

(1) EC-TYPE EXAMINATION CERTIFICATE

(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**

(3) EC-Type Examination Certificate Number: **KEMA 04ATEX1005 X** Issue Number: **2**

(4) Equipment: **Switch Box Types HD-IS., LDNA- IS. and LDN-IS..**

(5) Manufacturer: **Emerson Process Management, Valve Automation Division**

(6) Address: **Asveldweg 11, 7556 BR Hengelo, The Netherlands**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number 2086927.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN 50014 : 1997 + A1, A2
EN 50284 : 1999**

**EN 50020 : 1994
EN 50281-1-1 : 1998 + A1**

EN 50020 : 2002

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

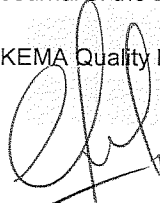
(12) The marking of the equipment shall include the following:



**II 1G EEx ia IIC T6 ... T4 or
II 1GD EEx ia IIC T6 ... T4 T44 °C ... T80 °C or
II 2G EEx ia IIC T6 ... T4 or
II 2GD EEx ia IIC T6 ... T4 T44 °C ... T80 °C**

This certificate is issued on 22 November 2006 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

KEMA Quality B.V.


C.G. van Es
Certification Manager

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Experience you can trust.

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 04ATEX1005 X Issue No. 2**

(15) **Description**

Switch Boxes types HD-IS., LDNA- IS.. and LDN-IS.. are assemblies of one or two switches and an enclosure. The Switch Boxes are used for electronic on/off control and on/off position feedback for pneumatic 90° rotation actuators.

The relation between the assembly type, enclosure type, switch type and equipment category are as per table 1.

Table 1						
Switch type	Enclosure type					
	HD		LDNA		LDN	
	Assembly type and equipment category		Assembly type and equipment category		Assembly type and equipment category	
SJ3,5-SN	HD-IS1	1GD	LDNA-IS1	1GD	LDN-IS1	1G
SJ3,5-N	HD-IS2	1GD	LDNA-IS2	1GD	LDN-IS2	1G
SJ5-N	HD-IS3	1GD	LDNA-IS3	1GD	LDN-IS3	1G
NJ2-11-N-G	-		LDNA-IS4	1GD	LDN-IS4	1G
NJ2-11-SN	-		LDNA-IS5	1GD	LDN-IS5	1G
NJ2-V3-N	HD-IS6	1GD	LDNA-IS6	1GD	LDN-IS6	1G
V3, Mechanical	HD-IS7	1GD	LDNA-IS7	1GD	LDN-IS7	1G
PL2-F25-N4-K	-		LDNA-IS8	2GD	LDN-IS8	2G
PL3-F25-N4-K	-		LDNA-IS9	2GD	LDN-IS9	2G
SC3,5-G-N0	HD-IS10	1GD	LDNA-IS10	1GD	LDN-IS10	1G
PL2-F25-SN4-K	-		LDNA-IS11	2GD	LDN-IS11	2G
PL3-F25-SN4-K	-		LDNA-IS12	2GD	LDN-IS12	2G
NJ4-12GK-N	-		LDNA-IS13	2GD	LDN-IS13	2G
NJ5-11-N-G	-		LDNA-IS14	2GD	LDN-IS14	2G

Switch Boxes of equipment category 1G may be used in environments in which equipment category 1G or 2G is required.

Switch Boxes of equipment category 1GD may be used in environments in which equipment category 1G or 2G or 1D or 2D is required.

Switch Boxes of equipment category 2GD may be used in environments in which equipment category 2G or 2D is required.

The minimum ambient temperature of the Switch Boxes is -25 °C.

The maximum ambient temperature of the Switch Box type LDN-IS7 is 70 °C.

The maximum ambient temperature of Switch Boxes type HD-IS7 and LDNA-IS7 is 80 °C.

The maximum ambient temperature of Switch Boxes of other types is as shown below.

The electrical parameters of the switch boxes are determined by the type of switch as shown in table 6. The equipment category and temperature data of the Switch Boxes are determined by the type of switch and the type of connection as shown in tables 2, 3, 4 and 5.

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The maximum ambient temperature in relation to the switch type, the connection type and the temperature class for assembly types HD and LDNA for category 1 G is listed in table 2. For assembly type LDN, the values of the maximum ambient temperature shall be reduced by 10 °C.

Table 2												
Switch type	Temperature class and maximum ambient temperature [°C] for category 1G											
	Connection type 1			Connection type 2			Connection type 3			Connection type 4		
	T4	T5	T6	T4	T5	T6	T4	T5	T6	T4	T5	T6
SJ3,5-SN	80	68	56	80	61	49	68	40	28	53	25	13
SJ3,5-N	80	68	56	80	61	49	68	40	28	53	25	13
SJ5-N	80	68	56	80	61	49	68	40	28	53	25	13
NJ2-11-N-G	80	71	59	80	68	56	68	57	45	63	49	37
NJ2-11-SN	80	68	56	80	61	49	68	40	28	53	25	13
NJ2-V3-N	80	68	56	80	61	49	68	40	28	53	25	13
SC3,5-G-N0	80	68	56	80	61	49	68	40	28	53	25	13

The maximum surface temperature T in relation to the switch type, the connection type and the maximum ambient temperature for the assembly types HD and LDNA for category 1 D is listed in table 3.

Table 3									
Switch type	Maximum temperatures for category 1D								
	Connection type 1			Connection type 2			Connection type 3		
	Ambient temperature Ta								
	40	70	77	40	70	74	40	60	80
	Surface temperature T [°C]								
SJ3,5-SN	44	73	80	48	76	80	60	80	--
SJ3,5-N	44	73	80	48	76	80	60	80	--
SJ5-N	44	73	80	48	76	80	60	80	--
NJ2-11-N-G	44	73	80	48	76	80	60	80	--
NJ2-11-SN	44	73	80	48	76	80	60	80	--
NJ2-V3-N	44	73	80	48	76	80	60	80	--
SC3,5-G-N0	44	73	80	48	76	80	60	80	--

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 04ATEX1005 X Issue No. 2**

The maximum ambient temperature in relation to the switch type, the connection type and the temperature class for assembly types HD and LDNA for category 2 G is listed in table 4. For assembly type LDN, the values of the maximum ambient temperature shall be reduced by 10 °C.

Table 4												
Temperature class and maximum ambient temperature [°C] for category 2G												
Switch type	Connection type 1			Connection type 2			Connection type 3			Connection type 4		
	T4	T5	T6	T4	T5	T6	T4	T5	T6	T4	T5	T6
SJ3,5-SN	80	80	73	80	80	66	80	60	45	74	45	30
SJ3,5-N	80	80	73	80	80	66	80	60	45	74	45	30
SJ5-N	80	80	73	80	80	66	80	60	45	74	45	30
NJ2-11-N-G	80	80	76	80	80	73	80	77	62	63	63	54
NJ2-11-SN	80	80	73	80	80	66	80	60	45	74	45	30
NJ2-V3-N	80	80	73	80	80	66	80	60	45	74	45	30
NJ4-12GK-N	80	80	73	80	80	69	80	66	51	61	54	39
NJ5-11-N-G	80	80	72	80	80	65	80	57	42	63	41	26
SC-3,5-G-N0	80	80	73	80	80	66	80	60	45	74	45	30
	Connection type 1b			Connection type 2b			Connection type 3b					
PL2-F25-N4-K	80	77	62	80	77	62	80	66	51	-	-	-
PL3-F25-N4-K	80	77	62	80	77	62	80	66	51	-	-	-
PL2-F25-SN4-K	80	77	62	80	77	62	80	66	51	-	-	-
PL3-F25-SN4-K	80	77	62	80	77	62	80	66	51	-	-	-



(13) **SCHEDULE**

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The maximum surface temperature T in relation to the switch type, the connection type and the maximum ambient temperature for the assembly types HD and LDNA for category 2 D is listed in table 5.

Table 5													
Switch type	Maximum temperatures for category 2D												
	Connection type 1			Connection type 2			Connection type 3			Connection type 4			
	Ambient temperature Ta												
	40	60	70	40	50	66	40	50	60	40	--	--	
	Surface temperature T [°C]												
SJ3,5-SN *)	44	63	73	48	58	72	60	70	80	80	--	--	
SJ3,5-N *)	44	63	73	48	58	72	60	70	80	80	--	--	
SJ5-N *)	44	63	73	48	58	72	60	70	80	80	--	--	
NJ2-11-N-G *)	44	63	73	48	58	72	60	70	80	80	--	--	
NJ2-11-SN *)	44	63	73	48	58	72	60	70	80	80	--	--	
NJ2-V3-N *)	44	63	73	48	58	72	60	70	80	80	--	--	
NJ4-12GK-N	48	68	80	51	61	80	64	80	--	80	--	--	
NJ5-11-N-G	49	69	80	54	64	80	70	80	--	80	--	--	
SC3,5-G-N0 *)	44	64	73	48	58	74	60	70	80	80	--	--	
	Connection type 1b			Connection type 2b			Connection type 3b						
	Ambient temperature Ta												
	40	50	64	40	50	64	40	50	--	--	--	--	
	Surface temperature T [°C]												
PL2-F25-N4-K	56	66	80	56	66	80	64	80	--	--	--	--	
PL3-F25-N4-K	56	66	80	56	66	80	64	80	--	--	--	--	
PL2-F25-SN4-K	56	66	80	56	66	80	64	80	--	--	--	--	
PL3-F25-SN4-K	56	66	80	56	66	80	64	80	--	--	--	--	

*) = Derived from Table 3

Switch type V3, mechanical:

The temperature class and the maximum surface temperature T for the assembly types using the mechanical switch type V3, is in all cases determined by the ambient temperature Ta.

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Electrical data

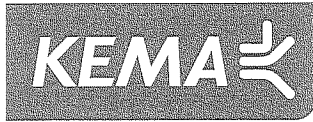
Switch types as per table 7:

In type of protection intrinsic safety EEx ia IIC, only for connection to an intrinsically safe circuit with the maximum values, depending on the connection type, as per table 6.

Table 6							
	Connection type						
	Type 1	Type 1b	Type 2	Type 2b	Type 3	Type 3b	Type 4
U _i	16 V	15 V	16 V	15 V	16 V	15 V	16 V
I _i	25 mA		25 mA		52 mA		76 mA
P _i	34 mW		64 mW		169 mW		242 mW

The relation between the switch type and the electrical parameters C_i and L_i is as per table 7.

Table 7		
Switch type	C _i (nF)	L _i (μH)
SJ3,5-SN	30	100
SJ3,5-N	50	250
SJ5-N	50	250
NJ2-11-N-G	30	50
NJ2-11-SN	50	150
NJ2-V3-N	40	50
NJ4-12GK-N	45	50
NJ5-11-N-G	45	50
SC3,5-G-N0	150	150
PL2-F25-N4-K	100	100
PL3-F25-N4-K	100	100
PL2-F25-SN4-K	100	150
PL3-F25-SN4-K	100	150



(13) **SCHEDULE**

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Switch type V3, mechanical:

In type of protection intrinsic safety EEx ia IIC, only for connection to a certified intrinsically safe circuit, with the maximum values per circuit as per table 8.

Table 8				
U_i	I_i	P_i	C_i	L_i
30 V	300 mA	1,2 W	0 nF	0 mH

For type HD-IS7 BASIC WIRING the data applies to the combined circuits.

Installation instructions

When used in a potentially explosive atmosphere, requiring the use of apparatus of equipment category 1D or 2D, cable entry devices shall be used that are suitable for the application, with a degree of protection of at least IP6x according to EN60529, and correctly installed.

Unused apertures shall be closed with suitable blanking elements.

To avoid voltage and current addition, the separation and wiring of the intrinsically safe circuits shall be in accordance with EN 60079-14.

(16) **Test Report**

KEMA No. 2086927.

(17) **Special conditions for safe use**

When the Switch Boxes type HD-IS.. or type LDNA-IS.. are used in a potentially explosive atmosphere, requiring the use of apparatus of equipment category 1G, the Switch Box shall be installed so, that even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.

(18) **Essential Health and Safety Requirements**

Assured by compliance with the standards listed at (9), except for some components of the apparatus which is assured by the manufacturer of those componentens. The applicable componentens and their certificate numbers are listed in Test Report 2086927.

For the application of intrinsically safe circuits in a potentially explosive atmosphere, caused by the presence of air/dust mixtures, IEC 61241-0 : 2004 and IEC 61241-11 : 2005 have been used as a guide.

(19) **Test documentation**

As listed in Test Report No. 2086927.