



# FU 522

## Electronic Pressure Switch

with IO-Link interface

Stainless Steel Sensor

accuracy according to IEC 60770:  
0.35 % FSO

### Nominal pressure

from 0 ... 100 mbar up to 0 ... 600 bar

### Digital output signal

IO-Link according to specification V 1.1

Smart sensor profile

Data transfer 38.4 kBaud

2 contacts

### Analog output (optional)

4 ... 20 mA or 0 ... 10 V

### Special characteristics

- ▶ indication of measured values on a 4-digit LED display
- ▶ rotatable and configurable display module
- ▶ parameter settings via IO-Link or menu (VDMA-conform)

### Optional versions

- ▶ different mechanical connections
- ▶ customer specific versions

The electronic pressure switch FU 522 is equipped with an IO-Link interface as standard in order to exchange process data, diagnostic reports and status messages with a superordinate control level. The parameters are set either also via the control level or via the VDMA-compliant menu system, which can be carried out at a local level using two keys.

The FU 522 is designed for the mechanical engineering and plant engineering sectors. A large number of inch threads, metric threads or NPT threads are available to users in order to ensure optimum integration in the application. In addition, unusual display positions can be compensated to the multiple rotatability of the display so that the user is able to read the vital information without any problems.

### Preferred areas of use are



Plant and machine engineering

- machine tools
- pneumatic plants
- hydraulic plants



| Input pressure range   |       |          |      |      |      |      |      |     |     |     |    |    |
|------------------------|-------|----------|------|------|------|------|------|-----|-----|-----|----|----|
| Nominal pressure gauge | [bar] | -1 ... 0 | 0.10 | 0.16 | 0.25 | 0.40 | 0.60 | 1   | 1.6 | 2.5 | 4  | 6  |
| Nominal pressure abs.  | [bar] | -        | -    | -    | -    | 0.40 | 0.60 | 1   | 1.6 | 2.5 | 4  | 6  |
| Overpressure (static)  | [bar] | 5        | 0.5  | 1    | 1    | 2    | 5    | 5   | 10  | 10  | 20 | 40 |
| Burst pressure $\geq$  | [bar] | 7.5      | 1.5  | 1.5  | 1.5  | 3    | 7.5  | 7.5 | 15  | 15  | 25 | 50 |

|                                     |                                                                       |     |     |     |     |     |      |      |      |      |
|-------------------------------------|-----------------------------------------------------------------------|-----|-----|-----|-----|-----|------|------|------|------|
| Nominal pressure gauge / abs. [bar] | 10                                                                    | 16  | 25  | 40  | 60  | 100 | 160  | 250  | 400  | 600  |
| Overpressure (static) [bar]         | 40                                                                    | 80  | 80  | 105 | 210 | 210 | 600  | 1000 | 1000 | 1000 |
| Burst pressure $\geq$ [bar]         | 50                                                                    | 120 | 120 | 210 | 420 | 420 | 1000 | 1250 | 1250 | 1800 |
| Vacuum resistance                   | $P_N \geq 1$ bar: fully vacuum resistant<br>$P_N < 1$ bar: on request |     |     |     |     |     |      |      |      |      |

| Contact                                   |                                                         |
|-------------------------------------------|---------------------------------------------------------|
| Voltage supply                            | $V_S = 18 \dots 30 V_{DC}$                              |
|                                           | <b>Output signal 1</b><br><b>Output signal 2</b>        |
| Standard                                  | IO-Link / SIO (PNP or NPN) + 1 PNP contact              |
| Optional                                  | IO-Link / SIO (PNP or NPN) + 1 NPN contact (on request) |
| Switching current                         | 200 mA                                                  |
| Accuracy of switching points <sup>1</sup> | $\leq \pm 0.35 \% FSO$                                  |
| Repeatability                             | $\leq \pm 0.1 \% FSO$                                   |
| Switching frequency                       | max. 200 Hz                                             |
| Switching cycles                          | $> 100 \times 10^6$                                     |
| Delay time                                | 0.0 ... 50.0 sec                                        |

| Analog output (optional) |                                                                                                                |
|--------------------------|----------------------------------------------------------------------------------------------------------------|
|                          | <b>Output signal 1</b><br><b>Output signal 2</b>                                                               |
| Voltage (3-wire)         | IO-Link / SIO (PNP or NPN) + 0 ... 10 V permissible load: $R_{min} \geq 10 k\Omega$                            |
| Current (3-wire)         | IO-Link / SIO (PNP or NPN) + 4 ... 20 mA permissible load: $R_{max} \leq 330 \Omega$                           |
| Accuracy <sup>1</sup>    | nominal pressure $\geq 0.4$ bar: $\leq \pm 0.35 \% FSO$<br>nominal pressure $< 0.4$ bar: $\leq \pm 0.5 \% FSO$ |
| Influence effects        | supply: 0.05 % FSO<br>load: $\leq 0.1 \% FSO$                                                                  |
| Long term stability      | $\leq \pm 0.3 \% FSO$ / year at reference conditions                                                           |
| Response time            | $< 12$ msec                                                                                                    |

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

| Thermal effects (Offset and Span) |         |                 |              |              |
|-----------------------------------|---------|-----------------|--------------|--------------|
| Nominal pressure $P_N$            | [bar]   | -1 ... 0        | $< 0.40$     | $\geq 0.40$  |
| Tolerance band                    | [% FSO] | $\leq \pm 0.75$ | $\leq \pm 1$ | $\leq \pm 1$ |
| in compensated range              | [°C]    | -20 ... 85      | 0 ... 70     | -20 ... 85   |

| Permissible temperatures |                                                                                             |
|--------------------------|---------------------------------------------------------------------------------------------|
| Permissible temperatures | medium: -40 ... 125 °C<br>electronics/environment: -40 ... 85 °C<br>storage: -40 ... 100 °C |

| Electrical protection         |                                             |
|-------------------------------|---------------------------------------------|
| Short-circuit protection      | permanent                                   |
| Reverse polarity protection   | no damage, but also no function             |
| Electromagnetic compatibility | emission and immunity according to EN 61326 |

| IO-Link       |                    |
|---------------|--------------------|
| Interface     | IO-Link 1.1; Slave |
| Data transfer | COM2, 38.4 kBaud   |
| Mode          | SIO / IO-Link      |
| Standard      | IEC 61131-9        |

| Mechanical stability |                                                      |
|----------------------|------------------------------------------------------|
| Vibration            | 10 g / 25 Hz ... 2 kHz according to DIN EN 60068-2-6 |
| Shock                | 500 g / 1 ms ec according to DIN EN 60068-2-27       |

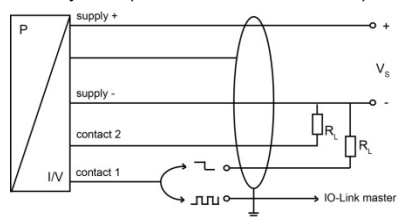
| Materials               |                                                                                                                                                                                                                                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pressure port / Housing | stainless steel 1.4404 (316L)                                                                                                                                                                                                                    |
| Display housing         | standard: PA 6.6                                                                                                                                                                                                                                 |
| Seals (media wetted)    | standard: FKM<br>option: EPDM others on request                                                                                                                                                                                                  |
| Diaphragm               | stainless steel 1.4435 others on request                                                                                                                                                                                                         |
| Media wetted parts      | pressure port, seal, diaphragm                                                                                                                                                                                                                   |
| Miscellaneous           |                                                                                                                                                                                                                                                  |
| Display                 | 4-digit, red LED display, digit height 7 mm,<br>range of indication -1999 ... +9999, visible range 22.5 x 10.5 mm,<br>4 LED's for unit switching (bar, mbar, PSI, MPa)<br>status display contact: contact 1 : LED, green, contact 2: LED, yellow |
| Operation               | 2 buttons / functions according to VDMA 24574-1                                                                                                                                                                                                  |
| Turn-on time            | 110 msec                                                                                                                                                                                                                                         |
| Weight                  | approx. 220 g                                                                                                                                                                                                                                    |
| Operational life        | 100 million load cycles                                                                                                                                                                                                                          |
| Current consumption     | < 40 mA                                                                                                                                                                                                                                          |
| Protection class        | IP 65 / IP 67                                                                                                                                                                                                                                    |
| Installation position   | any <sup>2</sup>                                                                                                                                                                                                                                 |
| CE-conformity           | EMC Directive: 2014/30/EU<br>Pressure Equipment Directive: 2014/68/EU (module A) <sup>3</sup>                                                                                                                                                    |

<sup>2</sup> Pressure transmitters are calibrated vertically with pressure port downwards. Changing the installation position could lead to minor zero offsets for pressure ranges  $P_N \leq 1$  bar.

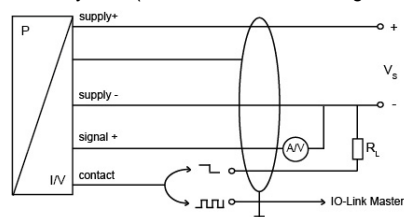
<sup>3</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar.

### Wiring diagrams

3-wire-system (IO-Link / SIO with contact)



3-wire-system (IO-Link / SIO with analogue output)

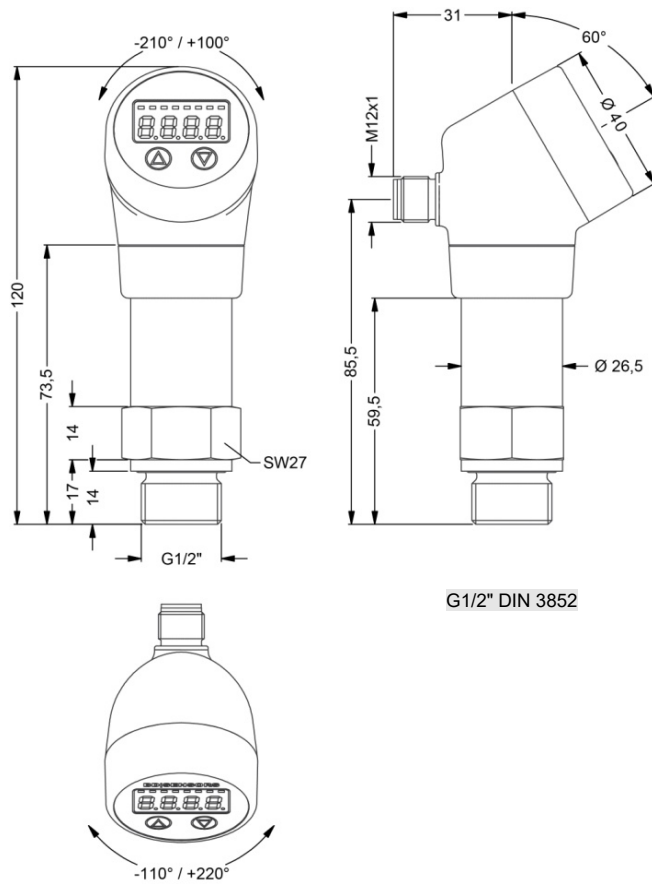


### Pin configuration

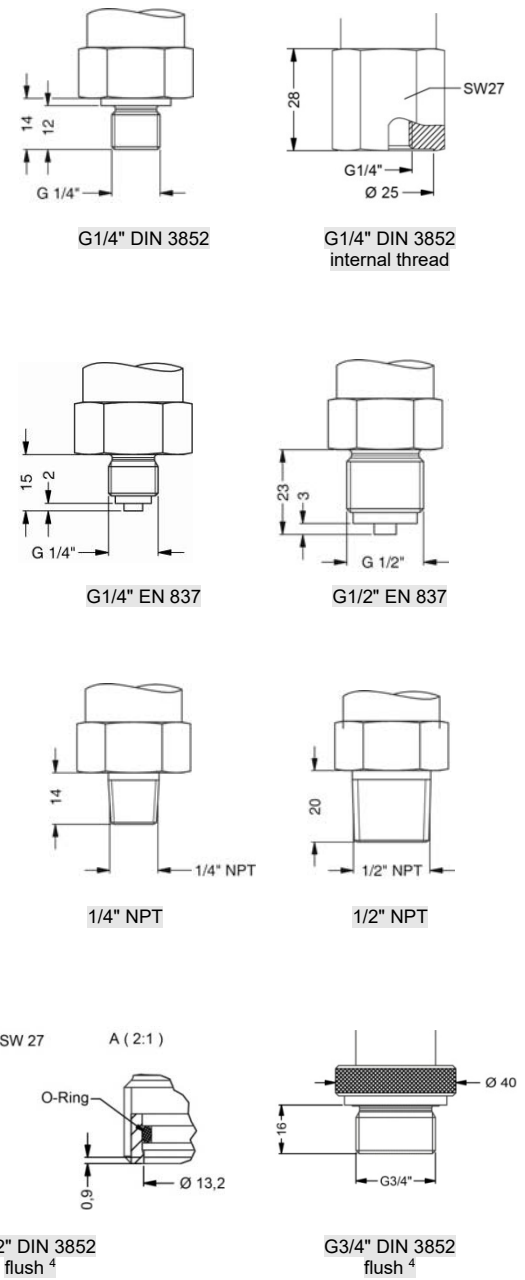
| Electrical connections    | M12x1 (4-pin) metal<br>(without analogue output) | M12x1 (4-pin) metal<br>(with analogue output) |
|---------------------------|--------------------------------------------------|-----------------------------------------------|
| Supply +                  | 1                                                | 1                                             |
| Supply -                  | 3                                                | 3                                             |
| Signal +                  | -                                                | 2                                             |
| Communication / contact 1 | 4                                                | 4                                             |
| Contact 2                 | 2                                                | -                                             |
| Shield                    | pressure port                                    | pressure port                                 |

## Mechanical connections (dimensions in mm)

### standard



### option



<sup>4</sup> not possible for nominal pressure PN > 40 bar and for vacuum ranges; for G3/4" flush absolute pressure on request

## Ordering code FU 522

FU 522

□□□ - □□□□ - □□ - □ - □ - □□□□ - □□□□ - □ - □□□□

| Pressure                                            |  |        |   |   |   |   |   |   |   |   |   |         |
|-----------------------------------------------------|--|--------|---|---|---|---|---|---|---|---|---|---------|
| gauge in bar                                        |  | 7      | 9 | 2 |   |   |   |   |   |   |   |         |
| absolute in bar <sup>1</sup>                        |  | 7      | 9 | 4 |   |   |   |   |   |   |   |         |
| Input                                               |  |        |   |   |   |   |   |   |   |   |   |         |
| [bar]                                               |  |        |   |   |   |   |   |   |   |   |   |         |
| 0.10 <sup>1</sup>                                   |  |        |   |   | 1 | 0 | 0 | 0 |   |   |   |         |
| 0.16 <sup>1</sup>                                   |  |        |   |   | 1 | 6 | 0 | 0 |   |   |   |         |
| 0.25 <sup>1</sup>                                   |  |        |   |   | 2 | 5 | 0 | 0 |   |   |   |         |
| 0.40                                                |  |        |   |   | 4 | 0 | 0 | 0 |   |   |   |         |
| 0.60                                                |  |        |   |   | 6 | 0 | 0 | 0 |   |   |   |         |
| 1.0                                                 |  |        |   |   | 1 | 0 | 0 | 1 |   |   |   |         |
| 1.6                                                 |  |        |   |   | 1 | 6 | 0 | 1 |   |   |   |         |
| 2.5                                                 |  |        |   |   | 2 | 5 | 0 | 1 |   |   |   |         |
| 4.0                                                 |  |        |   |   | 4 | 0 | 0 | 1 |   |   |   |         |
| 6.0                                                 |  |        |   |   | 6 | 0 | 0 | 1 |   |   |   |         |
| 10                                                  |  |        |   |   | 1 | 0 | 0 | 2 |   |   |   |         |
| 16                                                  |  |        |   |   | 1 | 6 | 0 | 2 |   |   |   |         |
| 25                                                  |  |        |   |   | 2 | 5 | 0 | 2 |   |   |   |         |
| 40                                                  |  |        |   |   | 4 | 0 | 0 | 2 |   |   |   |         |
| 60                                                  |  |        |   |   | 6 | 0 | 0 | 2 |   |   |   |         |
| 100                                                 |  |        |   |   | 1 | 0 | 0 | 3 |   |   |   |         |
| 160                                                 |  |        |   |   | 1 | 6 | 0 | 3 |   |   |   |         |
| 250                                                 |  |        |   |   | 2 | 5 | 0 | 3 |   |   |   |         |
| 400                                                 |  |        |   |   | 4 | 0 | 0 | 3 |   |   |   |         |
| 600                                                 |  |        |   |   | 6 | 0 | 0 | 3 |   |   |   |         |
| -1 ... 0                                            |  |        |   |   | X | 1 | 0 | 2 |   |   |   |         |
| customer                                            |  |        |   |   | 9 | 9 | 9 | 9 |   |   |   | consult |
| output                                              |  |        |   |   |   |   |   |   |   |   |   |         |
| IO-Link / SIO <sup>2</sup>                          |  |        |   |   |   |   | I | O |   |   |   |         |
| IO-Link / SIO + 0 ... 10 V / analogue <sup>3</sup>  |  |        |   |   |   |   | I | 3 |   |   |   |         |
| IO-Link / SIO + 4 ... 20 mA / analogue <sup>3</sup> |  |        |   |   |   |   | I | 7 |   |   |   |         |
| contact                                             |  |        |   |   |   |   |   |   |   |   |   |         |
| 1 x PNP                                             |  |        |   |   |   |   |   | 1 |   |   |   |         |
| 1 x NPN                                             |  |        |   |   |   |   |   | 5 |   |   |   |         |
| 2 x PNP                                             |  |        |   |   |   |   |   | 2 |   |   |   |         |
| 2 x NPN                                             |  |        |   |   |   |   |   | 6 |   |   |   | consult |
| customer                                            |  |        |   |   |   |   |   | 9 |   |   |   | consult |
| Accuracy                                            |  |        |   |   |   |   |   |   |   |   |   |         |
| standard for P <sub>N</sub> ≥ 0.4 bar               |  | 0.35 % |   |   |   |   |   | 3 |   |   |   |         |
| standard for P <sub>N</sub> < 0.4 bar               |  | 0.5 %  |   |   |   |   |   | 5 |   |   |   |         |
| customer                                            |  |        |   |   |   |   |   | 9 |   |   |   | consult |
| Electrical connection                               |  |        |   |   |   |   |   |   |   |   |   |         |
| Male plug M12x1 (4-pin) / metal                     |  |        |   |   |   |   | M | 2 | L |   |   |         |
| customer                                            |  |        |   |   |   |   | 9 | 9 | 9 |   |   | consult |
| Mechanical connection                               |  |        |   |   |   |   |   |   |   |   |   |         |
| G1/2" DIN 3852                                      |  |        |   |   |   |   |   |   | 1 | 0 | 0 |         |
| G1/2" EN 837                                        |  |        |   |   |   |   |   |   | 2 | 0 | 0 |         |
| G1/4" DIN 3852                                      |  |        |   |   |   |   |   |   | 3 | 0 | 0 |         |
| G1/4" DIN 3852, internal thread                     |  |        |   |   |   |   |   |   | J | 0 | 0 |         |
| G1/4" EN 837                                        |  |        |   |   |   |   |   |   | 4 | 0 | 0 |         |
| G1/2" DIN 3852 with <sup>4</sup>                    |  |        |   |   |   |   |   |   | F | 0 | 0 |         |
| flush sensor                                        |  |        |   |   |   |   |   |   |   |   |   |         |
| G3/4" DIN 3852 with <sup>4</sup>                    |  |        |   |   |   |   |   |   | K | 0 | 0 |         |
| flush sensor                                        |  |        |   |   |   |   |   |   |   |   |   |         |
| 1/2" NPT                                            |  |        |   |   |   |   |   |   | N | 0 | 0 |         |
| 1/4" NPT                                            |  |        |   |   |   |   |   |   | N | 4 | 0 |         |
| customer                                            |  |        |   |   |   |   |   |   | 9 | 9 | 9 | consult |
| Seals                                               |  |        |   |   |   |   |   |   |   |   |   |         |
| FKM                                                 |  |        |   |   |   |   |   |   |   | 1 |   |         |
| EPDM                                                |  |        |   |   |   |   |   |   |   | 3 |   |         |
| customer                                            |  |        |   |   |   |   |   |   |   | 9 |   | consult |
| Special version                                     |  |        |   |   |   |   |   |   |   |   |   |         |
| standard                                            |  |        |   |   |   |   |   |   |   | 0 | 0 | 0       |
| customer                                            |  |        |   |   |   |   |   |   |   | 9 | 9 | 9       |
|                                                     |  |        |   |   |   |   |   |   |   |   |   | consult |

<sup>1</sup> absolute pressure possible from 0.4 bar

<sup>2</sup> possible in combination with contact code 2, 6

<sup>3</sup> possible in combination with contact code 1, 5

<sup>4</sup> not possible for nominal pressure P<sub>N</sub> > 40 bar; also not possible for vacuum ranges; for G3/4" flush nominal pressure abs. on request