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**JUMO Process Control, Inc.**

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# JUMO MIDAS S05

## OEM pressure transmitter - universal

### Applications

- HVAC (Heating, Ventilating and Air Conditioning)
- Refrigeration
- Compressor construction
- Machine and plant engineering
- Packaging industry

### Brief description

The JUMO MIDAS S05 pressure transmitter is available with both relative pressure and absolute pressure measurement ranges.

The high-quality stainless steel welded measuring system with no seals ensures the instrument can be used in almost all media, even under harsh conditions. The design offers optimum protection against process medium escaping.

The instrument features a silicon sensor that is able to handle extreme overload, even in the



Type 401010  
with terminal box



Type 401010  
with M12x1 connector

lowest measuring ranges, and is capable of millions of pressure cycles.

### Customer benefits

#### • Economical

A high level of automation (digital compensation and calibration of the sensor assembly) reduces production time and manufacturing costs.

#### • Process safety

The piezoresistive silicon sensor is highly overload-resistant and long-term stable. The high quality of every pressure transmitter is ensured by the 100% final inspection within the fully automated measuring and calibration system.

#### • Time-saving, uncomplicated and versatile

There is little work involved in mounting the measuring instrument and electrical installation is simple. Universal: thanks to its modular configuration, it can be used in virtually every application.

### Special features

- 1 bar to 100 bar relative pressure, up to 25 bar in absolute pressure as well
- High level of process safety thanks to a welded measuring system with no seals
- Sturdy and maintenance-free measurement technology with extreme overload resistance
- 60% faster device installation with the Quickon fast-connection system
- Sturdy design for a long service life
- Parts in contact with media made of stainless steel

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## Technical data

### General information

|                             |                                                          |
|-----------------------------|----------------------------------------------------------|
| <b>Reference conditions</b> | DIN 16 086 and EN 60770                                  |
| <b>Sensor</b>               |                                                          |
| Material                    | Silicon sensor with stainless steel separating diaphragm |
| Pressure transfer medium    | Synthetic oil                                            |
| Permissible load change     | > 10 million                                             |
| <b>Location</b>             |                                                          |
| Mounting position           | Any                                                      |
| Calibration position        | Device standing upright, process connection on bottom    |

### Measuring range

|                                       |                                  |          |          |        |        |        |         |         |     |     |
|---------------------------------------|----------------------------------|----------|----------|--------|--------|--------|---------|---------|-----|-----|
| <b>Relative and absolute pressure</b> | Measuring ranges start at 0 bar. |          |          |        |        |        |         |         |     |     |
| Measuring range                       | 1                                | 1.6      | 2.5      | 4      | 6      | 10     | 16      | 25      | 40  | bar |
| Overload capacity <sup>a</sup>        | 4                                | 6        | 10       | 16     | 24     | 40     | 60      | 100     | 100 | bar |
| Bursting pressure                     | 6                                | 10       | 15       | 24     | 36     | 60     | 100     | 150     | 150 | bar |
| <b>Relative pressure</b>              | Measuring ranges start at 0 bar. |          |          |        |        |        |         |         |     |     |
| Measuring range                       | 60                               | 100      |          |        |        |        |         |         |     | bar |
| Overload capacity <sup>a</sup>        | 180                              | 180      |          |        |        |        |         |         |     | bar |
| Bursting pressure                     | 250                              | 250      |          |        |        |        |         |         |     | bar |
| <b>Relative pressure</b>              |                                  |          |          |        |        |        |         |         |     |     |
| Measuring range                       | -1 – 0                           | -1 – 0.6 | -1 – 1.5 | -1 – 3 | -1 – 5 | -1 – 9 | -1 – 15 | -1 – 24 |     | bar |
| Overload capacity <sup>a</sup>        | 4                                | 6        | 10       | 16     | 24     | 40     | 60      | 100     |     | bar |
| Bursting pressure                     | 6                                | 10       | 15       | 24     | 36     | 60     | 100     | 150     |     | bar |

<sup>a</sup> All pressure transmitters are vacuum-proof

### Output

|                                  |                                                                         |
|----------------------------------|-------------------------------------------------------------------------|
| <b>Output signal<sup>a</sup></b> |                                                                         |
| Current                          |                                                                         |
| Output 405                       | 4 – 20 mA, two wires                                                    |
| Voltage                          |                                                                         |
| Output 412                       | DC 0.5 – 4.5 V, three wires, ratiometric 10 – 90% of the supply voltage |
| Output 415                       | DC 0 – 10 V, three wires                                                |
| Output 418                       | DC 1 – 5 V, three wires                                                 |
| Output 420                       | DC 1 – 6 V, three wires                                                 |
| <b>Jump response</b>             |                                                                         |
| T <sub>90</sub>                  | ≤5 ms                                                                   |
| <b>Burden</b>                    |                                                                         |
| Current                          |                                                                         |
| 4 – 20 mA, two wires             | $R_i \leq (U_B - 8 \text{ V}) / 0.02 \text{ A } (\Omega)$               |
| Voltage                          |                                                                         |
| DC 0.5 – 4.5 V, three wires      | ≥ 5 kΩ                                                                  |
| DC 1 – 5 V, three wires          | ≥ 10 kΩ                                                                 |
| DC 1 – 6 V, three wires          | ≥ 10 kΩ                                                                 |
| DC 0 – 10 V, three wires         | ≥ 10 kΩ                                                                 |

<sup>a</sup> Additional outputs are available on request.

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## Mechanical properties

|                                          |                                                 |
|------------------------------------------|-------------------------------------------------|
| <b>Process connection</b>                |                                                 |
| Material                                 | Stainless steel 304 <sup>a</sup>                |
| <b>Membrane</b>                          |                                                 |
| Material                                 | Stainless steel 316L                            |
| <b>Enclosure</b>                         |                                                 |
| Material                                 | Stainless steel 304                             |
| <b>Electrical connection</b>             |                                                 |
| Material                                 |                                                 |
| Fixed cable, Electr. connection 11       | PBT-GF30, PVC                                   |
| Quickon, Electr. connection 23           | PBT-GF30                                        |
| Round plug M12x1, Electr. connection 36  | PBT-GF30, stainless steel 303                   |
| Bayonet connector, Electr. connection 53 | PBT-GF30                                        |
| Terminal box, Electr. connection 61      | PBT-GF30, PA, silicon                           |
| <b>Weight</b>                            | approx. 80 g with process connection 502 (G1/4) |

<sup>a</sup> Pressure transmitters with process connection 521 come with an FPM seal.

## Ambient conditions

|                                                   |                                                                              |
|---------------------------------------------------|------------------------------------------------------------------------------|
| <b>Permissible temperatures</b>                   |                                                                              |
| <b>Electrical connections 36, 53 or 61</b>        |                                                                              |
| Medium                                            | -40 – +125°C                                                                 |
| Environment                                       | -40 – +125°C                                                                 |
| Storage                                           | -40 – +125°C                                                                 |
| <b>Electrical connection 11</b>                   |                                                                              |
| Medium                                            | -40 – +125°C                                                                 |
| Environment                                       | -40 – +100°C                                                                 |
| Storage                                           | -40 – +100°C                                                                 |
| <b>At ambient temperature -50°C</b>               |                                                                              |
| Restricted function                               | Stationary use only, danger of broken cable                                  |
| <b>Permissible relative humidity</b>              |                                                                              |
| In operation                                      | 100% rel. humidity, incl. condensation on the outer sleeve of the instrument |
| Storage                                           | 90% relative humidity, no condensation                                       |
| <b>Permissible mechanical loading</b>             |                                                                              |
| Vibration resistance <sup>a</sup>                 | 20 g, 10 – 2000 Hz                                                           |
| Shock resistance <sup>b</sup>                     | 50 g for 11 ms<br>100 g for 1 ms                                             |
| <b>Electromagnetic compatibility</b>              |                                                                              |
| Interference emission <sup>c</sup>                | Class B                                                                      |
| Interference immunity <sup>c</sup>                | Industrial requirements                                                      |
| <b>Enclosure protection<sup>d</sup></b>           |                                                                              |
| Fixed cable, Electr. connection 11                |                                                                              |
| Relative pressure measuring ranges                | IP66                                                                         |
| Absolute pressure measuring ranges                | IP67                                                                         |
| Quickon, Electr. connection 23                    | IP66                                                                         |
| M12x1 round plug, Electr. connection 36           | IP66                                                                         |
| Bayonet connector, Electr. connection 53          | IP67                                                                         |
| Terminal box <sup>e</sup> , Electr. connection 61 | IP65                                                                         |

<sup>a</sup> IEC 60068-2-6

<sup>b</sup> IEC 60068-2-27

<sup>c</sup> EN 61326-2-3

<sup>d</sup> EN 60529

<sup>e</sup> Connecting cable diameter is min. 5 mm, max. 7 mm.

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## Accuracy

| Relative and absolute pressure      | Measuring ranges start at 0 bar. |          |          |        |        |        |         |         |     |         |
|-------------------------------------|----------------------------------|----------|----------|--------|--------|--------|---------|---------|-----|---------|
| Measuring range                     | 1                                | 1.6      | 2.5      | 4      | 6      | 10     | 16      | 25      | 40  | bar     |
| Linearity <sup>a</sup>              | 0.3                              | 0.25     | 0.25     | 0.25   | 0.25   | 0.25   | 0.2     | 0.2     | 0.2 | % of FS |
| Accuracy, 20°C <sup>b</sup>         | 0.6                              | 0.5      | 0.5      | 0.5    | 0.5    | 0.5    | 0.5     | 0.5     | 0.5 | % of FS |
| Accuracy, -20 – +100°C <sup>c</sup> | 1.5                              | 1.4      | 1.3      | 1.2    | 1.2    | 1.0    | 1.0     | 1.0     | 1.0 | % of FS |
| Relative pressure                   | Measuring ranges start at 0 bar. |          |          |        |        |        |         |         |     |         |
| Measuring range                     | 60                               | 100      |          |        |        |        |         |         |     | bar     |
| Linearity <sup>a</sup>              | 0.2                              | 0.2      |          |        |        |        |         |         |     | % of FS |
| Accuracy, 20°C <sup>b</sup>         | 0.5                              | 0.5      |          |        |        |        |         |         |     | % of FS |
| Accuracy, -20 – +100°C <sup>c</sup> | 1.0                              | 1.0      |          |        |        |        |         |         |     | % of FS |
| Relative pressure                   |                                  |          |          |        |        |        |         |         |     |         |
| Measuring range                     | -1 – 0                           | -1 – 0.6 | -1 – 1.5 | -1 – 3 | -1 – 5 | -1 – 9 | -1 – 15 | -1 – 24 |     | bar     |
| Linearity <sup>a</sup>              | 0.3                              | 0.3      | 0.3      | 0.3    | 0.25   | 0.25   | 0.25    | 0.2     |     | % of FS |
| Accuracy, 20°C <sup>b</sup>         | 0.6                              | 0.6      | 0.6      | 0.5    | 0.5    | 0.5    | 0.5     | 0.5     |     | % of FS |
| Accuracy, -20 – +100°C <sup>c</sup> | 1.5                              | 1.5      | 1.4      | 1.3    | 1.3    | 1.2    | 1.0     | 1.0     |     | % of FS |
| Long-term stability <sup>d</sup>    | < 0.2% of FS                     |          |          |        |        |        |         |         |     |         |

<sup>a</sup> Linearity based on limit point setting

<sup>b</sup> Includes: linearity, hysteresis, repeatability, deviation from initial and full scale values of the measuring range

<sup>c</sup> Includes: linearity, hysteresis, repeatability, deviation from initial and final values of measuring range, thermal effect on initial value of measuring range and span

<sup>d</sup> EN 61298-1

## Auxiliary power

|                                                 |              |            |                 |                                                                                  |
|-------------------------------------------------|--------------|------------|-----------------|----------------------------------------------------------------------------------|
| <b>Supply voltage U<sub>B</sub><sup>a</sup></b> |              |            |                 |                                                                                  |
| 4 – 20 mA,                                      | two wires,   | output 405 | DC 8 – 30 V,    | nominal power supply DC 24 V                                                     |
| DC 0.5 – 4.5 V,                                 | three wires, | output 412 | DC 3 – 5.25 V,  | nominal supply voltage DC 5 V, radiometric output 10 – 90% of the supply voltage |
| DC 0 – 10 V,                                    | three wires, | output 415 | DC 11,5 – 30 V, | nominal power supply DC 24 V                                                     |
| DC 1 – 5 V,                                     | three wires, | output 418 | DC 8 – 30 V,    | nominal power supply DC 24 V                                                     |
| DC 1 – 6 V,                                     | three wires, | output 420 | DC 8 – 30 V,    | nominal power supply DC 24 V                                                     |
| <b>Power consumption</b>                        |              |            | ≤ 25 mA         |                                                                                  |
| <b>Reverse polarity protection</b>              |              |            | Yes             |                                                                                  |
| <b>Circuit</b>                                  |              |            | SELV            |                                                                                  |

<sup>a</sup> Residual ripple: Peak voltages must **not** exceed or fall below the values specified for the supply voltage!

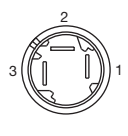
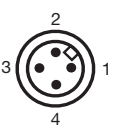
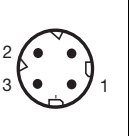
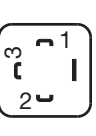
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## Connection diagram

| Connection                                                                               |                 | Terminal assignment <sup>a</sup>                                                  |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
|------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                          |                 |  |  |  |  |  |
|                                                                                          |                 | 11<br>Fixed cable                                                                 | 23<br>Quickon                                                                      | 36<br>Round plug,<br>M12x1                                                          | 53<br>Bayonet                                                                       | 61<br>Terminal<br>box                                                               |
| <b>4 – 20 mA, two wires, output 405</b>                                                  |                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Supply voltage 8 – 30 V DC                                                               | UB/S+<br>0 V/S- | White<br>Brown                                                                    | 1<br>3                                                                             | 1<br>3                                                                              | 1<br>2                                                                              | 1<br>2                                                                              |
| <b>DC 0.5 – 4.5 V Ratiometric, output 412</b>                                            |                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Supply voltage DC 3 – 5.25 V                                                             | UB              | White                                                                             | 1                                                                                  | 1                                                                                   | 1                                                                                   | 1                                                                                   |
| Ratiometric output 10 – 90 % of the supply voltage                                       | 0 V/S-<br>S+    | Brown<br>Yellow                                                                   | 2<br>3                                                                             | 2<br>3                                                                              | 2<br>3                                                                              | 2<br>3                                                                              |
| <b>DC 0 – 10 V, three wires, output 415</b>                                              |                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Supply voltage DC 11.5 – 30 V                                                            | UB              | White                                                                             | 1                                                                                  | 1                                                                                   | 1                                                                                   | 1                                                                                   |
|                                                                                          | 0 V/S-<br>S+    | Brown<br>Yellow                                                                   | 2<br>3                                                                             | 2<br>3                                                                              | 2<br>3                                                                              | 2<br>3                                                                              |
| <b>DC 1 – 5 V, three wires, output 418</b><br><b>DC 1 – 6 V, three wires, output 420</b> |                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Supply voltage DC 8 – 30 V                                                               | UB              | White                                                                             | 1                                                                                  | 1                                                                                   | 1                                                                                   | 1                                                                                   |
|                                                                                          | 0 V/S-<br>S+    | Brown<br>Yellow                                                                   | 2<br>3                                                                             | 2<br>3                                                                              | 2<br>3                                                                              | 2<br>3                                                                              |

<sup>a</sup> Illustration shows the pressure transmitter connector

|                                            |  |            |            |                                                                         |
|--------------------------------------------|--|------------|------------|-------------------------------------------------------------------------|
| <b>Color assignment: Round plug, M12x1</b> |  | 1 bn Brown | 4 bk Black | The color assignment applies<br><b>only</b> to A-coded standard cables! |
|                                            |  | 2 wh White | 5 gy Gray  |                                                                         |
|                                            |  | 3 bu Blue  |            |                                                                         |

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## Dimensions

### Electrical connection

| 11<br>Fixed cable | 23<br>Quickon | 36<br>Round plug, M12x1 | 53<br>Bayonet connector | 61<br>Terminal box |
|-------------------|---------------|-------------------------|-------------------------|--------------------|
|                   |               |                         |                         |                    |

### Process connection

| 501<br>G1/8 | 502<br>G1/4 | 504<br>G1/2 | 511<br>1/4 - 18 NPT |
|-------------|-------------|-------------|---------------------|
|             |             |             |                     |

| 521<br>G1/4 | 562<br>7/16-20 UNF | 563<br>7/16 UNF inside |
|-------------|--------------------|------------------------|
|             |                    |                        |

A = G1/4 profile seal

B = 7/16-20 UNF inside, with valve core depressor

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## Order details

**(1) Basic type**

401010/000 JUMO MIDAS S05 pressure transmitter  
401010/999 JUMO MIDAS S05 pressure transmitter, special design

**(2) Input**

454 0 – 1 bar relative pressure  
455 0 – 1.6 bar relative pressure  
456 0 – 2.5 bar relative pressure  
457 0 – 4 bar relative pressure  
458 0 – 6 bar relative pressure  
459 0 – 10 bar relative pressure  
460 0 – 16 bar relative pressure  
461 0 – 25 bar relative pressure  
462 0 – 40 bar relative pressure  
463 0 – 60 bar relative pressure  
464 0 – 100 bar relative pressure  
  
478 -1 – 0 bar relative pressure  
479 -1 – 600 mbar relative pressure  
480 -1 – 1.5 bar relative pressure  
481 -1 – 3 bar relative pressure  
482 -1 – 5 bar relative pressure  
483 -1 – 9 bar relative pressure  
484 -1 – 15 bar relative pressure  
485 -1 – 24 bar relative pressure  
  
488 0 – 1 bar absolute pressure  
489 0 – 1.6 bar absolute pressure  
490 0 – 2.5 bar absolute pressure  
491 0 – 4 bar absolute pressure  
492 0 – 6 bar absolute pressure  
493 0 – 10 bar absolute pressure  
494 0 – 16 bar absolute pressure  
495 0 – 25 bar absolute pressure  
  
998 Special measuring range for absolute pressure  
999 Special measuring range for relative pressure

**(3) Output**

405 4 – 20 mA, two wires  
412 DC 0.5 – 4.5 V, three wires  
415 DC 0 – 10 V, three wires  
418 DC 1 – 5 V, three wires  
420 DC 1 – 6 V, three wires

**(4) Process connection**

501 G 1/8 to DIN EN 837  
502 G 1/4 to DIN EN 837  
504 G 1/2 to DIN EN 837  
511 1/4-18 NPT to DIN 837  
521 G1/4 to DIN 3852 T11  
562 7/16 - 20 UNF  
563 7/16 - 20 UNF inside, with valve opener

**(5) Process connection material**

20 CrNi (stainless steel)

**(6) Electrical connection**

11 Fixed cable <sup>a</sup>  
23 Quickon  
36 Round plug, M12x1  
53 Bayonet instrument connector DIN 72585<sup>b</sup>  
61 Terminal box EN 175301-803, Form A, ex DIN 43650

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**(7) Extra codes**

|     |                                        |
|-----|----------------------------------------|
| 000 | No extra code                          |
| 591 | Throttle in pressure channel           |
| 624 | Free of oil and grease                 |
| 630 | Enlarged pressure channel <sup>c</sup> |

**Notes on the order details**

**a Electrical connection 11**

Standard: 2 m fixed cable, other lengths available on request

**b Electrical connection 53**

Bayonet connector DIN 72585-A1-3.1-Sn/K1

**c Extra code 630**

Diameter 6 mm for process connection 501

Diameter 8 mm for process connections 511 and 521

|              | (1)                  | (2)                    | (3)                    | (4)                    | (5)                    | (6)                    | (7)                    | (7)   |
|--------------|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------|
| Order code   | <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | / <input type="text"/> | , ... |
| Sample order | 401010/000           | - 459                  | - 405                  | - 504                  | - 20                   | - 61                   | / 591                  | , 624 |

**Minimum order quantity for production orders: 5 units**

**Minimum order quantity for storage orders: 1 unit**

**Stock versions**

| Order code                       | Description                                        | Part no. |
|----------------------------------|----------------------------------------------------|----------|
| 401010/000-456-405-502-20-61/000 | 0 – 2.5 bar; 4 – 20 mA; G1/4; terminal box         | 43012486 |
| 401010/000-457-405-502-20-61/000 | 0 – 4 bar; 4 – 20 mA; G1/4; terminal box           | 00517155 |
| 401010/000-458-405-502-20-61/000 | 0 – 6 bar; 4 – 20 mA; G1/4; terminal box           | 00517148 |
| 401010/000-459-405-502-20-61/000 | 0 – 10 bar; 4 – 20 mA; G1/4; terminal box          | 00517139 |
| 401010/000-459-405-563-20-61/000 | 0 – 10 bar; 4 – 20 mA; 7/16-20UNF; terminal box    | 43012540 |
| 401010/000-460-405-502-20-61/000 | 0 – 16 bar; 4 – 20 mA; G1/4; terminal box          | 00517133 |
| 401010/000-461-405-502-20-61/000 | 0 – 25 bar; 4 – 20 mA; G1/4; terminal box          | 00523660 |
| 401010/000-483-405-563-20-61/000 | -1 – 9 bar; 4 – 20 mA; 7/16 – 20 UNF; terminal box | 00531777 |
| 401010/000-491-405-502-20-61/000 | 0 – 4 bar abs.; 4 – 20 mA; G1/4; terminal box      | 43012517 |
| 401010/000-492-405-502-20-61/000 | 0 – 6 bar abs.; 4 – 20 mA; G1/4; terminal box      | 00526283 |

**Accessories**

| Description                                           | Part no. |
|-------------------------------------------------------|----------|
| Cable connector, straight, 4-pin, M12x1, 2m PVC cable | 00404585 |
| Cable connector, angled, 4-pin, M12x1, 2m PVC cable   | 00409334 |