

BONT® Remote Transmission System type MST and MST-X

GENERAL INFORMATION

The BONT® Remote Level Transmission System type MST (Multi Switch Transmitter) is an additional and subsidiary method for any BONT® Magnetic Level Gauge, already described in the preceding pages.

It is applicable for any operating pressure and material schedule (stainless steel, synthetic polymers, PTFE lined) even when level gauge is already installed. Note also that it is compatible with any accessory already present, as described at page 4.

This MST device can sense the position of the magnetic float, that corresponds to the level to be measured, by means of a series of very sensible magnetic sensors reed type of new generation.

A specific incorporated circuit, the transmitter, refers the sensed position by means of a transmission system with 2 wires current loop type 4÷20 mA.

This type of connection constitutes an industrial standard consistently spread and widely accepted, also for intrinsic safe applications; allows to easily connect any data acquisition and visualization system, also at very long distance through a simple couple of conductors.

The MST system can be connected to the led bar indicator device BONT® model MST-X both singularly or in parallel with any other type of industrial PLC or PC for the process control, as well as to various indicators and/or data recorders.

The application field of this system is extremely wide and can be extended to many applications, particularly on chemical and petrochemical plants and power plants.

The MST system can be installed outdoor in any weather condition, since it is not affected by heat, cold, freezing, wind.

The MST system is supplied with different feature whose differences are the measure resolution and the type of transmitter adopted.

The standard resolution is 15 millimeters, value suitable for the majority of the applications and that corresponds to the pitch between the reed sensing element; it shall be considered that the actual measure resolution for the majority of the applications is double, which means 7,5 mm thanks to the use of the sophisticated *digital resolution enhancement* technique.

On request, for special applications, will be supplied sensing elements with a pitch of 10 or 20 millimeters, which are subject to the same resolution technique (so having 5 or 10 mm resolution, due to the *digital resolution enhancement*).

The MST indicator provides different performances depending on the type of adopted transmitter that can be selected at order stage.

The available versions are:

- 1 MST-P transmitter standard type output 4÷20 mA, complete with alarm and out of scale indications;
- 2 MST-H as above with the addition of HART digital communication protocol, overlapped to the analogue 4÷20 mA signal;
- 3 MST-AE and AEH same as above with intrinsic safe protection, ATEX certified.

All these devices are complete with pre-programming functions, Signal filtering and linearization.

On request a programming kit to modify the configuration settings normally done at the workshop, is available.



The BONT® model MST-X device is a frame led bar digital indicator specifically designed to be used combined with MST transmitters.

It can both provide power supply and identify the signal from the MST level transmitter, this allows a simple electrical installation with the connections of two conductors only and use completely the simple pattern of the two wires current loop transmission system.

The shape of the housing is in conformance with the industrial standard for the rack frame system with a height of 6 units and a width of 18TE; this allows the insertion inside a panel system based on the standard 19" rack.

In any case, the possibility of front panel installation is always left, obtaining a simple rectangular slot; all cabling is realized with a practical extractable screwed connector positioned on the rear panel.

On request can be supplied a specific plastic housing to provide a supplementary protection against dust and sprays (IP65), useful when the MST-X will be installed outdoor; in this case cable glands to receive all connecting cable are prearranged.

The front panel shows a vertical line of 23 dual colour led that visualizes the level measured by the MST. The green colour led represent the liquid phase, the red colour led represent the vapour phase.

Being high brightness devices they are also visible at distance. Besides, a seven segments type red led display visualizes the level in numeric format, according to the unit of measure and the zero scale selected.

The front panel is completed by the yellow led of failure signal (for example interrupted cable or collapsed float) and a series of 4 red led that identifies the status of the programmable thresholds alarms; each led refer to a relay with exchange type contact.

The software incorporated in the microprocessor allows different functions of configuration: particularly it is possible to set precisely each thresholds alarm, to modify the unit of measure of the visualization, to set the zero at any position of the scale.

The buttons for the selection are accessible by removing a specific protective door positioned on the front panel; the programmed values are stored in a permanent memory also in absence of feeding, without the use of batteries.

A system of buffer battery, complete with regulating circuits for the continuity, is available on request to allow the visualization also in absence of power supply.

BONT® Remote Transmission System type MST and MST-X

Sensing elements type MST - Technical data

Sensing Element for external Magnetic Level Gauge, (Fig. 3335) consisting of a column of Reed Magnetic Switches and a Transmitter.

Field of application:

By means of a suitable insulation, the sensing element can be used with BONT® magnetic level gauges on services with high temperature process fluids up to 370 °C

Transmission protocol:

SMART - HART on request

Certification:

This equipment is in compliance and it is certified according to European Directive 89/336/EC; 93/68/EC; 94/9/EC (ATEX).

Sensing element (Fig. 3334.1):

- | | |
|---|--|
| Measuring range: | ● Up to 6.000 mm |
| Top extra range: | ● 50 mm |
| Bottom extra range: | ● 50 mm |
| Sensor Pitch: | ● Standard 15 mm
on request 10 or 20 mm |
| Resolution:
(digital resolution enhancement) | ● Standard 7,5 mm
on request 5 or 10 mm |
| Temperature limits: | ● -40 °C ÷ +125 °C
(uninsulated) |
| Housing: | ● SS pipe AISI 316L
Ø 16 x 1 mm IP65: |

Transmitter (Fig. 3334.2):

- | | |
|------------------------|---|
| Output signal: | ● 4÷20 mA
two wires self powered |
| Electrical connection: | ● Internal screw terminal |
| Loop power supply: | ● 11÷28 VDC |
| Response time: | ● 0,5 seconds |
| Temperature limits: | ● -20 °C ÷ +85 °C
(uninsulated) |
| Housing: | ● Aluminium IP65, explosion proof (EEXd) with ¾" NPT-F cable entry (as standard) |
| Configurability: | ● Scale field, linearization, inversion, filtering, by programming kit available on request |

Sensing element for vessel internal (Fig. 3344)

We have considered the remote transmission system BONT® type MST with reading from a **sensing element (Fig. 3334.1)** fitted on a magnetic level gauge outside the vessel.

The MST system range includes also a **sensing element (Fig.3344)** to install inside a tank, composed of:

- column of Reed Magnetic Switches and a Transmitter(3344.1)
- float (3344.2) containing a permanent magnet
- tank connection flange (3344.3)
- magnet driver (3344.4)

The technical characteristics of the sensing element and of the transmitter remain unchanged (see fig. 3334).

Fig. 3334.1

Fig. 3335

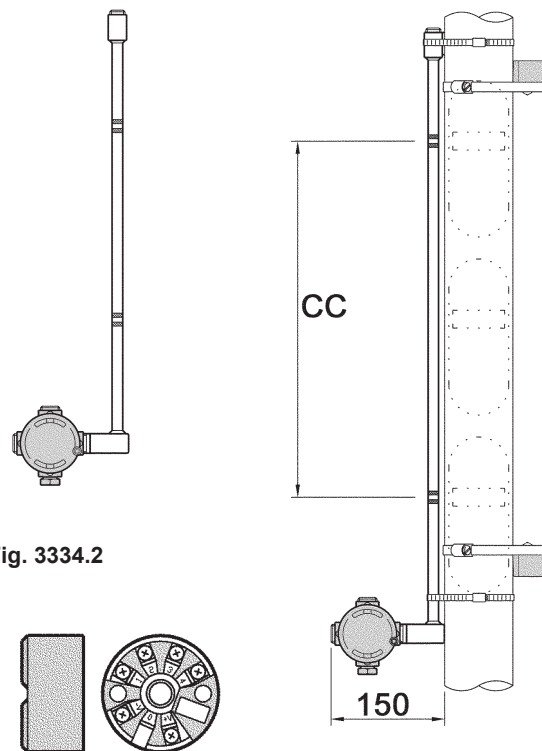
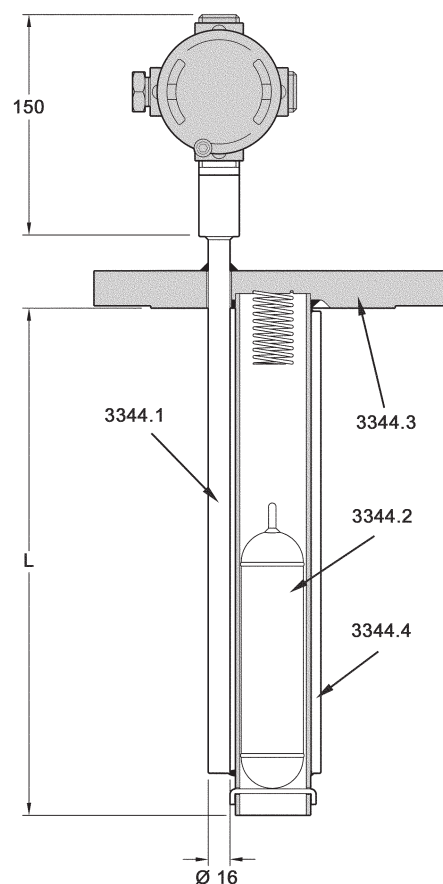


Fig. 3334.2

Fig. 3344



BONT® Remote Transmission System type MST and MST-X Indicator / Transmitter type MST-X - Technical data

Type MST-X single column bicolour led indicator

- Input signal: ● 4÷20 mA current loop which is also supplied with feed
- Electrical connections: ● Rear extractable screwed terminals
- Indication: ● Column of 23 bicolour red/green led high brightness efficiency
● Red led display with 4 digits plus one symbol
- Precision: ● Equivalent to the prescribed value for the adopted sensing element (see page 15)
- Reading of measure:
led: ● 23 red/green bright points
display: ● Double resolution respect to the adopted sensing element (*digital resolution Enhancement*) - see page 15)
- Power supply: (★) ● 18 ÷ 36 VDC or
● 24/115/230 ± 10% VAC - 50/60 Hz
- Power consumption: ● 15 W maximum
- Alarm: ● Yellow led 8 mm for failure signal
- Protection: ● IP 40 (rack design)
● IP 56 (with waterproof box with transparent cover)
● On request higher protection degree is available
- Temperature limits: ● -20 °C ÷ +85 °C
(on request -20 ÷ +115 °C)
- Housing: ● Aluminium anticorrosion anodized for rack design (approx 2 kg);
● Additional resin box for IP 56 version
- Thresholds: ● No. 4 1-exchange relay
1 A / 250 V max.

Certification:

This equipment has passed the test according to Standard EN 61326-1 + A1, and is certified compliant to European Directive 89/336/EC (Electro Magnetic Compatibility).

- (★) The system is equipped with a permanent memory that stores the programmed data, so saving them without the use of batteries also in absence of power supply.

A system of buffer battery, complete with regulating circuits for the continuity, is available on request to allow the visualization also in absence of power supply.

Fig. 3336.1

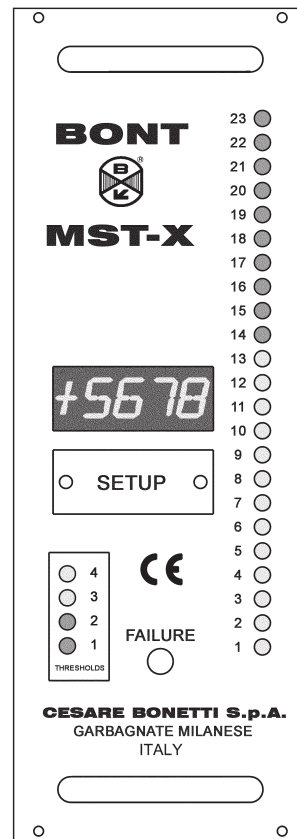
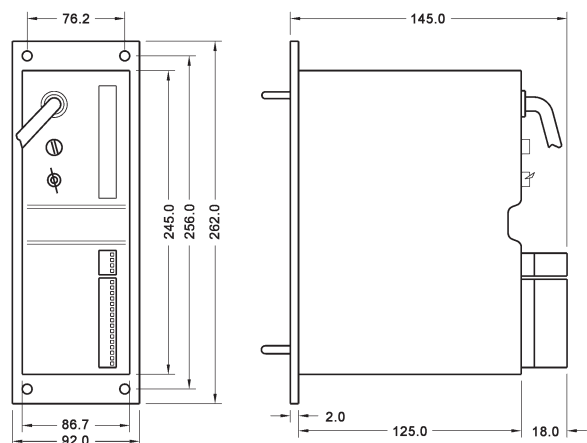


Fig. 3337.1



System RACK 19" - 6 HE - 18 TE

BONT® Remote Transmission System type MLS

As alternative of type MST System, magnetostrictive Type MLS System can be used for remote level transmission.

GENERAL INFORMATION

MLS type System is a level transmitter for continuous measurement of liquid level. It is based on the magnetostriction principle. The heart of the transmitter design is a sensing element made of appropriate magnetostrictive material contained in a protective outer pipe.

The measuring principle is a time measuring process. A low current interrogation pulse is generated in the transmitter electronics and transmitted down the magnetostrictive sensing element creating an electromagnetic field along its length. When this magnetic field interacts with the permanent magnetic field of the magnet fitted inside the float, a torsional strain of the sensing element results. This torsional strain is detected as a return pulse by the transmitter electronics. The time period between the initiation of the interrogation pulse and the detection of the return pulse is used to determine the level measurement with a high degree of accuracy and reliability. The running time of the pulse, proportional to the liquid level, is converted into an analogic 4÷20 mA output signal.

CONFIGURATION

Type MLS System is made of:

- 1 Sensor to be fixed externally at the magnetic level gauge chamber (Fig. 3348), or immersed into a tank (Fig. 3349),
- 1 Shielded 2-wire Cable which connects the transmitter to:
- 1 or more Receiver Instruments, analogic or digital, with eventual adjustable switches on the whole length.

TECHNICAL FEATURES

MATERIAL / CHARACTERISTIC

Housing of electronics	Epoxy-painted Aluminium
Sealing	IP 67; NEMA 6
Sensor outer Pipe	Stainless Steel 1.4401
(■) - Pressure max	50 bar
- Gauge Length	735 to 3785 mm with 305 mm increments
Mounting	3/4" NPT (welded for operation in Zone 0)
(■) Standard float	SST 1.4401; 52 mm diameter 68 mm high max 30 bar
-Pressure	
Safety Approval	PTB Approval for § 12VbF 08/PTB Nr Ex-92.C.2128 1.Nachtrag: EEX ib II T4 Factory Mutual Intrinsic Safety Approval for Class I, Division 1, Groups C-G

MEASURING PERFORMANCE / ELECTRICAL DATA

Measured Variable	Liquid Level
Measuring Range	max 3650 mm
Output Signal	4÷20 mA
Calibration	Factory Calibration
Linearity	0.035% F.S. or 0.8 mm whichever is greater
Repeatability	0.01% F.S. or 0.38 mm
Hysteresis	0.01% F.S. or 0.38 mm
Time Constant	1 second
Input Voltage Range	10.5 to 36 Vdc
Data Transfer	2 Wires
Max Resistance	E.g. 600 ohm at 24 V
Storage Temperature	-40°C to +80°C
(●) Operating Temperature	-30°C to +70°C
Temperature Sensitivity	Zero: <0.009% per °C

(■) Applicable for Fig. 3349 only.

(●) For temperature over 70°C, please contact our Technical Department.

Fig. 3348

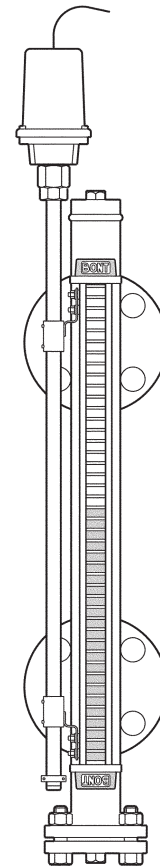


Fig. 3349

