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+ Datasheet EE741

**Inline Flow Sensor
for Compressed Air and Gases**



M-Bus



EE741

Inline Flow Sensor for Compressed Air and Gases

Versatility

The modular and compact EE741 is dedicated for accurate metering and monitoring of compressed air and technical gases such as O₂, N₂, Ar or CO₂ in DN15 to DN50 pipes.

Measuring principle

The thermal measuring principle and the well-proven E+E hot film sensing element lead to best long-term stability and fast response time.

Measurement performance

Outstanding measuring accuracy even in the lower measuring range is achieved by an application-specific multi-point factory adjustment performed at 7 bar (102 psi) and allows for reliable leak detection.

Easy installation and configuration

The EE741 is optimized for easy installation, configuration and maintenance. The setup can be performed using either display and push buttons or the free product configuration software EE-PCS.

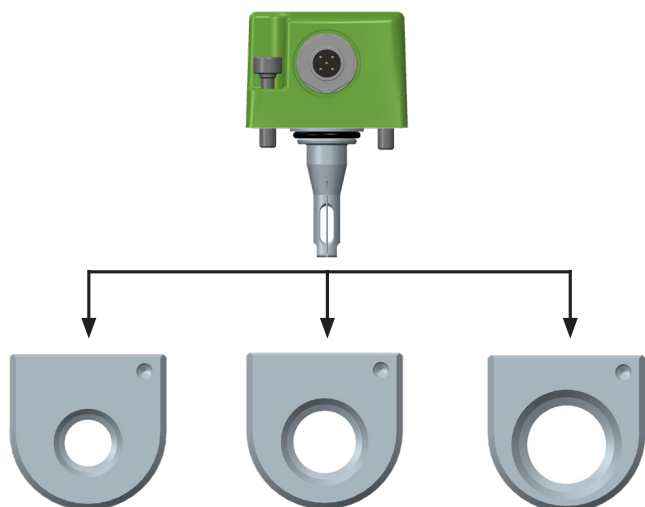


EE741 with gauge mounting block DN15 (1/2") and DN32 (1-1/4")



EE741 assembly on the gauge mounting block

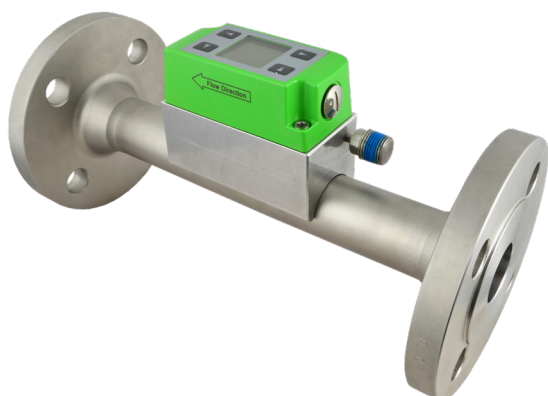
Modular Design



Pipe diameter

EE741	EE741-N50
DN15 (1/2")	DN32 (1-1/4")
DN20 (3/4")	DN40 (1-1/2")
DN25 (1")	DN50 (2")

EE741 Sensor for three different pipe diameters



EE741-N50 with gauge mounting block with flanges

Once the mounting block is built into the pipeline, the sensing unit can be installed and removed without disassembling the pipework. As a result, the EE741 is also ideal for temporary measurement with several mounting blocks.

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 E+E Elektronik calibration laboratory 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 CO₂.

Visit www.eplusecal.com for detailed information on calibration and to enquire a certificate of accredited traceable calibration for the EE741 from the E+E Elektronik calibration laboratory.

Features

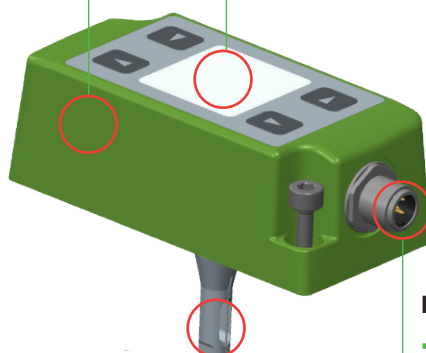
Sensing unit

Sensing unit

- One for each three pipe diameters
- Installation and removal without disassembling the pipework facilitates regular calibration
- Best accuracy due to application-specific adjustment under pressure

Display

- Shows instantaneous values and overall consumption
- Intuitive device setup with pushbuttons
- Rotation in 90° increments for convenient readability in any mounting position



Sensing head with hot film sensor

- Robust design in stainless steel
- Very short response time
- Wide measuring range
- Long-term stable and accurate
- Negligible pressure drop
- Highly insensitive to contamination
- No additional pressure and temperature compensation required

Interfaces

- User configurable via display or PC
- 0 - 20/4 - 20 mA output
- Two switch outputs
- Pulse output
- Modbus RTU
- M-Bus
- IO-Link

Measurands

- Standard volume flow [m³/h, m³/min, l/min, l/s, SCFM]
- Mass flow [kg/h, kg/min]
- Standard flow [m/s, SFPM]
- Temperature [°C, °F]
- Integrated consumption meter (totalisator) for cost-effective consumption analysis without additional data logger

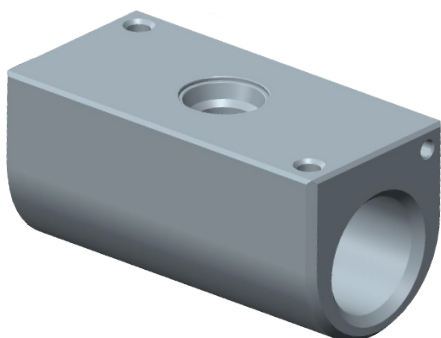
Inspection certificate

According to DIN EN 10204-3.1

Features / Dimensions

Gauge Mounting Block

- Best accuracy due to precise and reproducible positioning of the sensing head
- Aluminum or stainless steel
- Can be operated with sealing plug also without sensing unit

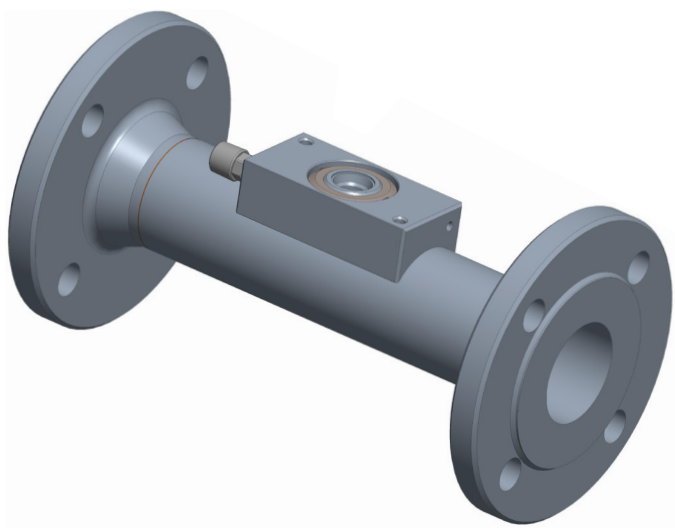


Available diameters

- DN15 / DN20 / DN25
- DN32 / DN40 / DN50

Gauge mounting block with flanges

- Robust design for demanding industrial application
- Entire media-contacting surface in stainless steel 1.4404
- Easy installation due to flange design
- Precise and reproducible positioning of the sensing unit for best accuracy
- Can be operated with sealing plug also without sensing unit



Available diameters

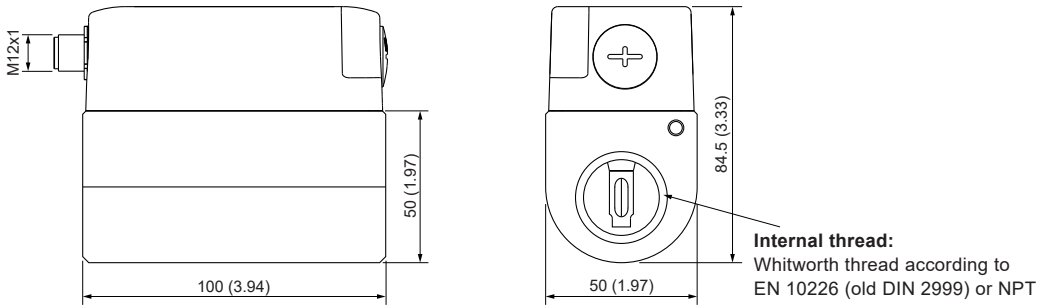
- DN32 / DN40 / DN50

Dimensions

Values in mm (inch)

Gauge mounting block

EE741



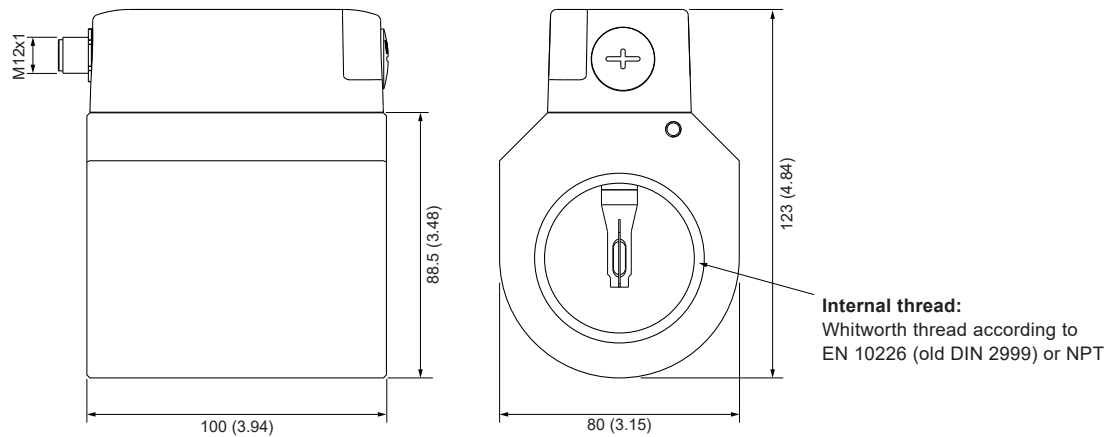
Pipe diameter

Mounting block	Thread Rp or NPT
DN15	1/2"
DN20	3/4"
DN25	1"
DN32 ¹⁾	1-1/4"
DN40	1-1/2"
DN50	2"

1) Rp thread only

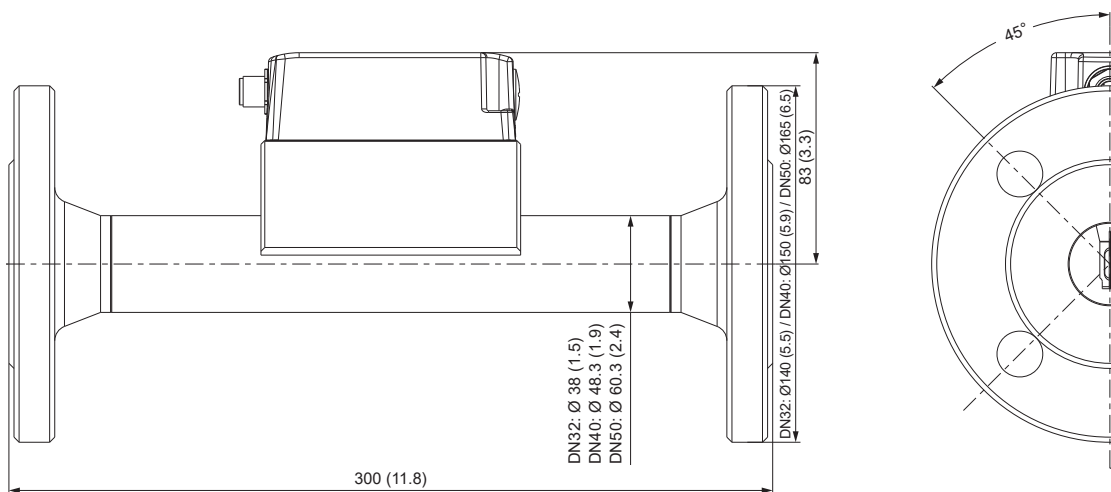
Gauge mounting block

EE741-N50



Gauge mounting block with flanges

EE741-N50



Technical Data

Measurands

Volume Flow (V'n)

Standard conditions	Factory setting according to DIN 1343 p _n = 1013.25 mbar (14.7 psi); T _n = 0 °C (32 °F), freely configurable via EE-PCS	
Measuring range¹⁾ in air at standard conditions	DN15 (1/2") DN20 (3/4") DN25 (1") DN32 (1-1/4") DN40 (1-1/2") DN50 (2")	0.2...76.3 m ³ /h (0.12...44.88 SCFM) 0.4...135.7 m ³ /h (0.24...79.77 SCFM) 0.6...212 m ³ /h (0.36...124.71 SCFM) 0.9...347.4 m ³ /h (0.52...202.06 SCFM) 1.4...542.8 m ³ /h (0.81...315.71 SCFM) 2.2...848.2 m ³ /h (1.22...493.35 SCFM)
Accuracy²⁾ in air @ 7 bar (102 psi) (abs) and 23 °C (73 °F)	±(3 % of measured value + 0.3 % of full scale)	
Temperature dependency	±(0.25 % of measured value / °C deviating from 23 °C (73 °F))	
Pressure dependency	Compensation by entering the system pressure using EE-PCS ³⁾	
Response time t₉₀	<2 s	
Sampling interval	0.1 s	

1) For factory setting, see User Manual.

2) The tolerance specifications include the uncertainty of the factory calibration with a coverage factor k=2 (2 x standard deviation).

The tolerance was calculated in accordance with EA-4/02 following the GUM (Guide to the Expression of Uncertainty in Measurement).

3) The flow meter is factory adjusted at 7 bar (abs, 102 psi). Pressure compensation is valid for v = 10...120 Nm/s. Without entering the system pressure into the EE741, the pressure dependency is ±0.5 % of the measured value / bar deviating from 7 bar.

Temperature (T)

Measuring range	-20...+60 °C (-4...+140 °F)
Accuracy @ 24 V DC, 20 °C (68 °F)	±0.7 °C (±1.26 °F)

Technical Data

Outputs

Analogue

Analogue output (scalable)	0 - 20 mA / 4 - 20 mA	$R_L < 500 \Omega$	$R_L = \text{load resistance}$
Switching output	DC PNP, max. 100 mA, $V_{drop} < 2.5 \text{ V}$, 10 k Ω pull-down Configurable: N/C or N/O, hysteresis, window		
Pulse output	Totalizer (Consumption meter)		
Pulse length	0.02...2 s		




Digital

Digital interface	RS485 (EE741 = 1 unit load)		
Protocol Factory settings Supported Baud rates ¹⁾ Measured data types	Modbus RTU 9600 Baud, parity even, 1 stop bit, Modbus address 240 600, 1 200, 2400, 4 800, 9600, 19 200, 38 400 and 57 600 FLOAT32 and DOUBLE64		
Protocol Factory settings Supported Baud rates ²⁾ Measured data types	M-Bus 2400 Baud, parity even, 1 stop bit, M-Bus address 240 600, 1 200, 2400, 4 800 and 9600 FLOAT32 or INT32		
Protocol Interface specification Measured data types Service interface	IO-Link IO-Link v1.1, IO-Link device, COM2 (38.4 kBaud) FLOAT32 or INT32 USB		

1) For further details on the communication setting: See User Manual and Modbus Application Note at www.epluse.com/ee741.

2) For further details on the communication setting: See User Manual.

General

Power supply class III  USA & Canada: Class 2 supply necessary	18 - 30 V DC		
Current consumption, max. with display without display	$\leq 120 \text{ mA}$ ($P_{max} \leq 2.5 \text{ W}$) $\leq 60 \text{ mA}$ ($P_{max} \leq 1.6 \text{ W}$)		
Electrical connection	M12x1 plug, 4 pole		
Operating pressure, max.	16 bar (232 psi)/PN16		
Humidity working range	0...100 %RH, non-condensing		
Ambient temperature range With display Without display	0...+50 °C -20...+60 °C		
Medium and storage temperature range	-20...+60 °C		
Medium	Compressed air or non-corrosive gases		
Material Enclosure sensing unit Sensing head / sensor element Gauge mounting block Gauge mounting block with flanges	Polycarbonate (PC) Stainless steel 1.4404 / glass Aluminium anodised or stainless steel 1.4404 Entire media contacting surface in stainless steel 1.4404		
Enclosure protection rating	IP65		
Electromagnetic compatibility	EN 61326-1 FCC Part15 Class A	EN 61326-2-3 ICES-003 Class A	Industrial environment
Conformity	 		

Ordering Guide

The EE741 flow sensor consists of a sensing unit (position 1) and a gauge mounting block (position 2).

Position 1: Sensing unit

Feature	Description	Code		
Hardware Configuration		EE741-		
	Pipe diameter / type	DN15, DN20, DN25	No code	
		DN32, DN40, DN50	N50	
	Output	Analogue / switch / pulse output	A6	
		RS485 (with Modbus RTU)		J3
		M-Bus		J5
		IO-Link		J10
	Display	Without display	No code	
		Display with backlight	D2	
	Accessories	Without	AC0	
M12x1 cable mount connector, socket, for self assembly		AC2		
Cleaning	Without	No code		
	Degreased for oxygen measurement ¹⁾	AF2		
Software-Setup (Analogue-) Outputs	Factory setting pipe diameter (selectable)	DN15 (1/2")	DN15	
		DN20 (3/4")	DN20	
		DN25 (1")	DN25	
		DN32 (1 1/4") for N50 only	DN32	
		DN40 (1 1/2") for N50 only	DN40	
		DN50 (2") for N50 only	DN50	
	Output signal 1	Analogue output	0 - 20 mA	GA5
4 - 20 mA			No code	
Output signal 2	Switch output	GA9		
	Pulse output (only with output 2 = Consumption)	No code		
Output 1 measurand	Standardised volume flow V'n [m ³ /h]	No code		
	Other measurands (xx see measurand code below)	MAxx		
Output 2 measurand	Consumption Qn [m ³] (only for output 2 = Pulse output)	No code		
	Standardised volume flow V'n [m ³ /h]	MB83		
	Other measurands (xx see measurand code below)	MBxx		
Units (for process parameters) ²⁾	SI units	No code		
	US units	U2		
Medium ³⁾	Air	No code		
	Other media (xx see media code below)	FUxx		
Accredited Traceable Calibration Certificate in accordance with DIN EN ISO/IEC 17025			see www.eplusecal.com	

1) The parts of the sensor / mounting block in contact with the medium are oil and grease-free. Only for DN15, DN20 and DN25.

2) For IO-Link: no code.

3) Other gases upon request.

Measurand Code

For Output 1 and 2 in the Ordering Guide

Measurand	Unit	Code	
		MAxx / MBxx	
Standardised volume flow	V'n	m ³ /min	84
		l/min	85
		l/s	86
		ft ³ /min	87
Mass flow	m ^t	kg/h	80
		kg/min	81
Standardised flow	vn	m/s	22
		ft/min	23
Temperature	T	°C	1
		°F	2

PLEASE NOTE

No mix of SI/US units allowed.

Media Code

Medium	Unit	Code
		FUxx
Nitrogen	-	FU2
CO ₂	-	FU3
Oxygen ¹⁾	-	FU4
Argon	-	FU7
75 % N ₂ + 25 % CO ₂	-	FU8
80 % Ar + 20 % CO ₂	-	FU9
60 % CO ₂ + 40 % N ₂	-	FU10
40 % CO ₂ + 60 % N ₂	-	FU11
35 % CO ₂ + 65 % N ₂	-	FU12
82 % Ar + 18 % CO ₂	-	FU13
N ₂ O (Nitrous oxide)	-	FU14

1) When selecting the medium FU4 (oxygen), AF2 (cleaning - degreased for oxygen measurement) is required. AF2 can also be selected in conjunction with another medium.

Ordering Guide

Position 2: Gauge mounting block

Feature	Description	BSP thread	NPT thread	Flange Version
		EE741-		
Aluminum gauge mounting block	DN15 (1/2")	HA079015	HA179015	
	DN20 (3/4")	HA079020	HA179020	
	DN25 (1")	HA079025	HA179025	
	DN32 (1-1/4")	HA079032		
	DN40 (1-1/2")	HA079040	HA179040	
	DN50 (2")	HA079050	HA179050	
Stainless steel gauge mounting block	DN15 (1/2")	HA078015	HA178015	
	DN20 (3/4")	HA078020	HA178020	
	DN25 (1")	HA078025	HA178025	
Stainless steel gauge mounting block for oxygen	DN15 (1/2")	HA081015	HA181015	
	DN20 (3/4")	HA081020	HA181020	
	DN25 (1")	HA081025	HA181025	
Stainless steel gauge mounting block with flanges	DN32 (1-1/4")			HA278032
	DN40 (1-1/2")			HA278040
	DN50 (2")			HA278050

Order Example

Position 1 - Sensing unit: EE741-A6D2AC2DN15

Feature	Code	Description
Pipe diameter/type	No code	DN15, DN20, DN25
Output	A6	Analogue / switch / pulse output
Display	D2	Display with backlight
Accessories	AC2	Cable mount connector, socket, for self assembly
Cleaning	No code	Without
Pipe diameter (selectable)	DN15	DN15 (1/2")
Output signal 1	No code	Analogue output 4 - 20 mA
Output 1 measurand	No code	Standardised volume flow V'n [m ³ /h]
Output signal 2	No code	Pulse output (only with output 2 = Consumption)
Output 2 measurand	No code	Consumption Qn [m ³] (only for output 2 = Pulse output)
Units (for process parameters)	No code	SI units
Medium	No code	Air

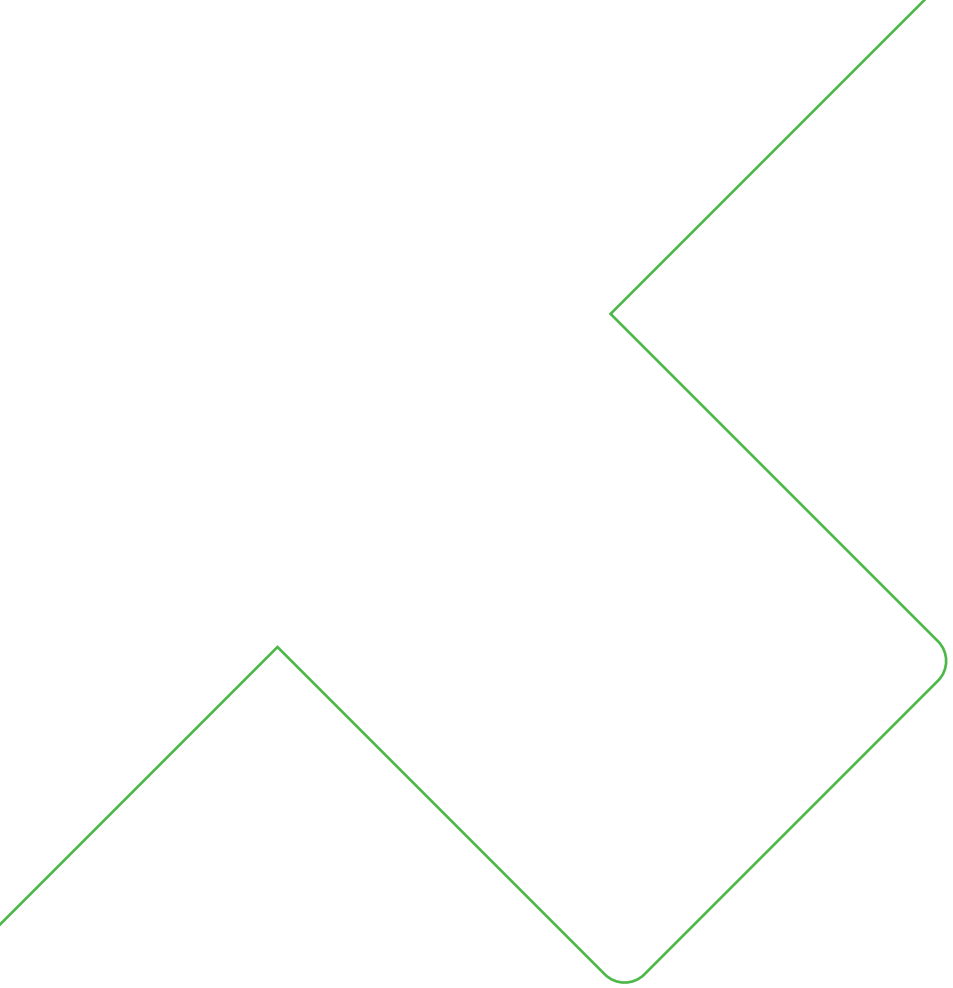
Position 2 - Gauge mounting block: HA079015

Feature	Code	Description
Aluminum gauge mounting block	HA079015	DN15 (1/2") BSP thread

Accessories

For further information see datasheet [Accessories](#).

Accessories	Code
Inlet and outlet pipe section, BSP 1/2" thread, stainless steel, for gauge mounting block	DN15 (1/2") HA070215 DN20 (3/4") HA070220 DN25 (1") HA070225 DN32 (1-1/4") HA070232 DN40 (1-1/2") HA070240 DN50 (2") HA070250
Gasket set for gauge mounting block with flanges	DN32 (1-1/4") HA074532 DN40 (1-1/2") HA074540 DN50 (2") HA074550
Sensor connection cable, shielded, M12x1 socket angled 90° ↔ free ends, 4 poles	2 m (6.6 ft) HA010824



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