

S401 / S421



Thermal Mass Flow Meter

Insertion / Inline



S421

S401



PROCESS MONITORING
High accuracy and reliable measurements



TOTALIZER INTEGRATED
Total consumption stored internally



S401 INSERTION METER
Installation under pressure



MOBILE APP
For remote configuration



INTEGRATED DISPLAY
For on site values



S421 IN-LINE METER
High accuracy and easy to install



Benefits

- ✓ S401 can be installed under pressure through a 1/2" ball valve
- ✓ S421 with measuring section for accurate and reliable readings
- ✓ No additional pressure or temperature compensation needed, thanks to thermal mass flow measurement
- ✓ Fast response time with a wide measuring range
- ✓ Thermal mass flow meter can be used in different process gases like: N₂, CO₂, O₂ and many other technical gases

1 Optional Color Display

On-site display for live value readings, total consumption counter and convenient sensor settings. Totalizer with 10 digits (1 999 999 999)

2 Various Outputs

S401 and S421 thermal mass flow meters are perfectly suited to be integrated into process controls or high-level monitoring systems. Various output options are offered for a seamless integration:

- Isolated 4... 20 mA output for actual flow readings
- Isolated Pulse output for totalizer
- Modbus/RTU to read all values digitally
- Modbus/TCP with PoE support to connect the meters to the local network and power them via Ethernet

3 Robust Materials

The industrial IP65 Polycarbonate-ABS housing offers the best protection in rough environments. The metal parts are made from high grade stainless steel, made to last forever.



4 Flexible and Easy Installation

- The insertion type flow meters supports any pipe size from 1" up to 12" or even bigger pipes. Thanks to the insertion through a 1/2" ball valve, the S401 can be installed under pressure and is perfectly suited for installations where shutdowns are not acceptable.
- The in-line type are offered with measuring sections from 1/2" up to 3" and can be easily integrated into existing piping systems.

5 Thermal Mass Flow Sensor

The built in sensor is using the thermal mass flow principle. This comes with main advantages:

- The sensor can cover a wide measuring range at high accuracy.
- The fast response times, no moving parts and minimal pressure loss are making them most suited sensors for volumetric flow and consumption measurement of compressed air and gases.
- There is no need to compensate the line pressure and temperature additionally, making them most efficient in terms of installations and costs.

Wireless Connection

The unique wireless connection on every flow meter is unlike its competition. Through the free S4G-FS App, live values can be read from the meters.

But not only during operation, the smartphone app is useful. Especially during installation and setup all settings can be performed using a smartphone, there is no need to carry a PC and an interface on site. This saves a lot of time and is the easiest way to get reliable sensor readings.

Every sensor is protected by default, to perform changes on the flow meter, first a QR code must be scanned.

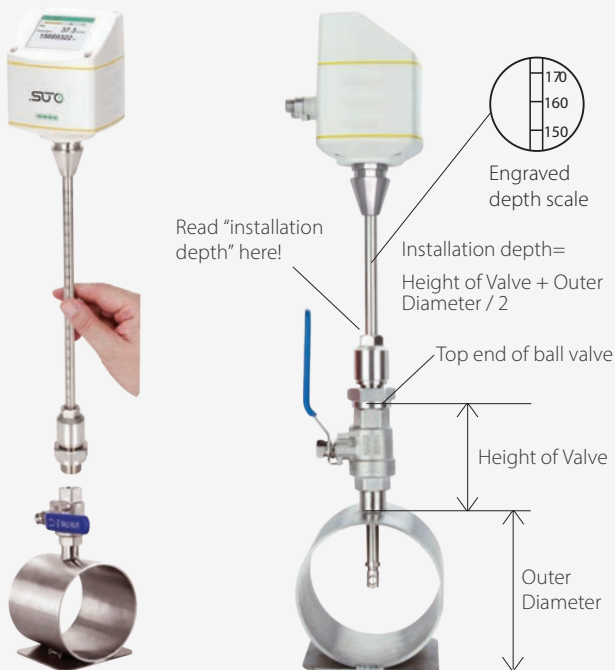


Installation and Sensor Removal

S401

S401 can be installed under pressure through a 1/2" ball valve. The sensor tip must be in the pipes center.

- Tube diameters of DN25 and above
- 2 installation types: center installation and 100 mm insertion depth installation for bigger pipes (> DN250)
- Installation under pressure through 1/2" ball valve



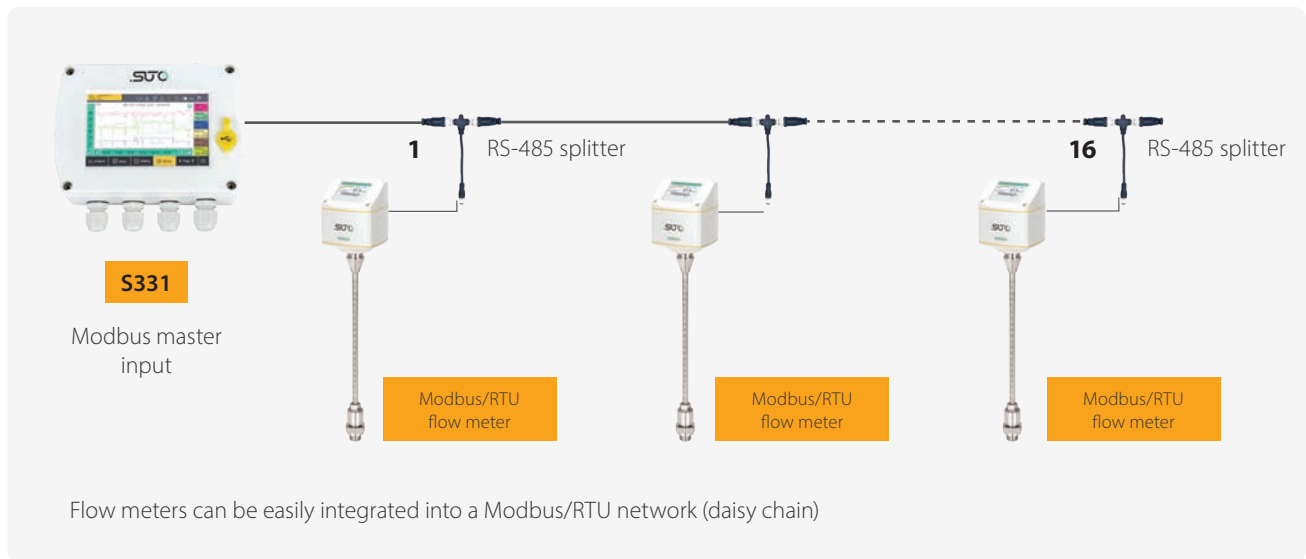
S421

The S421 sensor unit can be easily removed for calibration. (Closing cap separately available)

- Pipes sizes available: DN15, DN20, DN32, DN40, DN50, DN65, DN80
- Fits your needs: various process connections available (R-thread, EN 1092-1 flange or ANSI flange)
- Exchangeable sensor unit (easy sensor swap)
- Optional flow conditioner, no need for a straight inlet anymore



Connect several Flow Meters to Modbus Master



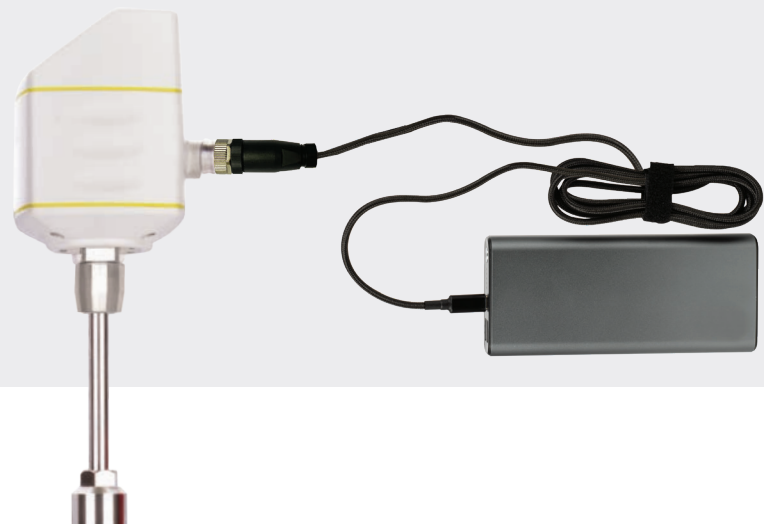
Volumetric flow ranges

Pipe Specifications			S401			S421
Inch	DN	DI (mm)	S401-S (m³/h)	S401-M (m³/h)	S401-H (m³/h)	Measuring range from to
½"	DN15		-	-		0.5 ... 90 m3/h
¾"	DN20		-	-		0.9 ... 170 m3/h
1"	DN25	27.3	0.5 ... 147.7	0.6 ... 294.7	0.6 ... 356.9	1.5 ... 290 m3/h
1¼"	DN32	36.0	0.9 ... 266.3	1.2 ... 531.5	1.2 ... 643.5	2 ... 500 m3/h
1½"	DN40	41.9	1.2 ... 366.7	1.5 ... 731.9	1.5 ... 886.2	3 ... 700 m3/h
2"	DN50	53.1	2.0 ... 600.1	2.5 ... 1197.6	3.0 ... 1450.0	4 ... 1000 m3/h
2½"	DN65	68.9	3.5 ... 1026.5	5.0 ... 2048.6	5.0 ... 2480.4	6 ... 1500 m3/h
3"	DN80	80.9	5.0 ... 1424.4	7.0 ... 2842.7	7.0 ... 3441.9	8 ... 2500 m3/h
4"	DN100	100.0	10 ... 2183.3	12 ... 4357.2	12.0 ... 5275.7	
5"	DN125	125.0	13 ... 3419.6	18 ... 6824.4	18.0 ... 8263.1	
6"	DN150	150.0	18 ... 4930.1	25 ... 9838.9	25.0 ... 11913.1	
8"	DN200	200.0	26 ... 8785.6	33 ... 17533.3	42.0 ... 21229.5	
10"	DN250	250.0	40 ... 13743.9	52 ... 27428.5	60.0 ... 33210.7	
12"	DN300	300.0	60 ... 19814.8	80 ... 39544.1	100.0 ... 47880.4	

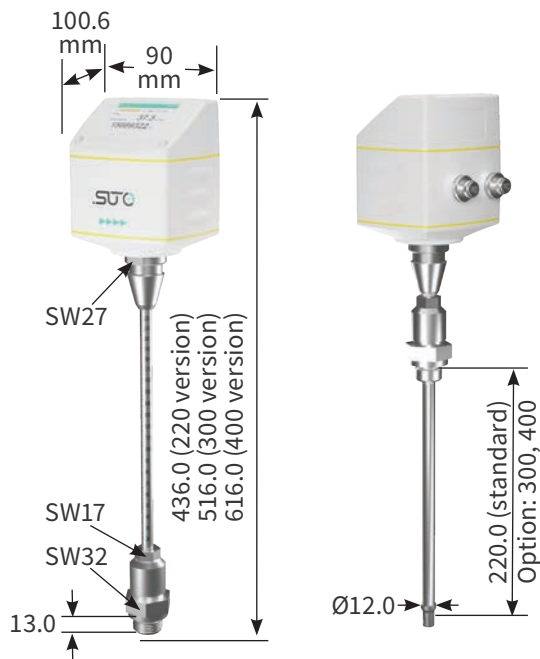
Mobile Power

S401 / S421 powered by power bank with connection cable KA66A5530154.

Note: power bank must be sourced locally due to shipping restrictions [USB-C, 20 V, min. 100 mA]

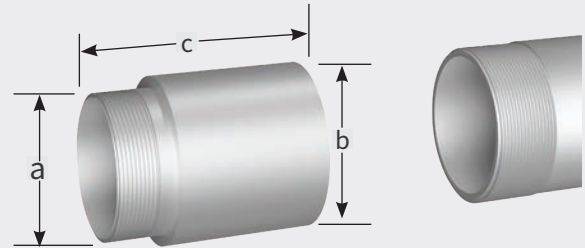


S401 Dimensions



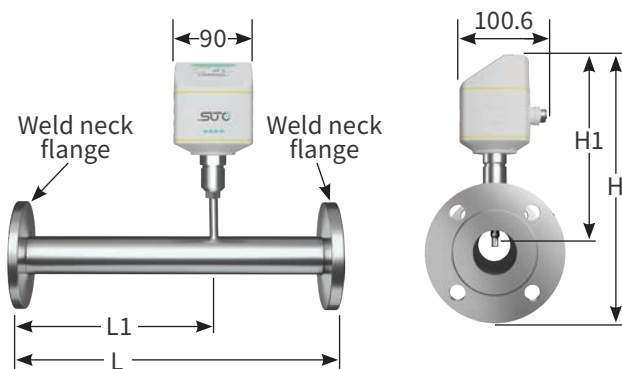
Optional Flow Conditioner

Optional flow conditioner eliminates the straight pipe inlet requirement



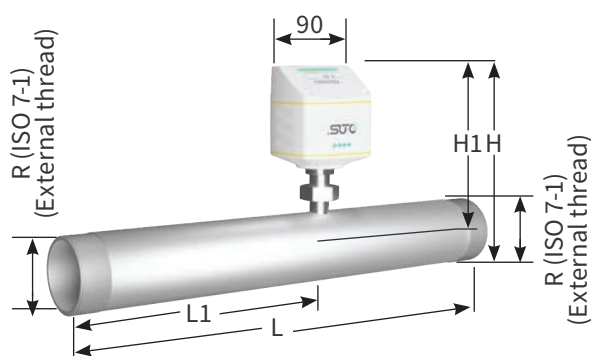
Order No.	DN	a	b in mm	c in mm
KA66000A1071	DN15	R 1/2"	24	64
KA66000A1072	DN20	R 3/4"	32	69
KA66000A1073	DN25	R 1"	37	75
KA66000A1074	DN32	R 1.25"	45	92
KA66000A1075	DN40	R 1.5"	54	92
KA66000A1076	DN50	R 2"	68	105
KA66000A1077	DN65	R 2.5"	80	128
KA66000A1078	DN80	R 3"	95	142

S421 Dimensions (Flange Type)



Pipe size inch / (DN)	L (mm)	L1 (mm)	H (mm)	H1 (mm)
½"(DN15)	300	210	234.2	186.7
¾"(DN20)	475	275	239.2	186.7
1"(DN25)	475	275	244.2	186.7
1¼"(DN32)	475	275	256.7	186.7
1½"(DN40)	475	275	261.7	186.7
2"(DN50)	475	275	269.2	186.7
2½"(DN65)	475	275	287.1	194.6

S421 Dimensions (Thread Type)



Pipe size inch / (DN)	L (mm)	L1 (mm)	H (mm)	H1 (mm)	R
½"(DN15)	300	210	197.4	186.7	R ½"
¾"(DN20)	475	275	200.2	186.7	R ¾"
1"(DN25)	475	275	203.6	186.7	R 1"
1¼"(DN32)	475	275	207.9	186.7	R 1¼"
1½"(DN40)	475	275	210.9	186.7	R 1½"
2"(DN50)	475	275	216.9	186.7	R 2"
2½"(DN65)	475	275	232.7	194.6	R 2½"
3"(DN80)	475	275	245.5	201.0	R 3"

Technical Data

Measurement

Flow

Accuracy	1.5 % of reading \pm 0.3 % FS (optional 1 % of reading)
Selectable units	m ³ /h, m ³ /min, l/min, l/s, cfm, kg/h, kg/min, kg/s
Repeatability	0.25 % of reading
Sensor	Thermal mass flow sensor
Sampling rate	10 samples / sec
Turndown ratio	1:100
Response time (t90)	0.1 sec

Consumption

Selectable units	m ³ , ft ³ , l
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Reference conditions

Selectable conditions	20 °C 1000 mbar (ISO1217), 0 °C 1013 mbar (DIN1343) freely adjustable
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Signal / Interface & Supply

Analog output

Signal	4 ... 20 mA (4-wire), isolated
Scaling	0 ... max flow, freely adjustable
Load	max. 250 Ohm
Update rate	Value updated ever 1 sec

Pulse output

Signal	Switch output, normally open, max. 30 VDC, 20 mA
Scaling	1 pulse per consumption unit (selectable)

Fieldbus

Protocol	Modbus/RTU, Modbus/TCP
Update rate	Value updated ever 1 sec

Supply

Voltage supply	15 ... 30 VDC
Current consumption	max. 200 mA

General data

Configuration

Wireless	S4C-FS App for mobile phones
PC Software	USB Service Kit + Software
Others	Display with 2 touch buttons

Display

Integrated	2.4" color graphic display with 2 touch buttons
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Material

Process connection	Stainless steel 1.4404 (SUS 316L)
Housing	PC + ABS
Sensor	Ceramic, glass coated
Metal parts	Stainless steel 1.4404 (SUS 316L)

Miscellaneous

Electrical connection	2 x M12 (5 pole); 1 x M12 (8-pole x-coded) for TCP
Protection class	IP65
Approvals	CE, RoHS, FCC
Process connection	S401: G1/2" (ISO 228/1) S421: Measuring section with R-thread or Flange

Weight

S401: 0.9 kg
S421: 0.4 kg (without measuring section)

Operating conditions

Medium	Air, N ₂ , O ₂ , CO ₂ and other gases
Medium quality	ISO 8573: 4.4.3 or better
Medium temperature	-30 ... +140 °C
Medium humidity	< 90 % rH, no condensation
Operating pressure	max. 5.0 MPa (> 1.6 MPa need installation device)
Ambient temperature	-30 ... +70 °C, -10 ... +50 °C (with display)
Ambient humidity	< 99 % rH
Storage temperature	-30 ... +70 °C
Transport temperature	-30 ... +70 °C
Pipe sizes	S401: 1/2" ... 12" (bigger pipes on request) S421: 1/2" ... 3"



Ordering S401

Please use the following tables to assist in placing your order with our sales staff.

S401 Thermal Mass Flow Meter (Insertion type)

Article no.	Description
KA66S6954100	S401 Thermal Mass Flow Meter, 220 mm shaft
KA66S6954101	S401 Thermal Mass Flow Meter, 300 mm shaft
KA66S6954102	S401 Thermal Mass Flow Meter, 400 mm shaft
KA66S6954103	S401 Thermal Mass Flow Meter, 160 mm shaft

Flow Medium 1

KA66000A1007	Option, flow medium Air
KA66000A1008	Option, flow medium CO ₂
KA66000A1009	Option, flow medium O ₂ (cleaning for oil and grease-free)
KA66000A1010	Option, flow medium N ₂
KA66000A1011	Option, flow medium N ₂ O
KA66000A1012	Option, flow medium Argon
KA66000A1013	Option, flow medium Natural Gas
KA66000A1014	Option, flow medium H ₂ (For real gas calibration. Please consult manufacturer for this option in advance)
KA66000A1015	Other gas (specify gas or gas mix)
KA66000A1016	Option, flow medium He (real gas calibration)
KA66000A1017	Option, flow medium Propane C ₃ H ₈
KA66000A1041	Option, flow medium O ₂ , Ar, CO ₂ (real gas calibration)
KA66000A1042	Option, flow medium CH ₄ , NG, N ₂ O (real gas calibration, please consult with manufacturer for this option in advance)

Flow Medium 2 (same selection as above)

KA66000A1003	No second gas
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Range

KA66000A1408	S401: Standard range version (92.7 m/s)
KA66000A1401	S401: Max range version (185 m/s)
KA66000A1402	S401: High speed range version (220 m/s)
KA66000A1403	S401/S421: Low range version (1/3 of standard range)
KA66000A1407	S401/S421: Vacuum / Atmospheric range (1/3 of standard range)

Calibration

KA66000A1409	S401/S421: Standard calibration
KA66000A1405	S401: Bi-directional calibration
KA66000A1404	S401/S421: High accuracy calibration (1 % ± 0.3 % F.S.)

Output

KA66000A1410	S401/S421: Isolated 4 ... 20 mA + pulse output
KA66000A1411	S401/S421: Modbus/RTU output
KA66000A1413	S401/S421: 4 ... 20 mA + pulse output (pin compatible to S400 / 420)
KA66000A1424	S401/S421: Modbus/TCP output with PoE support

Display

KA66000A1425	No display
KA66000A1420	S401/S421: Colorgraphic display, 2.4" with keypad

Accessories

KA66A6950008	S401: NPT½" thread adapter (former KA66000A1005)
KA66A6950009	S401: PT½" thread adapter (former KA66000A1006)
KA66A5530104	Sensor cable, 5 m with M12 connector, open wires, AWG 24 (0.2 mm ²)
KA66A5530105	Sensor cable, 10 m with M12 connector, open wires, AWG 24 (0.2 mm ²)
KA66A5530154	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M12 connector

Ordering example S401:

Article no.	Description
KA66S6954100	S401 Thermal Mass Flow Meter, 220 mm shaft
KA66000A1007	Flow medium 1: Air
KA66000A1003	Flow medium 2: Without second gas
KA66000A1401	Max range version (185 m/s)
KA66000A1409	Standard calibration
KA66000A1410	Isolated 4 ... 20 mA + pulse output
KA66000A1420	Colorgraphic display, 2.4" with keypad



Please use the following tables to assist in placing your order with our sales staff.

S421 Thermal Mass Flow Meter (Inline type)

Article no.	Description
KA66S6954120	S421 Thermal Mass Flow Meter (Inline), 1.6 MPa
KA66S6954121	S421 Thermal Mass Flow Meter (Inline), 4.0 MPa
Measuring section connection *	
KA66000A130X	R-thread (ISO 7-1)
KA66000A132X	Flange, EN 1092-1, PN40
KA66000A134X	Flange ANSI 16.5
Measuring section size *	
1	DN15, 1/2"
2	DN20, 3/4"
3	DN25, 1"
4	DN32, 1.25"
5	DN40, 1.5"
6	DN50, 2"
7	DN65, 2.5"
8	DN80, 3"
Flow Medium 1	
KA66000A1007	Option, flow medium Air
KA66000A1008	Option, flow medium CO ₂
KA66000A1009	Option, flow medium O ₂ (cleaning for oil and grease-free)
KA66000A1010	Option, flow medium N ₂
KA66000A1011	Option, flow medium N ₂ O
KA66000A1012	Option, flow medium Argon
KA66000A1013	Option, flow medium Natural Gas
KA66000A1014	Option, flow medium H ₂ (For real gas calibration. Please consult manufacturer for this option in advance)
KA66000A1015	Other gas (specify gas or gas mix)
KA66000A1016	Option, flow medium He (real gas calibration)
KA66000A1017	Option, flow medium Propane C ₃ H ₈
KA66000A1041	Option, flow medium O ₂ , Ar, CO ₂ (real gas calibration)
KA66000A1042	Option, flow medium CH ₄ , NG, N ₂ O (real gas calibration, please consult with manufacturer for this option in advance)
Flow Medium 2 (same selection as above)	
KA66000A1003	No second gas
Range	
KA66000A1426	S421: Standard range version
KA66000A1403	S401/S421: Low range version (1/3 of standard range)
KA66000A1407	S401/S421: Vacuum / Atmospheric range (1/3 of standard range)
Calibration	
KA66000A1409	S401/S421: Standard calibration
KA66000A1404	S401/S421: High accuracy calibration (1 % ± 0.3 % F.S.)
Output	
KA66000A1410	S401/S421: Isolated 4 ... 20 mA + pulse output
KA66000A1411	S401/S421: Modbus/RTU output
KA66000A1413	S401/S421: 4 ... 20 mA + pulse output (pin compatible to S400 / 420)
KA66000A1424	S401/S421: Modbus/TCP output with PoE support

Article no. Description

Display

KA66000A1420 S401/S421: Color graphic display, 2.4" with keypad

Flow conditioner (optional)

KA66000A107X R-thread flow conditioner (replace X with measuring section size from table in left column)

Accessories

KA66A5530104 Sensor cable, 5 m with M12 connector, open wires, AWG 24 (0.2 mm²)

KA66A5530105 Sensor cable, 10 m with M12 connector, open wires, AWG 24 (0.2 mm²)

KA66A5530154 Cable to connect power bank, 1.8 m, USB-C connector for power bank, M12 connector

Optional Flow Conditioner

Article no.	Dimensions	a	b in mm	c in mm
KA66000A1071	DN15	R 1/2"	24	64
KA66000A1072	DN20	R 3/4"	32	69
KA66000A1073	DN25	R 1"	37	75
KA66000A1074	DN32	R 1.25"	45	92
KA66000A1075	DN40	R 1.5"	54	92
KA66000A1076	DN50	R 2"	68	105
KA66000A1077	DN65	R 2.5"	80	128
KA66000A1078	DN80	R 3"	95	142

Ordering example S421:

Article no.	Description
KA66S6954120	S421 Thermal Mass Flow Meter (Inline), 1.6 MPa
KA66000A1306	R-thread (ISO 7-1), DN50 / 2"
KA66000A1008	Flow medium 1: CO ₂
KA66000A1010	Flow medium 2: N ₂
KA66000A1426	Standard range version
KA66000A1404	High accuracy calibration (1 % ± 0.3 % F.S.)
KA66000A1411	Modbus/RTU output
KA66000A1420	Color graphic display, 2.4" with keypad
KA66000A1076	R-thread flow conditioner, DN50 / 2"

