

EE771 Series

Flowmeter for compressed air and gases in Industrial Applications

The flowmeter of the series EE771, based on the measurement principle of thermal mass flow, is ideally suited for the measurement of flow of air and gasses in pipelines up to 16 bar (232 psi). The series EE771 set new standards with regard to accuracy and reproducibility when measuring mass flows, standard volume flow or standard flow in industrial applications. Measurement of for instance the usage of compressed air, nitrogen, helium, argon, oxygen or other non-corrosive gasses.

The centrepiece of the flowmeter is the E+E hot film-sensor element, manufactured in state of the art thin film technology, which already has proven itself million times over in the automotive industry. This sensor element is considerably less sensitive to dust and dirt than a conventional hot-wire sensor element. Hence, the result: an excellent long-term stability and the highest reliability, even in difficult applications.

The market offers two different methods of thermal mass flow measurement. Inline devices, fitted in a pipeline segment and measurement probes, mounted in the pipe by means of a fitting of some kind.

The flowmeter of the series EE771 combines the advantages of both systems.

- The delivery of the complete aligned measurement fixture guarantees the highest measurement accuracy and reproducibility.
- This unique mounting fixture, with the aligned position of the flowmeter in a ball valve assembly, allows for the removal in a few seconds, without interrupting the process flow. Regular checks of the measurement accuracy are therefore simple and cost friendly. One does not have to worry about the downtime of the process.

The EE771 is calibrated at the factory on a flow calibration rig at a pressure of 7 bar (100 psi). A calibration certificate as proof for the excellent measurement accuracy is in the scope of supply.

For further processing of the measurement data, two outputs are available. Depending on the application, these outputs can be configured as analogue (current or voltage), switch output or as pulse output for the measurement of the consumption.



EE771 Compact



EE771 remote probe

Typical Applications

Measurement of consumption of compressed air
Compressed air counter
Mass flow measurement of gases

Features

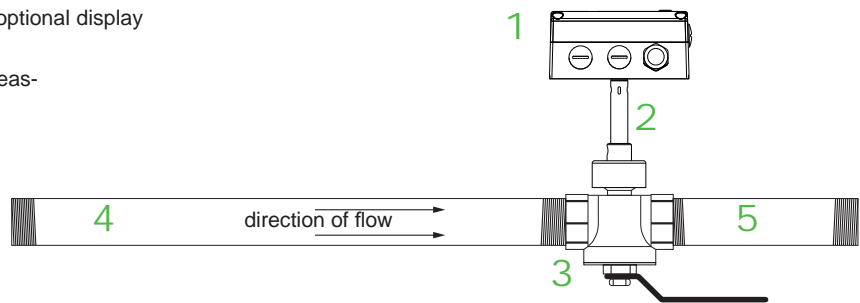
high accuracy $\pm 2.5\%$ of reading
exceptional reproducibility
quick measurement probe exchange at line pressure
simple calibration by user
broad working range of 1 : 400
very service friendly

Construction

The interchangeable measurement probe contains the sensor element and the measurement electronics, in which the data of the factory calibration is stored. The enclosure with the signal conditioning is mounted either on the measurement probe (compact) or is remote with a sensor cable up to 10 meter (33 feet).

The measurement probe is easy and quickly interchangeable in the field, independent of the electronics for the signal conditioning. This Plug & Play feature saves time and money with the calibration, for the configuration of the outputs is maintained. Therefore, it is ensured that no noteworthy interruption of operation will occur. The exchanged measurement probe can be recalibrated and adjusted if necessary, without any time pressure.

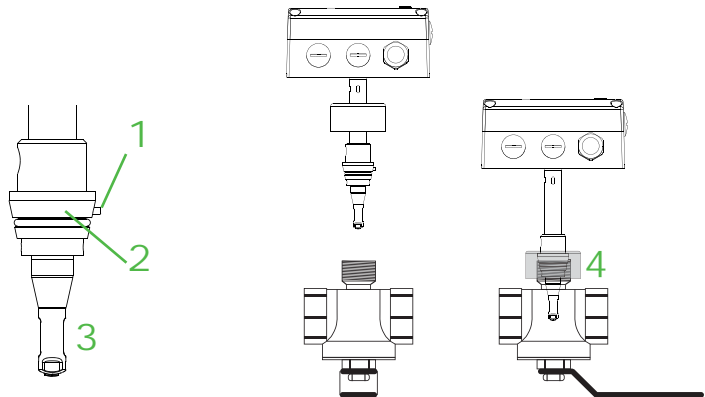
- 1 Enclosure with signal conditioning and optional display
- 2 Measurement probe with sensor and measurement electronics
- 3 Ball valve assembly
- 4 Pipeline segment – upstream
- 5 Pipeline segment – downstream



Ball valve assembly

The ball valve assembly allows for the exact alignment of the sensing head within seconds during instalment and removal, with only interrupting the process flow for a short moment.

- 1 Lock bolt – for exact alignment
- 2 Sealing cone – for reproducible immersion depth
- 3 Sensor – for the flow measurement
- 4 Retainer nut



Measurement of consumption (totalizer)

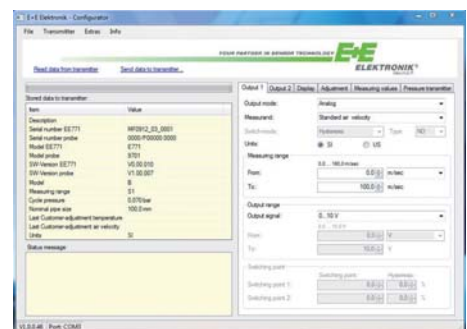
The EE771 holds an integrated counter for the usage. The amount is indicated in the display and stored; the data will not be lost due to a power outage. The availability of the consumption amount as a free configurable pulse output is another helpful feature.

Configuration software

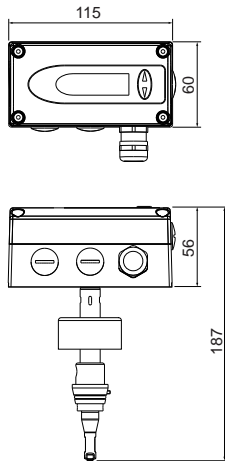
The EE771 flowmeter can be configured conveniently, to meet the requirements of the application with the standard configuration software and the integrated USB interface.

Functionality:

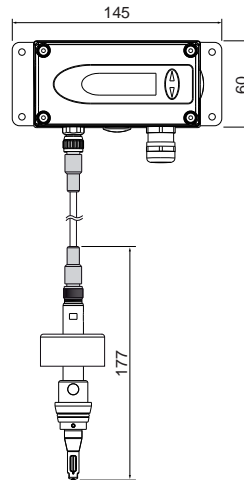
- Configuration of the output (scale / set point)
- 2-point user calibration for flow and temperature
- Readout of the counter values
- Reset of min / max values and counter
- Indication of the measurement value



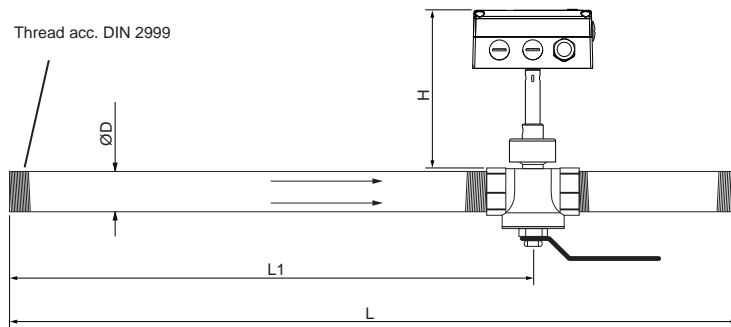
Dimensions (mm)



EE771-A and EE771-B
Compact



EE771-C
Remote probe



EE771-B
Compact in-line
(direction of flow is left to right)

Measuring pipe	ØD	L	L1	H
DN25	34	566	406	153
DN50	60	1099	800	153

Technical Data

Measuring value

Flow

Measurand

Volumetric flow at standard conditions acc. DIN 1343
P₀ = 1013,25mbar; t₀ = 0°C (273,15 K)

Measuring range

	low (1:200)	medium (1:320)	high (1:400)
DN25:	0,9...180 Nm ³ /h	0,9...288 Nm ³ /h	0,9...360 Nm ³ /h
DN50:	3,5...700 Nm ³ /h	3,5...1120 Nm ³ /h	3,5...1400 Nm ³ /h

Accuracy at 7bar (abs.) and 23°C (73°F)¹⁾

± (2,5% of measuring value + 0,15% of full scale)

Accuracy of temperature compensation

± (0,1% of measuring value/°C)

Response time t₉₀

typ. 4sec.

Sample rate

0,1 sec.

Temperature

Measuring range

-20...80°C (-4...176°F)

Accuracy at 20°C (68°F)

± 0,7°C (1,26°F)

Outputs

Output signal and display ranges are freely scalable

Analogue output

voltage 0 - 10V max. 1mA
current (3-wire) 0 - 20mA and 4 - 20mA R_L < 500 Ohm

Switching output

potential-free max. 44VDC 500mA switching capacity

Pulse output

Totalizator, pulse length: 0,02...2 sec.

Digital interface

USB (for configuration)

Input

Optional pressure compensation 4 - 20mA (2-wire; 12V) for pressure sensor

Technical Data

Factory setting of the Outputs²⁾

Analogue output [0...10V / 0(4)...20mA]		from	low (1:200)	to	medium (1:320)	high (1:400)	unit	
standardized	DN25:	0 (0)	180 (100)	280 (160)	350 (200)		Nm ³ /h (SCFM)	
volumetric flow	DN50:	0 (0)	640 (370)	1100 (650)	1400 (820)		Nm ³ /h (SCFM)	
mass flow	DN25:	0	220	350	440		kg/h	
	DN50:	0	800	1400	1700		kg/h	
standardized flow	for all Ø	0 (0)	100 (20000)	160 (31500)	200 (40000)		Nm/s (ft/min)	
Temperature	for all Ø	-20 (-4)	80 (176)	80 (176)	80 (176)		°C (°F)	
Switching output		[switching point/hysteresis]						
standardized	DN25:		150/15 (80/8)	250/25 (150/15)	300/30 (180/18)		Nm ³ /h (SCFM)	
volumetric flow	DN50:		600/60 (350/35)	1000/100 (600/60)	1200/120 (700/70)		Nm ³ /h (SCFM)	
mass flow	DN25:		200/20	300/30	400/40		kg/h	
	DN50:		700/70	1200/120	1500/150		kg/h	
standardized flow	for all Ø		80/8 (15000/1500)	140/14 (25000/2500)	180/18 (30000/3000)		Nm/s (ft/min)	
Temperature	for all Ø		30/3 (90/9)	50/5 (120/12)	70/7 (150/15)		°C	

General

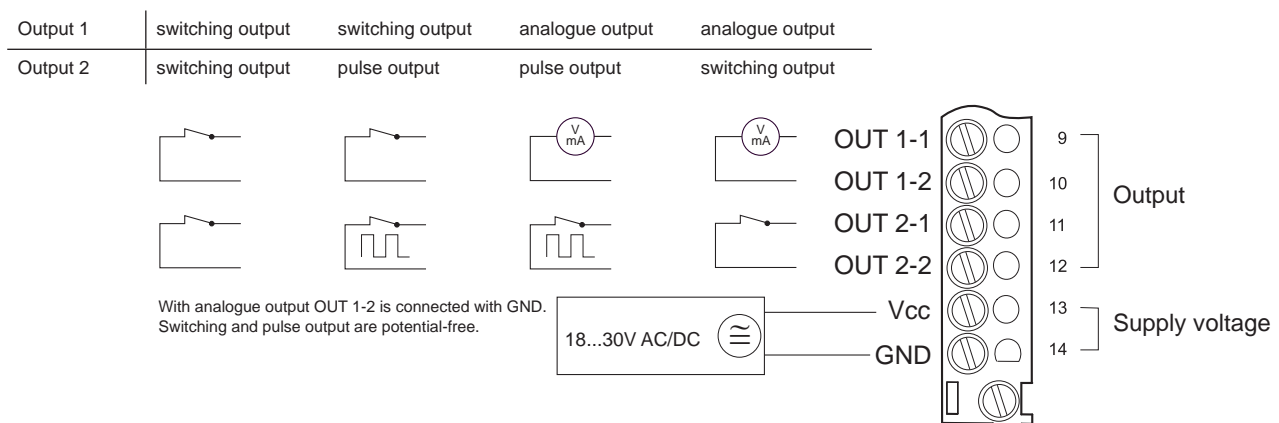
Supply voltage	18 - 30V AC/DC	
Current consumption	max. 200mA (with display)	
Temperature range	ambient temperature: -20...60°C (-4...140°F) medium temperature: -20...80°C (-4...176°F) storage temperature: -20...60°C (-4...140°F)	
Nominal pressure	up to 16 bar (232 Psi)	
Humidity	no condensation	
Medium	compressed air or none corrosive gases	
Connection	cable gland M16x1,5 (optional connector M12x1 8pol.)	
Electromagnetic compatibility	EN61326-1	EN61326-2-3
Material	housing	metal (AlSi3Cu)
	probe	stainless steel
	sensor head	plastic (PBT)
	pipe	stainless steel
	ball valve	brass
Housing protection class	IP65 / Nema 4	



1) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation). The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).

2) The setting of the outputs can be changed by the customer with the configuration software.

Connection Diagram



Ordering Guide

Position 1 - Transmitter			EE771-
Hardware Configuration			
Model	Compact ri-le Compact le-ri remote probe	direction od flow right to left direction od flow left to right	A B C
Working range	low medium high	(0,5...100 Nm/s) or (100...19685 ft/min) (0,5...160 Nm/s) or (100...31469 ft/min) (0,5...200 Nm/s) or (100...39370 ft/min)	L1 S1 H1
Measuring pipe-diameter	DN15 DN20 DN25 DN32 DN40 DN50 DN65 up to DN250		(on request) (on request) N025 (on request) (on request) N050 (on request)
Display	without display with display		D
Plug	cable gland 1 plug for power supply and outputs		C12
Software Configuration			
Physical parameters of output 1			
	Temperature standardized volumetric flow mass flow standardized flow	T [°C] [°F] V ₀ [Nm ³ /h] [SCFM] m ³ [kg/h] v ₀ [Nm/s] [ft ³ /min]	B R S T
Physical parameters of output 2			
	Temperature standardized volumetric flow mass flow standardized flow consumption ⁽¹⁾	T [°C] [°F] V ₀ [Nm ³ /h] [SCFM] m ³ [kg/h] v ₀ [Nm/s] [ft ³ /min] Q ₀ [Nm ³] [ft ³]	B R S T I
Output 1	0-5V analogue output 0-10V 0-20mA 4-20mA switching output		2 3 5 6 S
Output 2	switching output pulse output ⁽¹⁾		S I
Measured value units	metric / SI none metric US / GB		E01
Position 2 - measuring pipe			
pipe diameter	DN25 - with ball valve DN50 - with ball valve		HA070025 HA070050
Position 3 - Probe cable (only model C)			
cable length	2m 5m 10m		HA010816 HA010817 HA010818

⁽¹⁾ consumption measuring is possible only with pulse output (output 2 = I)

Order Example

Position 1 - Transmitter

EE771-AS1N025/RI6I

Model: Compact ri-le
Working range: medium
Measuring pipe-diameter: DN25
Display: no
Plug: cable gland
Phys. parameter output 1: standardized volumetric flow
Phys. parameter output 2: consumption
Output 1: 4-20mA
Output 2: pulse output
Measured value units: metric SI

Position 2 - measuring pipe

HA070025

pipe diameter: DN25 - with ball valve