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Datasheet EE600

Differential Pressure Sensor

Modbus

www.epluse.com

EE600

Differential Pressure Sensor

The EE600 is designed for the reliable measurement of differential pressure in HVAC, building automation and filter monitoring. The multi-range device is suitable for air as well as all non-flammable and non-aggressive gases. Optionally, the sensor is available with auto-zero function.

Measurement Performance

The EE600 is available with unidirectional ranges of 1 000 Pa (4 inch WC) and 10 000 Pa (40 inch WC) or with bidirectional ranges of ±1 000 (±4 inch WC) and ±10 000 Pa (±40 inch WC). All versions offer excellent accuracy of ±0.5 % full scale. The piezoresistive, non-flow-through pressure sensing element ensures outstanding long-term stability.

Analogue and Digital Outputs

The measured data is available on a combined analogue voltage and current output, on a 2-wire (4 - 20 mA) current output or on the RS485 interface with Modbus RTU protocol.

Functional and Robust

The IP65 / NEMA 4X enclosure minimizes installation costs. External mounting holes allow for installation with closed cover, the electronics are thus protected against construction site damage and pollution.

Configurable and Adjustable

A zero point and span adjustment can be easily performed with push buttons on the electronics board.
For analogue versions, DIP switches on the electronics board allow easy field setup. This includes measuring range, output signal, response time, displayed units and backlight.
Using an optional configuration stick and the free PCS10 Product Configuration Software, the EE600 can be set up for volume flow or air velocity measurement, as well as for filter monitoring or level indication. Additionally, the auto-zero interval can be configured.

EE600 with backlit display

EE600 without display

Features

Configurable and Adjustable

- Measuring range
- Output signal
- Response time
- Displayed units and backlight
- Zero point and span adjustment

Knockout for ½" Conduit Fitting (US)

Service Interface for Configuration

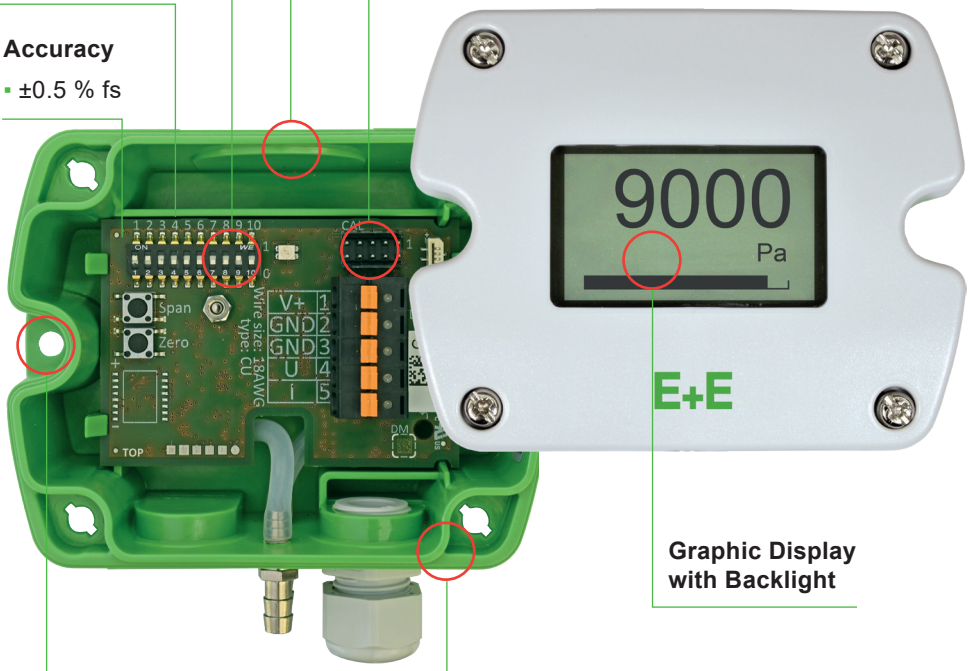
- Measurands
  - Differential pressure Δp
  - Volume flow V' (k-Factor input)
  - Air velocity v (k-Factor input)
- Application setting
  - Filter monitoring
  - Level indicator
- Auto-zero interval (optional)

Multi-range (Analogue Output)

- 0…250 / 500 / 750 / 1 000 Pa
- 0…2 500 / 5 000 / 7 500 / 10 000 Pa
- ±250 / ±500 / ±750 / ±1 000 Pa
- ±2 500 / ±5 000 / ±7 500 / ±10 000 Pa

Accuracy

- ±0.5 % fs



Graphic Display with Backlight

Enclosure

- IP65 / NEMA 4X protection rating
- Bayonet screws - opened / closed with a ¼ rotation

External Mounting Holes

- Mounting with closed cover
- Electronics protected against construction site pollution
- Easy and fast mounting

Test Report

According DIN EN 10204-2.2

Features

Accredited Traceable Calibration Certificate

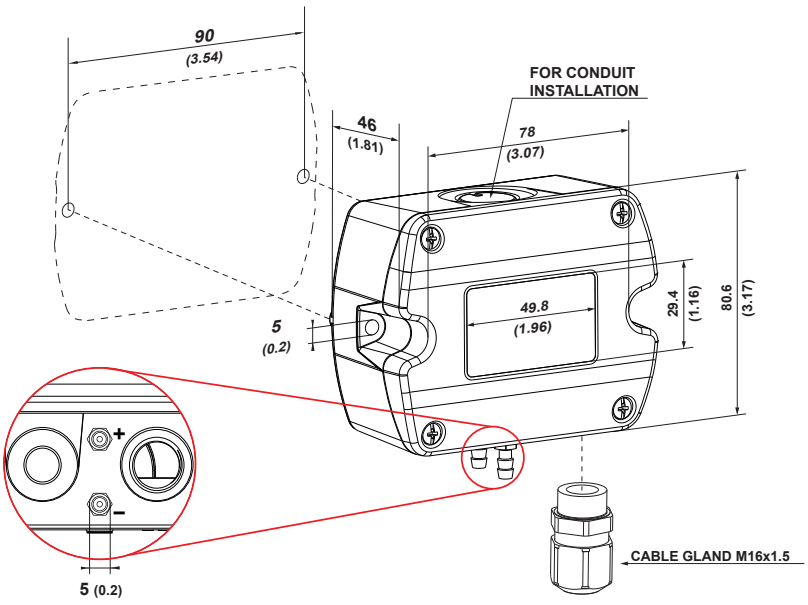
Internationally recognised certificates for the calibration of measuring instruments from accredited laboratories document the traceability of the measurements to the International System of Units (SI). The calibration laboratory at E+E Elektronik offers traceable calibrations.
The E+E calibration laboratory is accredited by Akkreditierung Austria in accordance with DIN EN ISO/IEC 17025 with the identification number 0608. This allows the laboratory to issue ISO 17025 certificates for the measurands humidity, temperature, dew point temperature, air velocity, flow, pressure and CO_2.
Visit www.eplusecal.com for detailed information on calibration and to enquire a certificate of accredited traceable calibration for the EE600 from the E+E Elektronik calibration laboratory.

ISO 9001 Calibration Certificate

An ISO 9001 calibration certificate documents the comparative measurement of a device against high quality reference equipment (factory level standard). The comparison is performed in accordance with internal procedures that comply with ISO 9001 and provides information on the specimen's measuring accuracy. The reference equipment is traceable to national standards, however, the calibration process is not accredited. Therefore, an ISO 9001 calibration is neither traceable nor internationally comparable.

Dimensions

Values in mm (inch)



Pressure fittings Ø5 (0.2)

+ high pressure
- low pressure

Pressure connection set is included in the scope of supply.

Technical Data

Measurands

Differential Pressure (Δp)

Measurement principle		Piezoresistive, no flow-through
Measuring range		
	Analogue output	±1 000 Pa (±4 inch WC) ±10 000 Pa (±40 inch WC)
	RS485	0...1 000 Pa (0...4 inch WC) 0...10 000 Pa (0...40 inch WC)
Analogue scaling		
	Analogue output[1)]	±250 / ±500 / ±750 / ±1 000 Pa..... field selectable with DIP switches ±2 500 / ±5 000 / ±7 500 / ±10 000 Pa.... field selectable with DIP switches 0...250 / 500 / 750 / 1 000 Pa..... field selectable with DIP switches 0...2 500 / 5 000 / 7 500 / 10 000 Pa ..... field selectable with DIP switches
	with PCS10	Configurable within max. measuring range
Accuracy @ 20 °C (68 °F), incl. hysteresis, non-linearity and repeatability		±0.5 % fs fs = full scale (1 000 Pa or 10 000 Pa)
Temperature dependency, typ.		<0.03 % from fs/K
Response time t_{90}		
	Analogue output[1)]	50 ms / 500 ms / 2 s / 4 s field selectable with DIP switches Configurable from 0.05 to 30 s with PCS10
	Digital interface[2)]	Configurable from 0.5 to 30 s with PCS10
Auto-zero interval		
	Factory setting	24 h
	4 - 20 mA (2-wire) output	Configurable from 90 min to 7 days with PCS10. Can be disabled.
	Voltage and current output / RS485	Configurable from 10 min to 7 days with PCS10. Can be disabled.
Long-term stability		<0.5 % fs/year fs = full scale (1 000 Pa or 10 000 Pa)
Overload limits	**1 000 Pa fs**	±10 000 Pa
	10 000 Pa fs	±80 000 Pa

1) Factory setup A6: measuring range ±100 % fs; response time t_{90}: 50 ms; displayed unit: Pa; other ranges selectable via order code.
Factory setup A7: measuring range ±100 % fs; response time t_{90}: 50 ms; displayed unit: Pa; display backlight: on; other ranges selectable via order code.
2) Factory setup RS485: response time t_{90}: 500 ms; displayed unit: Pa; display backlight: on.

Calculated measurands

		Unit
Level Indicator	LI	cm
		inch
Volume flow	V'	m^3/h
		l/s
		m^3/s
		ft^3/min
Air velocity	v	m/s
		ft/min
Filter contamination level	FCL	%

Technical Data

Outputs

Analogue

4 - 20 mA (2-wire) output	$R_L \leq 500\ \Omega$		R_L = load resistance
Voltage and current output[1)]	0 - 5 V or 0 - 10 V and 0 - 20 mA or 4 - 20 mA (3-wire)	-1 mA < I_L < 1 mA $R_L \leq 500\ \Omega$	I_L = load current R_L = load resistance

1) Voltage and current output signals available simultaneously at the spring loaded terminals (factory setup: 0 - 10 V / 4 - 20 mA). Settings selectable with DIP switches.

Digital

Digital interface	RS485 (EE600 = 1/2 unit load)
Protocol **Factory settings** **Supported Baud rates** **Data types for measuring values**	Modbus RTU Baud rate see order information, parity even, 1 stop bit, Modbus address 43 9 600, 19 200 and 38 400 FLOAT32 and INT16

General

Power supply class III USA & Canada: Class 2 supply necessary, max. voltage 30 V DC **4 - 20 mA (2-wire) output** **Voltage and current output / RS485**		15 - 35 V DC 15 - 35 V DC or 24 V AC ±20 %	
Current consumption, typ. @ 0 Pa (0 psi) / 24 V DC		**Analogue output**	**Digital interface**
	Without display	23 mA	8 mA
	Display with backlight	49 mA	29 mA
	Display without backlight and 4 - 20 mA (2-wire)	According to output current, max. 20 mA	
Electrical connection	**Analogue output**	Spring-loaded terminals, max. 1.5 mm^2 (AWG16)	
	Digital interface	Screw terminals, max. 2.5 mm^2 (AWG14)	
Cable gland		M16x1.5	
Display		Graphic, with backlight	
Selectable units on display with **analogue output via DIP switch** **analogue output and digital interface via PCS10**		 Pa, kPa, mbar, kPa Pa, kPa, mbar, kPa, inch WC, m^3/h, m^3/s, ft^3/min, l/s m/s, ft/min, %	
Humidity range		0...95 %RH, non-condensing	
Temperature range	**Operation**	-20...+60 °C (-4...+140 °F) / -20...+50 °C (-4...+122 °F) with display	
	Storage	-40...+70 °C (-40...+158 °F) / -20...+60 °C (-4...+140 °F) with display	
Enclosure	**Material**	Polycarbonate, UL94 V-0 (with display UL94 HB) approved	
	Protection rating	IP65 / NEMA 4X	
Electromagnetic compatibility		EN 61326-1 Industrial environment FCC Part15 Class A ICES-003 Class A	
Shock and vibration		Tested according to EN 60068-2-64 and EN 60068-2-27	
Conformity		CE UKCA	

Technical Data

Configurability

Device	DIP switches	PCS10
Analogue output without auto-zero	✓	✓
Analogue output with auto-zero	✓	✓
Digital interface without auto-zero	✓	✓
Digital interface with auto-zero	✓	✓

Configuration options see above or manual at www.epluse.com/ee600.

Ordering Guide

	Feature	Description	Code		
			EE600-		
Hardware configuration	**Measuring range**[1]	0...1 000 Pa (0...4 inch WC, 0...10 mbar, 0...1 kPa)			HV52
		0...10 000 Pa (0...40 inch WC, 0...100 mbar, 0...10 kPa)			HV53
		±1 000 Pa (±4 inch WC, ±10 mbar, ±1 kPa)	HV54		
		±10 000 Pa (±40 inch WC, ±100 mbar, ±10 kPa)	HV55		
	Output	4 - 20 mA (2-wire)	A6		
		Analogue (voltage and current output)		A7	
		RS485			J3
	Display	Without display	No code		
		Display with backlight		D2	
		Display without backlight	D1		
	Auto-zero	Without auto-zero	No code		
		Auto-zero	AF8		
Software setup, Analogue Outputs	**Output scaling low**	-1 000 / -10 000	No code		
		Value in Pa[2]	SAL*Value*		
	Output scaling high	+1 000 / +10 000	No code		
		Value in Pa[2]	SAH*Value*		
	Protocol	Modbus RTU[3]			P1
	Baud rate	9 600			BD5
		19 200			BD6
		38 400			BD7
	Accredited Traceable Calibration Certificate in accordance with DIN EN ISO/IEC 17025		see www.epluse.com		
	ISO 9001 Calibration Certificate		see www.epluse.com		

1) Measuring ranges 0...25 % / 50 % / 75 % / 100 % FS, selectable with DIP switches at analogue output or PCS10.
2) Minimum span 100 Pa for HV54 and 1000 Pa for HV55.
3) Factory setting: Even parity, 1 stop bit; Modbus Map and communication setting: See User Manual and Modbus Application Note at www.epluse.com/ee600.

Order Examples

EE600-HV54A7SAL-200SAH700

Feature	Code	Description
Measuring range	**HV54**	±1 000 Pa (±4 inch WC, ±10 mbar, ±1 kPa)
Output	**A7**	Analogue (voltage and current output)
Display	**No code**	Without display
Auto-zero	**No code**	Without auto-zero
Output scaling low	**SAL-200**	-200[1)]
Output scaling high	**SAH700**	+700[1)]

1) Value in Pa

EE600-HV53J3D2AF8P1BD5

Feature	Code	Description
Measuring range	**HV53**	0...10 000 Pa (0...40 inch WC, 0...100 mbar, 0...10 kPa)
Output	**J3**	RS485
Display	**D2**	Display with backlight
Auto-zero	**AF8**	Auto-zero
Protocol	**P1**	Modbus RTU
Baud rate	**BD5**	9 600

Accessories

For further information please refer to the Accessories datasheet.

Accessories	Code
Pressure connection set, 2 m (6.6 ft) PVC hose with two ABS pressure connection nipples (included in the scope of supply)	**HA011304**
USB-C configuration stick	**HA011070**
E+E Product Configuration Software (Free download: www.epluse.com/pcs10)	**PCS10**

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