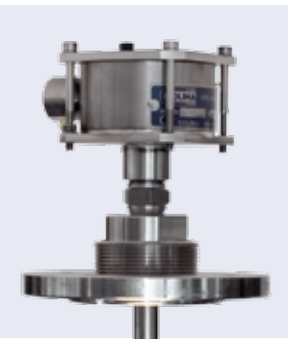
Level controls

Magnetic level switches and indicators



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spirax sarco

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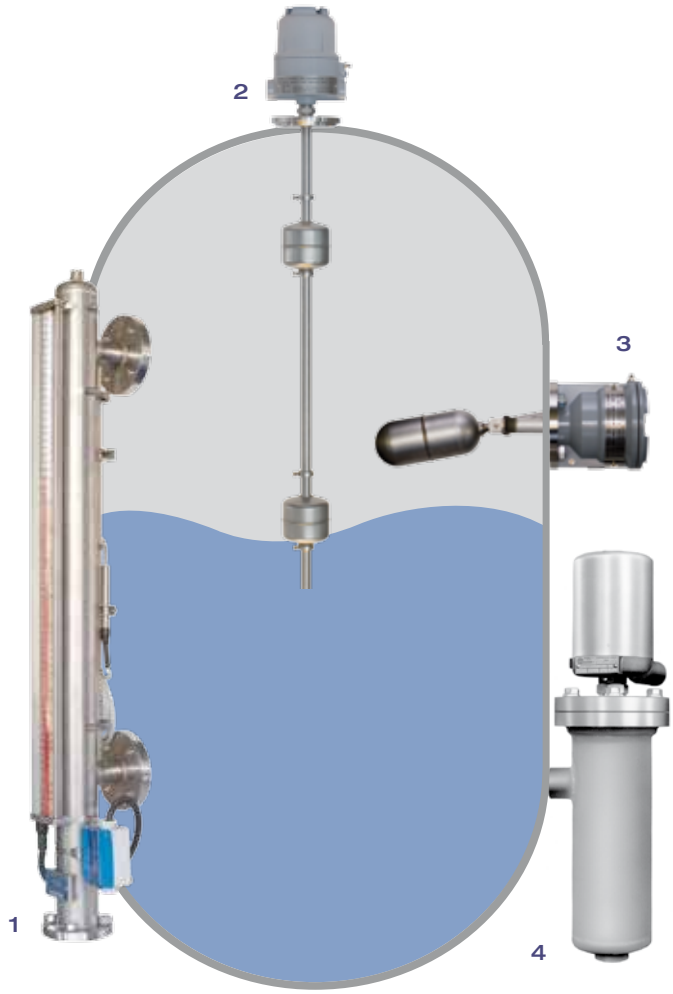
Level measurements and controls

The Spirax Sarco product range includes magnetic level switches and indicators designed to control and manage the level of various types of fluids in most industrial applications.
Designed to provide personalised and cutting-edge solutions, these are instruments with proven reliability due to attentive constructions in terms of both design and the choice of materials used.
Magnetic level switches and indicators ensure long-lasting high performance in even severe working conditions.
According to the type and application, instruments meet Directives PED97/23/CE and/or ATEX94/9/CE.
Electric constructions meet Low Voltage Directive 73/23/EEC and Electromagnetic Compatibility Directive 89/336/EEC.
According to the type, products intended for the naval industry meet RINA, Lloyd's Register and Italian Navy standards.
Spirax Sarco has an ISO 9001:2004 certified Quality Management System.



Lines:

1. **VISCOROL and VISCO**
   Level indicator
   The complete electrical contact and potentiometer transmitter model is depicted in this illustration.

2. **TOR**
   Level switch
   The stainless steel model with explosion-proof housing, flange attachment, two floats and two contacts is depicted in this illustration.

3. **MEC**
   Level switch
   The stainless steel model with explosion-proof housing, flange attachment, one float and contact is depicted in this illustration.

4. **SENSILEVEL**
   Level switch
   The carbon steel model with watertight housing, inspection chamber, weld attachment, one float and contact is depicted in this illustration.

Magnetic level switches

Designed to control and manage the level of various types of fluids, they are used for alarm signalling, simple and multiple level control, separation interface, pump control, single and sequential on-off commands, providing the complete automatic control of tanks and distribution lines.
They are made up of one or more floats that trigger the switch mechanism when the level is reached.
The wide range of combinations and models is able to meet all possible application needs.
Horizontal or vertical assembly, inside or outside the tank, lateral or on top, with or without external inspection chamber, with float or displacement piston, with rigid rod or suspended cable, simple or dual stage hydrostatic thrust.
The choice of materials used even allows for installation in process fluids or corrosive work environments with high temperature and pressure values.
Construction materials can be metallic or plastic, with threaded, welded or flanged attachments.
Electric component housings are made of both watertight and explosion-proof die-cast aluminium or stainless steel with protection grade up to IP68.
Electrical contacts meet all application needs, even with high vibrations or oxidising and corrosive environments.
Some models can be equipped with a potentiometer transmitter to continuously read the measured level of fluid. Versions with on-off pneumatic switch are also available for areas classified as hazardous or where electrical power is unavailable.

Magnetic level indicators

Magnetic level indicators display the liquid level in the field through an indicator or two-toned rollers.
Equipped with the foreseen electrical accessories, they become a complete instrument that offers three simultaneous functions: visual indication, on/off action, level transmission with 4:20mA signal.
Suited for most industrial applications, they can also be used with high pressures and temperatures, with especially viscous fluids or in hard to access tanks or vats. Functioning on the basis of the principle of communicating tanks.
These come in metallic or plastic material, with threaded, welded or flanged attachments, suited for external lateral or internal vertical installation. Accessories such as electrical contacts or potentiometer transmitter can be added to fully and automatically manage tanks, vats and boilers and control pumps, valves and alarm systems.
The electrical contacts normally used are bi-stable SPDT or DPDT reed switches.
The potentiometer transmitter, normally a reed chain, provides continuous remote level reading through a signal with 4:20mA output.

System design conditions must be assessed when choosing the type of instrument and model since several instruments may be suited for the same application.
For example, to drive a pump with on/off function, either switches or level indicators could be used according to tank conformation.
Our technicians will help you to assess your system needs and choose the right instrument.

VISCOROL

Magnetic level indicators for on-site viewing of liquid levels in most industrial applications, also under high pressure and at high temperatures.
Functioning on the basis of the principle of communicating tanks. They can be mounted sideways on the outside or vertically inside the tank.
The indicators can be equipped with electrical contacts or with a potentiometer transmitter for full automation of tank management, including pressurised ones, vats, boilers and to control pumps, valves and alarm systems.

Equipped with electrical bi-stable reed switch contacts, placed at the required threshold points, they allow the control of several intervention points with a single instrument.
Equipped with a potentiometer transmitter, they allow the continuous reading of liquid level.

Functioning principle

Due to the principle of communicating tanks, a float inside the indicator body goes to the same level of the liquid contained in the tank. A series of two-tone magnetic rollers (Viscorol) or a two-tone indicator (Visco), magnetically driven by float movement, are inserted in a transparent tube installed outside the indicator body and completely separate from the pressurised structure, sealed and protected by a stainless steel scale.

Viscorol
When the tank is empty, all the rollers have the white side turned towards the observer.
As the level increases, rollers rotate 180° to display the red side. The separation point between the two colours indicates the level reached by the liquid inside the tank.

Visco
The indicator slides in the tube as the level increases. The separation point between the two colours indicates the level reached by the liquid inside the tank.

VISCOROL 60LL
Model recommended for most industrial applications

Certifications and standards

ATEX 94/9/EC
PED 97/23/CE up to Class IV
RINA and Italian Navy standards

Models

VISCOROL LL Lateral assembly. Side/side attachments.
Available in versions 50, 60 and 70.

VISCOROL LF Lateral assembly.
Side/bottom attachments.
Available in versions 50, 60 and 70.

VISCOROL LT Lateral assembly.
Side/top attachments.
Available in versions 50, 60 and 70.

VISCOROL TF Lateral assembly.
Top/bottom attachments.
Available in versions 50, 60 and 70.

VISCOROL R Vertical assembly directly in the tank.
Available in versions 25, 50, 60 and 70.

VISCO 70 GV
Model specific to methane gas odour control

VISCOROL R25
Model specific to underground tank installations or where lateral installation is not possible

VISCO LL Lateral assembly. Side/side attachments.
Available in versions 60 and 70.

VISCO LF Lateral assembly. Side/bottom attachments.
Available in versions 60 and 70.

VISCO LT Lateral assembly. Side/top attachments.
Available in versions 60 and 70.

VISCO TF Lateral assembly. Top/bottom attachments.
Available in versions 60 and 70.

VISCO R Vertical assembly directly in the tank.
Available in versions 60 and 70.

VISCO GV Lateral assembly.
Specific for methane gas odorizer liquid tanks.
Available in version 70.

VISCO GDV Lateral assembly.
Specific for methane gas odorizer liquid tanks.

Pressure / temperature limits

Maximum admissible temperature	Steels		- 25 + 350°C
	Plastics	PVC	- 20 + 70°C
		PP	- 20 + 105°C
		PVDF	- 20 + 130°C
Maximum admissible pressure	Steels		< 125 bar
	Plastics		< 16 bar
Specific fluid weight	Steels and plastics		> 0.8 kg/l
	Buna N / Titanium		> 0.5 kg/l
Roller material	Polycarbonate		T < 180°C
	Aluminium		T < 350°C

Check reference Technical Specifications for single model data.

TOR

Magnetic level switches indicated for liquid level control in most industrial applications.
Vertical installation models. They can be equipped with single contacts to control up to six intervention points with a single instrument. Equipped with a reed chain transmitter to provide continuous level reading through a 4:20mA signal. Used for full tank automation, even pressurised, allowing operations such as pump on/off, solenoid valve open/close and alarm system activation.
Parts in contact made of suitable material to be used with especially aggressive liquids.
Easy to use and conveniently priced instruments guarantee long-lasting performance with minimum maintenance.

Functioning principle

One or more magnetic contacts (reed switches) or a reed switch chain potentiometer transmitter are placed inside a closed vertical tube in the lower part joined to the locking system. One or more floats, free to flow along the guide tube, act magnetically on contacts placed at the intervention points, switching their state depending on the liquid level inside the tank. Intervention points are set to the required quotas during construction and can always be adjusted in the field while intervention can be calibrated on the switchboard for the transmitter.

Certifications and standards

ATEX 94/9/EC

RINA, Lloyd's Register and Italian Military Navy standards

TOR PP
Plastic materials specific to corrosive fluids

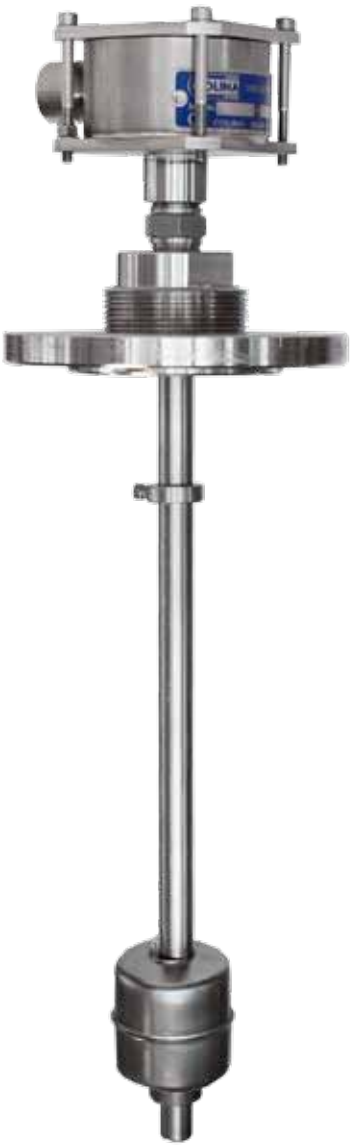
TOR CD
Small-sized and conveniently priced models

TOR A
Stainless steel model, suited for most industrial applications

Models

TOR A	Parts in contact fully made of AISI stainless steel. Up to 6 intervention points.
TOR B	Parts in contact made of AISI stainless steel, floats made of BUNA N. For hydrocarbons and mineral oils. Up to 6 intervention points.
TOR PC	Parts in contact fully made of Polyvinylchloride. Up to 6 intervention points.
TOR PP	Parts in contact fully made of Polypropylene. Up to 6 intervention points.
TOR PF	Parts in contact fully made of Polyvinylidene. Up to 6 intervention points.
TOR CD	Parts in contact made of AISI stainless steel, floats made of AISI stainless steel or BUNA N. Up to 2 intervention points.
TOR S	Specific to ship bilges. One intervention point.
TOR R	For difficult to access tanks. Up to 2 intervention points.
TOR GS	Indicated for gas or chemical tanker tanks. Up to two intervention points (96% and 98% of load).
TOR MINI	Reduced-sized instrument. One intervention point.
TOR MICRO	Reduced-sized instrument. One intervention point.
TOR C	External tank chamber.

TOR S
Model designed for ship bilges and for underwater applications up to 3 bar



TOR A
Stainless steel model for corrosive environments

Pressure / temperature limits

Maximum admissible temperature	Steels		- 110	+	200°C
	Buna N		- 20	+	80°C
	Plastics	PVC	- 20	+	70°C
		PP	- 20	+	105°C
		PVDF	- 20	+	130°C
Maximum admissible pressure	Steels				100 bar
	Buna N				16 bar
	Plastics				16 bar
Specific fluid weight	Steel and plastics				0.8 kg/l
	Buna N / Titanium				0.5 kg/l
Differential					Fixed 8 mm

Check reference Technical Specifications for single model data.

MEC

Magnetic level switches indicated for liquid level control in most industrial applications. Easy to use and conveniently priced instruments guarantee long-lasting performance with minimum maintenance. When installed at the foreseen threshold point, they work as ON/OFF switches and are used for full automatic management of tanks, including pressurised ones, allowing operations such as starting/stopping of pumps, opening/closing of solenoid valves, activation of alarm systems.
One or more instruments can be used according to the necessary interventions.
Parts in contact made of suitable material to be used with especially aggressive liquids. A specific dissipater is installed between the body and switch housing for applications with high temperatures.

Functioning principle

Two oscillating magnets on the same axis, one integral with the float in the tank and the other integral with the group of contacts inside the shunt housing, reject each other reciprocally in a forced line-up determined by the presence or absence of liquid at the float.
Contact switching is rapid and safe.
Materials and dimensions are selected according to tank features and operating design conditions (pressure, temperature and type of liquid).

Certifications and standards

PED 97/23/CE (up to Class III)
ATEX 94/9/EC
RINA and Italian Navy standards

MEC O
For underground tanks and suspended products

MEC A
Base model suited for general applications

MEC A in PVC
Model specific to corrosive fluids

Models

MEC A Horizontal assembly.
One intervention point.

MEC AT Horizontal or vertical assembly.
Temperature dissipater.
One intervention point.

MEC AV Horizontal assembly.
For high vibrations.
One intervention point.

MEC CP Horizontal assembly.
Float with counterweight.
One intervention point.

MEC O Vertical assembly.
Specific to underground tanks.
One intervention point.

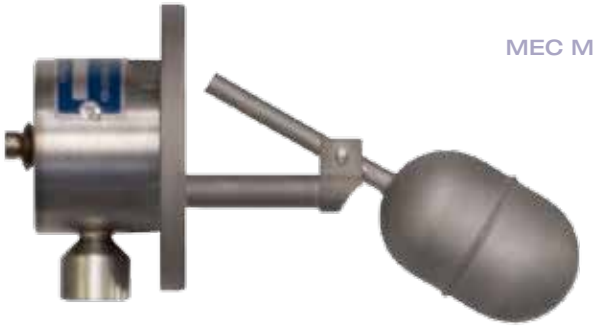
MEC A IP68
Fully made of stainless steel, suited for systems subject to washing or highly corrosive environments

MEC D Horizontal assembly.
Adjustable differential.
One intervention point.

MEC DV Vertical assembly.
Adjustable differential.
One intervention point.

MEC L Vertical assembly.
Indicated for cloudy liquids.
One intervention point.

MEC M Horizontal assembly.
With joint protection sleeve.
One intervention point.



MEC MINI
Small-sized and conveniently priced model

MEC PN Horizontal or vertical assembly.
3-way pneumatic.
One intervention point.

MEC S Horizontal assembly.
Indicated for cloudy liquids.
One intervention point.

MEC T Horizontal assembly.
With operating test device.
One intervention point.

MEC MINI Horizontal assembly.
Reduced size.
One intervention point.

MEC C External tank chamber.

Pressure / temperature limits

Maximum admissible temperature	Steels		- 20 + 150°C
		With temperature dissipater	- 20 + 350°C
	Plastics	PVC	- 20 + 70°C
		PP	- 20 + 105°C
		PVDF	- 20 + 130°C
Maximum admissible pressure	Steels	Standard flange	< 16 bar
		Flange dimensioned according to rating	< 100 bar
	Plastics		6 bar
Specific fluid weight			≥ 0.8 kg/l
		CP model only	≥ 0.5 kg/l
Differential			fixed 15 mm
		Only models D and DV	± 40°

Check reference Technical Specifications for single model data.

SENSILEVEL

Magnetic level switches designed for more severe industrial applications and used in control, safety and supervision.

Functioning principle

Float type:

A magnetic cylinder secured to the float rod slides in a non-magnetic pit and interacts with the switch magnet secured outside the pit, triggering it when it falls within its range of action. As the level changes, the magnetic cylinder exits the magnet's range of action and a spring returns the switch to the idle position.

Displacement type:

The displacement device, heavier than the controlled liquid, is supported by a calibrated spring which compresses in absence of fluid. The spring activates a rod with magnetic cylinder that slides in the non-magnetic pit. As the level increases covering the displacement device, the system receives a hydrostatic thrust that reduces the load on the spring, causing it to expand and raise the magnetic piston, triggering the switch. As the level drops, the hydrostatic thrust on the system reduces and the load on the spring increases, compressing it until the switch triggers in the idle position.

The various models allow one or more switches to be installed in a watertight, explosion-proof or intrinsically safe housing. Pneumatic switches are also available.

Special materials for bodies and floats allow use with especially aggressive liquids or severe conditions. A specific dissipater is installed between the body and switch housing for applications with high temperatures. Versions suited to measure the level of interface and separation between 2 non-mixable liquids are available.

Model 1100

Model 5500

Certifications and standards

PED 97/23/CE (up to Class IV)

ATEX 94/9/EC

Model 6600

Models

1100 External assembly with openable vertical chamber.

2200 External assembly with fully welded, non-openable vertical chamber.

3300 Installation on tank top for interventions up to 1200 mm from the attachment.

4400 Lateral assembly. Large differential.

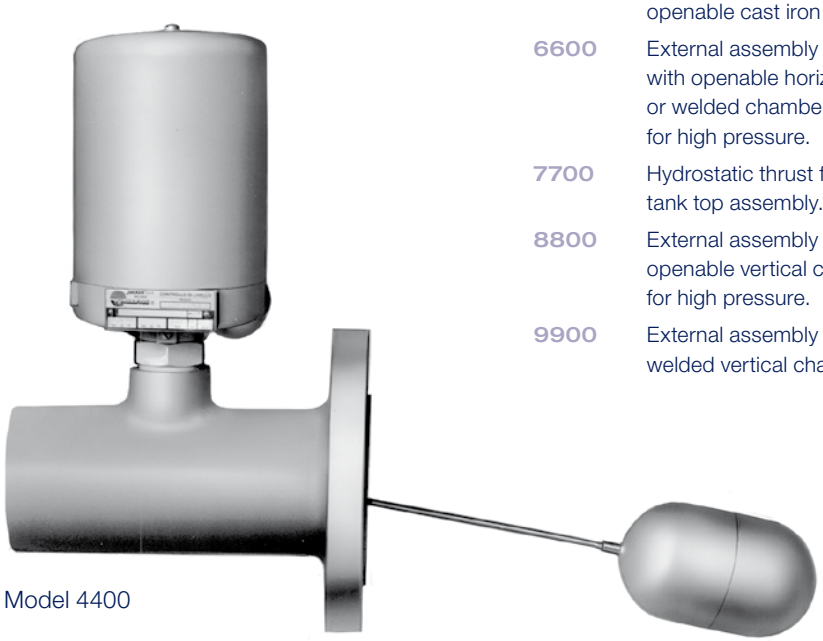
5500 External assembly with openable cast iron chamber.

6600 External assembly with openable horizontal or welded chamber for high pressure.

7700 Hydrostatic thrust for tank top assembly.

8800 External assembly with openable vertical chamber for high pressure.

9900 External assembly with fully welded vertical chamber.



Model 4400

Model 7700

Pressure / temperature limits

1100 and 2200	Maximum admissible temperature		- 20 + 400°C
	Maximum admissible pressure		68 bar
	Specific fluid weight		≥ 0.35 kg/dm³
3300	Maximum admissible temperature		- 20 + 400°C
	Maximum admissible pressure		50 bar
	Specific fluid weight		≥ 0.63 kg/dm³
4400	Maximum admissible temperature		- 20 + 400°C
	Maximum admissible pressure		80 bar
	Specific fluid weight		≥ 0.50 kg/dm³
5500	Maximum admissible temperature		- 20 + 205°C
	Maximum admissible pressure		17,5 bar
	Specific fluid weight		≥ 0.78 kg/dm³
6600	Maximum admissible temperature		- 20 + 400°C
	Maximum admissible pressure		100 bar
	Specific fluid weight		≥ 0.40 kg/dm³
7700	Maximum admissible temperature	Steels	- 20 + 400°C
		Ceramic	- 20 + 250°C
	Maximum admissible pressure	Steels	350 bar
		Ceramic	70 bar
	Specific fluid weight		≥ 0.50 kg/dm³
8800 and 9900	Maximum admissible temperature		- 20 + 150°C
	Maximum admissible pressure		350 bar
	Specific fluid weight		≥ 0.40 kg/dm³

Check reference Technical Specifications for single model data.

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