Connections

Assignment of model types to diagrams on following sheets:

Type Code					Cl I, Zn 0 [4] see sheet	Cl II, III Zn 20 [5] see sheet
NCN3	-F25...	-N4			3	
			-a... [1]		3	
			-Y41364		8	10
			-Y... [2]		3	
			-V1...		8	10
	-F31	-N4	-K		3	
				-a... [1]	3	
				-Y...	3	
				-K...	2	
				-V1...	2	
				-V16...	2	
			-V1		8	10
				-Y...	8	10
			-V18		8	10
				-Y...	8	10
			-V16		8	10
				-Y...	8	10
			-V16	-K...	6	-
				-V1...	6	-
				-V16...	6	-
		-N5	-K		9	-
				-a... [1]	9	-
				-Y...	9	-
				-K...	7	-
				-V1...	7	-
				-V16...	7	-
			-V1		9	-
				-Y...	9	-
			-V18		9	-
				-Y...	9	-
			-V16		9	-
				-Y...	9	-
			-V16	-K...	7	-
				-V1...	7	-
				-V16...	7	-

Type Code					Cl I, Zn 0 [4] see sheet	Cl II, III Zn 20 [5] see sheet
NCN3	-F31K	-N4			8	10
			-S...		8	10
			-Y...		8	10
			-K		6	-
				-S...	6	-
				-Y...	6	-
			-V1		6	-
				-S...	6	-
				-Y...	6	-
			-B13...		6	-
			-B23...		6	-
			-V1	-V1...	4	-
		-N5			9	-
			-S...		9	-
			-Y...		9	-
			-K		7	-
				-S...	7	-
				-Y...	7	-
			-V1		7	-
				-S...	7	-
				-Y...	7	-
			-B13...		7	-
			-B23...		7	-
			-V1	-V1...	5	-

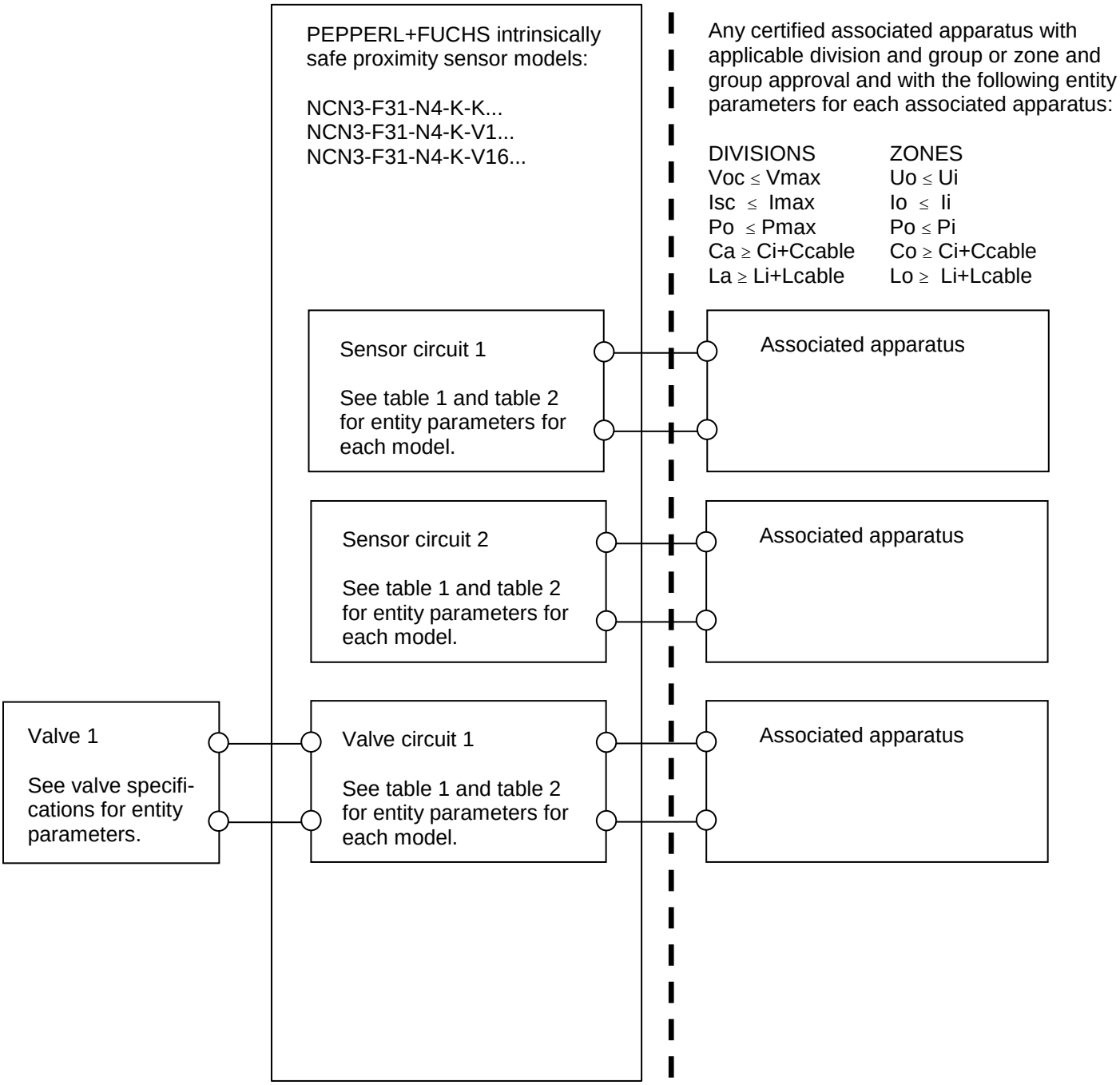
Legend:
... any combination of digits

Footnotes:
[1] any digits, beginning with a numeric digit
[2] except NCN3-F25F-N4-Y41364
[3] any digits
[4] Class I, Division 1, Groups A, B, C, D or Class I, Zone 0 IIC
[5] Class II, Division 1, Groups E, F, G; Class III, Division 1 or Zone 20 IIIC

HAZARDOUS LOCATION

Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1
or
Class I, Zone 0 IIC
Zone 20 IIIC

NON-HAZARDOUS LOCATION



HAZARDOUS LOCATION

Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1
or
Class I, Zone 0 IIC
Zone 20 IIIC

NON-HAZARDOUS LOCATION

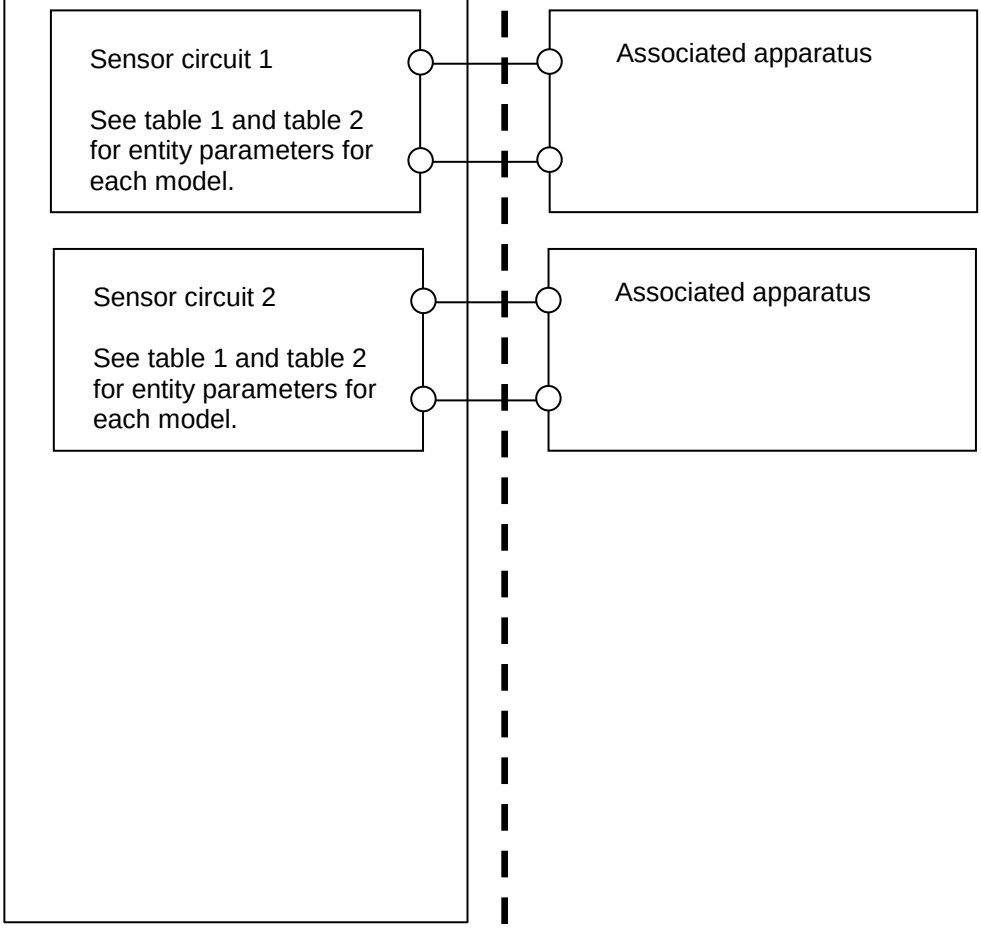
PEPPERL+FUCHS intrinsically safe proximity sensor models:

NCN3-F25...-N4
NCN3-F25...-N4-a... [1]
NCN3-F25...-N4-Y... [2]

NCN3-F31-N4-K
NCN3-F31-N4-K-a... [1]
NCN3-F31-N4-K-Y...

Any certified associated apparatus with applicable division and group or zone and group approval and with the following entity parameters for each associated apparatus:

DIVISIONS	ZONES
Voc ≤ Vmax	Uo ≤ Ui
Isc ≤ Imax	Io ≤ Ii
Po ≤ Pmax	Po ≤ Pi
Ca ≥ Ci+Ccable	Co ≥ Ci+Ccable
La ≥ Li+Lcable	Lo ≥ Li+Lcable



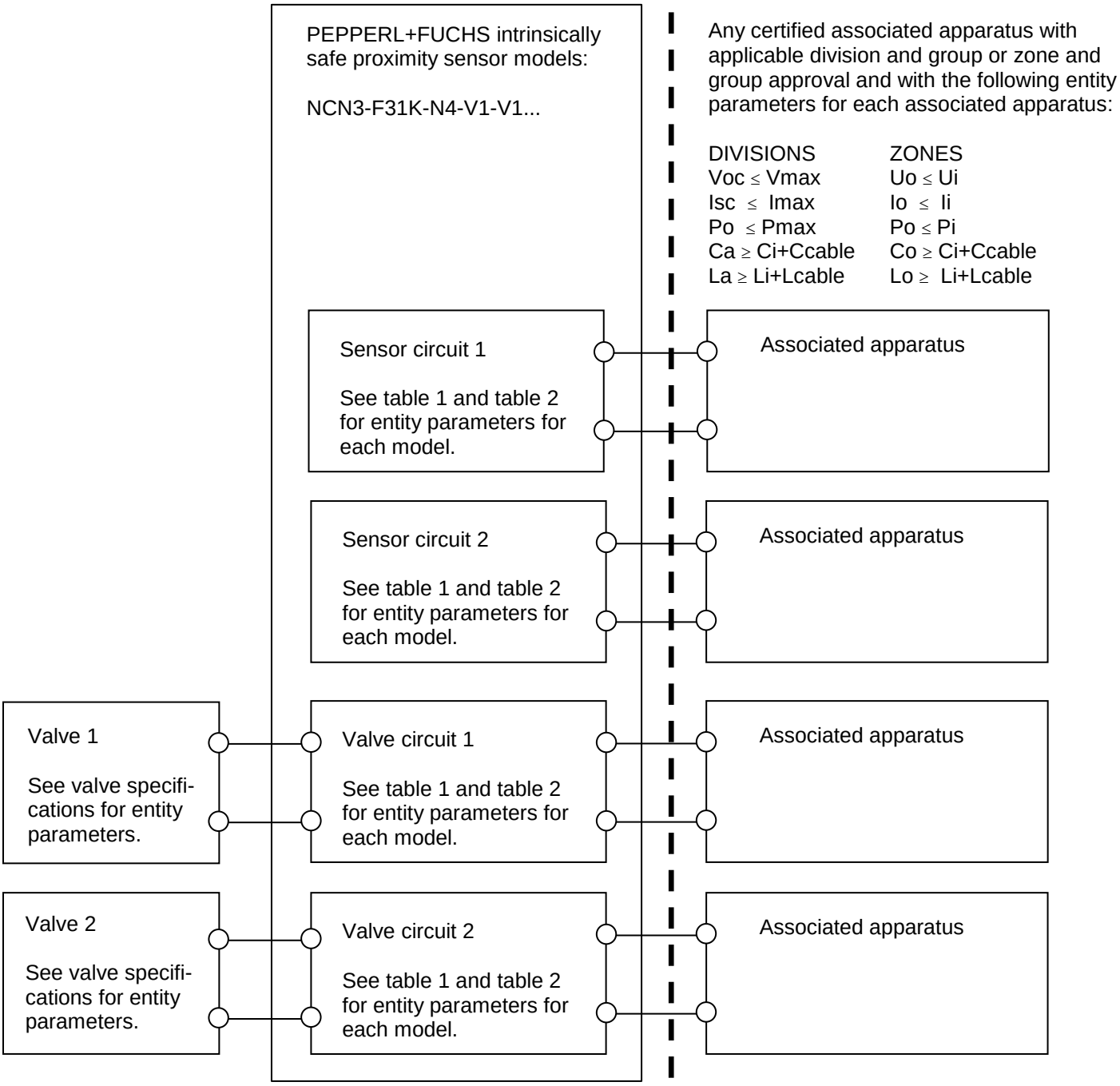
[1] The placeholder "a..." stands for digits, beginning with a numeric digit
[2] except NCN3-F25F-N4-Y41364

HAZARDOUS LOCATION

Class I, Division 1, Groups A, B, C, D

or
Class I, Zone 0 IIC

NON-HAZARDOUS LOCATION

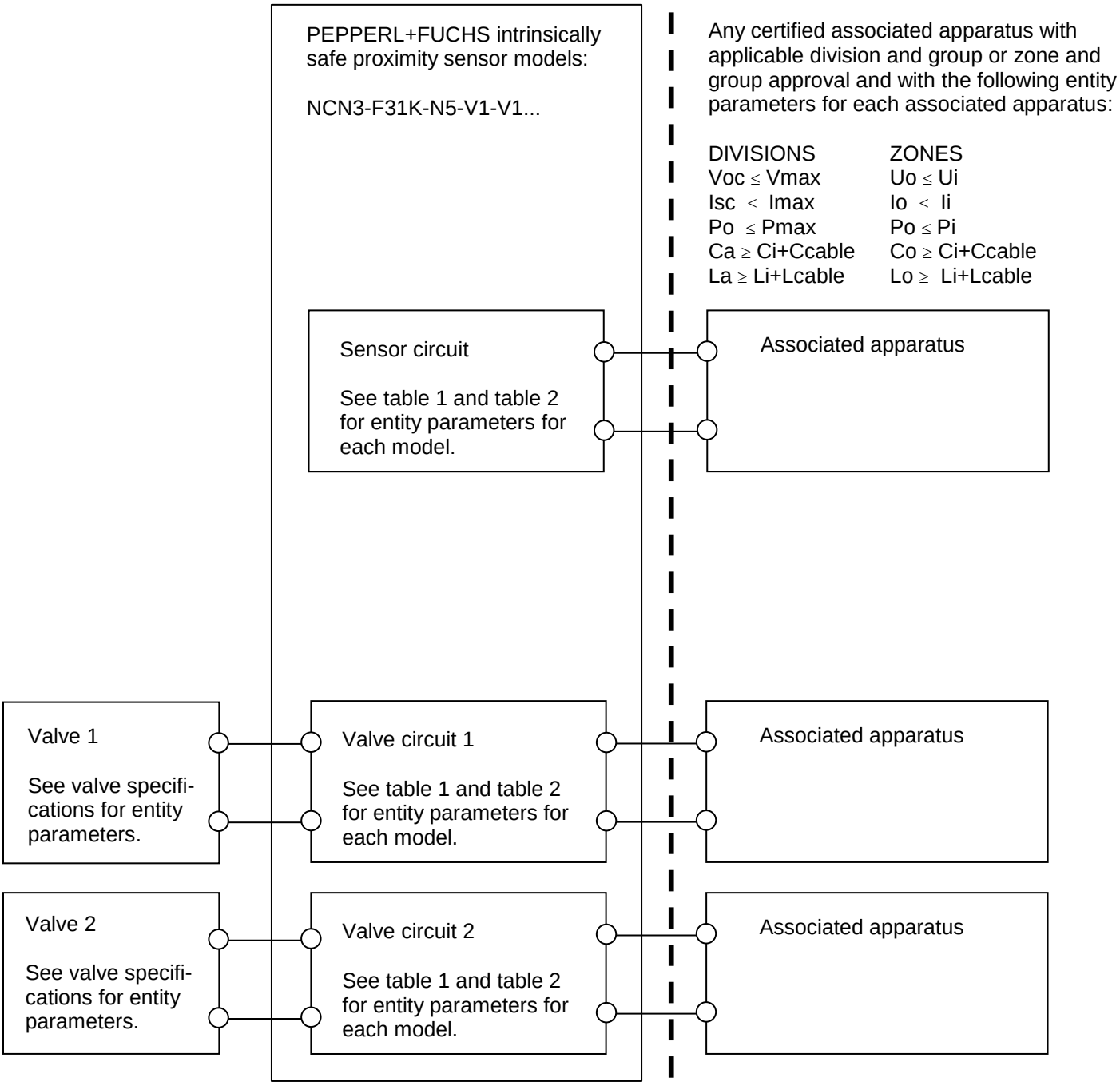


HAZARDOUS LOCATION

Class I, Division 1, Groups A, B, C, D

or
Class I, Zone 0 IIC

NON-HAZARDOUS LOCATION

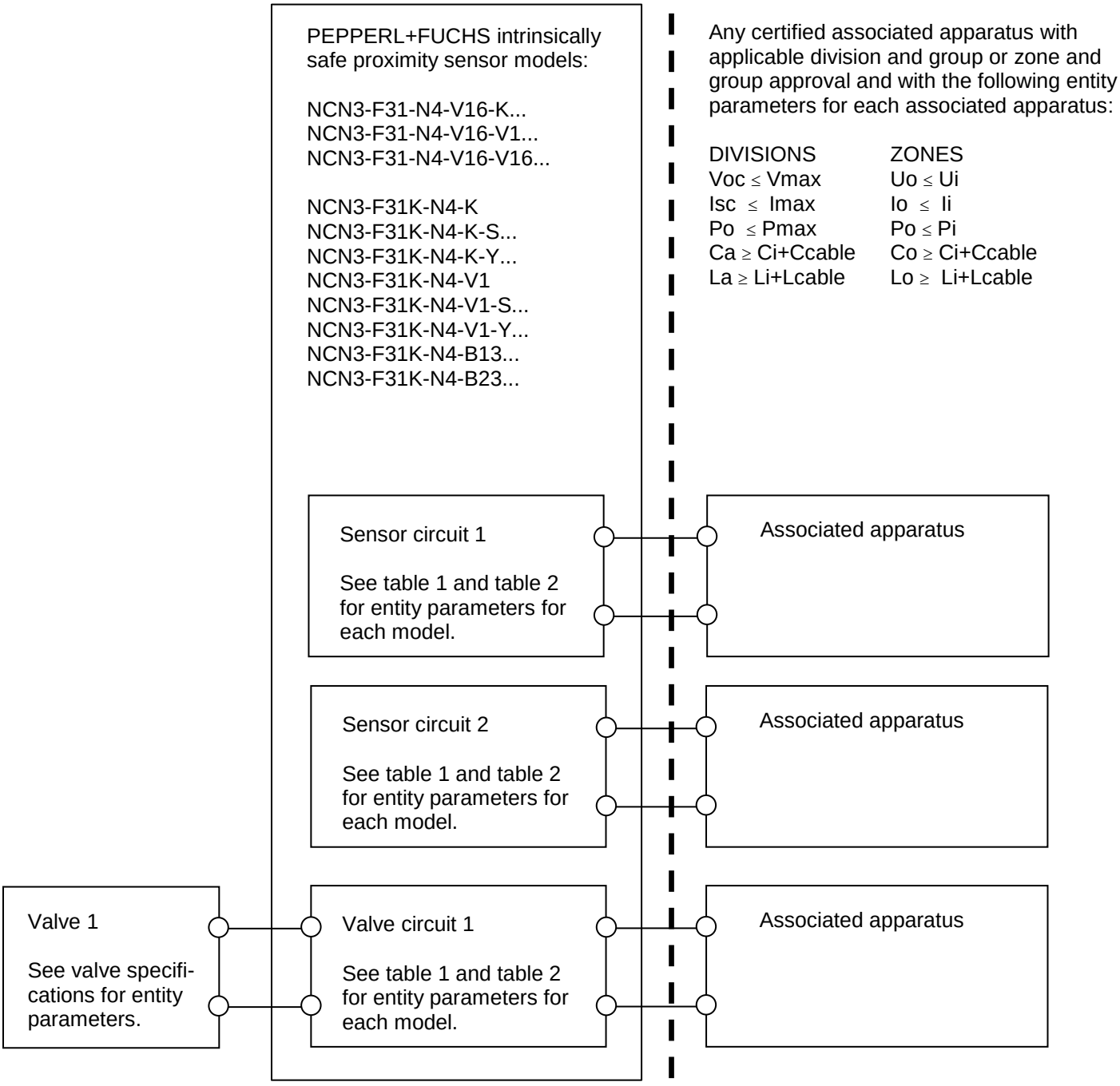


HAZARDOUS LOCATION

Class I, Division 1, Groups A, B, C, D

or
Class I, Zone 0 IIC

NON-HAZARDOUS LOCATION

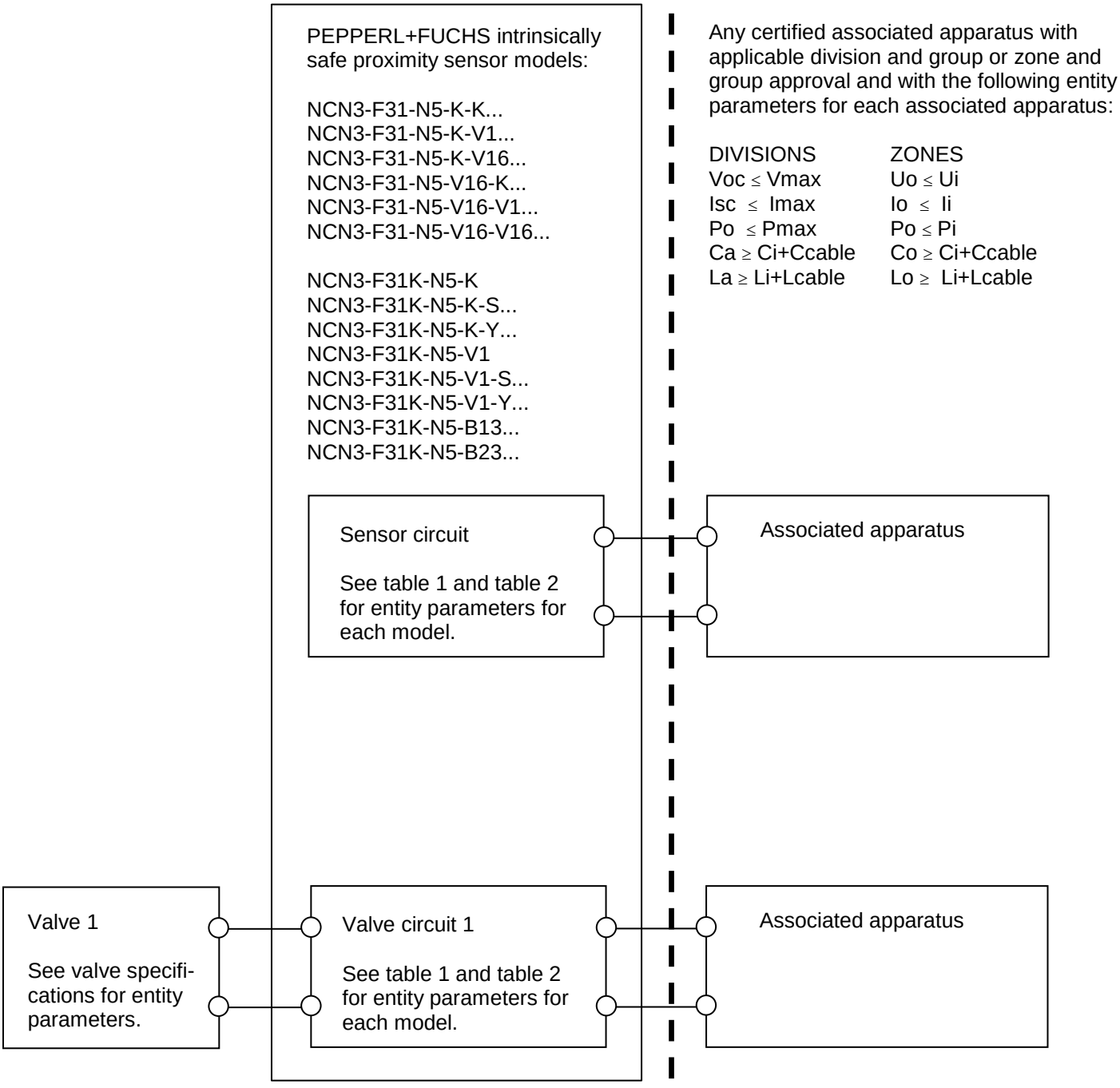


HAZARDOUS LOCATION

Class I, Division 1, Groups A, B, C, D

or
Class I, Zone 0 IIC

NON-HAZARDOUS LOCATION



HAZARDOUS LOCATION

Class I, Division 1, Groups A, B, C, D

or
Class I, Zone 0 IIC

NON-HAZARDOUS LOCATION

PEPPERL+FUCHS intrinsically safe proximity sensor models:

NCN3-F25F-N4-Y41364
NCN3-F25...-N4-V1...

NCN3-F31-N4-V1
NCN3-F31-N4-V1-Y...
NCN3-F31-N4-V18
NCN3-F31-N4-V18-Y...
NCN3-F31-N4-V16
NCN3-F31-N4-V16-Y...

NCN3-F31K-N4
NCN3-F31K-N4-S...
NCN3-F31K-N4-Y...

Any certified associated apparatus with applicable division and group or zone and group approval and with the following entity parameters for each associated apparatus:

DIVISIONS	ZONES
Voc ≤ Vmax	Uo ≤ Ui
Isc ≤ Imax	Io ≤ Ii
Po ≤ Pmax	Po ≤ Pi
Ca ≥ Ci+Ccable	Co ≥ Ci+Ccable
La ≥ Li+Lcable	Lo ≥ Li+Lcable

Sensor circuit 1

See table 1 and table 2 for entity parameters for each model.

Associated apparatus

Sensor circuit 2

See table 1 and table 2 for entity parameters for each model.

Associated apparatus

HAZARDOUS LOCATION

Class I, Division 1, Groups A, B, C, D

or
Class I, Zone 0 IIC

NON-HAZARDOUS LOCATION

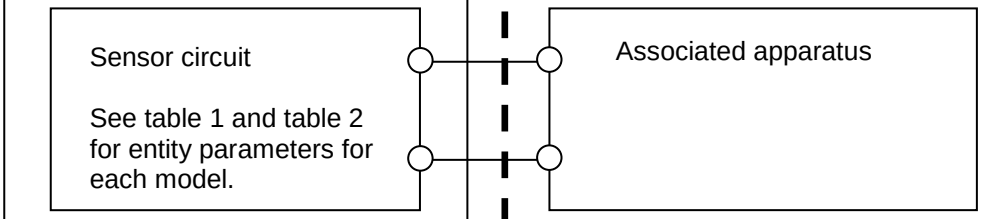
PEPPERL+FUCHS intrinsically safe proximity sensor models:

NCN3-F31-N5-K
NCN3-F31-N5-K-a... [1]
NCN3-F31-N5-K-Y...
NCN3-F31-N5-V1
NCN3-F31-N5-V1-Y...
NCN3-F31-N5-V18
NCN3-F31-N5-V18-Y...
NCN3-F31-N5-V16
NCN3-F31-N5-V16-Y...

NCN3-F31K-N5
NCN3-F31K-N5-S...
NCN3-F31K-N5-Y...

Any certified associated apparatus with applicable division and group or zone and group approval and with the following entity parameters for each associated apparatus:

DIVISIONS	ZONES
Voc ≤ Vmax	Uo ≤ Ui
Isc ≤ Imax	Io ≤ Ii
Po ≤ Pmax	Po ≤ Pi
Ca ≥ Ci+Ccable	Co ≥ Ci+Ccable
La ≥ Li+Lcable	Lo ≥ Li+Lcable



[1] The placeholder "a..." stands for digits, beginning with a numeric digit

HAZARDOUS LOCATION

NON-HAZARDOUS LOCATION

Class II, Division 1, Groups E, F, G
Class III, Division 1
or

Zone 20 IIIC

PEPPERL+FUCHS intrinsically safe proximity sensor models:

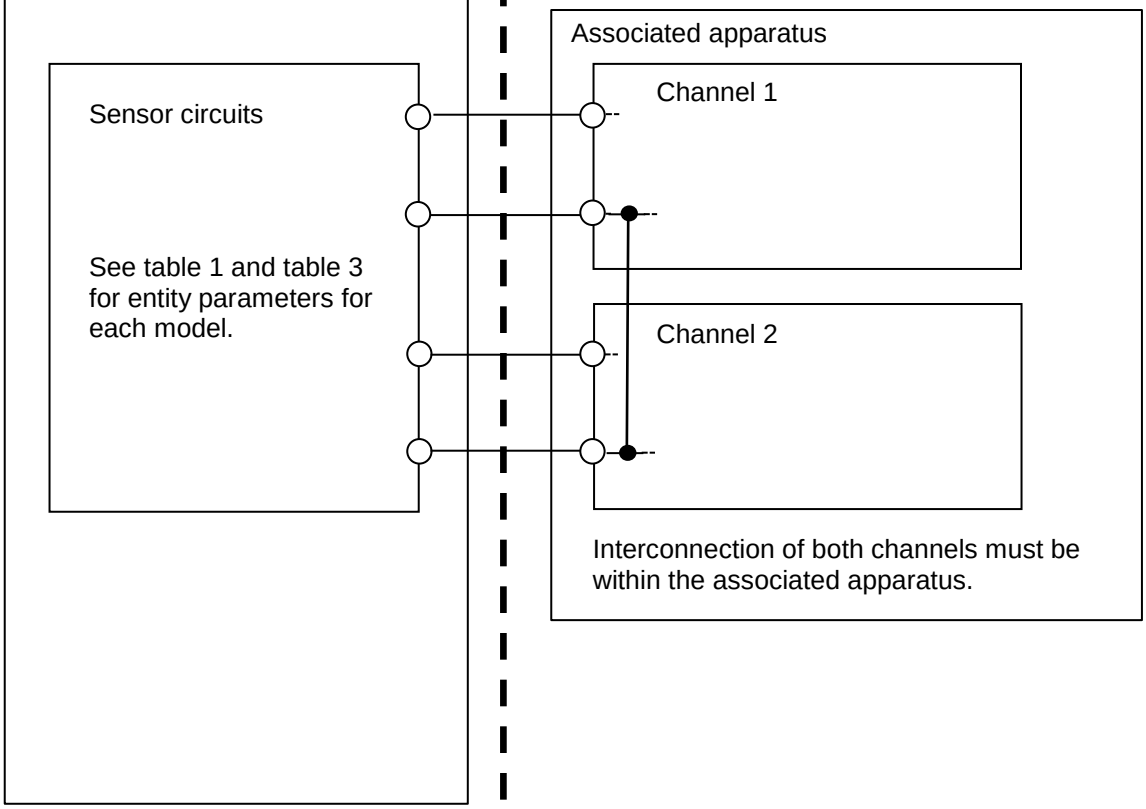
NCN3-F25…-N4-V1…
NCN3-F25F-N4-Y41364

NCN3-F31-N4-V1
NCN3-F31-N4-V1-Y…
NCN3-F31-N4-V18
NCN3-F31-N4-V18-Y…
NCN3-F31-N4-V16
NCN3-F31-N4-V16-Y…

NCN3-F31K-N4
NCN3-F31K-N4-S…
NCN3-F31K-N4-Y…

Certified associated apparatus with applicable division and group or zone and group approval and with the following entity parameters for the combination of both associated apparatus.

DIVISIONS	ZONES
Voc ≤ Vmax	Uo ≤ Ui
Isc ≤ Imax	Io ≤ Ii
Po ≤ Pmax	Po ≤ Pi
Ca ≥ Ci+Ccable	Co ≥ Ci+Ccable
La ≥ Li+Lcable	Lo ≥ Li+Lcable



Notes

1. MARKING

- Listee´s name or Trade Mark

- Model number or designation

- Class-Division marking resp. Class-Zone marking for models:
  NCN3-F25…-N4… NCN3-F31K-N4…
  NCN3-F31-N4… NCN3-F31K-N5…
  NCN3-F31-N5...
  - Class-Division marking:
    Class I, Division 1, Group A, B, C, D, T6…T1
    And/or
  - Class-Zone marking for USA:
    Class I, Zone 0, AEx ia IIC T6…T1 Ga
    And/Or
  - Class-Zone marking for Canada:
    Ex ia IIC T6…T1 Ga X

- Class-Division marking resp. Class-Zone marking for models:
  NCN3-F25…-N4… NCN3-F31-N4-V18…
  NCN3-F31-N4-K… NCN3-F31K-N4
  NCN3-F31-N4-V1-… NCN3-F31K-N4-Y…
  NCN3-F31-N4-V16 NCN3-F31K-N4-S…
  NCN3-F31-N4-V16-Y…
  - Class-Division marking:
    Class I, Division 1, Group A, B, C, D, T6…T1
    And/Or
    Class II, Division 1, Group E, F, G, T135 °C
    And/Or
    Class III, Division 1, T135 °C
    And/or
  - Class-Zone marking for USA:
    Class I, Zone 0, AEx ia IIC T6…T1 Ga
    And/Or,
    Zone 20, AEx ia IIIC T 135 °C Da
    And/Or
  - Class-Zone marking for Canada:
    Ex ia IIC T6…T1 Ga X
    And/Or,
    Ex ia IIIC T 135 °C Da X

- An indication that the apparatus is intrinsically safe

- A reference to the control drawing number

- A reference to ambient temperature range shown under suitable tables in the Control Drawing

- “WARNING – AVOID ELECTROSTATIC CHARGE – SEE INSTRUCTIONS” and/or “AVERTISSEMENT – DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES – VOIR INSTRUCTIONS” for apparatus models according to suitable table in the Control Drawing.

- A serial number, date code or equivalent

2. STANDARDS

   Investigation acc. United States Standards: UL 913, UL 60079-0, UL 60079-11 and acc. Canadian National Standards CSA C22.2 NO. 60079-0, CSA C22.2 NO. 60079-11

3. The Entity Concept allows interconnection of an intrinsically safe apparatus with an associated apparatus not specifically examined in combination as a system when the approved values of Voc (or Uo), Isc (or Io) and Po for the associated apparatus are less than or equal to Vmax (or Ui), Imax (or Ii) and Pmax (or Pi) for the intrinsically safe apparatus and the approved values of Ca (or Co) and La (or Lo) for the associated apparatus are greater than Ci + Ccable and Li + Lcable, respectively, for the intrinsically safe apparatus, where

   - Ccable= 60 pF/ft (197 pF/m) if unknown
   - Lcable= 0.20 µH/ft (0.66 µH/m) if unknown

4. For Class II, Division 1 or Class III, Division 1 or Zone 20 applications and Valve Position Sensor types:

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

   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 galvanic separation remains unaffected.

   The connected certified associated apparatus must have a multi-channel input, connected with each other. The entity parameters of the associated apparatus must be specified for interconnection of intrinsically safe input circuits.

5. The sum of all capacitances and inductances, including tolerances and a 10 m cable result to the given values for Ci and Li for the respective sensor models, shown in Table 2, resp. Table 3 if sensor circuits are considered galvanically connected to each other acc. note 4.

6. Wiring methods must be in accordance with all applicable installation requirements of the country in use. For the U.S. see NFPA 70 (NEC) article 504. For Canada see CEC section 18.

7. WARNING: Substitution of components may impair intrinsic safety and suitability for hazardous (classified) locations.
   AVERTISSEMENT - La substitution de composants peut compromettre la sécurité intrinsèque et l'adéquation à une utilisation en emplacements dangereux.

8. Correlations between the type of connected circuit and the maximum permissible ambient temperature are given in Table 1, Table 4 and Table 5.

   When assigning the actual sensor to the respective table, use the type description, which describes the sensor best. Letters and digits describe the different types according to the type description key.

   The dots in this type description represent free definable parameters. These free definable parameters can be omitted or replaced by letters or digits.

9. Appropriate measures need to be taken to protect the proximity 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.

10. When the following types of proximity sensors are applied acc. to the following classification

    - Class I, Division 1, Class II, Division 1 or Class III Division 1 or
    - Class I, Zone 0 or Zone 20

    as tabulated below, inadmissible electrostatic charge of the plastic housing has to be prevented.

	Division Classification			Zone Classification	
Model	Class I, Division 1 for Groups	Class II, Division 1 for Groups	Class III, Division 1 for Class	Class I, Zone 0 for Groups	Zone 20 for Group
NCN3-F25…-N4…	A, B	E, F, G	III	IIC	III
NCN3-F31-N…	A, B	E, F, G	III	IIC	III
NCN3-F31K-N…	A, B, C	E, F, G	III	IIB / IIC	III

    WARNING – AVOID ELECTROSTATIC CHARGE – SEE INSTRUCTIONS
    AVERTISSEMENT – DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES – VOIR INSTRUCTIONS

    Do not mount the supplied label in areas that can be electrostatically charged.

    Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1.

11. 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 of 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.

12. For the application of the following types of Valve Position Sensors in hazardous locations 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…

13. For use in Class I, Division 1 or Class I, Zone 0: 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 use in Class II, Division 1 or Class III, Division 1: The connection facilities of the Valve Position Sensors shall be installed as such that a minimum degree of protection of IP6X according IEC 60529 is complied with.

    For use in Zone 20: 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.

14. The Valve Position Sensors 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.

15. For Valve Position Sensors with valve circuits, the maximum values of each connected intrinsically safe valve have to be taken into account. It is not allowed to connect additional electrical sources to the intrinsically safe valve circuit on the valve side.

16. The proximity sensors may be provided with a permanently connected cable having the following characteristics:
    - Type: flexible jacketed power supply cord
    - Rated Voltage: 500 V
    - Rated Current: min. 52 mA for sensor circuits, 240 mA for valve circuits

Entity Parameters

Table 1, Valve Position Sensors, maximum values

Sensor ciruits	**Type 1** **Ui = 15 V** **Ii = 25 mA** **Pi = 34 mW**	**Type 2** **Ui = 15 V** **Ii = 25 mA** **Pi = 64 mW**	**Type 3** **Ui = 15 V** **Ii = 52 mA** **Pi = 169 mW**
Valve ciruit(s)	**Ui = 32 V** **Ii = 240 mA**		

Table 2, Valve Position Sensors, effective internal inductance and capacitance

For Valve Position Sensors according to note 4: see Table 3

Model	**Ci / nF**	**Li / µH**
NCN3-F25…-N4…	< 100	< 100
NCN3-F31-N4…	< 100	< 100
NCN3-F31-N5...	< 200	< 200
NCN3-F31K-N4…	< 100	< 100
NCN3-F31K-N5…	< 200	< 200

	Ci / nF	**Li / µH**
Valve ciruit(s)	< 10	< 20

Table 3, Valve Position Sensors according to note 4 only, effective internal inductance and capacitance

Model	**Ci / nF**	**Li / µH**
NCN3-F25…-N4-V1…	< 200	< 200
NCN3-F25F-N4-Y41364	< 200	< 200
NCN3-F31-N4-V1-…	< 200	< 200
NCN3-F31-N4-V16	< 200	< 200
NCN3-F31-N4-V16-Y…	< 200	< 200
NCN3-F31-N4-V18…	< 200	< 200
NCN3-F31K-N4	< 200	< 200
NCN3-F31K-N4-Y…	< 200	< 200
NCN3-F31K-N4-S…	< 200	< 200

Valve ciruit(s) n/a

Table 4, Valve Position Sensors, maximum permissible ambient temperature for use in Class I, Division 1 or Class I, Zone 0

	Type 1			Type 2			Type 3		
	maximum permissible ambient temperature in °C for application in temperature class								
Model	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
NCN3-F25…-N4…	75	90	100	70	85	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

Table 5, Valve Position Sensors, maximum permissible ambient temperature for use in Class II, Division 1, Class III, Division 1 or Zone 20

	Type 1	Type 2	Type 3
Model	maximum permissible ambient temperature in °C		
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