

CERTIFICATE OF CONFORMITY



1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**

2. **Certificate No:** FM20US0002X
3. **Equipment:** Type-WLS Water Level Sensor
(Type Reference and Name) Type-NL Multi-spot Thermometer

4. **Name of Listing Company:** Senmatic A/S

5. **Address of Listing Company:** Industrivej 8
DK-5471 Sonderso
Denmark

6. The examination and test results are recorded in confidential report number:

3032389 dated 9th July 2010

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

FM Class 3600:2018, FM Class 3610:2010, FM Class 3810:2005,
ANSI/ISA 60079-26:2008

8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

10. Equipment Ratings:

Intrinsically Safe for Class I, Division 1, Groups A, B, C and D; AEx ia for Class I, Zone 0, Group IIC, temperature code and ambient temperature range as shown in the Listings.

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

19 February 2020

Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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11. The marking of the equipment shall include:

Type WLS (Modbus version)

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

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

*T4 below the mounting flange, $-50^{\circ}\text{C} \leq T_a \leq +120^{\circ}\text{C}$;

T6 above the mounting flange, $-50^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$

Type WLS (HART version)

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

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

$-50^{\circ}\text{C} \leq T_a \leq +120^{\circ}\text{C}$, below the mounting flange;

$-50^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$, above the mounting flange

Type NLI

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

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

$-50^{\circ}\text{C} \leq T_a \leq +130^{\circ}\text{C}$, below the mounting flange;

$-50^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$, above the mounting flange

Type NLI

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

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

$-50^{\circ}\text{C} \leq T_a \leq +250^{\circ}\text{C}$, below the mounting flange;

$-50^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$, above the mounting flange

Type NLV

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

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

$-50^{\circ}\text{C} \leq T_a \leq +130^{\circ}\text{C}$, below the mounting flange;

$-50^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$, above the mounting flange

Type NL-Cryo

IS / 1 / ABCD / T5 - 800-9020-FM

I / 0 / AEx ia / IIC / T5 - 800-9020-FM

$-200^{\circ}\text{C} \leq T_a \leq +95^{\circ}\text{C}$, below the mounting flange;

$-50^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$, above the mounting flange

12. **Description of Equipment:**

The Type WLS can consist of two types of sensors; a water level sensor and a multi spot temperature sensor. The Type WLS is configurable with respect to dimensions, number of sensors and positioning of sensors to suit a broad range of applications.

The water level sensor is placed at the end of a flexible stainless steel tube and up to 16 RTDs can be integrated in the length of the tube. The vertical position of the sensors and the length of the water level sensing device are variable and can be specified by the user within the limits set out in the datasheet.

There are two versions of the level sensing device:

Type WLS HART version using HART communication technology and being a 2 wire device.

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Type WLS MODBUS version utilizing ModBus communication protocol and being a 4 wire device.

If the WLS is ordered without the capacitive level sensor, up to 20 RTDs can be ordered in the flexible tube. The Type NL sensors are available as: NLI, NLV, or NL-Cryo depending on the specific application.

TYPE-WLSa1bcdefg1hi1 Water Level Sensor HART Version

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

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

Electrical Parameters

	U _i	I _i	P _i	L _i	C _i
WLS main supply	28 V	100mA	700 mW	2.5 uH	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 Stainless steel welded or threaded flange connection

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

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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 Stainless steel welded or threaded flange connection

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

Type-NLI ab1defghij

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

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

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Electrical Parameters

	U _i	I _i	P _i	L _i	C _i
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: Stainless steel welded or threaded flange connection
- 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 Ambient temperature range:

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

Type-NLI ab1defghij

IS / 1 / ABCD / T2 - 800-9020-FM
 I / 0 / AEx ia / IIC / T2 - 800-9020-FM

Electrical Parameters

	U _i	I _i	P _i	L _i	C _i
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

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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 3/4
- d = Flange Connection Type: Stainless steel welded or threaded flange connection
- 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 Ambient temperature range:

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

Type-NLV a11def1h1 Multi-spot thermometer

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

Electrical Parameters

	U _i	I _i	P _i	L _i	C _i
<i>temperature elements with a common return (up to 20 elements)</i>	7.2 V	400 mA	700 mW	40 uH	500 nF
<i>temperature elements 3-wire (up to 20 elements)</i>	7.2 V	400 mA	700 mW	40 uH	500 nF
<i>temperature elements 4-wire (up to 20 elements)</i>	7.2 V	400 mA	700 mW	40 uH	500 nF
<i>Pt100 Average or Cu 90.48 average with common return (up to 5 elements)</i>	7.2 V	400 mA	700 mW	40 uH	500 nF

a = Overall length in mm;

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- d = Flange Connection Type: Stainless steel welded or threaded flange connection
- e = Number of conductors 3, or 4
- f = number of spots
- h = tolerance class
- j = cable lead out (total length)

Type-NLV Ambient temperature range:

Ambient temperature range above flange: -50°C to 70°C
Ambient temperature range below flange: -50°C to 130°C

Type-NL-Cryo ab1def11j

IS / 1 / ABCD / T5 – 800-9020FM
I / 0 / AEx ia / IIC / T5 – 800-9020-FM

Electrical Parameters

	U _i	I _i	P _i	L _i	C _i
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 Stainless steel welded or threaded flange connection
- e = Number of connectors 3 wire, 4 wire, or common return
- f = Number of spots
- j = Cable lead out (total length)

13. Specific 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

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codes shall be followed.

4. When connecting either the WLS or the RTDs to the junction box, adequate strain relief shall be provided.

14. Test and Assessment Procedure and Conditions:

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. Schedule Drawings

A copy of the technical documentation has been kept by FM Approvals.

16. Certificate History

Details of the supplements to this certificate are described below:

Date	Description
9 th July 2010	Original Issue.
19 th February 2020	Supplement 3 Report Reference: RR221866 dated 19 th February 2020. Description of the Change: Minor changes to the Listings, and minor drawing change not affecting safety. Re-wording of Specific Condition 4.

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