

INSTRUCTION MANUAL



Transmitters « Hall Effect »

MADE IN EUROPE

Rev 3.31 (10/2020)

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CHAPTRE 1

INTRODUCTION

1.1 Presentation

WORK PRINCIPLE

The EQF Hall Effect Transmitter is based on the transformation of the magnetic field of the dial pointer magnet into an electrical signal proportional to the volume of the liquid inside the tank. Those transmitters are available in different dial sizes (Junior, Senior, Senior 4", Magnetel 4" or 8"). Most of those transmitters are working as voltage dividers ($V_{out} = \% V_{in}$). Refer to specific documentation of each model in the following pages.

CERTIFICATION

These sensors are compatible for use in Hazardous Area. If they are powered by an intrinsically safe voltage supply with the values : $U_i = 14VDC$, $I_i = 200mA$. The transmitter is supplied with a sticker indicating the details of the type of ATEX approval and intrinsically safe parameters.

LABEL for 5Vdc transmitters



Hall Effect Sensor 6320S07****
* = see manual

II 2 G Ex ib IIB T4 EPL Gb APRAGAZ 10ATEX 0124X
CE 0029 T° ambient : -20°C to +65°C

If used in flammable area, sensor must be powered by an Intrinsically Safe power supply with $U_i=14VDC$, $I_i=200mA$, $L_i=4.8\mu H$, $C_i=123nF$ or $U_i=6,83V$, $L_i=410mA$, $L_i=4,8\mu H$


Description	Model	Sensor associated (**)
8" Magnetel	6320S0a07bc	5AANS02086
8" Magnetel	6320S1a07bc	5AANS02086
4" Magnetel	6320S3a07bc	5AANS02086
4" PV	6320S4a07bE	5AANS02086
Junior	6320S8a07bd	5A8YS02770, 5985S02714, 5985S02877 or 5985S02771
Senior	6320S9a07bd	5ADS02770, 5962S02714 or 5962S02877
Taylor	6320S2a07bd	5948S02757

a 1=Standard cable
2=Shielded cable
b Cable Length (1 or 2 digit)

c Magnetel Mounting Type
d E=standard, H=special dial plate
or V=vertical cable entry

(**) Printed on backside of twin site

LABEL for 2.5 or 3.3Vdc transmitters



Hall Effect Sensor 6320S07****
* = see manual

II 2 G Ex ib IIB T4 EPL Gb APRAGAZ 10ATEX 0124X
CE 0029 T° ambient : -20°C to +65°C

If used in flammable area, sensor must be powered by an Intrinsically Safe power supply with $U_i=10V(1) \& 14V(2)$, $I_i=200mA$, $L_i=4.8\mu H$, $C_i=2,3\mu F(1) \& 0,44\mu F(2)$

Description	Model	Sensor associated (**)
8" Magnetel	6320S0307bc	5AFYS02086 (2)
4" Magnetel	6320S3307bc	5AFYS02086 (2)
4" PV	6320S4307bE	5AFYS02086 (2)
Junior	6320S8307bE	5992S02713 (2)
Senior	6320S9307bE	5ACN02714 (2)
Junior	6320S9407bE	5961S02714 (1)

b Cable Length (1 or 2 digit)
c Magnetel Mounting Type

(**) Printed on backside of twin site

With (1) for 2.5Vdc transmitters and (2) for 3.3Vdc transmitters

- II 2 G Material in accordance with European directive ATEX 2014/34/EU.
Sensor for Hazardous area zone 2G.
- Ex ib Intrinsically Safe sensor, protection made by the supply characteristics (U_i , I_i , ...).
- IIB Gas group for which the sensor is safe (see list in EN 60079-0).
- T4 Maximum Sensor contact temperature (135°C).
- EPL Gb Explosion Protection Level
- APRAGAZ Notified Body certifying the product.
- 10 Certification year.
- ATEX0124X Certification number.
- CE 0029 Notified body.

NOTE

U_i and I_i are not the power supply and the current of the sensors but the maximum admitted values for the explosion proof protection. L_i and C_i are the inductance and the capacitance of the sensor. Inductance and capacitance of the cable have to be added.

1.2 Installation

WARNING :

**Only qualified people are authorised to work on this device.
All electrical works have to be done out of power.**

When located in hazardous area the sensor has to be powered through an intrinsically safe barrier compatible with the sensor parameter (see specific notice).

The transmitters 6320S*107 are mainly dedicated for remote system with intermittent power supply or for wireless level transmission with cable no longer than 50 meters.**

ELECTRICAL WIRING

The specific documentation of each model (see following pages) specify the colour code of the wires . In case of shielded cable, the shield has to be connected to the protection terminal (Sh) or to the receiver Electrical Ground. If a junction box is used, the junction box has to be waterproof and in conformity with the Ex protection degree required by its installation's location.

RECEIVER CALIBRATION

If the receiver has to be calibrated with the sensor this can be done by setting the needle of the dial at the calibration value. To set the needle at the required value, use a magnet or a metal rod underneath the dial to rotate the needle.

DIAL/TRANSMITTER MOUNTING

Never unscrew the gauge head screws or bolts.

By means of a "Phillips" screw driver remove the existing dial after recording of the displayed level.

By means of a magnet or a metal rod, locate the pointer of the new transmitter on the recorded value. Locate and fix the transmitter dial on the gauge head.

1.3 Maintenance

- These sensors and the dedicated dial do not need specific maintenance.
- If required clean them with a sweet and wet tissue.
- The use of solvent and abrasive are prohibited.
- Shut down the power supply before any electrical works.

Any defective sensors have to be returned to the manufacturer with a report explaining the missfunction.

1.4 Specific Notice

Specific information on each model (Junior, Senior, Squibb Taylor, Senior 4", Magnetel 4" or 8") are given in following pages.

1.5 Catodic Protection

No specific instruction, except: the shield (if present) is wired to the ground of the receiver but never wired to the cathodic protection.

1.6 Model Number & Features

6320 S ** 07 * * - (*)

Particularity Order

For a 4" or 8"

- C Centerline mounting
- CX Reverse Straddle mounting
- X Straddle mounting
- E 4" Senior for 6290/6293 gauges

For a Taylor, Junior or Senior

- E Horizontal cable entry
- V Vertical cable entry (with 3x0.25mm² cable)
- H Horizontal cable entry with a specific dial plate
- IND Horizontal cable entry with a industrial dial plate

Lenght of cable 0.5m to 20m by step of 0.5m (1 or 2 digits with or without decimal point) *Standard length specified in data sheet*

Type of Cable and Power Supply

- 1 Transmitter (5Vdc) with cable LiYY-OB
- 2 Transmitter (5Vdc) with shielded cable LiYCY-OB
- 3 Transmitter (3.3Vdc) with Shielded cable LiYCY-OB
- 4 Transmitter (2.5Vdc) with Shielded cable LiYCY-OB

Dial Type

- 0 8" Magnetel with 3-97% dial
- 1 8" Magnetel with 5-95% dial
- 2 Taylor dial
- 3 4" Magnetel with 5-95% dial
- 4 4" 6290/6293 gauges with 5-95% dial
- 8 Junior dial
- 9 Senior dial

NOTE

- Customer has to check the transmitter compatibility with his application and receiver.
- When located in Hazardous Area, the transmitter has to be powered by an Intrinsically Safe Power Supply.
- The listed Hall Effect Transmitters are certified for use in Hazardous Area.

1.7 Cable Technical Data LiYCY-OB

Controls and signalisation multiconductors screened cable with :

- Stranded conductors of bare copper
- PVC insulation
- Twisted
- Polyester foil taped
- Conductors colour code in accordance with DIN 47100.
- Total screening with tinned copper braid, 85% minimum coverage.

TEMPERATURE RANGE

Mounting and servicing -15°C to +70°C

USE

Measuring, control regulation applications.
Electronics control.

STANDARDS LIYCY-OB

In accordance with IEC 60228, DIN 47100, NF C 32-070, IEC 60332-1.

CABLE DESCRIPTION

wire : Red copper, 8 (0.25²) or 16 (0.5²) wires of 0.19 mm diameter
insulation : PVC Coloured following DIN 47100, PVC 105°C,
- diameter 1.3mm for 0.25mm²
- diameter 1.7mm for 0.5mm²
twisted : by layers
assembly : Mylar sheet
screening : tinned copper braid
outer sheath : for 0.25mm² RAL 7001 grey PVC, flame retardant category C2 by NF C 32-070, IEC 60332-1
for 0.5mm² RAL 5012 blue PVC, flame retardant category C2 by NF C 32-070, IEC 60332-1

CABLE SPECIFICATIONS

operating voltage : 300/500V
insulation at 20°C : conform to IEC 60228
testing voltage : 2KV
Bending radius : 10 x Ø of cable

ELECTRICAL DATA AT 20°C

conductor resistance : 79Ω/Km (0.25²) and 39Ω/Km (0.5²)
capacity (between 2 conductors) : 100nF/m (0.25²) and 120nF/m (0.5²)
capacity (between cond. & Shield) : 200nF/m (0.25²) and 210nF/m (0.5²)
Inductance : 0.460mH/Km
load : maximum 3A (0.25²) and 6A (0.5²)

MECHANICAL DATA

number of conductors [mm ²]	outer diameter [mm]	total weight [Kg/Km]
3 x 0.25	4.3 (±0.3)	31.0
3 x 0.5	5.3 (±0.3)	46.0

COLOUR MARKING DIN 47100

Number	Colour
1	white
2	brown
3	green

1.8 Cable Technical Data LiYY-OB

Controls and signalisation multiconductors screened cable with :

- Stranded conductors of bare copper
- PVC insulation
- Twisted
- Conductors colour code in accordance with DIN 47100.

TEMPERATURE RANGE

Mounting and servicing -15°C to +70°C

USE

Measuring, control regulation applications.
Electronics control.

STANDARDS LIYY-OB

In accordance with IEC 60228, DIN 47100, NF C 32-070, IEC 60332-1.

CABLE DESCRIPTION

wire : Red copper, 8 (0.25²) or 16 (0.5²) wires of 0.19 mm diameter
insulation : PVC Coloured following DIN 47100, PVC 105°C,
- diameter 1.3mm for 0.25mm²
- diameter 1.7mm for 0.5mm²
twisted : by layers
assembly : Mylar sheet
outer sheath : for 0.25mm² RAL 7001 grey PVC, flame retardant category C2 by NF C 32-070, IEC 60332-1
for 0.5mm² RAL 5012 blue PVC, flame retardant category C2 by NF C 32-070, IEC 60332-1

CABLE SPECIFICATIONS

operating voltage : 300/500V
insulation at 20°C : conform to IEC 60228
testing voltage : 2KV
Bending radius : 5 x Ø of cable

ELECTRICAL DATA AT 20°C

conductor resistance : 79Ω/Km (0.25²) and 39Ω/Km (0.5²)
Servicing capacity : 150nF/m
capacity (between 2 conductors) : 100nF/m (0.25²) and 120nF/m (0.5²)
Inductance : 0.70mH/Km
load : maximum 3A (0.25²) and 6A (0.5²)

MECHANICAL DATA

number of conductors [mm ²]	outer diameter [mm]	total weight [Kg/Km]
3 x 0.25	4.1 (±0.3)	26.0
3 x 0.5	5.1 (±0.3)	42.0

COLOUR MARKING DIN 47100

Number	Colour
1	white
2	brown
3	green

CHAPTRE 2

5VDC TRANSMITTERS

2.1 Electrical Parameters

Valid for 5VDC models, see pages (8 to 12)

For Hall Effect transmitters manufactured with twinsite 5AANS02086, 5883S02714, 5883S02877, 5952S02714, 5952S02877 or 5948S02757 Sensor. (note: twinsite model number is printed on the back side of transmitter)

	Hall Effect Sensor 6320S**07** <small>* = see manual</small>																								
	<small>II 2 G Ex ib IIB T4 EPL Gb APRAGAZ 10ATEX 0124X</small> <small>CE0029 T° ambient : -20°C to +65°C</small> <small>If used in flammable area, sensor must be powered by an Intrinsically Safe power supply with</small> <small>Ui=14VDC, Ii=200mA, Li=4.8µH, Ci=123nF or Ui=6,83V, Li=410mA, Li=4,8µH</small>																								
	<table border="1"> <thead> <tr> <th>Description</th> <th>Model</th> <th>Sensor associated (**)</th> </tr> </thead> <tbody> <tr> <td>8" Magnetel</td> <td>6320S0a07bc</td> <td>5AANS02086</td> </tr> <tr> <td>8" Magnetel</td> <td>6320S1a07bc</td> <td>5AANS02086</td> </tr> <tr> <td>4" Magnetel</td> <td>6320S3a07bc</td> <td>5AANS02086</td> </tr> <tr> <td>4" PV</td> <td>6320S4a07bE</td> <td>5AANS02086</td> </tr> <tr> <td>Junior</td> <td>6320S8a07bd</td> <td rowspan="3"> { 5A8YS02770, 5883S02714, 5883S02877 or 5983S02711 5ADS02770, 5952S02714 or 5952S02877 </td> </tr> <tr> <td>Senior</td> <td>6320S9a07bd</td> </tr> <tr> <td>Taylor</td> <td>6320S2a07bd</td> </tr> </tbody> </table>	Description	Model	Sensor associated (**)	8" Magnetel	6320S0a07bc	5AANS02086	8" Magnetel	6320S1a07bc	5AANS02086	4" Magnetel	6320S3a07bc	5AANS02086	4" PV	6320S4a07bE	5AANS02086	Junior	6320S8a07bd	{ 5A8YS02770, 5883S02714, 5883S02877 or 5983S02711 5ADS02770, 5952S02714 or 5952S02877	Senior	6320S9a07bd	Taylor	6320S2a07bd	<small>a 1=Standard cable</small> <small>2=Shielded cable</small> <small>b Cable Length (1 or 2 digit)</small>	<small>c Magnetel Mounting Type</small> <small>d E=standard,H=special dial plate</small> <small>or V=vertical cable entry</small>
Description	Model	Sensor associated (**)																							
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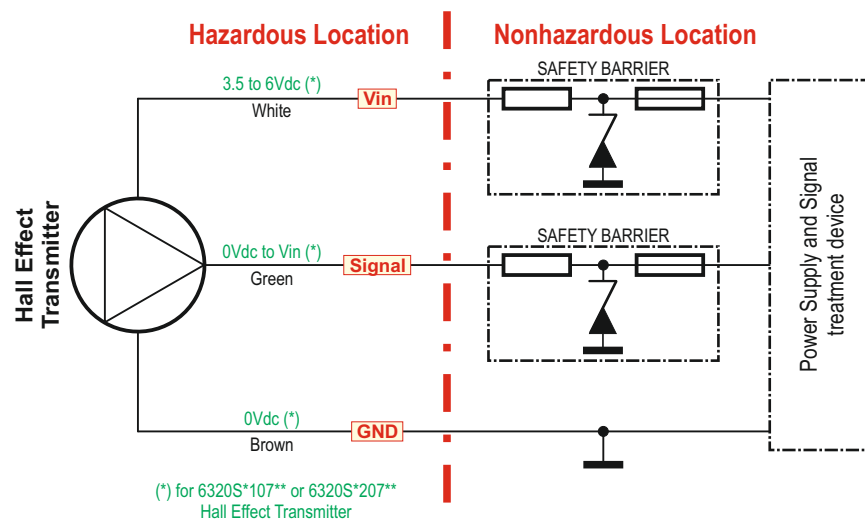
	Power Supply	Signal	Safety barrier
Voltage	Vin max = 6Vdc	Vout = 0 to Vin	Vmax (Ui) = 14Vdc
Current	Iin max = 8mA	Iout max = 1mA	Imax (Li) = 200mA
Capacitance	Ci = 123nF	Ci = 123nF	Ca > Ci + Cc
Inductance	Li = 4.8µH	Li = 4.8µH	La > Li + Lc

Ci, Li internal capacitance and inductance of transmitter, Lc, Cc : cable inductance and capacitance

2.2 Note

- Selected associated apparatus or barriers must be third party approved as Intrinsically Safe for the application and have V open circuit and I short circuit not exceeding Vmax and Imax.
- Cable capacitance (Cc) added to transmitter capacitance (Ci) must be less than the marked capacitance (Ca) and the cable inductance (Lc) added to the transmitter inductance (Li) must be less than the marked inductance (La) (Ca and La: barrier's capacitance and inductance)
- Barriers must be installed in accordance with barriers manufacturer's control drawing and applicable rules and standards.
- The maximum nonhazardous location voltage must not exceed than 250Vrms.
- Output current must be limited by a resistor such that the output voltage-current plot is a straight line drawn between open circuit voltage and short circuit current.
- Operating temperature : -20°C to +65°C

2.3 Schematic Diagram



2.4 Example of Compatible Safety Barrier

- | | |
|-----------------------------|---|
| a) Consumer : MTL | Model Number : MTL7761ac |
| b) Consumer : Stahl | Model Number : 9001/01-086-150-01 for power supply line
9001/01-086-020-01 for signal line |
| c) Consumer : Pepperl+Fuchs | Model Number : Z 961 |

2.5 Hall Effect TWINSITE (JR, SR or TAYLOR)

GENERAL DESCRIPTION

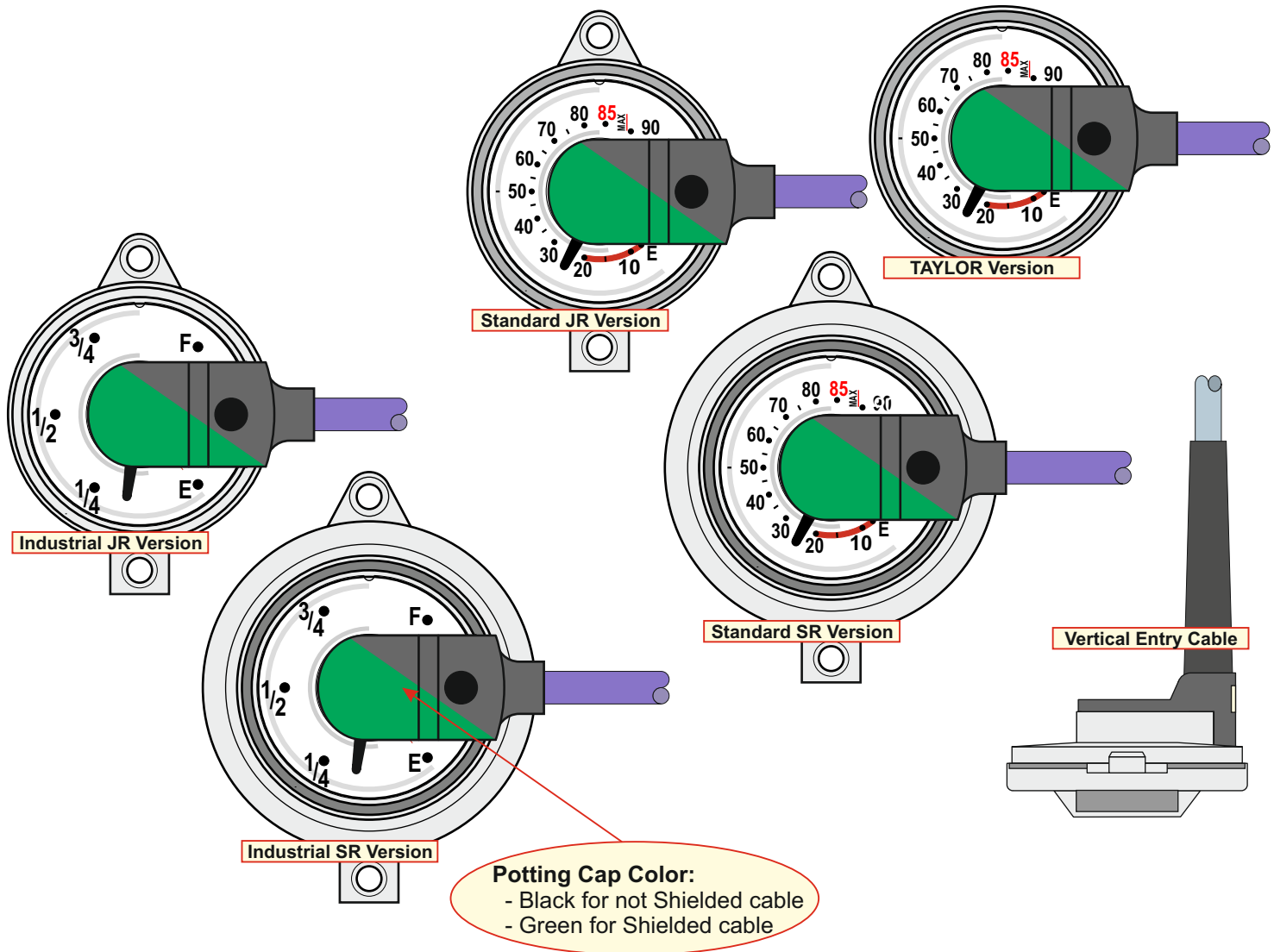
The Hall Effect Twinsite™ transmitter is a magnetically-driven Hall Effect, voltage output sender with potted wires and cable. Senders are utilized where direct reading plus an electrical signal to a remote level indication are required. Hall Effect is a solid state technology with no contacts. It counts on the fact that a magnet bends the path of electrons moving through a semiconductor. This bending is detected and converted into ratiometric voltage output.

Many existing domestic or industrial storage tanks are equipped with gauge having a weak drive magnet suited for low friction direct-indicating dial assemblies. As the Hall Effect Twinsite™ is a contactless sensor it can be utilized for a retrofit on those gauges to provide an electrical output which can be used for remote indication of tank levels.

The Hall Effect Twinsite™ provide the easiest way to read local indication by using a dial face divided into percentage units or fractional units.

This Hall Effect Twinsite require a 5Vdc Power Supply.

The housing, in UV stabilized plastic material, is hermetically sealed by ultrasonic welding and the electrical connections are sealed with potting material.



GENERAL SPECIFICATIONS

Accuracy: $\pm 4\%$ with nominal value indicated in the calibration chart « DS-1318 » (see next page) for all types

Hysteresis: less than $\pm 1\%$ typical

Repeatability: $\pm 2\%$

Resolution: Infinite

Operating Temperature: -20 to 65°C

Operating Voltage range: $5\text{Vdc} \pm 0.5\text{Vdc}$ With a accuracy decrease of 1 to 2%, power range can be extended to: 3.5 to 6Vdc

Consumption: typical 5 mA under 5Vdc

Output Voltage: Ratiometric (Ratiometric means that the output signal voltage is proportional with the input voltage (V_{in}) Under 5Vdc, 10% is 0.5V (or 10% of input voltage) 90% is 4.5V (or 90% of input voltage)).

Output Current: Max 1mA

MATERIAL OF CONSTRUCTION

Crystal and case: polycarbonate, ultrasonic sealed

Dial: painted aluminium

Cap: polycarbonate or polyamide

SPECIFICITY

The Hall Effect Twinsite™ Transmitters are available in three sizes to fit all Junior and Senior EQF Gauges and also for mounting on Taylor Gauges or some of competitive gauge (refer to specific mounting and instruction).

Transmitter with not shielded cable

Supplied in standard with 2 meters shielded blue cable LiYCY-OB 3x0.25mm² (for vertical entry cable) or 3x0.5mm² (for horizontal entry cable) DIN47100 with white, green and brown conductors.

This transmitter is used with battery operated receiver with intermittent power supply to the transmitter.

Impedance : 4.8μH
Capacitance : 123nF
Color of cable cover : Black
Cable Length : 50m maximum

Transmitter with shielded cable

Supplied in standard with 2 meters shielded blue cable LiYCY-OB 3x0.5mm² DIN47100 (with white, green and brown conductors) for each models except for vertical entry supplied with a grey cable 3x0.25mm².

For use with EQF receiver CSU or permanent power supply and Intrinsically Safe Barrier (if necessary) wired with no more than 300m 3x0.5mm² cable.

Impedance : 4.8μH
Capacitance : 123nF
Color of cable cover : Green
Cable Length : 300m maximum

CALIBRATION CHART « DS-1318 »

Best accuracy will be obtained using the calibration data in the table below, when powered in 5Vdc.

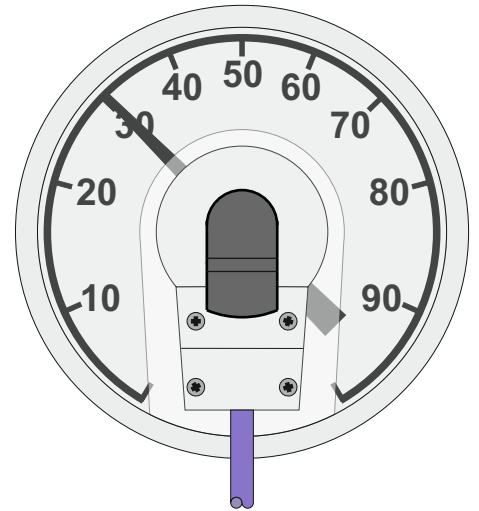
Graduation	Nominal Ref. (Volts)
E-Stop	0.29
E	0.49
10	0.64
20	1.15
30	1.53
40	1.98
50	2.5
60	3.02
70	3.5
80	3.9

Customer has to check the suitability of the sensor with his application.

2.6 Hall Effect 4" PV for SENIOR Gauges (6290/6293)

GENERAL DESCRIPTION

The Hall Effect Twinsite™ transmitter consists of a 4" dial for Senior Gauge (model 6290/6293) incorporating a Hall Effect Twinsite™ which provides an electrical output for remote indication. The Hall Effect Twinsite™ provide the easiest way to read local indication by using a dial face divided into percentage units. This Hall Effect Twinsite require a 5Vdc Power Supply.



GENERAL SPECIFICATIONS

Accuracy: $\pm 4\%$ with nominal value indicated in the calibration chart (see below) for all types

Hysteresis: less than $\pm 3\%$ typical

Repeatability: $\pm 2\%$

Resolution: Infinite

Operating Temperature: -20 to 65°C

Operating Voltage range: 5Vdc ± 0.5 Vdc With a decrease in accuracy of 1 to 2%, power range can be extended to: 3.5 to 6Vdc

Consumption: typical 5 mA under 5Vdc

Output Voltage: Ratiometric (Ratiometric means that the output signal voltage is proportional with the input voltage (V_{in}) Under 5Vdc, 10% is 0.5V (or 10% of input voltage) 90% is 4.5V (or 90% of input voltage)).

Output Current: Max 1mA

MATERIAL OF CONSTRUCTION

Crystal and case of twinsite: polycarbonate, ultrasonic sealed

Crystal of dial: polycarbonate

Case of dial: aluminium anodised

Bezel Ring: aluminium

Dial: painted aluminium

SPECIFICITY

This 4" Hall Effect Twinsite™ Transmitters is designed for mounting on EQF Gauges models 6290/6293.

Transmitter with not shielded cable

Supplied in standard with 4 meters blue cable LiYY-OB 3x0.5mm² DIN47100 (with blue, brown and black conductors).

This transmitter is used with battery operated receiver with intermittent power supply to the transmitter.

Impedance : 4.8 μ H

Capacitance : 123nF

Cable Length : 50m maximum

Transmitter with shielded cable

Supplied in standard with 4 meters shielded blue cable 3x0.5mm² DIN47100 (with white, green and brown conductors).

For use with EQF receiver CSU or permanent power supply and Intrinsically Safe Barrier (if necessary) wired with no more than 300m 3x0.5mm² cable.

Impedance : 4.8 μ H

Capacitance : 123nF

Cable Length : 300m maximum

CALIBRATION CHART

Best accuracy will be obtained using the calibration data in the table below, when powered in 5Vdc.

Graduation	Nominal Ref. (Volts)
5	0.18
10	0.54
20	1.03
30	1.39
40	1.88
50	2.44
60	3.03
70	3.57
80	3.97
90	4.42
95	4.82

Customer has to check the suitability of the sensor with his application.

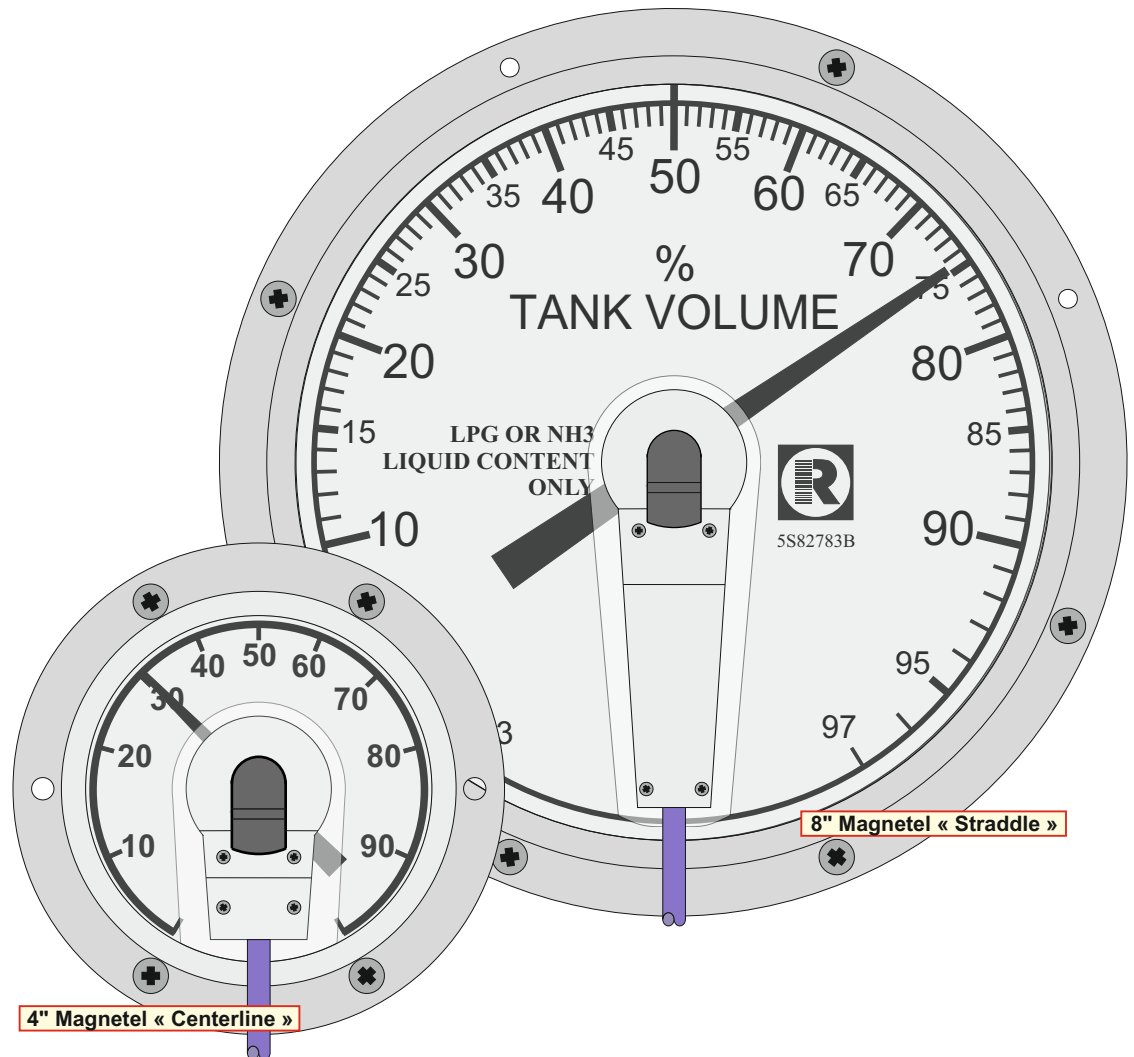
2.7 Hall Effect 4" and 8" for Magnetel Gauges

GENERAL DESCRIPTION

The Hall Effect Twinsite™ transmitter consists of a 4" or 8" dial for Magnetel Gauge incorporating a Hall Effect Twinsite™ which provides an electrical output for remote indication.

The Hall Effect Twinsite™ provide the easiest way to read local indication by using a dial face divided into percentage units.

This Hall Effect Twinsite require a 5Vdc Power Supply.



GENERAL SPECIFICATIONS

Accuracy: $\pm 4\%$ with nominal value indicated in calibration chart (see next page) for all types

Hysteresys: less than $\pm 3\%$ typical

Repeatability: $\pm 2\%$

Resolution: Infinite

Operating Temperature: -20 to 65°C

Operating Voltage range: $5\text{Vdc} \pm 0.5\text{Vdc}$ With a decrease in accuracy of 1 to 2%, power range can be extended to: 3.5 to 6Vdc

Consumption: typical 5 mA under 5Vdc

Output Voltage: Ratiometric (Ratiometric means that the output signal voltage is proportional with the input voltage (V_{in}) Under 5Vdc, 10% is 0.5V (or 10% of input voltage) 90% is 4.5V (or 90% of input voltage)).

Output Current: Max 1mA

MATERIAL OF CONSTRUCTION

Crystal and case of twinsite: polycarbonate, ultrasonic sealed

Crystal of dial: polycarbonate

Case of dial: aluminium anodised

Bezel Ring: Stainless Steel

Dial: painted aluminium

SPECIFICITY

This Hall Effect Twinsite™ Transmitters are available for three different mounting (C, X or CX) to fit all respective Magnetel EQF Gauge.

Transmitter with not shielded cable

Supplied in standard with 8 meters blue cable LiYY-OB 3x0.5mm² DIN47100 (with blue, brown and black conductors).

This transmitter is used with battery operated receiver with intermittent power supply to the transmitter.

Impedance : 4.8μH
Capacitance : 123nF
Cable Length : 50m maximum

Transmitter with shielded cable

Supplied in standard with 8 meters shielded blue cable 3x0.5mm² DIN47100 (with white, green and brown conductors).

For use with EQF receiver CSU or permanent power supply and Intrinsically Safe Barrier (if necessary) wired with no more than 300m 3x0.5mm² cable.

Impedance : 4.8μH
Capacitance : 123nF
Cable Length : 300m maximum

CALIBRATION CHART « for 4" Transmitters »

Best accuracy will be obtained using the calibration data in the table below, when powered in 5Vdc.

Graduation	Nominal Ref. (Volts)
5	0.218
10	0.643
20	1.104
30	1.472
40	1.957
50	2.483
60	3.046
70	3.592
80	4.021
90	4.504
95	4.789

Customer has to check the suitability of the sensor with his application.

CALIBRATION CHART « for 8" Transmitters »

Best accuracy will be obtained using the calibration data in the table below, when powered in 5Vdc.

For dial plate 3 to 97%		For dial plate 5 to 95%	
Graduation	Nominal Ref. (Volts)	Graduation	Nominal Ref. (Volts)
3	0.18	5	0.18
10	0.69	10	0.54
20	1.10	20	1.01
30	1.45	30	1.40
40	1.91	40	1.87
50	2.44	50	2.44
60	3.00	60	3.04
70	3.50	70	3.56
80	3.89	80	3.98
90	4.30	90	4.45
97	4.82	95	4.82

Customer has to check the suitability of the sensor with his application.

CHAPTRE 3

2.5VDC TRANSMITTERS

3.1 Electrical Parameters

Valid for 2.5VDC models, see page (14)

For Hall Effect transmitters manufactured with twinsite 5961S02714 Sensor. (note: twinsite model number is printed on the back side of transmitter)



Hall Effect Sensor 6320S07****
* = see manual

II 2 G Ex ib IIB T4 EPL Gb APRAGAZ 10ATEX 0124X
CE 0029 T° ambient : -20°C to +65°C

If used in flammable area, sensor must be powered by an Intrinsically Safe power supply with
 $U_i = 10V(1) \& 14V(2)$, $I_i = 200mA$, $L_i = 4.8\mu H$, $C_i = 2.3\mu F(1) \& 0.44\mu F(2)$

Description	Model	Sensor associated (**)
8" Magnetel	6320S0307bc	5AFYS02086 (2)
4" Magnetel	6320S3307bc	5AFYS02086 (2)
4" PV	6320S4307bE	5AFYS02086 (2)
Junior	6320S8307bE	5992S02713 (2)
Senior	6320S9307bE	5ACN02714 (2)
Junior	6320S8407bE	5961S02714 (1)

b Cable Length (1 or 2 digit)
c Magnetel Mounting Type

(**) Printed on backside of twinsite

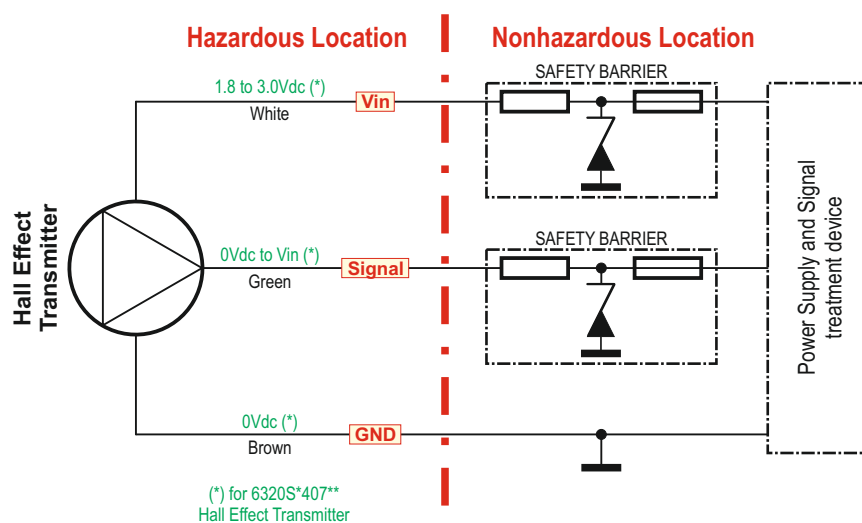
	Power Supply	Signal	Safety barrier
Voltage	$V_{in\ max} = 3V_{dc}$	$V_{out} = 0\ to\ V_{in}$	$V_{max}\ (U_i) = 10V_{dc}$
Current	$I_{in\ max} = 11mA$	$I_{out\ max} = 1mA$	$I_{max}\ (L_i) = 200mA$
Capacitance	$C_i = 2.3\mu F$	$C_i = 2.3\mu F$	$C_a > C_i + C_c$
Inductance	$L_i = 4.8\mu H$	$L_i = 4.8\mu H$	$L_a > L_i + L_c$

C_i, L_i internal capacitance and inductance of transmitter, L_c, C_c : cable inductance and capacitance

3.2 Note

- Selected associated apparatus or barriers must be third party approved as Intrinsically Safe for the application and have V open circuit and I short circuit not exceeding V_{max} and I_{max} .
- Cable capacitance (C_c) added to transmitter capacitance (C_i) must be less than the marked capacitance (C_a) and the cable inductance (L_c) added to the transmitter inductance (L_i) must be less than the marked inductance (L_a) (C_a and L_a : barrier's capacitance and inductance)
- Barriers must be installed in accordance with barriers manufacturer's control drawing and applicable rules and standards.
- The maximum nonhazardous location voltage must not exceed than 250Vrms.
- Output current must be limited by a resistor such that the output voltage-current plot is a straight line drawn between open circuit voltage and short circuit current.
- Operating temperature : -20°C to +65°C

3.3 Schematic Diagram



3.4 Example of Compatible Safety Barrier

- | | |
|-----------------------------|---|
| a) Consumer : MTL | Model Number : MTL7761ac |
| b) Consumer : Stahl | Model Number : 9001/01-086-150-01 for power supply line
9001/01-086-020-01 for signal line |
| c) Consumer : Pepperl+Fuchs | Model Number : Z 961 |

3.5 Hall Effect TWINSITE (JR)

GENERAL DESCRIPTION

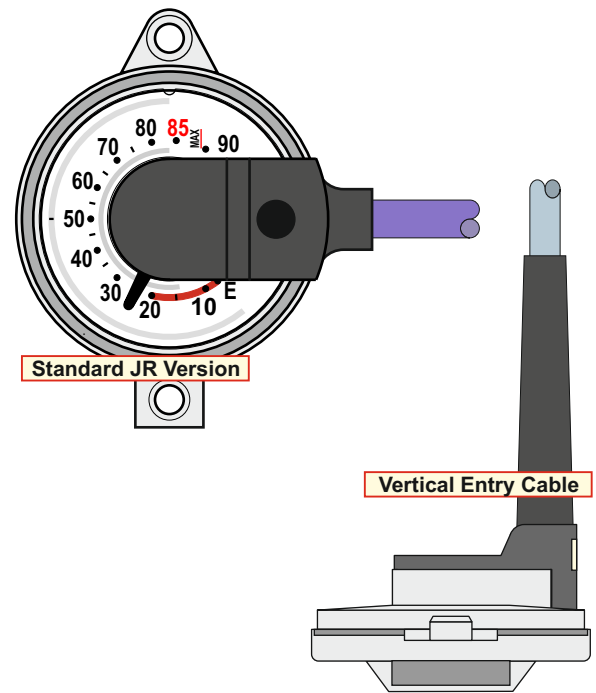
The Hall Effect Twinsite™ transmitter is a magnetically-driven Hall Effect, voltage output sender with potted wires and cable. Senders are utilized where direct reading plus an electrical signal to a remote level indication are required. Hall Effect is a solid state technology with no contacts. It counts on the fact that a magnet bends the path of electrons moving through a semiconductor. This bending is detected and converted into ratiometric voltage output.

Many existing domestic or industrial storage tanks are equipped with gauge having a weak drive magnet suited for low friction direct-indicating dial assemblies. As the Hall Effect Twinsite™ is a contactless sensor it can be utilized for a retrofit on those gauges to provide an electrical output which can be used for remote indication of tank levels.

The Hall Effect Twinsite™ provide the easiest way to read local indication by using a dial face divided into percentage units.

This Hall Effect Twinsite require a 2.5Vdc Power Supply.

The housing, in UV stabilized plastic material, is hermetically sealed by ultrasonic welding and the electrical connections are sealed with potting material.



GENERAL SPECIFICATIONS

Accuracy: $\pm 4\%$ with nominal value indicated in the calibration chart « DS-1318 » (see below) for all types

Hysteresis: less than $\pm 1\%$ typical

Repeatability: $\pm 2\%$

Resolution: Infinite

Operating Temperature: -20 to 65°C

Operating Voltage range: 2.5Vdc ± 0.25 Vdc with a accuracy decrease of 1 to 2%, power range can be extended to: 1.8 to 3Vdc

Consumption: typical 10 to 11 mA under 2.5Vdc

Output Voltage: Ratiometric (Ratiometric means that the output signal voltage is proportional with the input voltage (Vin) Under 2.5Vdc, 10% is 0.25V (or 10% of input voltage) 90% is 2.25V (or 90% of input voltage)).

Output Current: Max 1mA

MATERIAL OF CONSTRUCTION

Crystal and case: polycarbonate, ultrasonic sealed

Dial: painted aluminium

Cap: polycarbonate or polyamide

SPECIFICITY

The Hall Effect Twinsite™ Transmitters are available in one size to fit all Junior EQF Gauges.

Transmitter with not shielded cable

Supplied in standard with 2 meters blue cable LiYY-OB 3x0.5mm² DIN47100 (with white, green and brown conductors) for each models except for vertical entry supplied with a cable 3x0.25mm².

Impedance : 4.8μH

Capacitance : 123nF

Color of cable cover : Black

Cable Length : 50m maximum

CALIBRATION CHART « DS-1318 »

Best accuracy will be obtained using the calibration data in the table below, when powered in 2.5Vdc.

Graduation	Nominal Ref. (Volts)
E-Stop	0.145
E	0.245
10	0.320
20	0.575
30	0.765
40	0.990
50	1.250
60	1.510
70	1.750
80	1.950

CHAPTRE 4

3.3VDC TRANSMITTERS

4.1 Electrical Parameters

Valid for 3.3VDC models, see pages (16 to 19)

For Hall Effect transmitters manufactured with twinsite 55992S02713, 5AFYS02086 or 5ACNS02714 Sensor. (note: twinsite model number is printed on the back side of transmitter)

	Hall Effect Sensor 6320S**07** <small>* = see manual</small>		<table border="1"> <thead> <tr> <th>Description</th> <th>Model</th> <th>Sensor associated (**)</th> </tr> </thead> <tbody> <tr> <td>8" Magnetel</td> <td>6320S0307bc</td> <td>5AFYS02086 (2)</td> </tr> <tr> <td>4" Magnetel</td> <td>6320S3307bc</td> <td>5AFYS02086 (2)</td> </tr> <tr> <td>4" PV</td> <td>6320S4307bE</td> <td>5AFYS02086 (2)</td> </tr> <tr> <td>Junior</td> <td>6320S8307bE</td> <td>5992S02713 (2)</td> </tr> <tr> <td>Senior</td> <td>6320S9307bE</td> <td>5ACN02714 (2)</td> </tr> <tr> <td>Junior</td> <td>6320S8407bE</td> <td>5961S02714 (1)</td> </tr> </tbody> </table>	Description	Model	Sensor associated (**)	8" Magnetel	6320S0307bc	5AFYS02086 (2)	4" Magnetel	6320S3307bc	5AFYS02086 (2)	4" PV	6320S4307bE	5AFYS02086 (2)	Junior	6320S8307bE	5992S02713 (2)	Senior	6320S9307bE	5ACN02714 (2)	Junior	6320S8407bE	5961S02714 (1)
	Description	Model	Sensor associated (**)																					
	8" Magnetel	6320S0307bc	5AFYS02086 (2)																					
	4" Magnetel	6320S3307bc	5AFYS02086 (2)																					
	4" PV	6320S4307bE	5AFYS02086 (2)																					
	Junior	6320S8307bE	5992S02713 (2)																					
Senior	6320S9307bE	5ACN02714 (2)																						
Junior	6320S8407bE	5961S02714 (1)																						
 II 2 G Ex ib IIB T4 EPL Gb APRAGAZ 10ATEX 0124X		<small>b Cable Length (1 or 2 digit) c Magnetel Mounting Type</small>																						
CE0029 T° ambient : -20°C to +65°C																								
If used in flammable area, sensor must be powered by an Intrinsically Safe power supply with																								
$U_i = 10V(1) \& 14V(2)$, $I_i = 200mA$, $L_i = 4.8\mu H$, $C_i = 2,3\mu F(1) \& 0,44\mu F(2)$																								
<small>(*) Printed on backside of twinsite</small>																								

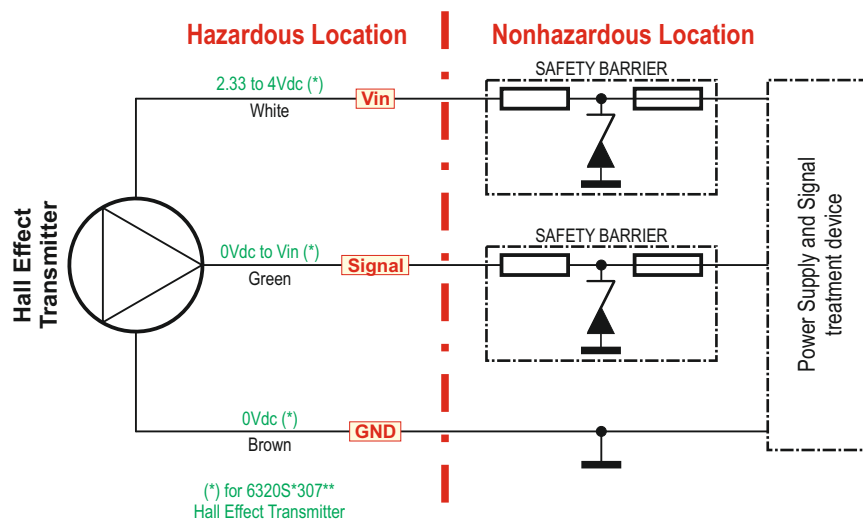
	Power Supply	Signal	Safety barrier
Voltage	$V_{in} \max = 4V_{dc}$	$V_{out} = 0 \text{ to } V_{in}$	$V_{max} (U_i) = 14V_{dc}$
Current	$I_{in} \max = 9mA$	$I_{out} \max = 1mA$	$I_{max} (L_i) = 200mA$
Capacitance	$C_i = 450nF$	$C_i = 0.44\mu F$	$C_a > C_i + C_c$
Inductance	$L_i = 4.8\mu H$	$L_i = 4.8\mu H$	$L_a > L_i + L_c$

C_i, L_i internal capacitance and inductance of transmitter, L_c, C_c : cable inductance and capacitance

4.2 Note

- Selected associated apparatus or barriers must be third party approved as Intrinsically Safe for the application and have V open circuit and I short circuit not exceeding V_{max} and I_{max} .
- Cable capacitance (C_c) added to transmitter capacitance (C_i) must be less than the marked capacitance (C_a) and the cable inductance (L_c) added to the transmitter inductance (L_i) must be less than the marked inductance (L_a) (C_a and L_a : barrier's capacitance and inductance)
- Barriers must be installed in accordance with barriers manufacturer's control drawing and applicable rules and standards.
- The maximum nonhazardous location voltage must not exceed than 250Vrms.
- Output current must be limited by a resistor such that the output voltage-current plot is a straight line drawn between open circuit voltage and short circuit current.
- Operating temperature : -20°C to +65°C

4.3 Schematic Diagram



4.4 Example of Compatible Safety Barrier

- | | |
|-----------------------------|---|
| a) Consumer : MTL | Model Number : MTL7761ac |
| b) Consumer : Stahl | Model Number : 9001/01-086-150-01 for power supply line
9001/01-086-020-01 for signal line |
| c) Consumer : Pepperl+Fuchs | Model Number : Z 961 |

4.5 Hall Effect TWINSITE (JR or SR)

GENERAL DESCRIPTION

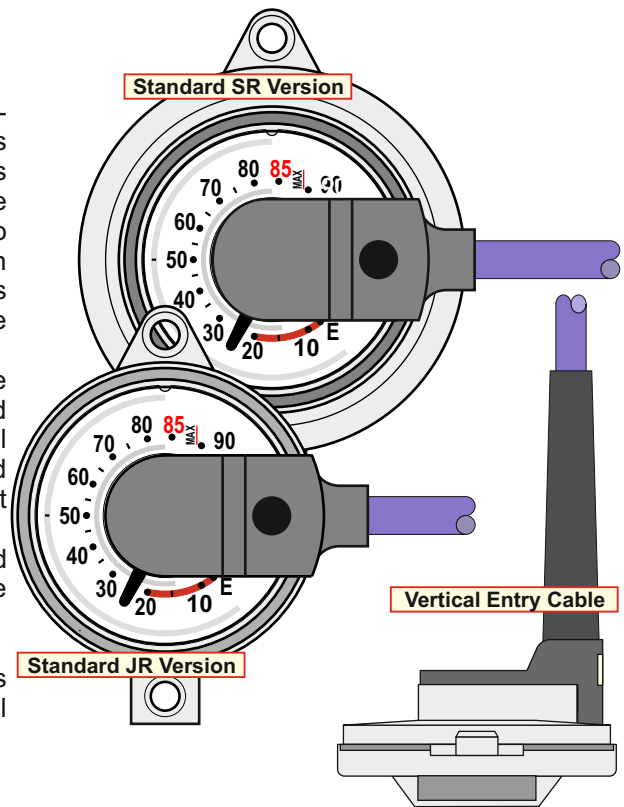
The Hall Effect Twinsite™ transmitter is a magnetically-driven Hall Effect, voltage output sender with potted wires and cable. Senders are utilized where direct reading plus an electrical signal to a remote level indication are required. Hall Effect is a solid state technology with no contacts. It counts on the fact that a magnet bends the path of electrons moving through a semiconductor. This bending is detected and converted into ratiometric voltage output.

Many existing domestic or industrial storage tanks are equipped with gauge having a weak drive magnet suited for low friction direct-indicating dial assemblies. As the Hall Effect Twinsite™ is a contactless sensor it can be utilized for a retrofit on those gauges to provide an electrical output which can be used for remote indication of tank levels.

The Hall Effect Twinsite™ provide the easiest way to read local indication by using a dial face divided into percentage units.

This Hall Effect Twinsite require a 3.3Vdc Power Supply.

The housing, in UV stabilized plastic material, is hermetically sealed by ultrasonic welding and the electrical connections are sealed with potting material.



GENERAL SPECIFICATIONS

Accuracy: $\pm 4\%$ with nominal value indicated in the calibration chart « DS-1318 » (see below) for all types

Hysteresis: less than $\pm 1\%$ typical

Repeatability: $\pm 2\%$

Resolution: Infinite

Operating Temperature: -20 to 65°C

Operating Voltage range: 3.3Vdc ± 0.33 Vdc with a accuracy decrease of 1 to 2%, power range can be extended to: 2.33 to 4Vdc

Consumption: typical 8 to 9 mA under 3.3Vdc

Output Voltage: Ratiometric (Ratiometric means that the output signal voltage is proportional with the input voltage (Vin) Under 3.3Vdc, 10% is 0.33V (or 10% of input voltage) 90% is 2.97V (or 90% of input voltage)).

Output Current: Max 1mA

MATERIAL OF CONSTRUCTION

Crystal and case: polycarbonate, ultrasonic sealed

Dial: painted aluminium

Cap: polycarbonate or polyamide

SPECIFICITY

The Hall Effect Twinsite™ Transmitters are available in two sizes to fit all Junior or Senior EQF Gauges.

Transmitter with not shielded cable

Supplied in standard with 2 meters blue cable LiYY-OB 3x0.5mm² DIN47100 (with white, green and brown conductors) for each models except for vertical entry supplied with a cable 3x0.25mm².

Impedance : 4.8μH

Capacitance : 123nF

Color of cable cover : Black

Cable Length : 50m maximum

CALIBRATION CHART « DS-1318 »

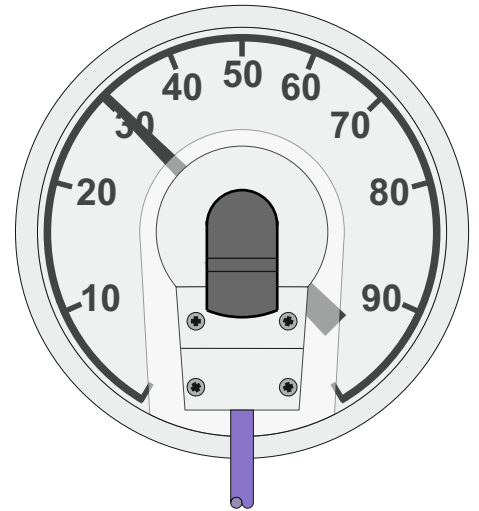
Best accuracy will be obtained using the calibration data in the table below, when powered in 3.3Vdc.

Graduation	Nominal Ref. (Volts)
E-Stop	0.191
E	0.323
10	0.422
20	0.759
30	1.010
40	1.307
50	1.650
60	1.993
70	2.310
80	2.574

4.6 Hall Effect 4" PV for SENIOR Gauges (6290/6293)

GENERAL DESCRIPTION

The Hall Effect Twinsite™ transmitter consists of a 4" dial for Senior Gauge (model 6290/6293) incorporating a Hall Effect Twinsite™ which provides an electrical output for remote indication. The Hall Effect Twinsite™ provide the easiest way to read local indication by using a dial face divided into percentage units. This Hall Effect Twinsite require a 3.3Vdc Power Supply.



GENERAL SPECIFICATIONS

Accuracy: $\pm 4\%$ with nominal value indicated in the calibration chart (see below) for all types

Hysteresis: less than $\pm 3\%$ typical

Repeatability: $\pm 2\%$

Resolution: Infinite

Operating Temperature: -20 to 65°C

Operating Voltage range: $3.3\text{Vdc} \pm 0.33\text{Vdc}$ With a decrease in accuracy of 1 to 2%, power range can be extended to: 2.33 to 4Vdc

Consumption: typical 8 to 9 mA under 3.3Vdc

Output Voltage: Ratiometric (Ratiometric means that the output signal voltage is proportional with the input voltage (V_{in}) Under 3.3Vdc, 10% is 0.33V (or 10% of input voltage) 90% is 2.97V (or 90% of input voltage)).

Output Current: Max 1mA

MATERIAL OF CONSTRUCTION

Crystal and case of twinsite: polycarbonate, ultrasonic sealed

Crystal of dial: polycarbonate

Case of dial: aluminium anodised

Bezel Ring: aluminium

Dial: painted aluminium

SPECIFICITY

This 4" Hall Effect Twinsite™ Transmitters is designed for mounting on EQF Gauges models 6290/6293.

Transmitter with shielded cable

Supplied in standard with 2 meters blue cable LiYY-OB 3x0.5mm² DIN47100 (with white, green and brown conductors) for each models .

Impedance : 4.8 μH

Capacitance : 123nF

Cable Length : 50m maximum

CALIBRATION CHART

Best accuracy will be obtained using the calibration data in the table below, when powered in 3,3Vdc.

Graduation	Nominal Ref. (Volts)
5	0.119
10	0.356
20	0.680
30	0.917
40	1.241
50	1.610
60	2.000
70	2.356
80	2.620
90	2.917
95	3.181

Customer has to check the suitability of the sensor with his application.

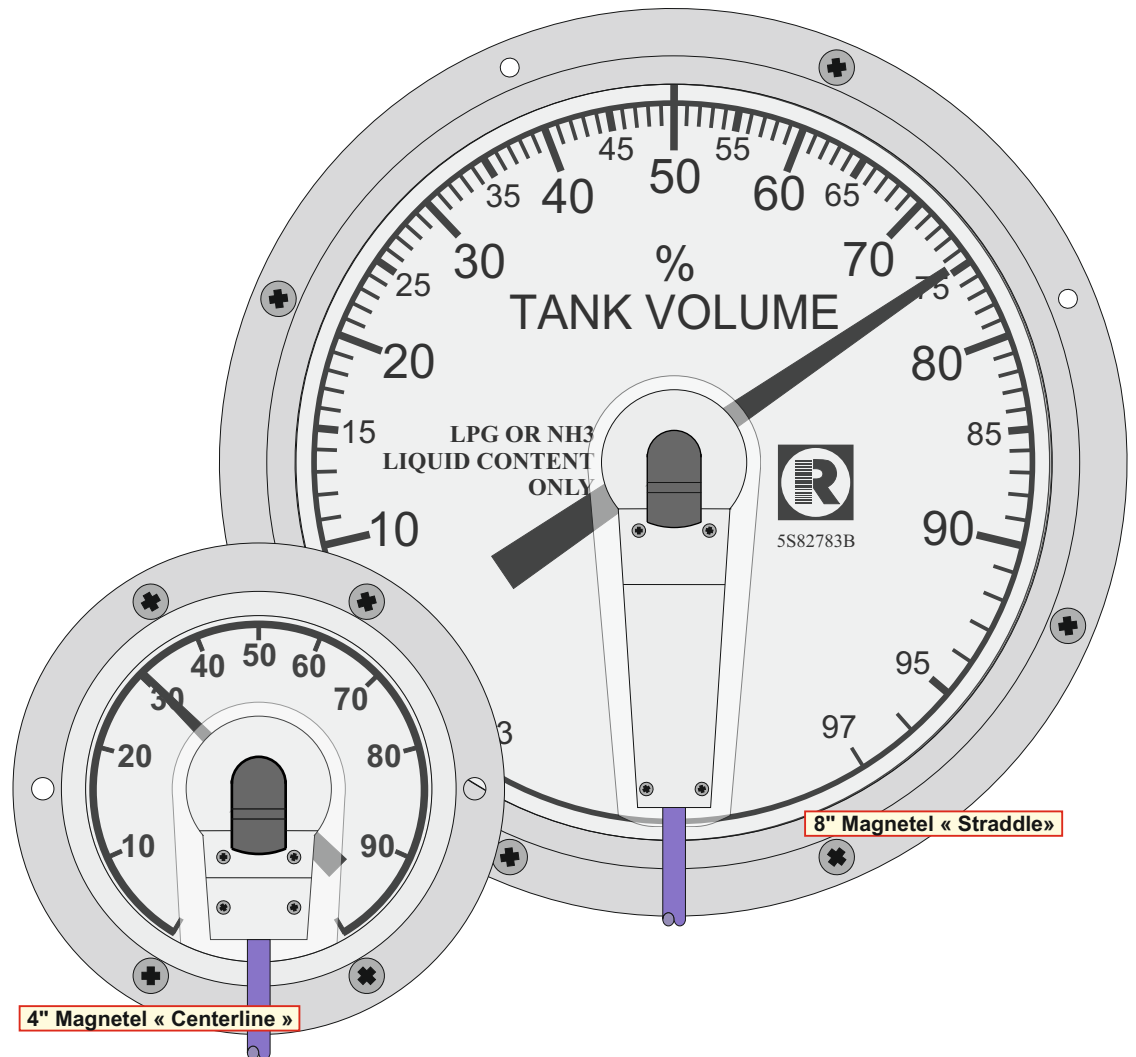
4.7 Hall Effect 4" and 8" for Magnetel Gauges

GENERAL DESCRIPTION

The Hall Effect Twinsite™ transmitter consists of a 4" or 8" dial for Magnetel Gauge incorporating a Hall Effect Twinsite™ which provides an electrical output for remote indication.

The Hall Effect Twinsite™ provide the easiest way to read local indication by using a dial face divided into percentage units.

This Hall Effect Twinsite require a 3.3Vdc Power Supply.



GENERAL SPECIFICATIONS

Accuracy: $\pm 4\%$ with nominal value indicated in calibration chart (see next page) for all types

Hysteresis: less than $\pm 3\%$ typical

Repeatability: $\pm 2\%$

Resolution: Infinite

Operating Temperature: -20 to 65°C

Operating Voltage range: $3.3\text{Vdc} \pm 0.33\text{Vdc}$ With a decrease in accuracy of 1 to 2%, power range can be extended to: 2.33 to 4Vdc

Consumption: typical 8 to 9 mA under 3.3Vdc

Output Voltage: Ratiometric (Ratiometric means that the output signal voltage is proportional with the input voltage (V_{in}) Under 3.3Vdc, 10% is 0.33V (or 10% of input voltage) 90% is 2.97V (or 90% of input voltage)).

Output Current: Max 1mA

MATERIAL OF CONSTRUCTION

Crystal and case of twinsite: polycarbonate, ultrasonic sealed

Crystal of dial: polycarbonate

Case of dial: aluminium anodised

Bezel Ring: Stainless Steel

Dial: painted aluminium

SPECIFICITY

This Hall Effect Twinsite™ Transmitters are available for three different mounting (C, X or CX) to fit all respective Magnetel EQF Gauge.

Transmitter with shielded cable

Supplied in standard with 2 meters blue cable LiYY-OB 3x0.5mm² DIN47100 (with white, green and brown conductors) for each models .

Impedance : 4.8μH

Capacitance : 123nF

Cable Length : 50m maximum

CALIBRATION CHART « for 4" Transmitters »

Best accuracy will be obtained using the calibration data in the table below, when powered in 3.3Vdc.

Graduation	Nominal Ref. (Volts)
5	0.144
10	0.424
20	0.729
30	0.971
40	1.292
50	1.639
60	2.010
70	2.371
80	2.654
90	2.973
95	3.161

Customer has to check the suitability of the sensor with his application.

CALIBRATION CHART « for 8" Transmitters »

Best accuracy will be obtained using the calibration data in the table below, when powered in 3.3Vdc.

For dial plate 3 to 97%	
Graduation	Nominal Ref. (Volts)
3	0.119
10	0.455
20	0.726
30	0.957
40	1.261
50	1.610
60	1.980
70	2.310
80	2.567
90	2.838
97	3.181

For dial plate 5 to 95%	
Graduation	Nominal Ref. (Volts)
5	0.119
10	0.356
20	0.666
30	0.924
40	1.234
50	1.610
60	2.006
70	2.350
80	2.627
90	2.937
95	3.181

Customer has to check the suitability of the sensor with his application.