

FM Approvals
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CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

TYPE-WLSa1bcdefg1hi1 Water Level Sensor Modbus Version

IS / 1 / ABCD / T* - 800-9020-FM

I / 0 / AEx ia / IIC / T* - 800-9020-FM

*T4 below the mounting flange and T6 above the mounting flange

Electrical Parameters

	U _i	I _i	P _i	L _i	C _i
main supply and communication	7.2 V	250 mA	700 mW	130 uH	0
temperature elements with a common return (up to 16 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 3-wire (up to 16 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 4-wire (up to 16 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF

- a = overall length in mm;
- b = Connection: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 31, 32, 33, 34, 35, 36, 37, 41, 42, 43, 44, 45, 46, 47, 48, 61, 62, 63, 64, 65, 66, 67, 71, 72, 73, 74, 75, 76, 77, 81, 82, 83, 84, 85, 86, 87 or 88.
- c = Level sensor; 0, 1, 2, 3, 4, 5, 6, A, B, C, D, E, F or G
- d = anchor weight 0, 1, 2, or 3
- e = number of conductors 3 or 5
- f = number of elements
- g = tolerance class 0, 1, 2, 3, 4 or 5
- h = temperature range 1
- i = lead out (total length) 1

WLS ModBus Ambient temperature range:

Above Flange: -50 °C to 70 °C

Below flange: -50 °C to 120 °C

Special Conditions of Use

- 1) The WLS and the RTDs are intrinsically safe circuits. At connection facilities the requirements in clause 6.2.1 in ISA 60079-11 for separation between intrinsically safe circuits and possibly non-intrinsically safe circuits shall be strictly followed.
- 2) The WLS and the RTDs are two separate intrinsically safe circuits. They must not be interconnected and the requirements for separation listed in clause 6.2.1 in ISA 60079-11 shall be followed.
- 3) Terminating and connecting the WLS cable and the wires from the RTDs, requirements in the local installation codes shall be followed.
- 4) When connecting the WLS and junction box adequate strain relief shall be provided for the wiring.

TYPE-WLSa1bcdefg1hi1 Water Level Sensor HART Version

IS / 1 / CD / T4 - 800-9020-FM

I / 0 / AEx ia / IIB / T4 - 800-9020-FM

Electrical Parameters

	Ui	Ii	Pi	Li	Ci
WLS main supply	28 V	100 mA	700 mW	2.5 mH	20 nF
temperature elements with a common return (up to 16 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 3-wire (up to 16 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 4-wire (up to 16 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF

a = overall length in mm;

b = Connection: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 31, 32, 33, 34, 35, 36, 37, 41, 42, 43, 44, 45, 46, 47, 48, 61, 62, 63, 64, 65, 66, 67, 71, 72, 73, 74, 75, 76, 77, 81, 82, 83, 84, 85, 86, 87 or 88.

c = Level sensor; 0, 1, 2, 3, 4, 5, 6, A, B, C, D, E, F or G

d = anchor weight 0, 1, 2, or 3

e = number of conductors 3 or 5

f = number of elements

g = tolerance class 0, 1, 2, 3, 4 or 5

h = temperature range 1

i = lead out (total length) 1

WLS HART Ambient temperature range:

Above Flange: -50 °C to 70 °C

Below flange: -50 °C to 120 °C

Special Conditions of Use

- 1) The WLS and the RTDs are intrinsically safe circuits. At connection facilities the requirements in clause 6.2.1 in ISA 60079-11 for separation between intrinsically safe circuits and possibly non-intrinsically safe circuits shall be strictly followed.
- 2) The WLS and the RTDs are two separate intrinsically safe circuits. They must not be interconnected and the requirements for separation listed in clause 6.2.1 in ISA 60079-11 shall be followed.
- 3) Terminating and connecting the WLS cable and the wires from the RTDs, requirements in the local installation codes shall be followed.
- 4) When connecting the WLS and junction box adequate strain relief shall be provided for the wiring.

Type-NLI ab1defghij

IS / 1 / ABCD / T4 - 800-9020-FM

I / 0 / AEx ia / IIC / T4 - 800-9020-FM

Electrical parameters

	Ui	Ii	Pi	Li	Ci
temperature elements with a common	7.2 V	400 mA	700 mW	40 uH	500 nF

	Ui	li	Pi	Li	Ci
return (up to 20 elements)					
temperature elements 3-wire (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 4-wire (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
Pt100 Average or Cu 90. 48 average with common return (up to 5 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF

- a = overall length in mm;
- b = Sheath Diameter 1 or 2
- d = Flange Connection Type: 1, 7, 21, 2, 22, 23, 24, 25, 26, 27, 31, 32, 33, 34, 35, 36, 37, 41, 42, 43, 44, 45, 46, 47, 48, 61, 62, 63, 64, 65, 66, 67, 71, 72, 73, 74, 75, 76, 77, 81, 82, 83, 84, 85, 86, 87 or 88.
- e = Number of conductors 3, 4 or 5
- f = number of spots
- g = sensing element 1, 2, 3 or 4
- h = tolerance class
- i = temperature range 0, 1 or 4
- j = cable lead out (total length)

Type-NLI Temperature Class and Ambient temperature range:

Above Flange: -50 °C to 70 °C

Below flange: -50 °C to 130 °C

Special Conditions of Use

- 1) The RTDs are intrinsically safe circuits. At connection facilities the requirements in clause 6.2.1 in ISA 60079-11 for separation between intrinsically safe circuits and possibly non-intrinsically safe circuits shall be strictly followed.
- 2) Terminating and connecting the wires from the RTDs, requirements in the local installation codes shall be followed.
- 3) When connecting the RTD's and junction box adequate strain relief shall be provided for the wiring.

Type-NLI ab1defghij

IS / 1 / ABCD / T2 - 800-9020-FM

I / 0 / AEx ia / IIC / T2 - 800-9020-FM

Electrical Parameters

	Ui	li	Pi	Li	Ci
temperature elements with a common return (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 3-wire (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 4-wire (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
Pt100 Average or Cu 90. 48 average with common return (up to 5 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF

- a = overall length in mm;
- b = Sheath Diameter 1 or ¾
- d = Flange Connection Type: 1, 7, 21, 2, 22, 23, 24, 25, 26, 27, 31, 32, 33, 34, 35, 36, 37, 41, 42, 43, 44, 45, 46, 47, 48, 61, 62, 63, 64, 65, 66, 67, 71, 72, 73, 74, 75, 76, 77, 81, 82, 83, 84, 85, 86, 87 or 88.
- e = Number of conductors 3, 4 or 5
- f = number of spots

- g = sensing element
- h = tolerance class
- i = temperature range 2 or 3
- j = cable lead out (total length)

Type-NLI Temperature Class and Ambient temperature range:

Above Flange: -50°C to 70°C
 Below flange: -50°C to 250°C

Special Conditions of Use

- 1) *The RTDs are intrinsically safe circuits. At connection facilities the requirements in clause 6.2.1 in ISA 60079-11 for separation between intrinsically safe circuits and possibly non-intrinsically safe circuits shall be strictly followed.*
- 2) *Terminating and connecting the wires from the RTDs, requirements in the local installation codes shall be followed.*
- 3) *When connecting the RTD's and junction box adequate strain relief shall be provided for the wiring.*

Type-NLV a11def1h1

IS / 1 / ABCD / T4 - 800-9020-FM
 I / 0 / AEx ia / IIC / T4 - 800-9020-FM

Electrical Parameters

	Ui	Ii	Pi	Li	Ci
temperature elements with a common return (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 3-wire (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 4-wire (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
Pt100 Average or Cu 90. 48 average with common return (up to 5 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF

- a = Overall length in mm;
- d = Flange Connection Type: 1, 2, 3, 4, 5, 6 or 7.
- e = Number of conductors 3, or 4
- f = number of spots
- h = tolerance class
- j = cable lead out (total length)

Type-NLV Temperature Class and Ambient temperature range:

Above Flange: -50°C to 70°C
 Below flange: -50°C to 130°C

Special Conditions of Use

- 1) *The RTDs are intrinsically safe circuits. At connection facilities the requirements in clause 6.2.1 in ISA 60079-11 for separation between intrinsically safe circuits and possibly non-intrinsically safe circuits shall be strictly followed.*
- 2) *Terminating and connecting the wires from the RTDs, requirements in the local installation codes shall be followed.*
- 3) *When connecting the RTD's and junction box adequate strain relief shall be provided for the wiring.*

Type-NL-Cryo ab1def111j
 IS / 1 / ABCD / T5 - 800-9020-FM
 I / 0 / AEx ia / IIC / T5 - 800-9020-FM

Electrical parameters

	Ui	Ii	Pi	Li	Ci
temperature elements with a common return (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 3-wire (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
temperature elements 4-wire (up to 20 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF
Pt100 Average or Cu 90. 48 average with common return (up to 5 elements)	7.2 V	400 mA	700 mW	40 uH	500 nF

- a = overall length in mm;
- b = Sheath Diameter 1 or 2
- d = Flange Connection Type: 1, 2 or 3.
- e = Number of conductors 3, 5 or 6
- f = number of spots
- j = cable lead out (total length)

Type-NL-Cryo Temperature Class and Ambient temperature range:

Above Flange: -50°C to 70°C
 Below flange: -200°C to 95°C

Special Conditions of Use

- 1) *The RTDs are intrinsically safe circuits. At connection facilities the requirements in clause 6.2.1 in ISA 60079-11 for separation between intrinsically safe circuits and possibly non-intrinsically safe circuits shall be strictly followed.*
- 2) *Terminating and connecting the wires from the RTDs, requirements in the local installation codes shall be followed.*
- 3) *When connecting the RTD's and junction box adequate strain relief shall be provided for the wiring.*

Equipment Ratings:

Type WLS Modbus version - Intrinsically safe for Class I, Division 1, Groups ABC and D and Class I, Zone 0 Group IIC indoor hazardous locations; Temperature class T4 below the flange at an ambient temperature range of -50 °C to 120 °C and T6 above the flange at an ambient temperature range of -50 °C to 70 °C

Type WLS HART version - Intrinsically safe for Class I, Division 1, Groups C and D and Class I, Zone 0 Group IIB indoor hazardous locations; Temperature class T4.

Type NL temperature sensors - Intrinsically safe for Class I, Division 1, Groups ABC and D and Class I, Zone 0 Group IIC indoor hazardous locations; Temperature class as indicated

FM Approved for:

Senmatic A/S
 DK-5471 Sonderso, Denmark



This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3610	2010
Class 3600	1998
Class 3810	2005
ANSI/ISA 60079-26	2008

Original Project ID3032389

Approval Granted: July 9, 2010

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
100803	August 9, 2010		
111125	October 8, 2012		

FM Approvals LLC



 J.E. Marquedant
 Group Manager, Electrical

8 October 2012

 Date