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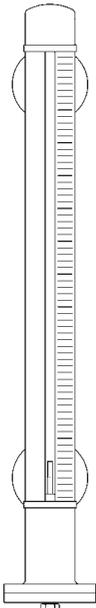
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**Colima Visco and Colima Viscorol  
Magnetic Level Indicators  
Installation and Maintenance Instructions**

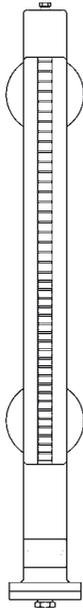
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**Colima  
Visco**



**Colima  
Viscorol**



- 1. *Safety information*
- 2. *General product information*
- 3. *Installation and Maintenance*
- 4. *Accessories*
- 5. *Spare parts*



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# 1. Safety information

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## 1.1 Type of application

The suitability of the Colima Visco and Colima Viscorol has to be verified for the specific usage and application according to the product name-plate, technical specifications and to these Installation and Maintenance instructions.

The Colima Visco and Colima Viscorol comply with the requirements of the following European Directives: PED 97/23/EC and ATEX 94/9/CE (for the electric components).

## 1.2 Accessibility

Ensure safe access and, where necessary, a safe and correctly protected platform before working on the product. Use suitable lifting mechanisms where required.

## 1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

## 1.4 Hazardous gases or liquids in the pipeline

Consider the present or previous content of the pipeline paying attention to inflammable materials, substances dangerous to health and to extremes of temperature.

## 1.5 Dangerous environment

Take account of areas at risk of explosion, lack of oxygen (e.g. tanks or pits), dangerous gases, temperature extremes, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

## 1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

## 1.7 Pressure

Ensure that all parts exposed to pressure are isolated or adequately vented to atmospheric pressure. Do not assume a system is de-pressurized even when the pressure gauge reads zero.

## 1.8 Temperature

To avoid the risk of burns, wait until the unit has reached ambient temperature before handling after isolation.

## 1.9 Tools and consumables

Before starting a work, ensure the availability of appropriate tools and / or consumables. Only use the spare parts listed in Section 5.

## 1.10 Protective clothing

Consider whether you and/or other personnel need protective clothing, against for example chemical products, high or low temperatures, noise, falling objects and hazards to eyes and face.

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## **1.11 Other risks**

During normal operation the product surface could be very hot. The surface temperature of some products operating at the maximum allowable temperature may reach 350°C. Please take this information into account before disassembly or removal from the plant!

## **1.12 Freezing**

The Colima Visco and Colima Viscorol are non auto-drainage products. Where they are exposed to temperatures below zero they must be protected from the damage caused by freezing conditions.

## **1.13 Disposal**

Unless otherwise stated within these Installation and Maintenance Instructions, these products are recyclable. Therefore, provided appropriate precaution is taken, there is no potential ecological risk after their disposal.

## **1.13 Returning products**

According to European Community laws on Health, Safety and Environmental Protection, upon returning products for their testing and/or repairs to Spirax Sarco, customers and distributors are reminded that they must supply the necessary information on hazards and precautions to be taken with regard to the presence of contaminated product residues or instrument damage which may present a health and/or environmental safety hazard.

## 2. General product information

### 2.1 Description

Colima Visco and Colima Viscorol magnetic level indicators have been designed for optical viewing of liquid levels in most industrial applications. They are suitable for high pressure and high temperature applications and the range is complemented by having a pharmaceutical grade option available when requested.

The indicators can be equipped with electrical contacts or with a potentiometer transmitter for full automation of process management, including pressurised tanks, vats, boilers, for the control of pumps, valves and alarm systems.

**Mounting** - The Colima Visco and Colima Viscorol magnetic level indicators are installed on the side of the tank (bypass system) or vertically on the top of the tank.

**Optional extras** - Electrical bistable reed switch contacts, placed at the required levels; thus allowing control of several operating points with a single instrument.

When equipped with a potentiometer transmitter, they allow continuous reading of liquid level.

**Standards and certification** - Colima Visco and Colima Viscorol magnetic level indicators comply with the following European Directives:

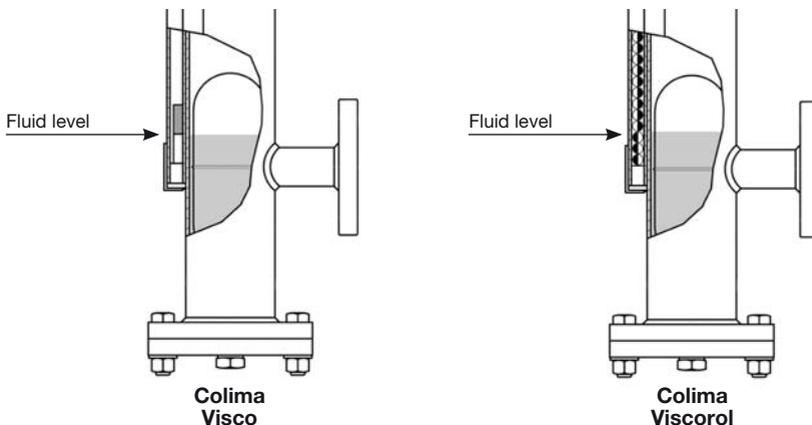
- PED 97/23/EC – Class IV, 94/9/CE and 73/23CEE requirements.
- ATEX 94/9/EC (for electrical equipment only).
- Products intended for use in the Naval and Marine sectors are RINA, Lloyds Register and M.M.I (Italian navy) approved.

#### 2.1.1 Operation

The indicator's body houses a float which rises or falls following the level of the liquid in a vessel. The float is provided with a magnetic system that attracts the two-colour rollers (Colima Viscorol) or a two-colour indicator (Colima Visco) vertically aligned in a transparent tube sealed at both ends. The tube stands vertically outside the indicator's body and is retained by a scale.

**Colima Visco** - The line between red and white marks the level of liquid in the tank.

**Colima Viscorol** - When the tank is empty all the rollers have the white side facing the observer. As the level of the float rises the rollers are actuated magnetically, they rotate through 180° to show their red side. The line between red and white marks the level of liquid in a vessel.

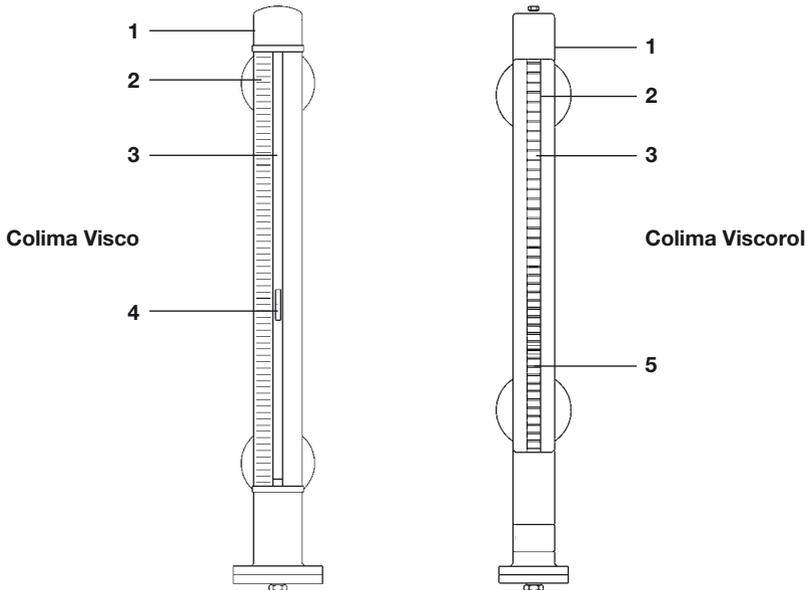


#### Warning

The correct selection of the diameter of the indicator body and the connection rating must always relate to the specific installation and application conditions.

## 2.2 Materials

No.	Part	Material
1	Indicator body	304 / 316L / 316Ti / PVC / PP / PVDF
2	Scale	Graduated or Neutral
3	Glass tube	Polycarbonate or Pyrex
4	Two colour indicator	Plastic or alnico
5	Two colour rollers	Plastic or Aluminium
6	Float (not shown)	316L / 316Ti / Titanio / Hastelloy PVC / PP / PVDF / Buna N



## 2.3 Design limits - Colima Visco and Colima Viscorol

TMA	Maximum allowable temperature	Steel	-25 to +350°C	
		PVC	-20 to + 70°C	
		Plastic	PP	-20 to +105°C
		PVDF	-20 to +130°C	
PMA	Maximum allowable pressure	Steel	< 125 bar g	
		Plastic	< 16 bar g	
Specific gravity of fluid	Steel and plastic	> 0.8 kg/l		
	Buna N / Titanium	> 0.5 kg/l		
Two-colour line marker material and rollers	Polycarbonate	T < 180°C		
	Aluminium	T < 350°C		

## — 3. Installation and Maintenance —

**Note: Before actioning any installation or maintenance work observe the 'Safety information' in Section 1.**

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation.

- 3.1** Check materials, pressure and temperature to ensure compatibility of the product with the required application.
- 3.2** Remove protective covers from all connections and the protective film from the name-plate.

### 3.3 Assembly

The Colima Visco and Colima Viscorol magnetic level indicators are delivered with the float packed and locked at its lower flange.

**Caution** before installation disassemble the lower flange and remove the float from its package.

**Confirm** the presence of supplied gaskets.

**3.3.1** Insert the float inside the indicator body following the direction arrow: ' → ' and 'TOP'.

**3.3.2** Reassemble the lower flange, and tighten the bolts.

**3.3.3** Mount the level indicator onto the tank; ensuring that all connections are aligned and tighten.

**Note:** we recommend that isolation valves are installed between the tank and the indicator connections to facilitate quicker and safer product removal.

**3.3.4** Slowly fill the tank allowing the float to become buoyant.

**3.3.5** Ensure that there is no particulate matter suspended in the fluid that may affect the float's movement.

### 3.4 Disassembly

Before disassembly of the level indicator disconnect or isolate any electricity supply or circuit and depressurize the tank. **Warning: do not** disassemble the level switch before the isolation valves have been closed or tank emptied.

**3.4.1** Close isolation valves or empty the tank. Ensure that isolation valves cannot be opened when the level indicator has been removed.

**3.4.2** Unscrew thread or connection bolts.

**3.4.3** Disassemble the level indicator from the tank connections.

**Caution:** support the float during the disassembly ensuring that it does not drop and hit the base of the body. Avoid any accidental damage to the body, scale or float.

Periodical inspections are necessary to guarantee complete efficiency of the instrument. A regular maintenance programme starting from its initial installation is recommended. The suggested precautions are important to obtain the best operating conditions of the level control.

The instrument does not require preventative maintenance, however it is recommended that from time-to-time a check of the liquid fluidity is actioned to avoid any suspensions or deposits that can influence wetted parts. Some versions are provided with a drain hole. Also check that the float moves freely and check the serviceability of the rollers/indicator.

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**Models:**

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**Colima Visco and Colima Viscorol LL**

Side / side connections.  
All wetted parts are made of stainless steel or plastic.

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**Colima Visco and Colima Viscorol LF**

Side / bottom connections.  
All wetted parts are made of stainless steel or plastic.

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**Colima Visco and Colima Viscorol LT**

Side / top connections.  
All wetted parts are made of stainless steel or plastic.

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**Colima Visco and Colima Viscorol TF**

Top / bottom connections.  
All wetted parts are made of stainless steel or plastic.

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### **Colima Visco and Colima Viscorol R**

Top connection.

Indicator for tanks or vats that are difficult to access, and in the event of especially viscous fluids, covering liquids, sludge.

All wetted parts are made of stainless steel or plastics.

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### **Colima Visco GV and GDV**

Side / side connections.

All wetted parts are made of stainless steel.

Specifically designed to control methane-gas odorant.

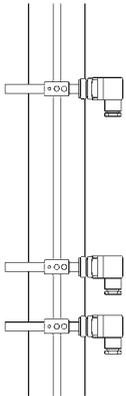
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# 4. Accessories

## Contacts

Limit switches must be fitted onto the reverse side of the indicator body, at the required threshold points. As the level of liquid increases or decreases the contacts are activated by the magnetic system (fitted inside the float) when the liquid reaches the expected level, switches reset when the liquid level returns to the required band. Parameter settings are factory-defined at the required set-points, however they are adjustable as needed.

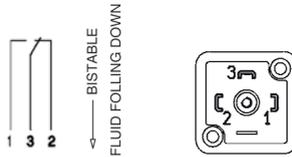
## Colima Visco



To connect limit switches follow the below wiring connections:



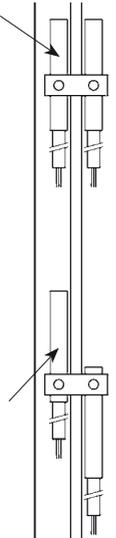
To connect limit switches follow the below wiring connections:



**Contact position:** 90° with respect to the visual scale.

## Colima Viscorol

DPDT bistable reed switch contact (two SPDT contacts alongside each other). The position of the contacts is always field adjustable

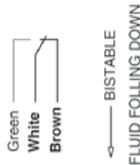


SPDT bistable reed switch contact. The position of the contact is always field adjustable

To connect the limit switches follow the wiring connections shown below:



To connect the limit switches follow the wiring connections shown below:



**Contact position:** 180° with respect to the visual scale.

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## 4.1 Contact characteristics

Contacts available SPDT or DPDT (two SPDT simultaneous).

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	Reed switch contact
	Ermetically sealed in inert gas
<b>Contact data</b>	Tungsten, Rhodio coated.
	60 W/VA 1 A 250 V ≅
	Shock and vibratrion resistance: 30 g 11 ms

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### 4.1.1 Electric contact wiring connection

Ensure correct earthing of equipment is carried out.

#### Warning

Electric contacts can be damaged by the following:

- Installation accidental damage.
- Over supply of voltage.
- Electromagnetic interference.

#### Handle with care

Before installing the contacts, ensure that they are the correct type for the unit and check that they function correctly. Damaged contacts due to any of the above will invalidate the warranty.

## 4.2 Potentiometer transmitter characteristics

A potentiometer, is a device comprising a printed circuit board on which a reed / resistance chain is welded and is placed inside the float's vertical weather-proof tube (outside the level indicator). The total resistance of a known value is measured at the ends of this potentiometer.

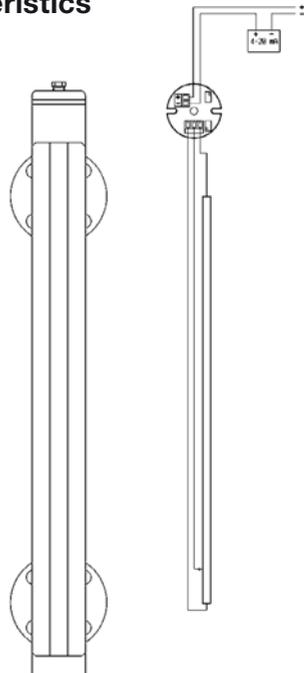
The float, following the liquid level trend, activates the potentiometer's reed contact chain through its own magnetic field, locally closing the signal. The total value of the resistance is measured between 0 and 100% of the maximum or total travel. The end poles of the potentiometer are connected to a converter that transforms the input value into Ohm and the output into mA.

### 4.2.1 Transmitter characteristics

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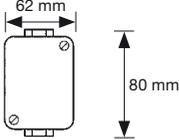
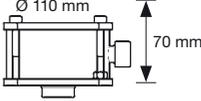
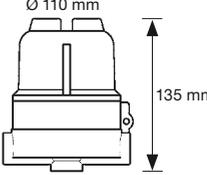
	5 mm
Reading resolution available	10 mm
	20 mm
Resistance input	1 k ÷ 100 k Ohm

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## 4.2.2 Converter's housings

Three types of housings are available, depending on the design conditions:

<p><b>Housing for safe area</b></p> <p>Weather-proof IP65, plastic.</p>	
<p><b>Housing for safe area, low / high temperature</b></p> <p>Special design suitable for low temperatures or installation in high concentration saline environments and for use in the food industry. Entirely in stainless steel. Protection degree IP67. On request IP68. Up to two cable entrances.</p>	
<p><b>Housing for hazardous area, ATEX certified</b></p> <p>ATEX certified (Ex) II 1/2 G EEx d IIC T6, T5 resp. T4 for use in hazardous areas. In pressure die-cast aluminium with a polyamide paint. Protection degree IP67. Up to a maximum of two cable entries.</p>	

## Explosion-proof housing operating limits

<b>Technical data</b>	Class I: simple protective-earth connection requirements
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## Employment data for potentially explosive atmospheres

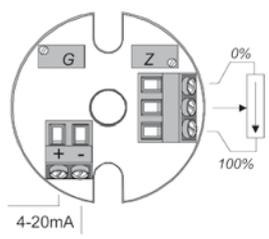
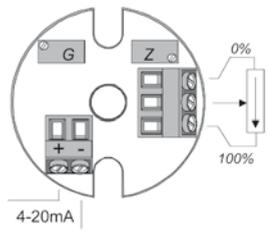
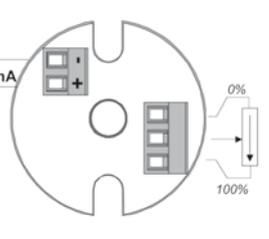
Ambient temperature limits	-20 ÷ 50°C	
Marking	(Ex) II 1/2 G EEx d IIC T6, T5 resp. T4	
Temperature class	T6	T4
Permitted temperature variation range	-20 ÷ 40°C	-20 ÷ 80°C
Suitability for area of: 0, 1, 2, GAS Group II (Directive 99/92/CE)		

### Warning:

1. Do not make any modification to the housing. Any alterations or modifications to the product will invalidate any warranties, explosion proof characteristics and any **CE** marking.
2. Install at the inlet of the housing a suitable fixing or locking device with filling material. The absence of these components will result in the loss of responsibility of the manufacturer.
3. These products should only be used for what they are designed for. Anything outside of the stipulated application range may be subject to unforeseen and dangerous circumstances and full responsibility will be with the installer.

### 4.2.3 Converter types

Ohm-mA signal converters are fitted inside the housing. Three types of converter are available:

<p><b>Converter for safe area</b></p> <p>Field set using two trimmers:</p> <ul style="list-style-type: none"> <li>- For the Z (zero) gauging and</li> <li>- For the G (gain) gauging</li> </ul> <p>without resorting to interconnecting systems.</p>	
<p><b>Converter for in-built safe area</b></p> <p>Field set using two trimmers:</p> <ul style="list-style-type: none"> <li>- For the Z (zero) gauging and</li> <li>- For the G (gain) gauging</li> </ul> <p>without resorting to interconnecting systems.</p>	
<p><b>Converter HART® protocol</b></p> <p>Converter regulated with an interconnection cable.</p>	

Resistance input	1 k ÷ 100 k Ohm
Current output	4÷20 mA

### 4.3 Valves (optional)

The level indicators are supplied as standard, with a drainage hole and a SS plug.

(A vent hole can also be supplied on request).

Upon request drain and vent valves can be supplied.

**Note:** Isolation or check valves between the indicator attachments and the tank should be installed to aid maintenance work.

## 5. Spare parts

The available spare parts are detailed below. No other parts are supplied as spares.

### Available spares

Float	5
Tube with rollers / indicator	2, 3 and 4
Scale	1
Electric components	6 and 7

### How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and serial number of the unit which is indicated on the name-plate.

#### Example:

1 Float for a Spirax Sarco Colima Visco having the following serial number: .....

