

VORTEX FLOW AND TEMPERATURE SENSOR



- VORTEX SHEDDING · NO MOVING PARTS
- 0.5 ... 400 L/MIN IN SEVEN SIZES · G3/8 ... G2
- ANALOGUE · SWITCH · PULSE · IO-LINK · RS485



Stainless Steel

KEY DATA

Property	Value	Property	Value
Flow range	0.5 ... 400 L/min (1)	Temperature range	0 ... 100 °C (2)
Flow accuracy	< ± 3.0 % F.S.	Temperature accuracy	≤ 2.0 °C
Repeatability	< 2.0 %	Pressure level	10 bar · max. 16 bar
Measuring principle	Vortex shedding	Process connection	G3/8 ... G2 internal
Output	Analogue · switch · pulse · IO-Link · RS485		

The device counts the vortices shed behind a bluff body; it has no moving parts and the reading is not affected by the static pressure in the pipe. (1) The range depends on the size: seven sizes from 0.5 ... 4 L/min to 150 ... 400 L/min — see the size table. (2) The temperature measurement is an option, the fifth field of the order code.



MEASUREMENT

Measuring principle	Vortex shedding
Flow range	0.5 ... 400 L/min in seven sizes (1)
Flow accuracy	< ± 3.0 % of full scale
Repeatability	< 2.0 %
Temperature range	0 ... 100 °C — option T (2)
Temperature accuracy	≤ 2.0 °C
Linearization	5-point flow curve
Totalizer	Totalized flow on the display
Static pressure	The reading is not affected by the static pressure in the pipe

MEDIA, MATERIALS AND PROCESS

Media	Liquids and gases · cooling water, circulating water, organic and inorganic solutions, oxygen, nitrogen, ammonia, natural gas
Wetted material	PPS below 100 L/min · PA66 above 100 L/min · stainless steel 304
Medium temperature	-20 ... +90 °C
Ambient temperature	-10 ... +65 °C
Pressure level	10 bar · maximum 16 bar
Process connection	G3/8 ... G2 internal thread · G, R or NPT
Mounting	Bracket in seven sizes · regulating valve up to 40 L/min

ELECTRICAL PROPERTIES

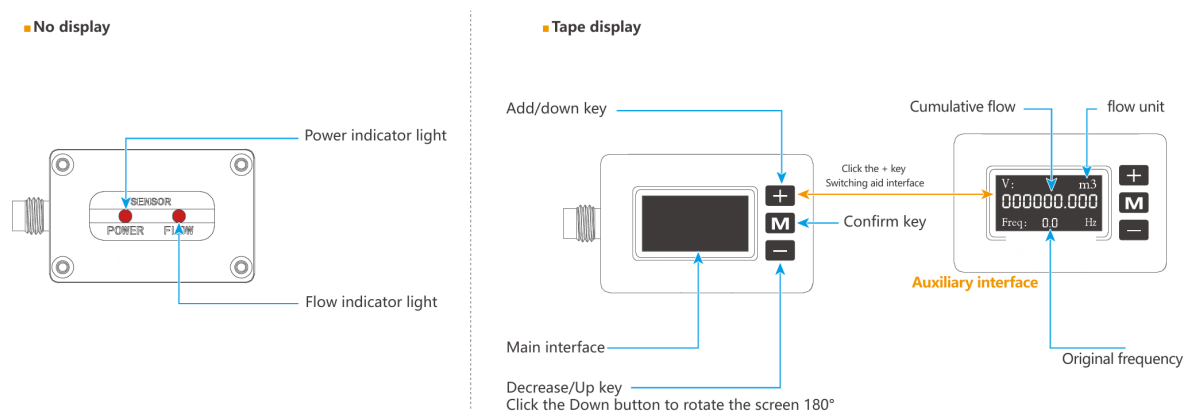
Analogue output	4 ... 20 mA or 1 ... 5 V · up to two channels · three-wire · load up to 500 Ω
Switching output	PNP or NPN · 24 Vdc / 200 mA · flow and temperature
Pulse output	Up to 1 kHz · original frequency or linear frequency, 100 Hz at full scale · scaling on request
Digital interface	IO-Link · RS485
Wiring	M8x1 connector, 4-pin · moulded cable 2, 5 or 10 m

DISPLAY AND SETTING

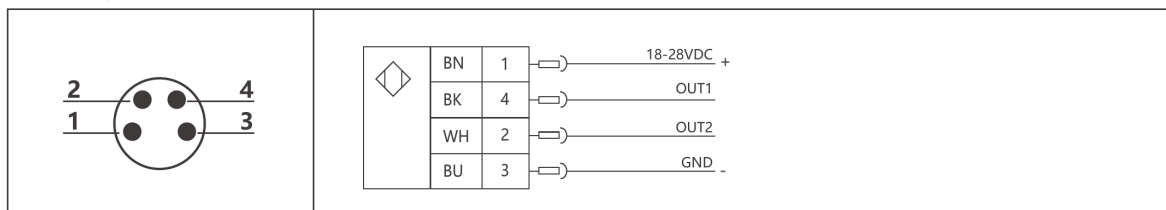
Display	Option — blind version or version with display
Reading	Instantaneous flow, totalized flow, temperature and frequency
Setting	Three keys · the screen can be turned by 180°
Blind version	No display · two indicators, power and flow
Remote display	Panel unit S10 — see accessories



WIRING



The panel: left the blind version with two indicators, right the version with display, its main screen and its auxiliary screen.



The M8x1 connector seen on its pins, and the basic wiring.

PIN ASSIGNMENT

Wire	Pin	Function
BN	1	Supply +
BU	3	Supply -
BK	4 (OUT1)	Output 1 — depends on the sixth field of the order code
WH	2 (OUT2)	Output 2 — depends on the sixth field of the order code

OUTPUTS

Output code	OUT1 · BK · pin 4	OUT2 · WH · pin 2
A2	Flow 4 ... 20 mA (factory default) · temperature 4 ... 20 mA	Temperature 4 ... 20 mA (factory default) · flow 4 ... 20 mA
V2	Flow 1 ... 5 V (factory default) · temperature 1 ... 5 V	Temperature 1 ... 5 V (factory default) · flow 1 ... 5 V
SA	Flow switch PNP (factory default) or NPN · temperature switch PNP or NPN · original frequency · linear frequency (100 Hz at full scale) · IO-Link	Flow 4 ... 20 mA (factory default) · temperature 4 ... 20 mA
SV	As SA	Flow 1 ... 5 V (factory default) · temperature 1 ... 5 V
S2	As SA	Flow switch PNP (factory default) or NPN · temperature switch PNP or NPN



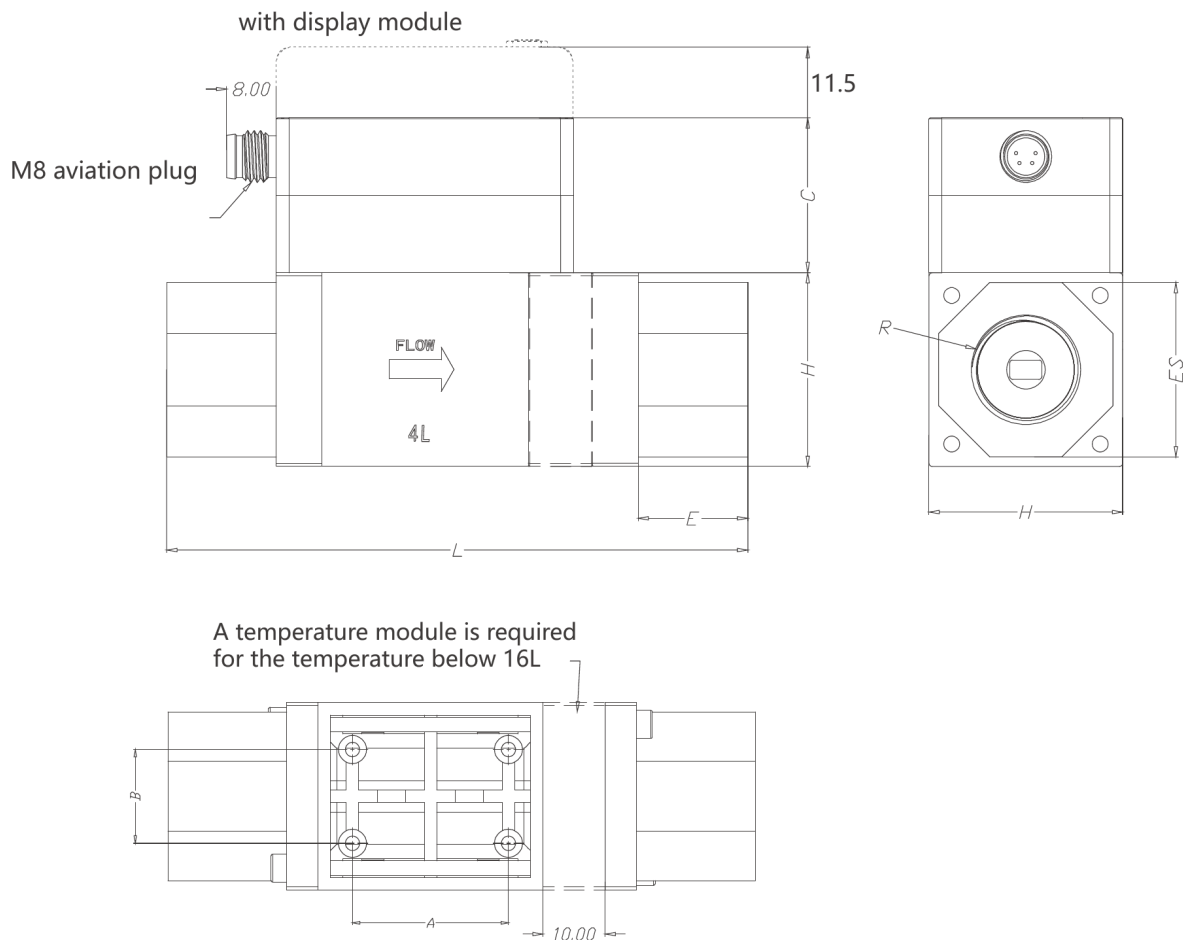
OUTPUTS . CONTINUED

Output code	OUT1 · BK · pin 4	OUT2 · WH · pin 2
R · RL	RS485 (A)	RS485 (B)

The same four cores carry every version; which output is fitted is set by the sixth field of the order code and, within that, by the factory setting. The temperature entries apply only to devices ordered with the temperature option T; without it the same codes exist with the flow functions alone. A2 and V2 are offered only together with the temperature option.



DIMENSIONS (mm)



The size 004 with display, drawn with and without the temperature module. C is the height of the shell above the body, H the body height and width, L the overall length, E the lock bit and A and B the position of the mounting holes. The lower view shows the temperature module, which the sizes up to 16 L/min need for the temperature measurement.

SIZES AND DIMENSIONS

Size code	Process connection G	Body H (mm)	Length L (mm)	Shell C (mm)	Fixing A x B (mm)	Lock E (mm)	Range (L/min)
004A	3/8" · 15 mm engagement	30 x 30	78 · 88 with temperature	24	25 x 15	17	0.5 ... 4
004B	1/2" · 15 mm engagement	30 x 30	78 · 88 with temperature	24	25 x 15	17	0.5 ... 4
016A	3/8" · 15 mm engagement	30 x 30	84 · 94 with temperature	24	25 x 15	19	2 ... 16
016B	1/2" · 15 mm engagement	30 x 30	84 · 94 with temperature	24	25 x 15	19	2 ... 16
040A	1/2" · 15 mm engagement	40 x 40	110	20	40 x 15	18	5 ... 40



SIZES · CONTINUED

Size code	Process connection G	Body H (mm)	Length L (mm)	Shell C (mm)	Fixing A x B (mm)	Lock E (mm)	Range (L/min)
040B	3/4" · 15 mm engagement	40 x 40	110	20	40 x 15	18	5 ... 40
100A	3/4" · 20 mm engagement	45 x 45	120	20	40 x 20	23	10 ... 100
100B	1" · 20 mm engagement	45 x 45	120	20	40 x 20	23	10 ... 100
200A	1-1/4" · 20 mm engagement	58 x 58	114	22	32 x 31	22	20 ... 200
200B	1-1/2" · 20 mm engagement	58 x 58	114	22	32 x 31	22	20 ... 200
250A	1-1/4" · 20 mm engagement	58 x 58	114	22	32 x 31	22	50 ... 250
250B	1-1/2" · 20 mm engagement	58 x 58	114	22	32 x 31	22	50 ... 250
400A	1-3/4" · 25 mm engagement	65 x 65	130	22	32 x 31	30	150 ... 400
400B	2" · 25 mm engagement	65 x 65	130	22	32 x 31	30	150 ... 400

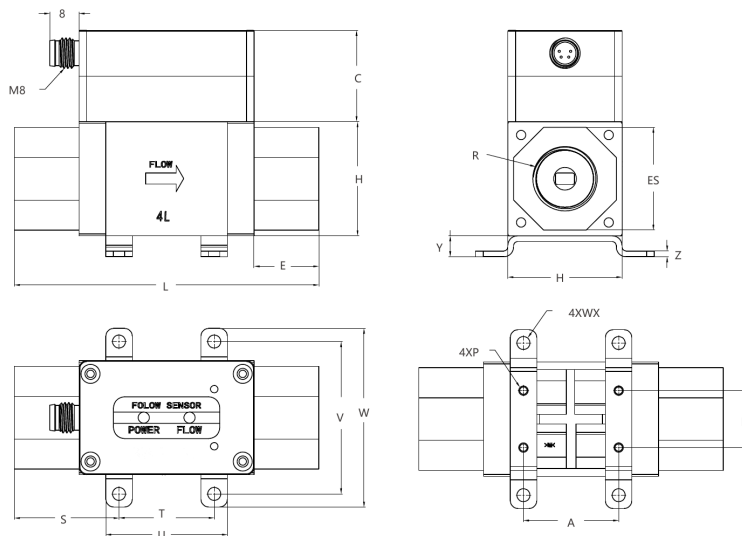
The size code is the second field of the order code; it fixes the thread and the range at the same time. Two size codes share every range — the A version has the smaller thread, the B version the larger one. H is the body height and width, C the height of the shell above the body, L the overall length, A and B the position of the mounting holes and E the lock bit. The M8x1 connector adds 8 mm.

Spanner flats across the process connection: ES 27 for the sizes 004 and 016, ES 34 for 040, ES 41 for 100, H 58 for 200 and 250, H 65 for 400.

The two smallest sizes are 10 mm longer when the temperature option is ordered — the temperature module sits in front of the measuring section.



MOUNTING AND BRACKETS



The device on its bracket, drawn for the size 004. T and V are the spacing of the bracket mounting holes, W and U the outline of the bracket, Y its height, Z its plate thickness and S the margin.

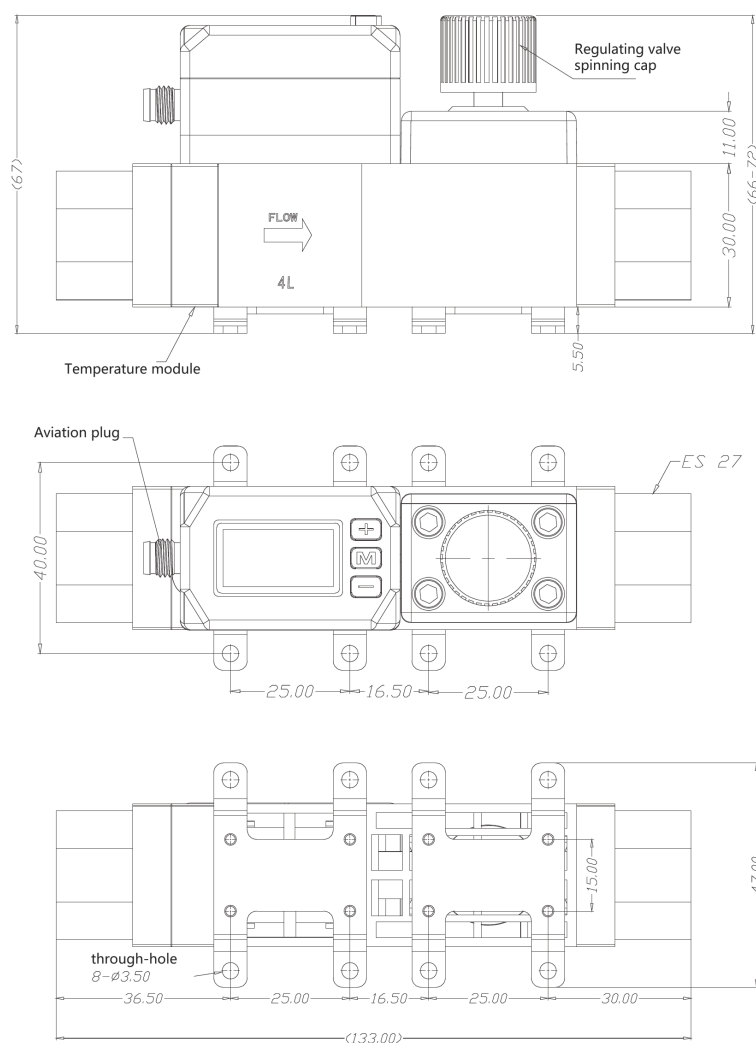
BRACKETS

Bracket for size	Mounting holes T x V (mm)	Bracket W x U (mm)	Lock screw	Hole Ø WX (mm)	Margin S (mm)
004	25 x 40	47 x 32	M2.5 x 10 deep	3.5	28
016	25 x 40	47 x 32	M2.5 x 10 deep	3.5	30
040	40 x 50	60 x 49	M4 x 10 deep	4.5	35
100	40 x 55	65 x 49	M4 x 10 deep	4.5	40
200	32 x 68	78 x 41	M4 x 10 deep	4.5	41
250	32 x 68	78 x 41	M4 x 10 deep	4.5	41
400	32 x 75	85 x 41	M4 x 10 deep	4.5	49

The bracket is ordered through the eighth field of the order code. Height Y is 5.5 mm and plate thickness Z is 1.5 mm on all seven brackets; the letters are those of the drawing above.

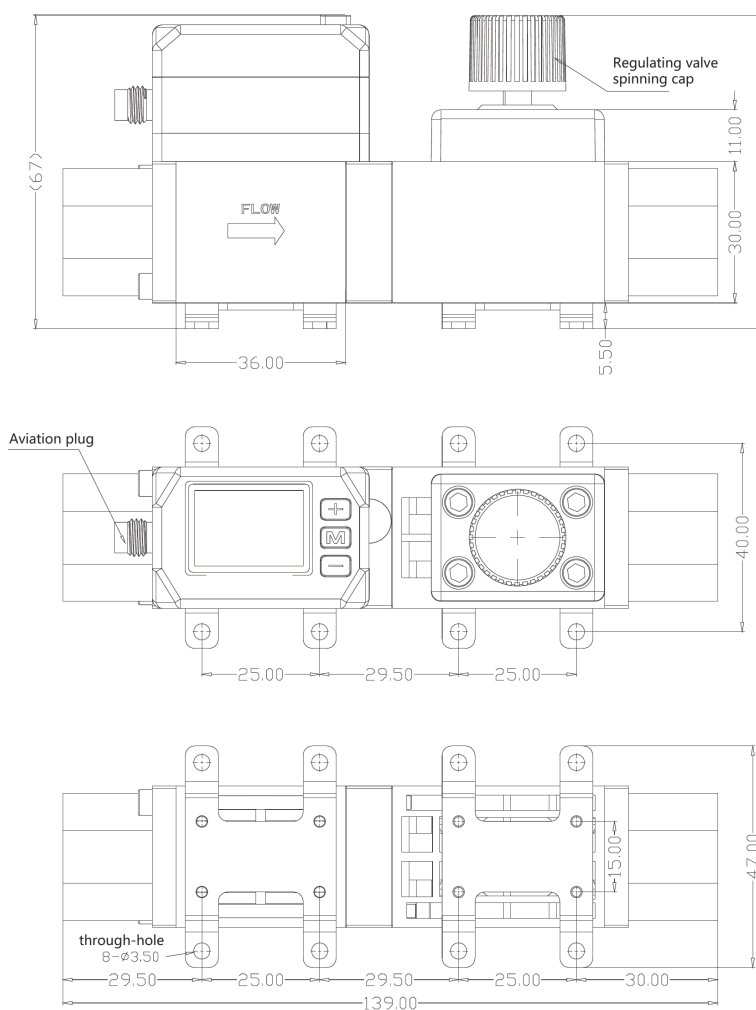


REGULATING VALVE



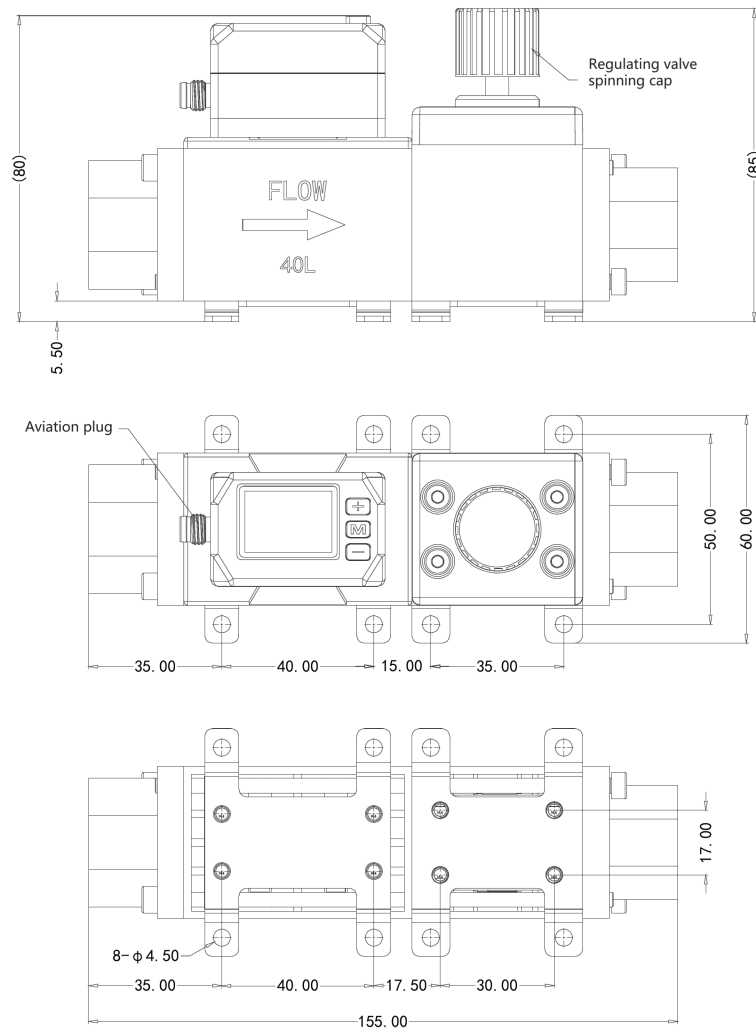
The valve for the size 004, with the temperature module — overall length 133.0 mm, process connection PT3/8".





The valve for the size 016 — overall length 139.0 mm, process connection PT1/2".





The valve for the size 040 — overall length 155.0 mm, process connection PT1/2" or PT3/4".

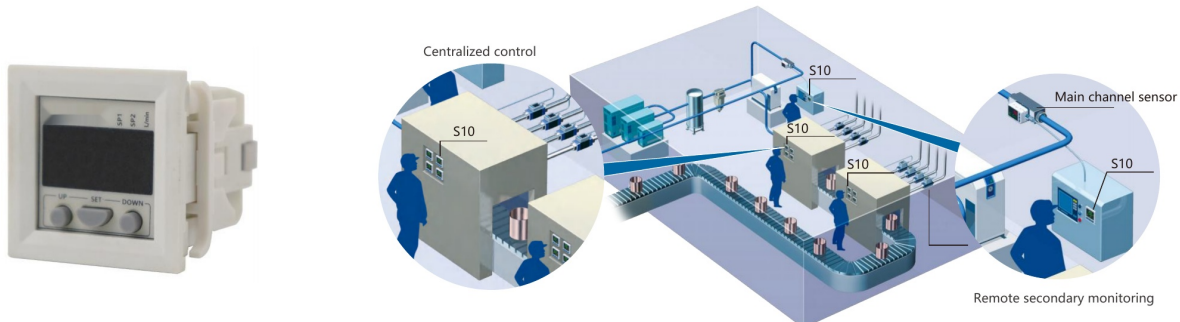
VALVE SIZES AND DIMENSIONS

Valve for size	Order number	Process connection	Length (mm)	Width body · ears (mm)	Height (mm)	Fixing
004	KTBCP31129	PT3/8"	133.0	40.0 · 47.0	(67) · (66 ... 72)	8 x Ø 3.5
016	KTBCP31129	PT1/2"	139.0	40.0 · 47.0	(67) · (66 ... 72)	8 x Ø 3.5
040	KTBCP33112	PT1/2" · PT3/4"	155.0	50.0 · 60.0	(80) · (85)	8 x Ø 4.5

The regulating valve sits in the same body as the sensor and is ordered through the seventh field of the order code, F. It is offered only up to 40 L/min. The valve is set by hand with the knurled cap; the sensor reads the flow through it. Dimensions in brackets are reference dimensions.



PANEL DISPLAY UNIT S10



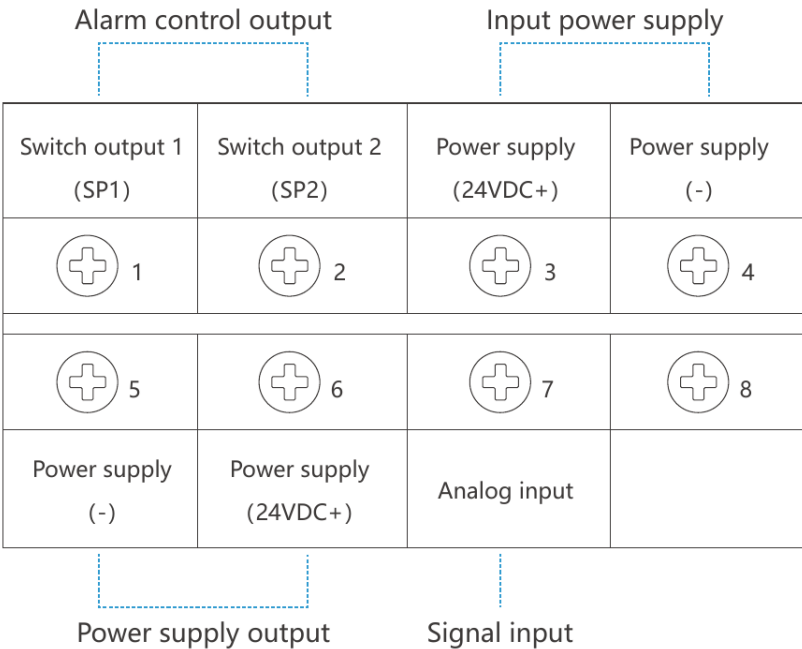
The S10 panel unit and one way of using it: several sensors report to one cabinet, and one unit per measuring point repeats the reading.

S10 · TECHNICAL DATA

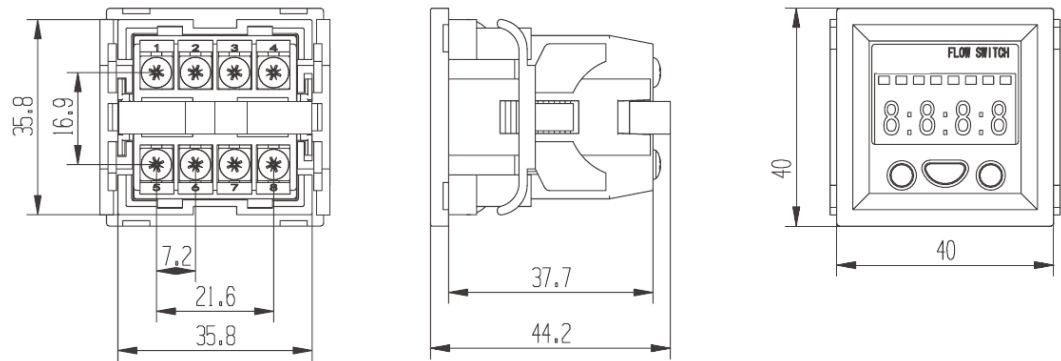
Property	Value
Input	Analogue (pulse) or Pt100
Display range	-199.9 ... 999.9
Temperature drift	$\leq \pm 0.015 \% \text{ F.S. per } ^\circ\text{C}$ — about $\pm 75 \text{ ppm}/^\circ\text{C}$
Electromagnetic compatibility	IEC 61000-4-4 (burst) $\pm 4 \text{ kV} / 5 \text{ kHz}$ · IEC 61000-4-5 (surge) 4 kV
Output	Switch or analogue
Supply voltage	$24 \text{ Vdc} \pm 20 \%$ · power consumption $\leq 3 \text{ W}$
Operating temperature	$-10 \dots +60 ^\circ\text{C}$ · humidity $\leq 90 \% \text{ RH}$
Panel cutout	$36 +0.5/0 \times 36 +0.5/0 \text{ mm}$ · panel $1 \dots 3.2 \text{ mm}$ thick · corner radius max. $R3.5$ · at least 43 mm between two cutouts
Terminals	Eight screw terminals
Order code	S10-21 — analogue input, two switch outputs, reading in L/min

The S10 is a separate device with its own order code; it repeats the reading of one or more sensors in a control cabinet and switches two alarm contacts of its own.



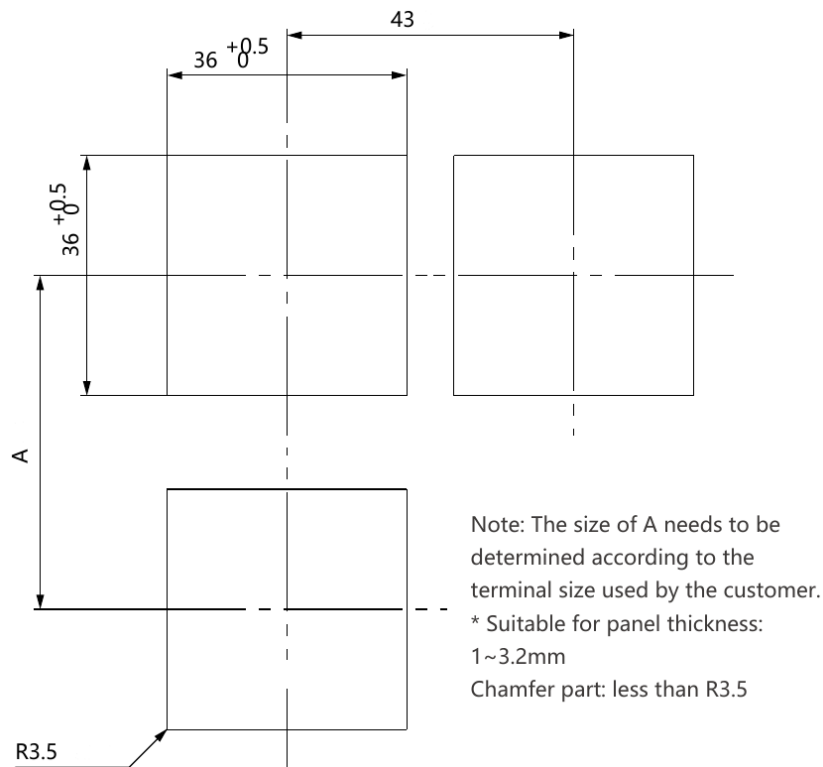


The eight terminals: 1 and 2 the two alarm contacts, 3 and 4 the supply, 5 and 6 the supply output for the sensor, 7 the analogue input.

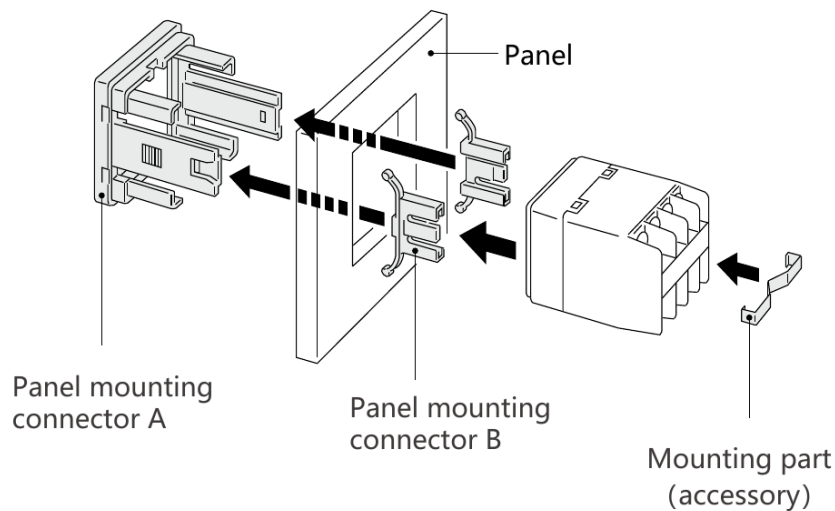


The S10 seen from behind, from the side and from the front — 40 x 40 mm in the panel, 44.2 mm deep.





The panel cutout, 36 mm square with a tolerance of +0.5/0. Between two cutouts at least 43 mm are needed; the corner radius must not exceed R3.5. A depends on the terminals used and has to be determined on site.



The unit is pushed into the cutout from the front and held by the two mounting parts from behind.



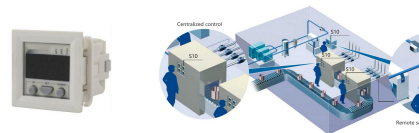
COMPLIANCE AND CERTIFICATION

Measuring principle	Vortex shedding
Flow accuracy	$< \pm 3.0 \%$ of full scale
Temperature accuracy	$\leq 2.0 \text{ }^{\circ}\text{C}$
Repeatability	$< 2.0 \%$
Wetted materials	PPS, PA66 and stainless steel 304
Pressure rating	10 bar, maximum 16 bar
Custody transfer	Excluded. The products are developed and made as automatic control components for the manufacturing industry, are not suitable outside it, and cannot be used for transactions or certifications under the metrology laws of any country

ORDER CODE AND ACCESSORIES

Sockets, bracket, valve and display

- The device is wired through an M8x1 4-pin connector; sockets are offered with 2, 5 or 10 m of moulded PVC cable. The bracket and the regulating valve are ordered through the last two fields of the order code and are delivered fitted; the valve is available only for the sizes up to 40 L/min. The S10 panel unit is a separate device with its own order code — it repeats the reading in a control cabinet and switches two alarm contacts of its own.



Connector
M8x1 · 4-pin

Cable
2 · 5 · 10 m

ORDER CODE

Field	Code	Meaning
1 Series	QEKJ	QEKJ vortex flow and temperature sensor
2 Size	004A ... 400B	Size code from the size table — thread and range in one field
3 Thread	GK	G internal thread
	RK	R internal thread
	NK	NPT internal thread
4 Electrical	M	M8x1 connector, 4-pin · moulded cable 2 m as standard, other lengths on request
5 Temperature	—	Without temperature measurement
	T	With temperature measurement
6 Output	—	Analogue 4 ... 20 mA · no display
	V	Analogue 1 ... 5 V · no display
	S	IO-Link / pulse frequency · no display (3)
	R	RS485 · no display
	A2	Two analogue channels 4 ... 20 mA · with display · only with option T
	V2	Two analogue channels 1 ... 5 V · with display · only with option T
	SA	One switch + pulse / IO-Link + analogue 4 ... 20 mA · with display
	SV	One switch + pulse / IO-Link + analogue 1 ... 5 V · with display
	S2	Two switches + pulse / IO-Link · with display



ORDER CODE · CONTINUED

Field	Code	Meaning
	RL	RS485 · with display
7 Valve	—	Without regulating valve
	F	With straight-through regulating valve · only up to 40 L/min
8 Bracket	—	Without bracket
	T	With bracket

Example: QEKJ-004A-GK-M-T-SA-F-T. A dash is a valid entry in the fields 5, 7 and 8 and means "without". (3) The factory setting of S is the pulse frequency; IO-Link supports the command wake-up function.

ACCESSORIES

Item	Order code	Data
Cable socket M8x1, 4-pin, moulded cable	M84PC02G · M84PC05G · M84PC010G	2, 5 or 10 m · PVC
Mounting bracket, seven sizes	Eighth field of the order code, T	Dimensions in the mounting section
Straight-through regulating valve	KTBCP31129 · KTBCP33112	Seventh field of the order code, F · only up to 40 L/min
Panel display unit S10	S10-21	Analogue input, two switch outputs, 24 Vdc · see the S10 section

These are the order numbers of the manufacturer. The bracket and the valve are not separate line items but fields of the order code.

