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Instrumentation and accessories
Position indicators and combi switchboxes are integrated components of an intelligent process automation system

Intelligent process automation follows a comprehensive approach which comprises the upper control levels as well as also innovative components and valves at the field level. GEMÜ has been offering valves and precisely tuned valve instrumentation, controllers, sensor systems, valve actuators, and system solutions for process automation for some years now. It could be said that you take care of your process, we take care of the component interfaces. Moreover, we believe that the most reliable and safest monitoring of valves always take place directly at the valve itself.

Overview

For linear valves

For quarter turn valves

Linear type valves and quarter turn valves are frequently used with position indicators. GEMÜ provides the most varied designs to suit any automation concept. The product range not only comprises simple switches but also intelligent designs equipped with timesaving automated initialisation. NAMUR, 2-wire and explosion proof versions are also available. Advanced combi switchboxes may be used in field bus networks such as AS-interface and DeviceNet.
For linear valves

Combi switchboxes and electrical position indicators for pneumatically operated linear valves

Our new devices detect the valve stroke in any installation position without play and free of tension. The sensor base of the series 1234, 1235, and 4222 is positively connected by means of spring preload to the respective valve spindle, so that possible tangential forces of the valve actuator do not negatively affect the position indicator. The position indicators can be quickly and easily assembled and are safe and uncomplicated to handle.

These position indicators can be adapted to the pneumatic actuators of GEMÜ globe and diaphragm valves. Due to its special design, the GEMÜ 9415 quarter turn actuator may likewise be combined with this type of position indicator.

### Electrical position indicators for linear valves

<table>
<thead>
<tr>
<th>Selection criteria</th>
<th>4222</th>
<th>4226</th>
<th>4216</th>
<th>1234</th>
<th>1235/1236</th>
<th>1205</th>
<th>1211</th>
<th>1231</th>
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<th>1232</th>
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<td>6 - 50</td>
<td>9 - 75</td>
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<td>M12</td>
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</table>

For more information, refer to the following pages:

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- (p. 5)
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Combi switchboxes

with integrated pilot valves, for linear valves

In comparison to standard electrical position indicators these combi switchboxes have additional integrated pilot valves. The fully electronic versions GEMÜ 4222 and GEMÜ 4221 have an analogue travel sensor system and automatic initialisation by means of speed\textsuperscript{ap} function. The two Atex versions GEMÜ 4226 and GEMÜ 4216 have mechanically adjustable proximity switches. In all versions the pilot valve can be operated manually.

**GEMÜ 4222**

- 1 or 2 integrated pilot valves
- Easy setting of end positions by automatic initialisation (speed\textsuperscript{ap} function)
- Adjustable end positions tolerances
- Integrated analogue travel sensor system
- For 3 – 30 mm, 6 – 50 mm, 9 – 75 mm valve strokes
- Simple and fast mounting
- No need to open the housing cover for commissioning
- Can be retrofitted to GEMÜ valves or other makes
- Optical position indication via LEDs
- Option: field bus connection AS-Interface, DeviceNet

**GEMÜ 4222**

- Rated voltage: 24 V DC (standard version)
- Current consumption: typ. 100 mA (standard version)
- Protection class: IP 65 to EN 60529
- Flow capability: 100 l/min
- Temperature range: 0 to 50°C
- Field bus: AS-interface, DeviceNet
- Housing cover: Polysulphone or PMMA (UV resistant)
- Housing base: Black powder coated aluminium or stainless steel 1.4301
- Connection: M12 connector
- Dimensions: Ø 87 x 76 mm (without electrical connection and mounting kit)
**GEMÜ 4226**

- Can be retrofitted to GEMÜ valves or other makes
- Proximity switches individually continuously and precisely adjustable via threaded spindles
- Integrated, intrinsically safe pilot valve
- Suitable for single acting actuators

**ATEX class:**
- II 2G IIB X
- EEEx II 2G ia IIB T6-T4

**Switch:** Inductive proximity switch

**Rated voltage:**
- 8V NAMUR (2-wire)
- 24V DC (3-wire)

**Output signal:**
- NAMUR (2-wire)
- Make contact PNP (3-wire)

**Protection class:** IP 65 to EN 60529

**Flow capability:** 8 l/min (higher air output on request)

**Temperature range:** -10 to 50°C

**Housing cover:** Polysulphone or PMMA (UV resistant)

**Housing base:** Stainless steel 1.4301

**Connection:** M16 cable gland

**Dimensions:** Ø 87 x 88 mm (without electrical connection and mounting kit)

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**GEMÜ 4216**

- Can be retrofitted to GEMÜ valves or other makes
- Proximity switches individually continuously and precisely adjustable via threaded spindles
- Integrated, intrinsically safe pilot valve
- Suitable for single and double acting actuators

**ATEX class:**
- II 2G IIB X
- EEEx II 2G ia IIB T6-T4

**Switch:** Inductive proximity switch

**Rated voltage:**
- 8V NAMUR (2-wire)
- 24V DC (3-wire)

**Output signal:**
- NAMUR (2-wire)
- Make contact PNP (3-wire)

**Protection class:** IP 65 to EN 60529

**Flow capability:** 588 l/min

**Temperature range:** -10 to 50°C

**Housing cover:** Polysulphone

**Housing base:** Stainless steel 1.4301

**Connection:** M16 cable gland

**Dimensions:** See technical data sheet
Programmable electrical position indicators

with automatic initialisation, for linear valves

The latest generation of electrical position indicators considerably reduces commissioning times in a plant. The intelligent, microprocessor controlled speed function enables even large plants with hundreds of devices to be initialised and ready for operation in only a couple of minutes. The automated programming of end positions is either directly controlled on site or remotely controlled by means of a digital programming input.

- Easy setting of end positions by automatic initialisation ('speed' function)
- Adjustable end position tolerances
- Contactless Long-Life travel sensor proved in millions of cycles
- Simple and fast mounting
- No need to open the housing cover for commissioning
- Suitable for single and double acting actuators
- Can be retrofitted to GEMÜ valves or other makes
- Optical position indication via LEDs
- Option: field bus connection AS-interface

GEMÜ 1234

| Measuring range:  | 1 – 10 mm |
| Rated voltage:    | 24 V DC (standard version) |
| Current consumption: | typ. 35 mA (standard version) |
| Protection class: | IP 65 to DIN 60529 |
| Temperature range: | -10 to 70°C |
| Field bus:        | AS-Interface |
| Body material:    | Black PSU |
| Connection:       | M12 connector |
| Dimensions:       | □ 32 x 65 mm (without electrical connection and mounting kit) |
**GEMÜ 1235/1236**

- **Measuring range:** 3 – 30 mm, 6 – 50 mm, 9 – 75 mm
- **Rated voltage:** 24 V DC (standard version)
- **Current consumption:** typ. 70 mA
- **Protection class:** IP 65 to DIN 60529
- **Temperature range:** -10 to 70°C
- **Housing cover:** PP transparent
- **Housing base:** Black PVDF (GEMÜ 1235) or stainless steel 1.4301 (GEMÜ 1236)
- **Connection:** M12 connector
- **Dimensions:** Ø 60 x 57 mm (without electrical connection and mounting kit)
Position indicators for explosion-proof areas

for linear valves

**GEMÜ 1205**

EC type examination certificate to ATEX directive 94/9 EC

Suitable for single and double acting actuators

**Setting range:** 2 – 70 mm continuous

**ATEX class:**
- Ex II 2G EEx ed IIC T6
- Ex II 2D IP 65 T 80°C

**Switch:** Built in electro-mechanical switches in a flameproof enclosure

**Make:** Bartec

**Rated voltage:** 250 V AC/DC, 30 V AC/DC

**Output current DC:** 0.15 A at 250 V, 4A at 30 V

**Output current AC:** 4 A at 30/250 V

**Protection class:** IP 65 to EN 60529

**Temperature range:** -30 to 70°C

**Housing:** Aluminium diecasting

**Connection:** PG 20 cable gland

**Dimensions:** Ø 100 x 127 mm (without electrical connection and mounting kit)

**GEMÜ 1211**

EC type examination certificate to ATEX directive 94/9 EC

Suitable for single and double acting actuators

**Setting range:** 2 – 70 mm continuous

**ATEX class:**
- Ex II 2G EEx ib IIC/IIB T6
- Ex II 2D T80°C IP 65 –20 to 60°C

**Switch:** Inductive proximity switches to NAMUR DIN 19234 / EN 50227

**Make:** Pepperl + Fuchs

**Rated voltage:** 8 V Namur

**Output current:** < 1 mA damped, > 3 mA undamped

**Protection class:** IP 65 to EN 60529

**Temperature range:** -20 to 60°C

**Housing cover:** Polysulphone (PSU)

**Housing base:** Polyamide (PA 6.6)

**Connection:** PG 13.5 cable gland

**Dimensions:** Ø 100 x 125 mm (without electrical connection and mounting kit)
GEMÜ 1231
EC type examination certificate to ATEX directive 94/9 EC
Suitable for single and double acting actuators

- Setting range: 2 – 20 mm continuous
- ATEX class: Ex II 2G EEx ia IIIC/IIB T6
- Ex II 2D T80°C IP 65
- –20 to 60°C
- Switch: Inductive proximity switches to NAMUR DIN 19234 / EN 50227
- Make: Pepperl + Fuchs
- Rated voltage: 8 V Namur
- Output current: < 1 mA damped, > 3 mA undamped
- Protection class: IP 65 to EN 60529
- Temperature range: -20 to 60°C
- Housing cover: Polysulphone (PSU)
- Housing base: Polypropylene (PP-R-GR glass fibre reinforced)
- Connection: M16 cable gland
- Dimensions: □ 50 x 72 mm (without electrical connection and mounting kit)

GEMÜ 1215

GEMÜ 1215 has a microswitch which indicates the open position of the valve. The electrical position indicator can only be used for valves with "normally closed (NC)" control function.

- ATEX class: Ex II 2G IIB T6 X
- Switch: Microswitch with potential-free SPDT (Single Pole Double Throw) contact
- Contacts: Gold plated silver
- Rated voltage: 250 V AC / 24 V DC
- On-load current: 4 A
- Protection class: IP 65 to EN 60529
- Temperature range: -15 to 60°C
- Housing: Polyamide (PA 6.6)
- Connection: PG 11 cable gland
- Dimensions: □ 30 x 54 mm (without electrical connection and mounting kit)
Position indicators with proximity switches

Contactless 3-wire proximity switches for end position detection, for linear valves

GEMÜ 1214 and 1232 are fitted with one or two contactless proximity switches for end position detection. These switches are individually continuously adjustable via threaded spindles.

<table>
<thead>
<tr>
<th><strong>GEMÜ 1214</strong></th>
<th><strong>GEMÜ 1232</strong></th>
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</thead>
<tbody>
<tr>
<td>Measuring range:</td>
<td>Measuring range:</td>
</tr>
<tr>
<td>3 – 70 mm continuous</td>
<td>2 – 20 mm continuous</td>
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<tr>
<td>Switch:</td>
<td>Switch:</td>
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<tr>
<td>Inductive 3-wire proximity switch, PNP make contact</td>
<td>Inductive 3-wire proximity switch, PNP make contact</td>
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<tr>
<td>Rated voltage:</td>
<td>Rated voltage:</td>
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<tr>
<td>10 – 30 V DC</td>
<td>10 – 30 V DC</td>
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<tr>
<td>Switching current:</td>
<td>Switching current:</td>
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<tr>
<td>&lt; 200 mA</td>
<td>&lt; 200 mA</td>
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<tr>
<td>Protection class:</td>
<td>Protection class:</td>
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<tr>
<td>IP 65 to EN 60529</td>
<td>IP 65 to EN 60529</td>
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<tr>
<td>Temperature range:</td>
<td>Temperature range:</td>
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<tr>
<td>-20 to 60°C</td>
<td>-20 to 60°C</td>
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<tr>
<td>Housing cover:</td>
<td>Housing cover:</td>
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<td>Polysulphone (PSU)</td>
<td>Polysulphone (PSU)</td>
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<tr>
<td>Housing base:</td>
<td>Housing base:</td>
</tr>
<tr>
<td>Polyamide (PA 6.6)</td>
<td>Polypropylene (PP-R-GR glass fibre reinforced)</td>
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<tr>
<td>Connection:</td>
<td>Connection:</td>
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<tr>
<td>PG 13.5 cable gland (for other connections see data sheet)</td>
<td>M 16 cable gland (for other connections see data sheet)</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>Dimensions:</td>
</tr>
<tr>
<td>Ø 100 x 127 mm (without electrical connection and mounting kit)</td>
<td>□ 50 x 68 mm (without electrical connection and mounting kit)</td>
</tr>
</tbody>
</table>

Option: optical position indication via LEDs available.
Position indicators with microswitches

Microswitches for end position detection, for linear valves

The most economical way to detect the valve position is with GEMÜ 1201 and GEMÜ 1230 position indicators with microswitches.

They are available with one or two microswitches as standard. The microswitches are individually continuously adjustable via threaded spindles. The devices are suitable for single or double acting actuators.

**GEMÜ 1201**

- **Measuring range:** 2 – 70 mm continuous
- **Switch:** Microswitch with potential-free SPDT (Single Pole Double Throw) contact
- **Rated voltage:** 28 V DC, 250 V AC
- **On-load current DC:** 5 mA – 5 A
- **On-load current AC:** 100 mA – 8 A
- **Protection class:** IP 65 to EN 60529
- **Temperature range:** -20 to 60°C
- **Housing cover:** Polysulphone (PSU)
- **Housing base:** Polypropylene (PP-R-GR glass fibre reinforced)
- **Connection:** PG 13.5 cable gland
- **Dimensions:** Ø 100 x 127 mm (without electrical connection and mounting kit)

**GEMÜ 1230**

- **Measuring range:** 2 – 20 mm continuous
- **Switch:** Microswitch with potential-free SPDT (Single Pole Double Throw) contact
- **Contacts:** Gold plated silver
- **Rated voltage:** 24 V DC, 250 V AC
- **On-load current DC:** 4 A
- **On-load current AC:** 2.5 A
- **Protection class:** IP 65 to EN 60529
- **Temperature range:** -20°C to 60°C
- **Housing cover:** Polysulphone (PSU)
- **Housing base:** Polypropylene (PP-R-GR glass fibre reinforced)
- **Connection:** M 16 cable gland
- **Dimensions:** □ 50 x 68 mm (without electrical connection and mounting kit)
- **Approvals:** UL recognized
- **Option:** Optical position indication via LEDs
Various electrical position indicators are available for ball valves and butterfly valves. The devices detect the valve position in any mounting position without play and strain. They enable fast and easy mounting and safe and uncomplicated handling.

The special design of the GEMÜ 9415 quarter turn actuator enables its combination with electrical position indicators for linear actuators.
Combi switchboxes
for pneumatically operated quarter turn valves

The GEMÜ 4221 combi switchbox operates with one or two integrated 3/2-way pilot valves, an analogue integrated travel sensor system and a microprocessor controlled electronic system for end position feedback.

**GEMÜ 4221**
- Easy setting of end positions by automatic or manual initialisation
- No need to open the housing for commissioning
- Integrated 3/2-way pilot valves for single or double acting actuators
- Manual operation of the pilot valve possible
- Integrated travel and system control
- Additional optical position indication via LEDs

**Rated voltage:** 24 V DC (standard version)
**Current consumption:** typ. 100 mA (standard version)
**Protection class:** IP 65 to EN 60529
**Flow capability:** 100 l/min
**Temperature range:** 0 to 50°C
**Field bus:** AS-interface, DeviceNet
**Housing cover:** Polysulphone or PMMA (UV resistant)
**Housing base:** Black powder coated aluminium or stainless steel 1.4301
**Connection:** M12 connector
**Dimensions:** Ø 87 x 76 mm (without electrical connection and mounting kit)
Position indicators for explosion-proof areas

for quarter turn valves

The SM-N2 and ES2 EEx i electrical position indicators can be used in explosion endangered areas. They are suitable for GEMÜ DR/SC and GEMÜ ADA/ASR single or double acting actuators and for other makes.

- Easy setting of the trip cams
- Damped or undamped in end position
- Suitable for 80 mm and 130 mm dimensions to VDI/VDE 3845, shaft height 20, 30 and 50 mm

**SM-N2**

SM-N2 has a solid plastic housing with bayonet fitting and universal trip cams. The device indicates the switching positions of 2/2-way and 3/2-way valves.

- Integrated adjustable plastic feet (width and height)
- Easy to read optical position indicator

**ATEX class:** ATEX Ex II 2G EEx ia IIB T6
-20°C to 70°C

**Switch:** Inductive proximity switches to NAMUR EN 60947-5-6

**Rated voltage:** 8 VDC

**Output current:** < 1 mA damped, > 3 mA undamped

**Protection class:** IP 67 to EN 60529

**Temperature range:** -20 to 70°C

**Angle of rotation:** 0° – 90° adjustable

**Housing cover:** Lexan 143 R, antistatic coating

**Housing base:** ABS, antistatic coating

**Switching shaft:** POM (Polyoxymethylene)

**Connection:** M 20 cable gland

**Dimensions:** Ø 105 x 120 mm (variable height)
GEMÜ ES2 EEx i with slotted type proximity switch

The slotted type proximity switch in the ES2 EEx i switchbox is intrinsically safe due to its low potential. The TCR module enables easy setting of the switch points. The stainless steel discs can be adjusted 0° – 360° independently.

- Up to 4 slotted type proximity switches can be used
- Various stainless steel mounting kits can be ordered separately
- Option: optical position indicator available

ATEX class: ATEX 2 IIG EEx ia IIC T6
Switch: Slotted type proximity switch, break contact function to NAMUR DIN 19234 / EN 50227
Make: Pepperl + Fuchs
Rated voltage: 8 V
Output current: < 1 mA damped, > 3 mA undamped
Protection class: IP 65 to DIN 40050
Temperature range: -25 to 85°C
Housing cover: Black Vestamid or transparent Makrolon
Housing base: Black Vestamid
Connection: M 20 cable gland
Dimensions: 146 x 64 x 74 mm (without mounting kit)
Position indicators with proximity switches

Contactless 3-wire proximity switches for end position detection, for quarter turn valves

The GEMÜ 1229 and ES2 electrical position indicators are suitable for GEMÜ DR/SC and GEMÜ ADA/ASR single or double acting pneumatic actuators and for other makes.

GEMÜ 1229

GEMÜ 1229 has a solid plastic housing with bayonet fitting and universal trip cams. The device indicates the switching positions of 2/2-way and 3/2-way valves.

- Damped or undamped in end position
- Integrated adjustable plastic feet (width and height)
- Easy to read optical position indicator

Switch: 3-wire proximity switch, PNP make contact
Make: Pepperl + Fuchs or IFM
Rated voltage: 9 V – 36 V DC
Constant current: 100 mA
Protection class: IP 67 to DIN 40050
Temperature range: -20 to 70°C
Angle of rotation: 0° – 90° adjustable
Housing cover: Lexan 143 R
Housing base: ABS
Switching shaft: POM (Polyoxymethylene)
Connection: M 20 cable gland
Dimensions: Ø 105 x 120 mm (variable height)

GEMÜ ES2 with 3-wire double proximity switch

The use of double sensors in the switchbox enables very easy mounting of the unit. The TCR module enables easy setting of the switch points.

- Various stainless steel mounting kits can be ordered separately
- Option: optical position indicator available

Switch: 3-wire proximity switch, PNP make contact
Make: Pepperl + Fuchs
Operating voltage: 10 – 36 VDC (depending on proximity switch)
Protection class: IP 65 to DIN 40050
Temperature range: -25 to 80°C (depending on proximity switch)
Housing cover: Black Vestamid or transparent Makrolon
Housing base: Black Vestamid
Connection: M 20 cable gland
Dimensions: 146 x 64 x 74 mm (without mounting kit)
Position indicators with microswitches

Microswitches for end position detection, for quarter turn valves

The GEMÜ 1227, ES2 and PCR electrical position indicators are suitable for GEMÜ DR/SC and GEMÜ ADA/ASR single or double acting pneumatic actuators and for other makes.

GEMÜ 1227

GEMÜ 1227 has a solid plastic housing with bayonet fitting and universal trip cams. The device indicates the switching positions of 2/2-way and 3/2-way valves.
- Integrated adjustable plastic feet (width and height)
- Easy to read optical position indicator

Switch: Microswitch with potential-free SPDT (Single Pole Double Throw) contact
Make: Crouzet
Contacts: Gold plated
Rated voltage: 4V DC – 250 V AC
On-load current: 1 mA – 5 A
Protection class: IP 67 to DIN 40050
Temperature range: -20 to 70°C
Angle of rotation: 0° – 90° adjustable
Housing cover: Lexan 143 R
Housing base: ABS
Switching shaft: POM (Polyoxymethylene)
Connection: M 20 cable gland
Dimensions: Ø 105 x 120 mm (variable height)

GEMÜ ES2 with microswitch

The microswitch of the switchbox works as a potential-free SPDT (Single Pole Double Throw) contact and enables flexible control. The TCR module enables easy setting of the switch points.
- Various stainless steel mounting kits can be ordered separately
- Option: optical position indicator available

Switch: Microswitch with potential-free SPDT (Single Pole Double Throw) contact
Make: Crouzet
Contacts: Silver-nickel gold plated
Temperature range: -20 to 100°C -20 to 85°
Rated voltage: 4V DC – 250 V AC
On-load current: 1 mA – 5 A
Protection class: IP 65 to DIN 40050
Housing cover: Black Vestamid or transparent Makrolon
Housing base: Black Vestamid
Connection: M 20 cable gland
Dimensions: 146 x 64 x 74 mm (without mounting kit)
Position indicators with microswitches

Microswitches for end position detection, for quarter turn valves

**GEMÜ PCR** with microswitches

The microswitches of the proxi-box are designed as potential-free SPDT (Single Pole Double Throw) contacts allowing the operator many control options. The integrated cable terminal enables simple and fast wiring of the module.

- Damped or undamped in end position
- Different mounting kits may be ordered separately
- Option: optical position indicator available

**Switch:** Microswitch with potential-free SPDT (Single Pole Double Throw) contact

**Make:** Crouzet

**Contacts:** Silver-nickel | gold plated

**Temperature range:** -20 to 100°C | -20 to 85°C

**Switch rating:** 16 A, 250 V

**Protection class:** IP 65 to DIN 40050

**Housing cover:** Black Vestamid or transparent Makrolon

**Housing base:** Black Vestamid

**Connection:** M 20 cable gland

**Dimensions:** Ø 80 x 50 mm (without electrical connection and mounting kit)

**GEMÜ 1226** mechanical switches

**Open design (non enclosed)**

GEMÜ 1226 is available with one or two position switches. The unit is universally applicable due to the base design technology. A high-grade steel cage provides the required contact protection according to valid EC safety standards.

The switch points can be selected to be unchangeable (“fixed”) or freely selectable (“variable”) according to a trip cam selector. GEMÜ 1226 can also be mounted on manual valves.

**Switch:** Potential-free change-over switch with double break Zb or 2 break contacts, galvanically insulated contact bridges

**Make:** Schmersal

**Contacts:** Silver

**Temperature range:** -30 to 80°C

**Rated voltage:** 24 V DC | 24 V AC | 220 V AC

**Rated current:** 10 A | 10 A | 4 A

**Protection class:** IP 67 to DIN 40050

**Housing:** Thermoplastic glass fibre reinforced

**Connection:** PG 13.5 cable gland

**Dimensions:** 59 x 30 x 30 mm (switch)
GEMÜ 1225

The GEMÜ 1225 electrical position indicator is suitable for GEMÜ 410 to 428 plastic or metal butterfly valves. The range of butterfly valves are manual, pneumatic or motorized depending on the type.

- Easy setting of the trip cams
- Additional indication of the switching position via colour LEDs

Switch: Microswitch with potential-free SPDT (Single Pole Double Throw) contact (PNP or NPN)
Contacts: Gold plated silver
Switch rating: 2.5 A to 24 V DC
Protection class: IP 40
Temperature range: 0 to 70°C
Angle of rotation: 0° – 90° adjustable.
Housing: PPO (Polyphenylene oxide, glass reinforced 30%)
Connection: M 16 cable gland
Dimensions: □ 48 x 32 mm (without electrical connection and mounting kit)