NELES® VALVGUARD VG9000
INTELLIGENT SAFETY SOLENOID

Metso’s Neles ValvGuard VG9000 is a new generation intelligent safety solenoid with partial stroke testing features. It can be used both with emergency shutdown (ESD) and emergency venting (ESV) valves. Its unique and advanced functions and features are specially designed for safety applications. Together with HART & FOUNDATION fieldbus communication it offers unbeatable value for our customers with increased efficiency, reliability and safety.

VG9000 is IEC 61508 compliant up to SIL 3, certified by TÜV Rheinland. Based on the automatic partial stroke testing (PST) and other diagnostics data, VG9000 increases safety and plant safety targets can be reached more economically than with traditional solutions. Also, unnecessary and expensive manual testing can be avoided. This increases safety and can simultaneously create major cost savings at a plant.

VG9000 HART version is operated by 4-20 mA signal and the diagnostics part of the device can be alive all the time. VG9000 FOUNDATION fieldbus version communication is done via the bus. Safety part is isolated from the fieldbus part and is powered with the separate binary 24 V DC signal. This is a true user benefit and gives maximum availability of the diagnostics information. VG9000 is thus capable to record emergency trips with graph and key figures related to it. The availability of the safety valves is maximized through unique diagnostics features, directly integrated into the device functionality. Diagnostic information is presented in an easily understandable form using a graphical FDT/DTM user interface, such as Metso FieldCare™. This enables the predictive maintenance of potentially failing valve assemblies before they have chance to impact on the process.

KEY FEATURES

- Valve and self tests
  - Partial stroke test (automatic or manual)
  - Self test for internal electronics and pneumatics
  - Emergency trip test
- High pneumatic capacity eliminates the need of additional instrumentation in most cases
- Device is powered during the trip and can collect diagnostics information
- Easy of use local / remote operation
- Advanced device diagnostics including
  - Self-diagnostics
  - Online diagnostics
  - PST Performance diagnostics
  - HART communication
  - FOUNDATION fieldbus communication

TÜV Certificate

Neles ValvGuard VG9000 is TÜV Rheinland certified according to IEC61508 to be used in safety applications up to and including safety integrity level 3 (SIL 3).

Designed for harsh environments

Neles ValvGuard VG9000 is developed for use in harsh environments with epoxy coated anodised aluminum as standard material for the whole enclosure. Even the most corrosive environments can be handled with our full 316 stainless steel enclosure.

Open solution

- Neto is committed to delivering products that freely interface with software and hardware from a variety of manufacturers. This open architecture allows the ValvGuard to be integrated with other field devices and systems.
- FDT and EDD based multi-vendor support configuration
- Support files for VG9000 are available from our internet page, at http://www.metso.com/vg9000 - choose Link to valve related software

VG9000 with option P (Partial stroke test device)

When ValvGuard is used only for partial stroke testing and an additional solenoid valve is used for controlling the fail-safe action, VG9000 with P-option is an optimum choice. VG9000H_P partial stroke test device provides excellent protection against the spurious trips. Even an electric failure or a cable break does not create an unwanted trip as the valve remains in the normal position even when ValvGuard is de-energized.

ValvGuard VG9000 with P-option is available with HART communication and the device is powered by analog 4 to 20 mA signal. VG9000H with P-option will give additional security against unauthorized usage by disabling all the testing, if input signal from the DCS is below 8 mA and also prevents an accidental calibration, if the signal is below 12 mA.

Options

- Full stainless steel enclosure (VG9300)
- High pneumatic capacity (VG923_)
- Integrated standard or SIL certified position transmitter
- Integrated SIL certified limit switches
- External junction box for wiring
- Version for partial stroke test only (VG9000H_P). Safety valves fail-safe action to be controlled via separate solenoid valve
- Remote Communication Interface (RC9H2) for VG9000H 24 VDC retrofit installations. (See type coding for RC9H2 option and technical bulletin 9RC121EN for all technical details)
- Local Control Panel (LCP9H) for VG9000H. (See type coding for LCP9H option)
Lower total cost of ownership

- Automated valve testing and testing documentation
- Low energy and air consumption
- Future proof design allows further options at a reduced cost

Easy installation and configuration

- Same unit for linear and rotary valves, double and single-acting actuators
- Simple calibration and configuration
  - Using local user interface
  - Using Metso FieldCare or any FDT compliant software in a remote location

Easy to maintain

- Optimized spares program. Reduced number of spares
- Fewer components to maintain than in a traditional instrumentation solution
- Ability to attach options to mechanics
- Visibility to the safety valve operation

Mounting

- Can be mounted on single and double acting pneumatic actuators
- Can be mounted on both rotary and linear valves
- Extensive selection of mounting kits for 3rd party actuators

Product reliability

- Designed to operate in harsh environmental conditions
- Epoxy coated anodised aluminium or full stainless steel enclosure
- Rugged modular design
- Excellent temperature characteristics
- Vibration and impact tolerant
- IP66 enclosure
- 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 FieldCare software
  - Logical trend collection
  - Information collected on service conditions
  - Fast notifications with on-line alarms
  - Condition monitoring tool available

VG9000F in FOUNDATION fieldbus networks

- Approved interoperability
- Host interoperability ensured
- FOUNDATION fieldbus ITK version 6 certified
- Unique communication diagnostics
- Digital communication via the FOUNDATION fieldbus includes not only the diagnostics, but also the position feedback signal from the position sensor.
- Back up LAS functionality available
- Multipurpose functionality
- Open and close information directly available via the FOUNDATION fieldbus

Operating principle of VG9000 is based on pneumatic solenoid valve (SV) and prestage (PR) which is controlled by microcontroller (μC). Information from the various sensors is used for the operation.

Technical description of VG9000H with option P

VG9000H_P version has fundamentally different functionality to other VG9000H versions. This version can be identified by the green cover instead of a standard red cover.

Coil of the prestage is normally de-energized and it is controlled by the microcontroller for testing and calibration. Signal failure does not affect the valve position.

Technical description of VG9000H with option P

VG9000H_P version has fundamentally different functionality to other VG9000H versions. This version can be identified by the green cover instead of a standard red cover.

Neles ValvGuard VG9000 is a 4-20 mA loop-powered microcontroller-based intelligent safety solenoid with partial stroke testing and HART communication. The device stays alive even at 3.7 mA input signal and communicates via HART. Optional RCI unit is required if the safety system output is binary (DO) 24 V DC.

Neles ValvGuard VG9000F is a microcontroller-based intelligent safety solenoid with partial stroke testing and FOUNDATION fieldbus communication. In addition to FOUNDATION fieldbus there is also a separate binary 24 V DC signal. It is isolated from the fieldbus and powers the safety part.

The device contains a Local User Interface enabling local configuration. A PC with Metso FieldCare software can be used for advanced configuration and diagnostics.

The powerful 32-bit microcontroller controls the valve position during partial stroke and other special testing.

The measurements include:

- Input signal (VG9000H)
- Safety signal (VG9000F)
- Valve position with contactless sensor
- Actuator pressures, two independent measurements
- Supply pressure
- Device temperature
- Housing pressure

Advanced self-diagnostics ensures that all measurements operate correctly. Failure of any measurement does not cause the valve to go to fail-safe position.

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## Technical Specifications

### Neles ValvGuard VG9000H & VG9000F

#### General
- **VG9000H:** Loop powered 4 - 20 mA, no external power supply required.
- **VG9000F:** FOUNDATION fieldbus powered diagnostics, 24 VDC power from safety system for the safety part.
- Suitable for rotary and linear valves.
- Actuator connections in accordance with VDI/VDE 3845 and IEC 60534-6 standards.
- **Action:** Double or single acting
- **Travel range:**
  - Linear: 10–120 mm
  - Rotary: 45–95°
  - Measurement range 110° with freely rotating feedback shaft

#### Environmental Influence
- **Standard temperature range:**
  - -40° to +85 °C / -40° to +185 °F
- **Influence of temperature on valve position:**
  - < 0.5 % / 10 °K
- **Influence of vibration on valve position:**
  - No effect when measured impulse 2g 5–150 Hz, 1g 150–300 Hz, 0.5g 300–2000 Hz.
  - No effect on PST if max. response 4g measured at housing.
  - No unintended valve movements if max. response 15g measured at housing

#### Enclosure
- **Material:** Epoxy coated anodised aluminum alloy and glass window (VG92_, not E2) or full 316 stainless steel enclosure (VG93_)
- **Protection class:** IP66, NEMA 4X
- **Mechanical position indicator and LUI visible through the main cover (VG92_, not E2)**
- **Pneumatic ports:**
  - VG9_1_ 1/4 NPT
  - VG9235 1/2 NPT
  - VG9237 1 NPT (1/2 NPT supply) (single acting only)
- **Conduit entry thread:** M20 x 1.5
- **Weight:**
  - VG921_ 3.0 kg / 6.6 lb
  - VG9235 4.6 kg / 10.1 lb
  - VG9237 5.0 kg / 11 lb
  - VG9315 9.0 kg / 19.8 lb
  - VG92_ with extension housing plus 1.0 kg / 2.2 lb
  - VG93_ with extension housing plus 3.0 kg / 6.6 lb

#### Pneumatics
- **Supply pressure:** 3.0–7.5 bar / 44–109 psi
- **Output pressure:** 3.0–7.5 bar / 44–109 psi
- **Air quality:** According to ISO 8573-1:2001
  - Solid particles: Class 6
  - Humidity: Class 1
  - (dew point 10 °C / 50 °F below minimum temperature is recommended)
  - Oil class: 3 (or <1 ppm)
- **Capacity with 4 bar / 60 psi supply:**
  - VG9212 7 Nm³/h / 4.1 scfm (Cv = 0.06)
  - VG9215 90 Nm³/h / 53 scfm (Cv = 0.7)
- **VG9000H electronics (input)**
  - **Electrical connections:** 0.25–2.5 mm²
  - **Supply power:** Loop powered, 4–20 mA
  - **Signal range:** 3.7–22 mA
  - **Input details (VG9000H):**
    - 0.0–3.7 mA (trip state; diagnostics not available)
    - 3.7–6.0 mA (trip state; diagnostics available)
    - 6.0–16.0 mA (hysteresis range; diagnostics available)
    - 16.0–22.0 mA (normal state; diagnostics available)
  - **Signal (VG9000H_L3):**
    - 0.0–7.7 mA (trip state, diagnostics not available)
    - 7.7–10.0 mA (trip state, diagnostics available)
    - 10.0–16.0 mA (hysteresis range)
    - 16.0–22.0 mA (normal state, diagnostics available)
  - **Signal details (VG9000H_P):**
    - 0.0–3.7 mA (de-energized state; diagnostics not available)
    - 3.7–6.0 mA (normal state; diagnostics available)
    - 6.0–8.0 mA (normal state; PST and diagnostics available)
    - 8.0–22.0 mA (normal state; PST, calibration and diagnostics available)
- **Load voltage:** up to 9.7 V DC / 20 mA (corresponding 485 Ω)
- **Voltage:** max 30 V DC
- **Polarity protection:** -30 V DC
- **Over current protection:** active over 36 mA

#### VG9000H electronics (output)
- **Usage:** Position transmitter (T) / device status output (S) (not SIL certified)
- **See type coding for SIL certified position transmitter (T01) details**
- **Electrical connections:** 0.25–2.5 mm²
- **Output signal:** Defined by type code option T or S
  - T: 4–20 mA = 0–100 % position
  - 4 mA = OK
  - 5 mA = Pneumatics test
  - 6 mA = PST test
  - 7 mA = ETT test
  - 8 mA = Warning
  - 10 mA = Alarm
12 mA = Safety position requested by LCP
Fault modes indicated by levels 3.5 and
22 mA
Galvanic isolation 600 V DC

Supply voltage: 12–30 V
Resolution: 16 bit / 0.244 μA
Linearity: <0.05 % FS
Temperature effect: <0.35 % FS
External load: max 0–780 Ω

**LCP9H interface**

Electrical connections: 0.25–2.5 mm²

**VG9000F safety signal (Binary input)**
Connections: 24 VDC: ‘+’ and ‘-’
Min voltage: 11 V DC
Max output resistance: R0 = 285 Ω

**VG9000F FOUNDATION fieldbus**
Connections: H1: ‘+’ and ‘-’
Power supply: taken from bus
Bus voltage: 9 to 32 V DC, reverse polarity
Max basic current: 14.2 mA
Operating current: 20.7 mA
Fault current (FDE): 6.3 mA

**VG9000F FOUNDATION fieldbus function block execution times**
MDO 15 ms
MDI 15 ms
AI 20 ms

**Local user interface functions**
- Monitoring of valve position, temperature, supply pressure, actuator pressure difference, input signal, safety signal status and device usage option (VG9000F)
- Guided start-up function
- LUI may be locked remotely to prevent unauthorised access
- Automatic travel calibration
- Parameter selection
- Testing
- Language selection: English, German and French
- Alarm and warning state indications
- Latest event view

**Safety**
IEC 61508 compliant up to and including SIL 3 by TÜV Rheinland
(VG9000H_P SIL certification is pending)

**Electromagnetic protection**
Electromagnetic compatibility
Emission acc. to EN 61000-6-4
Immunity acc. to EN 61000-6-2

**CE marking**
89/336/EEC
Electromagnetic compatibility
94/9/EC
ATEX

**Interoperability**
FDT/DTM VG9000 DTM certified by FDT group
HART
DD registered by HCF
FF
DD registered by FOUNDATION fieldbus

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Fig. 2. Local User Interface enables real time awareness of device parameters.

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Fig. 3. Configuration and diagnostics are easy to do with Metso Valve Manager™, graphical user interface.
<table>
<thead>
<tr>
<th>Certificate</th>
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<tbody>
<tr>
<td>ATEX</td>
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</table>
| VG9 X | VTT 14 ATEX 043X | II 1 G Ex ia IIC T6...T4 Ga  
1 G Ex ia IIC T95 °C...T125 °C Da  
II 2 G Ex ib IIC T6...T6 Gb  
2 D Ex ib IIC T95 °C...T125 °C Db | Input: U ≤ 28 V, I ≤ 120 mA, Cl ≤ 9.6 nF, Li ≤ 53 μH  
PT: U ≤ 28 V, I ≤ 120 mA, Ci ≤ 9.6 nF, Li ≤ 53 μH  
LCP: U ≤ 10 V, I ≤ 100 mA, Pi ≤ 0.25 W, Ci ≤ 5 nF, Li ≤ 1 μH |
| VG9 X | VTT 14 ATEX 044X | II 3 G Ex nA IIC T6...T4 Gc  
II 3 G Ex nA IIC T6...T6 Gc  
II 3 D Ex nA IIC T95 °C...T125 °C Dc | Input: U ≤ 30 V  
PT: U ≤ 30 V  
LCP: U ≤ 15 V |
| VG9 E6 | SIRA 11 ATEX 1006 | II 2 G Ex d IIC T6...T4 Gb  
II 2 D Ex db IIC T80 °C...T1105 °C Db | Input: U ≤ 30 V, Pi ≤ 1080 mW  
PT: U ≤ 30 V, I ≤ 20 mA, Pi ≤ 1050 mW |
| IECex | | |
| VG9 X | IECEx VTT 14.0005X | Ex ia IIC T6...T4 Ga  
Ex ia IIC T95 °C...T125 °C Da  
Ex ib IIC T6...T6 Gb  
Ex ib IIC T95 °C...T125 °C Db | Input: U ≤ 28 V, I ≤ 120 mA, Pi ≤ 1.0 W, Ci ≤ 9.6 nF, Li ≤ 53 μH  
PT: U ≤ 28 V, I ≤ 120 mA, Pi ≤ 1.0 W, Li ≤ 53 μH, Ci ≤ 8 nF  
LCP: U ≤ 10 V, I ≤ 100 mA, Pi ≤ 0.25 W, Ci ≤ 5 nF, Li ≤ 1 μH |
| VG9 X | IECEx VTT 14.0006X | Ex ic IIC T6...T4 Gc  
Ex nA IIC T6...T6 Gc  
Ex ic IIC T95 °C...T125 °C Dc | Input: U ≤ 30 V  
PT: U ≤ 30 V  
LCP: U ≤ 15 V |
| VG9 E6 | IECEx SIR 11.0001X | Ex d IIC T6...T4 Gb  
Ex db IIC T80 °C...T1105 °C Db | Input: U ≤ 30 V, Pi ≤ 1080 mW  
PT: U ≤ 30 V, I ≤ 20 mA, Pi ≤ 1050 mW |
| INMETRO | | |
| VG9 Z1, VG9 Z2 | NCC 12.0797 X | Ex ia IIC T6...T4 Ga  
Ex ia IIC T95 °C...T125 °C Da  
Ex ib IIC T6...T6 Gb  
Ex ib IIC T95 °C...T125 °C Db | Input: U ≤ 28 V, I ≤ 120 mA, Pi ≤ 1.0 W, Ci ≤ 9.6 nF, Li ≤ 53 μH  
PT: U ≤ 28 V, I ≤ 120 mA, Pi ≤ 1.0 W, Li ≤ 53 μH, Ci ≤ 8 nF  
LCP: U ≤ 10 V, I ≤ 100 mA, Pi ≤ 0.25 W, Ci ≤ 5 nF, Li ≤ 1 μH |
| VG9 Z3 | NCC 12.0798 | Ex ic nA IIC T6...T4 Gc | Input: U ≤ 30 V, I ≤ 152 mA, Ci ≤ 9.6 nF, Li ≤ 53 μH  
PT: U ≤ 30 V, I ≤ 152 mA, Ci ≤ 8 nF, Li ≤ 53 μH  
LCP: U ≤ 15 V, I ≤ 1.35 A, Ci < 5 nF, Li < 1 μH |
| VG9 E5 | NCC 12.0796 X | Ex d IIC Gb T5 Gb | Input: U ≤ 30 V, Pi ≤ 1080 mW  
PT: U ≤ 30 V, I ≤ 20 mA, Pi ≤ 1050 mW |
| cCSAus | | |
| VG9 U | CSA 70043951 | IG Class I, Division 1, Groups A, B, C, and D;  
T4/T5/T6  
Ex ia IIC T4/T5/T6 Ga  
IG Class I, Zone 0  
AEx ia IIC T4/T5/T6 Ga | Input: U ≤ 28 V, I ≤ 120 mA, Pi = 1.0 W, Ci = 9.6 nF, Li = 53 μH  
Output: U ≤ 28 V, I ≤ 120 mA, Pi = 1.0 W, Ci = 8 nF, Li = 53 μH |
| VG9 E2 | CSA 1980091 | Class I, Div 1, Groups B, C, D  
Class II, Div 1, Groups E, F, G  
Class III;  
T4...T6, Enclosure type 4X  
Ex d IIC T6...T4  
AEx d IIC T6...T4  
Ex db IIC T100 °C IP66  
AEx db IIC T100 °C IP66 | Input: U ≤ 30 V  
PT: U ≤ 30 V |

Other hazardous area approvals
CCOE / PESO Ex d, Ex ia, Ex nA nL  
GOST R Ex d, Ex ia  
KOSHA Ex d  
NEPSI Ex d  
ITRI Ex d

SIL certification
IEC 61508 compliant up to and including SIL 3 by TÜV Rheinland.  
Position transmitter option (T01) up to and including SIL 2.  
For device variant specific SIL certification coverage and exceptions see type coding.
## APPROVALS AND ELECTRICAL VALUES, VG9000F

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</table>
DIMENSIONS (mm)

**VG921 (J)**

**VG921 */_I_/, */_K_/, */_D_/ or VG921 */_L_**
## HOW TO ORDER

**Neles ValvGuard VG9000**

1. **PRODUCT GROUP**
   - **VG**: Neles ValvGuard VG9000, intelligent safety solenoid. TUV Sil. 3 certified according to IEC 61508.

2. **SERIES CODE**
   - 9: Series 9000 intelligent safety solenoid with universal shaft and attachment face according to standard VDI/VDE 3845. Relevant shaft adapter included in mounting kits. When VG9000 is separate delivery, shaft adapter kit needs to be ordered separately (see type coding for accessories).

3. **ENCLOSURE**
   - 3: Full 316 stainless steel enclosure, no glass window.

4. **SPOOL VALVE**

<table>
<thead>
<tr>
<th>SPOOL VALVE</th>
<th>CONNECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Restricted capacity Stroke volume of actuator 0.3 - 6.7 dm³</td>
</tr>
<tr>
<td>15</td>
<td>Standard capacity Stroke volume of actuator &gt; 0.6 dm³</td>
</tr>
<tr>
<td>37</td>
<td>High capacity Stroke volume of actuator &gt; 3.5 dm³</td>
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<td></td>
<td>Not applicable to 3. sign &quot;S&quot;</td>
</tr>
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5. **COMMUNICATION / INPUT SIGNAL RANGE**
   - **H**: 4-20 mA, HART communication.

6. **APPROVALS FOR HAZARDOUS AREAS**

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<tr>
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<td><strong>E5</strong></td>
<td>Internal 2-wire (passive) device status output. Analog device status feedback signal, output 4-20 mA. Output mA value is based on the device status, supply voltage 12 - 30 VDC, external load resistance 0 - 780 Ω.</td>
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<td><strong>E6</strong></td>
<td>For partial stroke test (PST) only. To be used together with additional solenoid valve for safety action. 4 mA normal state, signal failure does not affect to the valve position.</td>
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7. **NOTE:** Several options can be selected, but the order shown below needs to be maintained.

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13. **NOTE:** Several options can be selected, but the order shown below needs to be maintained.

*) Slash shall always be marked in places shown above.
### Position Transmitters

#### T01
- **Limit Switches**
  - SIL certified 2-wire (passive) position transmitter. Usable up to SIL 2 acc. to IEC61508.
  - Analog position feedback signal, output: -20 mA, supply voltage 12 - 30 VDC, external load resistance 0 - 700 Ohm.
  - Potentiometer Contec GL60, transmitter electronics Metso.
  - Temperature range: -40° to +85°C / -40° to +185°F.
  - Applicable to 6. sign "E2", "E3" or "E6". Not applicable with limit switches.

#### D44
- **Inductive proximity sensors**, 2 pcs.
  - Metso: SST Sensor Dual Module, NO, 2-125 VDC / 24-125 VAC
  - Temperature range: -40° to +80°C / -40° to +176°F.
  - Applicable to 6. sign "E2", "E3" or "E6".

#### I02
- **Potentiometer Celltec GL60**, transmitter electronics Metso.
  - Temperature range: -20° to +60°C
  - Safety input: 0/24/48 VDC; Output: 4/20 mA + HART; Power supply: 24V DC
  - TÜV Rheinland SIL 3 certified according to IEC61508
  - Remote Communication Interface with Status Relays

#### I09
- **Remote Communication Interface with Status Relays**

#### I56
- **Remote Communication Interface with Status Relays**

#### I57
- **Remote Communication Interface with Status Relays**

#### I58
- **Remote Communication Interface with Status Relays**

### Inductive proximity sensors

#### D33
- **Bus powered mechanical micro switches**
  - Temperature range: -40° to +85°C / -40° to +185°F.

#### B06
- **Bus powered mechanical micro switches**
  - Temperature range: -40° to +85°C / -40° to +185°F.

### Note:
- **NOTE:** These following optional devices for VG9000H need to be ordered separately.

### Optional Devices for VG9000H

#### RC19H2
- **ATEX certification:**
  - II (1) G Ex ia IIC T6...T4 Gc
  - IECEx certification: Ex ia Ga IIC

#### LCP9H
- **ATEX and IECEx certifications:**
  - LCP9H, LCP9HW:
    - II 2 G Ex ia IIC T6...T4 Gb
  - LCP9HE, LCP9HEW:
    - II 2 GD IIB + H2 T6 Gb
  - LCP9HEL, LCP9HEWL:
    - II 2 GD IIA + H2 T6 Gb
  - LCP9HL, LCP9HWL:
    - II 2 GD IIB + H2 T6 Gb
  - LCP9H_R, LCP9HRW:
    - II 2 GD IIB + H2 T6 Gb
  - LCP9H_P, LCP9HPW:
    - II 2 GD IIB + H2 T6 Gb

### Loop powered Local Control Panel (LCP)

#### LCP9H_L, LCP9HWL:
- **Loop powered Local Control Panel (LCP)**
  - Versions for Ex i.e: LCP9HL, LCP9HLW, Stainless steel 316L, IP66.
  - Versions for Ex d: LCP9HE, LCP9HEW, Anodized aluminum, IP66.
  - All versions include LEDs, Manual Reset and PST buttons.
  - Trip button removed in W versions.
  - Buttons are lockable in all versions.
  - Power consumption 400 mW. Power supply 11-30 V DC, 50mA

### Mechanical micro switches

#### K26
- **Limit switches & Position Transmitters**
  - 2 pcs, OMRON D2VW-01L2A-1MS, gold plated contacts, SPDT, 100 mA - 30 V DC / 125 V AC.
  - Applicable to 6. sign "E2", "E3" or "E6".

#### K45
- **Limit switches & Position Transmitters**
  - 4 pcs, OMRON D2VW-5L2A-1MS, SPDT, 3 A – 250 V AC, 0.4 A – 125 V DC, 5 A – 30 V DC.
  - Applicable to 6. sign "E2", "E3" or "E6".

#### K46
- **Limit switches & Position Transmitters**
  - 4 pcs, OMRON D2VW-01L2A-1MS, gold plated contacts, SPDT, 100 mA - 30 V DC / 125 V AC.
  - Applicable to 6. sign "E2", "E3" or "E6".

### Note:
- **NOTE:** These following optional devices for VG9000H need to be ordered separately.
### ADDITIONAL ACCESSORIES

#### FILTER REGULATORS

<table>
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<th>K</th>
<th>VG9215 Filter regulator for supply air. Filter size 5 μm. Pressure gauge, scale bar/psi/kPa, basic material brass, nickel plated, housing stainless steel, glycerine filled. Temperature range -40°C...+82°C / -40°F...+180°F. K option includes a thread nipple 1/4&quot;NPT to 1/4&quot;NPT which is suitable with VG9200 &amp; VG9300 option A3 (1/4&quot; NPT AIR CONNECTION). A large capacity filter regulator (not K) must be used for actuator bigger than BC 40 and BJ 32. Installation with mounting bracket. Use large capacity filter regulator also with VG923_.</th>
</tr>
</thead>
<tbody>
<tr>
<td>K2</td>
<td>VG9300 Stainless steel (AISI 316) filter regulator for supply air. Filter size 5 μm. Pressure gauge, scale bar/psi/kPa/cm², silicone oil, AISI 316, Temperature range -40°C...+80°C / -40°F...+176°F.</td>
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</table>

#### CONDUIT ENTRY NIPPLES

| CE09 | 1/2 NPT conduit entry nipples Brass M20x1.5 / 1/2 NPT, E xd approved Code: X0148 |
| CE19 | 1/2 NPT conduit entry nipples stainless steel M20x1.5 / 1/2 NPT, E xd approved Code: H7599 |

#### CABLE GLANDS

| CG6 | M20 x 1,5 blue/plastic, IP66, Ex e |

#### PRESSURE GAUGES AND CONNECTION BLOCKS

| A3 | Pressure gauges with connections 1/4 NPT (S, C1, C2) for VG921_, Gauges AISI316, block AISI316. |
| A7 | Pressure gauges with connections 1/4 NPT (S, C1, C2) for VG931_, Gauges AISI304, block AISI304. |
| A8 | Pressure gauges with connections 1/2 NPT (S, C1, C2) for VG9235_, Gauges AISI304, block AISI304. |
| A9 | Pressure gauges with connections 1/2 NPT (S) and 1" NPT (C) for VG9237_, Gauges AISI304, block AISI304. |
| A10 | Pressure gauges with connections 1/4 NPT for VG93_, Gauges AISI316L for severe off-shore use, with safety glass window. Block AISI316. |

#### DRIVER SETS FOR ROTARY ACTUATORS

| DS02 | Driver set for VG9_12, VG9_15 on BJ1, BJ1C and QPx actuators (VDI mounting face). H16181. Set includes the 1/4"NPT plug for single acting actuators. The driver set should also be applied with all VG with gauge blocks A3, A7 or A10. |
| DS03 | Driver set for VG9235 and VG9237 on BJ1, BJ1C and QPx actuators (VDI mounting face). H16182. Set includes the 1/2NPT plug for single acting actuators. The driver set can also be applied with VG with gauge block A8. |

#### 3RD PARTY MOUNTING SETS / Rotary actuators

| MS21 | Mouting set for rotary actuators with VDI/VDE 3845 attachment face. Attachment dimensions 80x30-20. (H036899) |
| MS22 | Mouting set for rotary actuators with VDI/VDE 3845 attachment face. Attachment dimensions 80x30-30. (H074705) |
| MS23 | Mouting set for rotary actuators with VDI/VDE 3845 attachment face. Attachment dimensions 130x30-30. (H036899) |
| MS24 | Mouting set for rotary actuators with VDI/VDE 3845 attachment face. Attachment dimensions 130x30-50. (H074708) |

#### PNEUMATIC PLUGS

| PP02 | 1/4"NPT plug. Stainless steel. VG921_, VG931_, VG9000 with gauge blocks A3, A7 or A10. |
| PP03 | 1/2NPT plug. Stainless steel. VG9235, VG9000 with gauge block A8. |

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