI 2500LB
- Multiple options for installation and process connection

Magnetic Level Gauge Technical Specifications

<table>
<thead>
<tr>
<th>Measuring Accuracy</th>
<th>±0.1” or ±2.54 mm</th>
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<tbody>
<tr>
<td>Chamber Materials</td>
<td>304/304LSS, 316/316LSS, 317LSS, 321LSS, 347LSS, 904SS, Ti2, Hastelloy C-276, Zr 702, Ni-6, 304/ 316SS lined PTFE, CPVC and PP.</td>
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<tr>
<td>Float Materials</td>
<td>316/316LSS, Ti2, titanium lined PFA, titanium alloy, Hastelloy C- 276, Zr 702 and etc.</td>
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<tr>
<td>Pressure Resistance Rating</td>
<td>ANSI 150<del>2500LB, DIN PN16</del>PN420</td>
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<tr>
<td>Process Connection Configuration:</td>
<td>Side-Mounting 1/2”<del>3” DN15</del>DN80</td>
</tr>
<tr>
<td></td>
<td>Top-mounting 3”<del>10” DN80</del>DN250</td>
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<tr>
<td>Process Connection Type</td>
<td>Flange/Thread/Nipple</td>
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<tr>
<td>Measuring Range</td>
<td>1<del>20ft. (0.3</del>6.1m), 40ft. (12m) at maximum</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-320<del>1000°F (-196</del>538°C)</td>
</tr>
<tr>
<td>Pressure Range</td>
<td>0<del>6000PSIG (Full Vacuum</del>42MPa)</td>
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<tr>
<td>Minimum Density</td>
<td>0.3S.G./level; 0.05 S.G./interface</td>
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<td>Indicator</td>
<td>Bargraph</td>
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<tr>
<td>Protection Grade</td>
<td>IP68</td>
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<tr>
<td>Indication Ruler</td>
<td>Stainless or aluminium ruler, multi engineering units optional</td>
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</table>

1. The pressure resistance grade of TBI is ANSI 600LB at maximum
2. The temperature resistance of magnetic bargraph type is 400°C at maximum, and magnetic shuttle 538°C

Optional

Transmitter: Magnetostrictive (see transmitter selection)
For High Temperature: High temperature insulation pad; high temperature insulation blanket
For Low Temperature: Insulation level with special frost prevention extension device, frost prevention indicator
Heat Tracing: Electric heat tracing, steam tracing tubing, steam jacket
For Valve: Vent valve/Drain valve
Standard Drawing
HAWK Magnetic Level Gauge

Standard Drawing

Measuring Range

Liquid Measuring Level Range

Interface Measuring Range

~10" (254mm)

~10" (254mm)

~10" (254mm)

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~10" (254mm)
Installation Mode

- Side - Side Mount
- Side – Side - Side Mount
- Side - Bottom Mount
- Top Mount
- Top - Bottom Mount
- Top – Side - Bottom Mount
Installation Mode

- Side - Side Mount
- Side - Bottom Mount
- Top - Side - Side Mount
- Top – Side - Bottom Mount
### HAWK Magnetic Level Gauge

#### Appendix

### Type Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tr>
<td>1</td>
<td><strong>Basic type</strong></td>
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<tr>
<td>HLG</td>
<td>Magnetic Level Indicator</td>
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### Process connections

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<tr>
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<th>2nd Key</th>
<th>3rd Key</th>
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<tr>
<td>Nom. size</td>
<td>Nom. pressure</td>
<td>Flange face</td>
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<tr>
<td>EN...</td>
<td>PNE - PN400</td>
<td>Form B1, B2, C, D</td>
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<td>DIN 10 - DN 100</td>
<td>PNE - PN400</td>
<td>Form C, N, F</td>
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<tr>
<td>ANSI 1/2&quot; - 4&quot;</td>
<td>Class 150 - Class 400</td>
<td>Form RF, SF, FF, RTJ</td>
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<tr>
<td>JIS...</td>
<td>5 K - 63 K</td>
<td>Form RF, SF, FF, RTJ</td>
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</table>

### Option: Level Sensor

- MG Basic type without optional code

### Distance centre-to-centre

- M... Distance between flange centres in mm

### Material and chamber dimensions

<table>
<thead>
<tr>
<th>1st Key</th>
<th>2nd Key</th>
<th>3rd Key</th>
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</thead>
<tbody>
<tr>
<td>Material</td>
<td>Chamber OD x Wall thickness</td>
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<tr>
<td>V</td>
<td>Stainless steel 1.4571</td>
<td>Chamber OD x Wall thickness</td>
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<tr>
<td>L</td>
<td>Stainless steel 1.4404</td>
<td>Chamber OD x Wall thickness</td>
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<tr>
<td>VE</td>
<td>Stainless steel electro-polished</td>
<td>Chamber OD x Wall thickness</td>
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<tr>
<td>VTF</td>
<td>Stainless steel PTFE-lined</td>
<td>Chamber OD x Wall thickness</td>
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<tr>
<td>VET</td>
<td>Stainless steel E-CTFE-coated</td>
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<td>VEC</td>
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### Magnetic Roller Display

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<th>3rd Key</th>
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<tr>
<td>Design</td>
<td>Scale</td>
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<tr>
<td>MRA</td>
<td>Aluminium case with plastic rollers</td>
<td>Scale</td>
</tr>
<tr>
<td>MRK</td>
<td>Aluminium case with ceramic rollers</td>
<td>Scale</td>
</tr>
<tr>
<td>MNAV</td>
<td>Stainless steel case with plastic rollers</td>
<td>Scale</td>
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<tr>
<td>MNKV</td>
<td>Stainless steel case with ceramic rollers</td>
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<tr>
<td>MRAV</td>
<td>Stainless steel case with T-slot and plastic rollers</td>
<td>Scale</td>
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<tr>
<td>MRFV</td>
<td>Stainless steel case with T-slot and stainless steel flaps</td>
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### Option Magnetic Switches 1st Key = Quantity

<table>
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<tr>
<th>2nd Key</th>
<th>3rd Key</th>
<th>4th Key</th>
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<tr>
<td>M...</td>
<td>Cable length</td>
<td>Options</td>
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<td>M...</td>
<td>1 m</td>
<td>R22 Pre resistance R22 for SPS</td>
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<tr>
<td>ME...</td>
<td>2 m</td>
<td>N NAMUR circuit according DIN EN 60947-5-6</td>
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<td>MS12</td>
<td>3 m</td>
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### Float (cylindrical) 2nd Key = Diameter/Length in mm

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<th>1st Key</th>
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<td>Pressure class</td>
<td>Magnetic system</td>
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<td>PN16 R16</td>
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<td>.HC...</td>
<td>Hastelloy C</td>
<td>E-CTFE-coated</td>
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<td>.CF...</td>
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<td>.PF...</td>
<td>PVDF</td>
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<td>PN25 R25</td>
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### Approvals

- Ex Ex-Design
### Ordering Example

<table>
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<tr>
<th>Code</th>
<th>Basic Type</th>
<th>Connection Size</th>
<th>Option Level Sensor</th>
<th>Distance Centre to Centre</th>
<th>Material Chamber Dimensions</th>
<th>Magnetic Roller Display</th>
<th>Option Magnetic Switch</th>
<th>Float Design</th>
<th>Certificates</th>
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<tr>
<td>HLG</td>
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<td>MG</td>
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### Scale Assembly Options

<table>
<thead>
<tr>
<th>Replaced Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>MRA</td>
<td>Aluminium case with T-slot, plastic rollers</td>
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<tr>
<td>MRK</td>
<td>Aluminium case with T-slot, ceramic rollers</td>
</tr>
<tr>
<td>MRF</td>
<td>Aluminium case with T-slot, stainless steel flaps (new)</td>
</tr>
<tr>
<td>MNAV</td>
<td>Aluminium case stainless steel-lined, plastic rollers</td>
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<tr>
<td>MNKV</td>
<td>Aluminium case stainless steel-lined, ceramic rollers</td>
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<tr>
<td>MRAV</td>
<td>Stainless steel case with T-slot, plastic rollers (new)</td>
</tr>
<tr>
<td>MRFV</td>
<td>Stainless steel case with T-slot, stainless steel flaps (new)</td>
</tr>
<tr>
<td>AVG2</td>
<td>Stainless steel rollers in glass tube, hermetically sealed (Phönix design)</td>
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<tr>
<td>AVG3</td>
<td>Aluminium case, stainless steel rollers (Phönix design)</td>
</tr>
<tr>
<td>AVV2</td>
<td>Aluminium case, stainless steel rollers (Vaihinger design)</td>
</tr>
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</table>
# HAWK Magnetic Level Gauge

## Appendix

### Float Selection Chart

<table>
<thead>
<tr>
<th>Type</th>
<th>PN</th>
<th>Density range</th>
<th>Diameter</th>
<th>Length</th>
<th>Material</th>
<th>Order no.</th>
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<tbody>
<tr>
<td>ZVS32/125/PN16/A990</td>
<td>16</td>
<td>1270 – 2000</td>
<td>32</td>
<td>125</td>
<td>Stainless steel (1.4571)</td>
<td>506369</td>
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<tr>
<td>ZVS32/150/PN16/A990</td>
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<td>1090 – 1350</td>
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<td>ZVS32/180/PN16/A990</td>
<td>16</td>
<td>940 – 1110</td>
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<td>ZVS32/210/PN16/A990</td>
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</tbody>
</table>
Customer Information

Company: ____________________________
Address: ____________________________
State: __________ Country: __________
Contact: ____________________________
Tel: ____________________________
Fax: ____________________________
E-mail: ____________________________

Magnetostriuctive Level Transmitter

□ Yes □ No

Top mount □ Bottom mount
Left mount □ Right mount
Left mount Bottom □ Right mount Bottom

Medium: ____________________________

Density: ____________________________
□ liquid Level □ liquid Level/Interface

Viscosity: ____________________________

Maximum Operation Pressure: ____________________________

Maximum Operation Temperature: ____________________________

Turbulence or fluctuation on liquid surface
□ Yes □ No

Flow or stir of liquid
□ Yes □ No

Vibration Environment
□ Yes □ No

Process Connection: ____________________________

Installation Mode: ____________________________

Chamber Materials: ____________________________

Measuring Range: ____________________________

Indicator Types: ____________________________

Accessories: ____________________________