NELES® ND9000 INTELLIGENT VALVE CONTROLLER

Metso’s Neles ND9000 is a top class intelligent valve controller designed to operate on all control valve actuators and in all industry areas. It guarantees end product quality in all operating conditions with unique diagnostics and incomparable performance features. ND9000 is a reliable and future-proof investment with life-time support.

**KEY FEATURES**
- Benchmark control performance on rotary and linear valves
- Reliable and robust design
- Easy commissioning and operation
- Safety; IEC 61508 compliant up to and including SIL 2 by TÜV
- Language selection: English, German and French
- Local / remote operation
- Expandable architecture
- Advanced device diagnostics including
  - Self-diagnostics
  - Online diagnostics
  - Performance diagnostics
  - Communication diagnostics
  - Extended off-line tests
  - Performance view
  - Online Valve Signature

**Options**
- Interchangeable communication options:
  - HART 6 or 7 (H)
  - FOUNDATION fieldbus
  - Profibus PA
- Limit switches
- Position transmitter (in HART only)
- Full stainless steel enclosure
- Exhaust adapter
- Remote mounting
- Arctic version (up to -53 °C / -64 °F)

**Total cost of ownership**
- Low energy and air consumption
- Future proof design allows further options at a reduced cost
- Optimized spares program minimizes spare part inventory
- Retro-fit to existing installations (Neles or 3rd party valves)

**Minimized process variability**
- Linearisation of the valve flow characteristics
- Excellent dynamic and static control performance
- Fast response to control signal change
- Accurate internal measurements

**Easy installation and configuration**
- Same device can be used for linear and rotary valves, double and single-acting actuators
- Simple fast calibration and configuration
  - using Local User Interface (LUI)
  - using DTM / EDD in a remote location
  - using Distributed Control System (DCS) asset management tools
- Extensive selection of mounting kits for 3rd party actuators
- Low power consumption enables installation to all common control systems

**Open solution**
- Metso is committed to delivering products that freely interface with software and hardware from a variety of manufacturers; ND9000 is no exception. This open architecture allows the ND9000 to be integrated with other field devices to give an unprecedented level of controllability.
- FDT and EDD based multi-vendor support configuration
- Support files for ND9000 are available from our internet pages, at www.metso.com/valves - choose the link: download center
Neles ND9000 in fieldbus networks

- Approved interoperability
- Host interoperability ensured
- FOUNDATION fieldbus ITK version 6.1.2 certified
- Profibus PA profile version 3.0 PNO certified
- Easy to upgrade; by replacing the HART communication board with a fieldbus communication board
- Excellent maintainability with firmware download feature
- Advanced communication diagnostics
- Digital communication via the fieldbus includes not only the set point, but also the position feedback signal from the position sensor. No special supplementary modules for analog or digital position feedback are needed when using the fieldbus valve controller.
- Back up LAS functionality available in FOUNDATION fieldbus environment
- Input selector and output splitter blocks available in FOUNDATION fieldbus devices allowing advanced distributed control
- Standard function blocks enables the freedom to use the ND9000 intelligent valve controller in either continuous or on-off control applications
- Open and close information is directly available via the fieldbus
- Open and close detection is based on either position measurement (soft limit switch) or mechanical limit switch information

**TECHNICAL DESCRIPTION**

The ND9000 is a 4–20 mA or fieldbus powered microcontroller-based intelligent valve controller. The device contains a Local User Interface (LUI) enabling local configuration. A PC with FDT/DTM software can be connected to the ND9000 itself or to the control loop.

The powerful 32-bit microcontroller controls the valve position. The measurements include:
- Input signal
- Valve position with contactless sensor
- Actuator pressures, 2 independent measurements
- Supply pressure
- Spool valve position
- Device temperature

Advanced self-diagnostics guarantees that all measurements operate correctly. After connections of electric signal and pneumatic supply, the micro controller (μC) reads the input signal, position sensor (α), pressure sensors (Ps, P1, P2) and spool position sensor (SPS). A difference between input signal and position sensor (α) measurement is detected by control algorithm inside the μC. The μC calculates a new value for prestage (PR) coil current based on the information from the input signal and from the sensors. The changed current to the PR changes the pilot pressure to the spool valve. Reduced pilot pressure moves the spool and the actuator pressures change accordingly. The spool opens the flow to the driving side of the double diaphragm actuator and opens the flow out from the other side of the actuator. The increasing pressure will move the diaphragm piston. The actuator and feedback shaft rotate. The position sensor (α) measures the rotation for the μC. The μC using control algorithm modulates the PR-current from the steady state value until the new position of the actuator, according to the input signal, is reached.

**ND9000 mounting on actuators and valves**

- Mounted on single and double acting actuators
- Both rotary and linear valves
- Ability to attach options to electronics and mechanics later
- 1-point calibration feature enables mounting without disturbing the process

**Product reliability**

- Designed to operate in harsh environmental conditions
- Rugged modular design
- Excellent temperature characteristics
- Vibration and impact tolerant
- IP66 enclosure
- Stainless steel enclosure (ND9300 and ND9400)
- Protected against humidity
- Maintenance free operation
- Resistant to dirty air
- Wear resistant and sealed components
- Contactless position measurement

**Predictive maintenance**

- Easy access to collected data with Metso DTM
- Unique Online Valve Signature to detect valve friction even more accurately.
- Performance view with report, which gives guidelines for recommended actions.
- Logical trend and histogram collection
- Information collected during process uptime
- Extensive set of off-line tests with accurate key figure calculations
- Fast notifications with on-line alarms
- Condition monitoring tool available
- Real time monitoring of valve control parameters
**GENERAL**
Loop powered, no external power supply required.
Suitable for rotary and linear valves.
Actuator connections in accordance with VDI/VDE 3845 and IEC 60534-6 standards.
Flush mounting on selected actuators.

**Actuator connections:**
- Linear: 10–120 mm / 0.4-4.7 in
- Rotary: 45–95 degrees

**Measurement range:**
- Linear: 110° with freely rotating feedback shaft.

**Environmental influence**
- **Standard temperature range:** -40 °C to +85 °C / -40 °F to +185 °F
- **Arctic temperature range:** -53 °C to +85 °C / -64° to +185 °F
- **Influence of temperature on valve position:** 0.5 % /10 °K
- **Influence of vibration on valve position:** < 1 % under 2g 5–150 Hz, 1g 150–300 Hz, 0.5g 300–2000 Hz

**Enclosure**
- **Material:**
  - ND9100: Anodized aluminum alloy and polymer composite
  - ND9200: Anodised aluminum alloy and tempered glass
  - ND9400: Stainless steel and polymer composite
  - ND9300: Stainless steel
- **Protection class:** IP66, Nema 4x
- **Pneumatic ports:** G 1/4 (ND9100), 1/4 NPT (ND9200, ND9300 & ND9400)
- **Cable gland thread:** M20x1.5 (ND9000), 1/2 NPT (ND9000E2, ND9000U)
- **Weight:** 1.8 kg / 2.0 lbs (ND9100), 3.4 kg / 7.5 lbs (ND9200), 5.6 kg / 12.4 lbs (ND9400), 8.6 kg / 19.0 lbs (ND9300)

**Pneumatics**
- **Supply pressure:** 1.4–8 bar / 20–115 psi
- **Effect of supply pressure on valve position:** < 0.1 % at 10 % difference in inlet pressure
- **Air quality:** Acc. to ISO 8573-1
- **Humidity:** Class 1 (dew point 10 °C / 18 °F below minimum temperature is recommended)
- **Oil class:** 3 (or < 1 ppm)

**Electronics**
- **HART**
  - **Supply power:** Loop powered, 4–20 mA
  - **Minimum signal:** 3.6 mA
  - **Current max:** 120 mA
  - **Load voltage:** up to 9.7 VDC/20 mA (corresponding 485 Ω)
  - **Voltage:** max. 30 VDC
  - **Polarity protection:** actve over 35 mA
- **Profibus PA and FOUNDATION fieldbus**
  - **Supply power:** voltage 9–32 VDC, reverse polarity protection
  - **Max basic current:** 17.2 mA
  - **Quiescent Current Draw:** 16 mA
  - **Fault current (FDE):** 3.9 mA

**FOUNDATION fieldbus function block execution times**
- **AO:** 20 ms
- **AI:** 20 ms
- **PID:** 20 ms
- **DO:** 20 ms
- **DI:** 15 ms
- **IS:** 15 ms
- **OS:** 15 ms

**Performance with moderate constant-load actuators**
- **Dead band:** ≤ 0.1 %
- **Hysteresis:** < 0.5 %

**Local User Interface (LUI) functions**
- Local control of the valve
- Monitoring of valve position, target position, input signal, temperature, supply and actuator pressure difference
- Guided-startup function
- LUI may be locked remotely to prevent unauthorised access
- Calibration: Automatic / Manual linearization
- 1-point calibration
- Control configuration: aggressive, fast, optimum, stable, maximum stability
- HART version configuration: HART 6 or HART 7
- Configuration of the control valve
  - Rotation: valve rotation clockwise or counter-clockwise to close
  - Dead Angle
  - Low cut-off, cut-off safety range (default 2 %)
  - Positioner fail action, open/close
  - Signal direction: Direct/reverse acting
  - Actuator type, double/single acting
  - Valve type, rotary/linear
  - Language selection: English, German and French

**Position transmitter (optional)**
- **Output signal:** 4–20 mA (galvanic isolation; 600 VDC)
- **Supply voltage:** 12–30 VDC
- **Resolution:** 16 bit / 0.244 μA
- **Linearity:** < 0.05 % FS
- **Temperature effect:** < 0.35 % FS
- **External load:** max 0–780 Ω
- **Ex ia IIC T6:** Ui ≤ 28 V
- **Ex d IIC T5/T6:** Ui ≤ 30 V
# APPROVALS AND ELECTRICAL VALUES, HART

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<th>Electrical values</th>
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### Electrical Values

- **Input:**
  - U ≤ 28 V
  - P ≤ 152 mA
  - I ≤ 120 mA
  - C ≤ 22 nF
  - L ≤ 53 μH

- **Output:**
  - U ≤ 28 V
  - P ≤ 152 mA
  - I ≤ 120 mA
  - C ≤ 22 nF
  - L ≤ 53 μH

- **Output (device limits itself):**
  - Pmax = device limits itself
### Approvals and Electrical Values, Foundation fieldbus and Proﬁbus PA

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- Comply with the requirements for FISCO field device
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Electromagnetic Protection
Electromagnetic compatibility acc. to
Immunity: EN 61000-6-2 (2005)

Safety
IEC 61508 compliant up to and
including SIL 2 by TUV

CE marking
EMC 2014/30/EU
ATEX 94/9/EC (until 19 April 2016)
ATEX 2014/34/EU (from 20 April 2016)

PROXIMITY SENSORS AND LIMIT SWITCHES
(OPTIONAL WITH EXTENSION MODULE FOR ND9100, ND9200 & ND9300)

- Code D33 SST Sensor Dual Module
- Code D44 Namur Sensor Dual Module
- Code I02 P+F NJ2-12GK-5N, 2 sensors
- Code I09 P+F; NCB2-12GM35-N0
- Code I32 Omron E2E-X2Y1, micro switch, 2 sensors
- Code I41 P+F, NJ4-12GK-5N, 2 sensors
- Code I45 P+F NJ3-13GK-51N, 2 sensors
- Code I56 IFC 2002-ARKG/UR, 2 sensors
- Code K05 Omron D2VW-5, micro switch, 2 sensors
- Code K06 Omron D2VW-01 gold plated, micro switch
- Code B06 Omron D2VW-01 gold plated, micro switch, 2 sensors.
  (Bus powered, no external power and cabling needed).

Figure 1. The Performance View of the Metso Valve Manager graphically displays indexes of the valve, actuator and positioner, as well as indexes of control performance and the application environment. Report will show explanations of the status of each component and guidelines for recommended actions.

Figure 2. Valve Online Signature feature shows friction of the control valve online, under normal process conditions when ever the valve is changing position.
DIMENSIONS

ND9100 and ND9400
ND9100/I, ND9100/K and ND9100/B

ND9200
ND9200/I, ND9200/K and ND9200/B

The feedback lever according to actuator
The feedback lever according to actuator (35.4) F05-ø50 M6x10 (4 pcs.) M8x15 (3 pcs.) 1/4 NPT

ND9300

ND9300/I, ND9300/K and ND9300/B

ND9300

Option J

ND9300_E1, E5, E7: M20x1.5
ND9300_E2: M20x1.5/1/2 NPT (CONDUIT ENTRY NIPPLE)

Min. 60

ND9300/I, ND9300/K and ND9300/B

VDI/VDE 3845

Linear actuator
### HOW TO ORDER

#### INTELLIGENT VALVE CONTROLLER ND9000 / LIMIT SWITCH (ND9000/D__, ND9000/I__, ND9000/K0_ or ND9000/B06)

<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND</td>
<td>9</td>
<td>2</td>
<td>03</td>
<td>H</td>
<td>E1</td>
<td>T</td>
<td>/</td>
<td>K05</td>
</tr>
</tbody>
</table>

#### 1. PRODUCT GROUP
- ND: Intelligent Valve Controller.

#### 2. SERIES CODE
- 9: Series 9000 valve controller with universal shaft and attachment face according to standard VDI/VDE 3845. Relevant shaft adapter included in mounting kits. When valve controllers are separate deliveries, shaft adapter kit is supplied.

#### 3. ENCLOSURE
- 1: Standard IP66 / NEMA 4X enclosure.
- 2: Flameproof (Ex d) IP66 / NEMA 4X enclosure.
- 3: Stainless steel flameproof (Ex d) IP66 / NEMA 4X enclosure.
- 4: Stainless steel IP66 / NEMA 4X enclosure, polymer composite cover.

#### 4. SPOOL VALVE

<table>
<thead>
<tr>
<th>PRODUCT GROUP</th>
<th>SERIES CODE</th>
<th>ENCLOSURE</th>
<th>SPOOL VALVE</th>
<th>PNEUMATIC CONNECTIONS (S, C1, C2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N7</td>
<td>No approvals for hazardous areas. Like N, but this is with Russian language machine plate.</td>
<td>G 1/4 (ND9100), 1/4 NPT (ND9200/ND9300/ND9400).</td>
<td>G 1/4 (ND9100), 1/4 NPT (ND9200/ND9300/ND9400).</td>
<td>G 1/4 (ND9100).</td>
</tr>
</tbody>
</table>

#### 5. COMMUNICATION / INPUT SIGNAL RANGE
- H: 4–20 mA, HART (6 and 7) communication.
- F: FOUNDATION fieldbus, physical layer according to IEC 61158-2.
- P: Profibus PA, physical layer according to IEC 61158-2.

#### 6. APPROVALS FOR HAZARDOUS AREAS

- **ATEX and IECEx certifications:**
  - II 3 G Ex ic IIC T6...T4 Gc: II 3 D Ex tc IIIC T90 °C Dc
  - II 1 G Ex ia IIC T4/T5/T6 Ga: II 1 D Ex ta IIC T4...T6 Da
  - II 2 G Ex ib IIC T6...T4 Gb: II 2 D Ex tb IIC T6...T4 Gb
  - II 2 D Ex tb IIC T90 °C Db: II 2 D Ex tb IIC T90 °C Db Temperature range: T4: -40 °C to +80 °C; T5: < +65 °C; T6: < +75 °C. Not applicable to 3. sign "1" or "4".
  - Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".

- **INMETRO certifications:**
  - Ex ia IIC T4/T5/T6 Gc: Ex ia IIC T4/T5/T6 Gc
  - Ex ia IIC T4/T5/T6 Gb: Ex ia IIC T4/T5/T6 Gb
  - Ex ia IIC T4/T5/T6 Gc: Ex ia IIC T4/T5/T6 Gc

- **Japanese Ex-d Certification:**
  - II 2 D Ex Db IIC T80 °C; T110 °C Db: II 2 D Ex Db IIC T80 °C; T110 °C Db Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".
  - Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".

- **cCSAus certifications:**
  - Class I, Division 1, Groups B, C, D; Class II, Division 2, Groups E, F, G; Class III; T4...T6, Enclosure type 4X
  - Ex i/ii D Ex T6...T4 AEx ic IIC T4...T6 E AEx d IIC T4...T6 F

- **cCSAus certifications:**
  - Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".

- **Japanese Ex-d Certification:**
  - Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".

- **cCSAus certifications:**
  - Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".

- **INMETRO certifications:**
  - Japanese Ex-d Certification: Ex ia IIC T4/T5/T6 Gb
  - Japanese Ex-d Certification: Ex ia IIC T4/T5/T6 Gb

- **ATEX and IECEx certifications:**
  - Ex ia IIC T4/T5/T6 Gb: Ex ia IIC T4/T5/T6 Gb
  - Ex ia IIC T4/T5/T6 Gb: Ex ia IIC T4/T5/T6 Gb
  - Ex ia IIC T4/T5/T6 Gb: Ex ia IIC T4/T5/T6 Gb

- **cCSAus certifications:**
  - Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".

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  - Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".

- **cCSAus certifications:**
  - Temperature range: T4: -40 °C to +85 °C; T5: < +75 °C; T6: < +80 °C. Not applicable to 3. sign "1" or "4".
7. OPTIONS OF VALVE CONTROLLER

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal 2-wire (passive) position transmitter. Analog position feedback signal, output 4–20 mA, supply voltage 1–30 V DC, external load resistance 0–780 Ω.</td>
<td>ND91_HXT, ND91_HZT, ND92_HXT, ND93_HXT, ND93_HZT, ND94_HXT, ND94_HZT:</td>
</tr>
<tr>
<td>1</td>
<td>I 1 G Ex iIC T84. T4 Ga</td>
</tr>
<tr>
<td>2</td>
<td>I 1 D Ex ts a IIC T90. T4 C</td>
</tr>
<tr>
<td>3</td>
<td>I 2 G Ex ts a IIC T90. T4 T4 Ga</td>
</tr>
<tr>
<td>4</td>
<td>I 2 D Ex ts a IIC T90. T4 T4 C</td>
</tr>
<tr>
<td>5</td>
<td>UI ≤ 28 V, Li ≤ 120 mA, P ≤ 1 W, Ci ≤ 22 nF, Li ≤ 53 μH, external load resistance 0–690 Ω.</td>
</tr>
<tr>
<td>ND91_HXT, ND91_HZT, ND92_HXT, ND93_HXT, ND93_HZT, ND94_HXT, ND94_HZT:</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I 3 G Ex nA IIC T6. T4 C</td>
</tr>
<tr>
<td>2</td>
<td>I 3 D Ex ts a IIC T90. T4 C</td>
</tr>
<tr>
<td>3</td>
<td>I 4 G Ex iIC T6. T4 C</td>
</tr>
<tr>
<td>4</td>
<td>I 4 D Ex ts a IIC T90. T4 C</td>
</tr>
<tr>
<td>5</td>
<td>UI ≤ 30 V, Pmax = device limits itself, Li ≤ 22 nF, Li ≤ 53 μH, external load resistance 0–780 Ω.</td>
</tr>
</tbody>
</table>

Remote mounting:
- Applicable only to 3. sign “I”
- Requires always external position measurement. For rotary actuator see accessories type code.
- Output values for: HART
- Uo(Voc) = 3.53V, Io(sc) = 12.6mA, P0 = 11.1 mW, Co(Ca) = 10nF, Lo(La) = 10μH, Foundation Fieldbus and Profibus
- Uo(Voc) = 5.0V, Io(sc) = 17.8mA, P0 = 22.2mW, Co(Ca) = 10nF, Lo(La) = 10μH.

Arctic temperature option:
- Temperature range -53 °C to +85 °C / -64 °F to +185 °F
- Applicable to 3. sign “2” and “3”
- Applicable to 6. sign “X” and “Y”
- Applicable to 7. sign “E.” (External junction box)
- Note. Limit switch may limit the temperature range

8. LIMIT SWITCH TYPE

<table>
<thead>
<tr>
<th>Switch Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductive proximity switches, 2 pcs.</td>
<td>IP66 / NEMA 4X enclosure. M20 x 1.5 conduit entry (2 pcs.). Option E2: 1/2 NPT conduit entry (2 pcs.). Limit switches applicable only with ND9100, ND9200 and ND9300.</td>
</tr>
<tr>
<td>Metso; SST Sensor Dual Module, NO, 8–125 V DC / 24–125 V AC</td>
<td>D33</td>
</tr>
<tr>
<td>Temperature range -40 °C to +82 °C / -40 °F to +185 °F. Usable up to SIL3 acc. to IEC61508. Applicable to 6. sign “N,” “N7,” “E1,” “E2,” “E3” and “E4.”</td>
<td></td>
</tr>
<tr>
<td>Metso; Namur Sensor Dual Module, 6–29 V DC, &gt; 3 mA; &lt; 1 mA. Temperature range -40 °C to +82 °C / -40 °F to +185 °F. Usable up to SIL3 acc. to IEC61508. Applicable to 6. sign “E4.”</td>
<td>D44</td>
</tr>
</tbody>
</table>

9. OPTIONS OF LIMIT SWITCH

<table>
<thead>
<tr>
<th>Switch Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special construction.</td>
<td>Y</td>
</tr>
</tbody>
</table>

Note: In safety-related applications the sensor must be operated with a qualified fail safe interface, such as P+F KFD2-SH-EX1.

Temperature range: -50 °C to +85 °C / -58 °F to +185 °F.
- Applicable to 6. sign “N,” “N7,” “X,” “X7,” “Z,” “U” and “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -20 °C to +85 °C / -4 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -25 °C to +85 °C / -13 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -25 °C to +85 °C / -13 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -25 °C to +85 °C / -13 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -25 °C to +85 °C / -13 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -25 °C to +85 °C / -13 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”

Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
- Applicable to 6. sign “E4.”
ADDITIONAL ACCESSORIES

FILTER REGULATOR

K5
Filter regulator for supply air.
Filter size 5 μm.
Pressure gauge, scale bar/psi/kPa and kg/cm², basic material brass, nickel plated, housing stainless steel, glycerine filled.
Temperature range -40 °C to +62 °C / -40 °F to +140 °F.
K5 option includes a thread nipple 1/4"NPT to 1/4"NPT between filter regulator and positioner which is suitable with ND9200 & ND9400 positioner and with option A1 (1/4" AIR CONNECTION). Supply air connector in the filter regulator is female 1/4".

K15
Filter regulator for supply air.
Filter size 5 μm.
Pressure gauge, scale bar/psi/kPa and kg/cm², basic material brass, nickel plated, housing stainless steel, glycerine filled.
Temperature range -40 °C to +80 °C / -40 °F to +176 °F.
K15 option includes a thread nipple 1/4"NPT to G1/4" between filter regulator and positioner which is suitable with ND9100 and ND9400 positioner and with option A1 (1/4" AIR CONNECTION). Supply air connector in the filter regulator is female 1/4".

K2
Stainless steel (AISI 316) filter regulator for supply air.
Filter size 5 μm.
Pressure gauge, scale bar/psi/kPa and kg/cm², silicone oil, AISI 316, Temperature range -40 °C to +80 °C / -40 °F to +176 °F.

CONDUIT ENTRY NIPPLES

CE07
1/2 NPT conduit entry nipples M20x1.5 / 1/2 NPT (ND9100 and ND9400)
CE08
1/2 (PT) conduit entry nipples M20x1.5 / 1/2 (ND9100 and ND9400)
CE09
1/2 NPT conduit entry nipples Brass M20x1.5 / 1/2 NPT, Exd approved (ND9200)
CE19
1/2 NPT conduit entry nipples Stainless Steel M20x1.5 / 1/2 NPT, Exd approved (ND 9300)

CABLE GLANDS

Not to be used together with conduit entry nipples (CE_) or connection plugs (P_). 
CG5
M20x1.5 grey/plastic, IP66
CG6
M20x1.5 blue/plastic, IP66, Ex e
CG3
Conduit entry and cable entry adapter for ND9200 and ND9300 M20x1.5 / x1/2NPT (f)  S5316 ExdIllc ExdIIIC Gb, Ip66
CG4
Conduit entry and cable entry adapter for ND9200 and ND9300 M20x1.5 x 0/1/2 NPT, Exd approved (ND9200)

PRESSURE GAUGES AND CONNECTION BLOCKS

A1
Pressure gauges, scale bar/psi/kPa and kg/cm², basic material brass, nickel plated, housing stainless steel, oil filled.
Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
Pneumatic connection block, material AlMgSi1, anodized grey.
Connections G1/4 (S, C1, C2).

A1B
As A1 but includes two pressure gauges with connections G1/4 (S, C2). Use in with single acting use only.

A3
Pressure gauges, scale bar/psi/kPa and kg/cm², basic material brass, nickel plated, housing stainless steel, oil filled.
Temperature range: -40 °C to +85 °C / -40 °F to +185 °F.
Pneumatic connection block, material AlMgSi1, anodized grey.
Connections 1/4 NPT (S, C1, C2), Converts also ND91, connections to 1/4 NPT.

A3B
As A3 but two pressure gauges with connections 1/4 NPT (S, C2). Converts also ND91, connections to 1/4 NPT.Use with in single acting use only.

A5
Pneumatic connection block, converts ND91, connections to 1/4 NPT. Material AlMgSi1, anodized grey.
Connections 1/4 NPT (S, C1, C2).

A6
Pressure gauges with connections G1/4, for ND9300 or ND9400. Material AISI 316.

A7
Pressure gauges with connections 1/4 NPT, for ND9300 or ND9400. Material AISI 316.

A10
Pressure gauges with connections 1/4 NPT for ND9300 or ND9400 AISI 316, pressure gauges for severe off-shore use, safety glass window.

Non oil filled, dry pressure gauges, scale bar/psi/kPa and kg/cm², basic material brass, nickel plated, housing stainless steel.
Temperature range -40 °C to +62 °C / -40 °F to +140 °F.
Pneumatic connection block, material AlMgSi1, anodized grey.
Connections 1/4 NPT (S, C1, C2), converts also ND91, connections to 1/4 NPT.

D3
As D3 but two pressure gauges with connections 1/4 NPT (S, C2), Converts also ND91, connections to 1/4 NPT.Use with in single acting use only.

3RD PARTY MOUNTING SETS

Mounting sets between the ND9000 generation valve controllers and linear actuators, including bracket and ball joint based feedback system.

Note! Sets are including the pneumatic plugs needed when used with single acting actuators.

Note! All available mounting sets listed in http://www2.stonel.com/utilities/metso/mkdbase_open.htm

MS01
Mounting set for Masoneilan 87/88 actuators, sizes 6...23.
IEC 60534-6, stroke length 55-120 mm. (H120404)

MS02
Mounting set for linear actuators, attachment face according to IEC 60534-6, stroke length 10-55 mm. (H116240)

MS03
Mounting set for linear actuators, attachment face according to IEC 60534-6, stroke length 55-120 mm. (H120404)

MS04
Mounting set for Massoneilan 87/88 actuators, sizes 6...23.
Stroke length 10-5 to 64 mm. (H120409)

REMOTE MOUNTING ACCESSORIES

ID code Description
RR01 C0217108 ND remote mount rotary sensor QNCOK05HDM
RR02 C0215954 ND remote mount rotary sensor QNCOK05HDM
RC01 H144183 Cable assembly remote mount sensor cable 1.2 m, straight connector
RC02 H126145 Cable assembly remote mount sensor cable 3.0 m, angle connector
RC03 H127093 Cable assembly remote mount sensor cable 30 m, angle connector