

CERTIFICATE OF CONFORMITY



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

2. **Certificate No:** FM17US0129X
3. **Equipment:** Quartz QN and QC Series Valve Position Monitor
(Type Reference and Name)

4. **Name of Listing Company:** Neles USA Inc. dba StoneL

5. **Address of Listing Company:** 26271 US Hwy 59
Fergus Falls, MN 56537
USA

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

2Z6A0.AE dated 21st March 1996

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

FM Class 3600:2022, FM Class 3610:2021, FM Class 3611:2021, FM Class 3810:2021,
ANSI/UL 60079-0:2020, ANSI/UL 60079-11:2018, ANSI/NEMA 250:1991, ANSI/IEC 60529:2004,
ANSI/UL 121201:2019, ANSI/ISA 61010-1:2012

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 use in Class I, II, III, Division 1, Groups A thru G T4, Ta = -50°C to +80°C; Type 4 / 4X / 6 / IP66 / IP67
Intrinsically Safe for use in Class I, Zone 0, AEx ia IIC T6...T1 Ga T4, Ta = -50°C to +80°C; Type 4 / 4X / 6 / IP66 / IP67

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

5 April 2022

Date

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

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FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
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Nonincendive for use in Class I,II, III, Division 2 Groups A, B, C, D, E, F and G T5, Ta = -50°C to +80°C; Type 4 / 4X / 6 / IP66 / IP67
Nonincendive for use in Class I, Zone 2, Group IIC T5, Ta = -50°C to +80°C; Type 4 / 4X / 6 / IP66 / IP67

See equipment description for specific hazardous location ratings. Some models are not available with all ratings. Some models have a more limited ambient temperature range.

11. The marking of the equipment shall include:

Class I, II, III, Division 2, Groups ABCDEFG, T5
 Class I, Zone 2, Group IIC T5
 Class I, II, III, Division 1, Groups ABCDEFG, T6...T1
 Class I, Zone 0, AEx ia IIC T6...T1 Ga
 Type 4 / 4X / 6 / IP66 / IP67
 Ta = -50°C to +80°C

12. **Description of Equipment:**

The “QN” and “QC” Series Valve Position Monitors consist of sensors, potentiometers and transmitters of various designs enclosed in an aluminum alloy or stainless steel enclosure with either an aluminum, stainless steel or a clear Lexan cover. The enclosure is rated to IP66 and IP67. The sensors covered are: a) Dual Module Namur sensors, b) Maxx-Guard proximity sensors, c) N Type Namur sensors (P + F) d) A Type Namur sensors (P + F) and e) B Type Namur sensors (P + F). The transmitters covered are 5_, 7_ and T_. The potentiometers covered are B_ and C_.

The Dual Module Namur Sensors consist of two (top & bottom) solid state switches and a rotating cam which has a top and bottom metal target mounted on a plastic part connected to a cam. Access to field wiring is by way of separate cables which enter the enclosure through a cable entry and connect to terminals of a terminal block.

The Maxx-Guard proximity sensor models consist of top & bottom reed switches and a rotating cam which has magnets mounted on a plastic part connected to a cam. Access to field wiring is by way of separate cables which enter the enclosure through a cable entry and connect to terminals of a terminal block. The PCBA and all components except for two LEDs are encapsulated.

The Namur “N” proximity models consist of solid state inductive proximity sensors (P + F NJ2-V3-N-V5, PTB00ATEX2032X) and a rotating cam which has a metal target mounted on a plastic part connected to a cam. Access to field wiring is by way of separate cables which enter the enclosure through a cable entry and connect to terminals of a terminal block.

The Namur “A” proximity models consist of solid state inductive proximity sensors (P + F NJ2-12GK-SN, PTB00ATEX2049X) and a rotating cam which has a metal target mounted on a plastic part connected to a cam. Access to field wiring is by way of separate cables which enter the enclosure through a cable entry and connect to terminals of a terminal block.

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The Namur “B” proximity models consist of solid state inductive proximity sensors (P + F NJ5-30GK-S1N, PTB00ATEX2049X) and a rotating cam which has a metal target mounted on a plastic part connected to a cam. Access to field wiring is by way of separate cables which enter the enclosure through a cable entry and connect to terminals of a terminal block.

The Transmitter option “5O” and “7O” consist of a direct drive potentiometer wired to a pcb that provides a 4-20mA signal. The transmitter option can include additional switches/sensors by replacing the second digit “O” with a sensor option digit (example “5N” or “7N”, etc...). Therefore the “transmitter” parameters (for “5” and “7”) are listed separately from the additional switch/sensor parameters (“N” or any other sensor option). Access to field wiring is by way of separate cables which enter the enclosure through a cable entry and connect to terminals of a terminal block.

The Transmitter option “TO” consists of a solid state sensing circuit that provides a 4-20mA signal. The transmitter option can include additional switches/sensors by replacing the second digit “O” with a sensor option digit (example “TR”, etc...). Therefore the “transmitter” parameters (for “T”) are listed separately from the additional switch/sensor parameters (“R” or any other sensor option). Access to field wiring is by way of separate cables which enter the enclosure through a cable entry and connect to terminals of a terminal block.

The Potentiometer option “BO” and “CO” consist of a direct drive potentiometer wired to a terminal block. The potentiometer option can include additional switches/sensors by replacing the second digit “O” with a sensor option digit (example “BN” or “CN”, etc...). Therefore the “Potentiometer” parameters (for “B” and “C”) are listed separately from the additional switch/sensor parameters (“N” or any other sensor option). Access to field wiring is by way of separate cables which enter the enclosure through a cable entry and connect to terminals of a terminal block.

QNabcdef-g. Valve Position Monitor.

NI / I, II, III / 2 / ABCDEFG / T5; Type 4 / 4X / 6 / IP66 / IP67; Ta* = -40°C to +80°C
 I / 2 / IIC / T5; Type 4 / 4X / 6 / IP66 / IP67; Ta* = -40°C to +80°C

*When a = 2E, 4E, 5E, 7E, BE, CE, 2F, 4F, 5F, 7F, BF or CF, Ta = -25°C to +70°C

a = Function 2P, 4P, 5P, 7P, BP, CP, 2L, 4L, 5L, 7L, BL, CL, 2H, 4H, 5H, 7H, 8H, BH, CH, 2S, 4S, 5S, 7S, BS, CS, 8Y, 2G, 4G, 5G, 7G, BG, CG, 4X, 6X, 2E, 4E, 5E, 7E, TE, BE, CE, 2F, 4F, 5F, 7F, TF, BF, CF, 33, 53, 73, B3, C3, 35, 5T, 7T, TT, BT, CT, 92, 93, 96, 97, 82, 83, 86 or 87.

b = Enclosure C, E, P, B, Y, S, U or J

c = Junction 02 or 03

d = Output X, S, N, or H

e = Visual Indication X, G, R, C, 1, 2, 3, 4, 5, 0, N, D, A, S, T, U, V or W

f = Branding A, or M

g = Options ‘Special Unit Digits’

Note: ‘Special Unit Digits’ do not affect the integrity of the housing, the electrical safety, or the title plate.

QNabcdef-g. Valve Position Monitor.

NI / I, II, III / 2 / ABCDEFG / T5; Type 4 / 4X / 6 / IP66 / IP67; Ta* = -40°C to +80°C
 I / 2 / IIC / T5; Type 4 / 4X / 6 / IP66 / IP67; Ta* = -40°C to +80°C

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IS / I, II, III / 1 / ABCDEFG / T6...T1*; Type 4 / 4X / 6 / IP66 / IP67; Ta* = -40°C to +80°C
 I / 0 / AEx ia IIC T6...T1* Ga; Type 4 / 4X / 6 / IP66 / IP67; Ta* = -40°C to +80°C

*When a = 5O, 7O

For T4 Ta* = -40°C to +80°C

Entity Limitation Parameters: Ui = 30 Vdc, li = 100 mA, Ci = 66 nF, Li = 0 H, Pi = 0.75 W

*When a = TO

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters:

Transmitter: Ui = 30 Vdc, li = 100 mA, Ci = 3 nF, Li = 0 H, Pi = 0.75 W

Solenoid Connection Terminals: Ui = 30 Vdc, li = 120 mA

*When a = BO, CO

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters: Ui = 26 V, li = 14 mA, Pi = 50 mW, Ci = 0 nF, Li = 0 mH

*When a = 2J, 4J, 2M, 4M

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters:

Switch/Sensor: Ui = 30V, li = 100 mA, Pi = 2.0W, Ci = 66 nF, Li = 0.8 mH

*When a = 5J, 7J, 5M, 7M

For T4 Ta* = -40°C to +80°C

Energy Limitation Parameters:

Switch/Sensor: Ui = 30 Vdc, li = 100 mA, Ci = 66 nF, Li = 0.8 mH, Pi = 2.0 W

Transmitter: Ui = 30 Vdc, li = 100 mA, Ci = 66 nF, Li = 0 H, Pi = 0.75 W

*When a = BJ, CJ, BM, CM

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters:

Switch/Sensor: Ui = 30V, li = 100 mA, Pi = 2.0W, Ci = 66 nF, Li = 0.8 mH

Transmitter: Ui = 26V, li = 14 mA, Pi = 50mW, Ci = 0 nF, Li = 0 mH

*When a = 44

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters:

Sensor Module: Ui = 22V, li = 120 mA, Pi = 2.0W, Ci = 98 nF, Li = 0.8 mH

Solenoid Connection Terminals: Ui = 30V, li = 120 mA

*When a = 54, 74

For T4 Ta* = -40°C to +80°C

Energy Limitation Parameters:

Sensor Module: Ui = 22V, li = 120 mA, Pi = 2W, Ci = 98 nF, Li = 0.8 mH

Solenoid Connection Terminals: Ui = 30V, li = 120mA

Transmitter: Ui = 30 Vdc, li = 100 mA, Ci = 66 nF, Li = 0 H, Pi = 0.75 W

*When a = B4, C4

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters:

Sensor Module: Ui = 22V, li = 120 mA, Pi = 2.0W, Ci = 98 nF, Li = 0.8 mH

Solenoid Connection Terminals: Ui = 30V, li = 120 mA

Potentiometer: Ui = 26V, li = 14 mA, Pi = 50mW, Ci = 0 nF, Li = 0 mH

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*When a = 45

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters:

Sensor Module: Ui = 22V, li = 120 mA, Pi = 0.4 W, Ci = 3 nF, Li = 0 mH

Solenoid Connection Terminals: Ui = 30V, li = 120mA

*When a = 5R, 7R

For T4 Ta* = -40°C to +80°C

Energy Limitation Parameters:

Sensor Module: Ui = 22V, li = 120 mA, Pi = 0.4W, Ci = 3 nF, Li = 0 mH

Solenoid Connection Terminals: Ui = 30V, li = 120mA

Transmitter: Ui = 30 Vdc, li = 100 mA, Ci = 66 nF, Li = 0 H, Pi = 0.75 W

*When a = TR

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters:

Sensor Module: Ui = 22Vdc, li = 120 mA, Pi = 0.4W, Ci = 3 nF, Li = 0 mH

Solenoid Connection Terminals: Ui = 30V, li = 120 mA

Transmitter: Ui = 30 Vdc, li = 100 mA, Ci = 3 nF, Li = 0 H, Pi = 0.75 W

Solenoid Connection Terminals: Ui = 30V, li = 120 mA

*When a = BR, CR

For T5 Ta* = -40°C to +80°C; For T6 Ta* = -40°C to +65°C

Energy Limitation Parameters:

Sensor Module: Ui = 22V, li = 120 mA, Pi = 0.4 W, Ci = 3 nF, Li = 0 mH

Solenoid Connection Terminals: Ui = 30V, li = 120mA

Potentiometer: Ui = 26V, li = 14 mA, Pi = 50mW, Ci = 0 nF, Li = 0 mH

* When a = 2N, 4N, 6N

For T6, Ta* =	For T5, Ta* =	For T4...T1, Ta* =	Ui V	li mA	Pi mW	Ci nF	Li mH
-25°C to +56°C	-25°C to +68°C	-25°C to +80°C	16	25	34	40	0.05
-25°C to +49°C	-25°C to +61°C	-25°C to +80°C	16	25	64	40	0.05
-25°C to +28°C	-25°C to +40°C	-25°C to +68°C	16	52	169	40	0.05
-25°C to +13°C	-25°C to +25°C	-25°C to +53°C	16	76	242	40	0.05

* When a = 5N, 7N

Switch/Sensor:

For T4...T1, Ta* =	Ui V	li mA	Pi mW	Ci nF	Li mH
-25°C to +80°C	16	25	34	40	0.05
-25°C to +80°C	16	25	64	40	0.05
-25°C to +68°C	16	52	169	40	0.05
-25°C to +53°C	16	76	242	40	0.05

Transmitter; Ui = 30Vdc, li = 100 mA, Ci = 66 nF, Li = 0 H, Pi = 0.75 W

* When a = TN

Switch/Sensor

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For T6, Ta*= -25°C to +56°C	For T5, Ta*= -25°C to +68°C	For T4...T1, Ta*= -25°C to +80°C	Ui V 16	li mA 25	Pi mW 34	Ci nF 40	Li mH 0.05
-25°C to +49°C	-25°C to +61°C	-25°C to +80°C	16	25	64	40	0.05
-25°C to +28°C	-25°C to +40°C	-25°C to +68°C	16	52	169	40	0.05
-25°C to +13°C	-25°C to +25°C	-25°C to +53°C	16	76	242	40	0.05

Transmitter: Ui = 30 Vdc, li = 100 mA, Ci = 3 nF, Li = 0 H, Pi = 0.75 W
Solenoid Connection Terminals: Ui = 30 Vdc, li = 120 mA

* When a = BN, CN
Switch/Sensor:

For T6, Ta*= -25°C to +56°C	For T5, Ta*= -25°C to +68°C	For T4...T1, Ta*= -25°C to +80°C	Ui V 16	li mA 25	Pi mW 34	Ci nF 40	Li mH 0.05
-25°C to +49°C	-25°C to +61°C	-25°C to +80°C	16	25	64	40	0.05
-25°C to +28°C	-25°C to +40°C	-25°C to +68°C	16	52	169	40	0.05
-25°C to +13°C	-25°C to +25°C	-25°C to +53°C	16	76	242	40	0.05

Potentiometer: Ui = 26V, li = 14 mA, Pi = 50mW, Ci = 0 nF, Li = 0 mH

* When a = 2A, 4A

For T6, Ta*= -40°C to +57°C	For T5, Ta*= -40°C to +69°C	For T4...T1, Ta*= -40°C to +80°C	Ui V 16	li mA 25	Pi mW 34	Ci nF 50	Li mH 0.15
-40°C to +52°C	-40°C to +64°C	-40°C to +80°C	16	25	64	50	0.15
-40°C to +34°C	-40°C to +46°C	-40°C to +74°C	16	52	169	50	0.15
-40°C to +22°C	-40°C to +34°C	-40°C to +61°C	16	76	242	50	0.15

* When a = 5A, 7A

Switch/Sensor:

For T4...T1, Ta*= -40°C to +80°C	Ui V 16	li mA 25	Pi mW 34	Ci nF 50	Li mH 0.15
-40°C to +80°C	16	25	64	50	0.15
-40°C to +74°C	16	52	169	50	0.15
-40°C to +61°C	16	76	242	50	0.15

Transmitter; Ui = 30Vdc, li = 100 mA, Ci = 66 nF, Li = 0 H, Pi = 0.75 W

* When a = TA

Switch/Sensor

For T6, Ta*= -40°C to +57°C	For T5, Ta*= -40°C to +69°C	For T4...T1, Ta*= -40°C to +80°C	Ui V 16	li mA 25	Pi mW 34	Ci nF 50	Li mH 0.15
-40°C to +52°C	-40°C to +64°C	-40°C to +80°C	16	25	64	50	0.15
-40°C to +34°C	-40°C to +46°C	-40°C to +74°C	16	52	169	50	0.15

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-40°C to +22°C	-40°C to +34°C	-40°C to +61°C	16	76	242	50	0.15
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Transmitter: $U_i = 30 \text{ Vdc}$, $I_i = 100 \text{ mA}$, $C_i = 3 \text{ nF}$, $L_i = 0 \text{ H}$, $P_i = 0.75 \text{ W}$

Solenoid Connection Terminals: $U_i = 30 \text{ Vdc}$, $I_i = 120 \text{ mA}$

* When a = BA, CA

Switch/Sensor:

For T6, Ta*= -40°C to +57°C	For T5, Ta*= -40°C to +69°C	For T4...T1, Ta*= -40°C to +80°C	Ui V 16	Ii mA 25	Pi mW 34	Ci nF 50	Li mH 0.15
-40°C to +52°C	-40°C to +64°C	-40°C to +80°C	16	25	64	50	0.15
-40°C to +34°C	-40°C to +46°C	-40°C to +74°C	16	52	169	50	0.15
-40°C to +22°C	-40°C to +34°C	-40°C to +61°C	16	76	242	50	0.15

Potentiometer: $U_i = 26 \text{ V}$, $I_i = 14 \text{ mA}$, $P_i = 50 \text{ mW}$, $C_i = 0 \text{ nF}$, $L_i = 0 \text{ mH}$

* When a = 2B

For T6, Ta*= -25°C to +57°C	For T5, Ta*= -25°C to +69°C	For T4...T1, Ta*= -25°C to +80°C	Ui V 16	Ii mA 25	Pi mW 34	Ci nF 100	Li mH 0.20
-25°C to +52°C	-25°C to +64°C	-25°C to +80°C	16	25	64	100	0.20
-25°C to +34°C	-25°C to +46°C	-25°C to +74°C	16	52	169	100	0.20
-25°C to +22°C	-25°C to +34°C	-25°C to +61°C	16	76	242	100	0.20

a = Function 2J, 4J, 5J, 7J, BJ, CJ, 2M, 4M, 5M, 7M, BM, CM, 5O, 7O, TO, BO, CO, 2N, 4N, 5N, 6N, 7N, TN, BN, CN, 2A, 4A, 5A, 7A, TA, BA, CA, 2B, 4A, 5A, 7A, B4, C4, 45, 5R, 7R, TR, BR or CR

b = Enclosure C, E, P, B, Y, S, U or J

c = Junction 02 or 03.

d = Output X, S, N, or H.

e = Visual Indication X, G, R, C, 1, 2, 3, 4, 5, 0, N, D, A, S, T, U, V or W.

f = Branding A, or M

g = Options 'Special Unit Digits'

Note: 'Special Unit Digits' do not affect the integrity of the housing, the electrical safety, or the title plate

QCabcdef-g. Valve Position Monitor.

IS / I, II, III / 1 / ABCDEFG / T5*; IP66; Ta* = -50°C to +80°C

CI I / 0 / AEx ia IIC T5* Ga; IP66; Ta* = -50°C to +80°C

*When a = 45

For Divisions T5 Ta* = -50°C to +80°C; For T6 Ta* = -50°C to +65°C

For Zones T5 Ta* = -50°C to +80°C; For T6 Ta* = -50°C to +65°C

Energy Limitation Parameters:

Sensor Module: $U_i = 22 \text{ V}$, $I_i = 120 \text{ mA}$, $P_i = 0.4 \text{ W}$, $C_i = 3 \text{ nF}$, $L_i = 0 \text{ H}$

Solenoid Connection Terminals: $U_i = 30 \text{ V}$, $I_i = 120 \text{ mA}$

a = Function: 45

b = Enclosure: E, B, S or J

c = Junction: 03.

d = Output: X, S, N or H

e = Visual Indication: X, G, R, C, 1, 2, 3, 4, 5, 0, N, D, A, S, T, U, V or W.

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f= Branding: A or M

g= Options: '1-5 alpha or numeric digits for special and marketing identification'

13. Specific Conditions of Use:

1. Part of the enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned only with a damp cloth.
2. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.

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
21 st March 1996	Original Issue.
11 th May 2017	<u>Supplement 7:</u> Report Reference: RR208761 dated 11 th May 2017. Description of the Change: Model code updates (remove function option K). Transfer to new certificate format.
6 th June 2017	<u>Supplement 8:</u> Description of the Change: Reissued to correct typos as follows: "QN Series" added to product name. Original record corrected from 2Z6A0.A0 to 2Z6A0.AE.
31 st July 2018	<u>Supplement 9:</u> Report Reference: 3064023 dated 31 st July 2018. Description of the Change: Removed Approval Guide code from description. Added sensor module option "T_".
9 th October 2019	<u>Supplement 10:</u> Report Reference - PR452032 dated 9 th October 2019. Description of the Change: Addition of "2B" function option. Revision to "96", "97", "86", and "87" function options. Removed 2X, 5X, 7X, BX, and CX function options.

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	Added "QC" section. Addition of IP66. "5_" and "7_" function option parameters changes. Function option "_A" parameters corrected. Updated documentation.
21 st April 2020	<p><u>Supplement 11:</u> Report Reference – RR222856 dated 21st April 2020. Description of the Change: Company name change.</p>
5 th April 2022	<p><u>Supplement 12:</u> Report Reference – RR231394 dated 5th April 2022. Description of the Change:</p> <ol style="list-style-type: none"> 1) FM3600 updated to latest edition (2022) 2) FM3610, FM3611 and FM3810 updated to latest edition (2021) 3) ANSI/UL 60079-0:2019 updated to ANSI/UL 60079-0:2020 4) ANSI/UL 121201:2019 added to standards list 5) ANSI/ISA 61010-1:2012 added to standards list 6) Section 10 (Equipment ratings) and Section 11 (Markings) clarified

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