

UK Type Examination Certificate CML 21UKEX21289X Issue 0**United Kingdom Conformity Assessment**

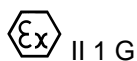
- 1 Product or Protective System Intended for use in Potentially Explosive Atmospheres UKSI 2016:1107 (as amended) – Schedule 3A, Part 1
- 2 Equipment **Valve Position Sensors type NCN3-F...-N... and PL...-F25...-N4..**
- 3 Manufacturer **Pepperl+Fuchs SE**
- 4 Address **Lilienthalstrasse 200
68307 Mannheim
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.

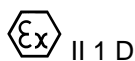
- 7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to specific conditions of use (affecting correct installation or safe use). These are specified in Section 14.
- 8 This UK Type Examination certificate relates only to the design and construction of 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:



II 1 G

Ex ia IIC T6... T1 Ga



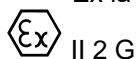
II 1 D

Ex ia IIIC T200 135°C Da



I M2

Ex ia I Mb



II 2 G

Ex ia IIC T6...T1 Gb



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11 Description

The Valve Position Sensor NCN3-F...-N... and PL...-F25...-N4... are used for transforming changes in distance in electrical signals.

Depending of the type, the device include 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-F...-N... types are placed in a plastic enclosure with basic enclosure types NCN3-F25...-N4..., NCN3-F31-N..., NCN3-F31K-N...

The NCN3-F...-N... are filled with casting compound, except terminal compartment of the NCN3-F31K...-N... type.

The PL...-F25...-N4... type is an open type design. PL...-F25...-N4... types must be installed in an enclosure in the application.

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

- Types NCN3-F...-N5..., with the speciality of antiparallel interconnection of both sensors (2:1-technique). It allows to lead two signals via a single pair of wires.
- Only for group III application: devices incorporating a terminal block or plug connectors intended.
- **Ex code assignment to product types**
- All Valve Position Sensors are marked as follows:
 - **I M2 Ex ia I Mb**
 - **II 1 G Ex ia IIC T6...T1 Ga or**
 - **II 2 G Ex ia IIC T6...T1 Gb**
- The Valve Position Sensor:
 - NCN3-F25...-N4...
 - NCN3-F31-N4-K...
 - NCN3-F31-N4-V1-...
 - NCN3-F31-N4-V16
 - NCN3-F31-N4-V16-Y...
 - NCN3-F31-N4-V18...
 - NCN3-F31K-N4
 - NCN3-F31K-N4-Y...
 - NCN3-F31K-N4-S...
- are additionally marked as follows:
 - **II 1 D Ex ia IIIC T200 135°C Da**



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Type key:

N C N 3 - F31K - N4 - V16 - V16 - S - Y...

N ... - ... - ... - ... - ...
PL ... - ... - ... - ... - ...

N **...** - ... - ... - ... - ...
PL **2**
PL **3**

N ... - **F25** - ... - ...
N ... - **F25F** - ... - ...
N ... - **F31** - ... - ...
N ... - **F31K** - ... - ...
PL ... - **F25** - ... - ...

... - ... - **N4** - ... - ...
... - ... - **N5** - ... - ...

N ... - F25(F) - ... - ...
N ... - F25(F) - ... - **123** - ...
N ... - F25(F) - ... - **V1** - ...
N ... - F25(F) - ... - **Y41364** - ...
N ... - F31 - ... - **123** - ...
N ... - F31 - ... - **K** - ... - ...
N ... - F31 - ... - **V1** - ... - ...
N ... - F31 - ... - **V16** - ... - ...
N ... - F31 - ... - **V18** - ... - ...
N ... - F31K - ... - ... - ...
N ... - F31K - ... - **K** - ... - ...

example

inductive Sensor
PCB version sensor

not ex-relevant
without valve circuit, without looping of shielding
one valve circuit, with looping of shielding

enclosure style: F25
enclosure style: F25F
enclosure style: F31
enclosure style: F31K
assembly of PCB with sensor NCN3-F25-N4...

electrical output: N4: Namur: two separated
sensor circuits
electrical output: N5: Namur: sensor circuits
combined

Blank: cable connection
beginning with a digit: cable connection details
V1 connector
connection header
beginning with a digit: cable connection details
system connection: cable
system connection: V1 connector
system connection: V16 connector
system connection: V18 connector
no valve connection
valve connection: cable entry at the side, thread
M12



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N - F31K - ... - **V1** - ... - ... - ...

N - F31K - ... - **B13** - ... - ... - ...

N - F31K - ... - **B23** - ... - ... - ...

N - F31 - ... - ... - ... - ...

N - F31 - ... - ... - **K** - ... - ...

N - F31 - ... - ... - **V1** - ... - ...

N - F31 - ... - ... - **V16** - ... - ...

N - F31K - ... - ... - ... - ... - ...

N - F31K - ... - ... - **K** - ... - ... - ...

N - F31K - ... - ... - **V1** - ... - ... - ...

PL - ... - ... - ... - ... - **K** - ... - ...

... .. - ... - ... - ... - ... - **S** - ... - ...

... .. - ... - ... - ... - ... - ... - **Y**...

valve connection: V1 connector

valve connection: cable entry at the back, thread: M20

valve connection: cable entry at the back, 1/2" NPT

Blank: no valve connection

valve connection: cable

valve connection: V1 connector

valve connection: V16 connector

Blank: no second valve connection

second valve connection: cable

second valve connection: V1 connector

terminal block: spring-type

terminal block: screw-type

variations without relevance

Legend:

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

blank position is empty, characters from the right will be moved left (preceding hyphen **left out**)

Electrical and thermal data:

For the Valve Position Sensors for group I:

- NCN3-F25...-N4...
- PL...-F25...-N4...
- NCN3-F31-N4...
- NCN3-F31-N5...
- NCN3-F31K-N4...
- NCN3-F31K-N5...



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Sensor circuit(s)

(connections, see operating instructions of the manufacturer)

the following data is valid:
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 maximum permissible ambient temperature has to be taken from the following table:

Group I (EPL Mb)	Type 1	Type 2	Type 3
	maximum permissible ambient temperature in °C		
Sensor types			
NCN3-F25...-N4...	100	100	95
PL...-F25...-N4...	100	100	95
NCN3-F31-N4...	100	100	90
NCN3-F31-N5...	100	100	90
NCN3-F31K-N4...	100	100	90
NCN3-F31K-N5...	100	100	90

The effective internal inductance and capacitance have to be taken from the following table:

Sensor circuits:

	C _i / nF	L _i / μH
NCN3-F25...-N4...	< 100	< 100
PL...-F25...-N4...	< 100	< 100
NCN3-F31-N4...	< 100	< 100
NCN3-F31-N5...	< 200	< 200
NCN3-F31K-N4...	< 100	< 100
NCN3-F31K-N5...	< 200	< 200



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Valve circuits:

Ci / nF	Li / 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.

For the Valve Position Sensors for group II:

- NCN3-F25...-N4...
- PL...-F25...-N4...
- NCN3-F31-N4...
- NCN3-F31-N5...
- NCN3-F31K-N4...
- NCN3-F31K-N5...

Sensor circuit(s)

(connections, see operating instructions of the manufacturer)

the following data is valid:

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

Maximum values:

	Type 1	Type 2	Type 3
Ui	15 V	15 V	15 V
li	25 mA	25 mA	52 mA
Pi	34 mW	64 mW	169 mW

Valve circuit(s)

(connections, see operating instructions of the manufacturer)

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

Maximum values:

Ui	32 V
li	240 mA



The maximum permissible ambient temperature depends on the temperature class and has to be taken from the following table:

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-F25...-N4...	75	90	100	70	85	100	60	75	95
PL...-F25...-N4...	60	75	100	60	75	100	60	75	95
NCN3-F31-N4...	75	90	100	75	90	100	65	80	90
NCN3-F31-N5...	75	90	100	75	90	100	65	80	90
NCN3-F31K-N4...	70	85	100	70	85	100	65	80	90
NCN3-F31K-N5...	70	85	100	70	85	100	65	80	90

Sensor circuits:

	C _i / nF	L _i / μH
NCN3-F25...-N4...	< 100	< 100
PL...-F25...-N4...	< 100	< 100
NCN3-F31-N4...	< 100	< 100
NCN3-F31-N5...	< 200	< 200
NCN3-F31K-N4...	< 100	< 100
NCN3-F31K-N5...	< 200	< 200

Valve circuits:

C _i / nF	L _i / μH
< 10	< 20

The above stated values of C_i and L_i 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.



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For the Valve Position Sensors for group III:

- NCN3-F25...-N4...
- NCN3-F31-N4-K...
- NCN3-F31-N4-V1-...
- NCN3-F31-N4-V16
- NCN3-F31-N4-V16-Y...
- NCN3-F31-N4-V18...
- NCN3-F31K-N4
- NCN3-F31K-N4-Y...
- NCN3-F31K-N4-S...

the following data is valid:

Sensor circuit(s)

(connections, see operating instructions of the manufacturer)

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

Maximum values:

	Type 1	Type 2	Type 3
Ui	15 V	15 V	15 V
Ii	25 mA	25 mA	52 mA
Pi	34 mW	64 mW	169 mW

Valve circuit(s)

(connections, see operating instructions of the manufacturer)

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

Maximum values:

Ui	32 V
Ii	240 mA



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

Group III (EPL Da)	Type 1	Type 2	Type 3
	maximum permissible ambient temperature in °C		
Sensor types			
NCN3-F25...-N4...	100	100	95
NCN3-F31-N4-K...	100	100	90
NCN3-F31-N4-V1-...	100	100	90
NCN3-F31-N4-V16	100	100	90
NCN3-F31-N4-V16-Y...	100	100	90
NCN3-F31-N4-V18...	100	100	90
NCN3-F31K-N4	100	100	90
NCN3-F31K-N4-Y...	100	100	90
NCN3-F31K-N4-S...	100	100	90

The effective internal inductance and capacitance have to be taken from the following table:

Sensor circuits:

	Ci / nF	Li / µH
NCN3-F25...-N4...	< 100	< 100
NCN3-F31-N4-K...	< 100	< 100
NCN3-F31-N4-V1-...	< 100	< 100
NCN3-F31-N4-V16	< 100	< 100
NCN3-F31-N4-V16-Y...	< 100	< 100
NCN3-F31-N4-V18...	< 100	< 100
NCN3-F31K-N4	< 100	< 100
NCN3-F31K-N4-Y...	< 100	< 100
NCN3-F31K-N4-S...	< 100	< 100

Valve circuits:

Ci / nF	Li / 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.



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For group III applications and Valve Position Sensor types:

- NCN3-F25...-N4-V1...
- NCN3-F25F-N4-Y41364
- NCN3-F31-N4-V1-...
- NCN3-F31-N4-V16
- NCN3-F31-N4-V16-Y...
- NCN3-F31-N4-V18...
- NCN3-F31K-N4
- NCN3-F31K-N4-Y...
- NCN3-F31K-N4-S...

The sensor circuits have to be considered galvanically connected to each other, in safety technical point of view. Verification of intrinsic safety must include the possibility of the interconnection of these intrinsically safe circuits. The functional galvanically separation remains unaffected.

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0		R14112BV/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

The following conditions relate to safe installation and/or use of the equipment.

- i. For relationship between type of the connected circuit, maximum 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, refer to this certificate and in the operating instructions manual.



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ii. For Group III, the Valve Position Sensors:

- NCN3-F25...-N4-V1...
- NCN3-F25F-N4-Y41364
- NCN3-F31-N4-V1-...
- NCN3-F31-N4-V16
- NCN3-F31-N4-V16-Y...
- NCN3-F31-N4-V18...
- NCN3-F31K-N4
- NCN3-F31K-N4-Y...
- NCN3-F31K-N4-S...

The sensor circuits have to be considered galvanically connected to each other, in safety technical point of view. Verification of intrinsic safety must include the possibility of the interconnection of these intrinsically safe circuits. The functional galvanically separation remains unaffected. See also Electrical data for list of effected Valve Position Sensors.

- iii. 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 temperature range between – 60 °C and – 20 °C. An ambient temperature below – 60°C is not permissible.
- iv. 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.
- v. Valve Position Sensors PL...-F25...-N4... shall be installed within a surrounding enclosure so that a proper IP degree of protection of at least IP 20 according IEC 60529 is achieved at the installation site.
- vi. 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:
- Valve Position Sensors with connection type V1, V16 or V18 may include relevant metal housing parts. See manufacturer instructions for more details.



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- vii. 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 warning note:

Type	For use in Group I EPL Mb	For use in Group II EPL Ga	For use in Group II EPL Gb	For use in Group III EPL Da
NCN3-F25...-N4...	-	IIC	-	IIIA/IIIB/IIIC
PL...-F25...-N4...	-	IIB/IIC	IIC	Not applicable
NCN3-F31-N...	-	IIC	-	IIIA/IIIB/IIIC
NCN3-F31K-N...	-	IIB/IIC	IIC	IIIA/IIIB/IIIC

Valve Position Sensors which are marked with a gas group resp. with IIIA/IIIB/IIIC in column "Group ..." need to be protected against dangerous electrostatic charges.

- viii. For the application of the following Valve Position Sensors in hazardous areas appropriate measures need to be taken to protect the free resin surface against mechanical damage if the free resin surface is accessible after installation:
- NCN3-F25...-N4...
 - NCN3-F31-N...
- ix. The Valve Position Sensors PL...-F25...-N4... and NCN3-F31K-N... are being delivered without cable gland. Protection of cables and cable glands from tensile load and torsional stress is necessary, alternatively certified cable glands may be used.
- x. Valve Position Sensors with valve circuits, the maximum values of the connected intrinsically safe valve have to be taken into account.

Certificate Annex

Certificate Number CML 21UKEX21289X
Equipment Valve Position Sensors type NCN3-F...-N... and PL...-F25...-N4..
Manufacturer Pepperl+Fuchs SE



The following documents describe the equipment defined in this certificate:

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For drawings describing the equipment, refer to attached certificate TUV 99ATEX1479X. In addition to the drawings listed on TUV 99ATEX1479X, 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	17 Dec 2021	Additional Marking Requirements for UKCA