TECHNICAL GUIDANCE

High-performance gas flowmeter

SRT1000 Series
THERMAL FLOWMETER

OUTLINE

Based on the long experienced know-how on the TOKYO KEISO's thermal flowmeters, SRT1000 series has enhanced its performance such as a reading accuracy, a reliable sealing by metal and a digital output. In measuring various gases it covers wider sizes ranging from 10 mm to even 1500 mm as standard. Either the integral type with the sensor integrated with an indicator and converter or the separate type with an indicator and converter remotely mounted is available for the application.
Various outputs are available for your convenience such as pulse, high and low alarms, and digital output via RS485, as well as 4 to 20 mA DC, 0 to 5, 0 to 10 V DC analog outputs all in standard features.
The SRT1000 covers much wider measuring range than the current thermal flowmeters.

FEATURES

❑ **High accuracy**
Based on our reference conditions
When measuring air or N_2
±1% R.D. between 10 to 100% F.S. and ±0.5% F.S. in less than 10% F.S.
When measuring other gases than air or N_2
± (1% R.D.+1% F.S.) between 10 to 100% F.S. and ±1.5% F.S. in less than 10% F.S.

❑ **Metallic sealing**
The sensor has a metallic sealing mechanism, durable and corrosion resistant.

❑ **Low pressure loss**
Negligible small pressure loss by a simple sensor made of stainless steel placed in the flow path.

❑ **High speed response**
Not more than 1 second at 63 % response.

❑ **Temperature indication**
The sensor consists of a heated sensor and a temperature sensor which allows also temperature indication in the piping.

❑ **Pressure compensation**
Flow rate compensation by inputting 4 to 20 mA DC pressure signal for unstable process.

❑ **Flow rate unit**
Normal flow rate at 0°C and 1 atm, standard flow rate, actual flow rate or mass flow rate is available.

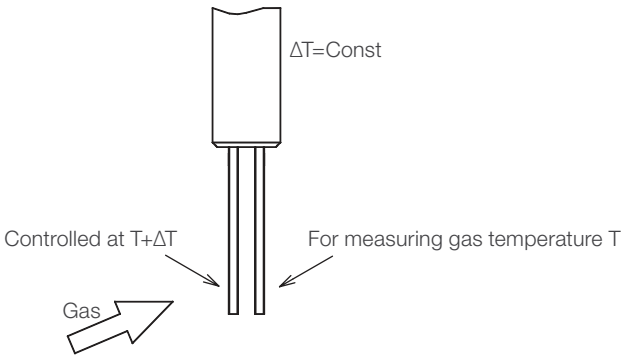
❑ **RoHS**

APPLICATIONS

- Semiconductor equipment gas lines
- Medical oxygen supply lines
- HVAC
- Process and utility lines for general industry

MEASURING PRINCIPLE

The fluid velocity sensor consists of a heated tubule and a gas temperature sensor. The temperature of heated tubule is controlled in constant at T+ΔT where T is the temperature measured by the temperature sensor and ΔT is the difference between the two temperature sensors. As the ΔT is constant, flow velocity is determined by the electric consumption required for the heating.



STANDARD SPECIFICATIONS

Fluid

- Measuring object: Non-corrosive gases. See flow range table.
- Temperature: –20 to 120°C
- Pressure: –0.07 to 1 MPa
- Flow velocity range: Min. : 6 m/s (nor) and the velocity at which Re number of the gas in relevant pipe size is 23200
  Max. : 150 m/s (nor) at the velocity converted to air
- Rangeability: 25 : 1

Sensor

- Material contacting gases
  SUS316L, SUS316, SCS14
  Sensor element is made of SUS316L
- He leak (Option): 1×10^{-9} Pa·m^3/s (He) or less
- Meter size
  Insertion type: 50 to 1500 mm
  Inline type: 10 to 150 mm
- Installation posture: Horizontal or vertical
- Process connection
  Flange: JIS 10K/20K, ANSI 150/300, JPI 150/300
  Insertion type by tube fitting
  Outside diameter 20 mm
  SWL, VCR, Rc: 3/8", 1/2", 3/4", 1"
  Wafer: 40 to 150 mm
- Sensor mass: See DIMENSIONS drawing

Converter

- Display: 16 digits of alphanumerics in 2 lines by LCD with back light
  Contents : Instantaneous flow rate, totalizing flow, temperature, Pressure, erro messages
  Flow rate in 5 digits in 0.000 to 99999
  Totalizing flow in 8 digits in 0.000 to 99999999
- Response: 1 second at 63 % step response
- Power supply: 24 ±10 % V DC
- Power consumption: Max. 18 W
- Cable entries: For power supply output M20 × 1.5 2 pieces
- Electrical connections
  Pin terminal connector
  Electrical wire: AWG 20
- Output
  Analog output: Select one from 4 to 20 mA DC, 0 to 5 V DC, 0 to 10 V DC
  Pulse output: Photo MOS relay, 30 V DC/100 mA
  Pulse width: 50 ms (Standard), 10 ms, 100 ms, 150 ms, 200 ms
  Alarm output: Photo MOS relay, 30 V DC/100 mA
  High alarm H, Low alarm L
  RS-485: Select one from 1200, 2400, 4800, 9600, 19200, 38400 bps
  ID address : 00 to 99
  Protocol : 8N1
  Output : Flow rate, totalizing flow, temperature, parameters etc.
- Time constant: 0 to 30 seconds, can be set in 1 second step
  Applied for display and analog output
- Low cut-off: 0 to 10 % of the maximum flow rate, can be set in 1 % step
- Parameter setting: Can be set by switches inside converter or communication via RS-485
- Converter mass: Approx. 1 kg
- Cable length: Max. 50 m between sensor and converter
- Testing: Simulation output by analog or pulse
- Converter material: Aluminum alloy, A DC 12
- Converter painting: Epoxy resin painting in blue for front cover and silver for the case
- Protection class: IP 65
- Mounting method of separate type converter
  Wall mount or 2 inch pipe mount
- Converter ambient temperature
  –10 to 60°C
- Converter ambient humidity
  10 to 90 % RH without condensation
- Pressure compensation
  By 4 to 20 mA DC pressure signal input by a pressure transmitter supplied by others.

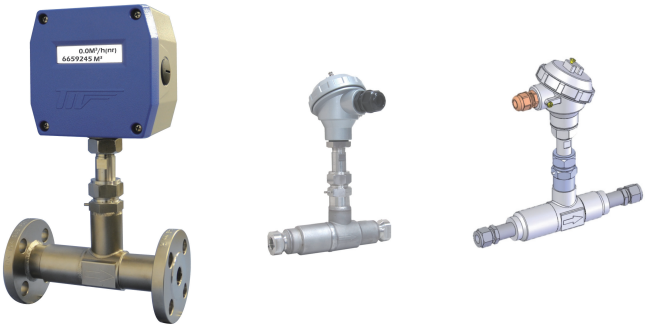
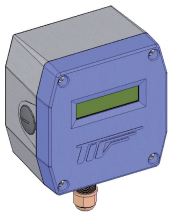
Specify other requirements not mentioned above when ordering. Consult TOKYO KEISO for the availability of flowmeters suitable for various gases or flow range.

Accuracy

- Flow rate indication accuracy
  Based on our reference conditions
  When measuring air or N_2
  ±1% R.D. ±1 digit between 10 to 100% F.S. and ±0.5% F.S. ±1 digit in less than 10% F.S.
  When measuring other gases than air or N_2
  ± (1% R.D.+1% F.S.) between 10 to 100% F.S. and ±1.5% F.S. in less than 10% F.S.
- Analog output: Add ±0.01 mA to analog indication
- Totalizing count: When measuring air or N_2
  ±1% R.D. ±1 pulse between 10 to 100% F.S.
- Error messages are displayed :
  Heated current error, Temperature difference signal error, Converter internal temperature error.

PRODUCT TYPES

Various types are available for your applications.

Insertion type for large pipe sizes	
Suitable for large pipes such as HVAC, utilities, flue gas and rectangular duct, etc.	
Inline type for medium pipe sizes	
Inline type suitable for semiconductor process, HVAC and utilities requires no welding of nozzle. The sizes from 40 mm through 150 mm are available.	
Inline type for small pipe sizes	
Inline type for small sizes have connections of SWL and VCR also. The sizes from 10 mm through 25 mm are available.	
Converter	
This model of its weight 1 kg is lighter than the existing converter of thermal flowmeters.	

Insertion type
SRT1100

OUTLINE

The light and compact SRT1100 is used by inserting its sensor into the pipes with rather large size. It features less expensive flow measurement in large process lines including rectangular ducts.

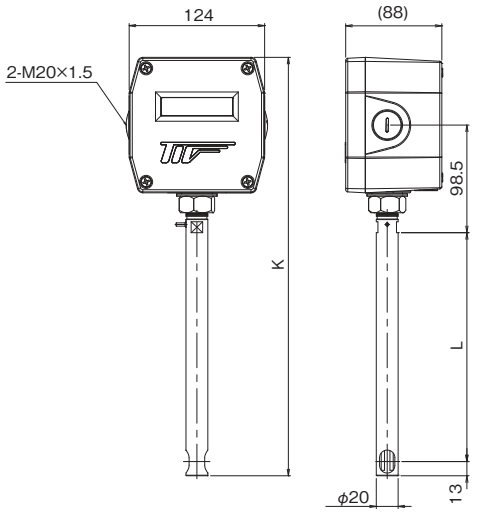
MODEL CODE

SRT1				–					–						Description
Shape	1			–					–						Insertion type 50 mm to 1500 mm
Display		1		–					–						Integral type : Sensor with a display
		2		–					–						Separate type : Sensor with a separately mounted display
Construction			W	–					–						Weatherproof construction
Probe length					P				–						150 mm
					Q				–						250 mm
					R				–						400 mm
					S				–						550 mm
					T				–						700 mm
					U				–						850 mm
					9				–						Consult Tokyo Keiso for the services larger than 850 mm
Material contacting gases						6			–						SUS316 as standard
						L			–						SUS316L
						9			–						Others
Process connection							N		–						Tube fittings
							1		–						Flange connection
							9		–						Others
Size and rating of flange connection								N	–						Tube fittings
								1	–						32 mm JIS 10K RF
								2	–						32 mm JIS 10K FF
								3	–						40 mm JIS 10K RF
								4	–						40 mm JIS 10K FF
								9	–						Others
Sensor guard									N	–					No
									1	–					Yes
Power supply											D				20.4 to 27.6 V DC, 800 mA or more The power is supplied by others.
Analog output set on delivery from factory												1			4 to 20 mA DC without pressure compensation
												2			0 to 5 V DC without pressure compensation
												3			0 to 10 V DC without pressure compensation
												4			4 to 20 mA DC with pressure compensation
												5			0 to 5 V DC with pressure compensation
												6			0 to 10 V DC with pressure compensation
Length of an exclusive cable between sensor and converter													N		None for the integral type (Sensor with a converter)
													1		5 m
													2		10 m
													3		15 m
													4		20 m
													5		25 m
													6		30 m
													7		35 m
													8		40 m
													A		45 m
													B		50 m
													9		Others
Two inches pipe for installing converter														N	Not required because of either wall mounting or integral type
														1	Required
Others															N None
															9 Yes. Consult us.

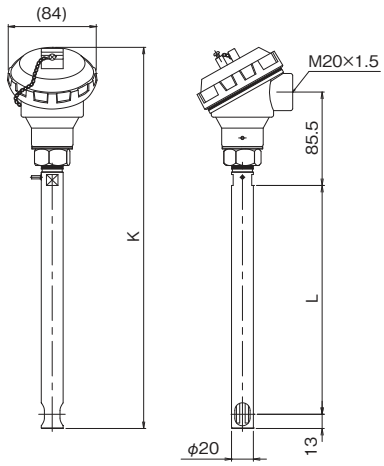
DIMENSIONS

[Insertion type with sensor guard]

SRT111W Integral type



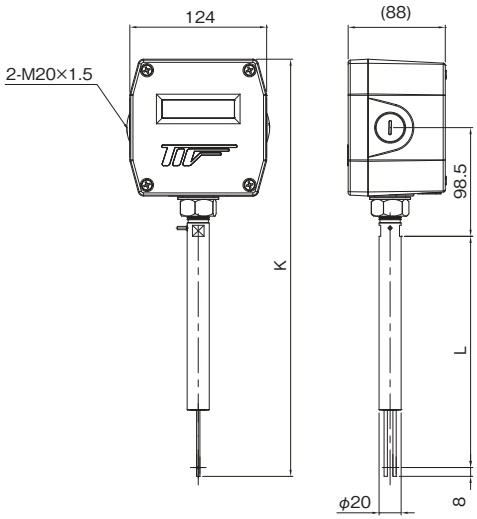
SRT112W Separate type



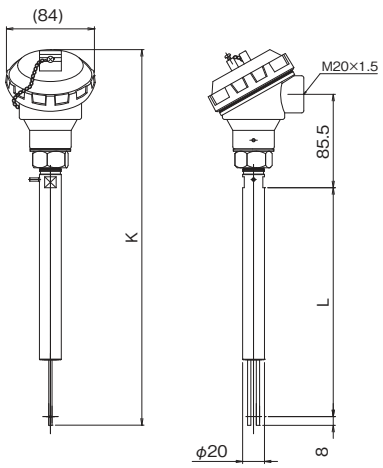
Size	Recommended length L (mm)	Integral type K (mm)	Separate type K (mm)	Integral type approx. mass (kg)	Separate type approx. mass (kg)
50mm to 150mm	150	325	290	1.3	0.3
200mm to 350mm	250	475	390	1.5	0.5
400mm to 650mm	400	575	540	1.6	0.6
700mm to 900mm	550	725	690	1.85	0.85
1000mm to 1200mm	700	875	840	1.9	0.9
1350mm to 1500mm	850	1025	990	2.2	1.2

[Insertion type without sensor guard]

SRT111W Integral type



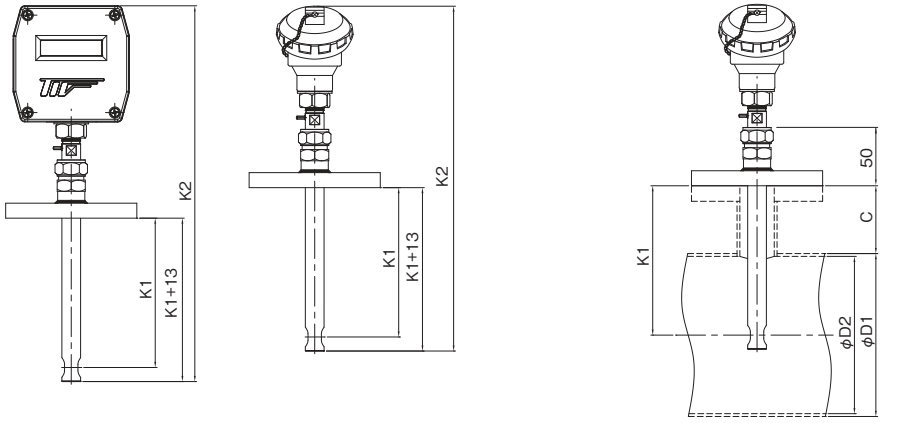
SRT112W Separate type



Size	Recommended length L (mm)	Integral type K (mm)	Separate type K (mm)	Integral type approx. mass (kg)	Separate type approx. mass (kg)
50mm to 150mm	150	320	285	1.3	0.3
200mm to 350mm	250	470	385	1.5	0.5
400mm to 650mm	400	570	535	1.6	0.6
700mm to 900mm	550	720	685	1.85	0.85
1000mm to 1200mm	700	870	835	1.9	0.9
1350mm to 1500mm	850	1020	985	2.2	1.2

[Insertion type with sensor guard with flange connection]

SRT111W Integral type **SRT112W Separate type** **Installation method**



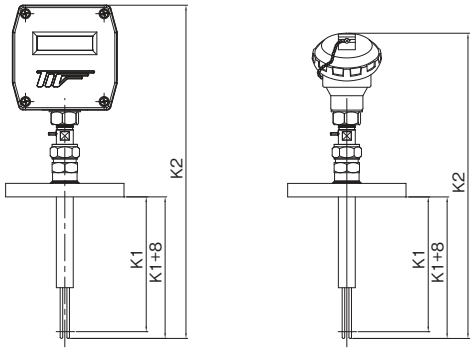
Size	Standard length* K1 (mm)	Meter size (Probe length)	Integral type K2 (mm)	Separate type K2 (mm)	Integral type approx. mass (kg)	Separate type approx. mass (kg)
50mm to 200mm	182	Q	475	390	3.5	2.5
250mm to 500mm	333	R	575	540	3.6	2.6
550mm to 800mm	483	S	725	690	3.85	2.85
850mm to 1000mm	633	T	875	840	3.9	2.9
1100mm to 1350mm	783	U	1025	990	5.2	3.2
More than 1350mm	Consult us					

*Standard length is the recommended one by Tokyo Keiso Co., Ltd. Inform us "K1" , "C" , "D1", "D2" dimensions for non-standard length. The mass described above is determined by the flowmeter with JIS 10K 40 mm flange.

How to select the probe length of the insertion type.
Select the probe length so that the probe length will be ≥ K1+50 mm.

[Insertion type without sensor guard with flange connection]

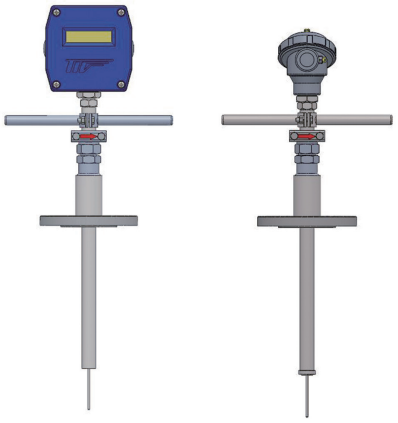
SRT111W Integral type **SRT112W Separate type**



Size	Standard length* K1 (mm)	Meter size (Probe length)	Integral type K2 (mm)	Separate type K2 (mm)	Integral type approx. mass (kg)	Separate type approx. mass (kg)
50mm to 200mm	182	Q	470	385	3.5	2.5
250mm to 500mm	333	R	570	535	3.6	2.6
550mm to 800mm	483	S	720	685	3.85	2.85
850mm to 1000mm	633	T	870	835	3.9	2.9
1100mm to 1350mm	783	U	1020	985	5.2	3.2
More than 1350mm	Consult us					

*Standard length is the recommended one by Tokyo Keiso Co., Ltd. Inform us "K1" , "C" , dimensions for non-standard length. The mass described above is determined by the flowmeter with JIS 10K 40 mm flange.

Variable length insertion type SRT1400



OUTLINE

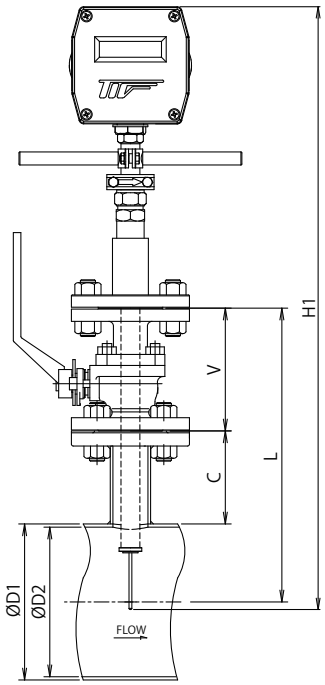
The SRT1400 is a variable length insertion detector provided for checking flow profile in pile line. Gate valve (customer's supply) can be added for easy maintenance without interrupting process operation.

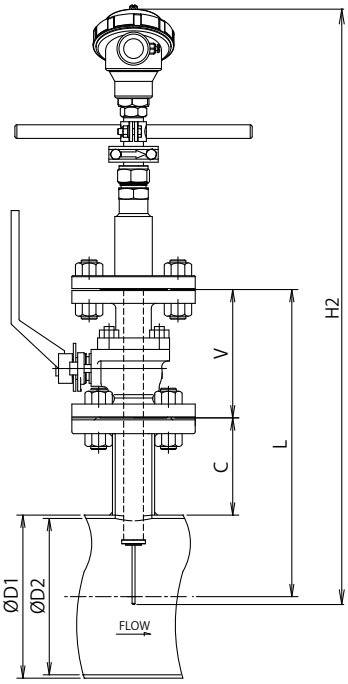
MODEL CODE

SRT1				–						–						Description
Shape	4			–						–						Variable length insertion type
Display		1		–						–						Integral type: Sensor with a display
		2		–						–						Separate type: Sensor with a separately mounted display
Construction			W	–						–						General weatherproof construction
Meter size (Probe length)					R					–						400 mm (50A to 80A)
					S					–						550 mm (Max 300A)
					T					–						700 mm (Max 600A)
					U					–						850 mm (Max 900A)
Material contacting gases						6				–						SUS316 as standard
						L				–						SUS316L
Connection							1			–						Flange connection
Flange								1		–						JIS 10K 32A RF
								2		–						JIS 10K 32A FF
								3		–						JIS 10K 40A RF
								4		–						JIS 10K 40A FF
								5		–						JIS 10K 50A RF
								6		–						JIS 10K 50A FF
								7		–						JIS 10K 25A RF
								8		–						JIS 10K 25A FF
Sensor guard									N	–						None
Power supply											D					20.4 to 27.6 V DC, 800 mA or more (The power is supplied by others)
Analog output & pressure compensation												1				4 to 20 mA DC without pressure compensation
												2				0 to 5 V DC without pressure compensation
												3				0 to 10 V DC without pressure compensation
												4				4 to 20 mA DC with pressure compensation
												5				0 to 5 V DC with pressure compensation
												6				0 to 10 V DC with pressure compensation
Length of an exclusive cable between sensor and converter													N			None for the integral type (Sensor with a converter)
													1			5 m
													2			10 m
													3			15 m
													4			20 m
													5			25 m
													6			30 m
													7			35 m
													8			40 m
													A			45 m
													B			50 m
													9			Others
Two inches pipe for installing converter														N		Not required because of either wall mounting or integral type
														1		Required
Others															N	None
															9	Yes. Consult us.

Note: The SRT1400 covers the same flow range as SRT1100 series.

DIMENSIONS





Size	Meter size (Probe length)	Integral type H1 (mm)	Separate type H2 (mm)	Integral type mass (kg)	Separate type mass (kg)
50 mm to 80 mm	R	580	546	Approx. 4.2kg	Approx. 3.2kg
80 mm to 300 mm	S	730	696	Approx. 4.5kg	Approx. 3.5kg
300 mm to 600 mm	T	880	846	Approx. 4.7kg	Approx. 3.7kg
600 mm to 900 mm	U	1030	996	Approx. 4.9kg	Approx. 3.9kg

Note: Inform us of the dimensions "ϕD1, ϕD2, C, V". The valve is supplied by others.The size may vary slightly depending on the dimensions and size of the valve. Consult us for details.

FLOW RANGE AT FULL SCALE SRT1100

unit in m^3/h (nor)

Size	Air or Nitrogen AIR/N_2	with sensor guard	Carbon dioxide CO_2	with sensor guard	Oxygen O_2	with sensor guard	Argon Ar	with sensor guard	City gas 13A	with sensor guard
50mm	63 to 1200	600	65 to 1200	600	70 to 1160	580	102 to 1200	600	60 to 740	370
65mm	90 to 2200	1100	114 to 2200	1100	87 to 2120	1060	181 to 2200	1100	77 to 1360	680
80mm	117 to 2900	1450	149 to 2900	1450	113 to 2800	1400	235 to 2900	1450	90 to 1790	895
100mm	200 to 4900	2450	254 to 4900	2450	193 to 4730	2365	400 to 4900	2450	124 to 3030	1515
125mm	300 to 7500	3750	381 to 7500	3750	290 to 7240	3620	600 to 7500	3750	185 to 4600	2300
150mm	425 to 10600	5300	540 to 10600	5300	410 to 10200	5100	850 to 10600	5300	260 to 6500	3250
200mm	753 to 18800	9400	957 to 18800	9400	727 to 18100	9050	1520 to 18800	9400	465 to 11600	5800
250mm	1140 to 28500	14250	1450 to 28500	14250	1100 to 27500	13750	2290 to 28500	14250	700 to 17600	8800
300mm	1625 to 40600	20300	2070 to 40600	20300	1570 to 39200	19600	3260 to 40600	20300	1000 to 25100	12550
350mm	2026 to 50600	25300	2570 to 50600	25300	1960 to 48800	24400	4070 to 50600	25300	1250 to 31300	15650
400mm	2460 to 61500	30750	3130 to 61500	30750	2380 to 59300	29650	4950 to 61500	30750	1520 to 38000	19000
450mm	3300 to 77900	38950	4200 to 77900	38950	3190 to 75200	37600	6630 to 77900	38950	2040 to 48100	24050
500mm	3870 to 96800	48400	4920 to 96800	48400	3740 to 93400	46700	7770 to 104000	52000	2390 to 59700	29850
550mm	4710 to 117700	58850	5990 to 117700	58850	4550 to 113600	56800	9460 to 117700	58850	2900 to 72700	36350
600mm	5600 to 140000	70000	7120 to 140000	70000	5400 to 135100	67550	11250 to 140000	70000	3460 to 86500	43250
650mm	6635 to 165800	82900	8430 to 165800	82900	6400 to 160000	80000	13330 to 165800	82900	4100 to 102400	51200
700mm	7757 to 193900	96950	9860 to 193900	96950	7490 to 187200	93600	15600 to 193900	96950	4800 to 119700	59850
750mm	8970 to 224150	112075	11400 to 224150	112075	8660 to 216400	108200	18000 to 224150	112075	5540 to 138400	69200
800mm	10260 to 256570	128285	13040 to 256570	128285	9900 to 247700	123850	20600 to 256570	128285	6340 to 158400	79200
850mm	11700 to 291200	145600	14870 to 291200	145600	11300 to 281100	140550	23500 to 304000	152000	7230 to 179800	89900
900mm	12840 to 321000	160500	16320 to 321000	160500	12400 to 309900	154950	25800 to 321000	160500	7930 to 198200	99100
1000mm	15960 to 399000	199500	20280 to 399000	199500	15410 to 385200	192600	32060 to 399000	199500	9860 to 246400	123200
1100mm	19070 to 476500	238250	24230 to 476500	238250	18410 to 460000	230000	38300 to 476500	238250	11780 to 294300	147150
1200mm	22430 to 560800	280400	28500 to 560800	280400	21660 to 541400	270700	45000 to 560800	280400	13860 to 346400	173200
1350mm	31900 to 797000	398500	40550 to 797000	398500	30800 to 769400	384700	64100 to 797000	398500	19700 to 492300	246150
1500mm	35600 to 891700	445850	45240 to 891700	445850	34370 to 860800	430400	71500 to 891700	445850	22000 to 550800	275400

Size	Methane CH_4	with sensor guard	Propane C_3H_8	with sensor guard	Normal butane C_4H_{10}nor	with sensor guard	Ammonia NH_3	with sensor guard
50mm	70 to 750	375	29 to 684	342	24 to 570	285	64 to 1100	550
65mm	90 to 1380	690	51 to 1250	625	43 to 1050	525	82 to 2000	1000
80mm	110 to 1820	910	67 to 1650	825	56 to 1380	690	107 to 2640	1320
100mm	137 to 3070	1535	114 to 2790	1395	95 to 2330	1165	180 to 4460	2230
125mm	190 to 4700	2350	170 to 4270	2135	143 to 3570	1785	270 to 6830	3415
150mm	270 to 6650	3325	240 to 6040	3020	200 to 5040	2520	380 to 9660	4830
200mm	470 to 11790	5895	430 to 10710	5355	360 to 8950	4475	680 to 17140	8570
250mm	720 to 17880	8940	650 to 16240	8120	540 to 13560	6780	1040 to 25980	12990
300mm	1020 to 25470	12735	930 to 23130	11565	770 to 19320	9660	1480 to 37000	18500
350mm	1270 to 31740	15870	1150 to 28830	14415	960 to 24080	12040	1850 to 46100	23050
400mm	1550 to 38580	19290	1400 to 35040	17520	1170 to 29200	14600	2240 to 56000	28000
450mm	2070 to 48870	24435	1880 to 44380	22190	1570 to 37000	18500	3000 to 71000	35500
500mm	2430 to 60720	30360	2200 to 55150	27575	1840 to 46000	23000	3530 to 88200	44100
550mm	2960 to 73830	36915	2680 to 67060	33530	2240 to 56000	28000	4290 to 107200	53600
600mm	3510 to 87820	43910	3190 to 79760	39880	2660 to 66600	33300	5100 to 127600	63800
650mm	4160 to 104000	52000	3780 to 94460	47230	3160 to 78800	39400	6050 to 151100	75550
700mm	4870 to 121600	60800	4420 to 110400	55200	3690 to 92200	46100	7070 to 176700	88350
750mm	5630 to 140600	70300	5110 to 127700	63850	4270 to 106600	53300	8180 to 204300	102150
800mm	6440 to 160900	80450	5850 to 146100	73050	4880 to 122000	61000	9350 to 233800	116900
850mm	7340 to 182700	91350	6670 to 165900	82950	5570 to 138500	69250	10600 to 265400	132700
900mm	8050 to 201300	100650	7320 to 182800	91400	6110 to 152700	76350	11700 to 292500	146250
1000mm	10010 to 250300	125150	9090 to 227300	113650	7590 to 189800	94900	14500 to 363600	181800
1100mm	11960 to 298900	149450	10860 to 271400	135700	9070 to 226700	113350	17400 to 434300	217150
1200mm	14070 to 351800	175900	12780 to 319500	159750	10670 to 266800	133400	20400 to 511000	255500
1350mm	20020 to 500000	250000	18180 to 454000	227000	15190 to 379200	189600	29000 to 726000	363000
1500mm	22330 to 559300	279650	20280 to 508000	254000	16940 to 424200	212100	32500 to 812000	406000

Note: Inform us whether the composition of mixed gases is in vol% or wt%.

PRECAUTIONS ON INSTALLING THE INSERTION TYPE SRT1100 ON PIPING

- Weld a socket on the main pipe to be measured as shown at Fig. A.
- Screw a tube fitting into the socket as shown at Fig. B. The tube fitting MDCTZ20M-R12 made by IHARA SCIENCE CORPORATION is recommended.

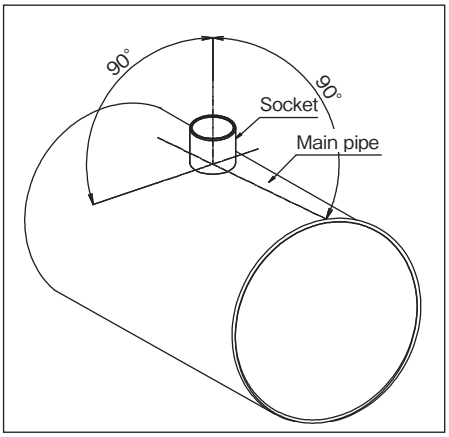


Fig.A

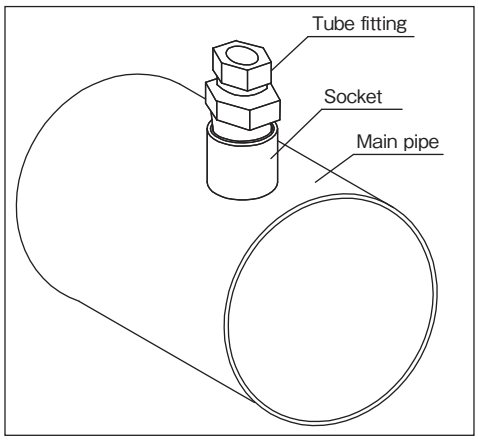


Fig.B

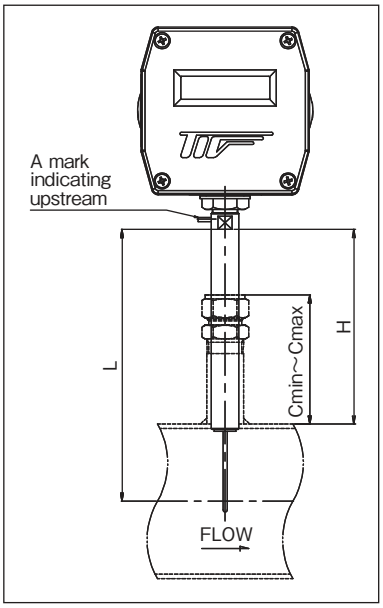


Fig.C

- Install the socket and the tube fitting so that the total length of them becomes in the range between C min and C max as shown at Fig. C.
- Install the flowmeter so that the length "H – C" becomes not less than 5 mm.
- Insert the sensor as shown at Fig. C. Place the upstream side of flowmeter in line with the upstream of main pipe as shown by the mark on the flowmeter.
- Fasten the tube fitting firmly.
- The sensor has no marking for its insertion. However the length H is acquired by subtracting the half length of the pipe diameter from the L dimension (L – pipe diameter/2). The marking at the position from the upstream mark calculated from "H - C" makes the installation easier as shown at Fig. D.

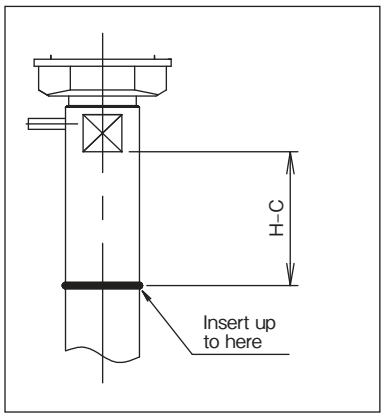


Fig.D

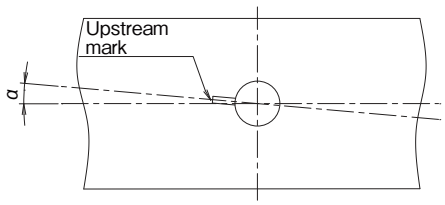


Fig.E

- The larger deviated angle of upstream mark on the sensor from the parallel line of flow line (pipe line) makes the accuracy worse. See Fig. E.
- Install the sensor in line with flow direction as precisely as possible using a proper jig. Make the angle "α" to be zero as shown at Fig. E.

Inline type for medium pipe sizes
SRT1200

OUTLINE

The in-line type SRT1200 with a sensor unit is directly connected to the pipes from 40 mm to 150 mm using process flanges like a spool piece. The welding of nozzle or tube fitting is not required.
* A straighter attached with the sensor increases the pressure loss. Consult us for details.

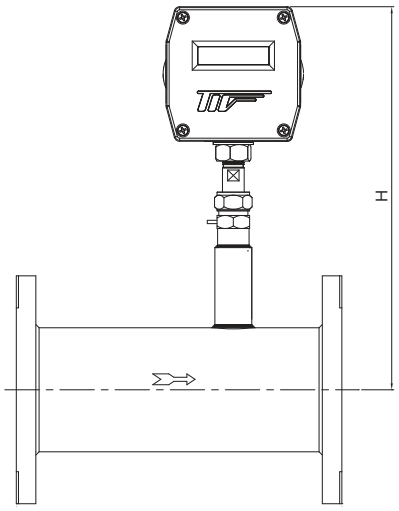
MODEL CODE

SRT1				–						–						Description
Shape	2			–						–						Inline type 40 mm to 150 mm
Display		1		–						–						Integral type : Sensor with a display
		2		–						–						Separate type : Sensor with a separately mounted display
Construction			W	–						–						Weatherproof construction
Meter size					F					–						40 mm
					G					–						50 mm
					H					–						65 mm
					J					–						80 mm
					K					–						100 mm
					L					–						125 mm
					M					–						150 mm
Material contacting gases						6				–						SUS316 as standard
						L				–						SUS316L
						9				–						Others
Process connection							1			–						Flange connection
							6			–						Flange connection + A straightener installed in series (Only for 40 to 150 mm)
							9			–						Others
Size and rating of flange connection								N		–						Other than flanges
								1		–						JIS 10K RF
								2		–						JIS 10K FF
								3		–						JIS 20K RF
								4		–						JIS 20K FF
								5		–						ANSI Class 150
								6		–						ANSI Class 300
								7		–						JPI Class 150
								8		–						JPI Class 300
								9		–						Special flanges other than above
Sensor guard									N	–						None, Fixed code
Power supply											D					20.4 to 27.6 V DC, 800 mA or more The power is supplied by others.
Analog output set on delivery from factory												1				4 to 20 mA DC without pressure compensation
												2				0 to 5 V DC without pressure compensation
												3				0 to 10 V DC without pressure compensation
												4				4 to 20 mA DC with pressure compensation
												5				0 to 5 V DC with pressure compensation
												6				0 to 10 V DC with pressure compensation
Length of an exclusive cable between sensor and converter													N			None for the integral type (Sensor with a converter)
													1			5 m
													2			10 m
													3			15 m
													4			20 m
													5			25 m
													6			30 m
													7			35 m
													8			40 m
													A			45 m
													B			50 m
													9			Others
Two inches pipe for installing converter														N		Not required because of either wall mounting or integral type
														1		Required
Others															N	None
															9	Yes. Consult us.

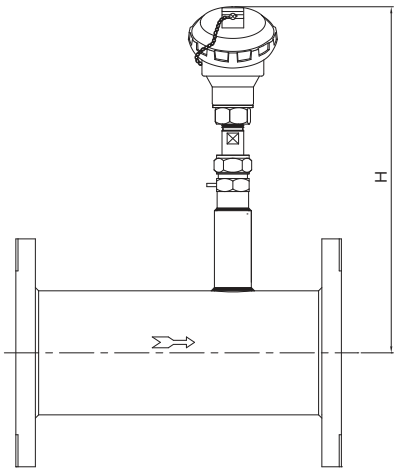
DIMENSIONS

[Inline type for medium pipe sizes] 40 mm to 150 mm

SRT121W Integral type



SRT122W Separate type



Size	L (mm)	Integral type H (mm)	Separate type H (mm)	Integral type approx. mass (kg)	Separate type approx. mass (kg)
40mm	300	300	268	5.5	5.0
50mm	300	300	268	6.5	6.0
65mm	300	300	268	8.2	7.7
80mm	300	300	268	8.4	7.9
100mm	300	300	268	11	10.5
125mm	300	300	268	15	14.5
150mm	300	300	268	18.5	18.5

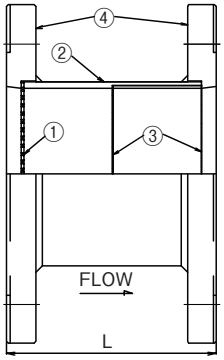
DIMENSIONS

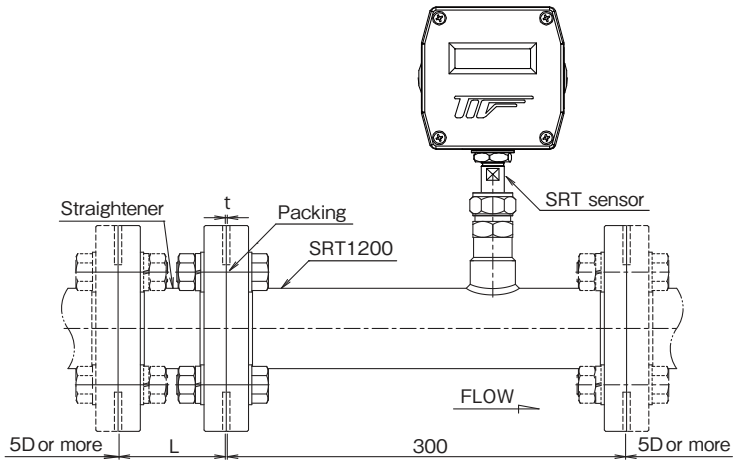
[Inline type for medium pipe sizes] 40 mm to 150 mm

Construction of straightener

No.	Part name	Material 1	Material 2	Material 3	Remarks
①	Perforated plate	SUS316	SUS316	SUS316	d=φ3 P=5
②	Body of straightener	SUS316	SUS316	SUS316L	
③	Mesh	SUS316	SUS316	SUS316	40 in mesh
④	Flange	SUS304	SUS316	SUS316L	

Size	40mm	50 mm	65 mm	80 mm	100 mm	125 mm	150 mm
L	80	80	90	100	130	150	190
t	1.6	2.8					





The straightener is delivered with the sensor assembled. Do not remove it.

FLOW RANGE AT FULL SCALE SRT1200

unit in m^3/h (nor)

Size	Air or Nitrogen AIR/N_2	Carbon dioxide CO_2	Oxygen O_2	Argon Ar	City gas 13A
40mm	50 to 780	39 to 780	50 to 750	62 to 780	47 to 482
50mm	63 to 1200	65 to 1200	70 to 1160	102 to 1200	60 to 740
65mm	90 to 2200	114 to 2200	87 to 2120	181 to 2200	77 to 1360
80mm	117 to 2900	149 to 2900	113 to 2800	235 to 2900	90 to 1790
100mm	200 to 4900	254 to 4900	193 to 4730	400 to 4900	124 to 3030
125mm	300 to 7500	381 to 7500	290 to 7240	600 to 7500	185 to 4600
150mm	425 to 10600	540 to 10600	410 to 10200	850 to 10600	260 to 6500

Size	Methane CH_4	Propane C_3H_8	Normal butane C_4H_{10}nor	Ammonia NH_3
40mm	55 to 490	18 to 444	15 to 370	50 to 711
50mm	70 to 750	29 to 684	24 to 570	64 to 1100
65mm	90 to 1380	51 to 1250	43 to 1050	82 to 2000
80mm	110 to 1820	67 to 1650	56 to 1380	107 to 2640
100mm	137 to 3070	114 to 2790	95 to 2330	180 to 4460
125mm	190 to 4700	170 to 4270	143 to 3570	270 to 6830
150mm	270 to 6650	240 to 6040	200 to 5040	380 to 9660

※Inform us whether the composition of mixed gases is in vol% or wt%.

Inline type for small pipe sizes
SRT1300

OUTLINE

The inline type SRT1300 with a sensor unit assembled into the precision casting body is directly connected to the pipes from 10 mm to 25 mm. The flowmeter of 10 mm, 15 mm or 20 mm has a flow straightener inside. The flowmeter of 25 mm has a flow straightener as an option or not.
* A straighter attached with the sensor increases the pressure loss. Consult us for details.

MODEL CODE

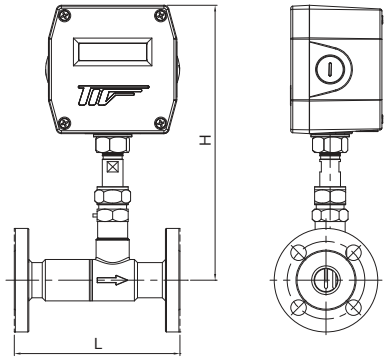
SRT1				–					–						Description
Shape	3			–					–						Inline type 10 mm to 25 mm
Display		1		–					–						Integral type : Sensor with a display
		2		–					–						Separate type : Sensor with a separately mounted display
Construction			W	–					–						Weatherproof construction
Meter size					A				–						10 mm with a straightener
					B				–						15 mm with a straightener
					C				–						20 mm with a straightener
					D				–						25 mm with a straightener
					E				–						25 mm without straightener
Material contacting gases						1			–						SCS14 as standard
						9			–						Others
Process connection							1		–						Flange
							2		–						Rc screw
							3		–						Tube connector
							4		–						VCR connector
							9		–						Others
Size and rating of flange connection								N	–						Other than flanges
								1	–						JIS 10K RF
								2	–						JIS 10K FF
								3	–						JIS 20K RF
								4	–						JIS 20K FF
								5	–						ANSI Class 150
								6	–						ANSI Class 300
								7	–						JPI Class 150
								8	–						JPI Class 300
								9	–						Special flanges other than above
Sensor guard									N	–					None, Fixed code
Power supply										D					20.4 to 27.6 V DC, 800 mA or more The power is supplied by others.
Analog output set on delivery from factory											1				4 to 20 mA DC without pressure compensation
											2				0 to 5 V DC without pressure compensation
											3				0 to 10 V DC without pressure compensation
											4				4 to 20 mA DC with pressure compensation
											5				0 to 5 V DC with pressure compensation
											6				0 to 10 V DC with pressure compensation
Length of an exclusive cable between sensor and converter												N			None for the integral type (Sensor with a converter)
												1			5 m
												2			10 m
												3			15 m
												4			20 m
												5			25 m
												6			30 m
												7			35 m
												8			40 m
												A			45 m
												B			50 m
												9			Others
Two inches pipe for installing converter													N		Not required because of either wall mounting or integral type
													1		Required
Others														N	None
														9	Yes. Consult us.

DIMENSIONS

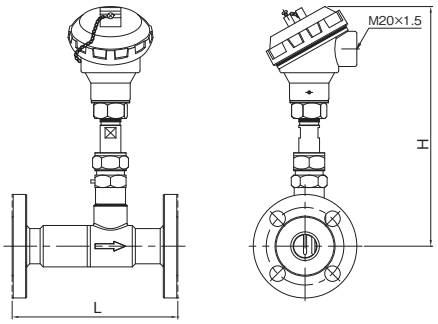
[Inline type for small pipe sizes]

Flange type

SRT131W Integral type



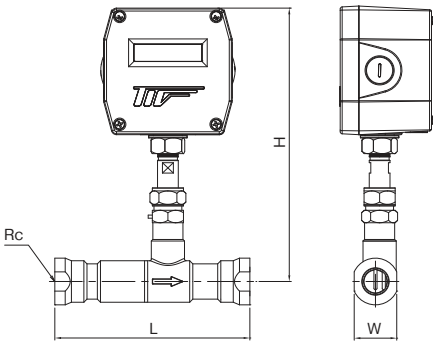
SRT132W Separate type



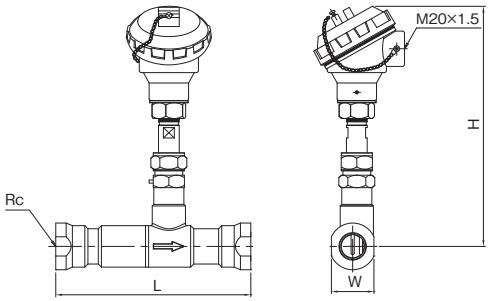
Size	L (mm)	Integral type H (mm)	Separate type H (mm)	Integral type approx. mass (kg)	Separate type approx. mass (kg)
10mm	160	256	223	3.5	2.5
15mm	160	256	223	3.6	2.6
20mm	160	256	223	3.9	2.9
25mm	160	256	223	4.7	3.7

Rc screw type

SRT131W Integral type



SRT132W Separate type



Size	L (mm)	Integral type H (mm)	Rc	W	Separate type H (mm)	Integral type approx.mass (kg)	Separate type approx.mass (mm)
10mm	180	256	3/8	27	223	3.2	2.2
15mm	186	256	1/2	30	223	3.3	2.3
20mm	188	256	3/4	41	223	3.4	2.4
25mm	195	256	1	46	223	4.1	3.1

FLOW RANGE AT FULL SCALE SRT1300

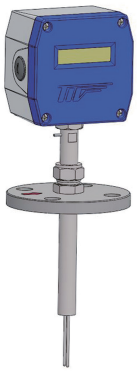
unit in m^3/h (nor)

Size	Air or Nitrogen AIR/N2	Carbon dioxide CO_2	Oxygen O_2	Argon Ar	City gas 13A
10mm	6.0 to 60	3.3 to 60	6.6 to 58	5.4 to 60	5.7 to 37
15mm	10.5 to 100	5.7 to 100	11.7 to 97	9.9 to 100	10.2 to 62
20mm	20.4 to 200	11.1 to 200	22.2 to 190	18.6 to 200	19.2 to 124
25mm	33 to 330	18 to 330	36 to 320	30 to 330	31 to 204

Size	Methane CH_4	Propane C_3H_8	Normal butane C_4H_{10}nor	Ammonia NH_3
10mm	6.6 to 38	1.8 to 34	1.2 to 29	6.0 to 55
15mm	11.7 to 63	3.2 to 57	2.1 to 48	10.5 to 91
20mm	22.2 to 125	6.3 to 114	4.2 to 95	20.4 to 182
25mm	36 to 207	10 to 188	6.9 to 157	33 to 301

※The flow range in full scale is expressed by a numeral without decimal point in m^3/h.
If the numeral has a decimal point in the unit of m^3/h, it will be expressed in the unit of L/min (nor) instead.
※Inform us whether the composition of mixed gases is in vol% or wt%.

Insertion type
SRT1100 with electrolytic polishing



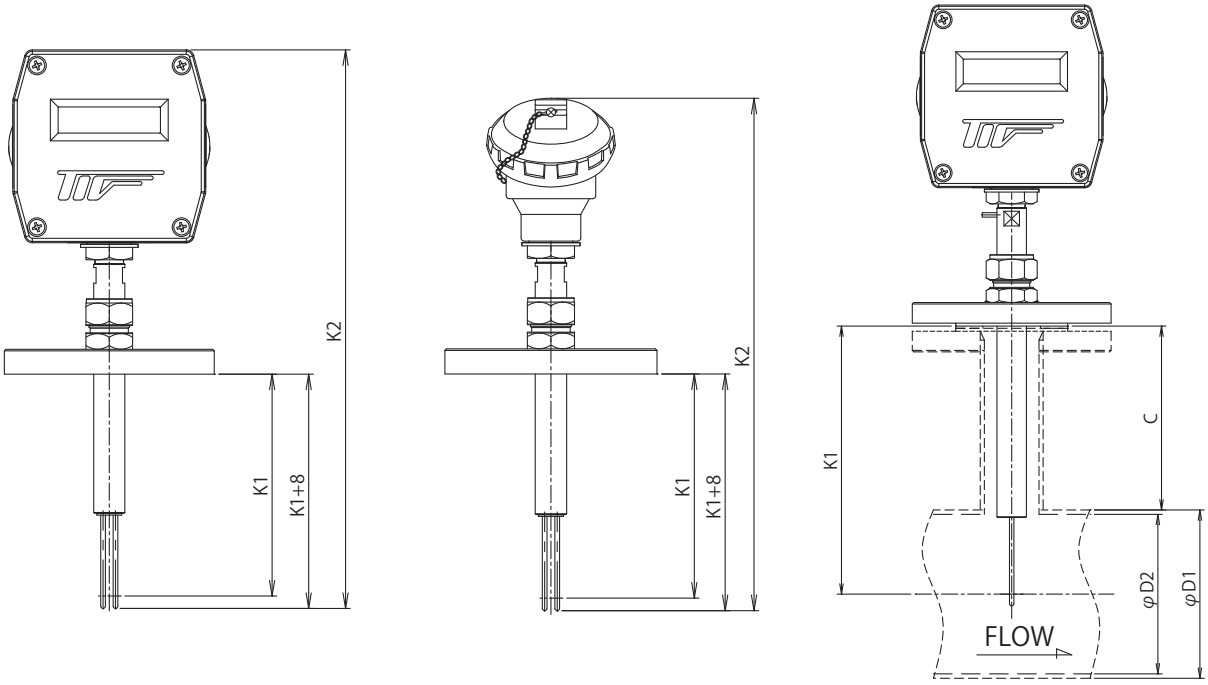
OUTLINE

The SRT1100 is an insertion type detector with electrolytic polishing. The gas contacting parts are manufactured from EP and BA grade materials. The SRT1100 is suitable for gas supply lines for semi-conductor production facilities.

MODEL CODE

SRT1				–						–						Description
Shape	1			–						–						Insertion type (40mm to 500mm)
Display		1		–						–						Integral type: Sensor with a display
		2		–						–						Separate type: Sensor with a separately mounted display
Construction			B	–						–						Weatherproof, BA grade, Rmax ≤ 4.5μm
			E	–						–						Weatherproof, EP grade, Rmax ≤ 0.7μm
Meter size (Probe length)					P					–						150 mm
					Q					–						250 mm
					R					–						400 mm
Material contacting gases						6				–						SUS316 as standard
						L				–						SUS316L
Connection							1			–						Flange connection
Flange								1		–						JIS 10K 32A RF
								3		–						JIS 10K 40A RF
								5		–						JIS 10K 50A RF
								7		–						JIS 10K 25A RF
Sensor guard									N	–						None
Power supply											D					20.4 to 27.6 V DC, 800 mA or more (The power is supplied by others)
Analog output & pressure compensation												1				4 to 20 mADC without pressure compensation
												2				0 to 5 VDC without pressure compensation
												3				0 to 10 VDC without pressure compensation
												4				4 to 20 mADC with pressure compensation
												5				0 to 5 VDC with pressure compensation
												6				0 to 10 VDC with pressure compensation
Length of an exclusive cable between sensor and converter													N			None for the integral type (Sensor with a converter)
													1			5 m
													2			10 m
													3			15 m
													4			20 m
													5			25 m
													6			30 m
													7			35 m
													8			40 m
													A			45 m
													B			50 m
													9			Others
Two inches pipe for installing converter														N		Not required because of either wall mounting or integral type
														1		Required
Others															N	None
															9	Yes. Consult us.

DIMENSIONS



Size	Meter size (Probe length)	Standard length* K1 (mm)	Integral type K2 (mm)	Separate type K2 (mm)	Integral type mass (kg)	Separate type mass (kg)
40 mm to 65 mm	P	95	410	378	Approx. 3.5kg	Approx. 2.5kg
40 mm to 300 mm	Q	182	560	528	Approx. 3.6kg	Approx. 2.6kg
40 mm to 500 mm	R	333	710	678	Approx. 3.85kg	Approx. 2.85kg

*Standard length is the one recommended by Tokyo Keiso Co., Ltd. Inform us of dimension "K1" or "C".

FLOW RANGE AT FULL SCALE SRT1100 (BA/EP grade)

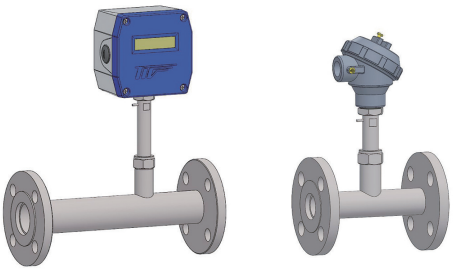
unit in m^3/h (nor)

Size	Air or Nitrogen AIR/N_2	Carbon dioxide CO_2	Oxygen O_2	Argon Ar	City gas 13A
50 mm	63 to 1000	65 to 1000	70 to 1000	102 to 1000	60 to 660
65 mm	90 to 2000	114 to 2000	87 to 1900	181 to 2000	77 to 1200
80 mm	117 to 2600	149 to 2600	113 to 2500	235 to 2600	90 to 1600
100 mm	200 to 4400	254 to 4400	193 to 4200	400 to 4400	124 to 2700
125 mm	300 to 6750	381 to 6750	290 to 6500	600 to 6750	185 to 4100
150 mm	425 to 9500	540 to 9500	410 to 9100	850 to 9500	260 to 5800
200 mm	753 to 16900	957 to 16900	727 to 16200	1520 to 16900	465 to 10400
250 mm	1140 to 25600	1450 to 25600	1100 to 24700	2290 to 25600	700 to 15800
300 mm	1625 to 36500	2070 to 36500	1570 to 35200	3260 to 36500	1000 to 22500
350 mm	2026 to 45500	2570 to 45500	1960 to 43900	4070 to 45500	1250 to 28000
400 mm	2460 to 55300	3130 to 55300	2380 to 48500	4950 to 55300	1520 to 34200
450 mm	3300 to 70100	4200 to 70100	3190 to 67600	6630 to 70100	2040 to 43200
500 mm	3870 to 87000	4920 to 87000	3740 to 84000	7770 to 104000	2390 to 53700

Size	Methane CH_4	Propane C_3H_8	Normal butane C_4H_{10}nor	Ammonia NH_3
50 mm	70 to 670	29 to 600	24 to 500	64 to 900
65 mm	90 to 1200	51 to 1100	43 to 900	82 to 1800
80 mm	110 to 1600	67 to 1400	56 to 1200	107 to 2300
100 mm	137 to 2700	114 to 2500	95 to 2000	180 to 4000
125 mm	190 to 4200	170 to 3800	143 to 3200	270 to 6100
150 mm	270 to 5900	240 to 5400	200 to 4500	380 to 8600
200 mm	470 to 10600	430 to 9600	360 to 8000	680 to 15400
250 mm	720 to 16000	650 to 14000	540 to 12000	1040 to 23300
300 mm	1020 to 22900	930 to 20000	770 to 17000	1480 to 33300
350 mm	1270 to 28500	1150 to 25000	960 to 21000	1850 to 41400
400 mm	1550 to 34700	1400 to 31000	1170 to 26000	2240 to 50400
450 mm	2070 to 43900	1880 to 39000	1570 to 33000	3000 to 63900
500 mm	2430 to 54600	2200 to 49000	1840 to 41000	3530 to 79300

Note: The flow ranges for the above products are different from those for the standard SRT1100 products.

Insertion type
SRT1200 with electrolytic polishing



OUTLINE

The SRT1200 is an insertion type detector with electrolytic polishing. The gas contacting parts are manufactured from EP and BA grade materials. The SRT120 suitable for gas supply lines for semi-conductor production facilities.

MODEL CODE

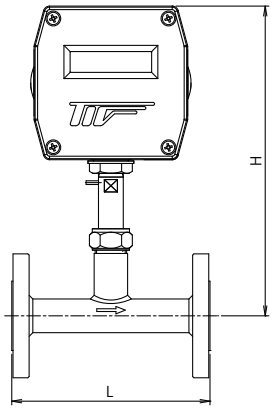
SRT1				–						–						Description
Shape	2			–						–						Inline type 20 mm to 150 mm
Display		1		–						–						Integral type: Sensor with a display
		2		–						–						Separate type: Sensor with a separately mounted display
Construction			B	–						–						Weatherproof, BA grade, Rmax ≤ 4.5μm
			E	–						–						Weatherproof, EP grade, Rmax ≤ 0.7μm
Meter size (Probe length)					C					–						20 mm
					D					–						25 mm
					E					–						32 mm
					F					–						40 mm
					G					–						50 mm
					H					–						65 mm
					J					–						80 mm
					K					–						100 mm
					L					–						125 mm
					M					–						150 mm
Material contacting gases						6				–						SUS316 as standard
						L				–						SUS316L
Connection							1			–						Flange connection
Flange								1		–						JIS 10K RF
								3		–						JIS 20K RF
Sensor guard									N	–						None
Power supply											D					20.4 to 27.6 VDC, 800 mA or more (The power is supplied by others)
Analog output & pressure compensation												1				4 to 20 mADC without pressure compensation
												2				0 to 5 VDC without pressure compensation
												3				0 to 10 VDC without pressure compensation
												4				4 to 20 mADC with pressure compensation
												5				0 to 5 VDC with pressure compensation
												6				0 to 10 VDC with pressure compensation
Length of an exclusive cable between sensor and converter													N			None for the integral type (Sensor with a converter)
													1			5 m
													2			10 m
													3			15 m
													4			20 m
													5			25 m
													6			30 m
													7			35 m
													8			40 m
													A			45 m
													B			50 m
													9			Others
Two inches pipe for installing converter														N		Not required because of either wall mounting or integral type
														1		Required
Others															N	None
															9	Yes. Consult us.

Note: The SRT1200 series EP/BA products do not support an external straightener.

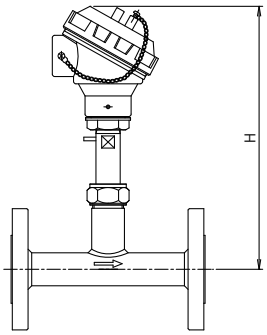
DIMENSIONS

[Inline type] 20mm to 150mm

SRT121W Integral type



SRT122W Separate type



Size	L mm	Integral type H (mm)	Separate type H (mm)	Integral type mass (kg)	Separate type mass (kg)
20 mm	160	250	218	Approx. 3.2kg	Approx. 2.2kg
25 mm	160	250	218	Approx. 4.1kg	Approx. 3.1kg
32 mm	300	300	268	Approx. 5.2kg	Approx. 4.2kg
40 mm	300	300	268	Approx. 5.5kg	Approx. 4.5kg
50 mm	300	300	268	Approx. 6.5kg	Approx. 5.5kg
65 mm	300	300	268	Approx. 8.2kg	Approx. 7.2kg
80 mm	300	300	268	Approx. 8.4kg	Approx. 7.4kg
100 mm	300	300	268	Approx. 11kg	Approx. 10kg
125 mm	300	300	268	Approx. 15kg	Approx. 14kg
150 mm	300	300	268	Approx. 18.5kg	Approx. 17.5kg

FLOW RANGE AT FULL SCALE SRT1200

unit in m^3/h (nor)

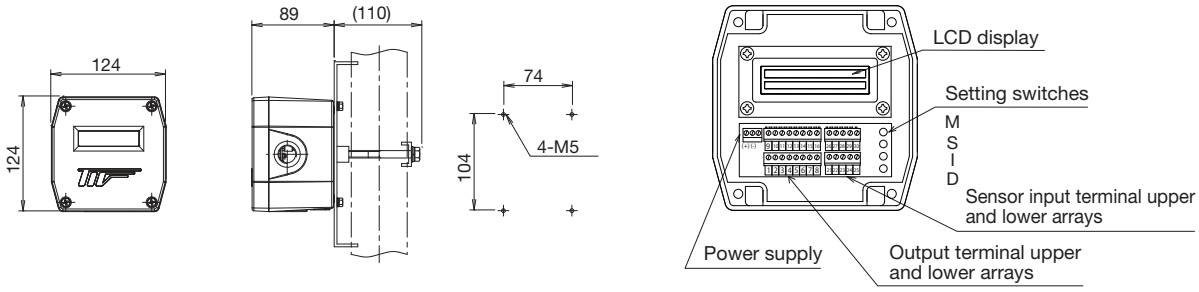
Size	Air or Nitrogen AIR/N_2	Carbon dioxide CO_2	Oxygen O_2	Argon Ar	City gas 13A
20 mm	20.4 to 180	11.1 to 180	22.2 to 170	18.6 to 180	19.2 to 110
25 mm	33 to 290	18 to 290	36 to 280	30 to 290	31 to 180
32 mm	36 to 490	30 to 490	38 to 470	44 to 550	34 to 238
40 mm	50 to 700	39 to 700	50 to 750	62 to 700	47 to 482
50 mm	63 to 1000	65 to 1000	70 to 1160	102 to 1000	60 to 740
65 mm	90 to 1900	114 to 1900	87 to 2120	181 to 1900	77 to 1360
80 mm	117 to 2600	149 to 2600	113 to 2800	235 to 2600	90 to 1790
100 mm	200 to 4400	254 to 4400	193 to 4730	400 to 4400	124 to 3030
125 mm	300 to 6700	381 to 6700	290 to 7240	600 to 6700	185 to 4600
150 mm	425 to 9500	540 to 9500	410 to 10200	850 to 9500	260 to 6500

Size	Methane CH_4	Propane C_3H_8	Normal butane C_4H_{10}nor	Ammonia NH_3
20 mm	22.2 to 110	6.3 to 100	4.2 to 85	20.4 to 160
25 mm	36 to 180	10 to 160	6.9 to 140	33 to 270
32 mm	40 to 250	14 to 177	12 to 150	38 to 350
40 mm	55 to 490	18 to 444	15 to 370	50 to 711
50 mm	70 to 750	29 to 684	24 to 570	64 to 1100
65 mm	90 to 1380	51 to 1250	43 to 1050	82 to 2000
80 mm	110 to 1820	67 to 1650	56 to 1380	107 to 2640
100 mm	137 to 3070	114 to 2790	95 to 2330	180 to 4460
125 mm	190 to 4700	170 to 4270	143 to 3570	270 to 6830
150 mm	270 to 6650	240 to 6040	200 to 5040	380 to 9660

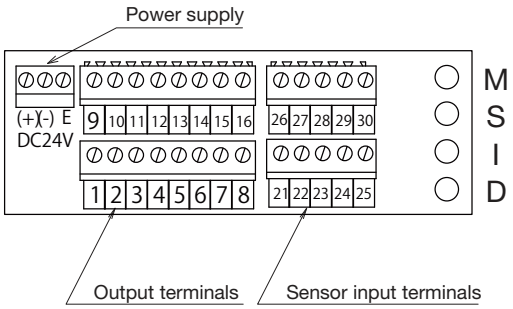
DIMENSIONS

[Separate type converter]

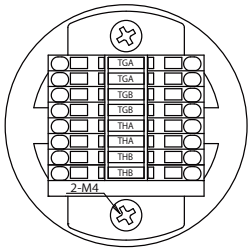
2 inch pipe mount **Wall mount** **Converter internal**



Converter terminal No.



Terminal in the terminal box of separate type converter



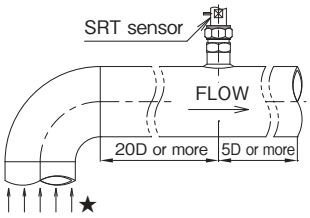
EXPLANATION OF TERMINALS

Name	Terminal No.	Polarity	Description
Power supply terminals	–	+	24 V DC ±10 %
	–	–	
	–	Earth	Earth protection
Output terminals	1	+	24 V DC ±10% power supply
	2	GND	
	3	+	RS-485
	4	–	
	5	+	Pressure signal 4 to 20 mA DC
	6	–	
	7	+	Analog output 4 to 20 mA DC, 0–5 V DC, 0–10 V DC
	8	–	
	9	+	High Alarm
	10	–	
	11	+	Low Alarm
	12	–	
	13	+	Abnormal Alarm
	14	–	
	15	+	Totalizing flow pulse output
	16	–	
Sensor input terminals	21	THA	Heated sensor
	22	THA	
	23	THB	
	24	THB	
	25	Earth	Earth protection
	26	TGA	Temperature sensor
	27	TGA	
	28	TGB	
	29	TGB	
	30		Not used

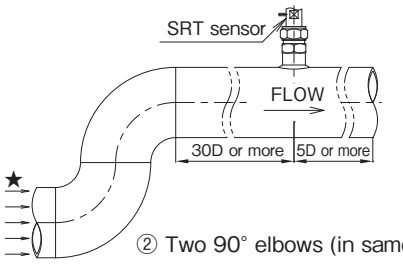
Note: See PRODUCT SPECIFICATION or Operation manual for details of terminals.

REQUIRED STRAIGHT LENGTH

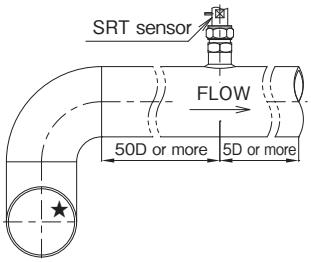
1. SRT1000 without the Flow Rectifier



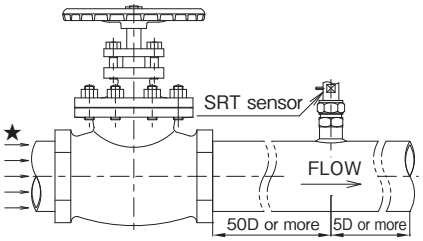
① Single 90° elbow;



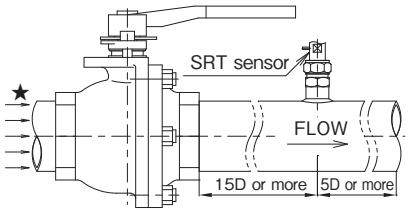
② Two 90° elbows (in same plane);



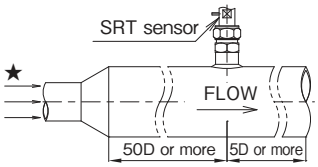
③ Two 90° elbows (different planes);



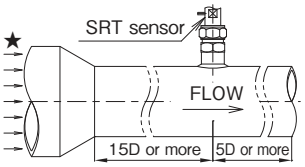
④ Downstream of a control valve;
⑤ Downstream of a partition valve;



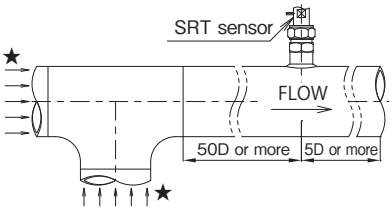
⑥ Downstream of a fully open full bore type ball valve;



⑦ Expansion;



⑧ Reduction;



⑨ In other cases

★ The velocity distribution in the pipe is a fully developed turbulent flow or a uniform flow.

Case	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Straight Pipe of Upstream	20D	30D	50D			15D	50D	15D	50D
Straight Pipe of Downstream	5D								

D : Inside diameter of process piping.

2. SRT1000 with the Flow Rectifier

We recommend to install straight runs of 5D or more in upstream and downstream of Sensor.

FOR INQUIRY

Model code Designate the code from model code table of each type.	SRT1□□□-□□□□□-□□□□□
Name of gas Volume % of the mixed gases	
Full scale flow rate	□m^3/h(nor) □L/min(nor) □m^3/min(nor)
Pressure	□MPa □kPa
Temperature	˚C
Remarks	

* Specification is subject to change without notice.

TOKYO KEISO CO., LTD.
Head Office : Shiba Toho Building, 1-7-24 Shibakoen, Minato-ku, Tokyo 105-8558
Tel : +81-3-3431-1625 (KEY) ; Fax : +81-3-3433-4922
e-mail : overseas.sales@tokyokeiso.co.jp ; URL : https://www.tokyokeiso.co.jp