

EE771

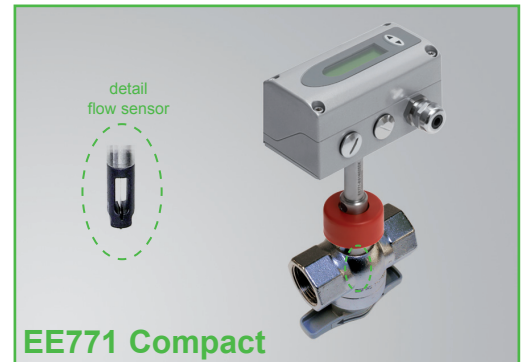
Inline Flowmeter for compressed air and gases DN15 - DN50 / 16 bar

The flow meter of the series EE771, based on the measurement principle of thermal mass flow, is ideally suited for the measurement of flow of compressed air and gasses. Measurement of for instance the usage of compressed air, nitrogen, CO2, oxygen or other non-corrosive gasses.

The EE771 is setting new standards in terms of measurement accuracy and reproducibility thanks to its application-specific adjustment during production. This flow meter is adjusted under a pressure of 7 bar. Adjusting the device specifically for its application has the advantage of keeping the actual flow speed in the pipeline low even with very large flow quantities. Thanks to the more stable flow profile, this low flow speed facilitates a much better degree of reproducibility and accuracy than if the device were adjusted conventionally under normal pressure, as flow speeds up to 200 m/s can often no longer be controlled under conventional adjustment pressures.

The core design of the flow meter is based on the E+E hot film sensor element, which is produced using the most modern thin film technology. This flow sensor features excellent long-term stability, a fast response time and an extremely high degree of reliability.

Two outputs are available, for further processing of the measurement data. 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.



Customer Value

Reduce cost of compressed air

Accurate measurement of compressed air consumption and detection of leaks

Accountability of consumption per cost centre

Measuring the individual consumption per customer / cost centre

Early detection of machine failures

Compressed air consumption levels for individual machines or systems are tracked

Very low maintenance costs

Simple and fast installation and removal of the probe

Installation also in existing systems

Sturdy and easy to install

Typical Applications

Measurement of consumption of compressed air

Compressed air counter

Mass flow measurement of industrial gases

Features

high accuracy $\pm 2.5\%$ of reading

exceptional reproducibility

quick sensor exchange at line pressure

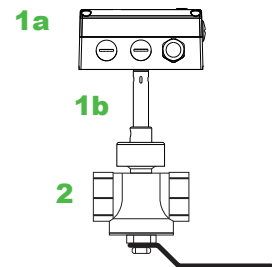
broad working range of 1 : 400

very service friendly

Construction

The flow meter consists of the transmitter and the mounting valve. The transmitter is modular and consists of the probe and the signal conditioner. The 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 mounting valve assembly allows for the easy and reliable installation within the pipeline. The high measurement accuracy is guaranteed by the accurate, reproducible positioning of the probe within the mounting valve.

- 1 Transmitter**
 - 1a** Enclosure with signal conditioning and optional display
 - 1b** Measurement probe with sensor and measurement electronics
- 2 Mounting ball valve**



Assembly with ball valve

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

The ball valve assembly is suitable for pressures up to 16 bar (PN16) and available for pipe diameters DN15 (1/2") to DN50 (2").

During installation in the pipeline, observe the required inlet and outlet paths as given in the operating instructions.



Measurement of consumption (totalizer)

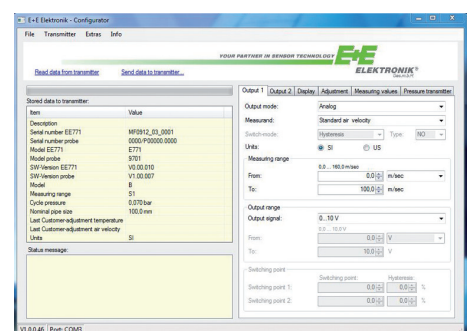
The EE771 holds an integrated counter for the usage. The amount is indicated in the display and stored; the data will not be lost due to a power outage. The availability of the consumption amount as a free configurable pulse output is another helpful feature.

Configuration software

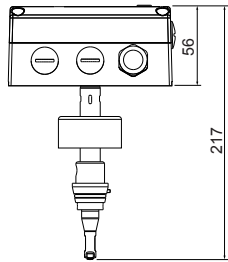
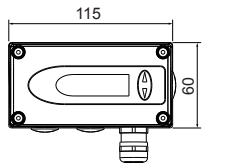
The EE771 flowmeter can be configured conveniently, to meet the requirements of the application with the standard configuration software and the integrated USB interface.

Functionality:

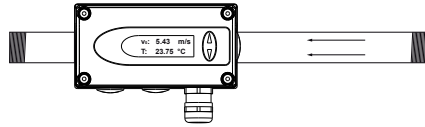
- Configuration of the output (scale / set point)
- 2-point user calibration for flow and temperature
- Readout of the counter values
- Reset of min / max values and counter
- Indication of the measurement value



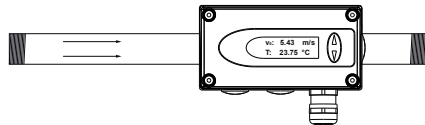
Dimensions (mm)



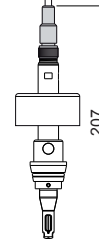
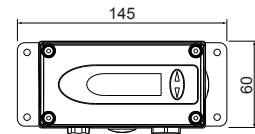
EE771-A and EE771-B Compact



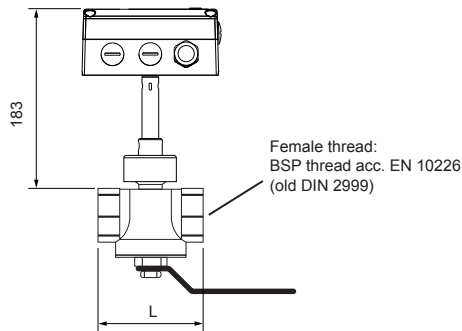
EE771-A direction of flow is right to left



EE771-B direction of flow is left to right



EE771-C Remote probe



HA075xxx Ball valve

Ball valve	Thread	L
DN15	R1/2"	83,7
DN20	R3/4"	72,7
DN25	R1"	88
DN32	R1 1/4"	100
DN40	R1 1/2"	110
DN50	R2"	131

Dimensions in mm

Connection Diagram

Output 1	switching output	switching output	analogue output	analogue output
Output 2	switching output	pulse output	pulse output	switching output



OUT 1-1
 OUT 1-2
 OUT 2-1
 OUT 2-2

With analogue output OUT 1-2 is connected with GND.
 Switching and pulse output are potential-free.



Output

Supply voltage

Technical Data

Measuring value

Flow

Measurand	Volumetric flow at standard conditions acc. DIN 1343 $P_0 = 1013,25 \text{ mbar}; t_0 = 0 \text{ °C} (273,15 \text{ K})$			
Measuring range	low (L1)		high (H1)	
standardized volumetric flow in air	DN15:	0,32...63 Nm ³ /h 0.19...37.1 SCFM	0,32...126 Nm ³ /h 0.19...74.1 SCFM	
	DN20:	0,57...113 Nm ³ /h 0.34...66.5 SCFM	0,57...226 Nm ³ /h 0.34...133 SCFM	
	DN25:	0,90...176 Nm ³ /h 0.53...103.5 SCFM	0,90...352 Nm ³ /h 0.53...207.1 SCFM	
	DN32:	1,45...289 Nm ³ /h 0.85...170.0 SCFM	1,45...578 Nm ³ /h 0.85...340 SCFM	
	DN40:	2,26...452 Nm ³ /h 1.33...265.9 SCFM	2,26...904 Nm ³ /h 1.33...531.8 SCFM	
	DN50:	3,50...700 Nm ³ /h 2.06...411.8 SCFM	3,50...1400 Nm ³ /h 2.06...823.6 SCFM	
standardized flow in air	≤DN50:	0,5...100 Nm/s 100...19685 SFCM	0,5...200 Nm/s 100...39370 SFCM	
nitrogen	≤DN50:	0,5...100 Nm/s 100...19685 SFCM	0,5...200 Nm/s 100...39370 SFCM	
CO ₂	≤DN50:	0,5...100 Nm/s 100...19685 SFCM	0,5...200 Nm/s 100...39370 SFCM	
helium	≤DN50:	0,5...100 Nm/s 100...19685 SFCM	0,5...120 Nm/s 100...23622 SFCM	
oxygen	≤DN25:	0,5...100 Nm/s 100...19685 SFCM	0,5...200 Nm/s 100...39370 SFCM	
Accuracy in air 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 t_{90}	typ. 1 sec.			
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 - 10 V	max. 1 mA
	current (3-wire)	0 - 20 mA and 4 - 20 mA	$R_L < 500 \text{ Ohm}$
Switching output	potential-free max. 44 VDC, 500 mA switching capacity		
Pulse output	Totalizator, pulse length: 0,02...2 sec.		
Digital interface	USB (for configuration)		

Input

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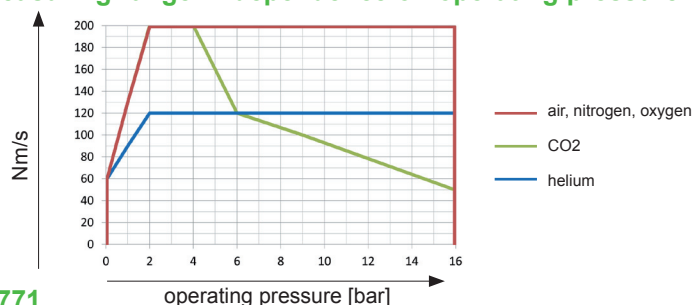
General

Supply voltage	18 - 30 V AC/DC	
Current consumption	max. 200 mA (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
	Industrial Environment	
Material	housing	metal (AlSi3Cu)
	probe	stainless steel
	sensor head	plastic (PBT)
	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).

Flow measuring range in dependence on operating pressure



Formula for calculating the standardized volumetric flow:

$$V_0 = v_0 \cdot id^2 \cdot \pi/4 \cdot 3600$$

V_0 ... standardized volumetric flow [m³/h]

v_0 ... standardized flow [m/s]

id ... inner pipe diameter [m]

π ... 3,1415

Ordering Guide

The complete Flow meter consists of the Transmitter (pos. 1) and the mounting valve (pos. 2). Both have to be ordered together! The probe cable (pos. 3) is only necessary for model C.

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 high		L1 H1
Mounting valve for pipe diameter	DN15 DN20 DN25 DN32 DN40 DN50		N015 N020 N025 N032 N040 N050
Display	without display with display		D
Mounting Plug	ball valve cable gland 1 plug for power supply and outputs		K 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' [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' [kg/h] v ₀ [Nm/s] [ft ³ /min] Q ₀ [Nm ³] [ft ³]	B R S T I
Output 1		0-5 V 0-10 V analogue output 0-20 mA 4-20 mA	2 3 5 6 S
Output 2		switching output switching output pulse output ¹⁾	S I
Measured value unit	metric / SI non metric US / GB		E01
Medium	air nitrogen CO2 oxygen ²⁾ helium		B C D F
Position 2 - mounting valve			
	DN15 - ball valve DN20 - ball valve DN25 - ball valve DN32 - ball valve DN40 - ball valve DN50 - ball valve	HA075015 HA075020 HA075025 HA075032 HA075040 HA075050	DN15 - ball valve for oxygen ²⁾ DN20 - ball valve for oxygen ²⁾ DN25 - ball valve for oxygen ²⁾ HA076015 HA076020 HA076025
Position 3 - Probe cable (only model C)			
cable length	2 m 5 m 10 m	HA010816 HA010817 HA010818	

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

2) Medium oxygen only for mounting valve DN15 up to DN25. The mounting valve and the sensor is oil and grease-free.

Order Example

Position 1 - Transmitter

EE771-AL1N025K/RI6I

Model: Compact ri-le
Working range: low 0.9 ... 176 Nm³/h
Measuring pipe-diameter: DN25
Display: no
Mounting: ball valve
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 unit: metric SI

Position 2 - mounting valve

HA070025

DN25 - ball valve

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