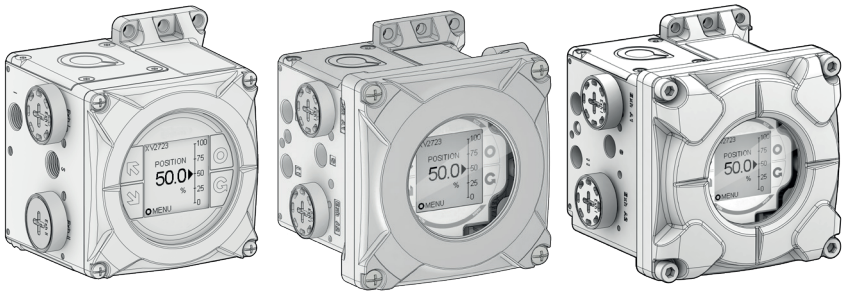


# NDX

## Intelligent valve controller

# Quick Guide

For your safety  
Read these instructions first!



For more information go to our website  
to view the different language versions,  
complete manual and installation videos:  
**[www.valmet.com/ndx](http://www.valmet.com/ndx)**

## SAVE THESE INSTRUCTIONS FOR LATER USE!

### Before you begin

The complete manual provides information about the safe handling, installation, commissioning, operation, troubleshooting, maintenance and replacement of the intelligent valve controller. This quick guide does not contain all detailed information on every possible aspect of installation, operation or maintenance.

If you are uncertain about the use of the controller or its suitability for your intended use or just if you require additional assistance, please contact Valmet or our local representative.

Addresses and phone numbers are printed on the back cover. See also [www.valmet.com/ndx](http://www.valmet.com/ndx) for the latest documentation.

Do not install, operate or maintain this intelligent valve controller without being fully trained and qualified in valve, actuator and accessory installation, operation and maintenance. To avoid personal injury or property damage, it is important to carefully read, understand, and follow all contents of this user guide, including all safety cautions and warnings. It is also important to be authorized by the plant operator before operating the intelligent valve controller.

Note, that there are additional safety regulations which are plant and/or hazardous area related, those are not covered in this manual.

### WARRANTY

Get more information on our website: [www.valmet.com/ndx](http://www.valmet.com/ndx)

## Neles™ NDX Intelligent Valve Controller Technical Description

Either loop powered 4-20 mA or FOUNDATION Fieldbus powered, no external power supply required. Suitable for linear and rotary valves. Actuator connections in accordance with VDI/VDE 3845 and IEC 60534-6 standards.

|                    |                                                                                                                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------|
| Action:            | Single or double acting, direct or reverse                                                                         |
| Travel range:      | Linear (standard): 5-120 mm / 0.2-4.7 in<br>Linear (long range): 120-220 mm / 4.7-8.6 in<br>Rotary: 30-160 degrees |
| Temperature Range: | -40° - +85 °C / -40° - +185 °F                                                                                     |
|                    | LUI usable range: -25° - +65 °C                                                                                    |
| Protection class:  | IP66, NEMA 4X, IP67 during storage/transport                                                                       |

### Pneumatics

Pneumatic ports:

|             |                                                 |
|-------------|-------------------------------------------------|
| Supply air: | 1/4 NPT, G1/4 with additional block             |
| Actuator:   | 1/4 NPT, G1/4 with additional block             |
| Exhausts:   | 2 or 3 pcs. 3/8 NPT, G3/8 with additional block |

|                  |                                                                                  |
|------------------|----------------------------------------------------------------------------------|
| Supply Pressure: | 1.4-8 bar / 20-116 psi (single acting)<br>2.0-8 bar / 29-116 psi (double acting) |
|------------------|----------------------------------------------------------------------------------|

|                             |                                               |
|-----------------------------|-----------------------------------------------|
| Supply Media:               | Air, nitrogen, sweet natural gas <sup>2</sup> |
| Air Capacity <sup>1</sup> : | 80 Nm <sup>3</sup> /h / 47.1 scfm             |

Air Consumption in steady state position<sup>1</sup>: 0.1 Nm<sup>3</sup>/h / 0.06 scfm

<sup>1</sup> rated at 4 bar / 60 PSI supply pressure

<sup>2</sup> If natural gas is collected from the exhaust, make sure there are no back-pressure in the exhaust side. This applies also to so called re-breather application where the exhaust is piped to the actuator spring side.

### Powering and connectivity

|              |                                   |
|--------------|-----------------------------------|
| Cable Entry: | 2 pcs. 1/2 NPT (M20 with adapter) |
|--------------|-----------------------------------|

### HART

Protocol rev. 6 / 7 (7 as default)

Loop powered, 4-20 mA

|              |        |
|--------------|--------|
| Min. signal: | 3.8 mA |
|--------------|--------|

|                      |         |
|----------------------|---------|
| Min. control signal: | 3.95 mA |
|----------------------|---------|

|                     |         |
|---------------------|---------|
| Impedance at 20 mA: | 485 ohm |
|---------------------|---------|

### FOUNDATION fieldbus

|              |                            |
|--------------|----------------------------|
| Bus voltage: | 9-32 VDC, reverse polarity |
|--------------|----------------------------|

|                      |      |
|----------------------|------|
| Current consumption: | 17mA |
|----------------------|------|

|                                       |      |
|---------------------------------------|------|
| Max. fault state current consumption: | 19mA |
|---------------------------------------|------|

# Markings

Identification plate markings include:

- Contact details of the manufacturer
- Input signal (voltage range)
- Transmitter input signal (voltage range)
- Supply pressure range
- Output
- Enclosure type
- Manufacturing serial number TTYWNNNN\*)
- Build number
- H/C-code
- Type code (7 signs)
- Gauge block options
- CE mark

VALMET FLOW CONTROL OY  
VANHA PORVOONTIE 229  
01380 VANTAA, FINLAND  
Input: 4-20 mA, max. 30 VDC, HART  
Pos. transmitter: 4-20 mA, max. 30 VDC  
Supply: 1,4...8 bar / 20...115 psi  
Double acting, Fail safe  
Temp: -40...+85 °C  
IP66 / NEMA 4X

S/N: PH17380001 REV: 1.0  
(bar code PH17380001)

BASE ID: C0000001  
(bar code C0000001)

BASE TYPE: NDX2512TG- **EAC**

CAUTION / WARNINGS:  
Refer to manual (IMO) **CE** 2460

www.valmet.com/ndx

Approval plate markings include:

- Type code (15 signs)
- C-code
- Approvals (max. two)
- Operational temperature
- Input values

\*) Manufacturing serial number explained:

TT= device and factory sign

YY= year of manufacturing

WW = week of manufacturing

NNNN = consecutive number

Example:

PH15360001 = controller,

year 2015, week 36,

consecutive number 1

TYPE: NDX2512TG-XU0N0000-000Y  
ID: C0000001

Gauge block: [ ] 0 [ ] 1 [ ] 2 [ ] 3  
EESF 18 ATEX 014X / IECEx EESF 18.0007X  
[ ] II 1 G Ex ia IIC T6...T4 Ga  
[ ] II 1 D Ex ia IIC T85°C...T115°C Da  
Temp T6: -40...+50 °C, T5: +65 °C, T4: +80 °C  
EESF 18 ATEX 015X / IECEx EESF 18.0008X  
[ ] II 3 G Ex nA IIC T6...T4 Gc  
[ ] II 3 G Ex ic IIC T6...T4 Gc  
[ ] II 3 D Ex ic IIC T85°C...T115°C Dc  
Temp T6: -40...+50 °C, T5: +65 °C, T4: +85 °C  
See certificate for connection values

Class I, Div 1, Gps A, B, C, D; T4/T5/T6  
Ex ia IIC T4/T5/T6 Ga  
Class I, Zone 0 AEx ia IIC T4/T5/T6 Ga  
Class I, Div 2, Gps A, B, C, D; T4/T5/T6  
Ex ic IIC T4/T5/T6 Gc/Ex nA IIC T4/T5/T6 Gc  
Class I, Zone 2 AEx ic IIC T4/T5/T6 Gc  
AEx nA IIC T4/T5/T6 Gc  
INSTALL PER DRAWING / INSTALLER  
SUIVANT PLAN F82699 NDX  
CONTROL WIRING DIAGRAM

# Tools

Following tools are needed for the product installation:



13 mm and 21/22 mm (linear)  
8 mm and 24 mm (rotary)



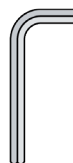
PH2



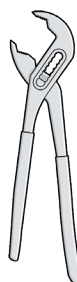
TX 7  
TX 8  
TX 10  
TX 20



3 mm  
8 mm



3 mm  
5 mm  
6 mm  
10 mm



13 mm and 21/22 mm with linear actuators.  
8 mm and 24 mm with rotary actuators.

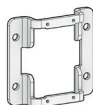
# LINEAR MOUNTING

## INSTALLATION TO NELES GLOBE

### MODEL VD25



### MODEL VD29



### MODEL VD37

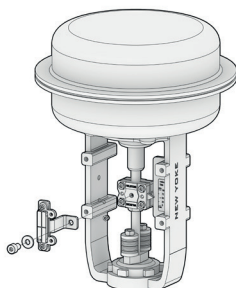


### MODEL VD48 AND 55

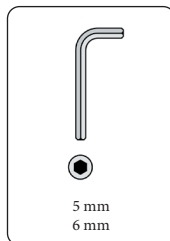
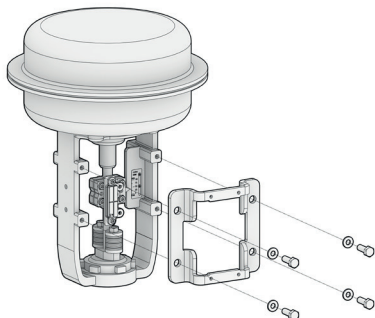


## INSTALLATION TO NELES GLOBE (VD29)

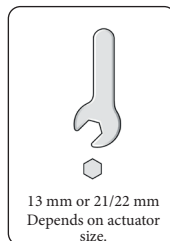
1. Mount the magnet holder with magnet to the actuator coupler, tighten the fixing screw.



2. Mount the bracket to the actuator, leaving the screws loose.



5 mm  
6 mm



13 mm or 21/22 mm  
Depends on actuator  
size.

### NOTE

Similar mounting steps apply also with other Neles Globe actuator sizes.

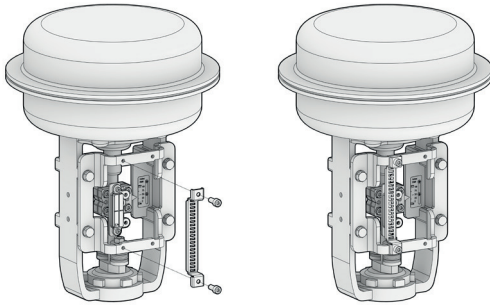
### NOTE

The bracket can be rotated 180° or flipped front/backside. If the bracket is flipped the magnet needs to be flipped correspondingly.

If needed, check the magnet installation tolerances from the picture in chapter Installation to any actuator.

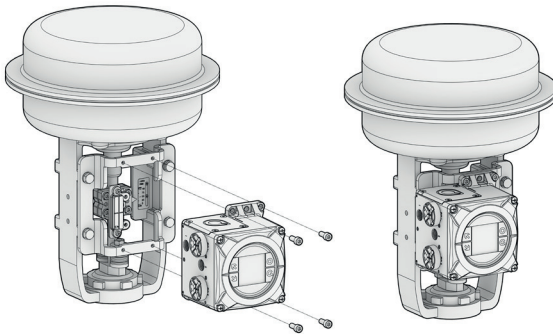
## LINEAR MOUNTING

3. Attach the magnet alignment tool to the magnet. Adjust the position of the bracket so that the magnet slides smoothly in the magnet alignment tool groove and tighten the magnet alignment tool fixing bolts.



Tighten the bracket screws. Remove the magnet alignment tool.

4. Mount the NDX to the bracket.

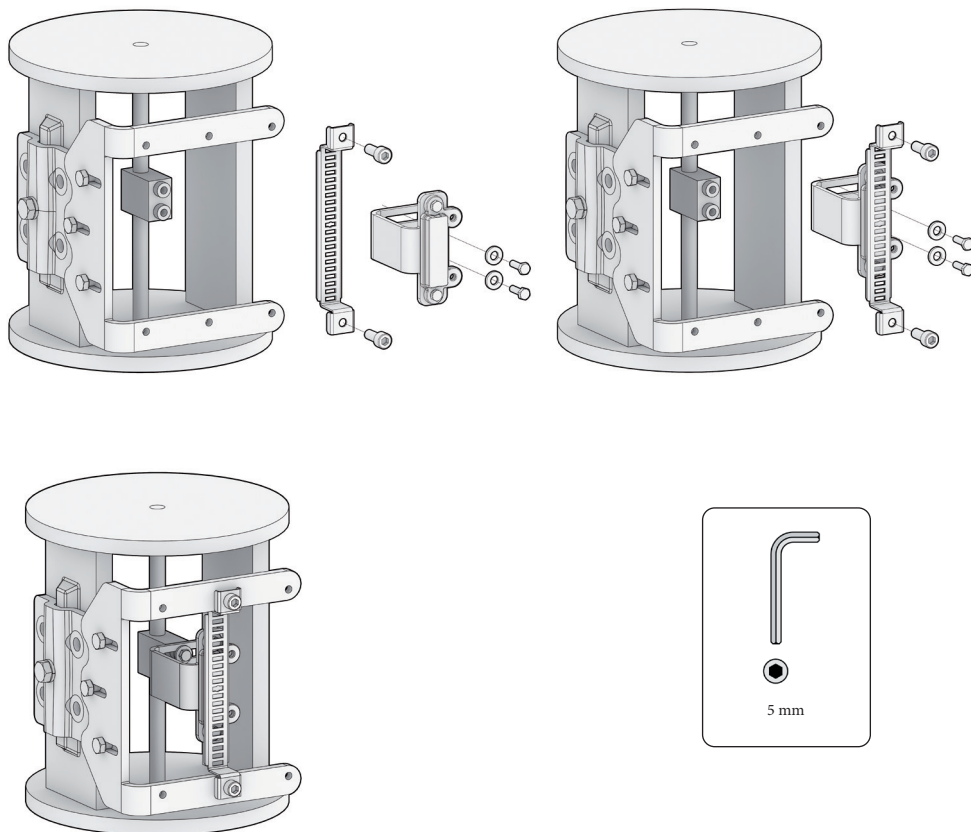


# LINEAR MOUNTING

## INSTALLATION TO IEC MOUNTING FACE

There are mounting brackets available which are designed for actuators with IEC 60534-6 interface. Mounting kit includes additional accessories which makes device installation really easy.

1. Mount the IEC bracket to the actuator, leaving the screws loose.
2. Mount the magnet alignment tool to the magnet bracket.
3. Mount the magnet bracket to the actuator coupler, leaving the screws loose.
4. Attach the magnet alignment tool to the center holes on the IEC bracket.

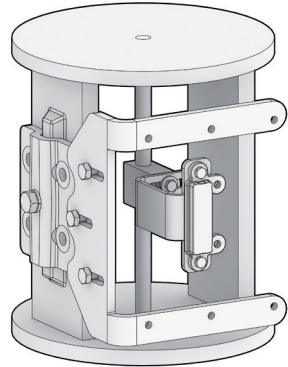
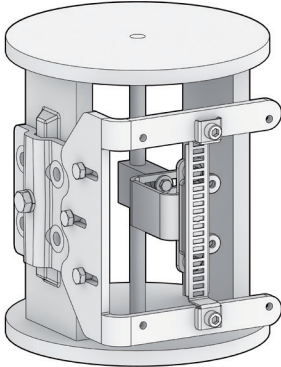


### NOTE

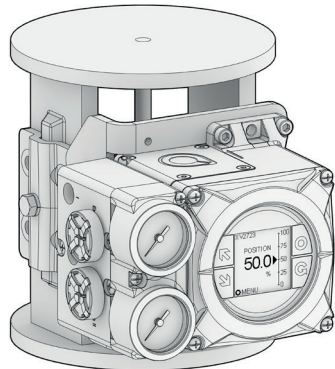
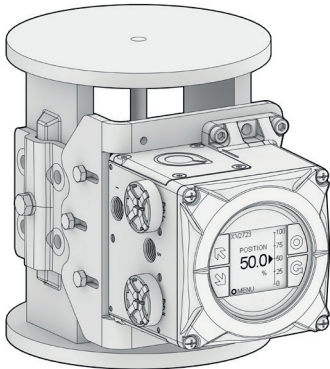
Other tools are dependent on the actuator which the NDX is installed upon.

## LINEAR MOUNTING

5. Adjust the position of the magnet bracket (and the IEC bracket) so that the magnet slides smoothly in the magnet alignment tool groove.
6. Tighten the magnet bracket screws.
7. When the magnet moves smoothly in the magnet alignment tool, that automatically defines the correct alignment and distance from the device position sensor. Tighten the IEC bracket to the actuator and remove the magnet alignment tool.



8. Mount the device to the IEC bracket.



# LINEAR MOUNTING

## INSTALLATION TO ANY LINEAR ACTUATOR

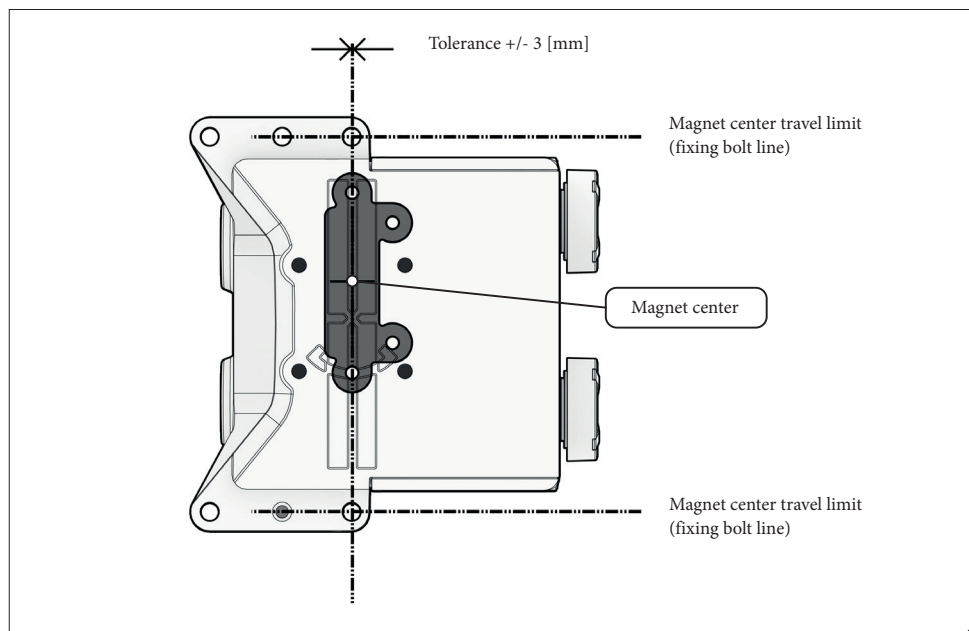
NDX can be easily installed to any linear actuator when following installation rules are followed. In order to guarantee the best possible position measurement accuracy, NDX and position feedback magnet must be positioned according the following guidelines.

When installing the device to any other actuator model make sure that the following tolerances are followed with magnet mounting.

1. Magnet shall be centered within  $\pm 3$  mm tolerance as shown in the picture.
2. Magnet center shall never exceed the magnet center travel limits shown in the picture.

### NOTE

Use only Valmet original magnets.  
Bracket and fixing bolt material should have low magnetic permeability (e.g. AISI316 or aluminium).



### NOTE

Always ensure that the magnet center stays within magnet center travel limits on the complete operation range of the valve.

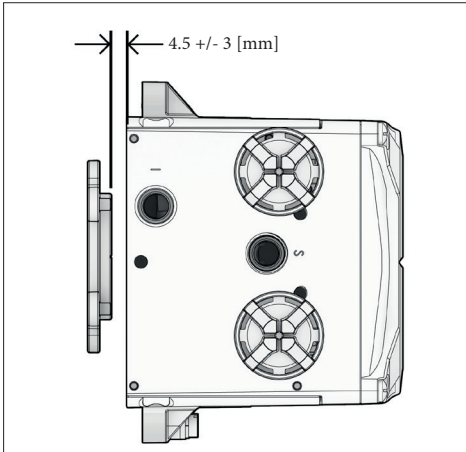
### NOTE

Shorter actuator stroke allows more freedom for alignment of the magnet and NDX in actuator stroke direction. Magnet position does not affect the measurement accuracy as long as the magnet center stays within the magnet center travel limits for whole travel range.



## LINEAR MOUNTING

- The distance between the magnet and the device bottom shall be 4.5 mm with  $\pm 3$  mm tolerance (1.5...7.5 mm).



- Check that following magnet alignment requirements are not exceeded.

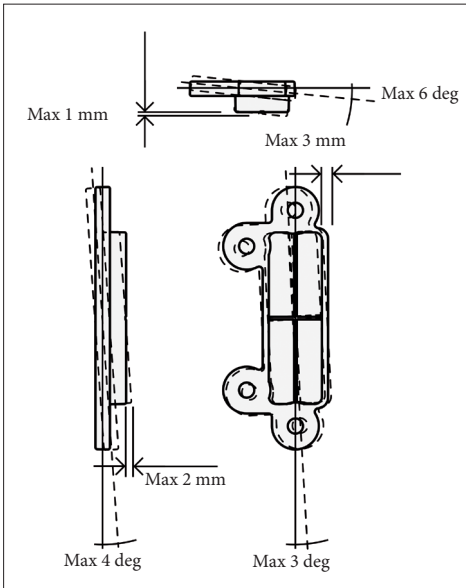
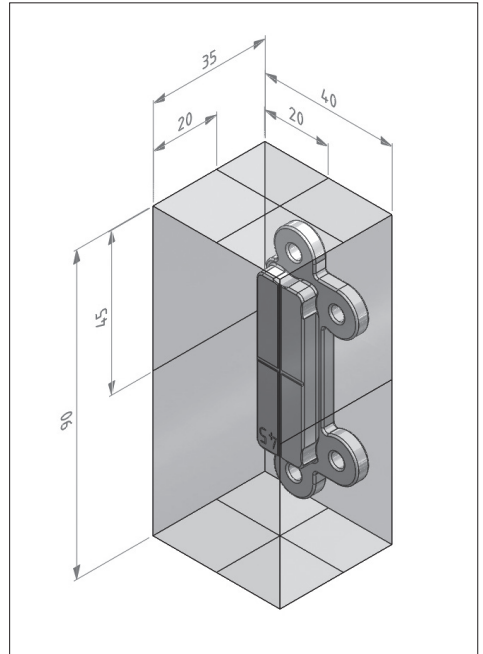


Figure below shows the exclusion zone. There is no material limitation outside the exclusion zone, but to guarantee the optimal performance do not use any magnetic material inside the zone. Inside the exclusion zone but close to the "walls" AISI 304 and any austenitic steel can be used.



# LINEAR MOUNTING

## INSTALLATION OF LONGSTROKE MAGNET

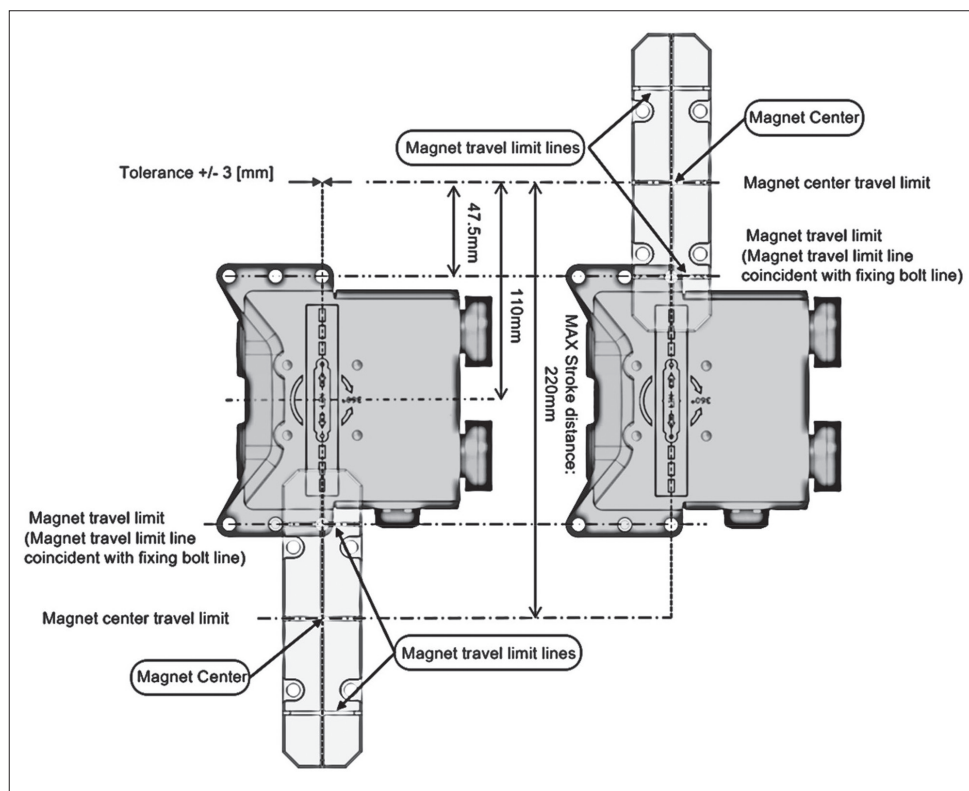
NDX with long stroke magnet can be installed to a linear actuator with a stroke distance between 120-220mm. Long stroke adaptation has a different position feedback magnet than standard stroke (5-120mm). NDX and the long stroke position feedback magnet must be positioned according to the following guidelines.

When installing the device to any other actuator model make sure that the following tolerances are followed with magnet mounting.

1. Magnet shall be centered within  $\pm 3$  mm tolerance as shown in the picture.
2. Magnet travel limit marks on magnet body shall never exceed the

### NOTE

Use only Valmet original magnets. Bracket and fixing bolt material should have low magnetic permeability (e.g. AISI316 or aluminium).



### NOTE

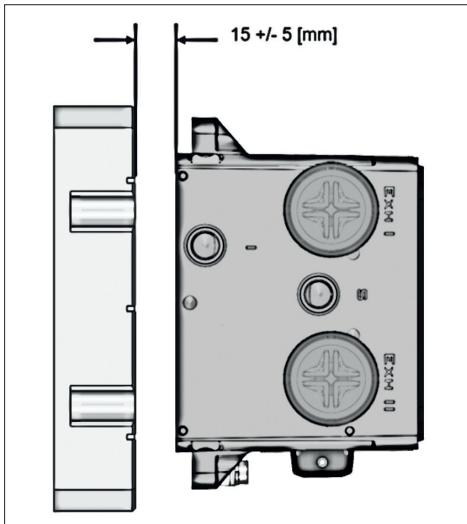
The magnet must be aligned with the actuator shaft.

### NOTE

Magnet body in the picture is faced upside down to give a better picture.

## LINEAR MOUNTING

- The distance between the magnet and the device bottom shall be  $15 \pm 5$  mm tolerance (10...20 mm).



- Check that following magnet alignment requirements are not exceeded.

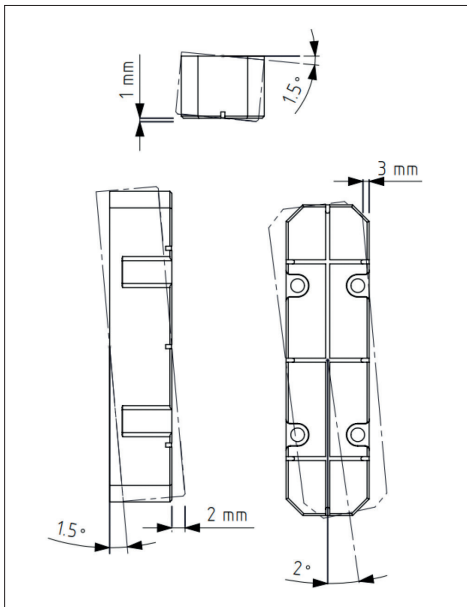
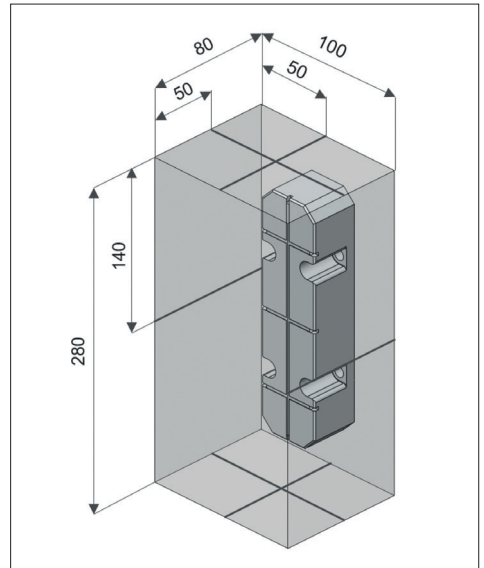


Figure shows the exclusion zone. There is no material limitation outside the exclusion zone, but to guarantee the optimal performance do not use any magnetic material inside the zone. Inside the exclusion zone but close to the "walls" AISI 304 and any austenitic steel can be used.



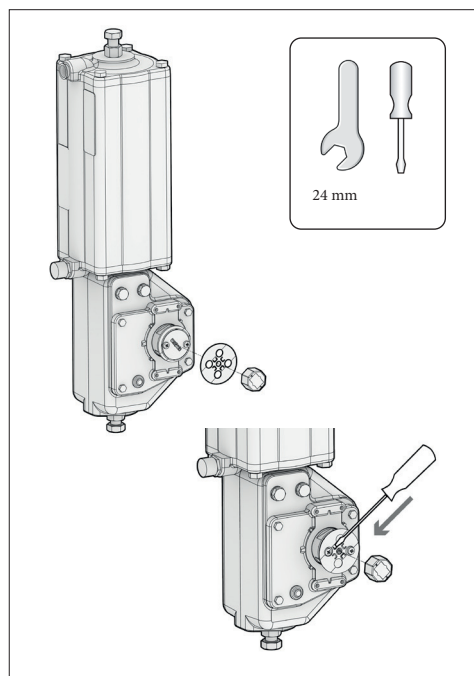
# ROTARY MOUNTING

Rotary mounting is designed according to VDI/VDE 3845 interface.

## INSTALLATION TO NELES B-SERIES ACTUATORS - MAGNET MOUNTING

- Mounting set includes mechanical position indicator. It can be used if there is no position indicator in the actuator.
- Place position indicator plate to the correct position so that it correspond to the valve position.
- Lock position indicator plate with screw driver so that it can't turn by bending locking tabs.
- Mount magnet to the actuator

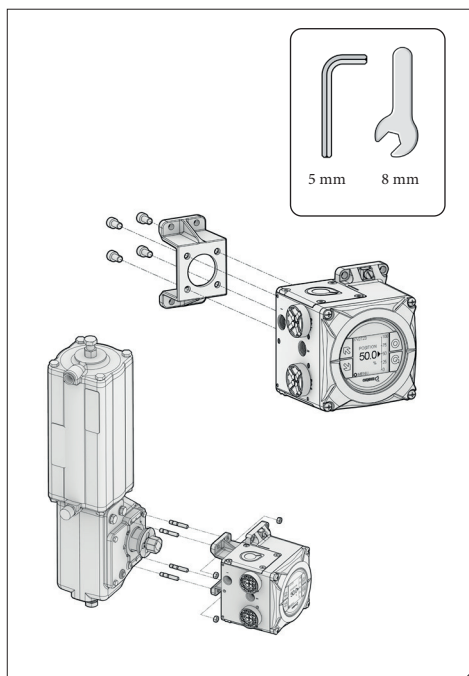
It is recommended to use thread locking to prevent magnet loosening under heavy vibration. Thread locking should be low or medium strength, e.g. Loctite 243. Magnet will be tightened as tight as 4 Nm, operation point of view magnet can be in any position so that there is no adjustment needed.



## INSTALLATION TO NELES B-SERIES ACTUATORS - BRACKET MOUNTING

For Neles B-series actuators there are few different mounting brackets, depends on actuator size. This example shows NDX mounting to Neles BJ6 actuator. For other sizes bracket types vary a little, but main steps are the same. When mounting NDX to the Neles actuators, there is no mechanical adjustment needed.

- Mount bracket to the NDX
- Mount bracket to the actuator



## INSTALLATION TO ANY ROTARY ACTUATOR

NDX can be easily installed to any rotary actuator when the following installation rules are followed. In order to guarantee the best possible position measurement accuracy, NDX and position feedback magnet must be positioned according to the following guidelines.

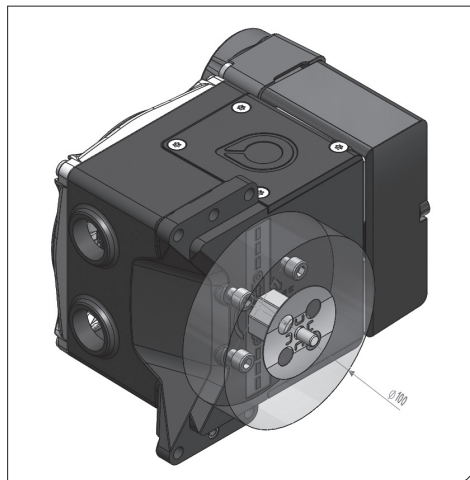
### NOTE

Use only Valmet original magnets. Bracket and fixing bolt material should have low magnetic permeability (e.g. AISI316 or aluminium).

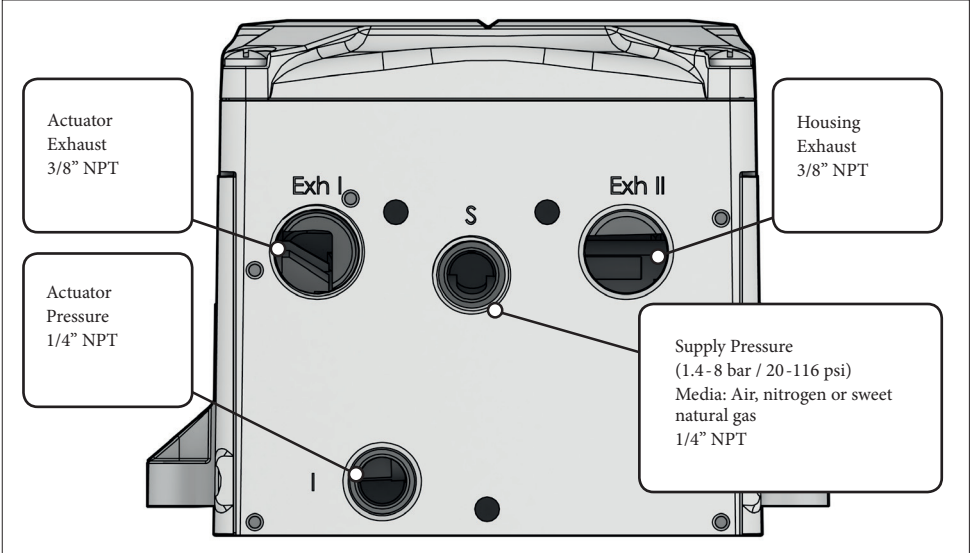
Aim for small mechanical clearance, but avoid contact. there shall be max 5 mm gap between the magnet and NDX. Tilt is not critical. Aim for zero eccentricity. Polarity of the magnet is irrelevant.

Figure at right shows the exclusion zone. There is no material limitation outside the exclusion zone, but to guarantee the optimal performance do not use any magnetic material inside the zone. Inside the exclusion zone but close to the "walls"

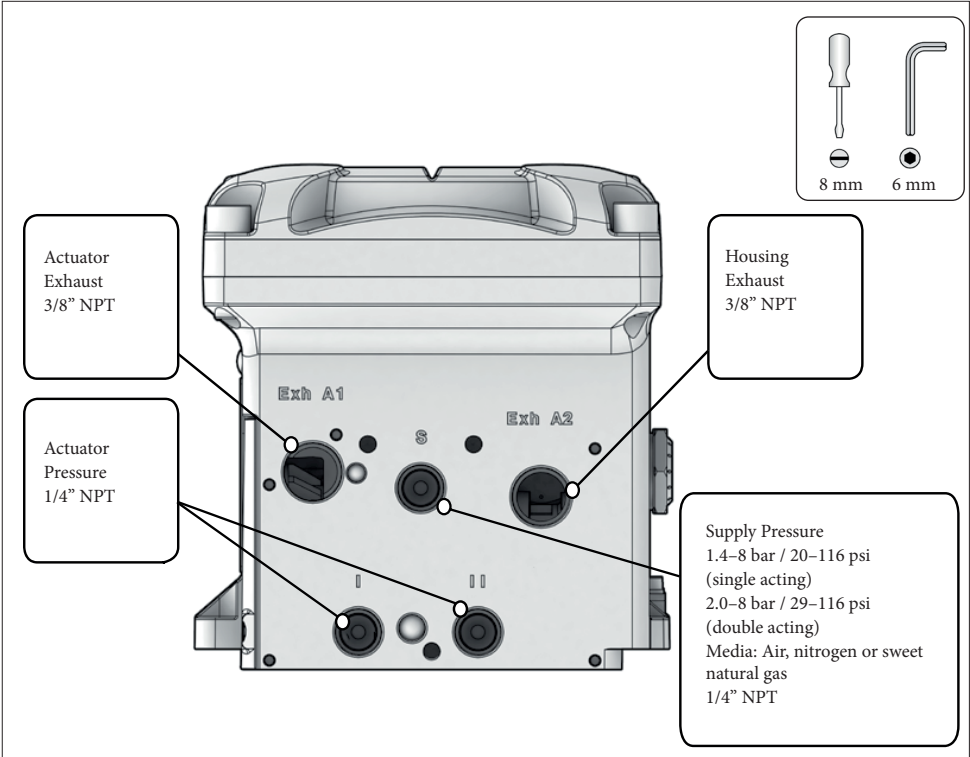
AISI 304 and any austenitic steel can be used.



# PNEUMATICS PIPING



NDX1510\_ piping



NDX\_511\_ and NDX\_512\_ piping

# PNEUMATICS PIPING

## NOTE

Remove all temporary transportation plugs with 8 mm flat-head screwdriver.

## NOTE

Placement and distances between exhaust and pressure channels are different than without the pressure gauge block. See Dimension drawings for details.

## NOTE

When NDX2\_ is used with single acting actuator, the pneumatic port II needs to be plugged. Install steel plug with 6 mm hexagon wrench.

## NOTE

Exhaust covers are different for Exh I and Exh II and shall not be mixed. Make sure that they are reinstalled to right exhaust port if removed.

## NOTE

When mounting the pneumatic connectors, the exhaust cover may need to be removed temporarily. Mount the exhaust cover back when the pneumatic connectors are mounted.  
Do not leave device without exhaust cover. Water and dirt may get into the device.

## NOTE

In double acting device only port I can be used with single acting actuator.

## NOTE

If electrical input signal is lost, the actuator port I is exhausted (0 pressure) and actuator port II goes to supply pressure.

## NOTE

When mounting the pneumatic connectors, the exhaust cover may need to be removed temporarily. Mount the exhaust cover back when the pneumatic connectors are mounted.  
Do not leave device without exhaust cover. Water and dirt may get into the device.

## NOTE

Exhaust covers are different for Exh I and Exh II and shall not be mixed. Make sure that they are reinstalled to right exhaust port if removed. See Installation, Maintenance and Operating instructions for details if needed.

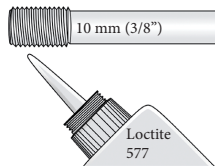
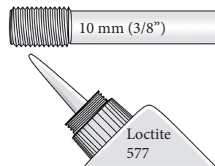
## NOTE

Check valve on supply pressure port (S) is used on double acting version of NDX (NDX2\_) only.  
Check valve on supply pressure port (S) is in use with double acting actuators only.

## SUGGESTED PIPING SIZE

Supply Pressure (S)  
All actuator types and sizes

Actuator Pressure (I and II)  
All actuator types and sizes



## NOTE

It is recommended to use 10 mm (3/8 inch) (inside diameter) supply air and actuator pressure piping.

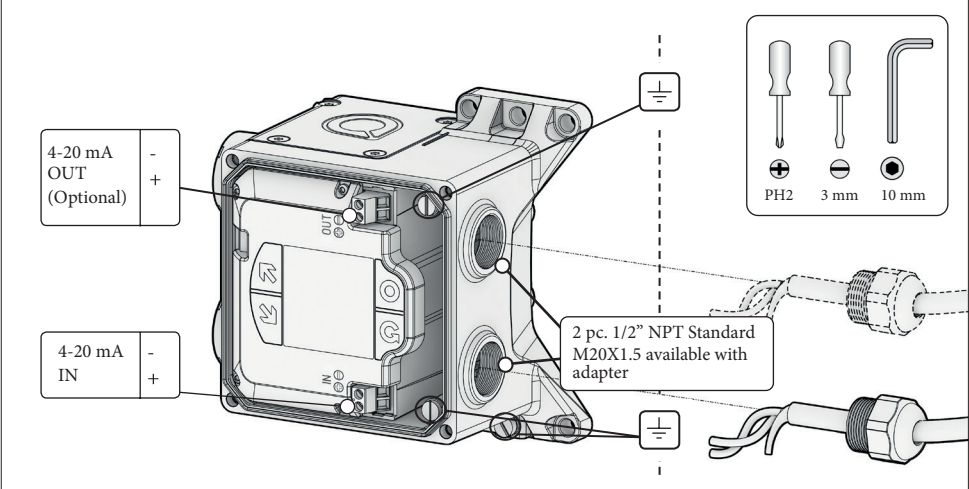
## CAUTION

If double acting version of NDX (NDX2\_) is installed on single acting actuator, the check valve must be removed.

## NOTE

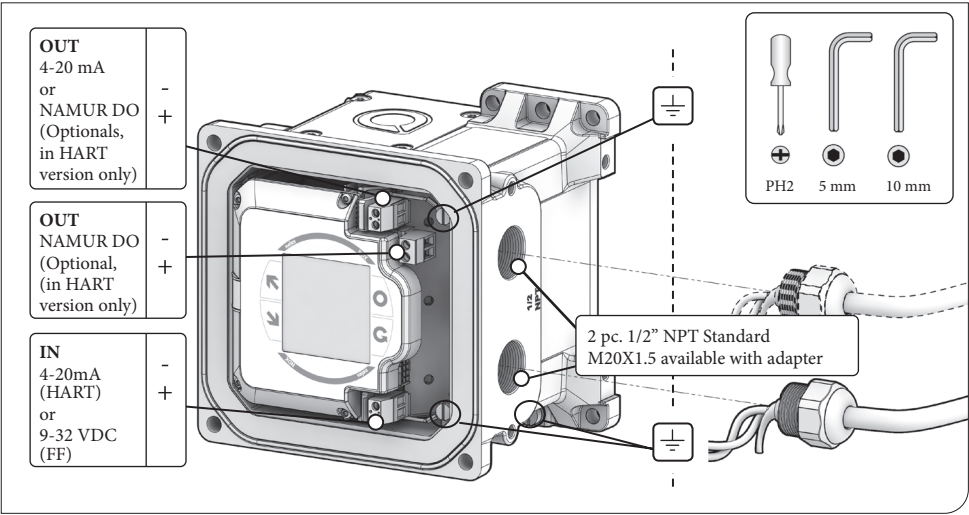
Liquid sealant such as Loctite 577 is recommended. Excess sealant may result in faulty operation. Sealing tape is not recommended. Ensure that the air piping is clean. When pneumatic connector is removed from the housing and reinstalled, make sure the old sealant is removed and threads are clean. Otherwise the dry old sealant might go to pneumatic components and affect the controllability or damage the device.

# ELECTRICAL INSTALLATION



Wiring of NDX1510\_

| Connector | Function             | Power Source           | Min. Power      | Impedance                 | Other                                 |
|-----------|----------------------|------------------------|-----------------|---------------------------|---------------------------------------|
| IN        | Setpoint / HART      | 4-20 mA Loop Power     | 3.8 mA, 9.7 VDC | 485 Ω at 20 mA            |                                       |
| OUT       | Position Transmitter | External 12 ... 30 VDC |                 | 780 Ω max, 690 Ω for I.S. | Fail safe output is 3.5 mA or 22,5 mA |

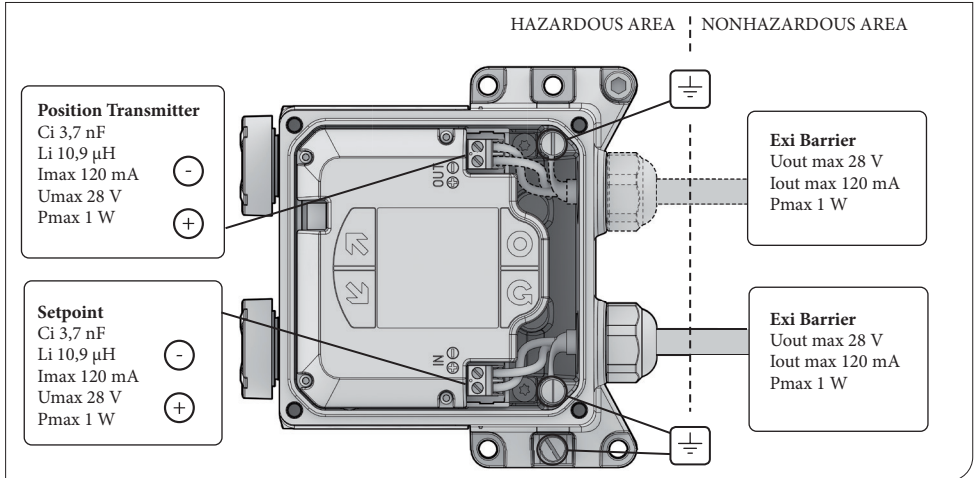


Wiring of NDX\_511\_ and NDX\_512\_

**NOTE**  
Remove temporary cable gland plugs with 10 mm hexagon wrench.



# ELECTRICAL INSTALLATION

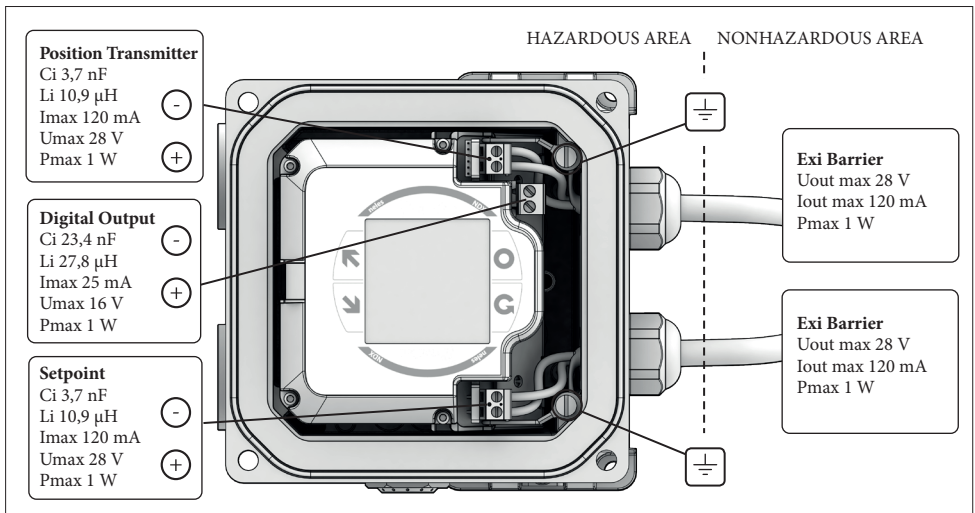


Input values for NDX150

- NOTE**  
 It is recommended that grounding of the input cable be carried out from one end only.
- NOTE**  
 If device is installed to Ex d area, it can't be installed to Ex i area anymore.

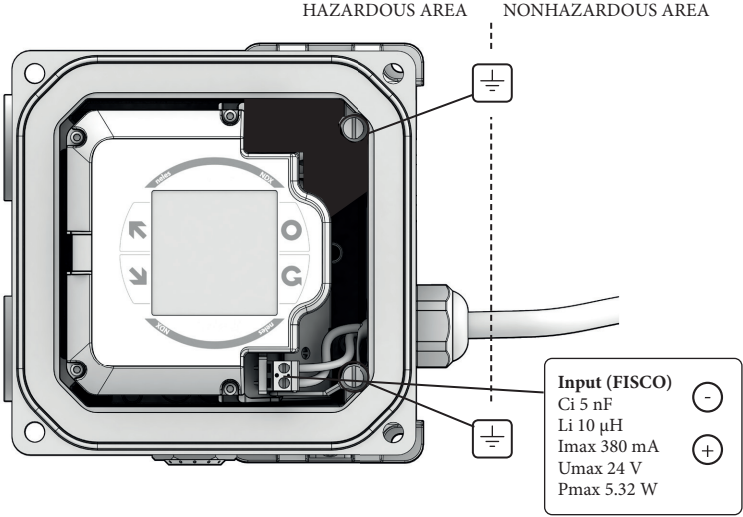
- NOTE**  
 Tightening torque for the wiring terminal screws shall be 0.4-0.6 Nm.

Recommended Wire Type: Shielded twisted pair with a max conductor size of 2.5 mm<sup>2</sup> / 14 AWG.



Input values for NDX\_511\_ and NDX\_512\_

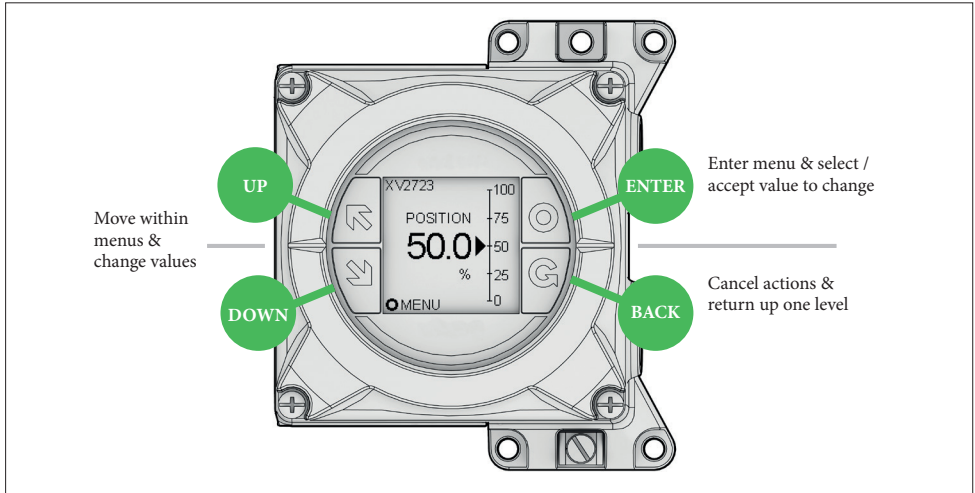
# ELECTRICAL INSTALLATION



Input values for NDX\_511\_F\_--

# LOCAL USER INTERFACE

The NDX Local User Interface (LUI) includes 4 capacitive touch buttons:



- ☐ **NOTE**  
Buttons can be used with the cover installed or removed.
- ☐ **NOTE**  
Device needs to be configured and calibrated before it is switched to automatic control mode. Follow the instructions on the LUI first screen and proceed to guided start-up.
- ☐ **NOTE (NDX1510\_)**  
When installing the cover make sure that the cover button symbols are at the same position as the symbols on the LUI module inside the device.

- ☐ **NOTE (NDX\_511\_ and NDX\_512\_)**  
When installing the cover check inside to define its correct position. The magnet in the cover shall be on the wiring terminal side.
- ☐ **NOTE (NDX\_511\_ and NDX\_512\_)**  
The LUI touch buttons area for sensing the touch of the finger may not be exactly on top of the button symbol but more on the screen area. This applies to the enclosure types NDX\_511\_ and NDX\_512\_ with thick aluminum cover.

## LUI - User access control

1. Cover lock (factory default)
2. PIN lock
3. Cover & PIN lock

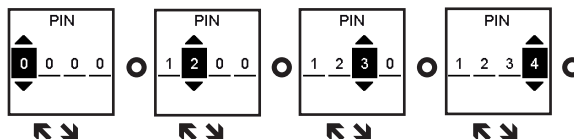
When Cover lock is enabled, detaching the main cover will unlock LUI for editing. When the cover is re-attached, LUI is again locked to read only mode.

When PIN lock is enabled, PIN code is required to unlock editing mode. PIN lock automatically re-locks after one minute of inactivity and at the same time LUI returns to monitoring view.

If both Cover and PIN lock are active, user must first detach the cover and after that enter the PIN code to enable the editing mode. One minute of inactivity enables PIN lock and re-attaching the cover locks the Cover lock.

As factory setting default, device has Cover lock active and PIN lock non-active. Default PIN code is 1234.

Different lock settings can be configured in DTM. See detailed instructions in full Installation, Maintenance and Operating instructions.



# GUIDED START-UP

Start

Start

RV2/23

POSITION

50.0

%

100

75

50

25

0

MENU

MENU

Guided Startup

Calibration

Parameters

Linearization

Manual Control

STARTUP

Screen rotation:

0°

90°

180°

270°

0°

STARTUP

Actuator type

Double acting

STARTUP

Valve type

Linear

Linear long

Rotary

STARTUP

Dead angle

0%

STARTUP

Positioner fail action:

Closed

Open

STARTUP

Instrumentation

None

None

Booster

QEV

Booster&QEV

CALIBRATION

SWITCH TO AUTOMATIC CONTROL MODE

Proceed

CALIBRATION

Drive valve to open position with arrow buttons.

Set open pos

CALIBRATION

Manual

1-Point

Automatic

1-point calibration  
If Valve type = Linear

CALIBRATION

Set stroke length

90 mm

CALIBRATION

Set approximate actuator volume

1.0 L

CALIBRATION

Set current valve position

100%

CALIBRATION

Set direction to close valve

↑

CALIBRATION

START CALIBRATION

CALIBRATION

CALIBRATION SUCCESSFUL

Proceed

CALIBRATION

SWITCH TO AUTOMATIC CONTROL MODE

Proceed

STARTUP

Automatic or manual calibration recommended when possible

Finish

Calibration

## NOTE

Set Positioner Fail Action according to actuator spring direction.  
When there is linear actuator without mechanical limit in open/closed end, it is recommended to use Manual calibration.

## NOTE

Changing parameter values that can cause valve to move requires a confirmation due to safety reasons.

## WARNING

Make sure that the valve movement does not endanger people or processes before running calibration!

## WARNING

Device needs to be in fail safe position when 1-point calibration is used.



# SAFETY PRECAUTIONS

## NOTE

Avoid grounding a welding machine in close proximity to a valve controller. Damage to the equipment may result.

## CAUTION

### Do not exceed the permitted values!

Exceeding the permitted values marked on the valve controller may cause damage to the controller and to equipment attached to the controller and could lead to uncontrolled pressure release in the worst case. Damage to the equipment and personal injury may result.

## CAUTION

### Do not remove or dismantle a pressurized controller!

Always shut off the supply air and release the pressure from the pipelines and equipment before removing or dismantling the controller. Otherwise personal injury and damage to equipment may result.

Do not rely on the pressure gauge readings alone to verify that the controller is not pressurized! Compare to local user interface reading or additional gauge.

The check valve installed with double acting actuators will keep the NDX and actuator pressurized even after the air supply is disconnected.

## WARNING

During automatic or manual calibration the valve operates between open and closed positions. Make sure that the operation does not endanger people or processes!

## WARNING

Do not operate the device with cover removed!  
- Environmental influence (water, dust etc.)

## WARNING

Do not operate under load.

## CAUTION

The pneumatic exhaust may cause high noise levels exceeding 85 dB. Use hearing protection when in proximity.

## Intrinsic Safety (Ex i) WARNING

Do not use oxygen as a driving medium!

## CAUTION

Rebooting and offline tests can be initiated remotely through the DTM, causing unexpected valve movement.

## Ex NOTE

Follow the standards EN/IEC 60079-14 when installing the equipment and EN/IEC 60079-25 when connecting Ex i interfaces.

## Ex Note

For ordinary locations and Class I Div 2 installations of NDX\_\_2 have to be supplied by a Class 2 or Limited Energy Source in accordance with CSA 61010-1-12/UL 61010-1.

## Ex NOTE (cCSAus)

When the temperature under rated conditions is higher than 60°C at the entry point or 60°C at the branching point of the conductors, information shall be marked on the equipment exterior to provide guidance to the user on the proper selection of cable and cable gland or conductors in conduit.

## Ex WARNING

### Electrostatic charge hazard!

The cover is non-conductive. Clean with a damp cloth only! Spark hazard!  
Protect the aluminum housing from impacts and friction!

## Ex WARNING

The exposed metal parts are not earthed and have a capacitance of up to 56pF with respect to an earthed conductor. If a charge-generating mechanism is present, an incandescent level of charge could migrate to these metal parts and subsequently discharge to earthed metal. Precautions are required to ensure that a charge-generating mechanism is unlikely to be present and/or discharge to earthed metal is improbable.

## Ex WARNING

For use in the presence of combustible dust.

- Ignition protection relies on the enclosure. Protect the cover of the valve controller from impacts.
- When temperature is higher than 70 °C / 158 °F the temperature rating of the cable shall be higher than the ambient temperature.
- Device shall not be subjected to a prolific charge generating mechanism.
- Accumulation of dust shall be avoided!

# SAFETY PRECAUTIONS

## Intrinsic Safety (Ex i) WARNING

- Ensure that the complete installation and wiring is intrinsically safe before operating the device!
- The equipment must be connected via a certified isolator or barrier placed outside the hazardous area.
- Temperature rating of selected connection cable shall be greater than 83 °C.

## WARNING

Electrostatic hazard: clean only with damp cloth.

## Intrinsic Safety (Ex i) WARNING

A device previously installed in any other protection mode than intrinsically safe (Ex i) shall never be re-installed as Ex i.

## Ex n WARNING

At an ambient temperature  $\geq +70\text{ °C}$  /  $158\text{ °F}$ , the temperature rating of selected connection cable shall be in accordance with the maximum ambient temperature range. Selected cable gland shall not invalidate the type of protection.

## Ex d WARNING

At an ambient temperature  $\geq +60\text{ °C}$ , the temperature rating of the connection cable shall be in accordance with maximum ambient temperature range.

## WARNING

Do not open when an explosive atmosphere is present.

## Ex d WARNING (NDX Ex d version)

**Do not open the device when energized!**  
Explosion protection is lost.

## Ex d WARNING (NDX Ex d version)

**After de-energizing, delay one minute before opening!**

## WARNING

To reduce the risk of ignition of hazardous atmospheres, do not remove cover while circuits are live.

## Ex d WARNING (NDX Ex d version)

Tightening torque for the housing cover screws is 15Nm.

## Ex d WARNING (NDX Ex d version)

Use a cable gland and blind plug with suitable Ex d certification.

For ambient temperature over  $70\text{ °C}$  /  $158\text{ °F}$  use a heat resistant cable and cable gland suitable for at least  $92\text{ °C}$  /  $196\text{ °F}$ .

## Ex d WARNING (NDX Ex d version)

Ex d certified cable glands needs to be used.  
Maximum of two cable glands installed into NDX 1/2"NPT ports are allowed.

## Ex d WARNINGÜ

onduit seal must be installed within 50 mm of the enclosure.

## WARNING

Do not separate when energized.

## WARNING

Separate only in a NON-HAZARDOUS AREA.

## WARNING

Use only thread adapters with suitable certification.

## NOTE

Minimum requirements in IEC 60079-1 for flameproof entry devices assume a maximum reference pressure of 2 000 kPa for Group II and 1 333 kPa for Group I. Other devices are available with ratings greater than these minimum requirements.

## WARNING

Potential electrostatic charging hazard - see instructions.

## WARNING

Live parts behind cover - do not contact.

## Ex d WARNING (cCSAus)

Use conductors rated at least  $12\text{ °C}$  above the maximum ambient temperature.

## Ex d WARNING (NDX Ex d version)

Cover and housing and their flange surfaces are Ex d critical parts. Extra caution needs to be taken when handling them. Always keep the flange surfaces clean on both cover and housing. If there are scratches in flange surfaces or if the cover is dropped, the cover and/or device needs to be changed.

## Ex d WARNING

Do not use a combustible gas (such as natural gas) as a driving medium.

## Conditions of Acceptability (applies to cCSAus approvals): Hazloc

- The maximum allowed ambient temperature ranges for level of protection "ia" and "ib" according to different T Classes are:  
 $-40^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$  for temperature class T6(IIC) or  $T_{200} 85^{\circ}\text{C}$  for dust (IIIC)  
 $-40^{\circ}\text{C} \leq T_a \leq +65^{\circ}\text{C}$  for temperature class T5(IIC) or  $T_{200} 100^{\circ}\text{C}$  for dust (IIIC)  
 $-40^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C}$  for temperature class T4(IIC) or  $T_{200} 115^{\circ}\text{C}$  for dust (IIIC)
- The maximum allowed ambient temperature ranges for level of protection "ic" according to different T Classes are:  
 $-40^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$  for temperature class T6(IIC) or  $T_{200} 85^{\circ}\text{C}$  for dust (IIIC)  
 $-40^{\circ}\text{C} \leq T_a \leq +65^{\circ}\text{C}$  for temperature class T5(IIC) or  $T_{200} 100^{\circ}\text{C}$  for dust (IIIC)  
 $-40^{\circ}\text{C} \leq T_a \leq +85^{\circ}\text{C}$  for temperature class T4(IIC) or  $T_{200} 115^{\circ}\text{C}$  for dust (IIIC)
- The maximum allowed ambient temperature ranges for level of protection "ec" according to different T Classes are:  
 $-40^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$  for temperature class T6(IIC) or  $T_{200} 85^{\circ}\text{C}$  for dust (IIIC)  
 $-40^{\circ}\text{C} \leq T_a \leq +65^{\circ}\text{C}$  for temperature class T5(IIC) or  $T_{200} 100^{\circ}\text{C}$  for dust (IIIC)  
 $-40^{\circ}\text{C} \leq T_a \leq +85^{\circ}\text{C}$  for temperature class T4(IIC) or  $T_{200} 115^{\circ}\text{C}$  for dust (IIIC)
- For level of protection "ec" provision shall be made to provide the transient protection at a level not exceeding 40% of the rated supply voltage.
- The permissible ambient temperature range depends on the used configuration. The ambient temperature range is marked on the identification plate.
- At an ambient temperature  $\geq +60^{\circ}\text{C}$ , 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 Da equipment.
- The valve controller shall be connected according to the manufacturer's instructions.
- The impact test of NDX\_\_0 enclosure was made according to low risk of mechanical danger. The device shall be protected from high level impacts.
- The plastic covers in the NDX\_\_0/1 enclosures shall be wiped with damp cloth only due to risk of electrostatic charging.

- Selected cable glands shall conform to the requirements of CAN/CA C22.2 No. 60079-0 and UL 60079-0.

## Ordloc

- The equipment shall be supplied by a Limited Power Source or Class 2 output in accordance with CEC Part 1, Rule 16-200 and NFPA 70, Article 725.121.
- The equipment has only been tested for safety. No evaluation of functional safety and performance characteristics has been conducted.
- Equipment is only to be installed by trained and qualified personnel.
- If at any time there is a conflict between the system safety provisions and any relevant local (national or regional) requirements, the local requirements always take precedence.
- Equipment is not to be used with flammable liquids.
- The equipment is provided with cable gland entries with or without an adapter. Blanking plugs, cable glands, conduit hubs or fittings, shall be appropriately approved under Type 4X and IP66, when used with the equipment.

# SAFETY PRECAUTIONS

## TRANSPORTATION AND STORAGE

The valve controller is a sophisticated instrument and it shall be handled with care. Products must be stored in a clean, dry environment.

Device is delivered in IP67 packaging for storage and transportation.

- Check the controller for any damage that may have occurred during transportation.
- Store the uninstalled controller preferably indoors, keep it away from rain and dust.
- Do not unpack the device until installing it.
- Do not drop or knock the controller.
- Keep the flow ports and cable glands plugged until installing.
- For complete instructions manual see website: [www.valmet.com/ndx](http://www.valmet.com/ndx)

## RECYCLING AND DISPOSAL

Most valve controller parts can be recycled if sorted according to material. Most parts have material marking. A material list is supplied with the valve controller. In addition, separate recycling and disposal instructions are available from the manufacturer. A valve controller may also be returned to manufacturer.



# EU DECLARATION OF CONFORMITY

Manufacturer:  
Valmet Flow Control Oy (\* Neles Finland Oy)  
Vanha Porvoontie 229  
FI-01380 Vantaa  
Finland

Product: **NELES™ NDX™ INTELLIGENT VALVE CONTROLLER**

Approvals:

| Type                                        | Approval                                                                                                                                                                                                                                                                                     | EC Type examination Certificate                                                                                                    |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| NDX HART,<br>enclosure options<br>0, 1 or 2 | II 1 G Ex ia IIC T <sub>6</sub> ...T <sub>4</sub> Ga<br>II 1 D Ex ia IIIC T <sub>200</sub> 85 °C...T <sub>200</sub> 115 °C Da<br>IP66<br>or<br>II 2 G Ex ib IIC T <sub>6</sub> ...T <sub>4</sub> Gb<br>II 2 D Ex ib IIIC T <sub>200</sub> 85 °C...T <sub>200</sub> 115 °C<br>IP66            | EESF 21 ATEX 018X<br>EN IEC 60079-0:2018/A11:2024<br>EN 60079-11:2012<br>IEC 60079-11:2023 Edition 7.0                             |
|                                             | II 3 G Ex ic IIC T <sub>6</sub> ...T <sub>4</sub> Gc<br>II 3 G Ex ec IIC T <sub>6</sub> ...T <sub>4</sub> Gc<br>II 3 D Ex ic IIIC T <sub>85</sub> °C...T <sub>115</sub> °C Dc<br>IP66                                                                                                        | EESF 21 ATEX 019X<br>EN IEC 60079-0:2018/A11:2024<br>EN 60079-11:2012<br>IEC 60079-11:2023 Edition 7.0<br>EN 60079-7:2015/A11:2024 |
| NDX FF,<br>enclosure option 1               | II 1 G Ex ia IIC T <sub>6</sub> ...T <sub>4</sub> Ga<br>II 1 D Ex ia IIIC T <sub>200</sub> 85 °C...T <sub>200</sub> 115 °C Da<br>II 2 G Ex ib IIC T <sub>6</sub> ...T <sub>4</sub> Gb<br>II 2 D Ex ib IIIC T <sub>200</sub> 85 °C...T <sub>200</sub> 115 °C Db<br>FISCO field device<br>IP66 | EESF 24 ATEX 031X<br>EN IEC 60079-0:2018<br>EN 60079-11:2012 / IEC<br>60079-11:2023                                                |
|                                             | II 3 G Ex ic IIC T <sub>6</sub> ...T <sub>4</sub> Gc<br>II 3 D Ex ic IIIC T <sub>85</sub> °C...T <sub>115</sub> °C Dc<br>FISCO field device<br>II 3 G Ex ec IIC T <sub>6</sub> ...T <sub>4</sub> Gc<br>IP66                                                                                  | EESF 24 ATEX 034X<br>EN IEC 60079-0:2018<br>EN 60079-11:2012 / IEC<br>60079-11:2023<br>IEC 60079-7:2015/<br>A1:2018                |
| NDX HART,<br>enclosure option<br>2 *        | II 2 GD<br>Ex db IIC T* Gb<br>Ex tb IIIC T <sub>85</sub> ...T <sub>113</sub> °C Db<br>T <sub>4</sub> : -40 °C to +85 °C<br>T <sub>5</sub> : -40 °C to +72 °C<br>T <sub>6</sub> : -40 °C to +57 °C<br>IP66                                                                                    | Sira 17ATEX1283X<br>EN 60079-0: 2012 (+A11:2013), EN 60079-1: 2014, EN 60079-31:2014                                               |

As the products within our sole responsibility of design and manufacture may be used as parts or components in machinery and are not alone performing functions as described in Article 6(2) in the Machinery Directive (2006/42/EC), we declare that our product(s) to which this Declaration of Conformity relates must NOT be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

The product above is manufactured in compliance with the applicable European directives and technical specifications/standards. Protection from e.g. static electricity caused by the process or connected equipment must be considered by the user (EN 60079-14 §6).

The product do not possess any residual risk according to hazard analyses made under the applicable directives providing that the procedures stated by the Installation, Operation and Maintenance manual are followed and the product is used under conditions mentioned in the technical specifications.

## Applicable directives:

EMC 2014/30/EU  
ATEX 2014/34/EU

Electrical  
Approved and Ex marked types

## ATEX Notified Bodies for EC Type Examination Certificate:

SIRA (Notified body number 0518)  
SIRA Certification Service  
CSA Group  
Unit 6, Hawarden Industrial Park  
Hawarden, Deeside, CH5 3US  
United Kingdom

EESF (Notified body number 0537)  
Eurofins Electric & Electronics Finland Oy  
Kivimiehentie 4  
FI-02150 Espoo  
Finland

## ATEX Notified Body for Quality Assurance:

ISO 9001:2015  
ATEX 2014/34/EU

Certificate No: LRQA ISO 9001 - 00040885  
Certificate No: Presafe 18 ATEX 91983Q

DNV GL Presafe AS (Notified body number 2460)  
Veritasveien 3  
1363 Høvik  
Norway

Vantaa, 11th December 2024

Janne Jussila, Quality Manager  
Authorized person of the manufacturer within the European Community





**Valmet Flow Control Oy**

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[www.valmet.com/flowcontrol](http://www.valmet.com/flowcontrol)

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