# ELECTRO-PNEUMATIC POSITIONERS
# TZIDC

## DESCRIPTION




The ADCATrol TZIDC is a digital intelligent electronically configurable positioner with communication capabilities designed for mounting to pneumatic linear or rotary actuators. It features a compact design with a modular construction and excellent performance capabilities.
Fully automatic determination of the control parameters and adaptation to the final control element yield considerable time savings and an optimal control behaviour.

## MAIN FEATURES

Low operating cost.
Compact and flexible design.
Easy to comission with user-friendly interface.
Increased shock and vibration resistance with gearless sensor activation.
Reliable and efficient, with integrated maintenance-friendly air filters.
Automatic adjustment of control parameters during operation.
Integrated mechanical position indicator.
Wide operating temperature range (-40 to +85 ºC).
Mounting onto any linear or rotary actuator.
Single or double acting.

## OPTIONS AND ACCESSORIES:

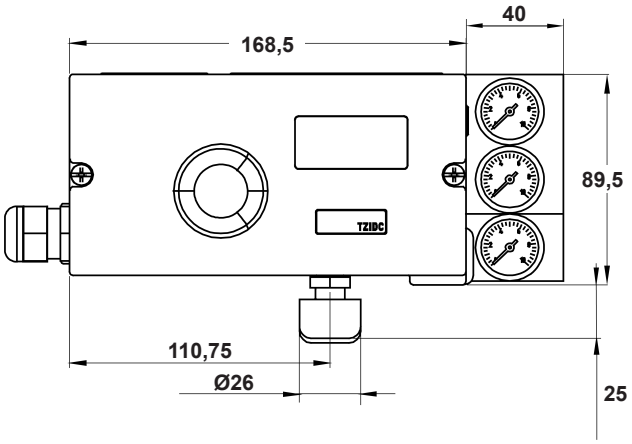
HART, Profibus PA or FOUNDATION Fieldbus-H1 communication.
ATEX, FM, CSA, GOST and IECEx approvals.
SIL2 certification.
Module for analog position feedback.
Digital position feedback with inductive proximity switches.
Digital position feedback with 24 V microswitches.
Positioner with remote sensor.
Attachment kit for linear actuators according to IEC 534/NAMUR and rotary actuators according to VDI/VDE 3845.
Connection manifold with gauges.
PC adapters for communication.
PC software for remote configuration and operation.

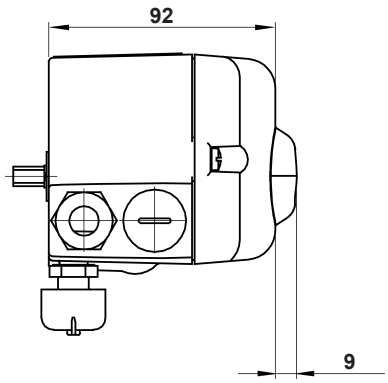
## AVAILABLE MODELS:

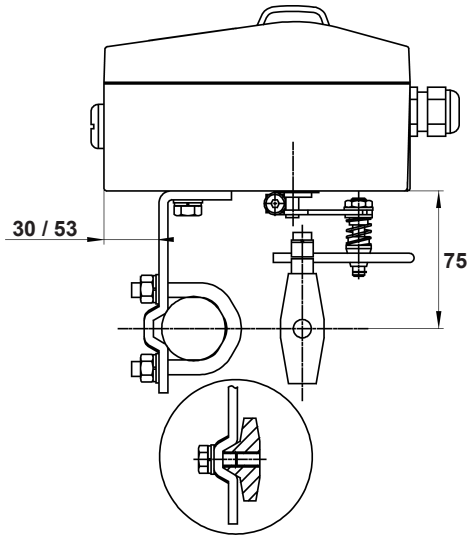
TZIDC – Standard unit, with optional HART comm.
TZIDC-110 – Incl. PROFIBUS PA communication.
TZIDC-120 – Incl. FOUNDATION Fieldbus comm.
TZIDC-200 – Incl. flameproof enclosure.

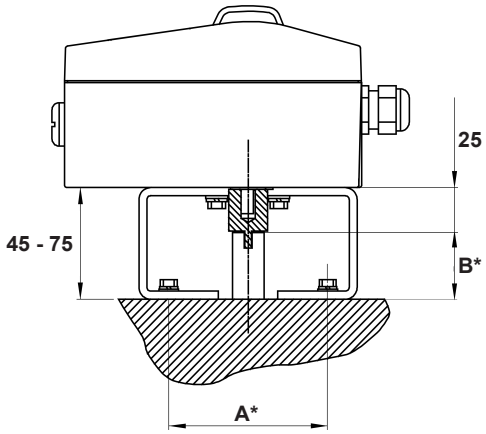

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## DIMENSIONS (mm)



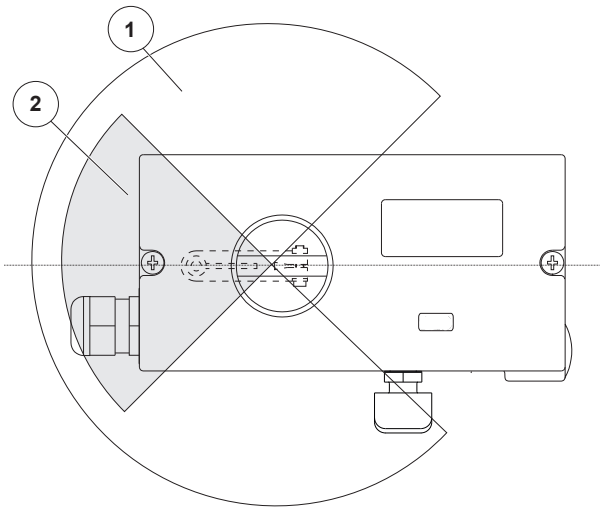

** Dimensions A and B are dependent on the rotary actuator*

## TECHNICAL DATA

| GENERAL | |
|---|---|
| Material | Aluminium with ≤ 0,1% copper |
| IP rating | Protection class IP 65 (IP 66 on request)<br>NEMA 4X |
| Surface | Electrostatic dipping varnish with epoxy resin, stove-hardened |
| Pneumatic connections | Female threaded ISO 228 G 1/4" |
| Electrical connections | M20 x 1,5 Cable glands<br>Screw terminals:<br>max. 1,0 mm² for options<br>max. 2,5 mm² for bus connector |
| Weight | 1,7 kg |
| Mounting orientation | Any |

| DIRECTIVES AND COMMUNICATION | |
|---|---|
| Directives | Compliant with:<br>- EMC directive 2004/108/EC from 12/2004<br>- EC Directive for CE conformity marking |
| Communication | - HART® protocol 5.9 as standard, optionally HART® protocol 7,4<br>- Profibus PA<br>- FOUNDATION Fieldbus H1<br>- Local connector for LCI (not in explosion protection area)<br>- HART communication via 20 mA signal line with (optional) FSK modem |

| TRAVEL | |
|---|---|
| **ROTATION ANGLE** | |
| Measuring range | 270º |
| Working range (Fig.1) | Linear actuators: min. 25º, max. 45º |
| | Rotary actuators: min. 25º, max. < 270º |
| Travel limit | Min. and max. limits, freely configurable between 0 to 100% of total travel (min. range > 20%) |
| Travel prolongation | Range of 0 to 200 s, separately for each direction |
| Dead band time limit | Setting range of 0 to 200 s (monitoring parameter for control until the deviation reaches the dead band) |




1 *Measuring range*

2 *Operating range*

| AIR SUPPLY * | |
|---|---|
| Purity | Maximum particle size: 5 µm<br>Maximum particle density: 5 mg/m³ |
| Oil content | Maximum concentration: 1 mg/m³ |
| Pressure dew point | 10 K below operating temperature |
| Supply pressure ** | 1,4 to 6 bar |
| Air consumption *** | < 0,03 kg/h / 0,015 scfm |

* Free of oil, water and dust, according to DIN/ISO 8573-1. Pollution and oil content according to Class 3.
** Do not exceed the maximum operating pressure of the actuator!
*** Independent of supply pressure.

| TRANSMISSION DATA AND CONTRIBUTING FACTORS | |
|---|---|
| **OUTPUT Y1** | |
| Increasing | Increasing setpoint signal 0 to 100%<br>Increasing pressure at output |
| Decreasing | Increasing setpoint signal 0 to 100%<br>Decreasing pressure at output |
| **ACTION (SETPOINT SIGNAL)** | |
| Increasing | Signal 4 to 20 mA = Position 0 to 100% |
| Decreasing | Signal 20 to 4 mA = Position 0 to 100% |

| CHARACTERISTIC CURVE * | |
|---|---|
| Deviation | ≤ 0,5% |
| Tolerance band | 0,3 to 10%, adjustable |
| Dead band | 0,1 to 10%, adjustable |
| Resolution (A/D conversion) | > 16,000 steps |
| Sample rate | 20 ms |
| Influence of ambient temperature | ≤ 0,5% per 10 K |
| Reference temperature | 20 ºC |
| Influence of vibration | ≤ 1% to 10 g and 80 Hz |
| Seismic vibration | Meets requirements of DIN/IEC 68-3-3 Class III for strong and strongest earthquakes |

* Linear, equal percentage 1:25 or 1:50 or 25:1 or 50:1 and freely configurable with 20 reference points.

| AMBIENT CONDITIONS | |
|---|---|
| **AMBIENT TEMPERATURE** | |
| During operation, storage and transport | -40 to 85 ºC<br>-25 to 85 ºC<br>-40 to 100 ºC * |
| **RELATIVE HUMIDITY** | |
| Operation (closed housing and air supply switched on) | 95% (annual average), condensation permissible |
| Transport and storage | 75% (annual average), non-condensing |

* Increased temperature range only with TZIDC Remote Sensor.

| SAFETY INTEGRITY LEVEL | |
|---|---|
| TZDIC meets the following requirements | - Functional safety according to IEC 61508<br>- Explosion protection (depending on the model)<br>- Electromagnetic compatibility acc. to EN 61000 |

Without the input signal, the pneumatic module in the positioner vents the drive and the installed spring in it moves the valve to a predetermined end position (OPEN or CLOSED).

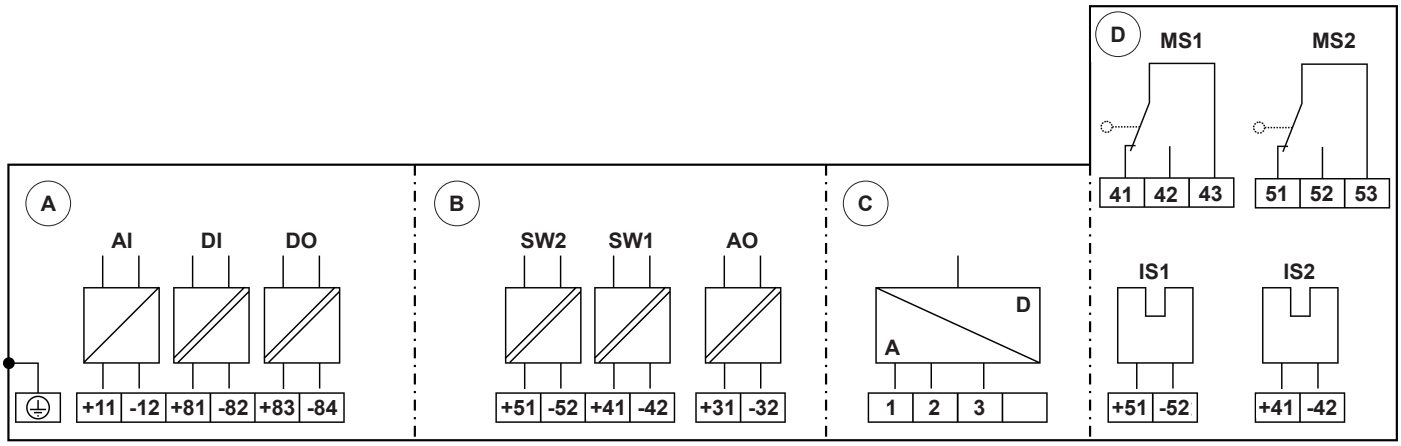
**SIL SPECIFIC SAFETY-RELATED CHARACTERISTICS**

| DEVICE | SFF | PFDav | $\lambda_{dd} + \lambda_s$ | $\lambda_{du}$ |
|---|---|---|---|---|
| TZDIC with supply current 0 mA | 94% | 1,76 x $10^{-4}$ | 651 FIT | 40 FIT |

Remarks: Applies to applications with single-acting and depressurizing pneumatics.


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# ELECTRICAL CONNECTIONS
# POSITIONER




(A) *Basic device*

(B) *Options*

(C) *Connection TZIDC remote sensor / remote position sensor (only for TZIDC Control Unit version)*

(D) *Limit value monitor with proximity switches or microswitches (not for TZIDC Control Unit version)*

| TERMINALS | |
|---|---|
| **TERMINAL** | **DESCRIPTION** |
| +11 / -12 | Analog input AI |
| +81 / -82 | Digital input DI |
| +83 / -84 | Digital output DO |
| +51 / -52 | Digital feedback SW1 (optional) |
| +41 / -42 | Digital feedback SW2 (optional) |
| +31 / -32 | Analog feedback AO (optional) |
| 1 / 2 / 3 | TZDIC remote sensor * |
| +51 / -52 | Limit switch Limit 1 with proximity switch IS1 (optional) |
| +41 / -42 | Limit switch Limit 2 with proximity switch IS2 (optional) |
| 41 / 42 / 43 | Limit switch Limit 1 with microswitch MS1 (optional) |
| 51 / 52 / 53 | Limit switch Limit 2 with microswitch MS2 (optional) |

* Only for options TZIDC Remote Sensor or TZIDC for remote position sensor.

Remarks: The TZIDC can be fitted either with proximity switches or microswitches as limit switches. It is not possible to combine both variants. For the version TZIDC control unit with TZIDC remote sensor, the limit switches are located in the TZIDC remote sensor.

| ANALOG INPUT (AI) | |
|---|---|
| Terminals | +11 / -12 |
| Nominal operating range | 4 to 20 mA, two-wire |
| Split range configuration | Can be parameterized between 20 and 100% of the nominal operating range |
| Operating range limits | 3,8 to 50 mA |
| Load voltage | 9,7 V at 20 mA |
| Impedance | 485 Ω at 20 mA |

| DIGITAL INPUT (DI) * | |
|---|---|
| Terminals | +81 / -82 |
| Supply voltage | 24 V DC (12 to 30 V DC) |
| Input “logical 0” | 0 to 55 V DC |
| Input “logical 1” | 11 to 30 V DC |
| Input current | Maximum 4 mA |

One of the following safety options can be selected: No function; Move to 0%; Move to 100%; Hold previous position; Block local configuration; Block local configuration and operation; Block any access (local or via PC).

| DIGITAL OUTPUT (DO) * | |
|---|---|
| Terminals | +83 / -84 |
| Supply voltage | 5 to 11 V DC (Control circuit in accordance with DIN 19234 / NAMUR) |
| Output “logical 0” | > 0,35 mA to < 1,2 mA |
| Output “logical 1” | > 2,1 mA |
| Direction of action | Configurable “logical 0” or “logical 1” |

* Output configurable as alarm output by software.

| MODULE FOR ANALOG FEEDBACK (AO) * | |
|---|---|
| Terminals | +31 / -32 |
| Signal range | 4 to 20 mA (split ranges can be parameterized) |
| Supply voltage (two-wire technology) | 24 V DC (11 to 30 V DC) |
| Characteristic curve | Rising or falling (configurable) |
| Deviation | < 1% |

Remarks: Without any signal from the positioner (e.g. “no power”, “initializing”, or in the event of an error), the module sets the output to >20 mA (alarm level).

* The modules for analog feedback and digital feedback have separate slots and can be used together.

| MODULE FOR DIGITAL FEEDBACK (SW) * | |
|---|---|
| Terminals | +41 / -42 and +51 / -52 |
| Supply voltage | 5 to 11 V DC (Control circuit in accordance with DIN 19234 / NAMUR) |
| Output “logical 0” | < 1,2 mA |
| Output “logical 1” | > 2,1 mA |
| Direction of action | Configurable “logical 0” or “logical 1” |
| Description | 2 software switches for binary position feedback (position adjustable within the range of 0 to 100%, ranges cannot overlap) |

* The modules for analog feedback and digital feedback have separate slots and can be used together.

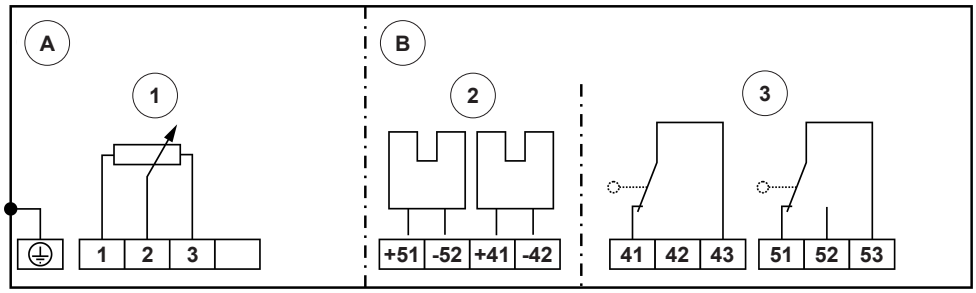
| LIMIT MONITOR WITH PROXIMITY SWITCHES (IS) | | |
|---|---|---|
| Terminals | +41 / -42 and +51 / -52 | |
| Supply voltage | 5 to 11 V DC (Control circuit in accordance with DIN 19234 / NAMUR) | |
| Direction of action | Metal tag in proximity switch | Metal tag outside proximity switch |
| Type SJ2-SN (NC) | < 1,2 mA | > 2,1 mA |

* Two switches for independent signaling of the actuator position with switching points adjustable between 0 and 100%.

| LIMIT MONITOR WITH 24V MICROSWITCHES (MS) * | |
|---|---|
| Terminals | +41 / -42 and +51 / -52 |
| Supply voltage | Maximum 24 V AC/DC |
| Load rating | Maximum 2 A |
| Contact surface | 10 µm Gold (AU) |

* Two switches for independent signaling of the actuator position with switching points adjustable between 0 and 100%.

## TZIDC REMOTE SENSOR




A *Basic device*

B *Options*

1 *Position sensor*

2 *Limit monitor with proximity switches (optional)*

3 *Limit monitor with microswitches (optional)*

| TERMINALS | |
|---|---|
| TERMINAL | DESCRIPTION / CONNECTION |
| 1 / 2 / 3 | TZIDC control unit |
| +51 / -52 | Proximity switches Limit 1 (optional) |
| +41 / -42 | Proximity switches Limit 2 (optional) |
| 41 / 42 / 43 | Microswitches Limit 1 (optional) |
| 51 / 52 / 53 | Microswitches Limit 2 (optional) |

Remarks: The TZIDC remote sensor can be fitted either with proximity switches or microswitches as limit switches. It is not possible to combine both variants.

**Remark:** For full product specifications, including requirements for use in potentially explosive atmospheres, different communication protocols (Profibus PA and FOUNDATION Fieldbus-H1) and others, please consult.

## ORDERING CODES TZIDC

| GROUP DESIGNATION | V18345 | 20 | 1 | 0 | 1 | 6 | 0 | 00 | 2 | |
|---|---|---|---|---|---|---|---|---|---|---|
| TZIDC – Electro-pneumatic positioner | **V18345** | | | | | | | | | |
| TZIDC-110 – Electro-pneumatic positioner, with PROFIBUS PA communication | **V18346** | | | | | | | | | |
| TZIDC-120 – Electro-pneumatic positioner, with FOUNDATION Fieldbus communication | **V18347** | | | | | | | | | |
| **ENCLOSURE MATERIAL** | | | | | | | | | | |
| Aluminium enclosure with mechanical position indicator | | **20** | | | | | | | | |
| Remote sensor control unit (only available with model code V18345) | | **70** | | | | | | | | |
| | | | | | | | | | | |
| **COMMUNICATION** | | | | | | | | | | |
| 4 to 20 mA, two-wire, with connector plug for LCI adapter (only available with model code V18345) | | | **1** | | | | | | | |
| 4 to 20 mA, two-wire, with connector plug for LCI adapter and FSK module for HART communication (only available with model code V18345) | | | **2** | | | | | | | |
| PROFIBUS PA (only available with model code V18346) | | | **3** | | | | | | | |
| FOUNDATION Fieldbus (only available with model code V18347) | | | **4** | | | | | | | |
| **EXPLOSION PROTECTION** | | | | | | | | | | |
| Without explosion protection | | | | **0** | | | | | | |
| ATEX II 2 G Ex ia IIC T6 resp. T4 Gb | Model code V18346 and V18347 | | | **1** | | | | | | |
| | Model code V18345 | | | **7** | | | | | | |
| FM/CSA | | | | **2** | | | | | | |
| IECEx ia IIC T6 resp. T4 Gb | Model code V18346 and V18347 | | | **5** | | | | | | |
| | Model code V18345 | | | **K** | | | | | | |
| | | | | | | | | | | |
| **OUTPUT / SAFE POSITION (IN CASE OF AN ELECTRIC POWER FAILURE)** | | | | | | | | | | |
| Single acting, fail safe | | | | | **1** | | | | | |
| Single acting, fail freeze | | | | | **2** | | | | | |
| Double acting, fail safe | | | | | **4** | | | | | |
| Double acting, fail freeze | | | | | **5** | | | | | |
| **CONNECTIONS** | | | | | | | | | | |
| Electrical: M20 x 1,5 without cable glands; Pneumatic: ISO 228 G 1/4" | | | | | | **6** | | | | |
| Electrical: 1/2" NPT without cable glands; Pneumatic: 1/4" NPT | | | | | | **2** | | | | |
| **MODULES FOR ANALOG AND DIGITAL POSITION FEEDBACK** | | | | | | | | | | |
| Without position feedback modules (must be selected in case of model code V18346 and V18347) | | | | | | | **0** | | | |
| Plug-in module for analog position feedback (AO), signal range 4 to 20 mA, two-wire | | | | | | | **1** | | | |
| Plug-in module for digital position feedback (SW) | | | | | | | **3** | | | |
| Plug-in module for analog position feedback (AO), signal range 4 to 20 mA, two-wire, and digital position feedback (SW) | | | | | | | **5** | | | |
| **MECHANICAL KIT FOR DIGITAL POSITION FEEDBACK** | | | | | | | | | | |
| Without mechanical digital feedback modules | | | | | | | | **00** | | |
| Mechanical kit for digital position feedback with proximity switches SJ2-SN (IS), NC or logical 1 **(a)** | | | | | | | | **10** | | |
| Mechanical kit for digital position feedback with 24 V microswitches (MS), change-over contacts **(b)** | | | | | | | | **50** | | |
| **DESIGN** | | | | | | | | | | |
| Standard | | | | | | | | | **2** | |
| Protection Class IP 66 / NEMA 4X (only available with model code V18345) | | | | | | | | | **P** | |
| Increased Corrosion Protection (incl. Protection Class IP66 in case of model code V18346 and V18347) | | | | | | | | | **S** | |
| **SPECIAL CONSTRUCTION / ADDITIONAL OPTIONS** | | | | | | | | | | |
| A full description must to be provided and validated in case of a non-standard construction. | | | | | | | | | | **E** |

**(a)** Not available with IECEx explosion protection.

**(b)** Not available with explosion protection.



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| ORDERING CODES TZIDC | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **GROUP DESIGNATION** | **V18348** | **20** | **1** | **1** | **1** | **1** | **0** | **0** | **1** | **1** | |
| TZIDC-200 – Electro-pneumatic positioner, with flameproof enclosure | **V18348** | | | | | | | | | | |
| **ENCLOSURE MATERIAL** | | | | | | | | | | | |
| Aluminium enclosure with mechanical position indicator without transparent window for LCD | | **20** | | | | | | | | | |
| | | | | | | | | | | | |
| **COMMUNICATION** | | | | | | | | | | | |
| 4 to 20 mA, two-wire, with connector plug for LCI adapter and HART communication | | | **1** | | | | | | | | |
| **EXPLOSION PROTECTION** | | | | | | | | | | | |
| ATEX Ex d II C T4/T5/T6 Gb | | | | **1** | | | | | | | |
| IECEx Ex d II C T4/T5/T6 Gb | | | | **6** | | | | | | | |
| | | | | | | | | | | | |
| **OUTPUT / SAFE POSITION (IN CASE OF AN ELECTRIC POWER FAILURE)** | | | | | | | | | | | |
| Single acting, fail safe | | | | | **1** | | | | | | |
| Single acting, fail freeze | | | | | **2** | | | | | | |
| Double acting, fail safe | | | | | **3** | | | | | | |
| Double acting, fail freeze | | | | | **4** | | | | | | |
| **CONNECTIONS** | | | | | | | | | | | |
| Electrical: M20 x 1,5 without cable glands; Pneumatic: ISO 228 G 1/4" | | | | | | **1** | | | | | |
| Electrical: 1/2" NPT without cable glands; Pneumatic: 1/4" NPT | | | | | | **3** | | | | | |
| **MODULES FOR ANALOG AND DIGITAL POSITION FEEDBACK** | | | | | | | | | | | |
| Without position feedback modules (must be selected in case of model code V18346 and V18347) | | | | | | | **0** | | | | |
| Plug-in module for analog position feedback (AO), signal range 4 to 20 mA, two-wire | | | | | | | **1** | | | | |
| Plug-in module for digital position feedback (SW) | | | | | | | **3** | | | | |
| Plug-in module for analog position feedback (AO), signal range 4 to 20 mA, two-wire, and digital position feedback (SW) | | | | | | | **4** | | | | |
| **MECHANICAL KIT FOR DIGITAL POSITION FEEDBACK** | | | | | | | | | | | |
| Without mechanical digital feedback modules | | | | | | | | **0** | | | |
| Mechanical kit for digital position feedback with proximity switches SJ2-SN (IS), NC or logical 1 **(a)** | | | | | | | | **1** | | | |
| Mechanical kit for digital position feedback with 24 V microswitches (MS), change-over contacts | | | | | | | | **3** | | | |
| **PARAMETER SETTING / BUS ADDRESS** | | | | | | | | | | | |
| Factory setting for HART devices | | | | | | | | | **1** | | |
| **DESIGN** | | | | | | | | | | | |
| Standard | | | | | | | | | | **1** | |
| Protection Class IP 66 | | | | | | | | | | **P** | |
| **SPECIAL CONSTRUCTION / ADDITIONAL OPTIONS** | | | | | | | | | | | |
| A full description must to be provided and validated in case of a non-standard construction. | | | | | | | | | | | **E** |

**(a)** Not available with IECEx explosion protection.



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