



Differential pressure transmitter



# Huba Control

## Relative and differential pressure transmitter

### Type 699M

The pressure transmitter 699M is used primarily for the monitoring of air and neutral gasses. The unit is optionally available with one or two differential pressure sensors, which allows the observation of differential pressure or volumetric flow at two individual points in the system. This makes the 699M ideally suited for a multitude of tasks in the HVAC industry.

The 699M communicates via Modbus® RTU and features two universal inputs in addition to two analog outputs. The linking of further sensors and control of actuators offers the option of using the unit as a decentralized node for existing controllers, extending in- and outputs, and lowering installation costs.

The sensors utilized by the unit are based on the unique and well-proven ceramic strain-gauge beam technology developed by Huba Control AG.

## Pressure range

**0 ... 500 – 7000 Pa**

- + High accuracy and long-term stability via ceramic strain-gauge technology
- + Modbus® RTU interface
- + Available with one or two differential pressure sensor units
- + Up to two universal inputs for 0 ... 10 V or passive temperature elements
- + Two 0 ... 10 V analog outputs
- + Simple installation, reduced wiring effort through decentralized node

## Technical overview

### Pressure range

|                           |                                   |
|---------------------------|-----------------------------------|
| Relative and differential | 0 ... 500 – 7000 Pa               |
| Measuring variables       | Pa, psi, mmHG, mmH <sub>2</sub> O |

### Operating conditions

|                                             |                                        |                |
|---------------------------------------------|----------------------------------------|----------------|
| Medium                                      | Air and neutral gases (not condensing) |                |
| Temperature                                 | Medium                                 | 0 ... +70 °C   |
|                                             | Ambient                                | -25 ... +50 °C |
|                                             | Storage                                | -30 ... +70 °C |
|                                             | No condensation                        |                |
| Tolerable overload on one side (short-term) | P+ = 10'000 Pa / P- = 400 Pa           |                |
| Rupture pressure                            | Ambient temperature                    | 20'000 Pa      |
|                                             | 70 °C                                  | 15'000 Pa      |

### Materials in contact with medium

|           |                                              |
|-----------|----------------------------------------------|
| Sensor    | Ceramic Al <sub>2</sub> O <sub>3</sub> (96%) |
| Diaphragm | Silicone                                     |
| Housing   | Polycarbonat PC / Polyamide (PA)             |

### Electrical overview

|                              |                                                                                                                                        |            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------|
| Power consumption            | < 2 VA                                                                                                                                 |            |
| Power supply                 | 24 VAC/DC ±15%                                                                                                                         |            |
| Voltage outputs              | 2x 0 ... 10 V                                                                                                                          |            |
| Universal inputs             | 2x 0 ... 10 V / PT1000 / LG-Ni1000 / NTC10K / Ni1000                                                                                   |            |
| Response time                | < 1 s                                                                                                                                  |            |
| Polarity reversal protection | Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage. |            |
| Wire length                  | signal wiring                                                                                                                          | max. 50 m  |
|                              | Modbus® wiring                                                                                                                         | max. 100 m |

### Protection standard

|       |                  |
|-------|------------------|
| IP 54 | Protection class |
|-------|------------------|

III

### Modbus®

|                        |                                                  |
|------------------------|--------------------------------------------------|
| Address range          | 1-247 (40 = default if DIP = 0)                  |
| Baudrate               | 9'600 - 57'600                                   |
| Format                 | Modbus® RTU                                      |
| Line termination       | selectable via DIP-Switch                        |
| Hardware               | RS485                                            |
| Standard configuration | selectable via DIP-Switch                        |
|                        | 9600E1 (9600 baud rate, 1 stop bit, even parity) |

### Interface

|             |                                                  |
|-------------|--------------------------------------------------|
| Push button | Zero point reset, reset on factory setting       |
| DIP switch  | Modbus® adress, baud rate, parity and scheduling |
| LED         | Status indication (red, yellow, green, blue)     |

### Electrical connection

|                                                                                                                                |  |
|--------------------------------------------------------------------------------------------------------------------------------|--|
| Screw terminals for wire and stranded conductors up to 2.5 mm²                                                                 |  |
| 2 x cable bushing  15 for cable Ø 3 - 6 mm  |  |
| 2 x cable bushing  20 for cable Ø 5 - 10 mm |  |

### Analogue outputs A01, A02

|                |              |      |         |
|----------------|--------------|------|---------|
| Accuracy       | 0 ... 10 VDC | 0 V  | ±66 mV  |
|                |              | 5 V  | ±95 mV  |
|                |              | 10 V | ±124 mV |
| Resolution     | < 11 mV      |      |         |
| Output current | max. 1 mA    |      |         |

### Analogue inputs AI1, AI2

|                  |                            |                  | Accuracy      | Resolution | TK/B <sub>25/85</sub> |
|------------------|----------------------------|------------------|---------------|------------|-----------------------|
|                  |                            |                  |               |            |                       |
| Accuracy         | configured as PT1000       | -50 ... +150°C   | ±0.5 K        | 0.1 K      | 3850 ppm/K            |
|                  | configured as LG-Ni1000    | -50 ... +150°C   | ±0.5 K        | 0.1 K      | 5000 ppm/K            |
|                  |                            | -50 ... -26°C    | ±1.0 K        | 0.2 K      | 3979 ppm/K            |
|                  | configured as NTC10K       | -25 ... +99°C    | ±0.5 K        | 0.1 K      | 3979 ppm/K            |
|                  |                            | +100 ... +150 °C | ±3.0 K        | 0.5 K      | 3979 ppm/K            |
|                  | configured as Ni1000       | -50 ... +150°C   | ±0.5 K        | 0.1 K      | 6180 ppm/K            |
|                  |                            | 0 V              | ±5 mV         | < 5 mV     | -                     |
|                  | configured as 0 ... 10 VDC | 5 V              | ±25 mV        | < 5 mV     | -                     |
| Input resistance |                            | 10 V             | ±50 mV        | < 5 mV     | -                     |
|                  |                            |                  | min. 100 kΩ Ω |            |                       |

### Flow calculation

|                          |                               |
|--------------------------|-------------------------------|
| Permitted K-Factor range | 0 ... 1500                    |
| Calculation Formula      | $Q = k \cdot \sqrt{\Delta p}$ |
| Measuring variables      | l/s, m³/h, m³/s               |

### Pressure connection

|                 |                                   |
|-----------------|-----------------------------------|
| Connection pipe | Ø 6.2 mm (for pipe inside Ø 5 mm) |
|-----------------|-----------------------------------|

### Mounting instructions

|                          |                                                                   |
|--------------------------|-------------------------------------------------------------------|
| Installation arrangement | Factory calibration: Vertical with pressure connections downwards |
| Mounting                 | Mounting bracket (integrated in case)                             |

### Tests / Admissions

|               |                                             |
|---------------|---------------------------------------------|
| UL            | ANSI/UL 60730-1                             |
| CE-conformity | acc. 2014/30/EU applied standard EN 60730-1 |
| EAC           |                                             |

### Weight

|         |
|---------|
| ~ 250 g |
|---------|

### Packaging

|                               |
|-------------------------------|
| Single packaging in cardboard |
| Multiple packaging (20 pcs.)  |

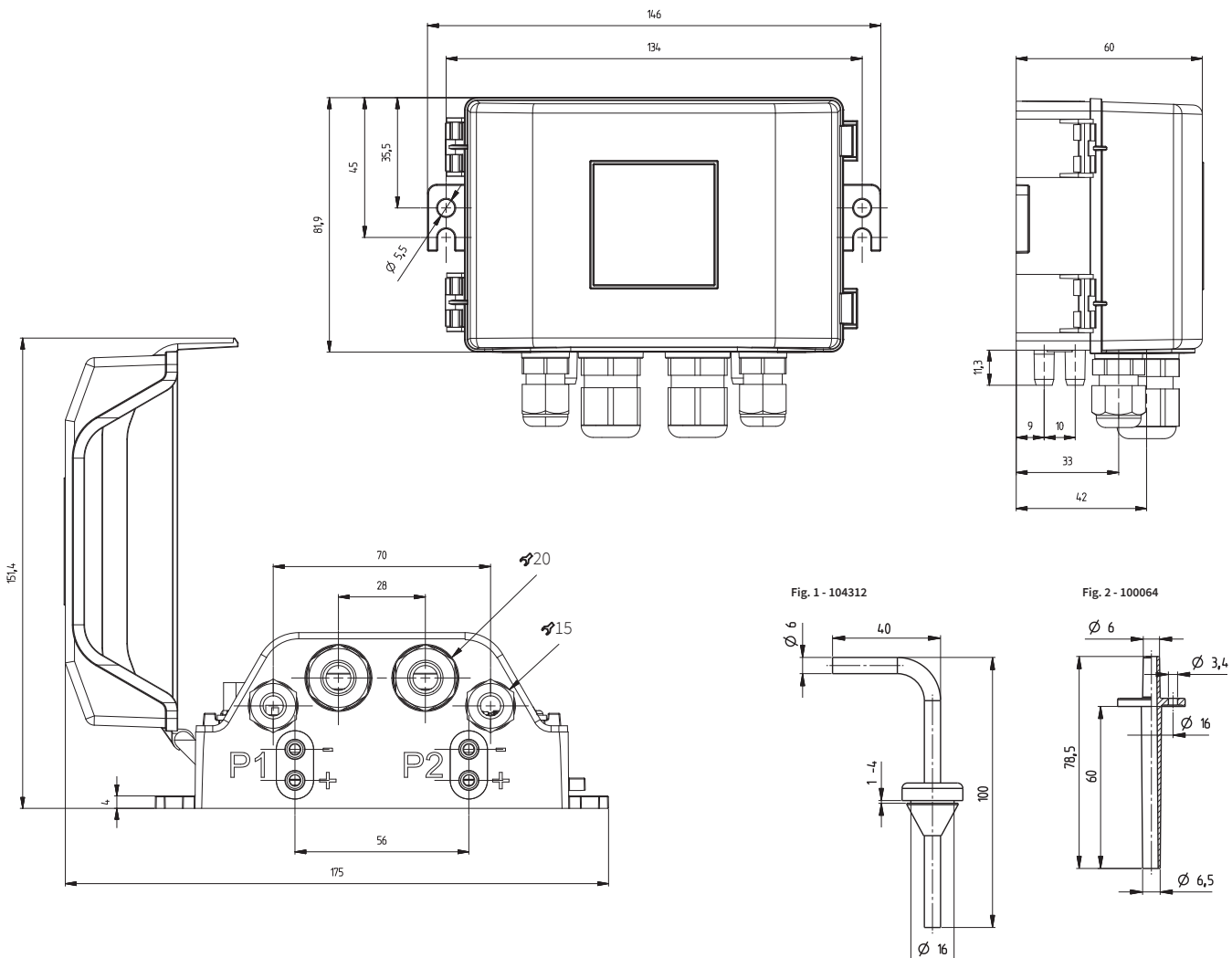
| Parameter                             | Unit | 0 ... 500 Pa | 0 ... 1250 Pa | 0 ... 2500 Pa | 0 ... 5500 Pa | 0 ... 7000 Pa |
|---------------------------------------|------|--------------|---------------|---------------|---------------|---------------|
| Overall accuracy at +20 °C            | % fs | < ±1.0       | < ±0.5        | < ±0.5        | < ±0.6        | < ±0.7        |
| Overall accuracy at 0 ... +50 °C      | % fs | < ±2.0       | < ±1.0        | < ±1.0        | < ±0.8        | < ±0.8        |
| Resolution                            | % fs | < 0.1        | < 0.1         | < 0.1         | < 0.1         | < 0.1         |
| Long term stability acc. DIN EN 60770 | % fs | < ±1.0       | < ±1.0        | < ±1.0        | < ±1.0        | < ±1.0        |

Test conditions:  
25 °C, 45% rh, power supply 24 VDC

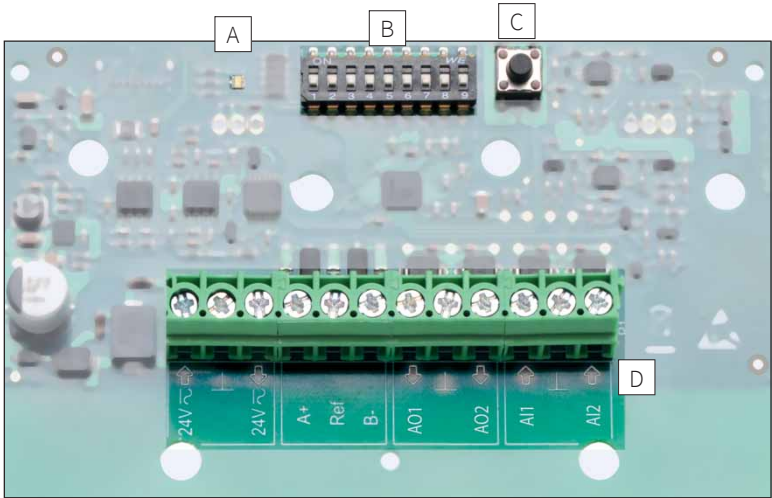
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## Order number

|                                                                  |                         |        |
|------------------------------------------------------------------|-------------------------|--------|
| Connection kit for vent duct (metal), 90° angled, 2pcs (Fig. 1)  | including tube 2 m long | 104312 |
| Connection kit for vent duct (plastic), straight, 2 pcs (Fig. 2) | including tube 2 m long | 100064 |

<sup>1)</sup> max. 10000 Pa (over pressure on one side)

Setting and connection elements



- A Status LED
- B DIP switch
- C Push button
- 24 V ~ → Power supply 24 VAC/DC
- ⏏ GND
- 24 V ~ ← Power supply external devices 24 VAC/DC
- A+ Modbus® communication +
- Ref Common
- B- Modbus® communication -
- AO1 ← Analogue output 1
- ⏏ GND
- AO2 ← Analogue output 2
- AI1 → Analogue input 1
- ⏏ GND
- AI2 → Analogue input 2

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