



1. **EU-TYPE EXAMINATION CERTIFICATE**

2. **Equipment or Protective System Intended for use  
in Potentially explosive atmospheres  
Directive 2014/34/EU**

3. Reference: **VTT 15 ATEX 030X Issue 4**

4. Equipment: **Intelligent Valve Controller**

Certified types: **NDX \_\_\_ 0**  
**NDX \_\_\_ 2**

5. Manufactured by: **Metso Flow Control Oy**

6. Address: **Vanha Porvoontie 229,  
FI-01380 Vantaa  
Finland**

7. This equipment or protective system and any acceptable variations thereto is specified in the schedule and possible supplement(s) to this Certificate and the documents therein referred to.

8. VTT, notified body number 0537, in accordance with Article 21 of the Directive 2014/34/EU of February 2014, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective system intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. VTT-S-04494-17.

9. Compliance with the Essential Health and Safety Requirements has been assured by compliance with the standards:

**EN 60079-0 (2012)**  
**EN 60079-11 (2012)**



10. If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.
11. This EU-Type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. This certificate does not cover these.
12. The marking of the equipment or protective system shall include the following:



**II 1 G**  
**II 1 D**

**Ex ia IIC T6...T4 Ga**  
**Ex ia IIC T85 °C...T115 °C Da**

or



**II 2 G**  
**II 2 D**

**Ex ib IIC T6...T4 Gb**  
**Ex ib IIC T85 °C...T115 °C Db**

Espoo, 1.9.2017

VTT Expert Services Ltd



Martti Siirola  
Senior Expert



Kari Koskela  
Expert



Certificate without signatures shall not be valid

This certificate, including the schedule, may only be reproduced in its entirety and without change.

13.

## Schedule

14.

## EU-TYPE EXAMINATION CERTIFICATE VTT 15 ATEX 030X Issue 4

15.

### Description

NDX valve positioners are intended for linear or rotary travel control valves. The NDX monitors valve position and controls the actuator of the device. NDX is connected to a control system (DCS) via 4 – 20 mA current loop which provides power supply to NDX and data communication between NDX and DCS utilizing HART communication protocol. The NDX includes floating 4 – 20 mA current transmitter/sink interface that can be used for indicating the valve position to the control system. Current loop for power supply and HART communication (mA loop) and current loop for Position Transmitter (PT loop) are separate I.S. circuits. NDX\_\_2 variant incorporates two current transmitter/sink interfaces complying with NAMUR standard.

The NDX produces pneumatic control signal for the actuator and monitors the pressure of air supply and actuator channel for diagnostic purposes. For valve position sensing, the NDX uses contactless measurement method based on sensing the direction of the magnetic field created by a target magnet on the valve shaft.

The NDX enclosures are made of cast aluminium and plastic (NDX\_\_0) or cast aluminium entirely (NDX\_\_2). LUI (Local User Interface) with LCD display and capacitive keypad is intended for controlling and monitoring valve and positioner operation locally.

Prestage unit in the device converts the electronic control signal from the main board to pneumatic control signal for the actuator.

### Product type nomenclatures

#### NDX\_\_0:

NDX 1 5 1 0 G - X - 0 0 0 0 - 0 0 0 Y  
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

<sup>6)</sup> Communication / Input signal range:

"H": HART / 4 – 20 mA

"T": HART / 4 – 20 mA and 4 – 20 mA + PT

"N": 4 – 20 mA (No HART)

"M": 4 – 20 mA + PT (No HART)

<sup>11)</sup> Pneumatic connections & gauges: "0"/ "1"/ "2"/ "3" (No relevance w.r.t. "ia" or "ib")

<sup>12)</sup> Brand:

"N": Neles;

"S": StoneL

<sup>18 - 20)</sup> Partner identification

<sup>21)</sup> Special feature - shall not affect hazardous area approvals

#### NDX\_\_2:

NDX 2 5 1 2 G - X N 0 N 0 0 0 0 - 0 0 0 Y  
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

<sup>6)</sup> Communication / Input signal range:

"H": HART / 4 – 20 mA

"T": HART / 4 – 20 mA and 4 – 20 mA + PT

"N": 4 – 20 mA (No HART)

"M": 4 – 20 mA + PT (No HART)

"D": HART / 4 – 20 mA + 2 x DO (Namur)

"L": HART / 4 – 20 mA + PT + DO (Namur)

<sup>11)</sup> Pneumatic connections & gauges: "0"/ "1"/ "2"/ "3" (No relevance w.r.t. "ia" or "ib")

<sup>18 - 20)</sup> Partner identification

<sup>21)</sup> Special feature - shall not affect hazardous area approvals



Certificate without signatures shall not be valid

This certificate, including the schedule, may only be reproduced in its entirety and without change.

The maximum input values of the NDX mA and PT loop interfaces are:

$U_i \leq 28 \text{ V}$        $I_i \leq 120 \text{ mA}$        $P_i \leq 1 \text{ W}$        $C_i < 22 \text{ nF}$        $L_i < 100 \text{ }\mu\text{H}$

The maximum input values of NAMUR-DO1 and NAMUR-DO2 interfaces in NDX \_\_2 are:

$U_i \leq 16 \text{ V}$        $I_i \leq 25 \text{ mA}$        $P_i \leq 100 \text{ mW}$        $C_i < 22 \text{ nF}$        $L_i < 100 \text{ }\mu\text{H}$

Documents:

| Description                                 | Doc. ID | Rev. | Date       | File name                                 |
|---------------------------------------------|---------|------|------------|-------------------------------------------|
| NDX Intrinsic Safety Description            | F71424  | D*   | 27.6.2017  | F71424D NDX IS Description.pdf            |
| NDX thermal analysis                        | F71427  | D*   | 27.6.2017  | F71427C NDX thermal analysis.xlsx         |
| NDX IS utilisation                          | F71429  | D*   | 27.6.2017  | F71429C NDX IS utilisation.xlsx           |
| NDX IS block diagram                        | F71430  | A    | 10.3.2016  | F71430A NDX IS block diagram.pdf          |
| NDX control wiring diagram                  | F68946  | A    | 29.2.2016  | F68946A NDX Control wiring diagram.pdf    |
| NDX A3 Panta SMD with PT Architecture       | F70493  | C*   | 22.6.2017  | F70493 A3 C.pdf                           |
| BOM A3 Panta SMD with PT                    | F70495  | C*   | 21.6.2017  | F70495 A3 Panta SMD with PT C.xlsx        |
| Main board, creepage description            | F70497  | C*   | 21.6.2017  | F70497C A3 Creepages.pdf                  |
| A3 Component locator drw.                   | F70497  | C*   | 21.6.2017  | F70497C Locator.pdf                       |
| A3 Main board PCB design                    | F70500  | C*   | 21.6.2017  | F70500C.pdf                               |
| LUI schematics                              | F57048  | H*   | 26.6.2017  | F57048 LUI H.pdf                          |
| LUI ACF schematics                          | F57048  | I*   | 26.6.2017  | F57048 LUI I.pdf                          |
| LUI Bill of materials                       | F57049  | H*   | 26.6.2017  | F57049 LUI H.xls                          |
| LUI ACF Bill of materials                   | F57049  | I*   | 26.6.2017  | F57049 LUI I.xls                          |
| Component locator LUI                       | F57050  | D    | 7.12.2015  | F57050D LOC LUI.pdf                       |
| Component locator LUI_ACF                   | F69523  | 0    | 7.12.2015  | F69523_0 LOC LUI_ACF.pdf                  |
| LUI creepage description LUI                | F57050  | D    | 7.12.2015  | F57050D LUI Creepage.pdf                  |
| LUI creepage description LUI-ACF            | F69523  | 0    | 7.12.2015  | F69523_0 LUI-ACF Creepage.pdf             |
| LUI PCB design                              | F57051  | D    | 7.12.2015  | F57051D LUI.pdf                           |
| LUI-ACF PCB design                          | F69523  | 0    | 7.12.2015  | F69523_0 LUI-ACF.pdf                      |
| NDX A5 Intrinsic Safety Description         | F82105  | A    | 13.6.2017  | F82105A NDX A5 IS Description.pdf         |
| A5 Thermal analysis                         | F82108  | A    | 13.6.2017  | F82108A_NDX_A5_thermal_analysis.xlsx      |
| A5 IS utilisation                           | F82107  | A    | 13.6.2017  | F82107A_NDX_A5_IS_utilisation.xlsx        |
| NDX A5 block diagram                        | F82106  | A    | 13.6.2017  | F82106A NDX A5 IS block diagram.pdf       |
| NDX A5 control wiring diagram               | F82699  | A    | 13.6.2017  | F82699A NDX A5 Control wiring diagram.pdf |
| NDX A5 FULL MASTER ARCHITECTURE             | F81458  | D1   | 31.5.2017  | F81458D1 NDX A5 FULL MASTER.pdf           |
| NDX A5 FULL MASTER BOM (main brd)           | F81291  | D1   | 31.5.2017  | F81291D1 NDX A5 FULL MASTER BOM.xlsx      |
| NDX A5 PCB creepage escry.                  | F82296  | D    | 12.5.2017  | F82296D NDX A% Creepage.pdf               |
| NDX A5 PCB top component. locator           | F71356  | D    | 17.4.2017  | F71356D locator.pdf                       |
| NDX A5 PCB layout (H148231D)                |         | D    | 17.4.2017  |                                           |
| NDX A5 LUI schematics                       | F78977  | D    | 1.6.2015   | F78977D1 NDX A% LUI.pdf                   |
| NDX A5 LUI BOM                              | F78981  | D1   | 1.6.2015   | F78981D1 NDX A% LUI BOM.xlsx              |
| NDX A5 LUI locator drw.                     | F78978  | D    | 8.3.2017   | F78978D Locator.pdf                       |
| NDX A5 LUI creepage escry.                  | F82297  | D    | 8.3.2017   | F82297D NDX A5 LUI Creepage.pdf           |
| NDX A5 LUI layout (H147920D)                |         | D    | 8.3.2017   |                                           |
| COIL 25,33/23,07x6,4, VG9_H                 | F26407  | A    | 12.11.2009 | F26407-A.pdf                              |
| Housing assembly embedded prestige NDX      | F58212  | E.1  | -          | F58212-E1.pdf                             |
| Valve Controller NDX A5 Assy dwg.           | F78964  | B    | 31.3.2017  | F78964_B.pdf                              |
| Identification plate NDX_X VTT approval     | F65210  | F    | 5.7.2017   | F65210-F.doc                              |
| CASTING CAP LUI MOLD LID NDX                | F64226  | A    | -          | F64226-A.pdf                              |
| NDX Potting components                      | F65722  | 0    | 3.7.2015   | F65722-0.xlsx                             |
| CASTING COVER MAIN MOLD COVER;<br>CHAMFERED | F65187  | A    | -          | F65187-A.pdf                              |
| NDX Compact – Main PCB Assembly potting     | F65580  | 0    | 30.6.2015  | F65580-0.xlsx                             |

LUI C2 vers. documents:

|                          |        |    |           |                          |
|--------------------------|--------|----|-----------|--------------------------|
| LUI schematics           | F57048 | C2 | 2.7.2015  | F57048 LUI C2.pdf        |
| LUI Bill of materials    | F57049 | C2 | 2.7.2015  | F57049 LUI C2.xls        |
| Component locator drw.   | F57050 | C  | 15.4.2015 | F57050C LOC LUI.pdf      |
| LUI creepage description | F57050 | C  | 15.4.2015 | F57050C LUI Creepage.pdf |
| LUI PCB design           | F57051 | C  | 15.4.2015 | F57051C LUI.pdf          |

\*) New documents.



Certificate without signatures shall not be valid

This certificate, including the schedule, may only be reproduced in its entirety and without change.

17. Report:

VTT-S-04494-17

18. Special conditions for safe use

- The maximum allowed ambient temperature ranges according to different T Classes are:
  - Tamb -40 °C ... +50 °C for temperature class T6 (IIC) or T85 °C for dust (IIIC)
  - Tamb -40 °C ... +65 °C for temperature class T5 (IIC) or T100 °C for dust (IIIC)
  - Tamb -40 °C ... +80 °C for temperature class T4 (IIC) or T115 °C for dust (IIIC)
- The permissible ambient temperature range depends on the used configuration. The ambient temperature range is marked on the identification plate.
- At an ambient temperature  $\geq +70^{\circ}\text{C}$ , the temperature rating of the connection cable shall be in accordance with maximum ambient temperature range.
- Temperature Classes for dust are based on measurement w.r.t. total immersion to dust required for category I D equipment.
- For Equipment category 1G (EPL Ga), the enclosure parts or enclosures made of aluminium alloy shall not be subjected to friction or impacts due to spark ignition hazard.
- The plastic cover in the NDX \_ \_ \_ 0 enclosure shall be wiped with damp cloth only due to risk of electrostatic charging.
- The valve controller shall be connected according to the manufacturer's instructions.

19. Essential Health and Safety Requirements

Requirements met by compliance with the standards referred in point 9.

Certificate history:

| Issue | Date      | Report No.     | Comment                                                                                                                                                                                                                                                                                                                                                    |
|-------|-----------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -     | 8.7.2015  | VTT-S-01508-15 | Prime certificate                                                                                                                                                                                                                                                                                                                                          |
| 1     | 21.9.2015 | VTT-S-04243-15 | New documents revisions. Assessment for IIIC dust done and new markings included.                                                                                                                                                                                                                                                                          |
| 2     | 30.9.2016 | VTT-S-03895-16 | Mechanical change on the Main PCBA structure. Touch keys on internal LUI unit modified and I.S. circuit for LUI buttons added in the current version (prior LUI C2 vers. is still compatible). Major changes in I.S. relevant components, all related documentation revised accordingly. Alternative component types assessed. LUI ACF version introduced. |
| 3     | 29.6.2017 | VTT-S-03663-17 | Certified type NDX _ _ _ 2 added. New documents.                                                                                                                                                                                                                                                                                                           |
| 4     | 1.9.2017  | VTT-S-04494-17 | I.S. component rating calculations updated to cover alternative types. I.S. description and other related documents reviewed accordingly.                                                                                                                                                                                                                  |

Espoo, 1.9.2017  
VTT Expert Services Ltd



Martti Siirola  
Senior Expert



Kari Koskela  
Expert



Certificate without signatures shall not be valid

This certificate, including the schedule, may only be reproduced in its entirety and without change.