UK Type Examination Certificate CML 21UKEX2974X Issue 0

United Kingdom Conformity Assessment

1 Product or Protective System Intended for use in Potentially Explosive Atmospheres UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

2 Equipment **Valve Position Sensors NCN3-F31K2…-N…**

3 Manufacturer **Pepperl+Fuchs SE**

4 Address **Lilienthalstrasse 200**
68307 Mannheim
Germany

5 The equipment is specified in the description of this certificate and the documents to which it refers.

6 Eurofins E&E CML Limited, Newport Business Park, New Port Road, Ellesmere Port, CH65 4LZ, United Kingdom, Approved Body Number 2503, in accordance with Regulation 43 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations.

The examination and test results are recorded in the confidential reports listed in Section 12.

7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to specific conditions of use (affecting correct installation or safe use). These are specified in Section 14.

8 This UK Type Examination certificate relates only to the design and construction of the specified equipment. Further requirements of the Regulations apply to the manufacturing process and supply of the product. These are not covered by this certificate.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the confidential report, has been demonstrated through compliance with the following documents:

EN IEC 60079-0:2018 EN 60079-11:2012

10 The equipment shall be marked with the following:

All Valve Position Sensors are marked as follows:

Ex II 1 G Ex ia IIC T6…T1 Ga, resp.

Ex II 2 G Ex ia IIC T6…T1 Gb

The Valve Position Sensors NCN3-F31K2-N… are additionally marked as follows:

Ex I M2

Ex ia I Mb

The Valve Position Sensors NCN3-F31K2M-N...-B13… and NCN3-F31K2M-N...-B23… are additionally marked as follows:

Ex II 1 D

Ex ia IIIC T_{200} 135°C Da

P. Shaw
Certification Officer

11 Description

The Valve Position Sensors NCN3-F31K2...-N… are used for transforming changes in distance in electrical signals.

Depending of the type, the device includes two inductive sensors and up to two valve connections. Valve connections for valve control are looped through the device only, but with indicating LEDs for displaying valve control status.

The NCN3-F31K2-N…-… consist of a plastic enclosure in which the internal sensor with an additional plastic enclosure is placed. The internal sensor is filled with casting compound and has a pin connector with screw terminal block.

The NCN3-F31K2M-N…-…has a plastic cover with a metallic base. The inner construction is the same as for the NCN3-F31K2-N...-…

The outer enclosure is the protection against dust, the inner enclosure and the casting are the protection against gas.

The principle mechanical construction of the equipment is specified in the type code.

The inductive sensors and valve connections are electrically separated from each other, except:

types NCN3-F31K2...-N5… with the specialty of antiparallel interconnection of both sensors (2:1-technique). It allows to lead two signals via a single pair of wires.

Type Code:

N	*C*	*N*	*3*	*- F31K2*	*- N4*	*- B13*	*- S*	*example*
N	…	…	…	- …	… - …	- …	- …	inductive Sensor
N	…	…	…	- …	… -	- …	- …	not ex-relevant
…	…	…	…	- **F31K2**	… - …	- …	- …	enclosure style: F31K2
…	…	…	…	- …	- …	- …	- …	plastic base
…	…	…	…	- …	**M** - …	- …	- …	metallic base
…	…	…	…	- …	… - **N4**	- …	- …	two separated sensor circuits
…	…	…	…	- …	… - **N5**	- …	- …	sensor circuits combined
…	…	…	…	- …	… - …	- **B13**	- …	Connections: sensor M20x1.5, 1 valve M20x1.5
…	…	…	…	- …	… - …	- **B33**	- …	Connections: sensor M20x1.5, 2 valves 2 lateral V1 connections and M20x1.5
…	…	…	…	- …	… - …	- **B23**	- …	Connections: sensor ½“ NPT, 1 valve ½“ NPT
…	…	…	…	- …	… …	-	- **S**	terminal block: Screw clamps
…	…	…	…	- …	… …	-	- **K**	terminal block: Cage clamps

Legend:

… letter/digit combination or blank,
if blank: characters from the right will be moved left (preceding hyphen left out)

Valve Position Sensors for group I (in type of protection Intrinsic Safety Ex ia I):

NCN3-F31K2-N4-...

NCN3-F31K2-N5-...

Valve Position Sensors for group II (in type of protection Intrinsic Safety Ex ia IIC):

NCN3-F31K2...-N4-…

NCN3-F31K2...-N5-…

Valve Position Sensors for group III (in type of protection Intrinsic Safety Ex ia IIIC):

NCN3-F31K2M-N4-B13-…

NCN3-F31K2M-N4-B23-…

NCN3-F31K2M-N5-B13-…

NCN3-F31K2M-N5-B23-…

Electrical Data:

For the Valve Position Sensors fo group I / II and III:

Sensor circuit(s)
(connections, see operating instructions of the manufacturer)

in type of protection Intrinsic Safety Ex ia I
only for the connection to intrinsically safe circuits

Maximum values:

	Type 1	**Type 2**	**Type 3**
U_i	15 V	15 V	15 V
I_i	25 mA	25 mA	52 mA
P_i	34 mW	64 mW	169 mW

Valve circuit(s)
(connections, see operating instructions of the manufacturer)

in type of protection Intrinsic Safety Ex ia I
only for the connection to intrinsically safe circuits

Maximum values:

U_i	32 V
I_i	240 mA

The effective internal inductance and capacitance have to be taken from the following table:
Sensor circuit(s):

	C_i / nF	L_i / µH
NCN3-F31K2…-N4-…	< 100	< 100
NCN3-F31K2…-N5-…	< 200	< 200

Valve circuit(s):

C_i / nF	L_i / µH
< 10	< 20

The above stated values of Ci and Li already consider the connection cable of a length of 10 m.

For cable length of more than 10 m, the internal inductance and capacitance of the additional cable length have to be considered.

Ambient temperature:

The permissible ambient temperature has to be taken from the following:

For the Valve Position Sensors for group I:

The minimum permissible ambient temperature is -60°C**.**

Group I (EPL Mb)	**Type 1**	**Type 2**	**Type 3**
Sensor types	maximum permissible ambient temperature in °C		
NCN3-F31K2-N4-…	100	100	75
NCN3-F31K2-N5-…	100	100	75

For the Valve Position Sensors for group II:

The minimum permissible ambient temperature is -60°C

Group II (EPL Ga and Gb)	**Type 1**			**Type 2**			**Type 3**		
	maximum permissible ambient temperature in °C for application in temperature class								
Sensor types	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NCN3-F31K2...-N4-…	70	85	100	70	85	100	60	75	75
NCN3-F31K2...-N5-…	70	85	100	70	85	100	60	75	75

For the Valve Position Sensors for group III:

The minimum permissible ambient temperature is -40°C

Group III (EPL Da)	Type 1	Type 2	Type 3
Sensor types	maximum permissible ambient temperature in °C		
NCN3-F31K2M-N4-B13-…	50	45	40
NCN3-F31K2M-N4-B23-…	50	45	40
NCN3-F31K2M-N5-B13-…	50	45	40
NCN3-F31K2M-N5-B23-…	50	45	40

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	27 Aug 2021	R14112BB/00	Prime Certificate issued.

Note: Drawings that describe the equipment are listed or referred to in the Annex.

13 Conditions of Manufacture

None.

14 Specific Conditions of Use

For relationship between type of the connected circuit, permissible ambient temperature and temperature class (for group II application) as well as the effective internal reactances for the individual types of the Valve Position Sensors, reference is made in this certificate and in the operating instructions manual.

For installation the standards IEC/EN 60079-14 or IEC/EN 60079-25 has to be observed.

For the use as EPL Da equipment mount the Valve Position Sensor in a way that it is protected against mechanical hazard. Using the protective cover SH-F31K2-B13 and the activator with protective cover BT65-F31K2-RG-EN-01 or the protective cover of the activator SH-BT65-F31K2-01 an adequate protection of the device is guaranteed according to IEC/EN 60079-0.

For the use as EPL Ga, Gb and Mb equipment the connection facilities of the Valve Position Sensors shall be installed as such that a minimum degree of protection of IP20 according IEC 60529 is complied with.

For the use as EPL Da equipment the connection facilities of the Valve Position Sensors shall be installed as such that a minimum degree of protection of IP54 according IEC 60529 is complied with.

For the use as EPL Da equipment suitable certified blind plugs and / or cable glands have to be used.

For the use as EPL Ga, Gb and Mb equipment protection of cables and cable glands from tensile load and torsional stress is necessary,alternatively suitable certified cable glands have to be used.

The ambient temperature for each application can be seen in the electrical data. Appropriate measures need to be taken to protect the Valve position Sensors against mechanical damage due to impact if they are used within an ambient tempature range below – 20 °C.

If the sensor type NCN3-F31K2M-N… (metallic base) is used as EPL Ga equipment, precautions to avoid an ignition hazard due to sparks by impact or friction have to be done, because the maximum permissible proportions of metallic materials in enclosure parts in accordance with IEC/EN 60079-0 have been exceeded.

When the following types of Valve Position Sensors are applied corresponding to the explosion group, apparatus group and zones tabulated below, inadmissible electrostatic charge of the plastic housing has to be prevented.

The equipment shall be labelled with an appropriate warningnote:

Type	Group I EPL Mb	Group II EPL Ga	Group II EPL Gb	Group III EPL Da
NCN3-F31K2-N…	-	IIA/IIB/IIC	IIC	Not permitted
NCN3-F31K2M-N…	Not permitted	IIA/IIB/IIC	IIC	III

Valve Position Sensors which are marked with a gas group resp. III in column “Group …” need to be protected against dangerous electrostatic charges.

Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of Valve Position Sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding these parts whereas very small parts of the metal housing (e.g.screws) do not need to be grounded: NCN3-F31K2M-…

Certificate Annex

Certificate Number	**CML 21UKEX2974X**
Equipment	**Valve Position Sensors NCN3-F31K2…-N…**
Manufacturer	**Pepperl+Fuchs SE**

The following documents describe the equipment defined in this certificate:

Issue 0

For drawings describing the equipment, refer to attached certificate IECEx TUR 17.0055X Issue 3. In addition to the drawings listed on IECEx TUR 17.0055X Issue 3, the following drawings include the additional marking required for this UK Type Examination certification:

Drawing No	Sheets	Rev	Approved date	Title
16-1555CM-10	1 to 2	0	27 Aug 2021	Additional Marking Requirements for UKCA